

# 中華民國國家標準

## C N S

### 用戶端能源管理系統與電力管理系統間之 系統介面－第 2 部：使用案例及要求事項

**Systems interface between customer  
energy management system and the power  
management system – Part 2 : Use cases  
and requirements**

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## **前言**

本標準係依據 2015 年發行之第 1.0 版 IEC TR 62746-2，不變更技術內容，制定成為中華民國國家標準者。

本標準係依標準法之規定，經國家標準審查委員會審定，由主管機關公布之中華民國國家標準。

依標準法第四條之規定，國家標準採自願性方式實施。但經各該目的事業主管機關引用全部或部分內容為法規者，從其規定。

本標準並未建議所有安全事項，使用本標準前應適當建立相關維護安全與健康作業，並且遵守相關法規之規定。

本標準之部分內容，可能涉及專利權、商標權與著作權，主管機關及標準專責機關不負責任何或所有此類專利權、商標權與著作權之鑑別。



## 1. 適用範圍

智慧電網與智慧家庭、智慧建築及智慧工業作法之成功與互性息息相關，此意味智慧電網與家庭/建築/工業環境中之所有智慧裝置，於定義的互運性方面，對訊息及資料有共同的理解(從廣義上而言，不論其是否能源相關訊息、管理訊息或資訊性訊息)。

The success of the Smart Grid and Smart Home/Building/Industrial approach is very much related to interoperability, which means that Smart Grid and all smart devices in a Home/Building/Industrial environment have a common understanding of messages and data in a defined interoperability area (in a broader perspective, it does not matter if it as an energy related message, a management message or an informative message).

矛盾的是，現今各場所被不同的網路及獨立裝置所覆蓋(如圖 2 所示)。

In contradiction, today's premises are covered by different networks and stand alone devices (see Figure 2).

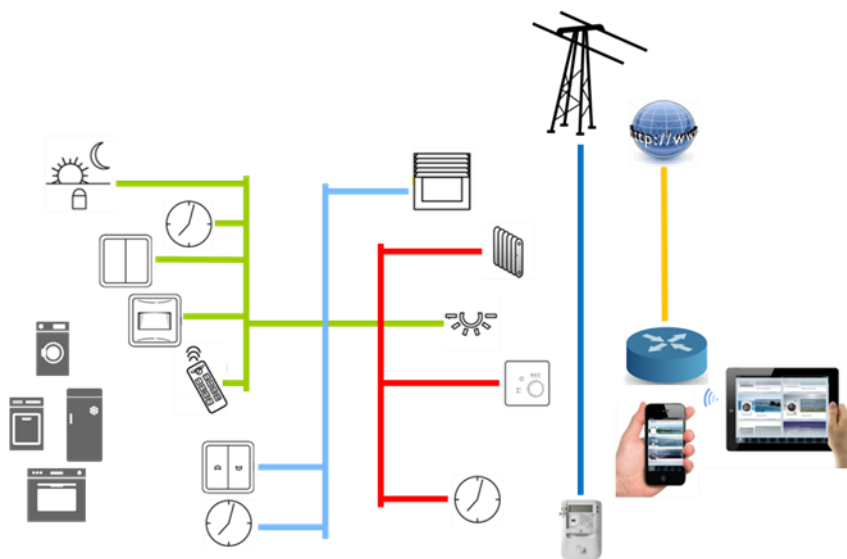


圖 2 現今的智慧環境

Figure 2 – Smart environment as of today

本標準之範圍係描述互運性的主要支柱，有助於定義此等涵蓋智慧電網與智慧家庭、建築/工業區域間，整個鏈接之介面及訊息(如圖 3 所示)。

The scope of this technical report is to describe the main pillars of interoperability to assist different Technical Committees in defining their interfaces and messages covering the whole chain between a Smart Grid and Smart Home/Building/Industrial area (see Figure 3).

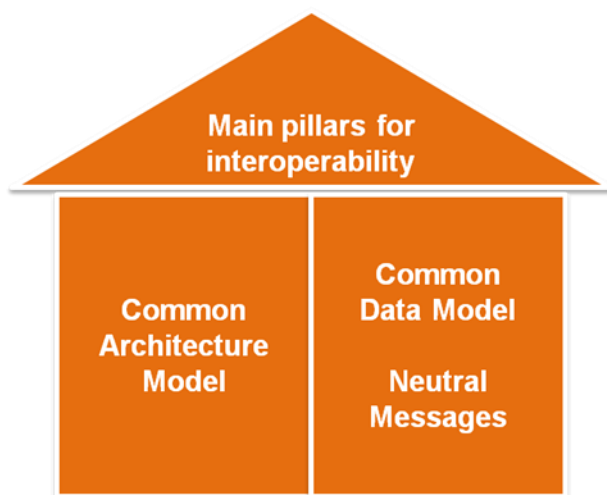


圖 3 互運性要求事項

Figure 3 – Requirements for interoperability

<<圖 3 中譯：內互運性主要支柱；共同架構模型；共同資料模型；中性訊息>>

本標準之主題為：

- 從邏輯觀點描述架構模型。
- 描述一組使用者經歷，此等描述關於能源彈性與需求面管理相關的多種情況，並概述未來可能出現的智慧建築和智慧家庭情境。此用戶事件集沒有列出所有房屋和建築物(能源)管理可能性的企圖，而是作為一組示例，用作使用案例中的輸入並檢查使用案例集是否完整；
- 根據用戶事件和架構描述一組使用案例，使用案例描述了識別架構元素之間的通信的情境；
- 透過描述對要交換的訊息和資訊的要求事項，進一步詳細說明使用案例中確定的通信。

本標準告也可以用作進一步智慧家庭解決方案的藍圖，例如遠端控制，遠端監控，居家環境助理等。

The main topics of this technical report are :

- To describe an architecture model from a logical point of view;
- To describe a set of user stories that describe a number of situations related to energy flexibility and demand side management as well as an outline of potential upcoming Smart Building and Smart Home scenarios. The set of user stories does not have the ambition to list all home and building (energy) management possibilities, but is meant as a set of examples that are used as input in use cases and to check that the set of use cases is complete;
- To describe a set of use cases based on the user stories and architecture. The use cases describe scenarios in which the communication between elements of the

architecture are identified;

- To further detail the communication, identified in the use cases, by describing the requirements for messages and information to be exchanged.

This technical report can also be used as a blue print for further smart home solutions like remote control, remote monitoring, ambient assistant living and so forth.

## 2. 引用標準

下列標準因本標準所引用，成為本標準之一部分。有加註年分者，適用該年分之版次，不適用於其後之修訂版(包括補充增修)。無加註年分者，適用該最新版(包括補充增修)。

IEC 62746-3:2015	Systems interface between customer energy management system and the power management system – Part 3: Architecture.
IEC 62559-2:2015	Use case methodology – Part 2: Definition of the templates for use cases, actor list and requirements list.
IEC 62390:2005	Common automation device – Profile guideline.

## 3. 術語、定義及縮寫

### 3.1 用語及定義

下列術語及定義適用於本標準：

#### 3.1.1 使用案例(use case)

##### 3.1.1.1 使用案例(use case)

系統(或其他個體)能執行，與系統參與者互動之一系列動作(包括變體類別規格。  
class specification of a sequence of actions, including variants, that a system (or other entity) can perform, interacting with actors of the system

##### 3.1.1.2 使用案例(use case)

描述所探討系統與其外部參與者之間與特定目標相關的可能交互作用順序。  
備考：使用案例是對各個參與者執行之 1 或多項功能的描述。  
description of the possible sequences of interactions between the system under discussion and its external actors, related to a particular goal.

Note 1 to entry: A use case is the description of one or several functions performed by the respective actors.

#### 3.1.2 使用案例範本(use case template)

允許在預定義欄位中，對使用案例進行結構化描述之表格。  
form which allows the structured description of a use case in predefined fields

#### 3.1.3 叢集(cluster)

具有相似背景或屬於一個系統或一個概念描述的一組使用案例。  
group of use cases with a similar background or belonging to one system or one conceptual description

#### 3.1.4 高階使用案例(high level use case)

描述一般需求，想法或概念的使用案例，與特定的技術實現(如結構化解決方案)無關。

use case which describes a general requirement, idea or concept independently from a specific technical realization like an architectural solution

#### 3.1.5 主要使用案例(primary use case)

描述業務流程(部分)詳細功能的使用案例。

備考：主要使用案例可以與一個主要目標或功能相關，可以對映到一個架構解決方案。

use cases which describe in detail the functionality of (a part of) a business process

Note 1 to entry： Primary use cases can be related to a primary goal or function which can be mapped to one architectural solution.

#### 3.1.6 二級使用案例(secondary use case)

基本使用案例，可由其他幾個主要使用案例使用。

例：通訊功能。

elementary use case which may be used by several other primary use cases

EXAMPLE Communication functions.

#### 3.1.7 通用使用案例(generic use case)

被廣泛接受用於標準化，通常在不依專案或技術特定解決方案的情況下收集，並調和不同的實際使用案例。

use case which is broadly accepted for standardization, usually collecting and harmonizing different real use cases without being based on a project or technological specific solution

#### 3.1.8 專業使用案例(specialized use case)

使用特定技術解決方案/實現之使用案例

例：特定介面協議之使用案例。

use case which is using specific technological solutions/implementations

EXAMPLE Use case with a specific interface protocol.

#### 3.1.9 個別使用案例(individual use case)

專用於特定專案或公司/組織內之使用案例

use case which is used specific for a project or within a company/organization

#### 3.1.10 情境(scenario)

可能的相互作用順序。

備考：情境在使用案例模板中，用以定義詳細描述序列中之幾種可能路線。

possible sequence of interactions

Note 1 to entry： Scenario is used in the use case template defining one of

several possible routes in the detailed description of sequences.

#### 3.1.11 活動步驟(activity step)

情境中的一個基本步驟，代表使用案例中最詳細的交互描述級別。

the one elementary step within a scenario representing the most granular description level of interactions in the use case

#### 3.1.12 儲存庫(repository)

可以存儲諸如使用案例之類資訊的位置(使用案例管理儲存庫)。

place where information like use cases can be stored (Use Case Management Repository)

#### 3.1.13 使用案例管理儲存庫(Use Case Management Repository)

用於編輯，維護與管理使用案例的資料庫，基於給定的使用案例模板。

備考：UCMR 被設計為標準化委員會的協作平台，除其他功能外，還具有作為 UML 模型或文本模板的導出功能。

database for editing, maintenance and administration of use cases which are based on a given use cases template

Note 1 to entry : The UCMR is designed as collaborative platform for standardization committees, inter alia equipped with export functionalities as UML model or text template.

#### 3.1.14 行為者 Actor

通訊和互動的實體。

備考 1. 此等參與者可以包括人員、軟體應用程式、系統及資料庫，甚至電力系統本身。

備考 2. 在行為者列表中，ENTSO-E 角色模型考慮一般行為者與技術系統行為者。

entity that communicates and interacts

Note 1 to entry: These actors can include people, software applications, systems, databases, and even the power system itself.

Note 2 to entry : In the actor list the ENTSO-E role model, generic actors and technical system actors are considered.

#### 3.1.15 行為者[外部] (actor [external])

與正在討論的系統(系統為“黑箱”)具有行為與互動以實現特定目標的實體(如圖 4 所示)。

entity having behavior and interacting with the system under discussion (system as ‘black box’) to achieve a specific goal (see Figure 4)

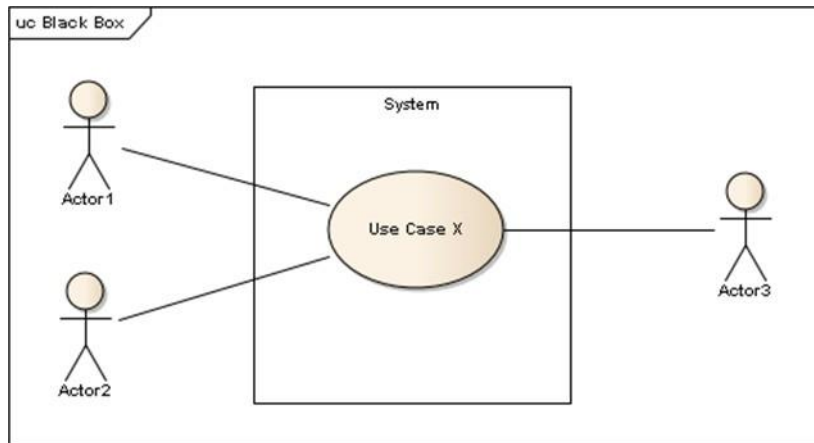


圖 4 外部的行為者定義

Figure 4 – External actor definition

### 3.1.16 行為者 [內部](actor [internal])

正在討論的系統中(系統中的角色；系統為“白箱”)起作用以實現特定目標的實體(如圖 5 所示)。

entity acting within the system under discussion (actor within the system; system as ‘white box’) to achieve a specific goal (see Figure 5)

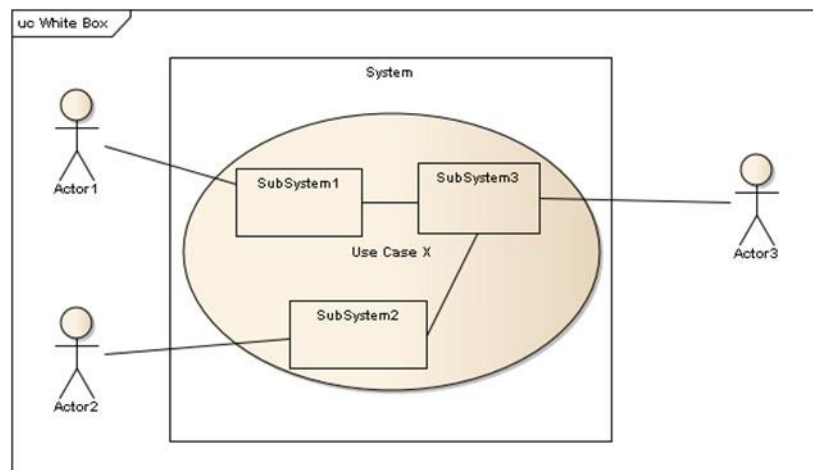


圖 4 內部行為者定義

Figure 5 – Internal actor definition

### 3.1.17 角色 (Role)

#### 3.1.17.1 角色 (role)

行為者與正在討論的系統互動扮演的角色。

備考：法律或一般定義的外部行為者可以透過其角色來命名和標識。

role played by an actor in interaction with the system under discussion

Note 1 to entry: Legally or generically defined external actors may be named and identified by their roles.

#### 3.1.17.2 角色(role)

當事人預期之外的行為。

例：合法定義的市場參與者(例如網路運營商，客戶)、代表一群可能角色的通用角色(例如可調度運營商)，或通用流程及使用案例描述所需之人為定義主體。

備考：當事人不能共享角色。

external intended behavior of a party

EXAMPLES A legally defined market participant (e.g. grid operator, customer), a generic role which represents a bundle of possible roles (e.g. flexibility operator) or an artificially defined body needed for generic process and use case descriptions.

Note 1 to entry: A party cannot share a role.

#### 3.1.18 架構(Architecture)

fundamental concepts or properties of a system in its environment embodied in its elements, relationships, and in the principles of its design and evolution  
系統在其環境中的基本概念或屬性，體現在其元素、關係以及設計與演化的原理中。

#### 3.1.19 系統(System)

元件及系統的典型產業配置，基於單一體系架構，用於一組特定的使用案例。  
typical industry arrangement of components and systems, based on a single architecture, serving a specific set of use cases.

#### 3.1.20 協調技術委員會 (coordinating TC)

標準化組織內之技術委員會，負責議定使用案例的責任，同時讓其他感興趣和有關的技術委員會參與。

備考：例如，職責可能包括使用案例之進一步詳細說明，分析，維護及協調。  
technical committee within a standardization organization taking over the responsibility for agreed use cases while involving other interested and concerned technical committees

Note 1 to entry: For example the responsibility might include further detailing, analysis, maintenance and harmonization of the use case

#### 3.1.21 參與技術委員會(involved TC)

標準化組織內對通用使用案例感興趣之技術委員會。

technical committee within a standardization organization with an interest in a generic use case

### 3.1.22 彈性(Flexibility)

彈性資源部署(需量、儲能、發電)之一般概念，提供輔助服務以電網穩定和/或市場優化(改變耗電量、減少電力饋入、提供無效功率等)。

general concept of elasticity of resource deployment (demand, storage, generation) providing ancillary services for the grid stability and/or market optimization (change of power consumption, reduction of power feed-in, reactive power supply, etc.)

### 3.1.23 彈性報價標單 flexibility offer

flex-offer

報價標單由連接到電網的角色發布，並以細粒度的方式提供彈性剖繪，即時動態調度，例：當再生能源的發電量偏離能源系統的預測發電量時。

備考：彈性報價標單開始協商過程。

offer issued by roles connected to the grid and providing flexibility profiles in a fine-grained manner dynamically scheduled in near real-time, e.g. in case when the energy production from renewable energy sources deviates from the forecasted production of the energy system

Note 1 to entry : Flexibility offer starts a negotiation process.

### 3.1.24 彈性運營商 flexibility operator

通用角色，將客戶角色與其可能為市場和電網角色聯繫在一起，提供彈性的可能性；如 DSO 公司，能源服務公司(ESCO)或能源供應商等許多利益相關者可以承擔的一般角色。

generic role which links the role customer and its possibility to provide flexibilities to the roles market and grid; generic role that could be taken by many stakeholders, such as a DSO company, an Energy Service Company (ESCO) or an energy supplier

### 3.1.25 市場 market

由市場運營商運營之開放式平台，依市場參與者下達訂單及報價標單的需求進行能源及電力交易，在清算過程中通常由市場運營商決定接受的報價標單。

例：能源、平衡功率/能量、容量或一般輔助服務。

open platform operated by a market operator trading energy and power on requests of market participants placing orders and offers, where accepted offers are decided in a clearing process, usually by the market operator

EXAMPLES Energy, balancing power/energy, capacities or in general ancillary services.

### 3.1.26 智慧電網連接點(Smart Grid Connection Point (SG CP))

電網及市場範圍面向客戶角色(例:家庭、建築、工廠)間的邊界。

borderline between the area of grid and markets towards the role customer (e.g. households, building, industry)



**3.1.27 客戶能源管理者(Customer Energy Manager, CEM))**

客戶角色之內部自動化功能，可依客戶之偏好，依外來信號及內部彈性進行優化。

CEM 包括用於接收與發送訊息的語義對映，在 CEM 連接的設備之間。

例：需量反應作法使用變動費率以激勵客戶於不同的時間範圍內轉移消費(即負載轉移)。於客戶側，信號會依預設之客戶偏好(例如成本考量或減碳)自動評估，並啟動 1 或多個連接設備的適當功能。

internal automation function of the role customer for optimizations according to the preferences of the customer, based on signals from outside and internal flexibilities.

CEM includes a semantic mapping for received and sent messages between CEM-connected devices.

EXAMPLE A demand response approach uses variable tariffs to motivate the customer to shift consumption in a different time horizon (i.e. load shifting). On customer side the signals are automatically evaluated according to the preset customer preferences like cost optimization or CO2 savings and appropriate functions of one or more connected devices are initiated.

**3.1.28 智慧型裝置 smart device**

能與 CEM 互動，並能依其功能進行整體能效優化管理之裝置。

device which is capable to interact with a CEM and is able to be managed in an overall energy efficiency optimization according to its capabilities

**3.1.29 交通燈概念 traffic light concept**

一方面，描述在電網面(紅色階段)、市場面(綠色階段)以及兩者相互關係(黃色階段)之彈性使用的關係，另一方面是評估電網狀態(紅色、黃色、綠色)並對相關市場角色訊息提供資訊之使用案例。

on one hand a concept which describes the relation between the use of flexibilities on the grid side (red phase) and the market side (green phase) and the interrelation between both (yellow phase), on the other hand a use case which evaluate the grid status (red, yellow, green) and provides the information towards the relevant market roles.

**3.1.30 需求面管理( demand side management, DSM)**

load management 負載管理

**3.1.30.1 需求面管理(DSM)demand side management (DSM)**

負載管理 load management

由市場角色(例：公用事業公司、用戶群代表)控制電力需量的措施，作為運轉電網的措施。

measures taken by market roles (e.g. utilities, aggregator) controlling electricity demand as measure for operating the grid.

### 3.1.30.2 需求面管理(DSM)demand side management (DSM)

負載管理 load management

影響最終用戶耗電量或使用方式的過程。

process that is intended to influence the quantity or patterns of use of electric energy consumed by end-use customers.

### 3.1.31 需量反應(demand response)

#### 3.1.31.1 需量反應(demand response, DR)

描述透過成本、生態資訊或其他因素激勵客戶，以引起其改變耗電或饋入型態之概念。

concept describing an incentivizing of customers by costs, ecological information or others in order to initiate a change in their consumption or feed-in pattern

#### 3.1.31.2 需量反應(demand response, DR)

因應供電狀況管理電力需量而採取的行動。

action resulting from management of the electricity demand in response to supply conditions

### 3.1.32 功能特定剖繪(function specific profile)

資料集，對資料之結構及型式有所要求。

備考：此包含對剖繪所載資訊的描述，使該剖繪在不同實例之間的對映成為可能，並使語義損失最小。

set of data with requirements on the structure and type of data

Note 1 to entry: This contains a description of the information carried by the profile such that a mapping between different instantiations of that profile is possible with a minimum of semantic loss.

### 3.1.33 量 Quantity

為以值及參考表示之大小(例：單位)。

magnitude that is expressed as a value and reference (e.g. unit)

### 3.1.34 值(Value)

無量綱之數。

dimensionless number

### 3.1.35 單位(Unit)

name of relative or absolute measurement unit from a system of units preceded by a conversion multiplier for the value

相對單位或絕對測量單位的名稱，單位為單位，後跟該值的轉換乘數

## 3.2 縮寫

### 3.2.1 JWG

聯合工作組使用案例與要求事項

## Joint Working Group Use Cases and Requirements

### 3.2.2 WGSP

可持續過程工作組(歐洲智慧電網協調組工作組)

**Working Group Sustainable Processes (working group of the European Smart Grid Coordination Group)**

## 4. 要求事項(Requirements)

### 4.1 通用架構模型 – 架構需求 Common architecture model – architectural requirements

本標準告中的架構模型主要用於分析訊息和資訊模型需求，且著重於用戶側之架構需求，而 IEC 62746 的其他部分則描述電網側的架構。

The architecture in this technical report, is which is used for analysing requirements for messages and information models, focuses on in-premises architectural requirements, whereas other parts of IEC 62746 describe the architecture on the grid side.

在圖 6 所示的架構是功能參考圖。

The architecture shown in Figure 6 is the functional reference diagram-

在這種邏輯架構中，智慧電網連接點(SG CP)代表著從電網到房屋的介面，客戶能源管理系統(CEM)透過能源管理閘道器管理連接的智慧裝置之功耗/發電量來提供彈性。而智慧電表及簡單的外部用戶顯示器則提供許多功能，這些功能在智慧電錶協調小組工作中將進行詳細介紹，能源管理閘道器透過智慧電表閘道器與計量通道及智慧計量進行通訊，在本架構模型中的閘道器將不同的網絡(廣域網路，鄰域網路和區域網路)加以分開，並且可以如下文進一步所述與其他功能實體集成在一起，詳細討論可查閱 4.2 章節。

In this logical architecture the Smart Grid Connection Point (SG CP) represents the interface from the Grid into the premises. The Customer Energy Manager (CEM) provides the flexibility by managing power consumption/generation of connected smart devices, through the energy management gateway, while the smart metering and the simple external consumer display provide a number of functionalities which are described in more detail in work of the Smart Meters Coordination Group. The energy management gateway communicates with the metering channel and the smart metering through the Smart Metering Gateway. The gateways in this architecture split different networks (Wide Area Network, Neighborhood Area Network and Local Area Network) and may be, as further described below, integrated with other functional entities. A detailed discussion can be found in 3.2.

客戶能源管理系統(CEM)具有中央管理功能，它決策基於來自電網和/或智慧裝置的資訊進行決策和管理。CEM 中的“能源”一詞反映了 SG-CG 專注於能源的需求，在典型的家庭或建築環境中，該管理者可能會管理各種未來的服務和管理方案，並將成為 AAL (環境生活助理/全面居家協助)和其他未來用戶方案的基礎。

The Customer Energy Manager (CEM) is the central managing function. It decides and manages based on information coming from the grid and/or from the smart devices. The term “Energy” within CEM reflects the demand of SG-CG to focus on Energy. In a typical home or building environment this manager will likely manage all kinds of future service and management scenarios and will be the basis for AAL (Ambient Assistant Living) and other future User Scenarios.

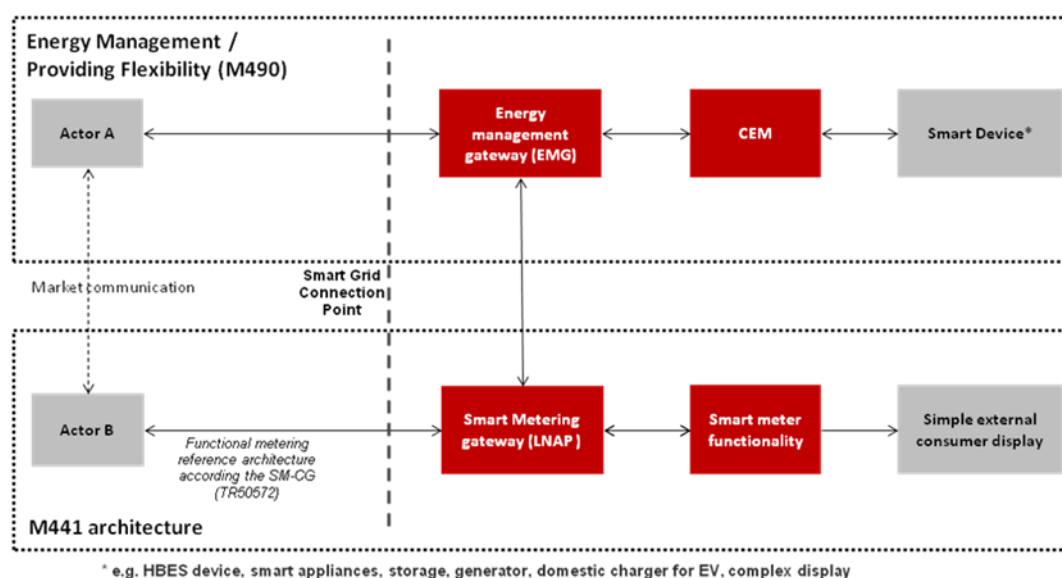


圖 6 智慧電網協調小組功能架構模型

Figure 6 – Smart Grid Coordination Group Functional Architecture Model

備考：以上架構中的參與者是功能性實體，這意味著它們其中有一些在真實場景中可能是同一物理設備的一部分(例如 CEM 功能可能是智慧裝置的一部分，智慧電表也可能包含智慧計量閘道器和 CEM 等)，這將透過其他範例進行詳細說明。

NOTE 1 The actors in the above architecture are functional entities, which means that some of them may be part of the same physical device (e.g. CEM functionality may be part of a smart device, the smart meter might also encompass the smart metering gateway and CEM, etc.). This will be detailed via further examples.

在此功能架構中的外部行為者 A 和 B，代表透過智慧電網連接點(SG CP)進行通信的(系統的)市場角色。這些角色的範例如電網營運商，電表資料集中器，電表營運商，用戶群代表，供應商，彈性調度中心等。

The external actors A and B, identified in this functional architecture, represent (systems of) market roles that communicate through the Smart Grid Connection Point (SG CP). Examples of these roles are Grid operator, meter data collector, meter operator, aggregator, supplier, flexibility operator, etc.

行為者 A 或行為者 B 的實際角色取決於當地市場組織會員之狀態與競爭。在本報

告的範圍內，行為者 A 被定義為與能源管理閘道通訊的外部行為者，而行為者 B 被定義為與智慧電表網路閘道通訊的外部行為者。

The actual role of actor A or B depends on the local market organization in a member state and competition. In the scope of this report, actor A is defined as the external actor communicating with the energy management gateway while actor B is defined as the external actor communicating with the smart metering gateway.

為簡單起見，本標準告中的使用案例不對能源管理閘道器和智慧電表閘道器功能做具體描述-在開發使用案例時，本報告假定閘道器不提供有助於實現使用案例目標的功能，但是，它們確實提供路由資訊，協議轉換，設備管理，安全性和服務功能方面的功能。

For the sake of simplicity, the use cases in this technical report do not represent the energy management gateway and the smart metering gateway – when developing the use cases, it was assumed that the gateways do not provide functionalities contributing towards the goals of the use cases. These do however provide functionality in terms of routing information, translation of protocols, device management, security and service capabilities.

在此架構模型中，需要三個主要的不同介面(如圖 7 所示)來支持以下各項之間的互通性：

Within this architecture model, 3 main different interfaces (see Figure 7) are necessary to support Interoperability between :

- (a) 智慧電網連接點和用戶能源管理器之間的能源管理閘道器。Smart Grid Connection Point & Customer Energy Manager via Energy Management Gateway
- (b) 智慧電網連接點或智慧電表和用戶能源管理器之間的智慧電表閘道和能源管理器閘道。Smart Grid Connection Point or Smart Meter & Customer Energy Manager via Smart Metering Gateway and Energy Manager Gateway
- (c) 用戶能源管理系統和智慧裝置。Customer Energy Manager and a smart device.

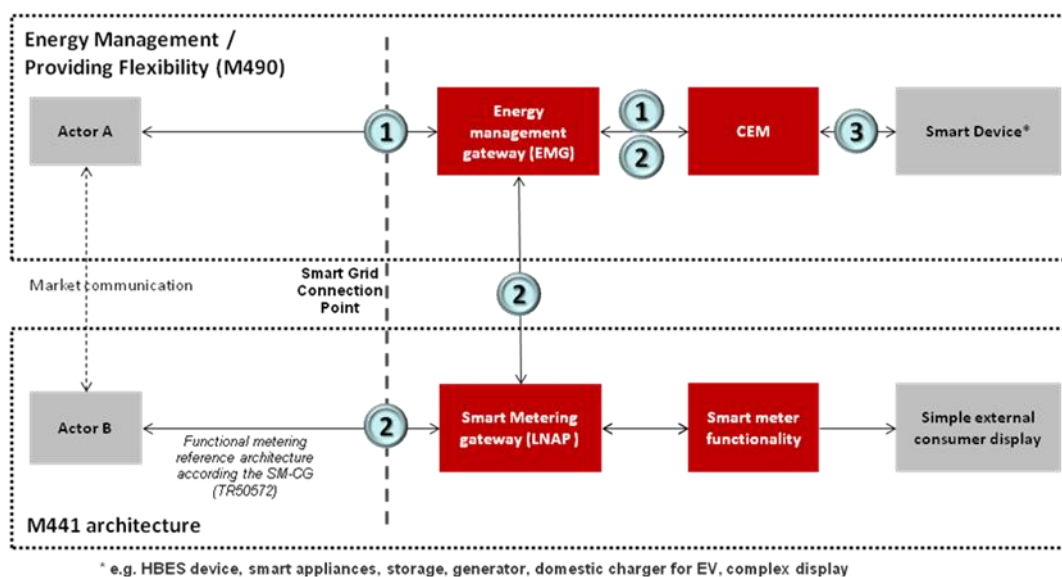


圖 7 功能架構模型中的介面

Figure 7 – Interfaces in the Functional Architecture Model

備考：智慧裝置的範圍可以從非常簡單到非常複雜的設備。

NOTE 2 A smart device can be in a range of very simple up to very complex devices.

本標準的主要目標是使技術委員會能夠定義必要的訊息與資訊交換，以確保智慧電網，CEM 和智慧裝置之間的互通性。

The main target of this document is to enable Technical Committees to define messages and information exchange necessary to ensure interoperability between Smart Grid, CEM and smart devices.

這些訊息與資訊交換是在中立的基礎上定義的(基於技術獨立的中性介面)。這意味著我們討論的是 ISO/OSI 模型中應用層而非其下各層中特定通訊協議相關的訊息。

These messages and information exchange are defined on a neutral basis (based on a technology independent neutral interface). This implies that we are talking about application level and do not describe specific protocol relevant messages on lower ISO/OSI levels

因此，本標準告既無意去定義各不同領域傳輸技術的對映，也無意要求任何用戶側的特定連接技術。

Therefore, this technical report neither intends to define the mapping onto domain-specific transmission technologies nor requests specific technologies for in-premises connectivity.

對映是各不同領域傳輸技術所有者的責任，但是，這也意味著訊息將傳輸到對映(不同領域通訊協議支持的各種設備類型)。

Mappings are the responsibility of domain specific protocol owners. However, this also implies that messages are transferred to mappings (types of devices, supported by domain specific protocols).

圖 8 至圖 10 描述端點架構。

Figures 8 to 10 describe the end-point architecture.

備考：訊息與訊息對映的設備範例如下圖(圖 8 至圖 10)所示。

NOTE 3 The equipment, messages and mapping of messages shown in the following diagrams (Figures 8 to 10) are examples.

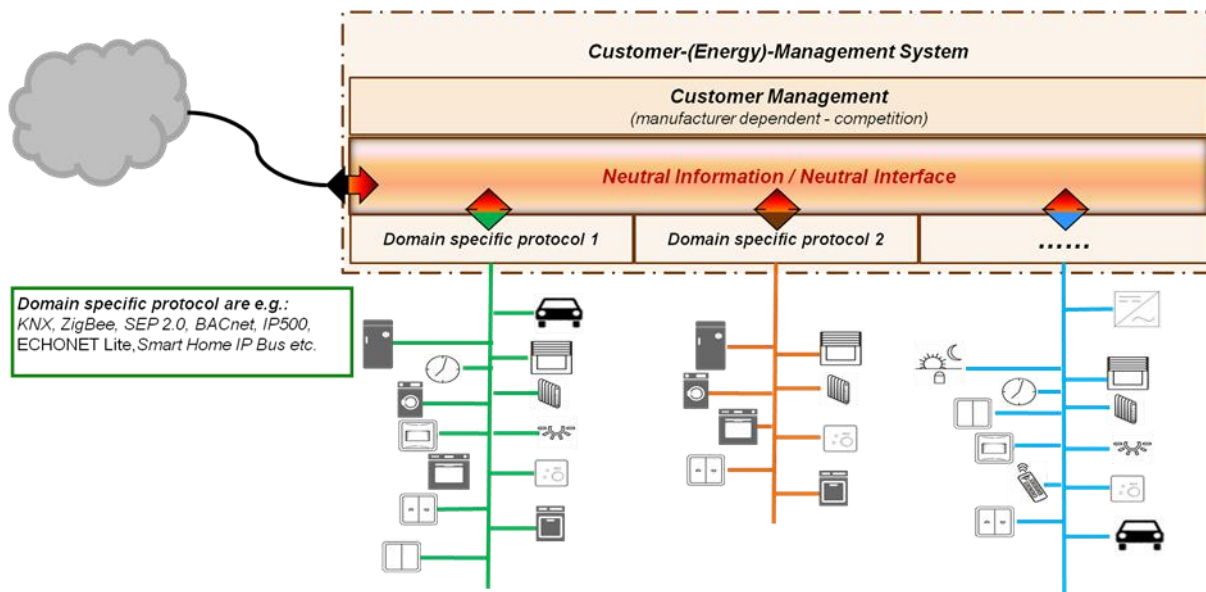


圖 8 中立介面

Figure 8 – Neutral interfaces

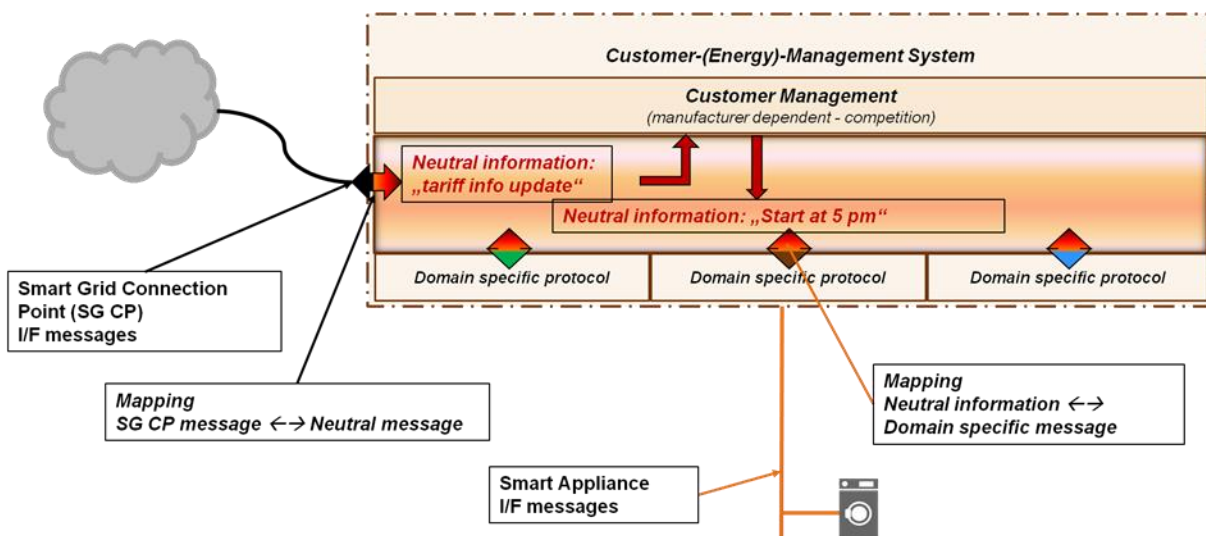


圖 9 對映 I/F 結構

Figure 9 – Mapping I/F structure

在這種情況下，CEM 可以使用不同的訊息及資訊交換來管理智慧裝置，就像其與電網進行交換一樣(如圖 10 所示)。

In this context the CEM may use a different set of messages and information exchange to manage smart devices as for the exchange with the grid (see Figure 10).



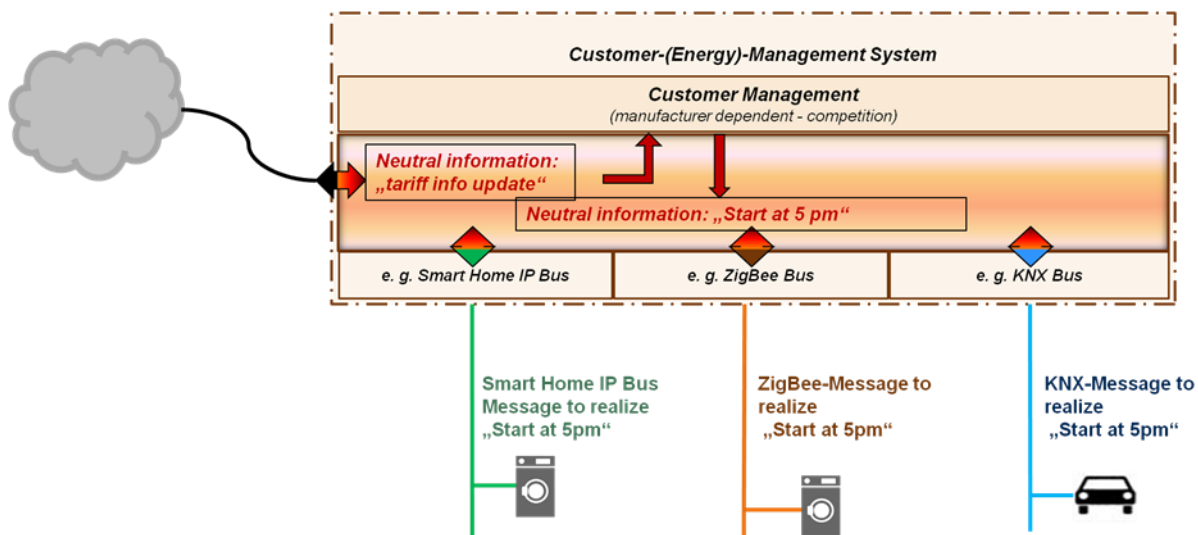


圖 10 訊息對映範例

Figure 10 – Example of a mapping of messages

如上所述，CEM 可以充當中央管理系統，而並行工作的 CEM 也可以共存，如圖 11 所示。

As mentioned above, the CEM may act as a central management system, while parallel working CEMs may also coexist, as shown in Figure 11.

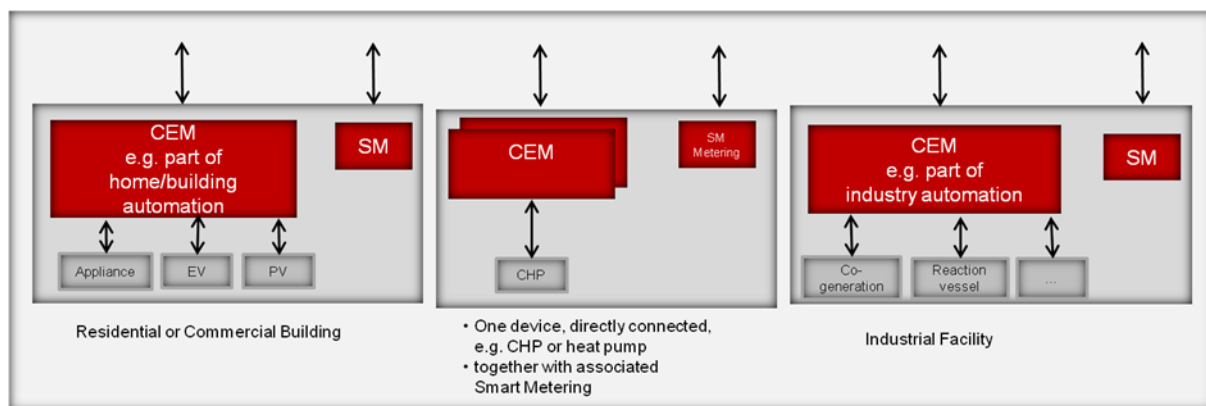


圖 11 不同的 CEM 配置

Figure 11 – Different CEM configurations

圖 12 列出“邏輯方塊”到時體設備組合的對映範例。

Figure 12 lists example mappings of “logical boxes” to physical device combinations.

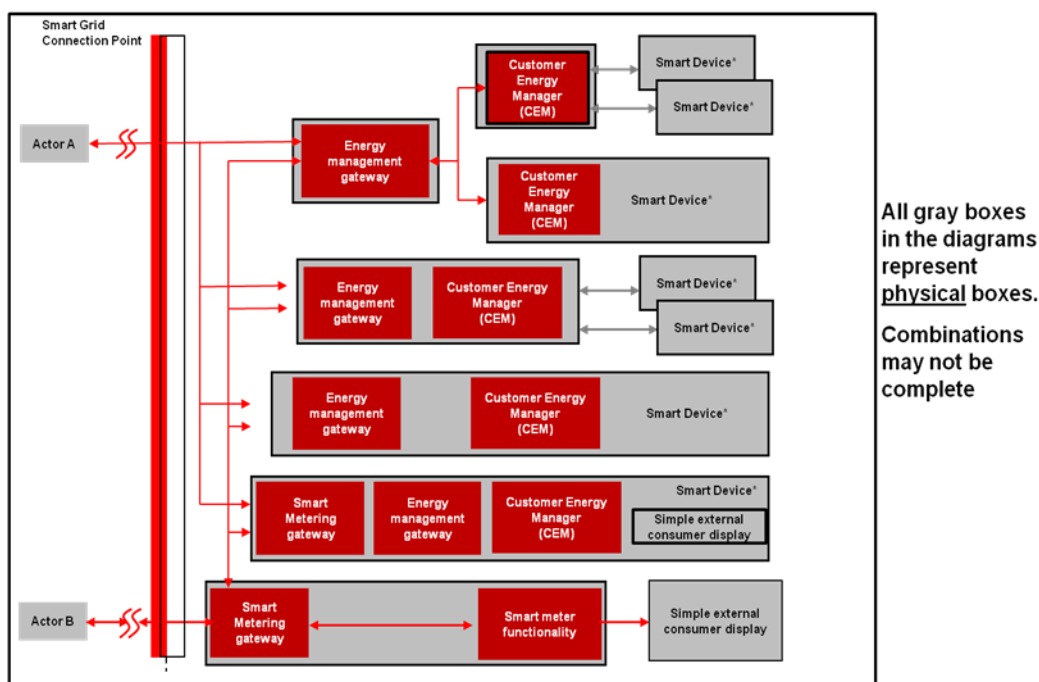


圖 12 實體組合

Figure 12 – Physical combinations

CEM 可以串接，串接 CEM 結構的示例如圖 13 所示。但是，串接 CEM 結構不是本標準告的主題。

CEMs may be cascaded. An example of a cascaded CEM structure is shown in Figure 13. Cascaded CEM structures however are not the subject of this technical report.

CEM 和 CEM 用戶群代表之間，以及 CEM 用戶群代表和電廠之間的介面將在 IEC 62746-x 的其他部分中定義。此外，房屋內部的串接 CEM 結構 (CEM – Sub CEM) 是進一步討論的一部分，並且可能成為 IEC 62746-2 即將發布版本的一部分。

Interfaces between CEM and CEM Aggregator as well as CEM Aggregator and power plant are to be defined in other parts of IEC 62746-x. In addition, cascaded CEM structures inside premises (CEM – Sub CEM) are part of further discussion and may become part of upcoming versions of IEC 62746-2.

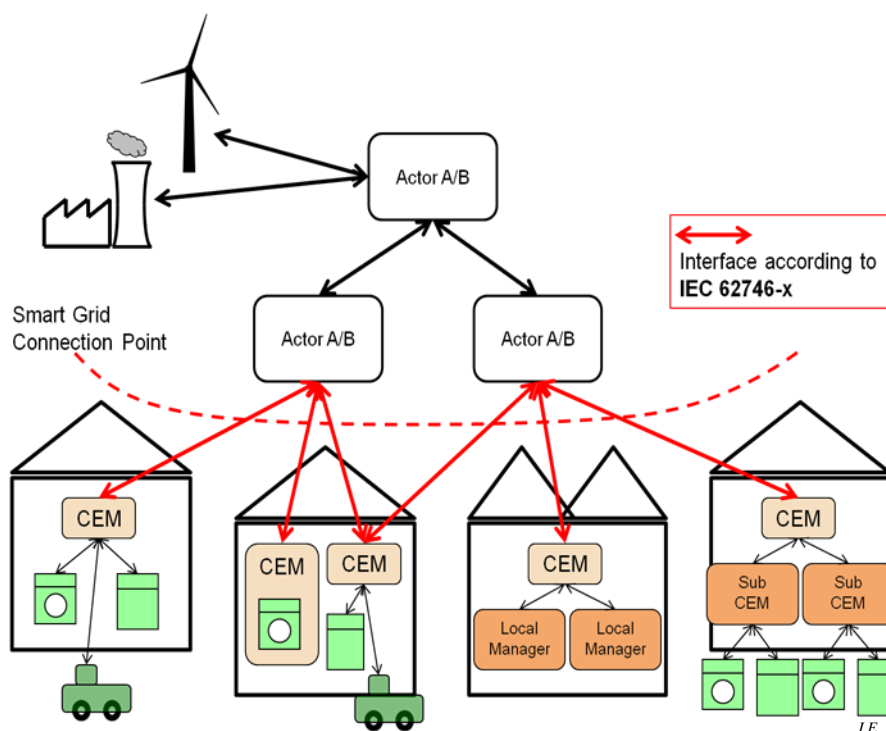


圖 13 CEM 架構範例

Figure 13 – Examples of CEM architecture

## 4.2 智慧電網連接點 SG CP (Smart Grid Connection Point)

### 4.2.1 範圍 (Scope)

本節考慮“能源供應商域群組”和“用戶域群組”之間的介面，如圖 14 所示，這兩個區域均在智慧電網概念模型中定義。

This section considers the interface between the “Group of Energy Supplier domains” and the “Group of Customer domains” as shown in Figure 14. Both domains are as defined in the Smart Grid Conceptual Model.

備考：本文件使用 NIST 模型用作智慧電網連接點的範例。

NOTE In this document the NIST model is used as an example for the Smart Grid Connection Point.

具有能源供應功能的用戶域的參與者(例如 DER)在本文件中屬於“用戶域群組”。

Those actors of the Customer domain, such as DER, that have energy supply functions here belong to the “Group of Customer domains”.

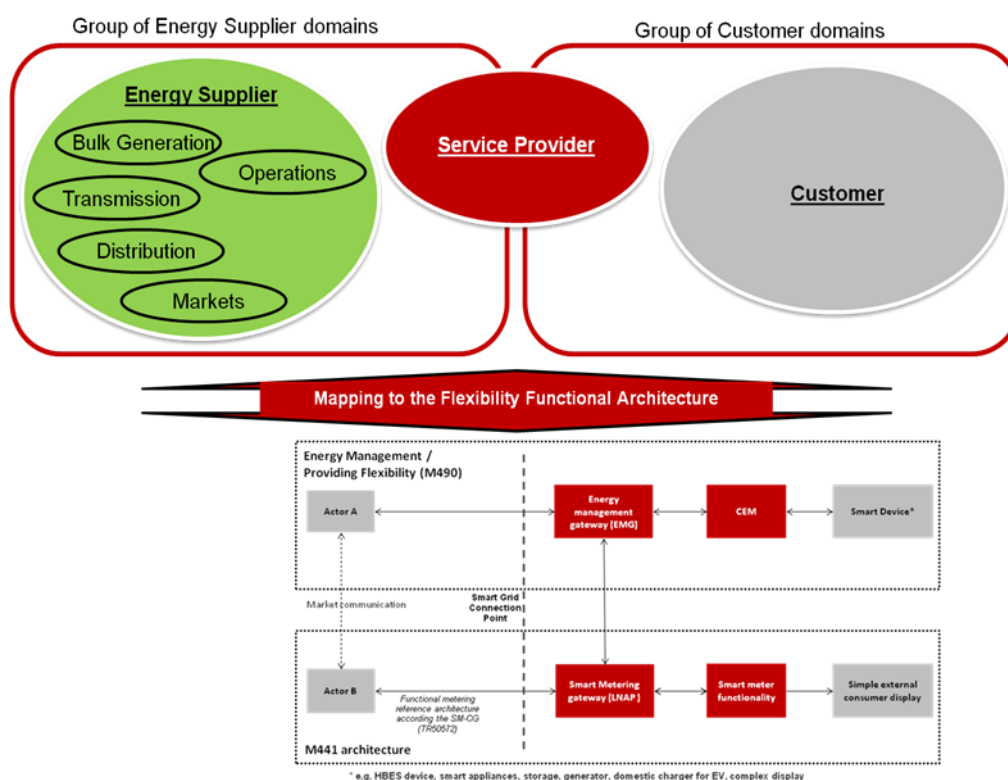


圖 14 “領域組”與“功能架構模型”

Figure 14 – “Group of domains” and “Functional Architecture Model”

#### 4.2.2 SG CP 定義(Definition of SG CP (Smart Grid Connection Point))

SG CP(智慧電網連接點)是“能源供應商域群組”和“用戶域群組”之間交換有關控制需求和供電資訊的介面(如圖 14 和 15 所示)。

The SG CP (Smart Grid Connection Point) is the interface over which the “Group of Energy Supplier domains” and the “Group of Customer domains” exchange information on the control of demand and supply power (see Figures 14 and 15).

在能源供應商的電力供應中斷的情況下，電力供需的控制是由服務提供商與用戶間透過電網的合作(如圖 16 所示)達成。此時，電力供需的控制資訊係透過 SG CP 發送和接收。

In the case of an interruption of the electrical power supply from an energy supplier, the control of demand/supply power is realized with the cooperation between the service provider and the customers through the grid (see Figure 16). In this, the information for the control of demand/supply power is sent and received via the SG CP.

#### 4.2.3 SG CP 定義的目的 Purpose of definition of SG CP (Smart Grid Connection Point)

SG CP 定義的目的是闡明“行為者之間電力需求/供電控制的介面點”和“發送

和接收資訊透過介面點”。

The purpose of defining SG CP is to clarify “the point of the interface for the demand/supply control of power between actors” and “the sending and receiving of information via the point of the interface”.

#### **4.2.4 電力需求/供應的目標，及資訊發送和接收 Target of demand/supply of power and information that is sent and received**

關於“能源供應商域群組”和“用戶域群組”之間電力供需的控制，供應商和客戶透過 SG CP 功能”實現“電力營銷，電力的需求/供應調整，電力系統的穩定(輔助服務)，客戶的電力最佳使用，減少溫室氣體對環境保護的影響，可再生能源加速發電，災難恢復，等等。”

On the control of demand/supply power between the “Group of Energy Supplier domains” and the “Group of Customer domain”, “the functions of the supplier and the customer that are implemented through the SG CP” realize “the marketing of power, the demand/supply adjustment of power, the power system stabilization (the ancillary service), the power optimum usage of the customer, the reduction of the greenhouse gas effect for environmental conservation, the acceleration of producing power by renewable sources of power, the disaster recovery, and so on.”

為了實現與電力需求和供電有關的功能，透過 SG CP 發送和接收的訊息包括“電能，需求(例如預測值，結果)，電力供應(例如供應能力)，價格，溫室氣體排放量的影響，公用電網的穩定性(例如傳輸能力，電壓，頻率)等，”此訊息在邏輯上和功能上都進行定義，以便可以在上述領域中的系統結構和設備，實現對需求/供應的控制。

In order to realize those functions relevant to the demand and supply of power, information that is sent and received via the SG CP includes “the time-series data of the electrical energy, the demand (e.g. predictive values, results), the supply (e.g. supply capacity), the price, the amount of the emission of the greenhouse gas effect, the utility grid stability (e.g. transmission capacity, voltage, frequency), and so on. ”This information is defined both logically and functionally so that the control of demand/supply may be realized under the system structure and devices in the Domains mentioned above.

#### **4.2.5 SG CP 的功能要求 Functional requirement of SG CP (Smart Grid Connection Point)**

SG CP 隱含功能要求，如下所示：

The SG CP implies a functional requirement as shown below.

SG CP 是功能與邏輯點的介面，可實現“能源供應商域群組”與“用戶域群組”之間對電力供需的控制，SG CP 獨立於每個角色的功能和實體結構，SG CP 不

適用於實體系統/設備的監視控制(例如：啟動命令，停止命令，直接控制設備的命令設置)。

The SG CP is the functional and logical point of the interface that realizes control of demand/supply power between the “Group of Energy Supplier domains” and the “Group of Customer domains”. The SG CP is independent of the function and physical structure of each actor. The SG CP is not for monitor control which is dependent on physical systems/devices (e.g. the start command, the stop command, the setting of command to control devices directly).

如果能源供應商和用戶透過服務供應商達成供需控制，則 SG CP 並不一定對應於電力發送/接收的實體連接點。

If the demand/supply control is realized by the energy supplier and the customer via the service provider, then the SG CP does not always correspond to the physical connection point for the power transmitting/receiving.

儘管各國對於提供電力、服務、設備所有權方面的責任有所不同，但“透過 SG CP 發送和接收的有關電力需求/供電控制的訊息”是恆定不變的。

While responsibility for providing electrical power, services, and ownership of devices varies between countries, “the information that is sent and received via SG CP for the demand/supply control of power” is constant.

可以將“消耗功率，存儲功率或供電的設備”集成到 CEM(用戶能源管理器)中，設備可以從“能源供應商領域群組”接收消息，並透過 CEM 將消息發送到“能源供應商領域群組”。

“The device that consumes power, stores power or supplies power” can be integrated into the CEM (Customer Energy Manager). The device can receive message from the “group of the energy supplier domains” and send message to the “group of the energy supplier domains” via the CEM.

如果具有電源設備的客戶需要與其他客戶通訊(例如，在能源供應商的電源中斷的情況下，如圖 16 所示)，則該客戶將透過 SG CP 與其他客戶通信。

If the customer with a power supply device needs to communicate with other customers (e.g. in the case of interruption of electrical power supply from energy supplier, see Figure 16), then the customer communicates with other customers via the SG CP.

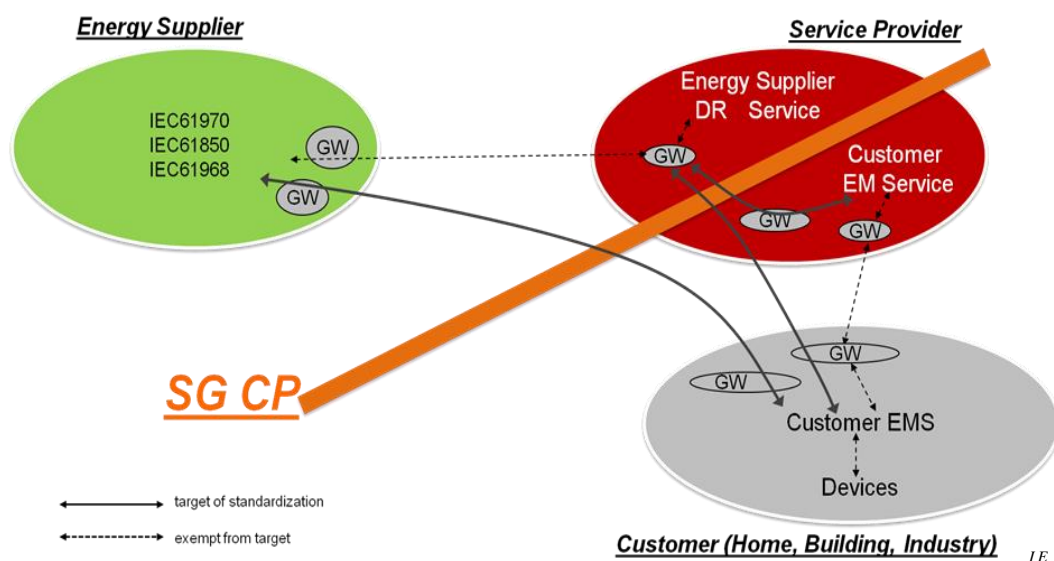


圖 15 智慧電網連接點 SG CP

Figure 15 – Smart Grid Connection Point SG CP

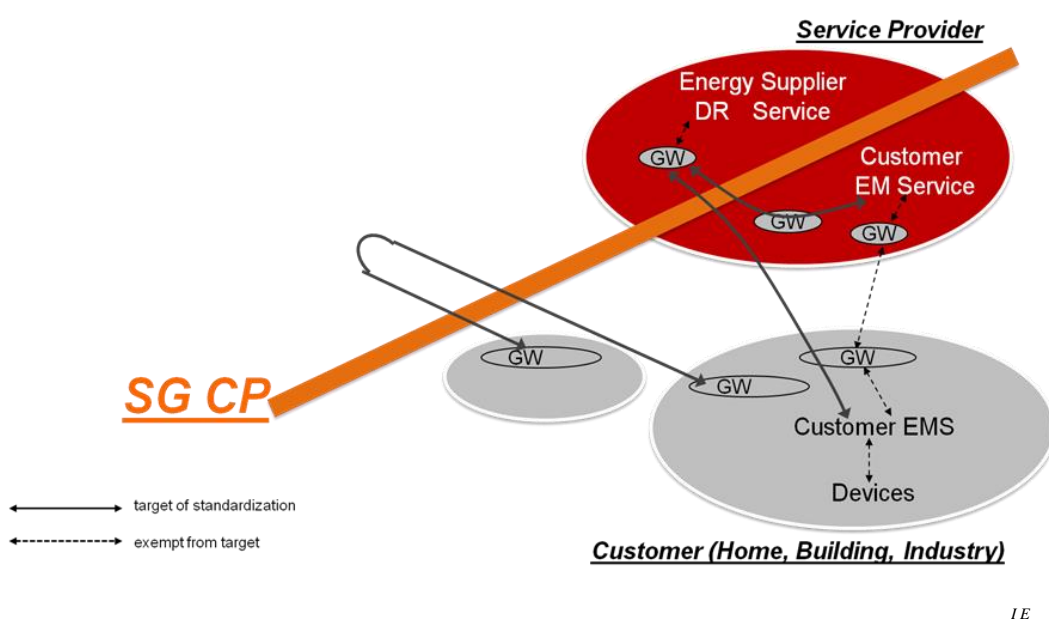


圖 16 SG CP (在能源供應商電源中斷的情況下)

Figure 16 – SG CP (in the case of interruption of electrical power supply from energy supplier)

#### 4.3 智慧電網和智慧電網連接點(到房屋的介面)的通信要求事項 (Communication requirements for the Smart Grid and the Smart Grid Connection Point (interface into the premises))

電網側用於連接智慧用戶的通信系統和協議應滿足以下要求事項：

The communication system and protocol on the grid side for connecting the smart

customers shall fulfil the following requirements :

- 眾多用戶(資源)可以並行連接到服務器(1 百萬)。Many customers (resources) can be connected in parallel to a server (繳 1 million).
- 系統應針對巨量小資料封包進行優化。The system shall be optimized for a high volume of small data packets.
- 需要有關網絡可用性(狀態)的資訊。Information about network availability (presence) is required.
- 通知和訊息應“及時”(在幾秒鐘之內),沒有存儲轉發或連續輪詢。Notifications and messages shall be “just-in-time” (within seconds) without store-and-forward or continually polling.
- 資源應具有唯一的, 受信任的身份, 該身份可以用作通信的邏輯地址。Resources shall have a unique, trusted identity. This identity may be used as a logical address for communications.
- 通訊必須經過雙方(受信實體)的加密和身份鑑別。Communication shall be encrypted and authenticated from both sides (trusted entities).
- 通訊網路需為分散式, 且可透過簡單的通訊同盟(Federation)程序達到互通性。The communication network must be decentralized with straight forward federation.
- 須支持服務器主機到服務器主機的通訊。Server-host to server-host communication shall be supported.
- 基於 XML 的消息內容應可擴展, 如果訊息包含設備無法理解的其他資訊, 則應將其忽略, 發送者必須意識到並適應此事實, 應當能夠定義新的有酬載類型而不會“斷路”介面。Message content based on XML shall be extensible. If a message contains additional information not understood by a device, it shall be ignored and the sender must realize and accommodate for this fact. Shall be able to define new payload types without ‘breaking’ interfaces.
- 資源不需要接受入站連接, 且不需要防火牆打開額外端口便能透過網際網路進行通訊。資源將僅會使用自己的憑證建立與通訊基礎結構之出站連接。Resources shall not be required to accept inbound connections, where there shall not be the need to open ports in firewalls to allow them to communicate over the internet. Resources will only make outbound connections to the communication infrastructure using their credentials.
- 資源應能夠異步接收訊息, 無需輪詢控制器。Resources shall be able to receive messages asynchronously, without the need to poll a controller.
- 無論目的地是控制資源的設備還是用於管理資源的應用軟件, 都應可以將消息尋址到特定端點。It shall be possible to address a message to a specific endpoint, whether the destination be a device that controls a resource



or application software used to manage resources.

- 應該支持群組通信(多方交互)，其中控制器可以將消息發送給群組的所有成員。設備可能具有零個或多個群組的成員身份，這意味著每個訊息應具有單一來源地址，但可能有多個目標地址，其中目標地址可能是由通訊基礎結構維護和管理的群組地址。Group communications (multi-party interactions) shall be supported, where a controller can address a message to all members of a group. Devices may have membership in zero or more groups. This means that each message shall have a single source, but potentially many destination addresses where a destination address may be a group address that is maintained and managed by the communication infrastructure.
- 協議應支持發布和訂閱。The protocol shall support publish and subscribe.
- 協議應支持服務發現。The protocol shall support service discovery.
- 通訊系統應支持冗餘。The communication system shall support redundancy.
- 通訊系統應能防止拒絕服務攻擊和適用於通訊機制的其他類型的攻擊。The communication system shall protect against denial of service attacks and other types of attacks as appropriate for the communication mechanisms.

#### 4.4 通用訊息-資訊交換(Common messages – information to be exchanged)

##### 4.4.1 通則(General)

如前所述，本標準告的主要目的是為電網側行為者與 CEM 之間以及 CEM 與建築物內智慧裝置之間的通訊定義要求事項。共同的訊息是相互理解的工具，本節收集這些訊息的相關資訊要求事項，並描述所使用的過程。

As already mentioned the main intention of this technical report is to define requirements for the communication between grid side actors and CEM as well as between CEM and smart devices within premises. Common messages are the vehicle to understand each other. This section collects relevant information-requirements for these messages and describes the process used.

##### 4.4.2 使用者經歷和使用案例的意圖 Intention of user stories and use cases

為什麼要使用使用者經歷和使用案例？標準化不會使使用案例標準化，用戶可以使用不同的方法來達到目標，或者製造商可以實施不同的解決方案，意味著對使用案例的不同解釋。但是，不同利益相關者之間交換的資料和資訊的定義對於確保互運性至關重要，本標準告的使用案例不排除任何利益相關者，而是定義在不偏愛任何特定利益相關者的情況下，完成特定任務所需交換的資訊。

Why user stories and use cases? Standardization does not standardize use cases. The user may use different ways to get to a target or the manufacturer may implement different solutions, means different interpretations of use cases. However the definition of data and information exchanged between the different stake holders is essential to ensure interoperability. Use cases for this technical report do not exclude any stakeholder but define the information

which needs to be exchanged to accomplish a certain task without favouring any specific stakeholder.

使用案例透過描述可能的情境來幫助收集必要資訊的需求。

Use cases help to collect requirements for necessary information by describing possible scenarios.

本標準定義確保互通性所需的最少資訊集，並定義此資訊交換的要求事項以及對功能和資訊流的描述。

This document defines a minimum set of information which is necessary to ensure interoperability. It also defines the requirements for this information is exchanged as well as a description of the functionality and information flow.

然後再由特定的技術規範(例如 IEC 62746-x)來標準化資料模型及其結構及其內容。

It is then up to the specific Technical Specification (e.g. IEC 62746-x) to standardize the data models and the structure with its content.

由於智慧電網，智慧建築和智慧家庭是重疊的領域，因此本標準告描述從電網介面到房屋/建築物的分配到智慧(終端)設備的整個雙向通訊鏈。

As Smart Grid, Smart Building and Smart Home are overlapping areas, this technical report describes the whole chain from the grid interface into the premises via in-home/-building distribution until the smart (end) devices and vice versa.

圖 17 描述定義訊息和資料模型結構的過程，而本標準告以資訊需求和概念結尾。

Figure 17 describes the process to define messages and data models structures while this technical report ends with the information requirements and concepts.

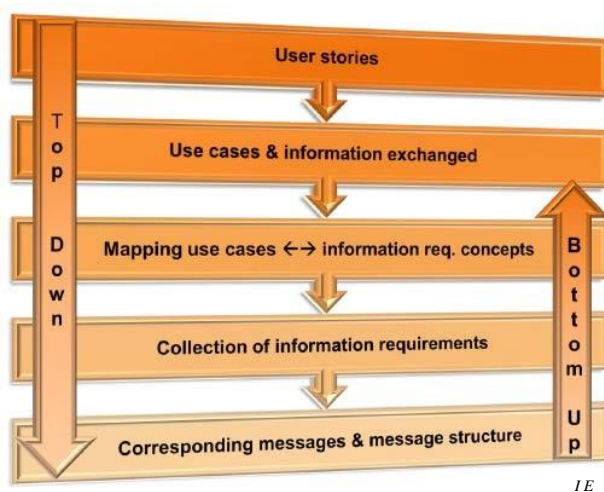


Figure 17 User stories and use cases process

為了定義要交換的訊息和相關資訊的要求事項，我們選擇了以下所述的過程。

In order to define requirements for messages and related information to be exchanged, we have chosen a process described below.

該過程的第一步是收集“使用者經歷”，每個“使用者經歷”都是對消費者可能會在智慧電網和智慧家庭/建築區域中遇到的特定情境的描述，用戶案例來自利益相關者集思廣益會議，它們不遵循特定的標準化格式，而使用案例則以標準化格式編譯訊息，它們是根據這些使用者經歷創建的，或者是從其他來源，例如 IEC 技術委員會 8，還有其他標準化委員會也在研究與本標準有關的使用案例，每個使用者經歷都是從消費者的角度出發的，描述消費者如何在其場所中與智慧電網和/或智慧家庭/建築物相關情境進行互動。

The first step of the process is collecting “user stories”. Each “user story” is a description of a specific scenario that a consumer may experience with Smart Grid and in the Smart Home/Building area. The user stories are derived from stakeholder brainstorming sessions. They do not follow a specific standardized format, use cases on the other hand compile information in a standardized format. They had been created out of these user stories or were taken from other sources, e.g. IEC Technical Committee 8. There are other standardization committees also working on use cases relevant to this technical report. Each user story is made from the consumer perspective and describes how consumers interact with Smart Grid and/or Smart Home/Building related scenarios in their premises.

該過程的第二步驟是使用案例的統一。所定義的每個使用案例未必能適合整個架構，必須進行擴展或稍作修改，它們也可能還涉及既有使用案例，並將其集成而成為的新使用案例，單個使用案例可以實現“使用者經歷”中描述的一項服務或多項服務，使用案例包括透過智慧電網連接點(SG CP)在智慧裝置，CEM 和/或電網側的行為者之間傳輸的訊息，SG CP 是資訊訪問點，但不考慮到用戶房屋的電網連接點。

The second step of the process is harmonization of use cases. Each use case as defined might not fit into the overall architecture and must be extended or slightly modified. It might also be possible to touch upon existing use cases and integrate them as a new one for this activity. A single use case can realize one service or multiple services described in User Stories. Use cases include messages transmitted between a smart device, a CEM and /or an actor on the power grid side through the Smart Grid Connection Point (SG CP). The SG CP is the information access point but does not consider the electrical grid connection point to the customer premises.

該過程的最後一步是驗證步驟，檢查所有用戶案例中使用案例的詳盡性。

The last part of this step of the process is a verification step, checking the exhaustiveness of use cases with all user stories.

確認使用案例詳盡無遺後，合併資訊交換列表顯示適用於所選用戶案例的最低要求事項，訊息的資料要求事項將作為第三步驟和第四步驟檢查，該過程的步驟將以驗證步驟結束，方法是檢查涵蓋所有使用案例訊息的詳盡性，該過程的最後一步是透過有關建築物中資訊交換(從 CEM 到智慧裝置)的技術規範，以及電網行為者與 CEM 之間資訊交換的技術規範來執行。

After confirming exhaustiveness of use cases, the consolidated information exchanged list shows the minimum requirements applicable to the selected user stories. The requirements for data for the messages are examined as the third and fourth step. This step of the process also ends with a verification step by checking the exhaustiveness of messages covering all use cases. The last step of this process is carried out by the technical specifications on the information exchange in the building (CEM to smart device) and on the information exchange between grid actors and the CEM.

#### 4.4.3 用戶案例和使用案例的關係 Relationship of user stories and use cases

本標準提供使用者經歷和使用案例的描述。

This document provides descriptions of user stories and use Cases.

使用者經歷是從消費者或電網方的角度產生的，並描述非結構化方式可能會遇到的典型情況，使用者經歷列表並不完全詳盡，只代表本標準告已考慮的情境，由於使用者經歷沒有標準化的格式，也不構成其內容，因此須將它們對映到結構化的使用案例，這些使用案例使用標準化的模板格式來編譯用戶案例中，描述的情境所需的資訊，一個使用者經歷可能利用多個使用案例來完成給定任務。

User stories are produced from the consumer or grid side perspective and describe typical scenarios that a may be experienced in an unstructured way. The list of user stories is not exhaustive and represents the scenarios which had been considered for this technical report. Since user stories do not have a standardized format and do not structure its content, they are mapped to structured use cases. These use cases use a standardized template format to compile the information required for the scenarios described in user stories. It might be possible that one user story utilizes multiple use cases to accomplish a given task.

根據詳細程度和內容，使用案例可以分為各種類別，本標準告的使用案例集根據 IEC 規範使用高階使用案例和專用使用案例。

Depending on the level of detail and the content, use cases can be classified into various categories. The use case collection for this technical report makes usage of high level use cases and specialized use cases according to IEC specifications. 如圖 18 所示。

This is depicted in Figure 18.

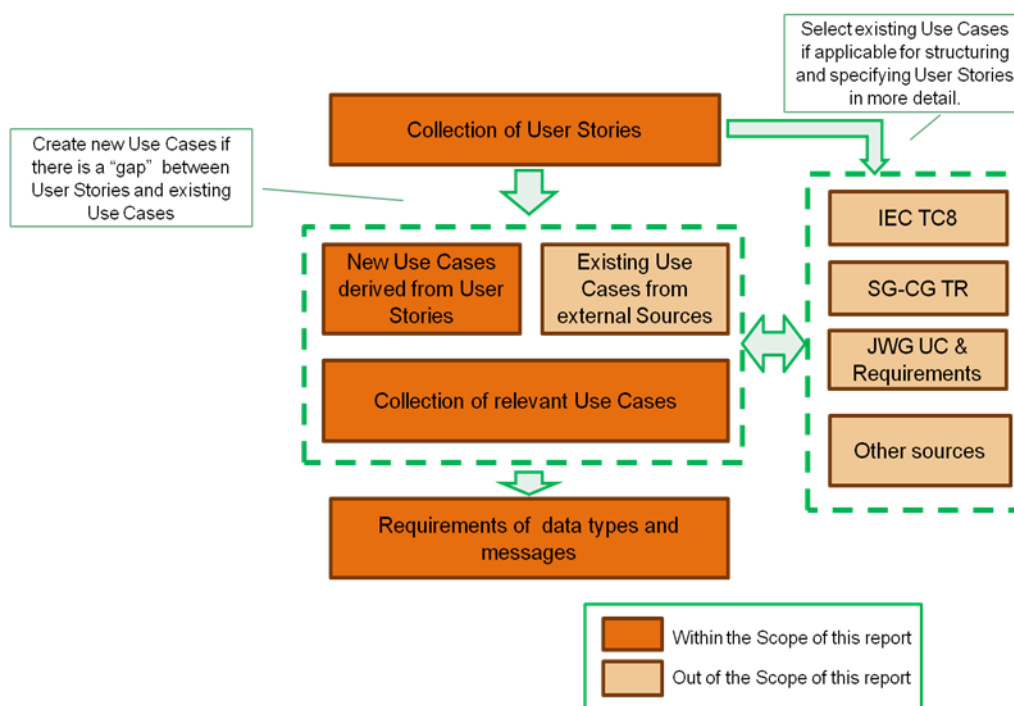


圖 18 用戶案例和使用案例之間的關係

Figure 18 – Relationship user stories and use cases

#### 4.4.4 資訊交換要求事項 Requirements for information exchange

根據 4.4.2 程序說明，使用案例是收集參與者之間要交換的大量資訊的基礎，圖 19 列出這些介面之間的高階範例

According to the process described in 3.4.2, use cases are the basis for a collection of a numerous number of information to be exchanged between actors. Figure 19 lists high level examples for the interface between

- 智慧電網(A 行為者和 B 行為者)和 CEM。(Smart Grid (Actor A and B) and CEM)
- 智慧裝置和 CEM。(Smart device and CEM)

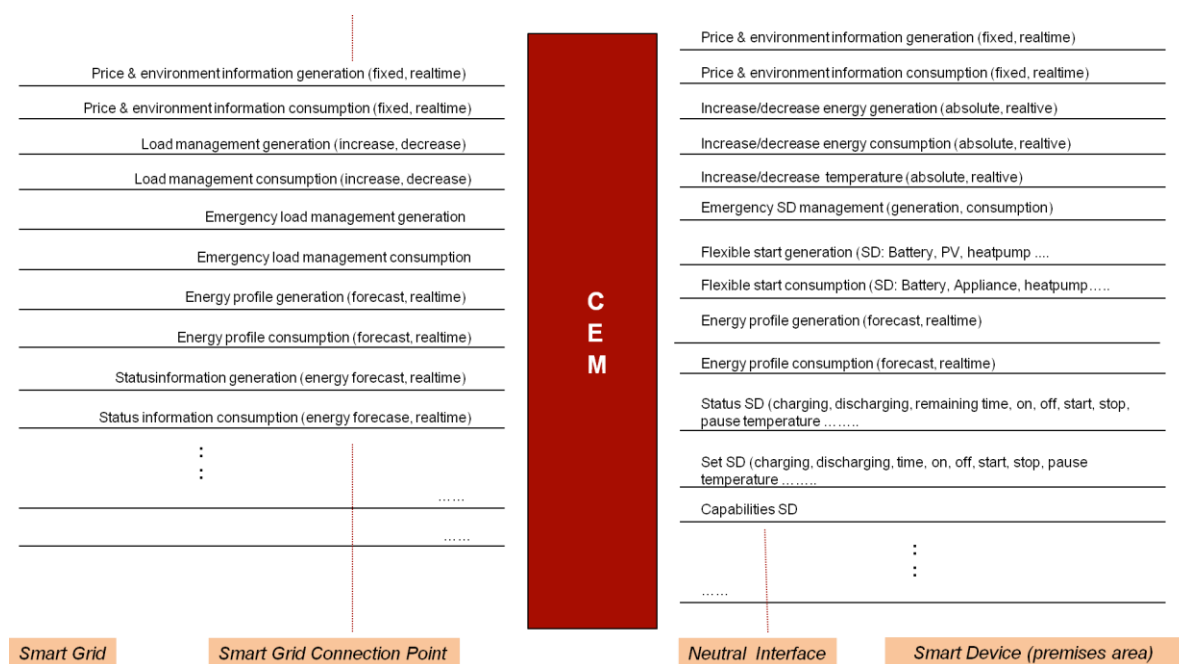


圖 19 交換資訊的範例

Figure 19 – Examples of information to be exchanged

如 4.1 節所述，CEM 的功能類似於智慧家庭、房屋管理和對映系統在智慧電網和智慧裝置之間。

As already described in 3.1, the CEM functions like an intelligent home or premises managing and mapping system between Smart Grid and smart devices.

以下範例可能有助於理解訊息的含義和 CEM 的行。請參考用戶案例：電動汽車的充電：A.1.3。

The following example may help to understand the meaning of messages and behaviour of the CEM. Please refer to the user story Charging of an electric vehicle：A.1.3.

在此用戶案例中，用戶想在第二天早晨(上午 8 點)開車一定距離，並建議汽車在早上 8 點之前進行電池充電，用戶已經將 CEM 排成使用最便宜的電價。

In this user story the user wants to drive a certain distance next morning (8 a.m.) and advises the car to take care of charging the battery until 8 a.m. The user has already programmed the CEM to use the cheapest price of electrical energy.

汽車會計算出電量不足的數量，並要求 CEM 進行彈性啟動，在這種情況下，附加參數是電池充電容量，最早的開始時間(例如現在)，最晚的結束時間(=上午 8 點)。

The car calculates the amount of lacking energy and asks the CEM to manage a flexible start. Attached parameters are in this case battery charging capacity, earliest starting time (e.g. now), latest end time (= 8 a.m.).

圖 19(CEM –智慧裝置介面)上的訊息由以下表示：

The messages on Figure 19 (interface CEM – Smart Device) are represented by

- 彈性啟動消耗(SD：電池，家電，熱泵等)。
- Flexible start consumption (SD：Battery, Appliance, heatpump etc.
- 能源消耗(預測，實時)。Energy profile consumption (forecast, realtime)

序列圖如圖 20 所示：

An example of a sequence diagram could look as shown in Figure 20：

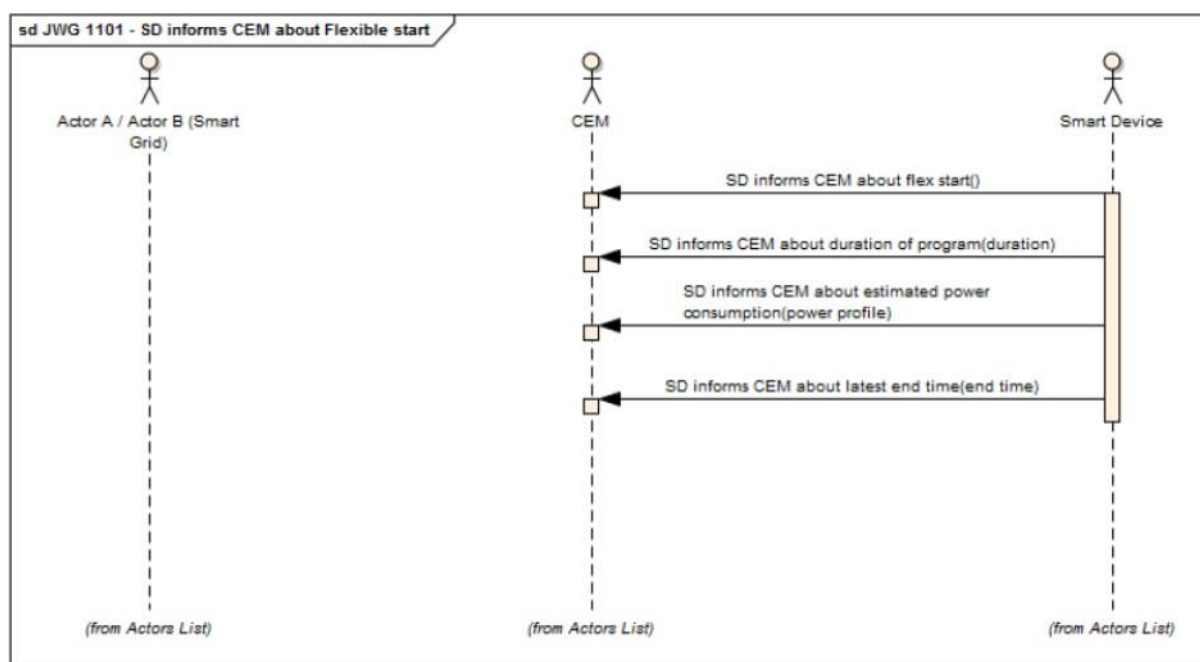


圖 20 序列圖彈性啟動

Figure 20 – Sequence Diagram Flexible Start

與電動汽車的請求無關，CEM 定期從能源零售商那裡獲取價格資訊，例如 提前 24 小時，接下來的 12 小時，每個時槽的約定價格，及接下來 12 小時預測。

Independent from the request of the EV, the CEM regularly gets price information from the energy retailer, e.g. for the next 24 h in advance, the next 12 h with binding prices per time slot and the next 12 h as forecast.

圖 19 (智慧電網– CEM 介面)上的訊息表示為

The message on Figure 19 (interface Smart Grid – CEM) is represented by

- 價格和環境資訊消耗(固定的，實時的)和順序圖如圖 21 所示：Price and environmental information consumption (fixed, realtime) and an example of sequence diagram could look as shown in Figure 21：

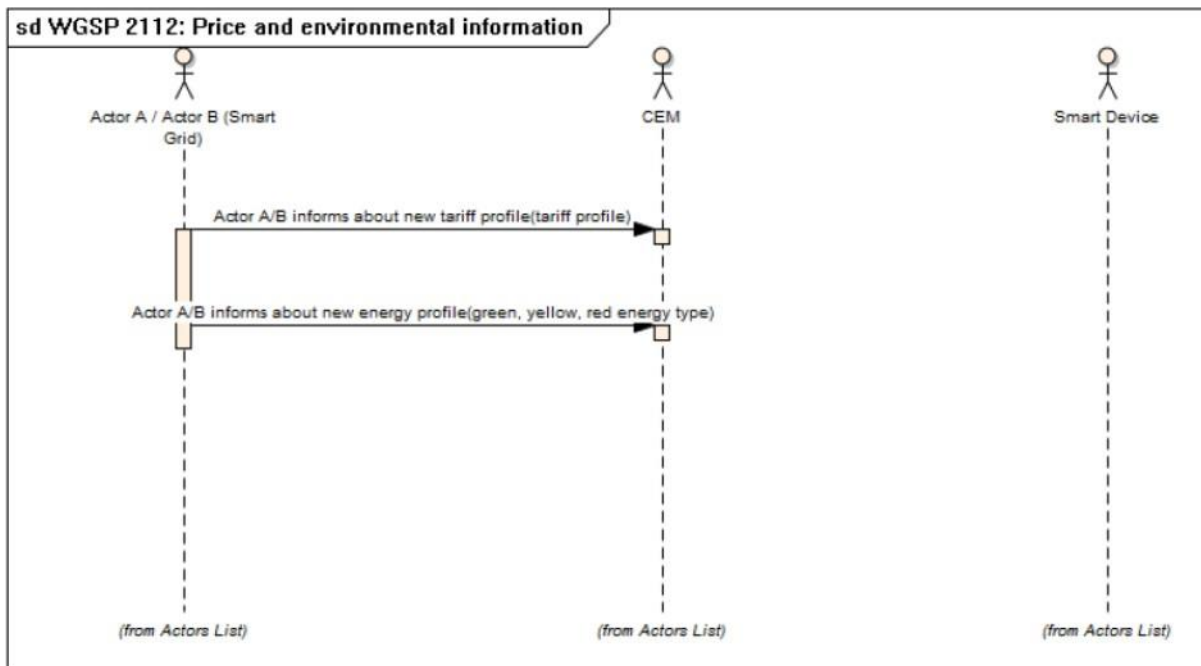


圖 21 序列圖價格和環境資訊

Figure 21 – Sequence diagram price and environmental information

現在，基於 EV 的請求，CEM 會計算出 EV 充電的最佳啟動時間，CEM 還可能包括其他智慧裝置已經接受的彈性啟動，用戶的行為，例如中午烹飪等，基於結果，CEM 將建議的開始時間發送給 EV。

Based on the request from the EV the CEM now calculates the best start time for EV charging. The CEM may also include already accepted flexible starts of other smart devices, behaviours of the users such as cooking at noon and so forth. Based on the outcome the CEM sends a proposed starting time to the EV.

圖 19 (智慧電網- CEM 界面)上的訊息表示為

The message in Figure 19 (interface CEM – smart device) is represented by

- 設置 SD (充電，放電，時間，開，關，開始，停止，暫停溫度等)，序列圖如圖 22 所示：

Set SD (charging, discharging, time, on, off, start, stop, pause temperature etc. and an example of sequence diagram could look as shown in Figure 22 :



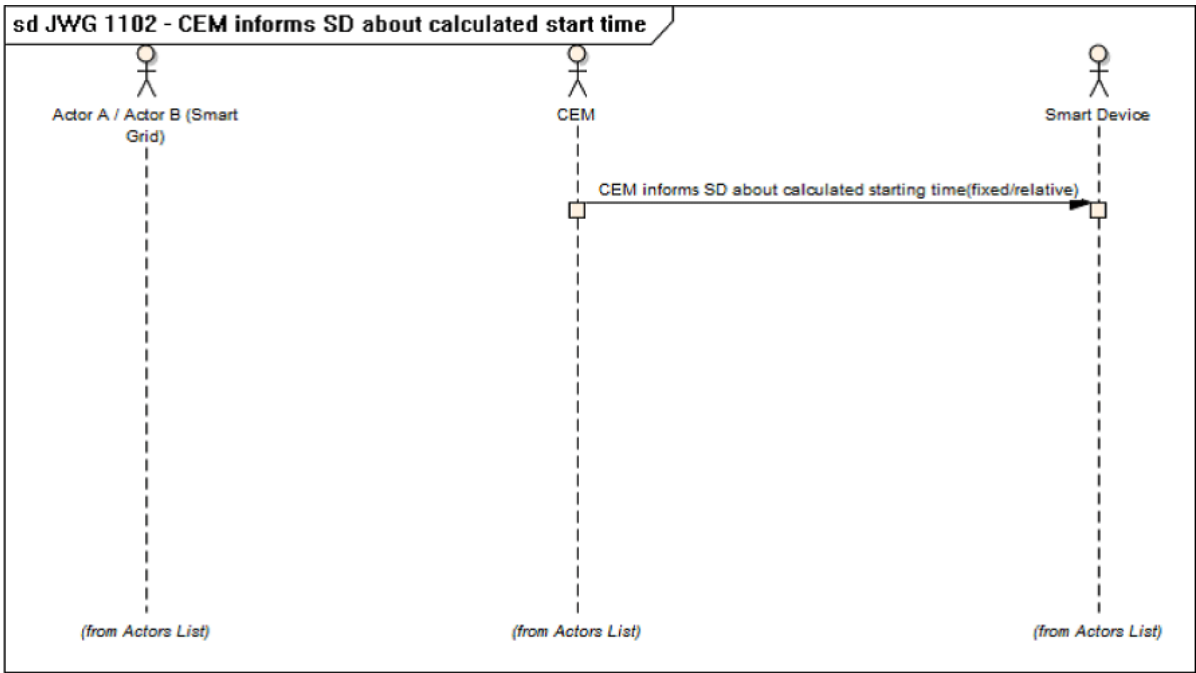


圖 22 序列圖開始時間

Figure 22 – Sequence diagram starting time

這些提及任何其他 CEM 算法都不是本報告的主題，因為它會影響競爭，本標準告僅關注智慧電網，CEM 和智慧裝置之間要交換的相關訊息和資訊。

These mentioned and any other CEM algorithms are not the subject of this report as it affects competition. This technical report only focuses on the relevant messages and information to be exchanged between Smart Grid, CEM and smart devices.

表 1 總結下一層級的詳細要求事項。

The next level of detailed requirements is summarized in Table 1.

表 1 資訊要求事項彙整

Table 1 – Information requirements collection

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
中止 Abort	中止 SD 功能 Abort SD function	直接負載/發電管理(需求方管理) Direct load/generation management (Demand Side Management)	JWG111x, 112x
容量 Capabilities	容量資費概況 Capabilities tariff profile	價格與環境資訊 Price & environmental information	JWG2112
調度資訊 Dispatch information	電池輔助服務調度資訊 Battery ancillary service dispatch information	直接負載/發電管理 Direct load/generation management	JWG2121/WGSP 2121, JWG1130
調度請求 Dispatch request	電池輔助服務調度 Battery ancillary service dispatch	直接負載/發電管理 Direct load/generation management	JWG2121/WGSP 2121
能源概況 Energy profile	實際能耗概況 Energy consumption profile actual	功率剖繪 Power profile	JWG2111/WGSP 2111
能源概況 Energy profile	預測能耗概況 Energy consumption profile forecast	功率剖繪 Power profile	JWG 1103, JWG120x, JWG212x, JWG2111/WGSP 2111
能源概況 Energy profile	實際能耗概況 Energy consumption profile actual	功率剖繪 Power profile	JWG2111/WGSP 2111
能源配置 Energy profile	預測能耗概況 Energy consumption profile forecast	功率剖繪 Power profile	JWG121x, JWG202x, JWG120x, JWG2111/WGSP 2111
估計功耗/發電/儲能概況 Estimated Power Consumption/Generation/Storage profile	用戶估計的單個智慧裝置消耗/發電/存儲資訊 Individual smart device consumption/Generation/Storage information estimated by the user	估計功率剖繪 Estimated Power Profile	JWG2001, JWG2000
估計功耗/發電概況 Estimated Power Consumption/Generat	估計的能量分佈，包括與智慧裝置的每種功率分類 (RE, non-RE, Load) 有關	估計功率剖繪 Estimated Power Profile	JWG2010

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
ion profile	的 能 量 分 佈 Estimated energy profile consists of energy profile with respect to each power classification of smart devices(RE, non-RE, Load)		
用戶產生的電量 Amount of the power produced by User	使用 RE 產生的電量 Amount of the power produced using REs	用戶產生的電量 Amount of the power produced by User	JWG2010
功耗/發電概況 Power Consumption/Generation profile	CEM 提供的分流情況下的選定功耗/發電剖繪，以便與 A 行為者協商 Selected power consumption/generation profile at triage case provided by CEM in order to negotiate with Actor A	功耗/發電剖繪 Power consumption/generation profile	JWG2001
功耗/發電概況 Power Consumption/Generation Plan	Aggregated Power usage plan of the building	總功耗/發電計劃 Aggregated Power consumption/generation plan	JWG2002
功耗/發電概況 Power Consumption/Generation Plan	建築群的需求縮減能力 Demand curtailment ability of Group of Buildings	總功耗/發電計劃 Aggregated Power consumption/generation plan	JWG2002
功耗/發電概況 Power Consumption/Generation Plan	匯總的建築物組的選定提案 (選定的提案是設施經理為 CEM 提供的每座建築物選擇的提案) Aggregated selected proposal for group of building (Selected proposal is facility manager's selection of proposals for each building offered by CEM)	總功耗/發電計劃 Aggregated Power consumption/generation plan	JWG2002
功耗/發電概況 Power Consumption/Generation Profile	災難情況下災難情況的電源剖繪，以便 CEM 與 A 行為者之間進行協商 power profile for disaster situations at disaster situation in order to negotiate between	功耗/發電概況 Power consumption/generation profile	JWG2042

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
	CEM and Actor A		
功耗/發電概況 Power Consumption/Generation Profile	災難情況下的匯總功率剖繪，以便 CEM 與行為者 A 進行協商  aggregated power profile at disaster situation in order to negotiate between CEM and Actor A	總功耗/發電計劃  Aggregated power consumption/generation profile	JWG2042
功耗/發電概況 Power Consumption/Generation Profile	功率剖繪，包括激勵計劃和重新創建的消費計劃，客戶建築物的生成計劃  Power profile that includes incentive and re-created plans of consumption schedules, generation schedules of the customer's building	功耗/發電概況  Power consumption/generation profile	JWG2001
功耗/發電概況 Power Consumption/Generation Profile	分流控制的緊急功率剖繪  Emergency Power Profile for the triage control	功耗/發電概況  Power consumption/generation profile	JWG2001
配電計畫 Power distribution Plan	行為者 A 提供的配電計劃，以便與 CEM 進行談判  Power distribution plan provided by Actor A in order to negotiate with CEM	功耗/發電概況  Power consumption/generation plan	JWG2010
用戶電池調度計劃 Customer's battery operation plan	CEM 提供的用戶電池調度計劃(以下形式之一：詳細計劃，概要計劃或剩餘計劃)，以便與行為者 A 協商  Customer's battery operation plan (one of the following form : Detail schedule, outline schedule or Surplus schedule) provided by CEM in order to negotiate with Actor A	電池聚合的峰值偏移貢獻(PSCBA)  Peak Shift Contribution by Battery Aggregation (PSCBA)	JWG202x
用戶電池調度計劃 Customer's battery operation plan	行為者 A 提供的客戶電池調度計劃(多餘的電量)，以便與 CEM 協商  Customer's battery operation	電池聚合的峰值偏移貢獻(PSCBA)  Peak Shift Contribution by	JWG202x

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
	plan (surplus power usage) provided by Actor A in order to negotiate with CEM	Battery Aggregation (PSCBA)	
風扇設定 Fan setting	自動模式 Mode automatic	舒適度，管理和狀態資訊 Comfort, management and status information	JWG 111x, 112x
風扇設定 Fan setting	非自動模式 Mode non-automatic	舒適度，管理和狀態資訊 Comfort, management and status information	JWG 111x, 112x
風扇設定 Fan setting	等級 Level	舒適度，管理和狀態資訊 Comfort, management and status information	JWG 111x, 112x
電網狀態 Grid status	紅綠燈 Traffic light	紅綠燈 Traffic light	WGSP 2112
電網狀態 Grid status	計劃停電將無法供電的時間段資訊 Time period information when no power will be provided by scheduled blackout	客戶的停電管理 Blackout management at Customer	JWG2122
電網狀態 Grid status	緊急程度 Level of Emergency	用戶的緊急管理 Emergency management at Customer	JWG2122
用戶狀態 Customer Status	每個智慧裝置的優先級資訊 Priority Information of the each smart devices	重要程度，優先程度 Degrees of importance, priorities	JWG2001
用戶狀態 Customer Status	建築物群組的聚合優先資訊 Aggregated priority information for the group of building	重要程度，優先程度 Degrees of importance, priorities	JWG2002

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
增加/減少 Increase/decrease	降低絕對熱量 decrease absolute heat	舒適度，管理和狀態資訊；溫度剖繪；直接負載/發電管理 Comfort, management and status information; Temperature profile; Direct load/generation management	JWG111x, 112x, JWG211x/WGSP 211x, JWG212x/WGSP212x
增加/減少 Increase/decrease	降低相對熱量 decrease relative heat	舒適度，管理和狀態資訊；溫度剖繪；直接負載/發電管理 Comfort, management and status information; Temperature profile; Direct load/generation management	JWG111x, 112x, JWG211x/WGSP 211x, JWG212x/WGSP212x
增加/減少 Increase/decrease	增加絕對熱量 increase absolute heat	舒適度，管理和狀態資訊；溫度剖繪；直接負載/發電管理 Comfort, management and status information; Temperature profile; Direct load/generation management	JWG111x, 112x, JWG211x/WGSP 211x, JWG212x/WGSP212x
增加/減少 Increase/decrease	增加相對熱量 increase relative heat	舒適度，管理和狀態資訊；溫度剖繪；直接負載/發電管理 Comfort, management and status information; Temperature profile; Direct load/generation management	JWG111x, 112x, JWG211x/WGSP 211x, JWG212x/WGSP212x
增加/減少 Increase/decrease	根據之前製定的計劃減少消費的請求 Request of reduce consumption based on the plan which is set before	功耗管理/減少 Management of power consumption/reduction	JWG2001
增加/減少 Increase/decrease	行為者 A 請求加速生產或減速生產 Request of accelerating the	功耗管理/減少 Management of power consumption/reduction	JWG2041

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
	production or decelerating the production by Actor A		
日誌資訊 Log information	燃料電池日誌資訊 Log information fuel cell	舒適度，管理和狀態資訊 Comfort, management and status information	WGSP 2114, JWG 1130
日誌資訊 Log information	熱泵日誌資訊 Log information heat pump	舒適度，管理和狀態資訊 Comfort, anagement and status information	WGSP 2114, JWG 1130
日誌資訊 Log information	太陽能日誌資訊 Log information photovoltaic	舒適度，管理和狀態資訊 Comfort, management and status information	WGSP 2114, JWG 1130
日誌資訊 Log information	存儲電池日誌資訊 Log information storage battery	舒適度，管理和狀態資訊 Comfort, management and status information	WGSP 2114, JWG 1130
日誌資訊 Log information	智慧裝置控制的結果 Result of smart device control	功 耗 管 理 / 減 少 Management of power consumption/reduction	JWG2010, JWG2041, JWG2042
日誌資訊 Log information	能量抑制性能報告 Energy suppression performance report	功 耗 管 理 / 減 少 Management of power consumption/reducti on	JWG2001
日誌資訊 Log information	聚合抑制效果報告 Aggregated suppression performance report	功 耗 管 理 / 減 少 Management of power consumption/reducti on	JWG2002
日誌請求 Log request	燃料電池日誌資訊 log information fuel cell	舒適度，管理和狀態資訊 Comfort, management and status information	WGSP 2114
日誌請求 Log request	熱泵日誌資訊 log information heat pump	舒適度，管理和狀態資訊 Comfort, management and status information	WGSP 2114

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
日誌請求 Log request	太陽能日誌資訊 log information photovoltaic	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2114
日誌請求 Log request	存儲電池日誌資訊 log information storage battery	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2114
計量 Metering	量測資料 Metering data	價格和環境資訊；簡 單資料單元  Price & environmental information; simple data unit	WGSP 2111
計量 Metering	費率概況 Tariff profile	價格和環境資訊；簡 單資料單元  Price & environmental information	WGSP 2112
計量 Metering	費率資料更新 Tariff profile update	價格和環境資訊；簡 單資料單元  Price & environmental information; simple data unit	WGSP 2112
開/關 On/off	關燃料電池 off fuel cell	直接負載/發電管理； 舒適度，管理和狀態 資訊；簡單資料單元  Direct load/generation management; Comfort, management and status information; simple data unit	JWG111x, 112x, JWG211x/WGSP 211x, JWG212x/WGSP212x
開/關 On/off	關閉加熱器 off heater	直接負載/發電管理； 舒適度，管理和狀態 資訊；簡單資料單元  Direct load/generation management; Comfort, management and status information; simple	WGSP 2121, JWG 1120



資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
		data unit	
開/關 On/off	關閉熱泵 off heat pump	直接負載/發電管理； 舒適度，管理和狀態 資訊；簡單資料單元  Direct load/generation management; Comfort, management and status information; simple data unit	JWG111x, 112x,  JWG211x/WGSP 211x, JWG212x/WGSP212x
開/關 On/off	卸載 off load	直接負載/發電管理； 舒適度，管理和狀態 資訊；簡單資料單元  Direct load/generation management; Comfort, management and status information; simple data unit	WGSP 2121
開/關 On/off	關閉太陽能 off photovoltaic	直接負載/發電管理； 舒適度，管理和狀態 資訊；簡單資料單元  Direct load/generation management; Comfort, management and status information; simple data unit	WGSP 2121
開/關 On/off	打開燃料電池 on fuel cell	直接負載/發電管理； 舒適度，管理和狀態 資訊；簡單資料單元  Direct load/generation management; Comfort, management and status information; simple data unit	JWG111x, 112x,  JWG211x/WGSP 211x, JWG212x/WGSP212x
開/關 On/off	打開加熱器 on heater	直接負載/發電管理； 舒適度，管理和狀態 資訊；簡單資料單元  Direct load/generation management; Comfort, management and status information; simple	WGSP 2121, JWG 1120

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
		data unit	
開/關 On/off	打開熱泵 on heat pump	直接負載/發電管理； 舒適度，管理和狀態 資訊；簡單資料單元  Direct load/generation management; Comfort,  management and status information; simple data unit	JWG111x, 112x,  JWG211x/WGSP 211x, JWG212x/WGSP212x
開/關 On/off	打開熱泵(水) on heat pump (water)	直接負載/發電管理； 舒適度，管理和狀態 資訊；簡單資料單元  Direct load/generation management; Comfort,  management and status information; simple data unit	JWG 1130, JWG 1120
開/關 On/off	打開負載 on load	直接負載/發電管理； 舒適度，管理和狀態 資訊；簡單資料單元  Direct load/generation management; Comfort,  management and status information; simple data unit	WGSP 2121
暫停 / 繼續 Pause/Resume	暫停 SD 功能 Pause SD function	直接負載/發電管理； 舒適度，管理和狀態 資訊；簡單資料單元  Direct load/generation management; Comfort,  management and status information; simple data unit	JWG111x, 112x
控制 Control	提前(例如提前一天)在用戶 場所中的智慧裝置的控制信號  Control signal for the smart devices in the customer premises in advance (e.x. one-day in advance)	負載/發電管理  Load/generation management	JWG2121

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
控制 Control	大樓或 CES/CEP 中智慧裝置的控制信號 Control signal for the smart devices in the Building or CES/CEP	負載/發電管理 Load/generation management	JWG2001, JWG2010, JWG2041, JWG2042
控制 Control	設備運行時間表 Equipment operation schedule	負載/發電管理 Load/generation management	JWG2002
控制 Control	請求時間表 Request for Schedule	電池聚合的峰值偏移貢獻(PSCBA) Peak Shift Contribution by Battery Aggregation (PSCBA)	JWG202x
控制 Control	詢價，詢價接受，詢價拒絕 Inquiry, Inquiry Acceptance, Inquiry Rejection	電池聚合的峰值偏移貢獻(PSCBA) Peak Shift Contribution by Battery Aggregation (PSCBA)	JWG202x
控制 Control	執行通知 Execution Notification	電池聚合的峰值偏移貢獻(PSCBA) Peak Shift Contribution by Battery Aggregation (PSCBA)	JWG202x
請求 Request	請求減少對 CEM 的消耗 Request of reduce consumption to CEM	負載/發電管理 Load/generation management	JWG2001
請求 Request	CEM 調整計劃的提案(這些是根據優先級，用電計劃以及建築物和設備的消耗量創建的) Proposals for adjustment plan to CEM (These are created based on priority, power usage plan and consumption of buildings and equipments)	負載/發電管理 Load/generation management	JWG2002

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
請求 Request	建築物群的抑制信號 Suppression signals for Group of Buildings	負載/發電管理 Load/generation management	JWG2002
請求 Request	建築群用電計劃 Power usage plan of Group of Buildings	負載/發電管理 Load/generation management	JWG2002
暫停/繼續 Pause/Resume	恢復 SD 功能 Resume SD function	直接負載/發電管理； 舒適度，管理和狀態 資訊；簡單資料單元 Direct load/generation management; Comfort, management and status information; simple data unit	JWG 111 x, 112x
請求減少輸出功率 Request exported power reduction	NA	直接負載/發電管理； 簡單資料單元 Direct load/generation management; power profile; simple data unit	WGSP 2121
請求降低進口功率 Request imported power reduction	NA	直接負載/發電管理； 簡單資料單元 Direct load/generation management; power profile; simple data unit	WGSP 2121
請求儲存熱量 Request store heat	請求儲存熱量 Request store heat	Temperature profile; Direct load/generation management; simple data unit	WGSP 2121
設置模式 Set mode	模式 Mode	simple data unit; Comfort, management and status information	JWG 1110
關機信號 Shut off signal	熱泵關閉信號剖繪 Heat pump shut off signal profile	直接負載/發電管理； 簡單資料單元 Direct load/generation management; simple data unit	WGSP 2121

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
信號 Signal	災害信號 Disaster Signal	信號 Signal	JWG2042
開始/停止 Start/Stop	開始 SD 功能 Start SD function	直接負載/發電管理； 簡單資料單元 Direct load/generation management; simple data unit	JWG 1110
開始/停止 Start/Stop	停止 SD 功能 Stop SD function	直接負載/發電管理； 簡單資料單元 Direct load/generation management; simple data unit	JWG 1110
狀態 Status	給儲能電池充電成功/失敗 charge storage battery successful/unsuccessful	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2112, 2121
狀態 Status	儲能電池放電成功/失敗 discharge storage battery successful/unsuccessful	舒適度，管理和狀態 資 訊 Comfort, management and status information	JWG 1130, WGSP 0200, 2112, 2121
狀態 Status	靈活啟動智慧裝置 flexible start for smart device	舒適度，管理和狀態 資訊 Comfort, management and status information	JWG 1103, JWG120x, JWG212x, JWG121x, JWG202x
狀態 Status	智慧裝置的最晚結束時間 Latest end time of smart device	舒適度，管理和狀態 資訊 Comfort, management and status information	JWG 1103, JWG120x, JWG212x
狀態 Status	關閉/減少熱泵成功/失敗 off/decrease heat pump successful/unsuccessful	舒適度，管理和狀態 資訊 Comfort, management and status information	JWG111x, 112x, JWG211x/WGSP 211x, JWG212x/WGSP212x
狀態 Status	關閉燃料電池成功/失敗 off fuel cell successful/unsuccessful	舒適度，管理和狀態 資訊 Comfort, management and status information	JWG111x, 112x, JWG211x/WGSP 211x, JWG212x/WGSP212x
狀態	關閉加熱器成功/失敗 off heater	舒適度，管理和狀態 資訊 Comfort,	WGSP 2121

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
Status	successful/unsuccessful	management and status information	
狀態 Status	關閉熱泵成功/失敗 off heat pump successful/unsuccessful	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2121
狀態 Status	卸載成功/失敗 off load successful/unsuccessful	舒適度，管理和狀態 資 訊 Comfort, management and status information	WGSP 2121
狀態 Status	關閉太陽能成功/失敗 off photovoltaic successful/unsuccessful	舒適度，管理和狀態 資 訊 Comfort, management and status information	WGSP 2121
狀態 Status	打開/增加熱泵成功/失敗 on/increase heat pump successful/unsuccessful	Comfort, management and status information	JWG111x, 112x, JWG211x/WGSP 211x, JWG212x/WGSP212x
狀態 Status	開啟燃料電池成功/失敗 on fuel cell successful/unsuccessful	舒適度，管理和狀態 資 訊 Comfort, management and status information	JWG111x, 112x, JWG211x/WGSP 211x, JWG212x/WGSP212x
狀態 Status	開啟加熱器成功/失敗 on heater successful/unsuccessful	舒適度，管理和狀態 資 訊 Comfort, management and status information	WGSP 2121
狀態 Status	開啟成功/失敗 on successful/unsuccessful	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2121
狀態 Status	智慧裝置的程序持續時間 Programme duration of smart device	舒適度，管理和狀態 資訊 Comfort, management and status information	JWG 1103, JWG120x, JWG121x, JWG212x
狀態 Status	太陽能態資料集 PV Status data set	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2121
狀態 Status	設定溫度成功/失敗 set temperature	舒適度，管理和狀態 資訊 Comfort,	WGSP 2121

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
	successful/unsuccessful	management and status information	
狀態 Status	設置計時器成功/失敗 set timer successful/unsuccessful	舒適度，管理和狀態 資訊 Comfort, management and status information	JWG111x, 112x, JWG211x/WGSP 211x
狀態 Status	燃料電池狀態 status fuel cell	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2114, 2121
狀態 Status	熱泵狀態 status heat pump	舒適度，管理和狀態 資訊 Comfort, management and status information	JWG 1130, WGSP 2114, 2121
狀態 Status	太陽能狀態 status photovoltaic	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2114, 2121
狀態 Status	SD 狀態 status SD	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2114
狀態 Status	VAR 模式成功/失敗 VAR mode successful/unsuccessful	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2121
狀態 Status	建築資訊 Building Information	管 理 和 狀 態 資 訊 Management and Status Information	JWG2010
狀態 Status	建築資訊聚合 Aggregated Building Information	管 理 和 狀 態 資 訊 Management and Status Information	JWG2002
狀態 Status	CEM 的狀態報告(是否存在) Status Report of the CEM (Alive or Not)	管 理 和 狀 態 資 訊 Management and Status Information	JWG2042

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
狀態請求 Status request	燃料電池狀態 status fuel cell	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2114
狀態請求 Status request	熱泵狀態 status heat pump	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2114
狀態請求 Status request	太陽能狀態 status photovoltaic	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2114
狀態請求 Status request	儲能電池狀態 status storage battery	舒適度，管理和狀態 資訊 Comfort, management and status information	WGSP 2114
儲能 Storage	充電儲能電池 charge storage battery	直接負載/發電管理； 簡單資料單元 Direct load/generation management; simple data unit	JWG111x, 112x, JWG211x/WGSP 211x, JWG212x/WGSP212x
儲能 Storage	放電儲能電池 discharge storage battery	直接負載/發電管理； 簡單資料單元 Direct load/generation management; simple data unit	JWG111x, 112x, JWG211x/WGSP 211x, JWG212x/WGSP212x
儲能 Storage	備用儲能電池 standby storage battery	直接負載/發電管理； 簡單資料單元 Direct load/generation management; simple data unit	JWG111x, 112x, JWG211x/WGSP 211x
儲能 Storage	備用儲能電池成功/失敗 standby storage battery successful/unsuccessful	舒適度，管理和狀態 資訊 Comfort, management and status	JWG111x, 112x, JWG211x/WGSP 211x



資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
		information	
費率 Tariff	固定費率表 Fixed tariff schedule	價格與環境資訊 Price & environmental information	WGSP 2112
費率 Tariff	即時費率 Real-time tariff	價格與環境資訊 Price & environmental information	JWG 1130, WGSP 2112
費率 Tariff	一段時間內每次的價格(例如一天中的每小時價格) Prices for each time in a period (e.g. Hourly prices in a day)	帶有激勵的直接負載/發電管理 Direct load/generation management with Incentive	JWG2121
費率 Tariff	一段時間內每次的價格(例如一天中的每小時價格) Prices for each time in a period (e.g. Hourly prices in a day)	每次基於價格的供需調整 Demand-Supply Adjustment based on Prices for each time	JWG2000
激勵措施 Incentive	獎勵資訊 Incentive information	行為者 A 減少需求 Demand reduction by Actor A	JWG2001, JWG2002, JWG2010
出價 Bid	用戶以一定價格出價 Negawatt(功率降低) Customer bids Negawatt (Power reduction) with certain price	帶負電的需量反應 Demand Response with Negawatt	Section A.1.22
遙測資料 Telemetry data	遙測資料 Telemetry data	功率剖繪；溫度剖繪，簡單資料單元 Power profile; temperature profile, simple data unit	WGSP 2121
溫度 Temperature	設定溫度 set temperature	Temperature profile; simple data unit	WGSP 2121
門檻等級 Threshold level	設定費率門檻 set tariff threshold	舒適度，管理和狀態資訊 Comfort, management and status information	WGSP 2112

資訊交換			
類別 Category	資料 Data	Concepts/data unit 概念/資料單元	使用案例參考 UC references
時間 Time	設定計時器 set timer	舒適度，管理和狀態 資訊 Comfort, management and status information	JWG 1103, JWG120x, JWG212x, JWG121x, JWG202x, WGSP 2112
VAR 模式資訊 VAR mode information	VAR 模式資訊 VAR mode information	功率剖繪；溫度剖 繪，簡單資料單元 Power profile; temperature profile, simple data unit	WGSP 2121
電壓支援請求 Voltage support request	電壓支援 Voltage supports	功率剖繪；溫度剖 繪，簡單資料單元 Power profile; temperature profile, simple data unit	WGSP 2121

#### 4.4.5 能源管理概念 Energy management concepts

##### 4.4.5.1 交通燈概念 Traffic Light Concept

- 行為者 A 通常會參考與市場相關的參與者，例如零售商。Actor A typically references the market relevant actors like retailers
- 行為者 B 通常引用諸如“計量調度中心”或“DSO”之類的參與者，這些參與者將透過智慧計量基礎架構與用戶域進行互動。Actor B typically references actors like “Meter Operator” or “DSO” that will interface to the customer domain by a smart metering infrastructure.

TLC 並不暗示任何特定的用戶案例和/或使用案例，它僅描述網格中具有不同類型情況的概念。

TLC does not imply any specific user stories and/or use cases. It only describes a concept with different types of situations in the Grid.

本標準告中與能源管理相關的使用者經歷和使用案例在一定程度上支持了交通信號燈概念(TLC)(請參見圖 23)，即使在任何情況下都不是前提條件，也不是完整的使用者經歷及使用案例，也並非涵蓋所有階段。

The energy management relevant user stories and use cases in this technical report support on a certain level the Traffic Light Concept (TLC) (see Figure 23) even if this is not in any case a prerequisite nor user stories and use cases are complete and covering all phases.

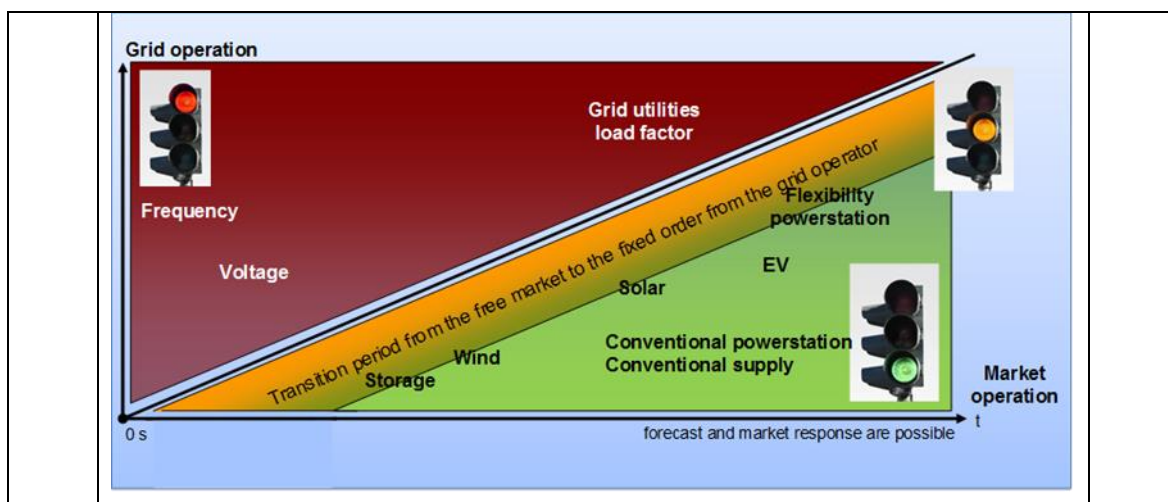


圖 23 交通燈概念

Figure 23 – Traffic Light Concept

備考：圖中的設備顯示可用於支持緩解電網問題的資源示例。

NOTE The devices in the graph show examples of resources that can be used to support mitigation on Grid issues

TLC 區分以下三個方面：

The TLC differentiates between three areas：

綠色陰影區域定義“智慧市場”自由競爭的區域；DSO 此時可能與市場互動，也可能不互動，這應該被視為“正常運行狀態”。

The **green shaded** region defines the region where the ‘smart market’ competitively operates freely; the DSO may or may not interact with the market at this point. This should be seen as the ‘normal operating state.’

在此狀態下使用的典型功能是“彈性或需量反應”，如 4.4.5.2 中所述。

A typical function, used in this state, is “Flexibility or Demand Response”, as described in 4.4.5.2.

黃色狀態表示 DSO 積極參與市場以防止系統變得不穩定的狀態，因此它是防止電網進入紅色狀態的臨時狀態，這可以透過執行預先約定的合同或介入以市場價格實時進行，這並不意味著客戶必須接受第三方(DSO)決定何時可以使用其房屋或辦公場所中任何物品的任何情況，相反，應提供智慧解決方案和經濟激勵措施，以使用戶決定並接受一些限制。

The **yellow state** indicates the state where the DSO actively engages with the market in order to keep the system from becoming unstable, it is therefore a

temporary state preventing the grid from entering the red state. This could be by executing pre-agreed contracts or by stepping in to procure in real time at market prices. This does not mean that the customer has to accept any situation where a third party (DSO) decides when they can use what is in their home or business premise. Instead intelligent solutions and economic incentives should be provided to allow the customer to decide and accept some limits.

在此狀態下使用的典型功能是“負載管理或需求側管理”，如 4.4.5.3 中所述。

A typical function, used in this state, is “Load Management or Demand Side Management”, as described in 4.4.5.3.

在紅色狀態下，DSO 需要控制發生約束的特定區域中的市場互動，但是，這種狀態下的動作必須是特定的且定義明確的，並且本質上是暫時的，在這種情況下，DSO 可以超越市場上現有的合同，透過彈性運營商執行專門的緊急行動，或者對發電量或需求進行直接控制，以便在合同或法規/法規允許的範圍內重新穩定係統。

In the **red state** the DSO needs to take control of market interactions in a certain area where the constraint has occurred. However, actions in this state must be specific and well defined and be temporary in nature. In this situation the DSO can override contracts existing in the market, execute dedicated emergency actions through flexibility operators, or execute direct controls over generation or demand in order to re-stabilize the system as far as a contract or regulation/legislation allows.

在此狀態下使用的典型功能是“緊急情況或停電預防”，如 4.4.5.4 中所述。

A typical function, used in this state, is “Emergency or Blackout prevention”, as described in 4.4.5.4.

#### 4.4.5.2 彈性(需量反應) Flexibility (demand response)

彈性是綠色區域中的典型功能，市場根據價格和/或環境提供彈性的能源，這可以是零售商提供的其他方案之一，除提供按時間劃分的電價外，還可以使用自己的 PV 能源及其組合。

Flexibility is a typical functionality in the green area. The market offers flexible energy based on prices and/or environment. This can be amongst other scenarios the retailer, offering time separated tariffs but also using the own PV energy and combinations of that.

客戶透過根據價格範圍，能源可用性或特定環境要求事項(綠色電源等)等特定條件來啟動，暫停等智慧裝置來提供彈性。

The customer offers flexibility by letting a smart device to be started, paused,

etc. based on specific conditions like price ranges, the availability of energy or specific environmental requirements (green power etc.).

智慧裝置可以是能源的消費者或生產者。

The smart device can be a consumer or producer of energy.

#### 4.4.5.3 負載管理(需求側管理) Load management (demand side management)

正如定義中已經提到的，需求方管理反映自上而下的方，。如果電網識別出穩定性問題，例如頻率用盡帶寬，則 TSO 和/或 DSO 可能會向所附的 CEM 尋求幫助，這可能是減少或增加能耗或發電量的請求。

As already mentioned in the definition (see [2]), demand side management reflects the Top Down approach. If the grid recognises stability issues like frequency is running out of bandwidth, the TSO and/or DSO may ask the attached CEMs for help. This can be a request to reduce or increase consumption or generation.

在特定合同的情況下，負載管理可以視為對智慧裝置的管理，例如 熱泵透過集成的 CEM 連接，在這種情況下，訊息可能是“增加/減少到 100 % 或 0 %”。

In case of a specific contract, load management can be seen as a management of Smart Devices, e.g. a heatpump is attached via an integrated CEM. In this case the message could be “increase/decrease to 100 % or 0 %”.

#### 4.4.5.4 緊急/停電預防 Emergency/blackout prevention

緊急或停電預防管理可以看作是特定的負載管理案例，如果門前有停電，則來自 TSO 或 DSO 的消息建議 CEM 和智慧裝置立即進入定義的待機模式，這是防止即將到來的停電的最後機會。

Emergency or blackout prevention management can be seen as a specific load management case. In case a blackout is in front of the door, the message from the TSO or DSO advises the CEM and smart devices to immediately go into a defined Standby Mode as a last chance to prevent the upcoming blackout.

#### 4.4.6 功能特定的剖繪 Function-specific profiles

##### 4.4.6.1 通則 General

為創建具有相關資訊的可互運訊息，需要解釋特定概念，以作為這些訊息和要交換的資訊的基礎，這些資訊要求事項在相應的表 2 至 5 中列出。

In order to create interoperable messages with the relevant information, specific concepts need to be explained to become the basis for these messages and information to be exchanged. These information requirements are listed in the corresponding Tables 2 to 5.

##### 4.4.6.2 功率剖繪 Power profile

不管智慧裝置是消費者還是生產者，它都需要宣布一種預期的能耗或發電量(功率分佈，如圖 24)，以允許在智慧場所內分配能量。

Irrespective of whether the smart device is a consumer or producer it needs to announce a kind of expected energy consumption or generation (power profile – see Figure 24) to allow energy allocation within smart premises.

例如，熱泵可以要求每天分配兩個序列，一次是早晨，一次是下午，每個序列具有不同的功耗階段。

For example, a heat pump can ask for allocating two sequences per day, once in the morning, once in the afternoon, each sequence with different phases of power consumption.

可替代地，智慧裝置可以在相同的時間段內提供多個序列，例如，電池組可以提供充電或放電，CEM 可以在這些可能性之間進行選擇。

Alternatively, a smart device can offer multiple sequences for the same time period, e.g. a battery pack can offer charging or discharging. The CEM can choose between these possibilities.

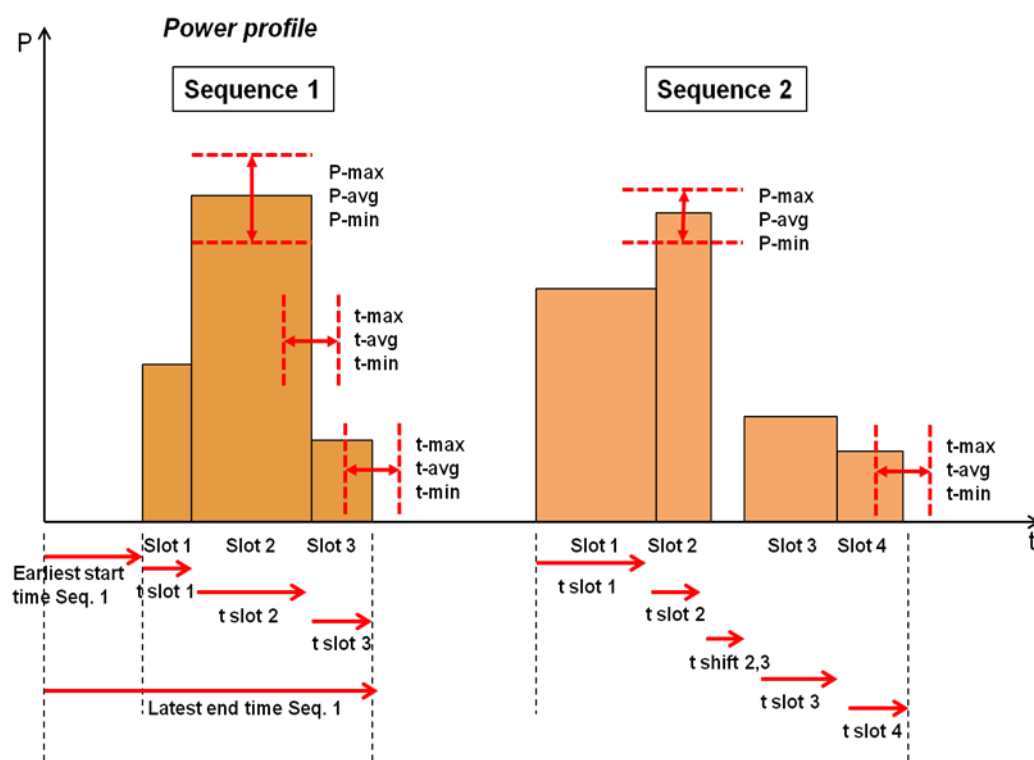


Figure 24 – Structure of a power profile

此功率剖繪允許區分能量的“產生”或“消耗”，圖 25 示例顯示在充電和放電期間蓄電池的能量方向。

This power profile allows “generation” or “consumption” of energy to be distinguished. Figure 25 shows as example the energy direction of a storage battery during charging and discharging.

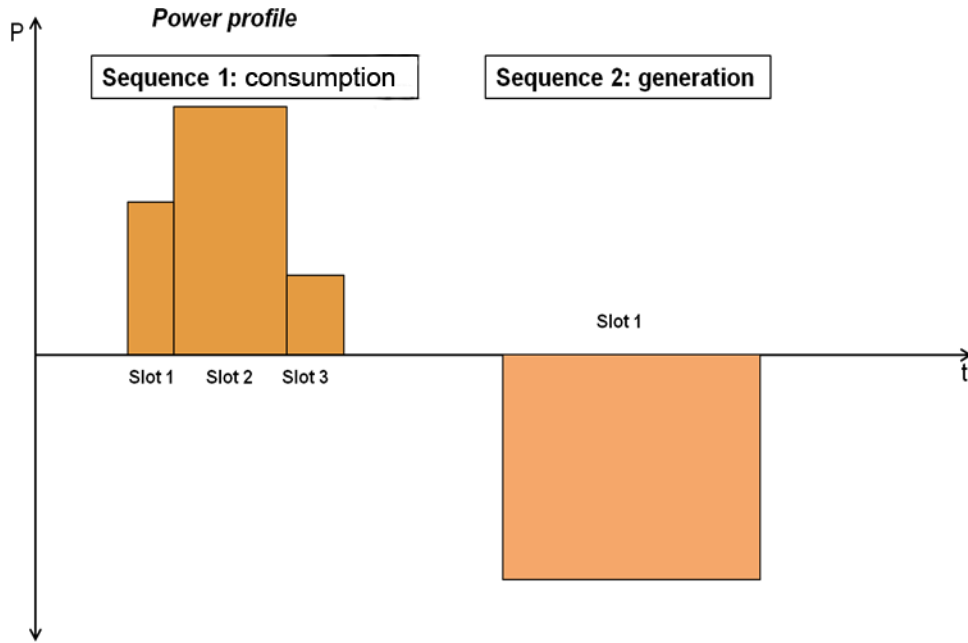


圖 25 消費量和發電量

Figure 25 – Consumption and generation

表達預期能量消耗/發電量的最簡單方法是，一個序列帶有一個時間幀，在整個時槽上具有一個功率值(如圖 26)。

The easiest way to express the expected energy consumption/generation is one sequence with one time frame with one power value over timeslot (see Figure 26).

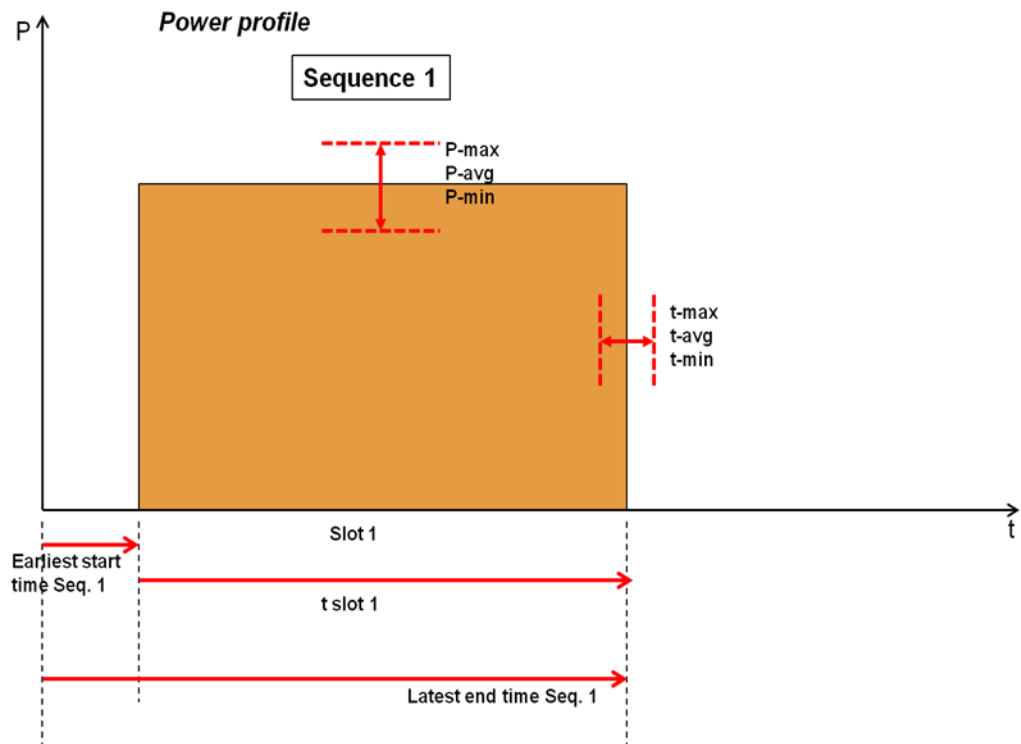


圖 26 簡易功率剖繪的結構

Figure 26 – Structure of an easy power profile

表 2 “能源配置” 資訊要求事項

Table 2 – Information requirements “Energy Profile”

名稱 Name	包含 Includes	UC 參考 UC references
功率剖繪(功率隨時間變化) power profile (power over time)		JWG1100, 1101, 1102, 1103, 120x, 212x, WGSP2110, 2111, 2112
	功率 power quantity	
	能源類型和每種能源類型的能量 type of energy sources and amount of energy from each source type	
	功耗/發電 consumption/generation	
	時間資訊(例如時段，實際時間，開始時間，結束時間等) time information (e.g. slots, actual time, start time, end time, etc.)	
	日期資訊(例如，工作日，日期等) date information (e.g. weekday, date, etc.)	
	可信度 confidence level	
	裝置 devices	
瞬時功率資訊 instantaneous power information		JWG1103, 1130
	電量 power quantity	
	時間資訊(例如，實際時間，...) time information (e.g. actual time, ...)	



	日期資訊(例如，工作日，日期等) date information (e.g. weekday, date, etc.)	
	可信度 confidence level	
	裝置 devices	

#### 4.4.6.3 價格和環境資訊概況(見圖 27) Price and environmental information profile (see Figure 27)

價格和環境概況使用功率概況中與 4.4.6.2 中所示相同的基本結構，因此，可以在一個時間段內(例如接下來的 24 小時)某些時槽的價格表一樣處理典型方案。

The price and environmental profile uses the same basic structure as shown in 3.4.6.2 within power profile. Herewith typical scenarios can be handled like the price table for certain time slots within a timeframe (e.g. the next 24 h).

另外，基準條件可用於解決每個時槽一個以上的價格，不同的價格可以基於不同的條件，例如：

Additionally benchmark conditions can be used to address more than one price per time-slot. The different price can be based on different conditions. Examples are :

- 如果在該時槽內能耗超過一定量的能量，則將激活下一個價格水平。If energy consumption exceeds a certain amount of energy within the time-slot, the next price level will be activated
- 價格水平反映基準，例如：客戶可以選擇的能源類型，例如可再生能源，黃色能源，碳足蹟等。The price levels reflect benchmarks, e.g. types of energy like renewables, yellow energy, CO<sup>2</sup> footprint etc., from which the customer can select

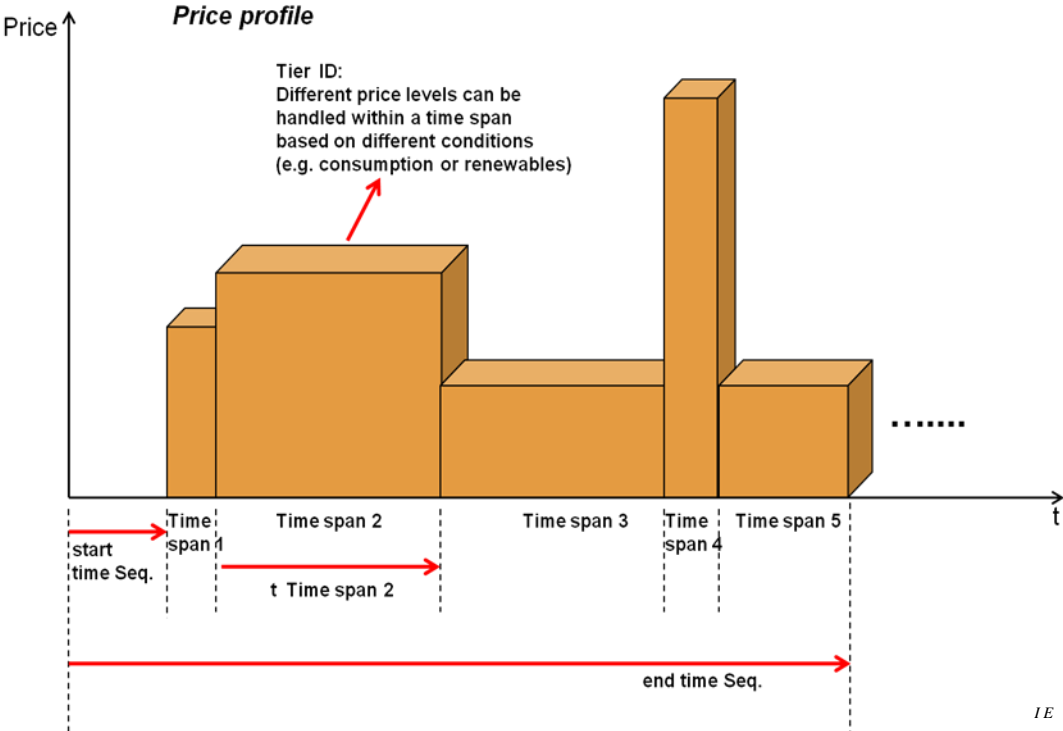


圖 27 價格資料的結構

Figure 27 – Structure of a price profile

表 3 資訊要求事項 “價格和環境概況”

Table 3 – Information requirements “Price and Environment Profile”

名稱 Name	包含 Includes	UC 參考 references
價格和環境概況 price & environment profile		JWG1100, 1130, 1110, 1111, WGSP 2110, 2111
	價格 price quantity	
	環境描述 A/O 數量 environment description a/o quantity	
	可變價格模型(例如折扣，基於數量等) variable price model (e.g. discount, quantity based etc.)	
	時間資訊(例如時段，實際時間，開始時間，結束時間等) time information (e.g. slots, actual time, start time, end time, etc.)	
	日期資訊(例如，工作日，日期等) date information (e.g. weekday, date, etc.)	
	綁定水平 binding level	

#### 4.4.6.4 負載/發電/儲能管理剖繪 Load/generation/storage management profile

負載/發電管理用於表達功率調整的需求和數量，行為者 A/B 正在發信號通知電網中的穩定性問題並尋求幫助，如果用戶提供支持(例如，作為合同的一部分或作為激勵計劃的一部分)，則 CEM 可以評估增加或減少房屋內部能耗或發電量的能力。

Load/generation management is used for expressing the need and quantity of power adjustment. The actor A/B is signalling stability issues in the grid and is asking for help. If the customer has offered support (e.g. as part of the contract or as part of an incentive program) the CEM can evaluate capabilities to increase or reduce energy consumption or generation inside premises.

例如：Examples are：

- 由於某個電站發生故障而在一定時間內升級另一個備用電站，導致電網能

量不足。lack of energy in the grid due to a breakdown of a power station with a certain time to ramp up another backup power station

- 太陽能 and 風力不成比例導致的能量過載。energy overload due to disproportional PV- and wind energy

在這些示例中，行為者 A/B 要求 CEM 在特定時間段內減少或增加功耗。

In these examples the actor A/B asks the CEM to reduce or increase power consumption for a specific time period.

但是，此負載/發電管理概念也可以用於直接管理特定的 CEM 智慧裝置(請參見圖 28)。

Nevertheless this load/generation management concept can also be used to manage specific CEM-smart devices directly (see Figure 28).

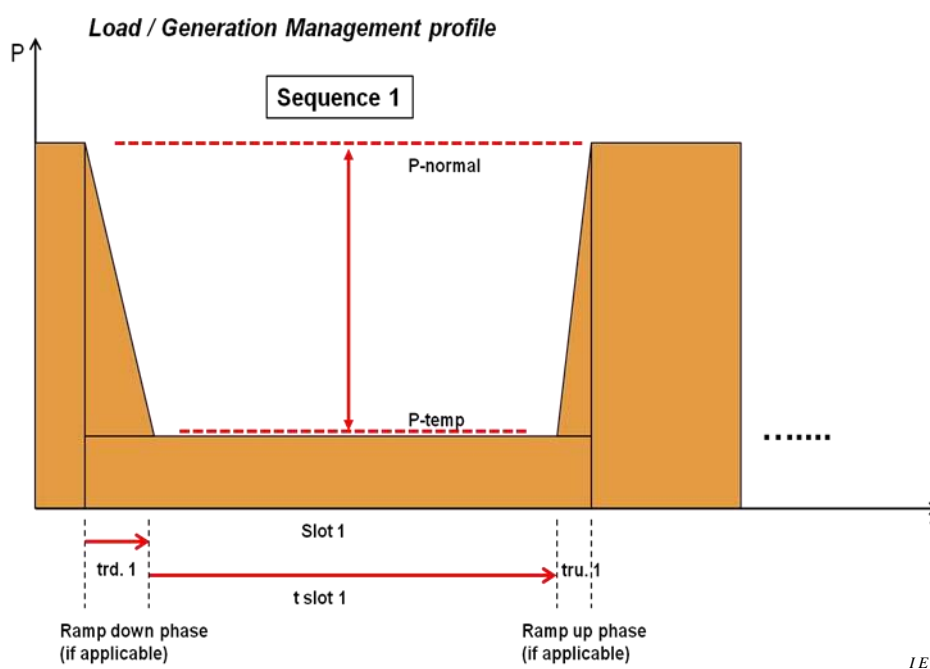


圖 28 負載/發電管理剖繪的結構

Figure 28 – Structure of a load/generation management profile

表 4 資訊要求事項 “直接負載/發電管理剖繪”

Table 4 – Information requirements “Direct Load/Generation Management Profile”

Name	Includes	UC references
負載/發電管理剖繪 load/generation management profile		JWG1130, 1111, 112x, 1110, 120x, 121x, 202x, 2002  WGSP2121, 2114, 2111, 2112

	時間資訊(例如，時間段，實際時間，開始時間，結束時間，加速時間，減速時間等)time information (e.g. slots, actual time, start time, end time, ramp up time, ramp down time, etc.)	
	日期資訊(例如，工作日，日期等)date information (e.g. weekday, date, etc.)	
	上升/下降時的功率量(絕對/相對)power quantity during ramp up/down (absolute/relative)	
	緊急程度/緊急程度 Urgency/criticality	
	可信度 confidence level	
	裝置 devices	

#### 4.4.6.5 緊急情況/斷電預防 Emergencies/Blackout prevention profile

Emergencies/Blackout prevention management is a specific characteristic of load /generation management. The actor A/B is signalling an upcoming blackout situation in the grid. To prevent this blackout the actor A/B is advising the CEM to send all smart devices into a defined blackout prevention mode (minimal power consumption except safety relevant tasks). The information exchange can be handled like the load/generation management profile.

緊急情況/停電預防管理是負載/發電管理的特定特徵。演員 A/B 正在發信號通知電網即將停電。為了防止這種停電，行動者 A/B 建議 CEM 將所有智慧裝置發送到定義的停電防止模式(除了安全相關任務以外的最低功耗)。

可以像負載/生成管理剖繪一樣處理資訊交換。

#### 4.4.6.6 溫度剖繪 Temperature profile

除電源管理類型之外，智慧裝置還可以透過溫度剖繪進行管理(參見圖 29)，後面的概念與功率剖繪概念相當。

Instead of power management types smart devices can also be managed by a temperature profile (see Figure 29). The concept behind is comparable with the power profile concept.

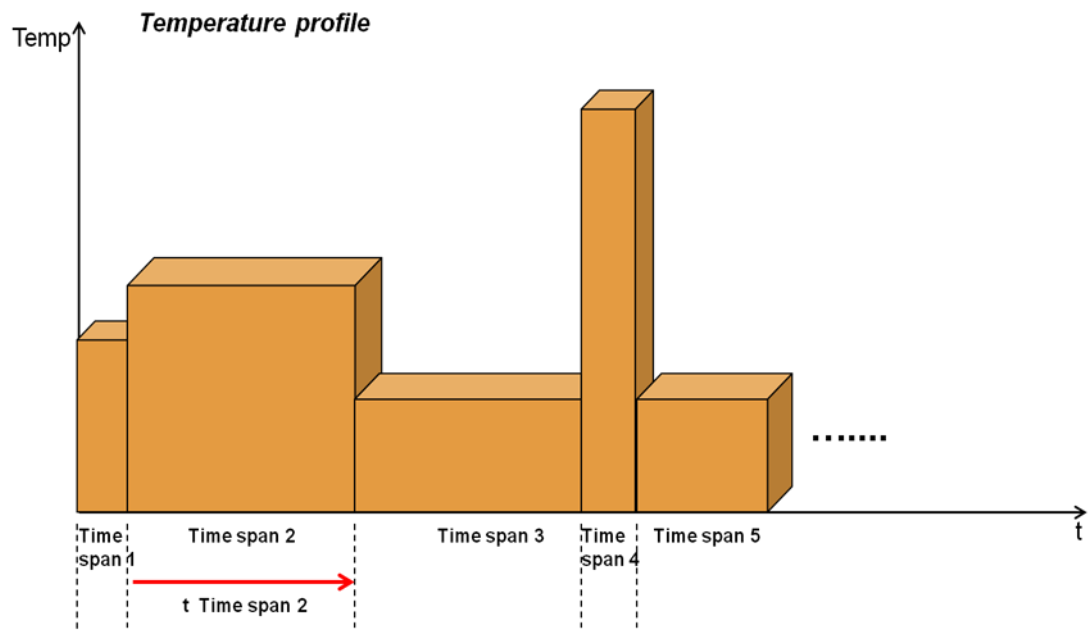


圖 29 溫度剖繪的結構

Figure 29 – Structure of a temperature profile

表 5 資訊要求事項“溫度剖繪”

Table 5 – Information requirements “Temperature Profile”

名稱 Name	Includes	UC references
溫度剖繪 temperature profile		JWG202x, 120x, 121x, 1003, 212x, 1110,  1130, 1111  WGSP2112, 2121, 2114, 2111
	溫度量 temperature quantity	
	時間資訊(例如時段，實際時間，開始時間，結束時間等) time information (e.g. slots, actual time, start time, end time, etc.)	
	日期資訊(例如，工作日，日期等) date information (e.g. weekday, date, etc.)	
	可信度 confidence level	
	裝置	

	devices	
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#### 4.4.7 舒適度，管理和狀態資訊 **Comfort, management and status information**

舒適度，管理和狀態資訊概述遠程管理以及各種遠程監視(如通知，警報和狀態資訊)的資訊要求事項。

該集合包括典型資料，如打開，關閉，等待開始，剩餘時間，暫停，完成等。要交換的資訊已在圖 19 引用。

Comfort, management and status information summarize information requirements for remote management as well as kinds of remote monitoring like notifications, alerts and status information.

The collection includes typical data like on, off, waiting for start, remaining time, pause, finished etc. The information to be exchanged is already referenced within Figure 19

#### 4.4.8 針對新服務要求事項的即將到來的剖繪 **Upcoming profiles for new service requirements**

功能特定的剖繪，要交換的資訊(如本標準告中所述)和相應的消息的設置方式允許輕鬆定義和平穩協調即將到來的服務，例如進一步的能源相關要求事項，AAL，安全性，醫療保健等 以此類推。

The function specific profiles, information to be exchanged (as described in this technical report) and corresponding messages are set up in a manner to allow easy definition and smooth harmonization of upcoming services like further energy related requirements, AAL, security, healthcare, and so forth.

## 附錄 A

(非規範性)

## User stories and use cases collection

## 使用者經歷和使用案例集合

## A.1 使用者經歷 User stories

## A.1.1 通則 General

本節描述使用者經歷的集合，作為必要使用案例的基礎，使用者經歷從客戶/用戶的角度描述行為，使用者經歷的主要目標是敘述自己場所中的典型行為，以驗證用於完成故事的使用案例，這些用戶案例可能適用於各種情況，並且不僅限於特定的家庭環境，建築和工業應用。

This section describes a collection of user stories as a basis for necessary use cases. User stories describe the behaviour from the customers'/users' point of view. The main target of user stories are to narrate typical behaviors in own premises to validate the use cases used to accomplish the story. These user stories may apply to various scenarios and are not limited to specific home environments, building and industrial applications.

圖 A.1 列出典型的用戶要求事項。

Figure A.1 lists typical user requirements.

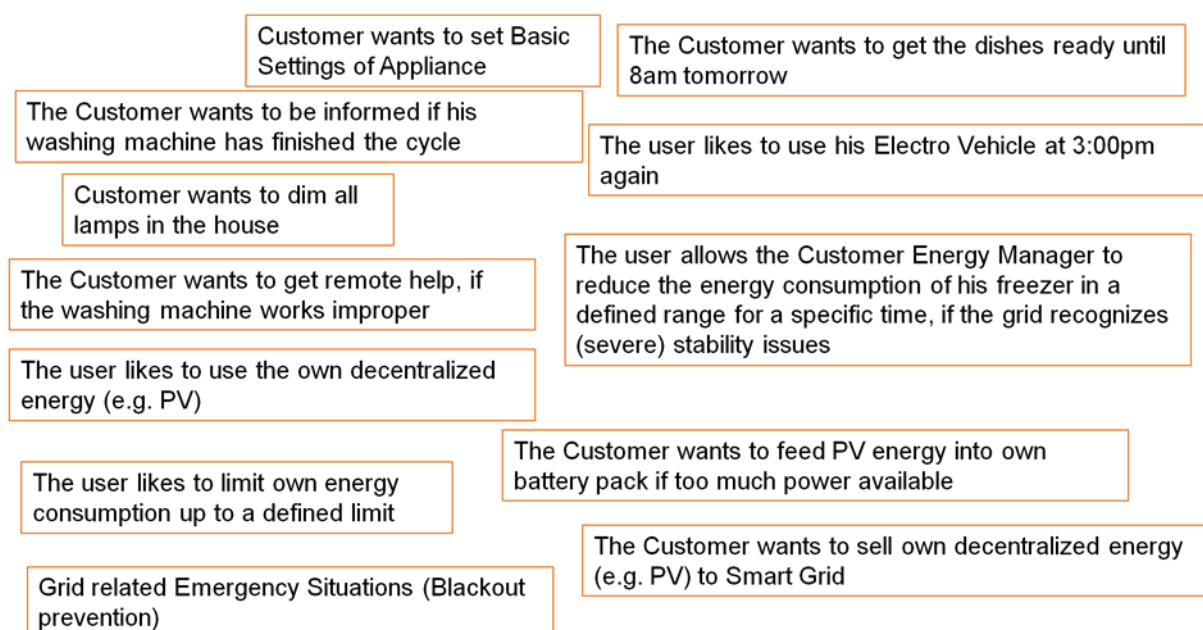


圖 A.1 使用者經歷的種類

Figure A.1 – Kinds of user stories

備考：附件的使用者經歷未分類。



NOTE The attached user stories are not categorized.

#### A.1.2 彈性啟動洗衣機 JWG1 Flex start washing machine

用戶希望在晚上 8:00 之前完成洗衣。

The user wants to get the laundry done by 8:00 p.m.

用戶準備洗衣機

裝衣服選擇洗滌程序

預選擇結束時間(例如，晚上 8:00)

開始清洗程序

洗衣機現在通知 CEM 有關

新程序的開始

預選結束時間

帶有持續時間和(例如與時間相關的特定)能耗的預期功耗剖繪

CEM 計算運營計劃並考慮

預選結束時間

預選的激勵計劃

帶有持續時間和(例如與時間相關的特定)能耗的預期功耗剖繪

資費資訊

預計其他智慧裝置的能耗

本地存儲的電量

CEM 將計算的開始時間發送到智慧裝置(洗衣機)

如果情況發生變化，除非智慧裝置啟動，否則 CEM 可能會發送更新的開始時間

智慧裝置根據計算出的開始時間開始循環

The user prepares the washing machine

Fills clothesSelects washing program

Pre-selects the end time (e.g. 8:00 p.m.)

Starts washing program

The washing machine now informs the CEM about

The start of the new program

The pre-selected end time

The expected power consumption profile with duration and (e.g. time related specific) energy consumption

The CEM calculates the operation plan and takes into account

The pre-selected end time

A pre-selected incentive program

The expected power consumption profile with duration and (e.g. time related specific) energy consumption

Tariff information

Expected energy consumption other smart devices Expected local energy

generation

Amount of locally stored energy

The CEM sends the calculated start time to the smart device (washing machine)

In case the situation changed, a CEM may send an updated starting time unless the smart device started

The smart device starts the cycle based on the calculated start time

### A.1.3 彈性啟動 EV 充電 JWG2 Flex start EV charging

用戶希望在上午 8:00 之前給電動汽車充電。

The user wants to have his electro vehicle charged by 8:00 a.m.

用戶準備電動汽車

選擇充電級別

預選擇結束時間(例如上午 8:00)

可以預先選擇獎勵計劃(例如最便宜的關稅，最環保的電力等)

開始充電週期

電動汽車現在通知 CEM 有關

新充電週期的開始

預選結束時間

預先選擇的獎勵計劃(如果尚未存儲)

帶有持續時間和(例如與時間有關的特定)能量消耗的預期充電消耗剖繪

CEM 計算運營計劃並考慮

預選結束時間

預選的激勵計劃(如果尚未存儲)

資費資訊

分散能源預測(如果適用)

EV 充電請求的預期功耗剖繪

其他智慧裝置的預期能耗

預計當地發電

本地存儲的電量

CEM 將計算出的開始時間發送到 EV

如果情況發生變化，除非智慧裝置啟動，否則 CEM 可能會發送更新的開始時間。

EV 根據計算的開始時間開始循環。

The user prepares the EV

Selects charging level

Pre-selects the end time (e.g. 8:00 a.m.)

May pre selects the incentive program (e.g. cheapest tariff, greenest power etc.)

Starts charging cycle

The EV now informs the CEM about

The start of the new charging cycle

The pre-selected end time

The pre selected incentive program (if not already stored)

The expected charging consumption profile with duration and (e.g. time related specific) energy consumption

The CEM calculates the operation plan and takes into account

The pre-selected end time

The pre-selected incentive program (if not already stored)

Tariff information

Decentralized Energy forecast, if applicable

The expected power consumption profile of the requested EV charging

Expected energy consumption of other smart devices

Expected local energy generation

Amount of locally stored energy

The CEM sends the calculated start time to the EV

In case the situation changed, a CEM may send an updated starting time unless the smart device started

The EV starts the cycle based on the calculated start time

#### **A.1.4 嚴重的電網穩定性問題 JWG3 Severe grid stability issues**

網格識別(嚴重)穩定性問題

The grid recognizes (severe) stability issues

電網發送負載控制消息，請求 CEM 調整負載(透過增加或減少消耗或發電)，負載控制消息可以包括

The grid sends a load control message, requesting the CEM to adjust the load (by either increasing or decreasing consumption or generation). The load control message may include

- 答覆請求的獎勵價值和/或時間表。an incentive value and/or time frame for answering to the request
- 根據請求採取行動的激勵價值和/或時限。an incentive value and/or time frame for acting on the request

根據用戶配置，可能有幾個選項，例如：

Depending on user configurations, several options are possible, e.g. :

- 用戶允許 CEM 調整其某些設備的負載(例如，在定義的/最大時間內的冷凍櫃)，這些功能的支持通常可能是能源供應商與客戶之間的合同的一部分，在收到電網的請求後，CEM 會檢查連接的智慧裝置的狀態，並檢查是否存在以下情況：透過減少  $xW$ ， $x\%$  的消耗量或替代品來減少消耗量，從而導致消耗量/發電量的變化，智慧裝置可能會做出反應，並可能會對所獲得的細節做出響應。

The user allows the CEM to adjust the load of some of his devices (e.g. of the freezer for a defined/maximum time). The support of these capabilities may usually be part of a contract between Energy Supplier and customer. After receiving the request from the grid, the CEM checks the status of attached smart devices checking on the possibility of e.g. reducing consumption by xW, x % of consumption or alternatives which leads into a change in consumption/generation. The smart device may react so and may respond with the achieved details

- CEM 可能會將響應發送回電網，CEM 檢查狀態，並可以重新計算(例如推遲)已經計劃的即將到來的周期的開始時間，CEM 更新智慧裝置的啟動時間。

The CEM may send the response back to the grid. The CEM checks the status and may recalculate (e.g. postpone) the starting time of already planned upcoming cycles. The CEM updates starting time of smart devices

- CEM 將自己的電池組能量饋入自己的網絡或電網，CEM 檢查電池組的狀態，如果電池組可以提供足夠的能量，則 CEM 可以決定開始供電過程。

CEM feeds own battery pack energy into own network or into the grid. The CEM checks status of battery pack. In case the battery pack can provide enough energy the CEM can decide to start feeding process

- CEM 將來自電網的更多能量存儲到自己的電池組，CEM 檢查電池組的狀態，如果電池組有足夠的容量，並且如果能源價格加上激勵值好於平均儲能成本，則 CEM 開始供電過程。

CEM stores additional energy from the grid into own battery pack. The CEM checks status of battery pack. In case the battery pack has enough capacity and if the energy price plus the incentive value is better than the average cost of stored energy, the CEM starts feeding process

#### A.1.5 功率限制 PV JWG4 Power limitation PV

用戶希望將其消費限制在自己的本地產品(例如 PV)中

The user wants to limit his consumption to his own local production (e.g. PV)

- 此限制在一天中的哪個時間適用
- 哪些設備不受此限制
- 等等。

用戶指示 CEM 將功耗限制為自己分散的電量。與該命令一起，可以設置幾個其他參數，例如

The user instructs the CEM to limit power consumption up to amount of own decentralized power. Along with this command, several additional parameters may be set, for example :

- 此限制在一天中的哪個時間適用。At which time of the day this limit applies
- 哪些設備不受此限制。Which devices are exempt from this limit

- 等等。Etc.

透過智慧電表隨時了解 CEM 的總功耗和發電情況。

The CEM is kept informed on total power consumption and generation through the smart meter.

在管理房屋中的功耗時，CEM 考慮了上述限制和參數。

如果用戶要啟動智慧裝置，則智慧裝置會通知 CEM 並接收負載剖繪(請參閱 4.1.1)。

如果基於負載剖繪和其他參數，CEM 得出超過功率極限的結論，則它可以向相關設備和顯示器發送警告消息(如果有)。

根據警告消息，用戶可以決定推遲消費或手動推翻功率限制。

When managing power consumption in the house, the CEM takes into account the above limits and parameters.

If the user wants to start a smart device, then the CEM is notified by the smart device and receives, amongst others, a load profile (see 3.1.1).

If, when based on the load profile and other parameters, the CEM concludes that the power limit will be exceeded, then it may send a warning message to the relevant device and to a display if one is available.

Based on the warning message, the user may decide to postpone his consumption or to manually overrule the power limit.

此外，房舍可能會與配電系統隔離(孤島)運行。此類場所將由電網運營商或場所自身的控制設施根據適當的監視安排隔離或“關閉”，孤島運行的能力來自於這樣一個事實，即它們能夠透過房屋自己的“分散式”發電機和/或存儲設施(即電池)滿足自己的電力需求，在這種情況下，由於緊急情況和/或計劃的維護和/或維修活動，配電網絡可能處於運行狀態或服務中斷，具有自己的發電和存儲設施的場所可以滿足其總需求，也可以滿足 CEM 控制的總需求的至少一部分，無論是否連接到配電網絡，在正常情況下，房屋產生的多餘能量可以傳遞回配電系統，經過一段時間的孤島運行後，必須以安全和協調的方式將房屋重新連接到配電系統，可以由帶有內置監視和控制裝置的同步設備/單元來安排；後者可以是上述 CEM 的一部分。

Furthermore there is the possibility that premises go in isolated (island) operation from the distribution system. Such premises will be isolated or "switched off" by the network operator or by the premise's own control facilities based on appropriate monitoring arrangements. The ability of island operation comes from the fact that they are able to cover their own power demand by the premise's own "distributed" generator and/or storage facilities, i.e. batteries. In such situations the distribution network can be in operation or out of service due to emergency situations and/or planned maintenance and/or repair activities. Premises with their own generation and storage facilities can

cover their total demand or at least part of their total demand controlled by a CEM with or without being connected to the distribution network. In normal situations the surplus of energy generated by the premises can be delivered back to the distribution system. Reconnecting the premises to the distribution system after a period of island operation has to be arranged in a safe and coordinated manner. That can be arranged by a synchronizing facility/unit with build-in monitoring and control arrangements; the latter can be part of the afore-mentioned CEM.

#### **A.1.6 CEM 管理裝置 JWG5 CEM manages devices**

**開啟/關閉設備，暗淡設備**

**Switch on/off devices, dim devices**

例如打開/關閉設備，例如照明，智慧插頭和調光照明等。

Examples are turning on/off devices such as lighting, smart plugs and dimming lighting etc.

#### **A.1.7 用戶彈性售電 JWG6 Customer sells flexibility**

**客戶希望彈性售電給電網**

**The Customer wants to sell his flexibility to the grid**

基於以下資訊：

- 電流消耗(從智慧電表接收)
- 當前正在運行的設備及其負載剖繪
- 要運行的設備分配及其負載剖繪
- 關稅資訊
- 有關功率限制的資訊

CEM 可能會發現彈性的機會。

用戶能對可提供給電網調度的設置限制，這些約束可能是：

- 哪些負載(或發電機)和用戶指定的條件可提供調度
- 可調度的開始時間(特定時間段內的開始時間)
- 可調度的持續時間
- 某個時間點的可調度電量
- 可調度能源的數量

CEM 透過提供以下資訊，為網格提供調度彈性：

- 可調度的開始時間(特定時間段內的開始時間)
- 可調度的持續時間
- 某個時間點的可調度電量
- 可調度能源的數量

Based on information on：

- Current consumption (received from smart meter)

- Currently running devices and their load profiles
- Device assignments to be ran and their load profile
- Tariff information

Information on power limitations

The CEM may identify opportunities for flexibility.

The user may have set constraints on the flexibility that may be offered to the grid. These constraints may be :

Which loads (or generators) and user specified conditions are available for providing flexibility

Start time of the flexibility (start time within a certain time period)

Duration of the flexibility

Amount of flexible power at a point in time

Amount of flexible energy

The CEM proposes this flexibility to the grid, by providing the following information :

Start time of the flexibility (start time within a certain time period)

Duration of the flexibility

Amount of flexible power at a point in time

Amount of flexible energy

這些要約是透過可能的要約，接受或拒絕過程來協商的，接受和拒絕的原因包括所提供調度的適合性(調度的期望值，例如在投資組合中)和財務方面。

如果電網想要接受要約，則它會發送一條消息，指示這一點以及與接受有關的激勵(這是彈性要約接受)

電網中的第二條消息指示應如何分配調度，該消息以負載剖繪的形式出現，但不超出可調度提供的限制。

CEM 透過在內部調整設備的消耗(時間)/生成來實現調度分配。

These offerings are negotiated by a process of offering, accepting or rejecting, possibly. Reasons for accepting and rejecting include suitability of the offered flexibility (the expected value of the flexibility e.g. in a portfolio) and financial aspects.

If the grid wants to accept the offer, it sends a message indicating this and with the incentive that is related to the acceptance (this is the Flexibility Offer Acceptance)

A second message from the grid indicates how the flexibility should be allocated. This message comes in the form of a load profile, but stays within the constraints of the flexibility offer.

The CEM implements the flexibility allocation by adjusting the (time of the) consumption/generation of devices on the premise.

#### A.1.8 用戶出售分散式電源 JWG7 Customer sells decentralized energy

用戶希望將自己的分散式電源(例如 PV)出售給智慧電網

**The customer wants to sell own decentralized energy (e.g. PV) to Smart Grid**

當用戶想要將自己的分散式電源出售給電網時，可能有幾種選擇：

基於價格消息或負載/發電控制消息，CEM 可以指示本地發電機/存儲設備調整輸出。

CEM 提議以指定價格出售一定數量的能源，如用戶案例 JWG 6 中所述，這對應於彈性報價標單，用戶彈性售電，請參閱 A.1.7。

然後，CEM 釋放存儲的能量並開始發電(如果有)。

When the consumer wants to sell his own decentralized energy to the grid, several options are possible :

Based on a price message or load/generation control message, CEM may instruct local generators/storage to adjust output.

CEM offers to sell an amount of energy at a specified price. This corresponds to offering flexibility as described in user story JWG 6 Customer sells flexibility, see A.1.7

The CEM then releases stored energy and starts power generation if available.

#### A.1.9 與電網有關的緊急情況 JWG8 Grid-related emergency situations

與電網相關的緊急情況(預防停電)

**Grid-related emergency situations (blackout prevention)**

電網接近停電，不久將不得不切斷網格的各個部分。

The grid is close to a black-out and will soon have to cut off sections of the grid.

為透過將整體能耗限制在一定的最低水平來防止這種情況，電網會向所有連接的家庭發送緊急消息，以指示他們將其連接的設備置於“緊急關閉模式”。

As a means of preventing this by limiting the overall energy consumption to a certain minimum, the grid sends an emergency message to all connected households in order to instruct them to place their connected devices into “emergency connected off mode” .

假設：CEM 和智慧裝置已預先配置“緊急連接關閉模式”剖繪，此剖繪定義哪些已連接的設備進入“緊急連接關閉模式”，以及該模式意味著什麼(逐個設備地)，此剖繪已由消費者和能源提供商雙方商定，並且很可能包含在合同中。

Assumption : The CEM and smart devices are pre-configured with an “emergency connected off mode” profile. This profile defines which connected devices enter “emergency connected off mode” and what that mode entails (on a device by device basis). This profile is agreed by both the consumer and the energy provider and is likely to be included in a contract.

CEM 收到緊急消息(某些低耗電，必不可少的設備(如燃氣鍋爐)需要運行的最低



電量，可能允許其保持運行狀態-這將在剖繪中定義)。

The CEM receives an emergency message (some low consumption, essential devices like gas boilers that require a minimum of electricity to run, may be allowed to stay operational – this will be defined within the profile).

該消息可以包括緊急時期的持續時間。

CEM 向所有連接的智慧裝置發送一條消息，以切換到“緊急連接關閉模式”。

設備切換到“緊急連接關閉模式”。

當緊急時間段結束時(由於預定的緊急時間已過，或者因為網格發送了緊急消息已透過的消息)，CEM 指示設備可以恢復正常運行。

This message may include the duration of the emergency period.

The CEM sends a message to all connected smart devices to switch to “emergency connected off mode” .

The devices switch to “emergency connected off mode” .

When the emergency period has ended (either because the predetermined emergency time has passed or because the grid sent a message that the emergency has passed), the CEM instructs the devices that they may resume operations as normal.

#### **A.1.10 客戶連接新的智慧裝置 JWG9 Customer connects new smart device**

客戶希望將新的智慧裝置連接到 CEM

The Customer wants to connect a new smart device to the CEM

將支持安裝程序和/或“即插即用”消費者安裝

發現，驗證等由較低層處理，不在本標準範圍內

CEM 與設備之間使用的有關設備功能(類型和功能)的通信消息和資料均在本標準範圍內。

Installer and/or “plug and play” consumer installation will be supported

Discovery, authentication etc. are handled by lower layers and are out of scope of this document

Communication messages and data used between the CEM and device concerning the capability (type and functionality) of the device are within the scope of this document

#### **A.1.11 能耗資訊 JWG10 Energy consumption information**

消費者希望了解其歷史和預測的能源使用情況

The consumer wants to be informed on their historic and forecasted energy use

消費者在 CEM 用戶界面上指示他們想要有關其歷史和預測能源使用的資訊。

如果 CEM 沒有相關的歷史資訊，則可以從智慧電錶或其他來源請求這些資料。

基於與當前連接的設備以及它們的預期消耗和產生有關的資訊，以及基於歷史資料，CEM 可以建立短期能量預測並通知用戶。

The consumer indicates on the CEM User Interface that they want information on their historic and forecasted energy use.

In case the CEM does not have the relevant historic information, it may request these data from the smart meter or other source.

Based on the information related to currently connected devices and their expected consumption and generation and based on the historic data, the CEM may build a short term energy forecast and informs the user.

#### **A.1.12 意外斷開 JWG11 Unexpected disconnect**

智慧裝置意外斷開連接(故障)

A smart device disconnects unexpectedly (failure)

CEM 和智慧裝置交換常規消息或狀態消息，以使彼此之間(與網絡的連接)及其運行狀態保持相互聯繫。

在某個時刻，CEM 不會從設備收到預期的消息。

CEM 將狀態請求發送到設備。

如果 CEM 沒有收到響應或設備以異常狀態響應，則 CEM 將警告消息發送到高階顯示器，CEM 還可以向電網側的第三方(例如服務提供商)發送警告。

The CEM and smart device exchange regular messages or status messages to keep each other informed of their connection (to the network) and of their operational status.

At a moment in time, the CEM does not receive such a message from a device when it expected one.

The CEM sends a status request to the device.

In case the CEM does not receive a response or when the device responds with an abnormal status, the CEM sends a warning message to an advanced display. The CEM may also send a warning to a third party (e.g. service provider) on the grid side.

#### **A.1.13 預計智慧裝置的年度費用 JWG12 ExpectedYearlyCostsOfSmartDevice**

消費者希望了解智慧裝置每年的能源成本估算

The consumer wants to know an estimate of the yearly energy cost of a smart device

(此使用者經歷假設 CEM 或設備存儲有關單個設備的使用時間消耗的資訊，並且 CEM 擁有使用時間段的歷史記錄以及相關貨幣的相關費率)。

消費者在 CEM 用戶界面上指示他們想要有關特定設備的年度成本的資訊。

CEM 會從其內存中收集單個設備的消耗資訊，或從設備中請求此資訊。

CEM 從其內存中收集與歷史使用時間段有關的資訊以及以財務單位表示的費率資訊。

CEM 將(估計的)消費資訊與費率資訊結合在一起，並將對消費者查詢的響應發送回 CEM 用戶界面。

(This user story assumes that the CEM or the device stores information on time-of-use consumption of individual devices and that the CEM has a historic record of time-of-use buckets and their related tariffs in the relevant currency).

The consumer indicates on the CEM User Interface that they want information on the yearly cost of a specific device.

The CEM collects information of individual device's consumption from its memory or requests this information from the device.

The CEM collects information related to historic time-of-use buckets and tariff information expressed in financial units from its memory.

The CEM combines (estimated) consumption information with tariff information and sends the response to the consumer's query back to the CEM User Interface.

#### **A.1.14 儲能和基於電價的投入 JWG13 Energy storage and feed in based on tariff**

消費者希望儲能設備在電價達到一定閾值後向電網供電

The consumer wants a storage device to feed energy to the grid once the tariff reaches a certain threshold

一旦售電價格達到一定閾值，用戶就將 CEM 參數化以供應能源，另外，使用者可以參數化本地儲能不應降到特定點以下。

CEM 從電網接收新的電價(可能是透過智慧電表)，並注意到該電價超出了上述閾值。

CEM 可以檢查：

- 儲能量是否低於用戶指定的點
- 將存儲的能量釋放到電網是否與其他用戶命令/設置不一致(例如，必須在特定時間充電的電動汽車，彈性分配，請求增加能耗或降低發電量的負載控制消息等)

當與上述要點沒有衝突時，CEM 指示儲能設備在電網中供電。

The consumer parameterizes the CEM to feed energy once the tariff for selling energy reaches a certain threshold. Additionally, the consumer may parameterize that local storage should not drop below a certain point

The CEM receives a new tariff from the grid (may be via the smart meter) and notices that this tariff exceeds the abovementioned threshold.

The CEM may check：

- Whether the amount of stored energy is not below a user specified point
- Whether releasing stored energy to the grid would be inconsistent with other user commands/settings (e.g. electric vehicle that must be charged by a specific time, flexibility assignments, load control messages requesting to increase consumption or lower generation, etc.)

When there is no conflict with the above mentioned points, the CEM instructs the storage device to feed energy in the grid.

#### A.1.15 外部能源消耗管理 JWG14 EnergyConsumptionManagementFromExternal

透過智慧電網管理智慧裝置的能耗

Manage energy consumption of smart devices by Smart Grid

該用戶案例說明房屋客戶在 7 月 15 日如何允許供應商(或能源服務提供商)將空調的溫度設置提高到定義的範圍，以減少特定時間的電力需求。

This user story explains how on 15 July, a premises customer allows the supplier (or energy service provider) to raise the temperature setting of his air-conditioner in a defined range so as to curtail power demand for a specific time.

- 7 月 14 日，供應商請求在 7 月 15 日明天上午 10:00 到下午 2:00 降低能耗。
- 用戶得到請求並透過以下方式確認他願意遵守。
- 將溫度範圍設置為特定溫度範圍。
- 打開空調
- 7 月 15 日上午，供應商透過分析資料收集器連續交付的能耗資料，這些資料收集器透過智慧電表累計所有客戶的能耗，並考慮天氣發送的量測資料，再次確認高峰時段的高需求預測預測系統。
- 在給定未來幾個小時的估計電力需求的情況下，上午 11:00，供應商將消息發送到 CEM，並要求從上午 12:00 到下午 2:00 降低 300 W(功率 I)功耗的可能性。
- CEM 向空調告知減排目標，包括時間表。
- 凌晨 12:00，空調降低能耗，並將其傳達給 CEM。如果無法達到請求的設置，則空調會通知您可以實現的目標。
- On the 14 July, the supplier requests a reduction of power consumption by tomorrow, 15 July, from 10:00 a.m. to 2:00 p.m.
- The customer finds the request and confirms that he is willing to comply by e.g.
- Setting the temperature range to a specific one.
- Turning on the air-conditioner
- In the morning of 15 July, the supplier analyzes the power consumption data continuously delivered through data collectors which accumulate the power consumed by all customers via smart meters, and reconfirms the high demand forecast during the peak period considering the metrological data sent from the weather forecast system.
- At 11:00 a.m., given the estimated power demand for the coming hours, the supplier sends messages to the CEM and asks for the possibility to

reduce power consumption by 300 W (Power I) from 12:00 a.m. to 2:00 p.m.

- The CEM informs the air-conditioner about the target of reduction including timeframe.
- At 12:00 a.m. the air-conditioner reduces power consumption and communicates this to the CEM. If the requested settings cannot be reached, the air conditioner informs what can be achieved.

#### A.1.16 管理內部電池系統 JWG15 Manage in-premises battery system

管理內部電池系統

Manage in-premises battery system

此使用者經歷介紹房地用戶擁有的電池，如何在非高峰期(從晚上 11:00)開始充電(買電)，到凌晨 5:00，並在高峰時段(上午 10:00 到下午 2:00)釋放電能以使用房屋內的家電。

This user story explains how a battery owned by premises customers charges (buys) electricity during off-peak period, from 11:00 p.m. to 5:00 a.m., and discharges power to use appliances in the house during peak period, 10:00 a.m. to 2:00 p.m.

- 客戶透過 CEM 準備電池的設置：
  - 透過在非高峰時段充便宜的電力，並在高峰時段放電來優先降低電力成本。
- CEM 根據以下內容計算操作計劃：
  - 例如關稅資訊；
    - (i) 從下午 11:00 起，每度電 XX.XX 美分/千瓦時 到凌晨 5:00
    - (ii) 從上午 10:00 到下午 2:00，每千瓦時 XX.XX 美分，價格昂貴
  - 預期的功耗基於；
    - (i) 過去的功耗記錄；
    - (ii) 所有者今天的時間表
  - 剩餘電池電量
- 根據此操作計劃，CEM 指示電池以最佳方式進行充電和放電。
- The customer prepares the setting of the battery through the CEM：
  - Prioritizing the reduction of electricity cost by charging cheaper electricity at off-peak time and discharging power during the peak-period.
- The CEM calculates the operation plan based on：
  - Tariff information, for example;
    - i) XX.XX cent/kWh, cheaper electricity, from 11:00 p.m. to 5:00 a.m.
    - ii) XX.XX cent/kWh, expensive, from 10:00 a.m. to 2:00 p.m.
  - Expected power consumption based on;
    - i) The past power consumption records;

- ii) The owner's today's schedule
  - The remaining battery charge
- Based on this operation plan, the CEM instructs the battery to charge and discharge in the most optimal way.

#### A.1.17 管理分散式電源 JWG16 Manage DER

管理分佈式能源(DER)

Manage distributed energy resources (DER)

備選方案 1：此使用者經歷描述房屋用戶擁有的 DER 如何在高峰時段(從上午 10:00 到下午 2:00)發電，以降低用電成本。

- 客戶透過 CEM 準備 DER 的設置：
- 選擇在一天的高峰期利用 DER 發電的計劃。
- CEM 檢查 DER 的狀態。
- CEM 在上午 10:00 啟動 DER，並在下午 2:00 停止。

Alternative 1： this user story describes how a DER owned by a premises customer generates electricity in peak periods, from 10:00 a.m. to 2:00 p.m., to reduce electricity cost.

- The customer prepares the setting of the DER through the CEM：
- Select the plan that utilizes DER to generate electricity during peak period in a day.
- The CEM checks the status of the DER.
- The CEM starts the DER at 10:00 a.m. and stop it at 2:00 p.m.

備選方案 2：該用戶案例描述當從供應商向用戶提供動態定價消息時，房屋用戶擁有的 DER 如何發電。

- 客戶透過 CEM 準備 DER 的設置：
- 選擇計劃，當提供的電價為 XX.XX 美分/kWh 或更高時，將啟動 DER 操作。
- CEM 檢查來自供應商的消息和 DER 的狀態。
- 在上午 10:30，供應商從上午 11:00 到下午 2:00 提供 XX.XX 美分/千瓦時。
- CEM 收到消息，然後將價格與設置值進行比較。
- 如果確認價格等於或高於設定值且 DER 已經準備就緒，則 CEM 啟動 DER。
- DER 從上午 11:00 到下午 2:00 發電。
- 如果下午 2:00 之後電價不再超過上述閾值，則 CEM 指示 DER 停止發電。

Alternative 2： this user story describes how a DER owned by a premises customer generates electricity when a dynamic pricing message is provided from the supplier to the customer.

- The customer prepares the setting of the DER through the CEM：
- Select the plan, which initiates the DER operation when a tariff of

XX.XX cent/kWh or more of electricity price is offered.

- The CEM checks the messages from the supplier and status of the DER.
- At 10 : 30am, the supplier offers XX.XX cent/kWh from 11:00 a.m. to 2:00 p.m.
- The CEM receives the message and compares the price with the set value.
- The CEM starts the DER if both that the price is equal to or higher than the set value and that the DER is ready are confirmed.
- The DER generates electricity from 11:00 a.m. to 2:00 p.m.
- If after 2:00 pm the tariff no longer exceeds the abovementioned threshold, the CEM instructs the DER to stop generation.

#### **A.1.18 電池聚合對峰移的貢獻 JWG17 Peak shift contribution by battery aggregation**

電池聚合對峰移的貢獻

Peak shift contribution by battery aggregation

用戶想根據用戶指定的條件(例如客戶的電池輸出功率的最大值和最小值)參與電池聚合(PSCBA)的峰值漂移貢獻，根據電力公司與客戶之間的合同，電池 SCADA 和 CEM 相互通訊。

- 客戶讓 CEM 參與 PSCBA。
- 電池 SCADA 向 CEM 發送“時間表請求”。
- CEM 將請求的時間表發送到電池 SCADA。其中包括用戶電池的明細表/大綱表/剩餘電池表。
- 電池 SCADA 計算總剩餘電勢和電池計劃。
- 根據電網運營商為 PSCBA 制定的計劃，電池 SCADA 將為該計劃計算每個電池的時間表。
- 電池 SCADA 將“查詢”命令發送到 CEM，其中包括與用戶電池相對應的 PSCBA 計劃。
- CEM 將“詢問”消息的響應發送到電池 SCADA，這包括“查詢拒絕”或“查詢接受”
- 在“查詢接受”的情況下，電池 SCADA 將“執行通知”發送給 CEM。

CEM 根據客戶的詳細計劃和與客戶電池相對應的 PSCBA 計劃向客戶的電池發送充電/放電命令。

The customer likes to participate in the peak shift contribution of battery aggregation (PSCBA) according to the conditions such as the maximum and minimum value of Customer's battery output power that are specified by the customer. Under the contract between the electric company and the customer, battery SCADA and the CEM communicate with each other.

- The customer lets CEM participate in the PSCBA.

- Battery SCADA sends “request for Schedule” to the CEM.
- The CEM sends the requested schedule to battery SCADA. This includes Detail Schedule/Outline Schedule/Surplus Schedule of customer’s battery.
- Battery SCADA calculates the total surplus potential and the schedule of batteries.
- According to the plan for PSCBA set by grid operator, battery SCADA calculates the schedule of each battery for the plan.
- Battery SCADA sends “inquiry” command to CEM. This includes the plan for PSCBA corresponding to customer’s battery.
- CEM sends the response of “inquiry” message to battery SCADA. This includes “inquiry rejection” or “inquiry acceptance”
- In case of “inquiry acceptance”, battery SCADA sends “execution notification” to CEM.

CEM sends charging/discharging command to customer’s battery according to the customer’s detail schedule and the plan for PSCBA corresponding to customer’s battery.

#### **A.1.19 根據價格資訊控制家電 JWG18 Control appliances based on price information**

基於時間段的價格資訊控制智慧家電

Control of smart home appliances based on price information by time slot

用戶想使用熱水器，空調和其他家電，使總電費相對較少。

- 用戶指示 CEM 根據多種條件對熱水器，空調和其他家電進行編程。
- 用戶在 CEM 上輸入每個家電的操作條件，例如：
  - 熱水器溫度 90 °C，水位 50 %
  - 空調模式：降溫，風力：自動，溫度:27 °C
- 用戶在 CEM 上輸入每個家電的時間條件(理想的開始時間，理想的完成時間)，例如：
  - 透過 AM7 完成熱水器
  - AM10 使空調完成冷卻
- 在接下來的 24 小時內，每天中午發布電費資訊。
- 根據輸入條件，時間條件和電價，用戶可以讓 CEM 計算第二天的程序，從而使總電費相對較少
- CEM 考慮到運行時間，運行過程中的功耗，電費等，為這些家電計算運行計劃
- 用戶確認計算結果並提交要執行的操作計劃
  - CEM 根據操作計劃的條件按編程控制每個家電

The user likes to use a water heater, air conditioner and other appliances such



that total electricity charges are relatively less.

- The user instructs the CEM to program the water heater, air conditioner and other appliances following a number of conditions.
- The user inputs operating conditions of each appliance at CEM, e.g. :
  - Water heater      temperature 90    °C, water level 50%
  - Air conditioner   mode:   cooling down, wind:   auto, temperature:   27    °C
- The user inputs time conditions (desirable start time, desirable finish time) of each appliance at CEM, e.g. :
  - Water heater      finish by AM7
  - Air conditioner   finish cooling down by AM10
- The electricity tariff information is issued at noon every day for the following 24 hours.
- Based on the input conditions, time conditions and tariff, the user lets CEM calculate a program for the following day such that total electricity charges are relatively less
- CEM calculates an operating plan for those appliances considering operation time, power consumption during operation, electricity charges and so forth
- The user confirms the calculation results and commits the operating plan to be executed
  - CEM controls each appliance as programmed according to conditions of operating plan

#### **A.1.20 根據節能信號控制家電 JWG19 Control appliances based on energy savings signal**

響應電力供應商的節電請求控制智慧家電

##### **Control of smart home appliances in response to power saving request from Electric power supplier**

用戶使用熱水器，空調和其他家電，以便盡可能滿足來自電力供應商的節電請求。

- 用戶指示 CEM 根據多種條件對熱水器，空調和其他設備進行編程。
- 用戶在 CEM 上輸入每個家電的操作條件，例如：
  - 熱水器溫度 90 °C，水位 50 %
  - 空調模式：降溫，風力：自動，溫度：27 °C
- 用戶在 CEM 上輸入每個家電的時間條件(理想的開始時間，理想的完成時間)，例如：
  - 透過 AM7 完成熱水器
  - AM10 使空調完成冷卻
- 在 AM7，CEM 從 PM1 到 PM5 接收節電請求。
- 用戶讓 CEM 在 AM8 的輸入條件下計算程序，以便盡可能滿足節電請求

- CEM 在考慮所需的運行時間，運行時的功耗，電費等因素之後，計算出計劃這些家電的操作計劃在請求節電前、中和後。
- 用戶確認計算結果並提交要執行的操作計劃
- 用戶在 CEM 激活運行計劃的執行
- CEM 根據操作計劃的條件按編程控制每個家電

The user likes to use a water heater, air conditioner and other appliances such that power saving request from electric power supplier is satisfied if possible.

- The user instructs the CEM to program the water heater, air conditioner and other appliances following a number of conditions.
- The user inputs operating conditions of each appliance at CEM, e.g. :
  - Water heater temperature 90 °C, water level 50 %
  - Air conditioner mode : cooling down, wind : auto, temperature : 27 °C
- The user inputs time conditions (desirable start time, desirable finish time) of each appliance at CEM, e.g. :
  - Water heater finish by AM7
  - Air conditioner finish cooling down by AM10
- At AM7, the CEM receives a request for power saving from PM1 to PM5.
- The user lets CEM calculate a program at AM8 with input conditions such that power saving request is satisfied as possible
- CEM calculates to program an operating plan for those appliances before, during and after the requested power saving, considering operation time, power consumption while in operation, electricity charges and so forth
- The user confirms calculation results and commits the operating plan to be executed
- The user activates the execution of operating plan at CEM
  - CEM controls each appliance as programmed according to conditions of operating plan

#### A.1.21 停電前控制家電 JWG20 Control appliances before power cut

停電前控制智慧家電

Control of smart home appliance before power cut

用戶想在停電前使用熱水器，空調和其他家電

- 用戶指示 CEM 根據多種條件對熱水器，空調和其他電器進行編程
- 用戶在 CEM 上輸入每個家電的操作條件，例如：
  - 熱水器溫度 90 °C，水位 50 %
  - 空調模式：降溫，風力：自動，溫度:27 °C
- 用戶在 CEM 上輸入每個家電的時間條件(理想的開始時間，理想的完成時

間)，例如：

- 透過 AM7 完成熱水器
- AM10 使空調完成冷卻
- 在 AM7 發出的資訊是 PM1 到 PM5 將會斷電。
- 用戶可以考慮輸入電源供應商告知的停電情況，讓 CEM 在 AM8 的輸入條件下計算程序
- CEM 計劃在計劃的停電之前，期間和之後為這些家電製定運行計劃，其中要考慮運行時間，運行時的功耗等
- 用戶確認計算結果並提交要執行的操作計劃
- 用戶在 CEM 激活運行計劃的執行
  - CEM 根據操作計劃的條件按編程控制每個家電

The user likes to use a water heater, air conditioner and other appliances before power cut takes place

- The user instructs the CEM to program the water heater, air conditioner and other appliances following a number of conditions
- The user inputs operating conditions of each appliance at CEM, e.g. :
  - Water heater temperature 90 °C, water level 50 %
  - Air conditioner mode : cooling down, wind : auto, temperature : 27 °C
- The user inputs time conditions (desirable start time, desirable finish time) of each appliance at CEM, e.g. :
  - Water heater finish by AM7
  - Air conditioner finish cooling down by AM10
- The information is issued at AM7 that a power cut will occur from PM1 to PM5.
- The user lets CEM calculate a program at AM8 with input conditions considering power cut informed by electric power supplier
- CEM calculates to program an operating plan for those appliances before, during and after the scheduled power cut, considering operation time, power consumption while in operation and so forth
- The user confirms calculation results and commits the operating plan to be executed
- The user activates the execution of operating plan at CEM
  - CEM controls each appliance as programmed according to conditions of operating plan

#### **A.1.22 自然災害下的智慧家電控制 JWG21 Control appliances in case of natural disaster**

自然災害下的智慧家電控制

#### Control of smart home appliances in case of natural disaster

如果由於自然災害而導致不穩定的電源和/或斷電，用戶想優先使用熱水器和蓄電池

- 用戶在 CEM 處預設熱水器和蓄電池以製定緊急操作計劃
- 用戶在 CEM 上輸入每個家電的操作條件
  - 熱水器溫度 90 °C，水位：50 %
  - 蓄電池模式：快速充電
- 用戶可以讓 CEM 根據輸入條件計算程序，以防 CEM 收到來自電力供應商的電源警報
- 當 CEM 收到電源警報時，CEM 將計算熱水器，蓄電池和所有其他家電的操作計劃，這樣的操作計劃可能如下所示：
  - 確認連接到 CEM 的所有家電的運行狀態
  - 對除熱水器和蓄電池以外的所有運行中的家電執行正常關機過程
  - 根據用戶設定的條件執行熱水器和蓄電池的操作
- 如果 CEM 收到來自電力供應商的電源警報，則用戶輸入 CEM 編程的緊急操作計劃的自動執行
- CEM 在 AM10 收到電力供應商的電力警報
- CEM 從 AM10 開始，按照操作計劃的條件按編程控制每個設備，例如：
  - 繼續操作熱水器和蓄電池，並執行正常的關閉過程以完成操作，直到 CEM 沒有收到消息來取消電源警報；
  - 執行熱水器的正常關閉過程以完成操作，並在 CEM 收到節電請求後繼續操作蓄電池；
  - 繼續操作熱水器和蓄電池，直到斷電的開始時間為止，並在 CEM 收到斷電資訊之前執行正常的關機過程以在斷電的開始時間之前完成操作；
  - 如果 CEM 收到消息以取消電源警報，則對熱水器和蓄電池執行正常的關閉過程以完成操作。The user likes to use a water heater and storage battery at the highest priority in case that unstable electric power supply and/or power cut is expected due to natural disaster
- The user presets water heater and storage battery at CEM to program an emergency operation plan
- The user inputs operating conditions of each appliance at CEM
  - Water heater      temperature 90    °C, water level :    50 %
  - Storage battery mode :    quick charge
- The user lets CEM calculates a program with input conditions in case CEM receives power alert from electric power supplier
- CEM calculates an operating plan for water heater, storage battery and all

other appliances when CEM receives power alert. Such an operating plan could look like the following :

- confirm the operating status of all appliances connected to CEM
- execute normal shutdown process to all appliances in operation except Water heater and Storage battery
- execute operation of water heater and storage battery with conditions set by the user
- The user inputs auto-execution of emergency operating plan as programmed at CEM in case CEM receives power alert from electric power supplier
- CEM receives power alert from electric power supplier at AM10
- CEM commences at AM10 湯 n to control each appliance as programmed according to conditions of operating plan, an example of which is :
  - continue operating water heater and storage battery and execute normal shutdown process to finish as far as CEM does not receive a message to call off power alert;
  - execute normal shutdown process of water heater to finish, and continue operating storage battery in case that CEM receives power saving request;
  - continue operating water heater and storage battery till start time of power cut and execute normal shutdown process to finish operating before start time of power cut in case that CEM receives power cut information;
  - execute normal shutdown process to water heater and storage battery to finish in case that CEM receives a message to call off power alert

#### A.1.23 雙邊需量反應兆瓦 JWG22 Bilateral DR-negawatt

雙邊需量反應(兆瓦交易=日本相關要求)

Bilateral demand response (Negawatt transaction= Japanese related requirement)

該用戶案例描述在預期電力供應和需求趨緊的那一天，能源供應商如何從消費者那裡請求需求響應負載。

在活動日的前一天(預計供應緊張)，能源供應商向連接的消費者/CEM 指示減少需求的規範。規格/靈活性請求包含：

- 日期，
- 時間窗口(事件開始和事件結束)，
- 控制區域中的金額。

基於有關預測的能源使用和用戶設置的資訊，CEM 進行投標，用戶也可以手動輸入此資訊，產生的出價包含：

- 需求響應負載量(kW)和
- 投標價格(價格/kWh)。

能源供應商根據“優劣順序”對消費者的投標進行排名，並通知執行結果。

投標成功的消費者可以減少指定日期在時間範圍內的負擔。

This user story describes how an energy supplier asks for a demand responsive load from consumer on the day when tightness of electricity supply and demand is expected.

On the day before the event day (at which a supply tightness is expected), the energy supplier indicates a specification of demand reduction, to connected consumers/CEMs. The specification/flexibility request contains :

- The date,
- Time window (event start and event end),
- Amount in control area.

Based on information on forecasted energy use and user settings, the CEM tenders a bid. The consumer can also input this information manually. The resulting bid contains :

- Amount of demand responsive load (kW) and
- Bidding price (price/kWh).

The energy supplier ranks bids from consumers according to “merit order” and notifies execution results.

Consumers, who made a successful bid, reduce their load in the time window on the specified day.

#### A.1.24 照明使用者經歷 JWG23 User story lighting

照明系統

Lighting system

設施管理者希望在需量反應(DR)事件(例如，資費資訊過高或可再生能源的預測過低)或需求方管理事件(例如，電網中存在電網穩定性問題)期間減少照明負荷和建築物中的其他負荷，請求減少能耗)。

Facility manager wants to reduce lighting load and other loads in a building during a Demand Response (DR) event (e.g. tariff information too high or forecast of renewable energy too low) or a Demand Side Management event (e.g. stability issue in the grid with the request to reduce energy consumption). (背景：照明系統由大量設備組成，這些設備各自不會消耗很多電能，但總的來說可能會消耗大量的建築用電量，通常將照明設備組合在一起，以實現所需的照明功能，並非所有照明設備在建築物中都具有相同的重要性，因此可能需要安排優先級)

(Background: Lighting system consists of large number of devices, which individually do not consume very much power but in total it could be a significant amount of the total building electricity consumption. The lighting devices are usually grouped to accomplish a desired illumination function for the spaces in the building. Not all lighting devices have same importance in the

building, so priority scheduling may be needed)

- 設施管理者進行調查以識別不同負載的重要性和約束條件，對於照明負載，它確定：
  - 可以完全關閉的照明(例如，開放辦公室空間中的裝飾照明)被分配為最低優先級，它們的最小功耗設置為零。
  - 可以調暗的照明，例如在開放式辦公室和私人辦公室中，可以將照明分配為中等優先級，並根據居住者的要求事項設置最低功耗，最重要空間的照明為首席執行官或董事會會議室分配最高優先級，並配置其最低功耗。
- 設施管理者將優先級組和最小功率限制編程到照明系統控制器中。
- 建築 CEM 透過 DR 或 DSM 消息從提供商(例如，公用事業提供商或 DSO)接收縮減請求。
- 來自照明系統控制器的構建 CEM 請求：
  - 當前消耗
  - 可以減少的電量，根據特定限制將燈光分組時(例如應急燈，辦公燈，落地燈等)，可能存在多個優先級類別。
- 照明系統控制器將請求的資料提交給建築物 CEM。
- 建築 CEM 基於以下因素確定每個智慧裝置/子系統的減少量：
  - 請求的減少
  - 消費基準
  - 如果存在多個優先級，則每個智慧裝置/子系統針對每個優先級可以減少的電量。
- 建築 CEM 將減少請求傳達給照明系統控制器。
- 照明系統控制器執行功率降低。
- The facility manager conducts a survey to identify the importance and the constraints of the different loads. For the lighting load it determines :
  - Lighting that can be switched-off completely (e.g. decorative lighting in an open office space) is assigned lowest priority. Their minimum power consumptions are set to zero.
  - Lighting that can be dimmed, e.g. in open offices and private offices lighting can be assigned a medium priority and the minimum power consumption is set according the occupants requirements. Lighting in the most important spaces, e.g. the CEO or board room, is assigned highest priority and their minimum power consumption is configured.
- The facility manager programs the priority group and the minimum power constraints into lighting system controller.
- Building CEM receives a reduction request from the provider (e.g. utility provider or DSO) via DR or DSM message.

- Building CEM requests from lighting system controller :
  - The current consumption
  - The amount of power it can reduce. Multiple priority classes might exist when lights are grouped together based on specific constraints (e.g. emergency lights, office lights, floor lights, etc.)
- Lighting system controller submits the requested data to building CEM.
- Building CEM determines the reduction for each smart devices/sub-system based on :
  - The requested reduction
  - The consumption baseline
  - The amount of power each smart devices/sub-system can reduce for each class of priority, if multiple classes of priority exist.
- Building CEM communicates the reduction request to the lighting system controller.
- Lighting system controller executes the power reduction.

#### **A.1.25 能源市場彈性管理 能源彈性管理 JWG24 Energy market flexibility management Energy flexibility management**

建築物所有者/運營商希望利用其建築物的能源彈性，透過根據彈性的能源價格調整能耗來優化其能源採購，和/或在輔助服務能源市場上獲得額外的收入。A building owner/operator wants to use the energy flexibility of its building(s) to optimize its energy procurement by adapting the consumption according to flexible energy tariffs and/or to achieve additional revenue at the ancillary service energy markets.

對於長期需求計劃，透過日前市場進行的能源貿易以及透過日內市場進行的能源貿易，這種能源彈性管理可以具有不同的方案。

Such energy flexibility management can have different scenarios for long term demand planning, energy trade through day-ahead-market and energy trade through intra-day market.

##### **方案 1：“長期需求計劃”**

該業務情景描述零售商業務根據長期合同(1周到多年)採購客戶所需的一定數量能源的過程，此類合同的能源價格通常低於日前市場上的價格，為了確定長期合同中採購的最佳能源量，零售商將獲得其客戶提供的負荷預測的支持，此方案使用長期計劃階段。

##### **Scenario 1：“Long term demand planning”**

This scenario describes the process with the retailer business to procure a certain amount of energy needed by his customers based on long term contracts (1 week up to multiple years). The energy prices of such contract are typically lower than the process on the day-ahead market. To determine the optimal



amount of energy to procure with long term contracts, the retailer is supported by load forecasts provided by his customers. This scenario utilizes a long-term planning phase.

#### **方案 2：「透過日間交易市場進行能源貿易」**

此方案說明透過長期合同在已採購的能源之上採購所需剩餘能源的過程，就建築物觸發方法而言，客戶(即建築物自動化/管理系統)會提供第二天的更新預測，該預測僅包含與初始長期預測的偏差或更新的總預測，然後，零售商必須推斷出增量以獲得採購所需的能量，零售商在交易市場上購買所需的能源，並將有關已實現能源價格的資訊發送回客戶，在價格驅動的能源市場觸發的情況下，零售商從市場接收能源價格表，添加最終可用的長期合同的價格資訊，並將此資訊轉發給 VPP，該 VPP 匯總了最終客戶群，VPP 為每個相連的建築物生成優化的價格明細表，客戶的樓宇自動化系統將利用價格資訊來最大程度地降低成本，此方案考慮了建築物觸發或能源市場觸發的提前計劃。

#### **Scenario 2 : 「Energy trade through day-ahead market」**

This scenario illustrates the process of procuring the remaining amount of energy which is needed on top of the already procured energy by long term contracts. In terms of a building triggered approach, the customers (i.e. the building automation/management systems) provide an updated forecast for the next day. This forecast contains either only the deviation to the initial long term forecast or an updated total forecast. Then the retailer has to deduce the delta to obtain the energy amount for procurement. The retailer procures the needed energy at the exchange market and sends the information about the achieved energy prices back to the customer. In case of a price driven energy market triggered scenario the retailer receives the energy price schedule from the market, adds price information of eventually available long term contracts and forwards this information a VPP which aggregates a pool of end customers. The VPP generates an optimized price schedule for each of the connected buildings. The building automation system of the customers will utilize the price information for a cost minimization. This scenario considers a building triggered or energy market triggered day ahead planning.

#### **方案 3：「透過日內市場進行能源貿易」**

此方案描述檢測到與計劃的計劃建築能源的重大偏差時的過程，VPP 運營商將這種額外的彈性置於日內市場上，根據交易的彈性，將新的消費時間表提供給建築物運營商，根據他們的合同，一些客戶可能有權拒絕(選擇)改變其能源消耗時間表，此業務情景描述了當日可操作的市場報價。

#### **Scenario 3 : 「Energy trade through intra-day market」**

This scenario describes the process when a major deviation from the planned

building energy scheduled is detected. This additional flexibility is placed at the intraday market through the VPP operator. According to the traded flexibility new consumption schedules are provided to the building operators. Depending on their contracts some customers might have the right to deny (opt out) a change in their energy consumption schedule. This scenario describes an operational intra-day market offering.

#### **方案 4：“在控制準備金市場上提供二級/三級準備金”**

此方案描述智慧建築/VPP 在二級/三級儲備能源市場中的參與，基於從設備級別開始的可用能源彈性的預測，VPP 運營商可以提前一周或一天針對二級和三級儲備在儲備能源市場上提供一定程度的彈性，如果得標，則需要提供承諾的儲備能源，購買備用能源的傳輸系統運營商可以隨時向 VPP 運營商發出自動觸發信號(二次備用)或透過電話(三次儲備)給他，他需要提供備用能源，然後，VPP 操作員將所需的命令轉發給連接的客戶，BAS/BMS 在給定的時間和給定的時間段內自動激活二級或三級儲備，為了完整起見，應該提到的是，這些使用案例包括兩個單獨的合同：用於常規能源採購的能源供應商/零售商，以及使用 VPP 系統進行彈性商業化的服務提供，關於此問題的法律說明超出了本標準的範圍。

#### **Scenario 4：“Providing secondary/tertiary reserves at the control reserve market”**

This scenario describes the participation of Smart buildings/VPP at the secondary/tertiary reserve energy markets. Based on a prediction of available energy flexibility starting at the device level, the VPP operator may offer a certain amount of flexibility at the reserve energy markets one week or one day ahead for secondary and tertiary reserves, respectively. In case of a successful bidding provision of committed reserve energy is required. The transmission system operator who bought the reserve energy may at any time give an automated trigger signal (secondary reserve) or by phone call (tertiary reserves) to the VPP operator that he needs to provide reserve energy. The VPP operator then forwards the needed commands to the connected customers and the secondary or tertiary reserve is automatically activated by the BAS/BMS at a given time and for a given time period. For the sake of completeness it shall be mentioned that this use cases includes two separate contracts: energy supplier/retailer for regular energy procurement and a service provider utilizing a VPP system for flexibility commercialization. The legal clarification of this issue is out of scope of this document.

#### **方案 5：“應對電網擁堵”**

該使用案例描述建築物對配電網運營商發起的電網壅塞事件的反應，這可以基於預測的電網中斷或預定義措施的臨時觸發以在緊急情況下緩解電網，應

該提到的是，當前建立的監管框架不支持該使用案例，因此，此使用案例的優先級最低。

**Scenario 5 : “Reaction on grid congestions”**

This use case describes the reaction of buildings on grid congestion events initiated by the distribution grid operator. This may be based on a forecasted grid outage or ad hoc triggering of predefined measures to relief the grid during emergency situations. It shall be mentioned that the regulatory framework currently in place does not support this use case. Hence this use case has the lowest priority.

**A.1.26 日本的能源管理建築方案 Japanese building scenarios on energy management**

**A.1.26.1 通則 (General)**

能源管理系統在建築物內，管理建築物/房屋中功能強大的設備，與電網管理的介面，該用戶案例重點介紹建築能源管理及其介面的通訊。

Energy management inside the building manages capable devices in the building/home and interfaces to the power grid management. This user stories focuses an on the communication of building energy management with its interfaces.

在某些情況下，CEM 與相應的電網管理實體之間存在互動，在這種情況下，可能出現以下情況：

In some cases there is interaction between the CEM and the corresponding power grid management entity. On this following scenarios are possible :

**A.1.26.2 透過供應商和用戶之間的合作進行供需調整(模型 1) Demand-supply adjustment with cooperation between Supplier and Customer (Model 1)**

- (a) 能源供應商在確認供需狀況和批發電價後確定價格。
- (b) 用戶的 EMS 從能源供應商處接收價格資訊。
- (c) 用戶的設備根據收到的價格資訊制定用電計劃。
- (d) 能源供應商收到用戶的用電計劃。
- (e) 能源供應商根據收到的用電計劃審查價格。
- (f) 返回到(a)。

重複執行步驟(a)至(f)，最終用戶從供應商處收到最終價格資訊。

- 1) An energy supplier determines prices after confirming the supply & demand situation and the wholesale electricity prices.
- 2) A Customer’s EMS receives pricing information from the energy supplier.
- 3) Customer’s equipment creates a power usage plan based on the pricing information received.
- 4) The energy supplier receives power usage plans from Customers.
- 5) The energy supplier reviews the prices according to the received power

usage plans.

6) Go back to (1).

Steps (1) to (6) are performed multiple times and finally Customers receive the final pricing information from the supplier.

**A.1.26.3 單個建築物的節能，供需控制(模型 2)Energy saving, demand-supply control for individual buildings (Model 2)**

為優化功耗和發電量，CEM 提供單個建築物協調負載和資源的功能。

(a)設施管理者將重要性程度，優先級和消費/發電計劃放到 CEM 的終端中。

(b)CEM 將這些註冊到服務提供商。

(c)服務提供商根據單個設備的使用，單個設備的實際位置，消耗/生成時間表以及消耗/消耗結果的趨勢來創建調整計劃，每個調整計劃都包括設備操作計劃和激勵措施，服務提供商在用戶的 CEM 終端上顯示帶有激勵資訊的調整計劃。

(d)在緊急情況下，服務提供商根據上述過程的“重要程度”和優先級為分類分類控制創建調整計劃。

(e)設施管理者根據設備的運行計劃和激勵措施選擇調整計劃。

(f)服務提供商的 CEM 根據調整計劃向用戶發送抑制信號，然後，用戶根據抑制信號調整使用計劃。

For optimizing the power consumption and generation, the CEM provides functionality in coordinating loads and resources for an individual building.

1) The facility manager puts degrees of importance, priorities and consumption/generation schedules into terminal of the CEM.

2) The CEM registers these to the service provider.

3) The service provider creates adjustment plans based on uses of individual equipment, physical positions of individual equipment, consumption/generation schedules and trends of consumption/consumption result. Each adjustment plan includes an operation plan of equipment and a incentive. The service provider displays adjustment plans with a incentive information on the terminal of the customer's CEM.

4) In case of the emergency, the Service Provider creates adjustment plans for the triage control based on “degrees of importance” and priorities on the above process.

5) The facility manager selects the adjustment plan based on the operation plan of equipment and the incentive.

6) The CEM of the service provider sends suppression signals to customers based on adjustment plans. Then the customer adjusts the usage plan

based on suppression signals.

#### **A.1.26.4 地區的節能，供需調整(模型 3)Energy saving, demand-supply adjustment for the district (Model 3)**

- (a)設施管理者將建築物的優先級和用電計劃輸入 CEM，然後，CEM 將這些註冊到區域服務提供商和供應商。
  - (b)地區服務提供商為街區(基於合同的一組建築物)創建“用電計劃”和“設備運行計劃”，然後，地區服務提供商將這些註冊到他的 CEM。
  - (c)當需要抑制功率時，供應商計算區域的需求縮減能力，然後，供應商創建一個新的區域用電計劃，接下來，供應商將其發送給區域服務提供商。
  - (d)地區服務提供商收到該資訊後，根據優先級，用電計劃以及建築物和設備的消耗量製定“調整計劃建議”，這些建議中的每一個都包括“設備運行計劃”和激勵措施，然後，地區服務提供商將這些建議發送給客戶。
  - (e)設施管理者在用戶建築物的 CEM 終端檢查這些建議，然後，設備管理員根據“設備運行計劃”和激勵措施選擇其中一項建議，CEM 將選定的提案發送到地區服務提供商。
  - (f)地區服務提供商收到客戶選擇的提議後，地區服務提供商根據提議發送信號。
  - (g)客戶 CEM 根據收到的信號調整用電計劃。
- 1) The facility manager inputs the priority and the power usage plan of the building into the CEM. Then, the CEM registers these to the District Service Provider and Supplier.
  - 2) The district service provider creates the “power usage plan” and the “equipment operation plan” for the town block (a group of buildings based on a contract). Then the district service provider registers these to his CEM.
  - 3) When a suppression control of power is needed, the supplier calculates the demand curtailment ability of the district. Then the Supplier creates a new power usage plan of the district. Next, the supplier sends it to the district service provider.
  - 4) After the district service provider receives it, he creates “proposal for adjustment plans” based on the priority, the power usage plan and the consumption of buildings and equipment. Each of these proposals includes an “equipment operation plan” and an incentive. Then the district service provider sends these proposals to the customers.
  - 5) The facility manager checks these proposals at the CEM terminal in the customer’s building. Then the facility manager selects one of these proposals based on the “equipment operation plan” and incentive. The

CEM sends the selected proposal to the district service provider.

- 6) After the district service provider receives the proposal selected by the customer, the district service provider sends signals according to the proposal.
- 7) The customer CEM adjusts the power usage plan based on signals received.

**A.1.26.5 自我維持社區(模型 4)透過 Res 加速生產能力 Self sustaining community (Model 4) Acceleration of producing power by Res**

- (a) 透過 CEM 的終端,“建築物的設施管理員”將其建築物註冊到地區服務提供商提供的“社區能源貢獻服務”中。
  - (b) 以類似的方式,“擁有 RE (CES)/社區節能服務提供商(CEP)的社區能源供應商的管理者”將自己註冊到地區服務提供商提供的“能源貢獻服務”中。
  - (c) 地區服務提供商估算 CES/CEP 和客戶(建築物)擁有的再生能源產生的電力,區域服務提供商估計客戶的消費量。
  - (d) 地區服務提供商創建使用再生能源的生產計劃,以及分配給 CES/CEP 和客戶的計劃。
  - (e) 區域服務提供商將這些計劃提供給 CES/CEP,擁有再生能源的客戶,其他客戶以及供應商。
  - (f) CES/CEP,擁有再生能源的用戶,其他用戶和供應商確認這些計劃。
  - (g) 地區服務提供商使用用戶擁有的再生能源來收集生產結果。
  - (h) 地區服務提供商計算社區中使用再生能源發電的電量,然後計算每個用戶的個人發電量。
  - (i) 接下來,地區服務提供商計算 CES/CEP 和擁有再生能源的客戶對社區的能源貢獻率。
  - (j) 區域服務提供商根據其對社區的貢獻為他們提供 CES/CEP 和擁有再生能源的用戶獎勵。
  - (k) 擁有再生能源的用戶建築物管理者使用 CEM 終端確認上述激勵措施。CES/CEP 的管理者也確認上述激勵措施。
- 1) Via the terminal of the CEM, “the facility manager of the building” registers his building to the “energy contribution service to the community” provided by the district service provider.
  - 2) In a similar way, “the manager of the Community Energy Supplier owning REs (CES)/Community Energy saving Service Provider (CEP)” registers itself to the “energy contribution service” provided by the district service provider.
  - 3) The district service provider estimates the production of electricity

generated by renewable sources of power owned by CES/CEPs and customers (buildings). And the district service provider estimates the consumption of customers.

- 4) The district service provider creates a plan of the production using renewable sources of power, and a plan for the distribution to CES/CEPs and customers.
- 5) The district service provider provides these plans to CES/CEPs, to customers owning renewable sources of power, to other customers and to the supplier.
- 6) The CES/CEPs, the customers owning renewable sources of power, the other customers and the supplier confirm these plans.
- 7) The district service provider collects the results of production, using renewable sources of power owned by the customers.
- 8) The district service provider calculates the amount of electricity produced using renewable sources of power in the community and then calculates the individual production of each customer.
- 9) Next, the district service provider calculates the ratio of energy contribution to the community for the CES/CEP and customers owning renewable sources of power.
- 10) The district service provider gives the CES/CEP and Customers owning renewable sources of power an incentive based on their individual energy contribution to the community.
- 11) The manager of the customer's building, which owns renewable sources of power, confirms the above incentive using the CEM terminal. The manager of the CES/CEP also confirms the above incentive.

正常情況下的能源生產和消費調整

Adjustment of energy production and consumption in normal conditions

在這種情況下，電網既沒有緊急事件也沒有其他活動事件或未決事件。

In this scenario the power grid has neither an urgent or any other emergency event active or pending.

電力短缺時應採取的行動

Action in case of a shortage of supply of electricity

- (a) 地區服務提供商使用社區的天氣資訊估算未來的電力生產，當地區服務提供商決定在不久的將來電力生產不足時，地區服務提供商會向 CES/CEP 發送信號，以加快生產速度。
- (b) CES/CEP 收到上述消息後，CES/CEP 根據能源的市場價格更新供熱和發電計劃。
- (c) CES/CEP 將電抑制信號發送給每個用戶。

(d) 客戶使用 CEM 端確認抑制信號，接下來，用戶將對 CES/CEP 的答复輸入終端。

(e) CES/CEP 根據用戶的答復和能源的市場價格更新熱量和發電的計劃。

(f) CES/CEP 向區域服務提供商發送回復。

1) The district service provider estimates future production of electricity using the weather information for the community. And when the district service provider decides that the production of electricity will be insufficient in the near future, the district service provider sends a signal to the CES/CEPs in order to accelerate the production.

2) After the CES/CEP received the above message, the CES/CEP updates the planning of the heat and electrical generation based on the market price of energy.

3) The CES/CEP sends the electricity suppression signal to each customer.

4) The customer confirms the suppression signal using the CEM terminal. Next the customer inputs the reply to the CES/CEP into the terminal.

5) The CES/CEP updates the planning of the heat and electrical generation based on replies from the customers and the market price of energy.

6) The CES/CEP sends a reply to the district service provider.

電力供應過剩時採取的措施 Action in case of an excess of supply of electricity

(a) 地區服務提供商使用社區的天氣資訊估算未來的電力生產，並且，當地區服務提供商決定在不久的將來電力生產將超過電力需求時，地區服務提供商會向 CES/CEP 發送一個信號，以降低發電量。

(b) CES/CEP 根據能源市場價格更新向供應商的電力供應計劃和向客戶的火力供應計劃。

(c) CES/CEP 控制客戶建築物中的熱泵，以將電力存儲在熱泵中。

1) The district service provider estimates future production of electricity using the weather information for the community. And when the district service provider decides that the production of electricity will exceed the demand of electricity in the near future, the district service provider sends a signal for decelerating the production to the CES/CEPs.

2) The CES/CEP updates the plan for the supply of electric power to the supplier and the plan for the supply of thermal power to the customer based on the market price of energy.

3) The CES/CEP controls heat pumps in the customers' buildings to storage electric power in the heat pumps.

災難條件下的能量調節 **Energy accommodation in disaster conditions**

(a) 透過用戶大樓中的 CEM 終端，“災難控制中心”的設施管理者透過



CES/CEP 向地區服務提供商註冊其“災難情況用電計劃”。

- (b) 地區服務提供商根據該計劃為 CES/CEP 創建“災難情況下的供電計劃”，然後，地區服務提供商將“災難情況電源計劃”發送給 CES/CEP。
- (c) CES/CEP 中的 CEM 收到“災難情況的電源計劃”。
- (d) 在發生災難的情況下，供應商將災難信號發送到區域服務提供商。
- (e) CES/CEP 中的 CEM 收到來自地區服務提供商的災難信號後，將“正常情況下的電源計劃”更改為“災難情況下的電源計劃”。
- (f) CES/CEP 中的 CEM 為“災難控制中心”提供電力和火力。
- (g) “災難控制中心”中的 CEM 收到災難信號後，CEM 更改設備計劃。
- 1) Via the CEM terminal in the customer's building, the facility manager of the “disaster control center” registers its “power usage plan for disaster situations” to the district service provider through the CES/CEP.
- 2) The district service provider creates “power supply plans for disaster situations” for the CES/CEP based on this plan. Then the district service provider sends the “power supply plan for disaster situations” to the CES/CEPs.
- 3) The CEM in the CES/CEP receives the “power supply plan for disaster situations”.
- 4) In case of a disaster situation, the supplier sends the disaster signal to the district service provider.
- 5) After the CEM in the CES/CEP received the disaster signal from the district service provider, it changes the “power supply plan for normal situations” to the “power supply plan for disaster situations”.
- 6) The CEM in the CES/CEP supplies the electrical and the thermal power to the “disaster control center”.
- 7) After the CEM in the “disaster control center” receives the disaster signal, the CEM changes the equipment plan.

## A.2 用戶案例和使用案例對映表 User stories and use case mapping table

表 A.1 顯示了用戶案例和使用案例之間的關係。

Table A.1 shows the relation between user stories and use cases.

該對映表的主要目的是支持驗證新使用案例的必要性，並減少或多或少的等效使用案例的數量。

The main intention of this mapping table is to support the verification of necessity of a new use case and to reduce the number of more or less equivalent use cases at all.

如果有新的用戶案例，則可以將此用戶案例對映到現有使用案例，例如 電動汽

車的彈性充電週期與洗衣機的靈活啟動使用相同的使用案例。

In the event of a new user story, this user story can be mapped to existing use cases, e.g. a flexible charging cycle of an electric vehicle uses the same use cases than a flexible start of a washing machine.

如果對映顯示缺少使用案例，則需要添加此使用案例和資料模型。

If the mapping shows a lack of use case, this use case and data model need to be added.

Table A.1 – User stories – Use case mapping

User Story Use Case Mapping													
User Stories	JWG1100 FlexStartSD v.0.5	JWG1101 SDInformanCEMFI v.0.2	JWG1102 CEMInformSSDabo v.0.2	JWG1103 SlotShift v.0.1	JWG1110 TemperatureControlBasedOnPriceInformation v.0.1	JWG1111 FuelCellOperationWithFixedSchedule v.0.1	JWG112x MixedEnergySystem-HeatPumps-PV-StorageBattery v.0.2	JWG113x LogSystemEvents v.0.2	JWG120x LocalEnergyManagement v.0.1	JWG121x ProvideLocalPowerToTheGrid v.0.1	JWG2000 DemandSupplyAdjustment v.0.3	JWG2001 CascadedCEM v.0.2	JWG2002 DistrictEnergyManagement v.0.2
JWG 1 Flexible Start Washing Machine	yes	yes	yes	yes	no	no	no	yes	yes	no	no	yes	yes
JWG 2 Flexible Start EV charging	yes	yes	yes	no	no	no	yes	yes	yes	no	yes	no	no
JWG 3 SevereGridStabilityIssues	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes
JWG 4 PowerLimitationPV	yes	yes	yes	yes	no	no	yes	yes	yes	yes	yes	no	yes
JWG 5 CEMSimpleDevice	yes	no	no	no	no	no	no	no	no	no	no	no	no
JWG 6 CustomerSellsFlexibility	yes	no	no	no	no	yes	yes	yes	yes	yes	yes	no	yes
JWG 7 CustomerSellsDecentralizedEnergy	no	no	no	no	no	yes	yes	yes	yes	yes	no	no	yes
JWG 8 GridRelatedEmergencySituations	no	no	no	no	no	no	yes	yes	yes	no	no	no	no
JWG 9 CustomerConnectsNewSmartDevice	no	no	no	no	no	no	no	yes	yes	no	no	no	no
JWG 10 EnergyConsumptionInformation	no	no	no	no	no	no	no	yes	yes	no	no	no	no
JWG 11 UnexpectedDisconnect	yes	no	no	no	no	no	yes	yes	yes	no	no	no	no

Table A.1 – User stories – Use case mapping

Use Cases		Accelerated Distribution	PeakShiftBatteryAggregation	PowerAdjustmentNormalConditions	EnergyAccessmodulationForBuildingsUnderBastardConditions	TariffConsumptionInformationExchange	Directload-GenerationManagement	Directload-GenerationManagement	TariffSynchronization	MarketCommunicationFlexibility	Energy Production / Storage Integration	Local Power Loss	Historical Data Visualization
User Stories	JWG2010 v.0.3	JWG2020x v.0.91	JWG2041 v.0.3	JWG2042 v.0.3	JWG211x v.0.6	JWG212x v.0.6	JWG212x v.0.6	JWG212x v.0.6	JWG214x v.0.5	JWG300xx v.2.1	JWG3101 v.0.2	JWG3102 v.0.2	JWG3103 v.0.2
JWG 1 Flexible Start Washing Machine	no	no	yes	no	yes	yes	yes	yes	yes	no	yes	no	No
JWG 2 Flexible Start EV charging	no	no	no	no	no	no	no	no	yes	no	yes	Yes	No
JWG 3 SevereGridStabilityIssues	yes	yes	yes	yes	no	yes	yes	yes	no	yes	yes	Yes	No
JWG 4 PowerLimitationPV	yes	no	yes	no	yes	yes	yes	yes	no	no	yes	Yes	No
JWG 5 CEMSimpleDevice	no	no	no	no	no	no	no	yes	no	no	no	No	No
JWG 6 CustomerSellsFlexibility	yes	yes	yes	yes	no	no	no	yes	yes	yes	yes	No	No
JWG 7 CustomerSellsDecentralizedEnergy	yes	no	yes	no	no	yes	yes	no	yes	yes	yes	No	No
JWG 8 GridRelatedEmergencySituations	no	no	no	yes	no	no	no	no	no	no	yes	Yes	No
JWG 9 CustomerConnectsNewSmartDevice	no	no	no	no	no	no	no	no	no	no	yes	No	No
JWG 10 EnergyConsumptionInformation	no	no	no	no	no	no	no	no	no	no	yes	Yes	Yes
JWG 11 UnexpectedDisconnect	no	no	no	no	no	no	no	no	no	no	yes	Yes	No

Use Cases																
User Story Use Case Mapping																
User Stories		JWG1100 v.0.5	JWG1101 v.0.2	JWG1102 v.0.2	JWG1103 v.0.1	JWG1110 v.0.1	JWG1111 v.0.1	JWG1112x v.0.2	JWG113x v.0.2	JWG120x v.0.1	JWG121x v.0.1	JWG2000 v.0.3	JWG2001 v.0.2	JWG2002 v.0.2		
JWG 12	ExpectedYearlyCostsOfSmartDevice	no	no	no	no	no	no	yes	no	no	no	no	no	no		
JWG 13	EnergyStorageAndFeedInBasedOnTariff	no	no	no	no	no	no	yes	yes	yes	yes	no	no	no		
JWG 14	EnergyConsumptionManagementFromExternal	no	no	no	no	no	yes	yes	yes	yes	yes	yes	no	yes		
JWG 15	ManageIn-PremisesBatterySystem	no	no	no	no	no	no	yes	yes	yes	no	yes	no	no		
JWG 16	ManageDER	no	no	no	no	no	yes	yes	yes	yes	yes	no	no	yes		
JWG 17	PeakShiftWithBatteryAggregation	no	no	no	no	no	no	yes	yes	yes	yes	no	no	no		
JWG 18	ControlAppliancesBasedOnPricingInformation	yes	yes	yes	yes	no	no	no	yes	yes	no	yes	yes	no		
JWG 19	ControlAppliancesBasedOnEnergySavingsSignal	yes	yes	yes	yes	no	no	no	yes	yes	no	yes	yes	no		
JWG 20	ControlAppliancesBeforePowerCut	yes	yes	yes	yes	no	no	no	yes	yes	no	yes	yes	yes		
JWG 21	ControlAppliancesInCaseOfNaturalDisaster	yes	yes	yes	yes	no	no	no	no	no	no	yes	yes	no		
JWG 22	BilateralDR-Negawatt	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes		
JWG 23	UseCaseLighting	no	no	no	no	no	no	no	no	yes	no	yes	no	yes		
JWG 24	EnergyMarketFlexibilityManagement	no	no	no	no	no	no	yes	yes	yes	yes	yes	no	yes		

### A.3 使用案例說明 Use case descriptions

#### A.3.1 概述 Overview

以下使用案例係依上述用戶案例以及本標準前面定義的架構[CE1]，注意[CE2]此等使用案例僅說明行為者 A/B，CEM，智慧電錶和智慧裝置之間的通訊，為簡單起見，這些使用案例不代表能源管理閘道器和智慧電錶閘道器-在開發使用案例時，我們假設閘道器不提供有助於使用案例目標的功能，實際上，閘道器可以在路由資訊，協議翻譯，裝置管理，安全性及服務能力方面提供功能。

The following use cases are based on the above user stories and the architecture defined earlier in this technical report. Note that the use cases only describe communication between Actor A/B, the CEM, the smart meter and the smart devices. For sake of simplicity, these use cases do not represent the energy management gateway and the smart metering gateway – when developing the use cases we assumed that the gateways do not provide functionalities contributing towards the goals of the use cases. In reality, the gateway may provide functionality in terms of routing information, translation of protocols, device management, security and service capabilities .

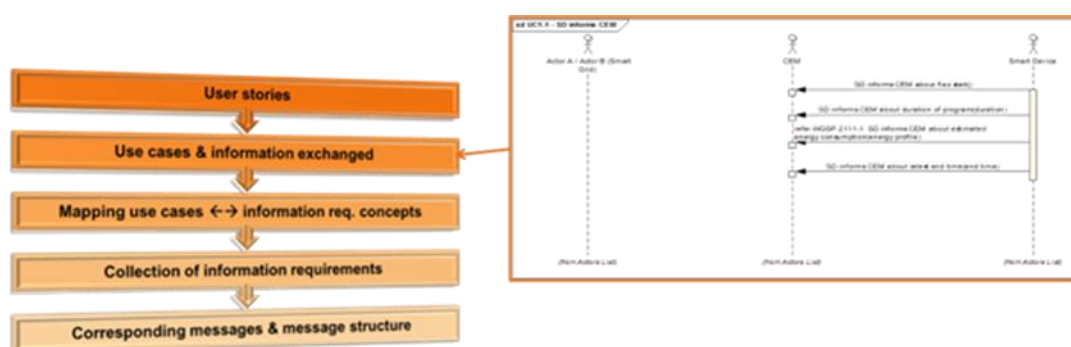


圖 A.2 使用案例及需求程序

Figure A.2 – Use case and requirements process

備考 1.幾種使用案例情境以疊代方式一同工作。例：可能為一種使用價格 (WGSP2112)獲取預測(WGSP2111)之協議，調整價格並從那時刻開始綁定。

NOTE 1 Several use case scenarios may work together in an iterative way. E.g. there might be a negotiation which uses the price (WGSP2112) to get a forecast (WGSP2111), then adapting the price, which might be binding from there on.

備考 2.資訊可以透過不同的通道傳送給行為者 A，B 以及消費者或家庭裝置，這意味著使用案例可以有效地分為幾個子使用案例，各子使用案例皆有其目標。

NOTE 2 Information can be transferred via different channels to actor A, B and to the consumer or in-home devices. This implies that the use case

could effectively be split up into several sub-use cases, each with its own goal.  
在此處提及的所有使用案例中，均引用 IEC 62559-2 用戶列表，並遵循 IEC 62559-2 使用案例範本。

In all the use cases mentioned here, IEC 62559-2 actors list [15] is referred to and the IEC 62559-2 Use Case template [16] is followed.

為了定義本標準中的使用案例，使用已經引用 SG-CG 架構模型作為基礎(參見圖 A.3)。

For the definition of the use cases in this document, the already referenced SG-CG architecture model has been used as a basis (see Figure A.3).

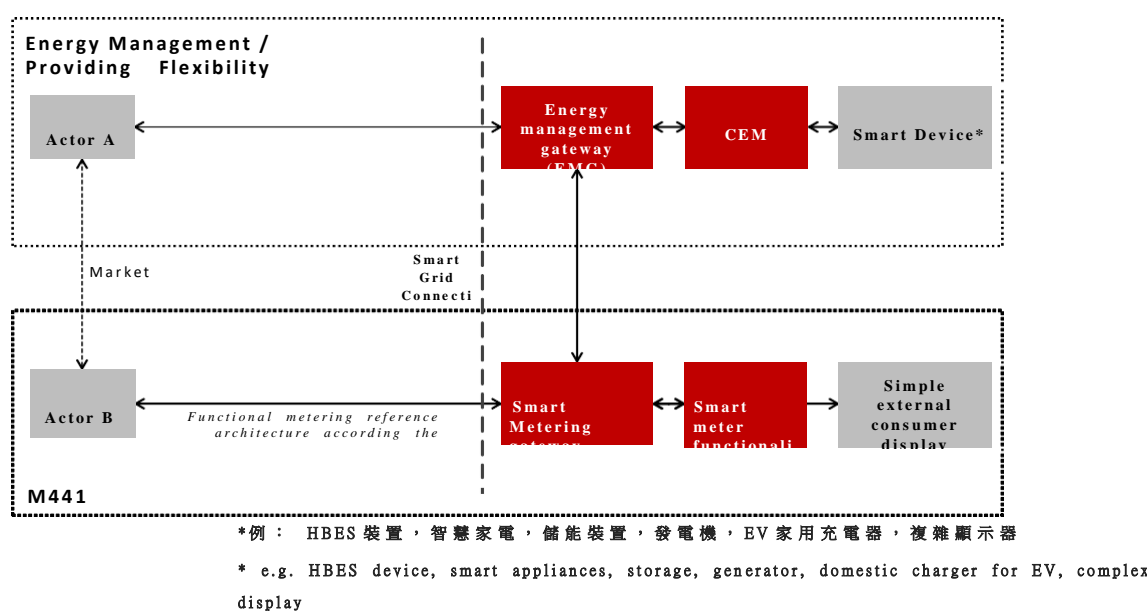


圖 A.3 智慧電網協調組架構模型

Figure A.3 – Smart Grid Coordination Group Architecture Model

備考 3. 以上架構中之行為者為功能個體，這意味著它們中的一些可能是同一實體裝置[CE3]的一部分(例：CEM 功能可能是智慧裝置的一部分，智慧電錶也可能包含智慧電錶閘道器和 CEM 等)。

NOTE 3 The actors in the above architecture are functional entities, which means that some of them may be part of the same physical device (e.g. CEM functionality may be part of a smart device, the smart meter might also encompass the smart metering gateway and CEM, etc.).

A.3.2 高階使用案例(JWG1100)智慧裝置(SD)彈性[CE4]開始

A.3.2 High level use case (JWG1100) Flexible start of a smart device (SD)

A.3.2.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	域/區 Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG1100	域：客戶端、DER Domain: Customer Premises, DER 區：過程，場域，變電所 Zones: Process, Field, Station	SD 彈性之能耗/發電(高階使用案例或一般使用案例) SD consumes/generates energy on a flexible basis (High Level Use Case or Generic Use Case)

版本管理

Version management

版本管理 Version management					
變化/版本 Changes/ Version	日期 Date	領域專家 Domain expert	專業知識/領域/角色之區域 Area of expertise /Domain /Role	標題/變更 Title/Changes	批准狀態草案、於評論及投票、定稿 Approval status draft, for comments, for voting, final
0.1	04/11/2013	編輯者[CE5] Editor		初稿 Initial Draft	草案 Draft
0.2	06/12/2013	編輯者 Editor		討論 CLC TC59x 之後的更新版本 Updated Version after CLC TC59x discussions	草案 Draft
0.3	06/01/2014	編輯者 Editor		更新 HLUC 以適應聯合使用案例工作組說明 Update HLUC to fit Joint Use	草案 Draft



				Case Workshop description	
0.4	07/03/ 2014	編輯者 Editor		添加 JWG-ID  Added JWG-ID	草案 Draft
0.5	16/12/ 2014	編輯者 Editor		添加了選擇性的步驟 5 以計算預期的運行成本  Added optional step 5 to calculate expected running costs	草案 Draft

## 使用案例之範圍及目標 Scope and objectives of use case

使用案例之範圍及目標 Scope and objectives of use case	
範圍 Scope	<p>在某些情況下，智慧裝置可以彈性應對時間，裝置可以自行管理其彈性的運行時間，並在協議的基礎上將其傳達給 CEM。</p> <p>In some cases smart devices provide flexibility towards their time. The device can manage its flexible running times by itself and communicates them to the CEM on a negotiation basis.</p> <p>必須與智慧裝置協議並確認 CEM 的彈性。</p> <p>智慧裝置的彈性操作並不意味著特定的優化策略。這取決於客戶為其智慧裝置和 CEM 定義的控制算法。</p> <p>Utilizing flexibility by a CEM must be negotiated and confirmed with the smart device.</p> <p>The flexible operation of a smart device does not imply a specific optimization strategy. It depends on the control algorithm which the customer defines for its smart device and the CEM.</p> <p>該高階使用案例的範圍涉及智慧裝置和 CEM 之間的基本資訊交換，以允許彈性啟動，它還涵蓋有關運行期間能耗的資訊交換，以允許在 CEM 中進行能源調度。</p> <p>The scope of that High Level Use Case deals with the basic information exchange between a smart device and the CEM to allow a flexible start. Also it covers the information exchange on the energy consumption during operation to allow an energy scheduling within the CEM.</p>
目標 Objective(s)	<p>該使用案例定義彈性啟動智慧裝置所需的基本資訊。</p> <p>有多種優化目標可用於設定彈性啟動時間。</p> <p>This use case defines the basic information which is required to offer flexible</p>

	start of smart devices.
	There are various optimization targets possible for setting a flexible start time.

使用案例之範圍及目標 Scope and objectives of use case	
相關業務案例 Related business case(s)	<ul style="list-style-type: none"> <li>— 需量反應 (DR)</li> <li>— 需求面管理 (DSM)</li> <li>— Demand Response (DR)</li> <li>— Demand Side Management (DSM)</li> </ul>

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case
簡短說明 Short description
<p>用戶啟動智慧裝置上的特定剖繪，從而可以彈性啟動。然後，智慧裝置將與 CEM 開始協議過程，以找到最合適的開始時間。SD 和 CEM 之間的互動不需要用戶互動，並且可以自主運行。SD 依啟動的剖繪完成任務，並可能要求用戶進行最終確認。作業完成後，最終客戶可能會收到調試成功或失效的通知。</p> <p>The User activates a specific profile on the smart device that allows a flexible start. The smart device then starts a negotiation process with the CEM to find the most suitable start time. The interaction between the SD and the CEM does not require user interaction and operates autonomously. The SD fulfils the job according to the activated profile and might ask the user for final confirmation. After job completion the end customer might get notified on successful or failed commissioning.</p> <ul style="list-style-type: none"> <li>— 智慧裝置可能具有兩種基本操作模式：</li> <li>— 透過發電來發電</li> <li>— A smart device might have two basic operational modes:</li> <li>— Power Producing by generating electricity</li> </ul>
完整說明 Complete description
<p>該使用者啟動一個特定動作剖繪[CE6]上的智慧裝置。所述智慧裝置然後協議一個開始時間與所述 CEM 係依所選規範。這樣的規格可以包括使用者的具體要求像預先定義的結束時間，最大能量消耗，或者一些別的和裝置的具體能力。這樣的一個剖繪可以是非常簡單的，並定義一個設定為一個特定目的。</p> <p>The User activates a specific action profile on the smart device. The smart device then negotiates a start time with the CEM based on the selected specification. Such specification might include user specific requirements like pre-defined end-time, maximum energy consumption, or something else and device specific capabilities. Such a profile can be very simple and defines a setting for a specific purpose.</p> <p>SD 和 CEM 之互動並未要求使用者互動和自主運行。它是最多到的 SD 到找到的最好的可能的解決方案依以所述使用者定義的操作模式。該 SD 在可能的情況下向使用者[CE7]可視化相關資訊，並與 CEM 合作採取行動。一旦使用者在智慧裝置的彈性啟動時間上啟動剖繪，使用者便會將控件移交給 CEM 或智慧裝置。</p> <p>The interaction between the SD and the CEM does not require user interaction and operates autonomously. It is up to the SD to find the best possible solution according to the user defined operational mode. The SD</p>

visualizes relevant information to the User if possible and starts action in cooperation with the CEM. Once the User activates a profile on flexible start time of a smart device, the User hands over the control to the CEM or smart device.

SD 依使用者啟動剖繪完成工作，並在調試成功或失效時通知使用者。相關資訊的通知和可視化方法因所使用的裝置而異。

The SD fulfils the job according to the activated profile of the user and notifies the User on successful or failed commissioning. A notification and visualization method of relevant information varies on the appliances that are used.

此使用案例包括三個主要使用案例：

This use case comprises three primary use cases:

(1) JWG1101 : SD 告知 CEM 彈性啟動

(1) JWG1101: SD informs CEM about flexible start

智慧裝置將其彈性和局限性告知 CEM。

The smart device informs the CEM about its flexibility and limitations.

(2) JWG1102 : CEM 告知 SD 開始時間

2) JWG1102: CEM informs SD about starting time

CEM 依所選的操作策略協調優化的啟動。可能需要考慮多個智慧裝置來計算合適的開始時間。

The CEM coordinates an optimized starting according to the selected operational strategy. It might require consideration of more than one smart device for calculating a suitable start time

(3) JWG1103 : CEM 告知 SD 時槽[CE8]移動[CE9]

3) JWG1103: CEM informs SD about slot shift

CEM 已發送到智慧裝置的計算出的起點需要進行更新。可能會有變化需要 CEM 重新計算新的開始時間的環境(在受影響的智慧裝置的預定義限制內)。

The calculated start which had been sent to the smart device by the CEM requires an update. There might be a change in the environment which requires the CEM to recalculate a new start time (within the pre-defined limits of the affected smart devices).

## 一般說明 General remarks

## 一般說明 General remarks

此高階使用案例或一般使用案例考慮了智慧裝置，例：家電(白色家電，棕色家電及能耗電子產品)。

This high level use case or generic use case considers smart devices like home appliances (white goods, brown goods and consumer electronics).

SD 和 CEM 之間的任何通訊都必須在應用程式級別和基本故障檢測上提供確認處理。通訊鏈結斷開不應導致不安全和嚴重的情況。因此，智慧裝置必須提供裝置特定的故障安全機制，以防止來自客戶的危險(例：若通訊失效，則高溫烤箱的清潔過程不會導致家庭中的危急情況)。

Any communication between SD and CEM must provide acknowledge handling on application level and basic failure detection. A broken communication link shall not lead to an unsecure and critical situation. Therefore, smart devices must provide device specific fail-safe mechanisms to prevent danger from the customer (e.g. a cleaning process of an oven with very high temperatures shall not lead to a critical situation in the home if communication fails).

## A.3.2.2 使用案例圖 Diagrams of use case

## 使用案例圖 Diagram of use case

查看使用案例的詳細說明

See detailed description of use cases

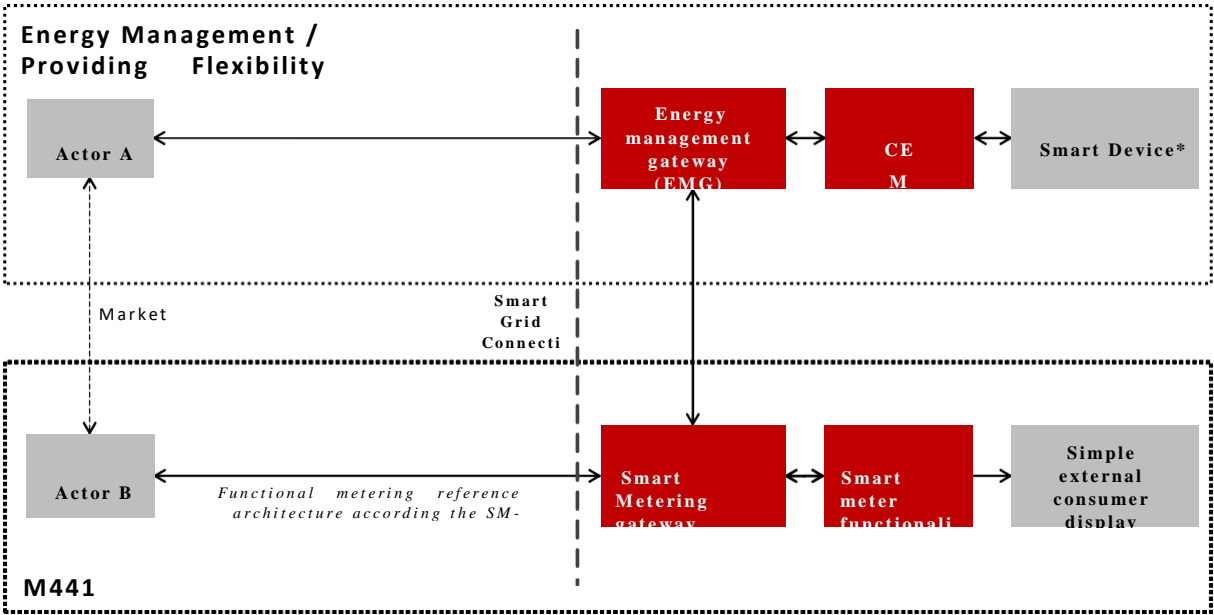
## A.3.2.3 技術細節 Technical details

行為者：人員，系統，應用程式，資料庫，電力系統和其他利益相關者。

Actors: people, systems, applications, databases, the power system, and other stakeholders

備考：為定義此使用案例，已使用圖 A.4 中所示之架構作為基礎。

NOTE 1 For the definition of this use case, the architecture shown in Figure A.4 has been used as a basis.



\*例： HBES 裝置，智慧家電，儲能裝置，發電機，EV 家用充電器，複雜顯示器

\* e.g. HBES device, smart appliances, storage, generator, domestic charger for EV, complex display

Figure A.4 SG CG Architecture Model

備考 2.圖 A.4 所示架構中的行為者是功能個體，這意味著它們中的一些可能是同一實體裝置的一部分(例：CEM 功能可能是智慧裝置的一部分，智慧電錶也可能包含智慧量測閘道器和 CEM 等)。

NOTE 2 The actors in the architecture shown in Figure A.4 are functional entities, which means that some of them may be part of the same physical device (e.g. CEM functionality may be part of a smart device, the smart meter might also encompass the smart metering gateway and CEM, etc.).

備考 3. 請考慮此高階別使用範圍不需上圖所示之所有行為者。下表顯示了參與的行為者。

NOTE 3 Please consider that the scope of this high level use does not require all actors shown on the figure above. The following table shows involved actors.

行為者 Actors	
分組(群體[CE10]) Grouping (Community)	群組說明 Group description

行為者名稱參照 行為者列表 Actor name see Actor list	行為者類型 參照行為者 列表  Actor type see Actor list	行為者說明參照行為者列表  Actor description see Actor list	特定使用案例 之進一步資訊  Further information specific to this use case
客戶能源管理者  Customer Energy Manager	內部  Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向“電網/市場”提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the "grid/market".</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 整合通訊功能時則稱為客戶能源管理系統。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System.</p>	

行為者 Actors	
分組(社群) Grouping (Community)	群組說明 Group description

行為者名稱參照行為者列表  Actor name see Actor list	行為者名稱參照行為者列表  Actor name see Actor list	行為者名稱參照行為者列表  Actor name see Actor list	行為者名稱參照行為者列表  Actor name see Actor list
智慧裝置  Smart device	外部  External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過CEM介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc...). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and messages from the grid in an intelligent way.</p> <p>智慧裝置不在 SG-CG 範圍內，因此須將其視為外部行為者。</p> <p>Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor.</p>	
智慧家電(白色家電)  Smart appliance (white goods)	外部  External	<p>智慧裝置之一範例為智慧白色家電，其具備扮演回應電網訊息之能力及優化自身向能源供應網路之表現。此訊息可直接從公共事業或第三方能源服務提供商或透過房屋能源管理(CEM)系統接收，</p> <p>An example of a smart device is a smart white goods appliance which is an appliance that has the capability to act in response to a message from the grid and there by optimize its behaviour towards the energy supply network. The message can be received from a utility or a third party energy service provider directly or via a home energy management (CEM) system,</p> <p>此訊息可為能源成本或有效再生能源的數量資訊或家電需依預設或活躍消費者輸入，接收、解釋並回應的需量反應訊息(延遲負載訊息或其他相關資訊)。智慧家電不保證會回應，但會依自身狀態及使用者設定回應，以確保達到預期效能。</p> <p>The message can be information like the cost of energy or the amount of available renewable energy, or it can be a Demand Respond message (delay load message or other related information) that the appliance must receive, interpret and react upon based on pre-set or active consumer input. The smart appliance is not guaranteed to respond, but will do so based on its status</p>	

		<p>and user settings in order to ensure the expected performance.</p> <p>消費者擁有對家電最終控制權，可以複寫任何特定模式(例：複寫延遲允許立即操作，將延遲限制為不超過數小時數或保持設定之房溫)。</p> <p>The consumer has the ultimate control of the appliance and can override any specific mode (e.g. override a delay to allow immediate operation, limit delays to no more than a certain number of hours, or maintain a set room temperature).</p> <p>任何家電操作設定或模式應易於普通非技術消費者啟動或實作。</p> <p>Any appliance operation settings or modes shall be easy for an average, non-technical consumer to activate or implement.</p>	
行為者 A Actor A	外部 External	<p>外部行為者(智慧電網市場角色)透過能源管理通道與家庭或家庭自動化網路之系統功能及組件進行互動。此市場角色諸如能源提供商、能源服務提供商及聚合商等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the energy management communication channel. Examples of such market roles are the energy provider, the energy services Provider, the aggregator, etc.</p>	
行為者 B Actor B	外部 External	<p>外部行為者(智慧電網市場角色)透過量測通訊通道與家庭或家庭自動化網路之系統功能及組件進行互動。該行為者負責收集量測資料。此市場角色諸如 DSO、量測公司等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the metering communication channel. This actor is responsible for collecting metering data. Examples of such market roles are the DSO, metering company, etc.</p>	
使用者 User	外部 External	<p>已購買智慧裝置之終端客戶。終端客戶負責配置及設定智慧裝置之運轉模式。</p> <p>The end customer who has acquired a smart device. The end customer is responsible for configuring and setting operation mode of the smart device.</p>	

觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件



Use case conditions			
行為者/系統/資訊 /契約  Actor/System/Information  /Contract	觸發事件  Triggering event	前提條件  Pre-conditions	假設條件  Assumption
SD	啟動訊息  Activation Message	SD 已啟用且正在運行。  SD is active and operational.	使用者於建立事件前已建立或選擇剖繪。SD 依剖繪開始與 CEM 進行協議。  User has created or selected a profile before creating the event. SD starts negotiations with CEM based on the profile.

## 參考文獻[CE11]

## References

參考文獻						
References						
No.	參考資料 型 式 [CE12] Reference s Type	參考 Reference	狀態 Status	使用案例之 影響 Impact on use case	發起人/組織 Originator/Organi sation	鏈結 Link
1	指導方針 Guideline	基本定義 及通用程 序 Basic definitions and common procedures	定稿 Final	術語及定義 Terms and definitions	SG-CG 可持續過 程工作組 SG-CG Sustainable Processes WG	<a href="ftp://ftp.cen.eu/EN/European%20Standardization/HotTopics/SmartGrids/SustainableProcesses.pdf">ftp://ftp.cen.eu/EN/European Standardization/HotTopics/S martGrids/SustainablePr ocesses.pdf</a>
2	技術報告 Technical Report	使用者經 歷及序列 圖[CE13] User story and Sequence diagrams	草案 Draft	情境之主要 影響 Major impact on Scenario	IEC TC57/CLCTC205 /CLC /TC59x	-
3	標準 Standard	使用案例 範本 Use case template	草 案 (FDIS) [CE14] Draft (FDIS)	範本說明 Template description	IEC TC8	-

分類/對映使用案例之更多資訊

Further Information on the use case for classification/mapping

分類資訊
Classification information
與其他使用案例關聯
Relation to Other use cases
深度[CE15]
Level of Depth

高階使用案例 High level use case
優先序 Prioritisation
一般，區域或國家關係 Generic, Regional or National Relation
通用高階使用案例可用於任何智慧裝置之類型。 Generic high level use case which can be applied to any kind of smart device.
觀點 Viewpoint
此高階使用案例具有使用者視角及 SD 與全體客戶能源管理系統之互動。其不考慮彈性提供或特定於電網實作之市場機制。 This high level use case has the user perspective and the interaction of the SD with an overall customer energy management system. it does not consider market mechanisms for flexibility offering or power grid specific implementations.
分類的其他關鍵字 Further Keywords for Classification
通用高階使用案例 Generic high level use case

#### A.3.2.4 使用案例的逐步分析 Step by step analysis of use case

步驟－情境名稱

Steps – Scenario Name

情境條件 Scenario conditions					
No.	情境名稱 Scenario name	主要行為者 Primary actor	觸發事件 Triggering event	前提 Pre-condition	後置條件 Post-condition

步驟－情境

Steps – Scenarios

情境 JWG1100 彈性啟動 SD								
Scenario JWG1100 Flexible Start SD								
情境名稱：		第一位 – 家電彈性啟動時間						
Scenario name:		No. 1 – Flexible start time of appliance						
Step No.	事件 Event	流程/活動名稱 Name of process/activity	流程/活動說明 Description of process/activity	服務 Service	資訊生產者(行為者) Information producer (Actor)	資訊接收者(行為者) Information receiver (Actor)	資訊交換 Information exchanged	要求事項 [CE16], R-ID Requirements, R-ID
1	-	準備 Preparation	使用者準備操作 SD User prepares SD for operation	準備 Preparation	使用者 User	SD	特定裝置 (閉門, 水龍頭連接, 瓦斯燃燒器連接, 電熱器連接, ...)  Device Specific (Door Closed, Water tap connected, Gas burner connected, electrical heating connected, ...)	
2	-	操作模式準備 Operation mode preparation	使用者輸入操作模式設定 User enters settings for operational mode	剖繪生成/選擇 Profile Generation/Selection	使用者 User	SD	裝置及客戶特定資料  Device and Customer Specific Data	
3	啟動訊息 Activation	操作模式啟動 [CE17] Operation	預定義或手動輸入之設設於 SD 上啟動	服務啟動 Service Activation	使用者 User	SD	通用裝置資料 (啟動) General	

	Mes sag	Mode Activati on	Pre-define d or manually entered setting become active on SD	tion			Device Data (Activatio n)	
4	SD 通知  SD  Noti fi- catio n	SD 告 知 CEM  SD  informs CEM	SD 將 啟 動剖繪發 送到CEM  SD sends activation profile to CEM	向 CEM 通 知 用 戶 請 求  Notifi cation of User reques t to CEM	SD	CEM	剖繪  Profile	
5	通知  Noti ficati on	成本計 算  Cost Calcula tion	CEM或智 慧裝置都 可以計算 預期的運 行成本  Either the CEM or the smart device calculates the expected running costs	訊 息 傳遞  Infor matio n  delive ry	SD/CEM	CEM/SD	費用  Costs	
6	協議 Neg otiat ion	CEM/S D 協議  CEM/S D  Negotia tion	CEM 和 SD 協 議 彈性啟動 時間  CEM and SD negotiate on flexible start time	排 程 規畫  Sched ule Planni ng	SD/CEM	CEM/SD	裝置及客 戶特定資 料  Device and Customer Specific Data	
7	使用者資 訊  User Infor mati on	可視化  Visuali zation	SD 會 按 排程通知 用戶  SD notifies the User on the schedule	訊 息 傳遞  Infor matio n delive ry	SD	用 戶 User	剖繪  Profile	

## A.3.2.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements to information data
裝置特定資料 (DSD) Device Specific Data (DSD)	<p>裝置特定資料可被分類至各系列產品，例：洗碗機、洗衣機機器、加熱單元等</p> <p>Device specific data can be classified to each product family like dish washer, washing machine, heating unit, etc.</p> <p>此資料組特定於 SD 類別。在組合多功能時，SD 可具有多個特定裝置資料集。</p> <p>This set of data is specific to the category of the SD. A SD might have multiple device specific data sets when combining multiple features.</p>	<p>此等資訊很敏感，任何修改皆可能改變 SD 某些行為。此為 CEM-SD 協議之關鍵。因此，通訊資料必須被保護避免濫用及受外部影響。</p> <p>Such information is sensitive in a way that any modification might change certain behaviour of a SD. That is crucial for CEM-SD negotiations. Therefore, the communication must be protected from misuse and external influences.</p>

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements to information data
客戶特定資料 (CSD) Customer Specific Data (CSD)	<p>使用者操作應能夠建立客戶特定資訊剖繪。依 SD 資料設定應包含能源提供者，舒適度設定，客戶習慣等 SLAs。</p> <p>The user who operates might be able to create a profile for customer specific information. Depending on the SD the data set might contain SLAs with energy providers, comfort settings, Customer habits, etc.</p> <p>SD 可維護一或多個客戶之特定資料集。</p> <p>A SD can maintain one or more customer specific data sets.</p>	<p>CSD 包含敏感資訊。這樣的資料集可能包含 SLA 和與隱私有關的資訊。</p> <p>CSD contains sensitive information. Such a data set might contain SLAs and privacy relevant information.</p> <p>因此，此類資訊必須謹慎處理，並且應僅相關行為者可以訪問。這包括 CEM 無法訪問特定契約屬於第三方服務提供商的資訊。</p> <p>Therefore, such information must be handled with care and shall be accessible to relevant actors only. That includes, that the CEM shall</p>

		not be able to access contract specific information which belong to third party service providers.
一般裝置資料 (GDD)  General Device Data (GDD)	各 SD 所需之公共資訊，例：ID、通訊地址、狀態資訊等。  Common information which is required from each SD like an ID, communication address, status information, etc.  此資料集並不特定於白色、棕色或能耗品。  This set of data is not specific to white, brown, or consumer goods.  GDD 提供公共標準化功能為啟用之下限。  GDD provide common standardized functionalities which are the lower limit for enabling.	此等資訊很敏感，任何修改皆可能開關 SD。因此，通訊資料必須被保護避免濫用及受外部影響。  Such information is sensitive in a way that any modification might turn on or off a SD. Therefore, the communication data must be protected from misuse and external influences.
能源剖繪  Energy Profile	能源剖繪定義針對適用於智慧裝置特定運轉模式之特徵。  An energy profile defines characteristics towards s specific operational mode which is applicable to the smart device.  此等資訊可用於功耗，亦可用於發電。  Such information can be used for power consumption but also power generation.	能源剖繪不包含敏感資料，以至於在特定運轉模式下給予已使用能源指示。  The energy profile does not contain sensitive data in a way that it gives indication on the used Energy for a specific operational mode.

#### A.3.2.6 要求事項(選項) Requirements (optional)

#### A.3.2.7 常用術語及定義 Common terms and definitions

常用術語及定義 Common terms and definitions	
術語 Term	定義 Definition
能源剖繪 Energy Profile	能源剖繪定義一段時間內之功耗/發電量。智慧裝置上之功率可能會有變化，其變化將透過能源剖繪進行擷取及可視化。

	<p>An energy profile defines the power consumption/generation over time. The power might vary on the smart device which will be captured and visualized by the energy profile.</p> <p>能源剖繪可能被分成多個時槽。此時槽具有固定功率，以獲得一個離散功耗/發電剖繪。簡單能源剖繪將包含僅一功率值及區間。</p> <p>An energy profile might be split into multiple time slots. Such time slots have a fix amount of power to get a discrete power consumption/generation profile. A simple energy profile will contain only one power value and its duration.</p>
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#### A.3.2.8 自定義資訊(選項) Custom information (optional)

自定義資訊(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 [CE18] Refers to section

#### A.3.3 特定使用案例(JWG1101)SD 告知 CEM 彈性啟動

#### A.3.3 Specialized use case (JWG1101) SD informs CEM about flexible start

##### A.3.3.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	域/區 Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG1101	域： 顧客 前提，DER Domain: Customer premises, DER 區： 過程，場域，變電所	SD 告知 CEM 有關彈性星形(特定使用案例或主要使用案例)的資訊 SD informs CEM about flexible star (specialized use case or primary use case)
	Zones: Process, Field, Station	



## 版本管理

## Version Management

版本管理 Version management					
變化/版本 Changes/ Version	日期 Date	領域專家 Domain expert	區的專業知識 /網域/角色 Area of expertise /Domain /Role	標題/變更 Title/Changes	批准狀態草案，用於評論，投票，最終 Approval status draft, for comments, for voting, final
0.1	06/01/ 2014	編輯者 Editor		初稿 Initial draft	草案 Draft
0.2	07/03/ 2014	編輯者 Editor		添加了使用案例 ID Added use case ID	草案 Draft

## 使用案例之範圍及目標 Scope and objectives of use case

使用案例之範圍及目標 Scope and objectives of use case	
範圍 Scope	後一個智慧裝置是能夠註冊在該 CEM 和正常工作，它告知了有關其 CEM 彈性啟動時間。 After a smart device was able to register at the CEM and works properly, it informs the CEM about its flexible start time.
目標 Objective(s)	該使用案例定義了在彈性啟動時間通知 CEM 所需的基本資訊。 This use case defines the basic information which is required to inform the CEM on a flexible start time.
相關業務案例 Related business case(s)	<ul style="list-style-type: none"> <li>– 需量反應(DR)</li> <li>– 需求面管理(DSM)</li> <li>– Demand Response (DR)</li> <li>– Demand Side Management (DSM)</li> </ul>

## 使用案例敘述 Narrative of use case



使用案例敘述 Narrative of use case
簡短說明 Short description
完整說明 Complete description

一般說明 General remarks

一般說明 General remarks

A.3.3.2 使用案例圖 Diagrams of use case

圖 A.5示出了使用案例圖的使用案例圖。

Figure A.5 shows a 使用案例圖 Diagram of use case.

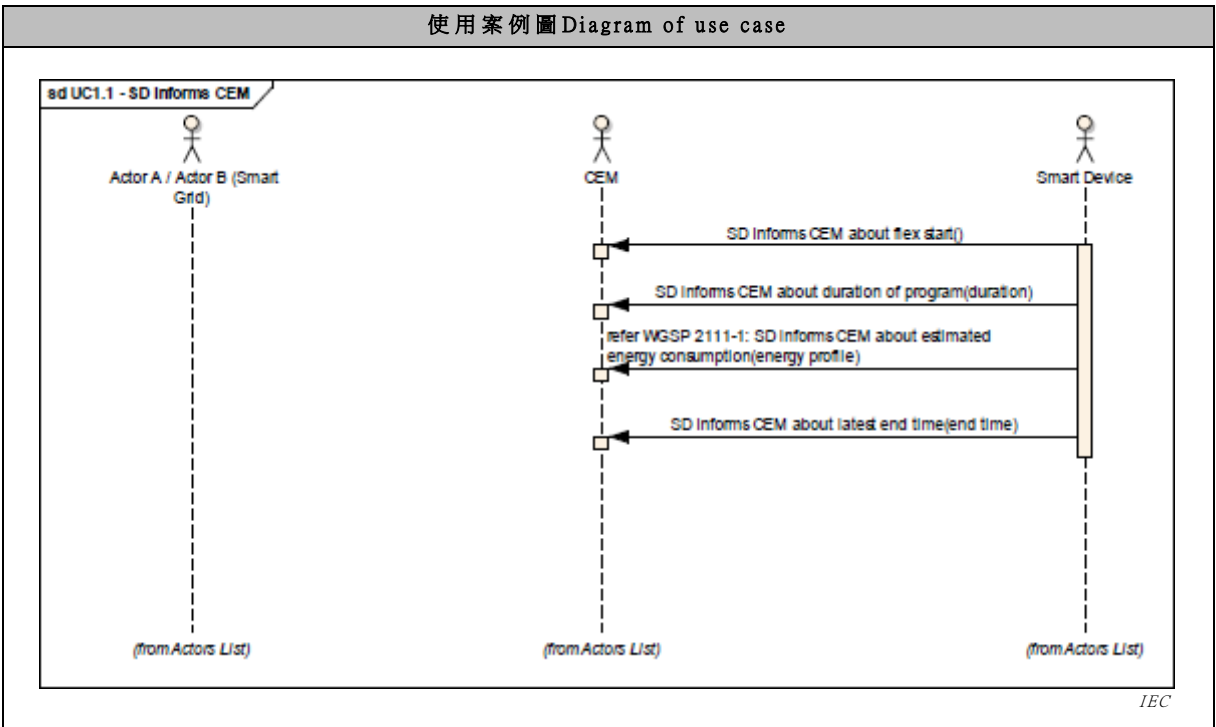


圖 A.5 序列圖

Figure A.5 – Sequence diagram

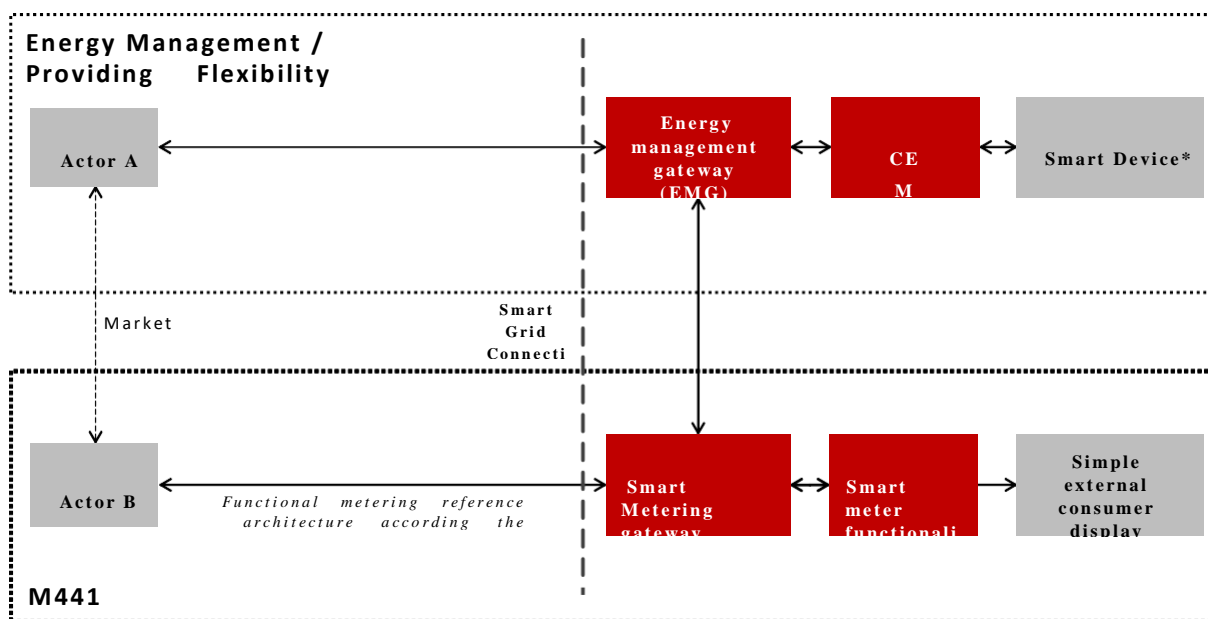
### A.3.3.3 技術細節 Technical details

行為者：人員，系統，應用程式，資料庫，電力系統和其他利益相關者。

Actors: people, systems, applications, databases, the power system, and other stakeholders

備考 1. 為定義該使用案例，已使用圖 A.6 所示的架構作為基礎。

NOTE 1 For the definition of this use case, the architecture shown in Figure A.6 has been used as a basis.



\*例：HBES 裝置，智慧家電，儲能裝置，發電機，EV 家用充電器，複雜的顯示器

\* e.g. HBES device, smart appliances, storage, generator, domestic charger for EV, complex display

圖 A.6 SG CG 架構模型

Figure A.6 – SG CG Architecture Model

備考 2. 以上架構中之行為者為功能個體，這意味著它們中的一些可能是同一實體裝置的一部分(例：CEM 功能可能是智慧裝置的一部分，智慧電錶也可能包含智慧量測閘道器和 CEM 等)。

NOTE 2 The actors in the above architecture are functional entities, which means that some of them may be part of the same physical device (e.g. CEM functionality may be part of a smart device, the smart meter might also encompass the smart metering gateway and CEM, etc.).

備考 3. 請考慮此高階別使用範圍不需上圖所示之所有行為者。下表顯示了參

與的行為者。

NOTE 3 Please consider that the scope of this high level use does not require all actors shown on the figure above. Following table shows involved actors.

行為者 Actors			
分組(社群) Grouping (Community)		群組說明 Group description	
行為者名稱參照 行為者列表 Actor name see Actor list	行為者名稱參照 行為者列表 Actor name see Actor list	行為者名稱參照行為者列表 Actor name see Actor list	特定使用案例之進一步資訊 Further information specific to this use case
客戶能源管理者 Customer Energy Manager	內部 Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the "grid/market".</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 整合通訊功能時則稱為客戶能源管理系統。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System.</p>	

智慧裝置 Smart device	外部 External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲存器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc...). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and signals from the grid in an intelligent way.</p> <p>智慧裝置不在 SG-CG 範圍內，因此須將其視為外部行為者。</p> <p>Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor.</p>	
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觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件 Use case conditions			
行為者/系統/資訊/契約 Actor/System/Information/Contract	行為者/系統/資訊/契約 Actor/System/Information/Contract	行為者/系統/資訊/契約 Actor/System/Information/Contract	行為者/系統/資訊/契約 Actor/System/Information/Contract
SD	啟動訊息 Activation Message	SD 已啟用且正在運行。 SD is active and operational.	用戶在建立事件之前已經建立或選擇了個人資料。SD 將依剖繪開始與 CEM 進行協議。 User has created or selected a profile before creating the event. SD starts negotiations with CEM based on the profile.

## 參考文獻

## References

參考文獻 References						
No.	參考資料 型式 References Type	參考 Reference	狀態 Status	使用案例之影響 Impact on use case	發起人/組織 Originator/Organisation	鏈結 Link
1	指導方針 Guideline	基本定義及 通用程序 Basic definitions and common procedures	定稿 Final	術語及定義 Terms and definitions	SG-CG 可持續流程工作組 SG-CG Sustainable Processes WG	<a href="ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf">ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf</a>
2	通用使用 案例 Generic use case	額 外 資 訊 Additional information	定稿 Final	市場通訊之額外資訊 Additional information on Market communication	智慧電網協調小組 (SG-CG) 可 持 續 流 程 WGSP2128 Smart Grid Coordination Group (SG-CG) Sustainable Processes WGSP2128	
3	高 階 使用 案例 High level use case	直接關聯 Direct relevance	草案 Draft	術語及定義 Terms and definitions	聯合使用案例工作組 (IECTC57 WG21/CLC TC205WG18/CLC TC59xWG7) Joint Use Case Working Group (IECTC57 WG21/CLC TC205 WG18/CLC TC59x WG7)	

## 分類/對映使用案例之更多資訊

## Further Information on the use case for classification/mapping

分類資訊 Classification information
與其他使用案例關聯 Relation to other use cases

深度 Level of depth
特定級別的使用案例 Specific level use case
優先序 Prioritisation
一般、區域或國家關係 Generic, regional or national relation
特定高階使用案例可用於任何智慧裝置之類型。 Specific high level use case which can be applied to any kind of smart device.
觀點 Viewpoint
此特定使用案例具有使用者視角及 SD 與全體客戶能源管理(CEM)系統之互動。其不考慮彈性提供或特定於電網實作之市場機制。 This specialized use case has the user perspective and the interaction of the SD with an overall customer energy management (CEM) system. It does not consider market mechanisms for flexibility offering or power grid specific implementations.
分類的其他關鍵字 Further keywords for classification
特定使用案例 Specialized use case

#### A.3.3.4 使用案例的逐步分析 Step by step analysis of use case

步驟 - 情境名稱

Steps - Scenario Name

情境條件 Scenario conditions					
No.	情境名稱 Scenario name	主要行為者 Primary actor	觸發事件 Triggering event	前提 Pre-condition	後置條件 Post-condition

步驟-情境

Steps - Scenarios





情境								
Scenario								
情境名稱：		第一位 - 家電彈性啟動時間						
Scenario name:		No. 1 – Flexible start time of appliance						
Step No.	事件 Event	流程 / 活動名稱 Name of process/activity	流程/活動說明 Description of process/activity	服務 Service	資訊生產者 (行為者) Information producer (Actor)	資訊接收者(行為者) Information receiver (Actor)	資訊交換 Information exchanged	要求事項, R-ID Requirements, R-ID
1	啟動訊息 Activation Message	操作模式準備 Operation mode preparation	CEM 或用戶在智慧裝置上啟動特定的操作模式。 The CEM or the User activate a specific operational mode on a smart device.	準備 Preparation	User/CEM	SD	裝置特定 (按下按鈕, 來自 CEM 的要求以詢問彈性, SD 上的計時器, SD 內部狀態更改等) Device Specific (Button Pressed, Request from CEM to ask for flexibility, Timer on the SD, SD internal state change, ...)	

情境								
Scenario								
情境名稱：		第一位 - 家電彈性啟動時間						
Scenario name:		No. 1 – Flexible start time of appliance						
Step No.	事件 Event	流程 / 活動名稱 Name of process/ac	流程/活動說明 Description of process/acti	服務 Service	資訊生產者 (行為者) Information	資訊接收者(行為者) Information	資訊交換 Information exchanged	要求事項, R-ID Requirements, R-

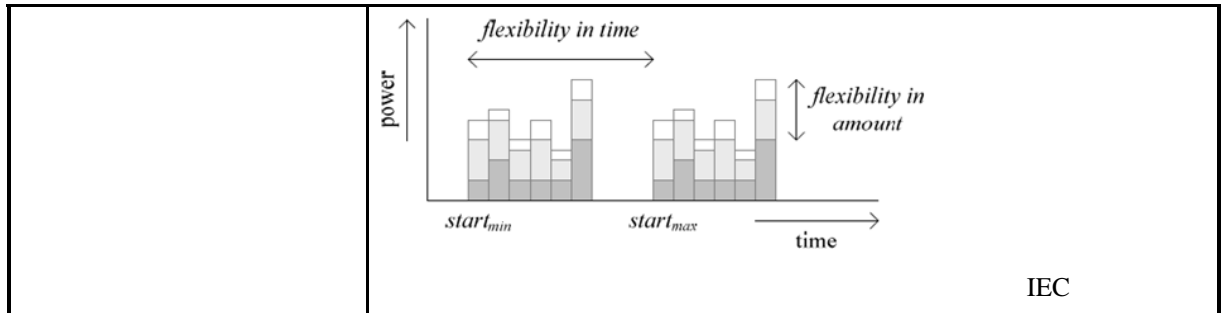
		tivity	vity		n producer (Actor)	n receiver (Actor)		ID
2	-	SD 計算其能力 SD calculates its capabilitie s	依狀態及其操作模式，可能會有各種可能性，必須對SD進行評估。  There might be various possibilities depending on the state and its operational mode which must be evaluated of the SD.	準備  Prepara tion	SD	SD	-	
3	SD通知  SD Notifi cation	SD告知 CEM  SD informs CEM	SD將彈性啟動資訊發送到CEM。  SD sends the information of the flexible start to the CEM.	彈性服務內容  Flexibil ity Service offering	SD	CEM	開始時間，結束時間能源剖繪(估計能耗)  Start Time, End Time Energy Profile (estimated energy consumetion)	

## A.3.3.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements to information data
客戶特定虛擬能源計數器。 Customer specific virtual energy counter.	客戶特定資料(CSD) Customer Specific Data (CSD)	如 JWG-HLUC1.1 中 CSD 定義。 As defined for CSD within JWG-HLUC1.1.
顧客識別 Customer Identification	客戶特定資料(CSD) Customer Specific Data (CSD)	如 JWG-HLUC1.1 中 CSD 定義。 As defined for CSD within JWG-HLUC1.1.
最晚結束時間 Latest possible end time	一般裝置資料(GDD) General Device Data (GDD)	如 JWG-HLUC1.1 中 CSD 定義。 As defined for GDD within JWG-HLUC1.1.
最晚開始時間 Latest possible start time	一般裝置資料(GDD) General Device Data (GDD)	如 JWG-HLUC1.1 中 CSD 定義。 As defined for GDD within JWG-HLUC1.1.
估計能耗 Estimated Energy Consumption	能源剖繪 Energy Profile	如 JWG-HLUC1.1 中“能源剖繪”定義。 As defined for the Energy Profile within JWG-HLUC1.1.

## A.3.3.6 常用術語及定義 Common terms and definitions

常用術語及定義 Common terms and definitions	
術語 Term	定義 Definition
能源剖繪 Energy Profile	<p>能源剖繪定義一段時間內之功耗/發電量。智慧裝置上之功率可能會有變化，其變化將透過能源剖繪進行擷取及可視化。</p> <p>An energy profile defines the power consumption/generation over time. The power might vary on the smart device which will be captured and visualized by the energy profile.</p> <p>能源剖繪可能被分成多個時槽。此時槽具有固定功率，以獲得一個離散功耗/發電剖繪。簡單能源剖繪將包含僅一功率值及區間。</p> <p>An energy profile might be split into multiple time slots. Such time slots have a fix amount of power to get a discrete power consumption/generation profile. A simple energy profile will contain only one power value and its duration.</p>



#### A.3.3.7 自定義資訊(選項) Custom information (optional)

自定義資訊(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Refers to section

#### A.3.4 特定使用案例(JWG-SPUC1102)CEM 告知 SD 啟動時間

#### A.3.4 Specialized use case (JWG-SPUC1102) CEM informs SD about starting time

##### A.3.4.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	域/區 Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG1102	域：客戶端、DER Domain: Customer Premises, DER 區：過程，場域，變電所 Zones: Process, Field, Station	CEM 告知 SD 彈性啟動時間(特定使用案例或主要使用案例) CEM informs SD about flexible start time (specialized use case or primary use case)

版本管理

Version management

版本管理 Version management					
變化/版本 Changes/ Version	日期 Date	領域專家 Domain expert	區的专业知識 /網域/角色 Area of expertise /Domain /Role	標題/變更 Title/Changes	批准狀態草案，用於評論，投票，最終 Approval status draft, for comments, for voting, final
0.1	06/01/ 2014	編輯者 Editor		初稿 Initial draft	草案 Draft
0.2	07/03/ 2014	編輯者 Editor		添加了使用案例 ID Added use case ID	草案 Draft

## 使用案例之範圍及目標 Scope and objectives of use case

使用案例之範圍及目標 Scope and objectives of use case	
範圍 Scope	<p>若智慧裝置備具有彈性，則 CEM 可以協調併計算最佳的開始時間。優化方法不在此使用案例範圍內的策略。</p> <p>一旦 CEM 確定了智慧裝置的合適開始時間，就必須共享該資訊。</p> <p>The CEM coordinates and calculates a best possible start time if a smart device offers flexibility. The strategy on how the optimization is not within the scope of this use case.</p> <p>Once a CEM has identified a suitable start time for a smart device, that information must be shared.</p>
目標 Objective(s)	<p>該使用案例的目的是確定與從 CEM 到 SD 的開始時間交付有關的所需資訊交換。</p> <p>The objective of that use case is to determine the required information exchange related to a start time delivery from CEM to SD.</p>
相關業務案例 Related business case(s)	<ul style="list-style-type: none"> <li>– 需量反應(DR)</li> <li>– 需求面管理(DSM)</li> <li>– Demand Response (DR)</li> <li>– Demand Side Management (DSM)</li> </ul>

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case
<p>簡短說明 Short description</p> <p>告知智慧裝置何時啟動的資訊交換具有有限的選擇。因此，關於預期開始時間的資訊交換僅限於發送帶有相應資訊的時間戳。</p> <p>The information exchange to tell a smart device when to start has limited options. Therefore, the information exchange on the expected start time is limited to transmitting a timestamp with the corresponding.</p>
<p>完整說明 Complete description</p> <p>智慧裝置已經將所有與彈性相關的資訊發送到了 CEM。CEM 與其他裝置配合使用，並具有依使用者需求進行優化的能力。</p> <p>將來的預期啟動時間應足以使 CEM 能夠確保正常運行。若在互聯網上的某個地方擁有 CEM，則必須考慮延遲時間，並且不會損害安全操作的可靠性。</p> <p>要發送的預期時間可能具有絕對時間格式或相對時間格式。但是，時間同步是一個重要的問題，在實作過程中必須備考：要滿足安全性和安全性約束。</p> <p>The smart device had sent all flexibility related information already to the CEM. The CEM coordinates with other devices and has the capability to optimize according to the user's need.</p> <p>The expected start time shall be enough in the future that the CEM can ensure proper operation. In case of having a CEM somewhere on the internet, delay times must be considered and fail safe operation shall not be harmed.</p> <p>The expected time to be transmitted might have absolute time format or relative time format. However, time synchronization is an important issue and the implementation has to take care that safety and security constraints are met.</p>

## 一般說明 General remarks

一般說明 General remarks

## A.3.4.2 使用案例圖 Diagrams of use case

Figure A.7 shows a 使用案例圖 Diagram of use case.

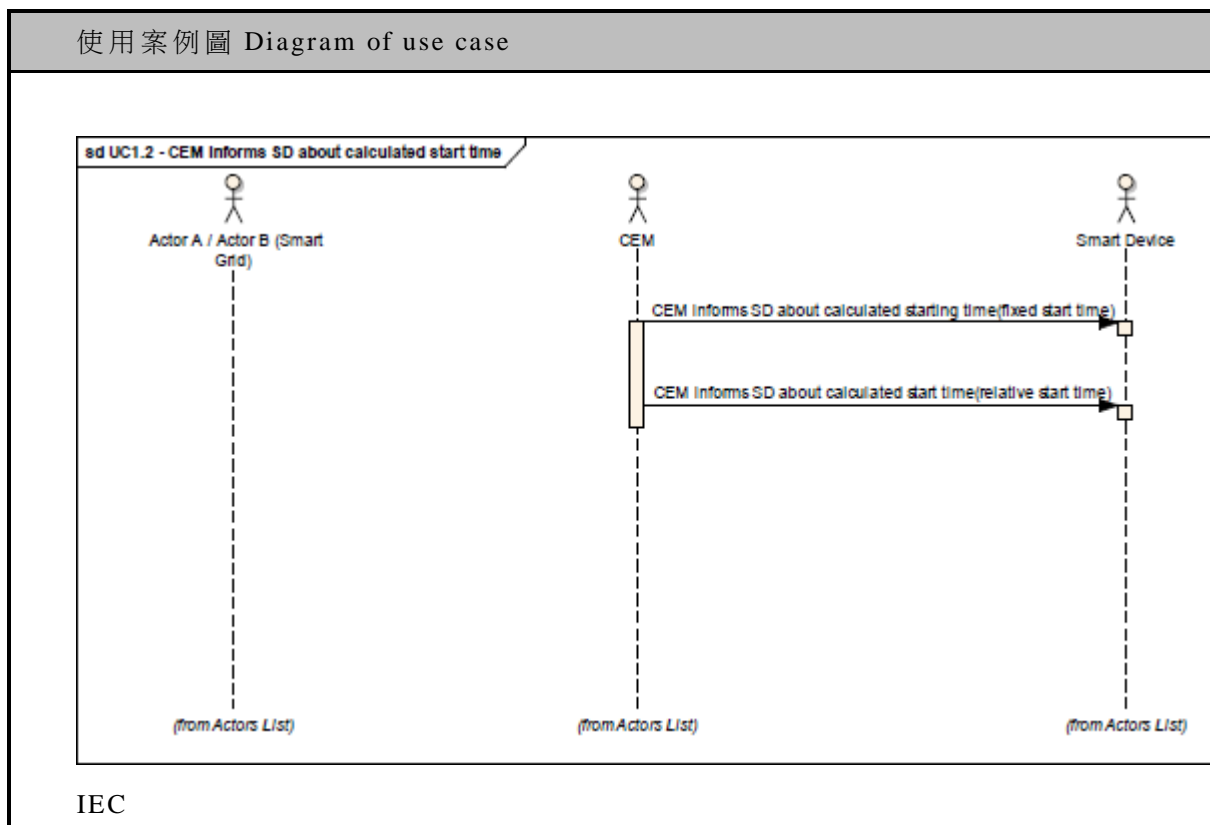


圖 A.7 序列圖

Figure A.7 – Sequence diagram

#### A.3.4.3 技術細節 Technical details

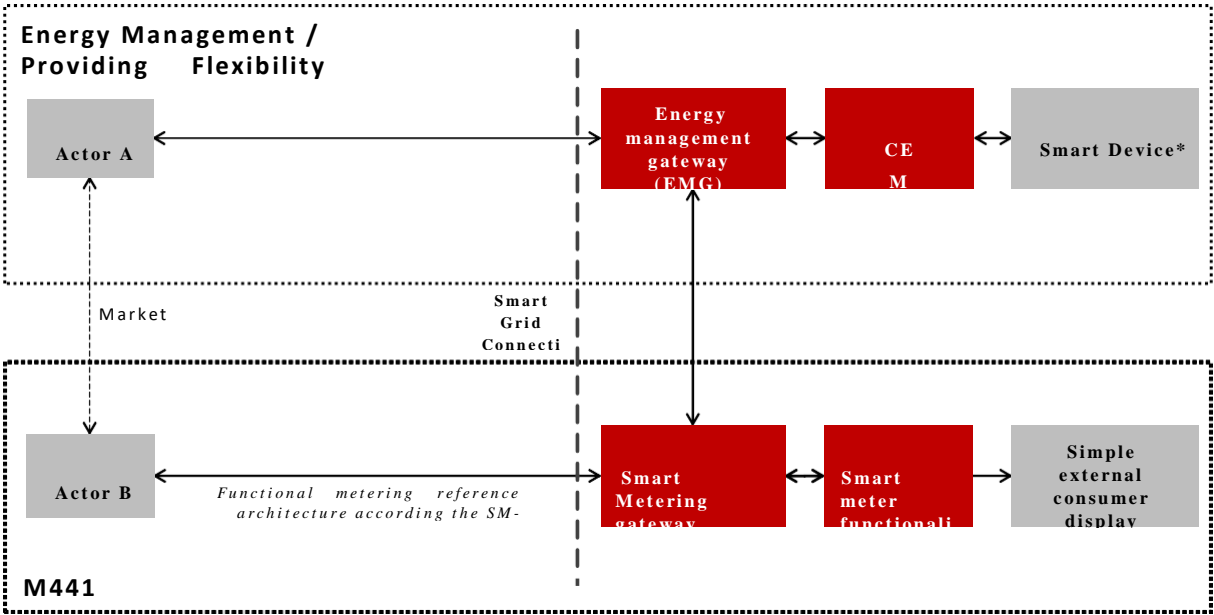
行為者：人員，系統，應用程式，資料庫，電力系統和其他利益相關者。

Actors: People, Systems, Applications, Databases, the Power System, and Other Stakeholders

備考 1.為定義此使用案例，已使用圖 A.8 所示的架構作為基礎。

NOTE 1 For the definition of this use case, the architecture shown in Figure A.8 has been used as a basis.





\* 例：HBES 裝置，智慧家電，儲能裝置，發電機，EV 家用充電器，複雜的顯示器

\* e.g. HBES device, smart appliances, storage, generator, domestic charger for EV, complex display

圖 A.8 SG CG 架構模型[9]  
Figure A.8 – SG CG Architecture Model [9]

備考 2. 以上架構中之行為者為功能個體，這意味著它們中的一些可能是同一實體裝置的一部分(例：CEM 功能可能是智慧裝置的一部分，智慧電錶也可能包含智慧量測閘道器和 CEM 等)。

NOTE 2 The actors in the above architecture are functional entities, which means that some of them may be part of the same physical device (e.g. CEM functionality may be part of a smart device, the smart meter might also encompass the smart metering gateway and CEM, etc.).

備考 3. 請考慮這種高階使用的範圍並不需要圖 A.8 所示的所有行為者。下表顯示了參與的行為者。

NOTE 3 Please consider that the scope of this high level use does not require all actors shown in Figure A.8. The following table shows involved actors.

行為者 Actors			
分組(社群) Grouping (Community)		群組說明 Group description	
行為者名稱參照 行為者列表 Actor name see Actor list	行為者名稱參照 行為者列表 Actor name see Actor list	行為者名稱參照行為者列表 Actor name see Actor list	特定使用案例之進一步資訊 Further information specific to this use case
客戶能源管理者 Customer Energy Manager	內部 Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向“電網/市場”提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the " grid/market " .</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 整合通訊功能時則稱為客戶能源管理系統。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System.</p>	

智慧裝置 Smart device	外部 External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc...). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and messages from the grid in an intelligent way.</p> <p>智慧裝置不在 SG-CG 範圍內，因此須將其視為外部行為者。</p> <p>此外於此使用案例中，智慧裝置係由“REs，non-REs 及負載”組成。</p> <p>Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor.</p> <p>In addition in this use case, smart device consists of “REs, non-REs and load.”</p>	
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觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件 Use case conditions			
行為者/系統/資訊/契約 Actor/System/Information/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption

參考文獻

References

參考文獻						
References						
No.	參考資料型式 References Type	參考 Reference	狀態 Status	使用案例影響 Impact on use case	發起人/組織 Originator/Organisation	鏈結 Link
1	指導方針 Guideline	基本定義及通用程序 Basic definitions and common procedures	定稿 Final	術語及定義 Terms and definitions	SG-CG 可持續流程工作組 SG-CG Sustainable Processes WG	<a href="ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf">ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf</a>
2	通用使用案例 Generic use case	額外資訊 Additional Information	定稿 Final	市場通訊之額外資訊 Additional information on Market communication	智慧電網協調小組(SG-CG) 可持續流程 WGSP2128 Smart Grid Coordination Group (SG-CG) Sustainable Processes WGSP2128	-
3	高階使用案例 High level use case	直接關聯 Direct relevance	草案 Draft	術語及定義 Terms and definitions	聯合使用案例工作組 (IECTC57 WG21/CLC TC205WG18/CLC TC59xWG7) Joint Use Case Working Group (IEC TC57 WG21/CLC TC205 WG18/CLC TC59x WG7)	

有關使用案例分類/對映的更多資訊

Further Information to the use case for classification/mapping

分類資訊
Classification information
與其他使用案例關聯
Relation to Other use cases
深度
Level of Depth

特定級別的使用案例 Specific level use case
優先序 Prioritisation
一般，區域或國家關係 Generic, Regional or National Relation
特定高階使用案例可用於任何智慧裝置之類型。 Specific high level use case which can be applied to any kind of smart device.
觀點 Viewpoint
此特定使用案例具有使用者視角及 SD 與全體客戶能源管理(CEM)系統之互動。其不考慮彈性提供或特定於電網實作之市場機制。 This specialized use case has the user perspective and the interaction of the SD with an overall customer energy management (CEM) system. It does not consider market mechanisms for flexibility offering or power grid specific implementations.
分類的其他關鍵字 Further Keywords for Classification
特定使用案例 Specialized use case

#### A.3.4.4 使用案例的逐步分析 Step by step analysis of use case

步驟 - 情境名稱

Steps - Scenario Name

情境條件 Scenario conditions					
No.	情境名稱 Scenario name	主要行為者 Primary actor	觸發事件 Triggering event	前提 Pre-condition	後置條件 Post-condition

步驟 - 情境

Steps - Scenarios

情境 Scenario								
情境名稱： Scenario name:		第一位-家電彈性啟動時間 No. 1 – Flexible start time of appliance						
Step No.	事件 Event	流程/活動名稱 Name of process/activity	流程/活動說明 Description of process/activity	服務 Service	資訊生產者(行為者) Information producer (Actor)	資訊接收者(行為者) Information receiver (Actor)	資訊交換 Information exchanged	要求事項, R-ID Requirements, R- ID
1	啟動訊息 Activation Message	操作模式準備 Operation mode preparation	CEM 或用戶在智慧裝置上啟動特定的操作模式。 The CEM or the User activates a specific operational mode on a smart device.	準備 Preparation	用戶/CEM User/CEM	SD	裝置特定(按下按鈕,CEM 要求彈性的請求, SD 上的計時器, SD 內部狀態更改等) Device Specific (Button Pressed, Request from CEM to ask for flexibility, Timer on the SD, SD internal state change, ...)	
2	-	SD 計算其能力 SD calculates its capabilities	依狀態及其操作模式,可能存在各種可能性,必須對 SD 進行評估。 There might be various possibilities depending on the state and its	準備 Preparation	SD	SD		

			operational mode which must be evaluated of the SD.					
3	SD 通知 SD Notification	SD 告知 CEM SD informs CEM	SD 將彈性啟動資訊發送到 CEM。 SD sends the information of the flexible start to the CEM.	彈性服務產品 Flexibility Service offering	SD	CEM	開始時間，結束時間 能源剖繪(估計能耗) Start Time, End Time Energy Profile (estimated energy consumption)	

#### A.3.4.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements to information data
分配的開始時間 Assigned start time	一般裝置資料(GDD) General Device Data (GDD)	如 JWG-HLUC1100 中為 GDD 定義的。 As defined for GDD within JWG-HLUC1100.

#### A.3.4.6 常用術語及定義 Common terms and definitions

常用術語及定義 Common terms and definitions	
術語 Term	定義 Definition

#### A.3.4.7 自定義資訊(選項) Custom information (optional)

自定義資訊(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Reference chapter

Key	Value	Refers to section

### A.3.5 特定使用案例(JWG1103) CEM 告知 SD 時槽移動

### A.3.5 Specialized use case (JWG1103) CEM informs SD about slot shift

#### A.3.5.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	域/區 Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG1101	域：客戶端、DER 區： 過程，場域，變電所 Domain: Customer Premises, DER Zones: Process, Field, Station	CEM 透過發送更新之能源剖繪告知 SD 關於時槽移動 CEM informs SD about slot shift by sending an updated energy profile

版本管理

Version Management

版本管理 Version management					
變化/版本 Changes/ Version	日期 Date	領域專家 Domain expert	專業知識/領域/ 角色之區域 Area of expertise /Domain /Role	標題/變更 Title/Changes	批准狀態草案， 用於評論，投票，最終 Approval status draft, for comments, for voting, final
0.1	07/03/ 2014	編輯者 Editor		初稿 Initial Draft	草案 Draft

使用案例之範圍及目標 Scope and objectives of use case



使用案例之範圍及目標 Scope and objectives of use case	
範圍 Scope	<p>後一個智慧裝置是能夠註冊在該 CEM 和正常工作，它收到一個排程從該 CEM。該 SD 的配置正確，並在 CEM 知道關於它。</p> <p>After a smart device was able to register at the CEM and works properly, it received a schedule from the CEM. The SD is configured properly and the CEM knows about it</p>
目標 Objective(s)	<p>這種使用情況定義的基本資訊，這是必需的，以通知的 SD 約一個變化在它的運行排程。在 CEM 可能會重新計算的排程，由於任何原因而可能告知的 SD 上這個結果。</p> <p>This use case defines the basic information which is required to inform the SD about a change in its running schedule. The CEM might recalculate the schedule due to whatever reason and might inform the SD on this outcome.</p>
相關業務案例 Related business case(s)	<ul style="list-style-type: none"> <li>– 需量反應(DR)</li> <li>– 需求面管理(DSM)</li> <li>– Demand Response (DR)</li> <li>– Demand Side Management (DSM)</li> </ul>

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case
簡短說明 Short description
<p>該使用案例通過更新能源剖繪來改變智慧裝置的運行時間。SD 將依能源剖繪中提供的資訊進行重新配置和修改。</p> <p>This use case shifts the running time of a smart device by updating the energy profile. The SD will the reconfigure and modify according to the information provided within the energy profile.</p>
完整說明 Complete description

使用案例敘述 Narrative of use case
<p>CEM 從任何外部來源接收資訊，這會觸發對總體能源排程的重新計算。觸發資訊可以是用戶選擇的新選擇的能源優化方案，更新的費率資訊，來自外部行為者的需量反應請求或其他任何資訊。</p> <p>The CEM receives from any external source information, which triggers a recalculation of the overall energy schedule. Triggering information can be a new selected energy optimization scheme selected by the User, updated tariff information, a demand response request from an external actor, or anything else.</p> <p>CEM 管理的總體能源排程包括所有已註冊的智慧裝置。其中一些裝置可能會為 CEM 提供彈性。CEM 必須具有此功能，才能消除客戶場所的功耗。</p> <p>The overall energy schedule that the CEM manages includes all registered smart devices. Some of these devices might offer flexibility to the CEM. That capability must be available at the CEM to shuffle around power consumption at customer premises.</p> <p>在 CEM 估算了已註冊到 CEM 的每個智慧裝置的能源剖繪之後，它將發送能源剖繪的更新。能源剖繪</p>

包含一個或多個插槽，這些插槽指示每個裝置的裝置特定運行模式。CEM 不得知道特定的運行模式，但不得超過功耗。

After the CEM has estimated energy profiles for each smart device that has been registered to the CEM, it will send an update of the energy profile. The energy profile contains one or more slots which indicate a device specific running mode of each device. That specific running mode must not be known by the CEM but the power consumption shall not be exceeded.

智慧裝置在驗證排程後會確認新的能源剖繪。

The smart device confirms the new energy profile after verifying its schedule.

一般說明 General remarks

一般說明 General remarks

A.3.5.2 使用案例圖 Diagrams of use case

使用案例圖 Diagram of use case

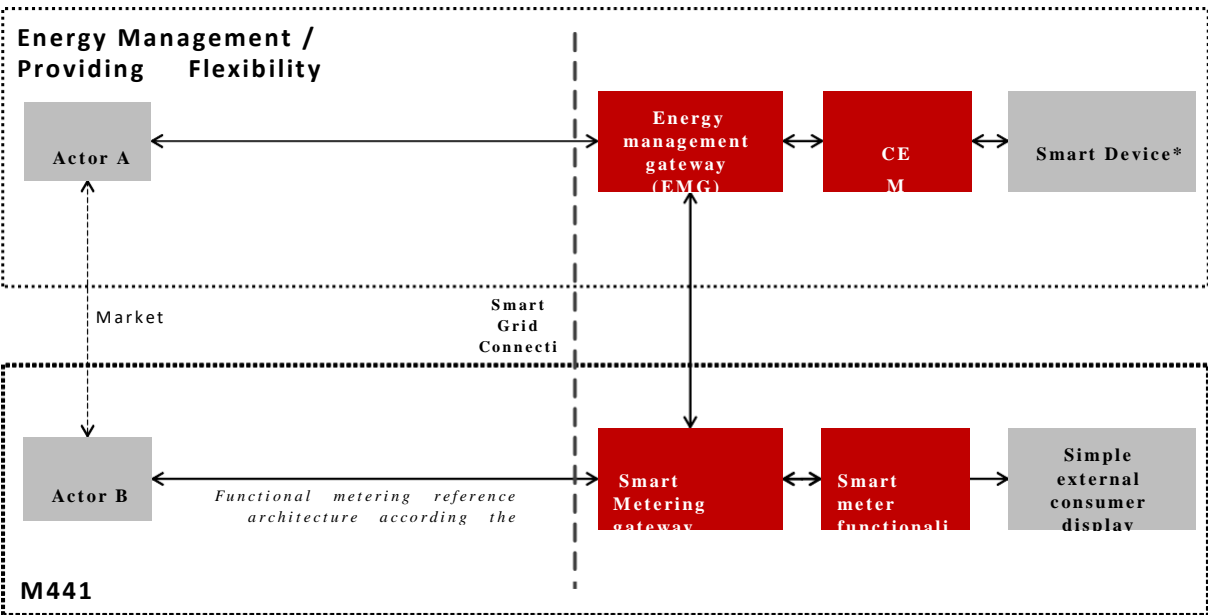
A.3.5.3 技術細節 Technical details

行為者：人員，系統，應用程式，資料庫，電力系統和其他利益相關者。

Actors: people, systems, applications, databases, the power system, and other stakeholders

備考 1.為定義該使用案例，已使用圖 A.9 所示的架構作為基礎。

NOTE 1 For the definition of this use case, the architecture shown in Figure A.9 has been used as a basis.



\*例：HBES 裝置，智慧家電，儲能裝置，發電機，EV 家用充電器，複雜顯示器  
 \* e.g. HBES device, smart appliances, storage, generator, domestic charger for EV, complex display

圖 A.9 SG CG 架構模型

Figure A.9 – SG CG Architecture Model

備考 2. 以上架構中之行為者為功能個體，這意味著它們中的一些可能是同一實體裝置的一部分(例：CEM 功能可能是智慧裝置的一部分，智慧電錶也可能包含智慧量測閘道器和 CEM 等)。

NOTE 2 The actors in the above architecture are functional entities, which means that some of them may be part of the same physical device (e.g. CEM functionality may be part of a smart device, the smart meter might also encompass the smart metering gateway and CEM, etc.).

備考 3. 該特定使用案例的範圍並不需要如圖所示的所有行為者。

NOTE 3 Please consider that the scope of this specialized use case does not require all actors shown in Figure

A.9 下表顯示了參與的行為者。

A.9. The following table shows involved actors.

行為者 Actors			
分組(社群) Grouping (Community)		群組說明 Group description	
行為者名稱參照 行為者列表 Actor name see Actor list	行為者名稱參照 行為者列表 Actor name see Actor list	行為者名稱參照行為者列表 Actor name see Actor list	行為者名稱參照 行為者列表 Actor name see Actor list
客戶能源管理者 Customer Energy Manager	內部 Internal	CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。  The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.  客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。	

		<p>其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the " grid/market " .</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 整合通訊功能時則稱為客戶能源管理系統。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System.</p>	
智慧裝置 Smart device	外部 External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>由於智慧裝置不在 SG-CG 的範圍內，因此必須將其視為外部行為者</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc...). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and messages from the grid in an intelligent way.</p> <p>Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor</p>	

觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件

Use case conditions			
行為者 / 系統 / 資訊 / 契約 Actor/System/Information/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption
CEM	重新安排活動 Rescheduling event	SD 和 CEM 處於活動狀態且可運行。 SD and CEM are active and operational.	用戶在建立活動之前建立或選擇了個人資料。CEM 依剖繪開始與 SD 進行協議。 User has created or selected a profile before creating the event. CEM starts negotiations with SD based on the profile.

## 參考文獻

## References

參考文獻 References						
No.	參考資料 型式 References Type	參考 Reference	狀態 Status	使用案例之 影響 Impact on use case	發起人/組織 Originator/Organisation	鏈結 Link
1	指導方針 Guideline	基本定義 和通用程序 Basic definitions and common procedures	定稿 Final	術語及定義 Terms and definitions	SG-CG 可持續流程工作組 SG-CG Sustainable Processes WG	<a href="ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf">ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf</a>

參考文獻 References						
No.	參考資料 型式 References	參考 Reference	狀態 Status	使用案例之 影響 Impact on use	發起人/組織 Originator/Organisation	鏈結 Link

	Type			case		
2	Generic use case	額外資訊 Additional Information	定稿 Final	市場通訊之額外資訊 Additional information on Market communication	智慧電網協調小組 (SG-CG) 可持續流程 WGSP2128 Smart Grid Coordination Group (SG-CG) Sustainable Processes WGSP2128	-
3	High level use case	直接關聯 Direct relevance	草案 Draft	術語及定義 Terms and definitions	聯合使用案例工作組 (IEC TC57 WG21/CLC TC205 WG18/CLC TC59x WG7) Joint Use Case Working Group (IEC TC57 WG21/CLC TC205 WG18/CLC TC59x WG7)	

分類/對映使用案例之更多資訊

Further Information on the use case for classification/mapping

分類資訊 Classification information
與其他使用案例關聯 Relation to Other use cases
深度 Level of Depth
特定級別的使用案例 Specific level use case
優先序 Prioritisation
一般，區域或國家關係 Generic, Regional or National Relation
特定高階使用案例可用於任何智慧裝置之類型。 Specific high level use case which can be applied to any kind of smart device.
觀點 Viewpoint

此特定使用案例具有使用者視角及 SD 與全體客戶能源管理(CEM)系統之互動。其不考慮彈性提供或特定於電網實作之市場機制。

This specialized use case has the user perspective and the interaction of the SD with an overall customer energy management (CEM) system. It does not consider market mechanisms for flexibility offering or power grid specific implementations.

分類的其他關鍵字

Further Keywords for Classification

特定使用案例

Specialized use case

#### A.3.5.4 使用案例的逐步分析 Step by step analysis of use case

步驟 - 情境名稱

Steps – Scenario Name

情境條件					
Scenario conditions					
No.	情境名稱 Scenario name	主要行為者 Primary actor	觸發事件 Triggering event	前提 Pre-condition	後置條件 Post-condition

步驟 - 情境

Steps – Scenarios

情境								
Scenario								
情境名稱：		第一位-家電彈性啟動時間						
Scenario name:		No. 1 – Flexible start time of appliance						
Step No.	事件 Event	流程 / 活動名稱 Name of process/activity	流程/活動說明 Description of process/activity	服務 Service	資訊生產者(行為者) Information producer (Actor)	資訊接收者(行為者) Information receiver (Actor)	資訊交換 Information exchanged	要求事項, R-ID Requirements, R-ID
1	啟動訊息 Activation	重新計算運行排程 Recalculation of an	CEM 收到一個事件, 在該事件上, CEM	準備 Preparation	用戶/行為者 A/ 行為者 B/SD	CEM	裝置特定 (按下按鈕, 來自電網的 DR 事	

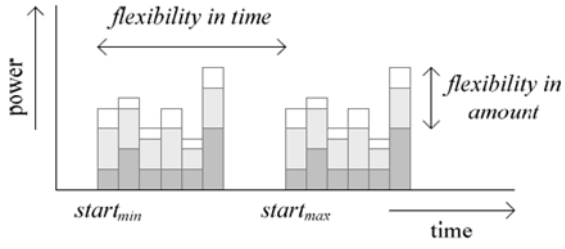
	Messaging	operational schedule	將為註冊到 CEM 的智慧裝置重新計算最佳計畫。  The CEM received an event on which it recalculates an optimal schedule for the smart devices that are registered to the CEM.		User/Actor A/Actor B/SD		件，電費資訊，緊急信號等)  Device Specific (Button Pressed, DR event coming from the Grid, Tariff information, emergency signal,...)	
2	更新 Update	CEM 將更新的排程發送到 SD  CEM send an updated schedule to the SD	更新後的排程包含在能源剖繪中。  The updated schedule is included in the energy profile.	更新請求 Update Request	CEM	SD	-	
3	確認 Confirmation	SD 確認新排程  SD confirms new schedule	由於 CEM 知道 SD 的彈性，因此 SD 應當接受新提議的能量分佈。  Since the CEM knows about the flexibility of the SD, the new proposed energy profile shall be accepted by the SD.	確認 Confirmation	SD	CEM	確認的能源剖繪(估計的能耗，插槽等)  Confirmed Energy Profile (estimated energy consumption, slots, etc.)	

## A.3.5.5 資訊交換 Information exchanged



資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements to information data
更新之能源部繪 Updated Energy Profile	能源部繪 Energy Profile	如針對 JWG1100 中的能源部繪所定義 As defined for the Energy Profile within JWG1100.

#### A.3.5.6 通用術語及定義 Common terms and definitions

通用術語及定義 Common terms and definitions	
術語 Term	定義 Definition
能源部繪 Energy Profile	<p>能源部繪定義一段時間內之功耗/發電量。智慧裝置上之功率可能會有變化，其變化將透過能源部繪進行擷取及可視化。</p> <p>An energy profile defines the power consumption/generation over time. The power might vary on the smart device which will be captured and visualized by the energy profile.</p> <p>能源部繪可能被分成多個時槽。此時槽具有固定功率，以獲得一個離散功耗/發電部繪。簡單能源部繪將包含僅一功率值及區間。</p> <p>An energy profile might be split into multiple time slots. Such time slots have a fix amount of power to get a discrete power consumption/generation profile. A simple energy profile will contain only one power value and its duration.</p>  <p>IEC</p>

#### A.3.5.7 自定義資訊(選項) Custom information (optional)

自定義資訊(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Refers to section

## A.3.6 特定使用案例(JWG1110)係依時槽的價格資訊控制智慧家電

## A.3.6 Specialized use case (JWG1110) Control of Smart home appliances based on price information by time slot

## A.3.6.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	域/區 Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG1110	域：客戶端、DER Domain: Customer Premises, DER 區：過程，場域，變電所 Zones: Process, Field, Station	係依時槽的價格資訊控制智慧家電 Control of Smart home appliances based on price information by time slot

版本管理

Version management

版本管理 Version management					
變化/版本 Changes/ Version	日期 Date	領域專家 Domain expert	區的專業知識 /網域/角色 Area of expertise /Domain /Role	標題/變更 Title/Changes	批准狀態 草案，用於評論，投票，最終 Approval status draft, for comments, for voting, final
0.1	07/03/ 2014	家電 Home Appliances	使用案例 Use Cases	初稿 Initial Draft	草案 Draft

使用案例之範圍及目標 Scope and objectives of use case

使用案例之範圍及目標 Scope and objectives of use case	
Scope	通過 CEM 的適當管理/指示，熱水器，空調和其他家電等裝置可以智慧運行。對某些有限的簡單命令和訊息作出反應的智慧裝置或配備複雜的恆溫器，適

	<p>配器(例：開/關水龍頭)等的裝置均在此使用案例範圍內。</p> <p>With proper management/instruction by CEM, Device such as water heater, air conditioner and other appliances can act smart. Smart device which reacts to some limited simple commands and messages or device which equips sophisticated thermostat, adopter (e.g. on/off tap) etc. fall within the scope of this use case.</p>
Objective(s)	<p>該使用案例定義了 CEM 管理裝置所需的基本訊息，以使總電費相對較少。</p> <p>This use case defines the basic Message which is required to manage devices by CEM such that total electricity charges are relatively less.</p>
相 關 業 務 案 例 Related business case(s)	<ul style="list-style-type: none"> <li>– 需量反應(DR)</li> <li>– 需求面管理(DSM)</li> <li>– Demand Response (DR)</li> <li>– Demand Side Management (DSM)</li> </ul>

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case	
簡短說明 Short description	
—	用戶在 CEM 上輸入各個家電的操作條件。
—	接著 24 小時每天中午發布電費資訊。
—	依輸入條件，時間條件和電價，用戶可以讓 CEM 計算第二天的程式，從而總電費 相對較少。
—	CEM 依操作計畫條件以程式控制各家電。
	The user inputs operating conditions of each appliance at CEM.
	The electricity tariff information is issued at noon every day for the following 24 hours.
	Based on the input conditions, time conditions and tariff, the user lets CEM calculate a program for the following day such that total electricity charges are relatively less
	CEM controls each appliance as programmed according to conditions of operating plan
完整說明 Complete description	

用戶喜歡使用熱水器及空調與其他家電，此總電費相對較少。

- 用戶指示 CEM 於多種情況下編寫對熱水器及空調與其他家電之程式
- 用戶於 CEM 上輸入各個家電之操作條件，例：
- 熱水器 溫度 90 °C，水位 50 %
- 空調模式：降溫，風力：自動，溫度：27 °C

The user likes to use a water heater, air conditioner and other appliances such that total electricity charges are relatively less.

The user instructs the CEM to program the water heater, air conditioner and other appliances following a number of conditions

The user inputs operating conditions of each appliance at CEM, e.g.:

- Water heater temperature 90 °C, water level 50 %
- Air conditioner mode: cooling down, wind: auto, temperature: 27 °C

用戶於 CEM 上輸入各個家電之時間條件(理想之起迄時間)，例：

- 熱水器早上 7 點結束
- 空調早上 10 點完成冷卻
- 接著 24 小時每天中午發布電費資訊
- 係依輸入條件，時間條件和電價，用戶可以讓 CEM 計算第二天的程序，從而總電費相對較少

The user inputs time conditions (desirable start time, desirable finish time) of each appliance at CEM, e.g.:

- Water heater finish by AM7
- Air conditioner finish cooling down by AM10

The electricity tariff information is issued at noon every day for the following 24 hours

Based on the input conditions, time conditions and tariff, the user lets CEM calculate a program for the following day such that total electricity charges are relatively less

- CEM 考慮到運行時間，運行過程中的功耗，電費等，為這些家電計算運行計畫
- 用戶確認計算結果並提交要執行的操作計畫
- CEM 依操作計畫條件以程式控制各家電。

CEM calculates an operating plan for those appliances considering operation time, power consumption during operation, electricity charges and so forth

The user confirms the calculation results and commits the operating plan to be executed

- CEM controls each appliance as programmed according to conditions of operating plan

一般說明 General remarks

一般說明 General remarks



#### A.3.6.2 使用案例圖 Diagram of use case

Figure A.10 shows a 使用案例圖 Diagram of use case.

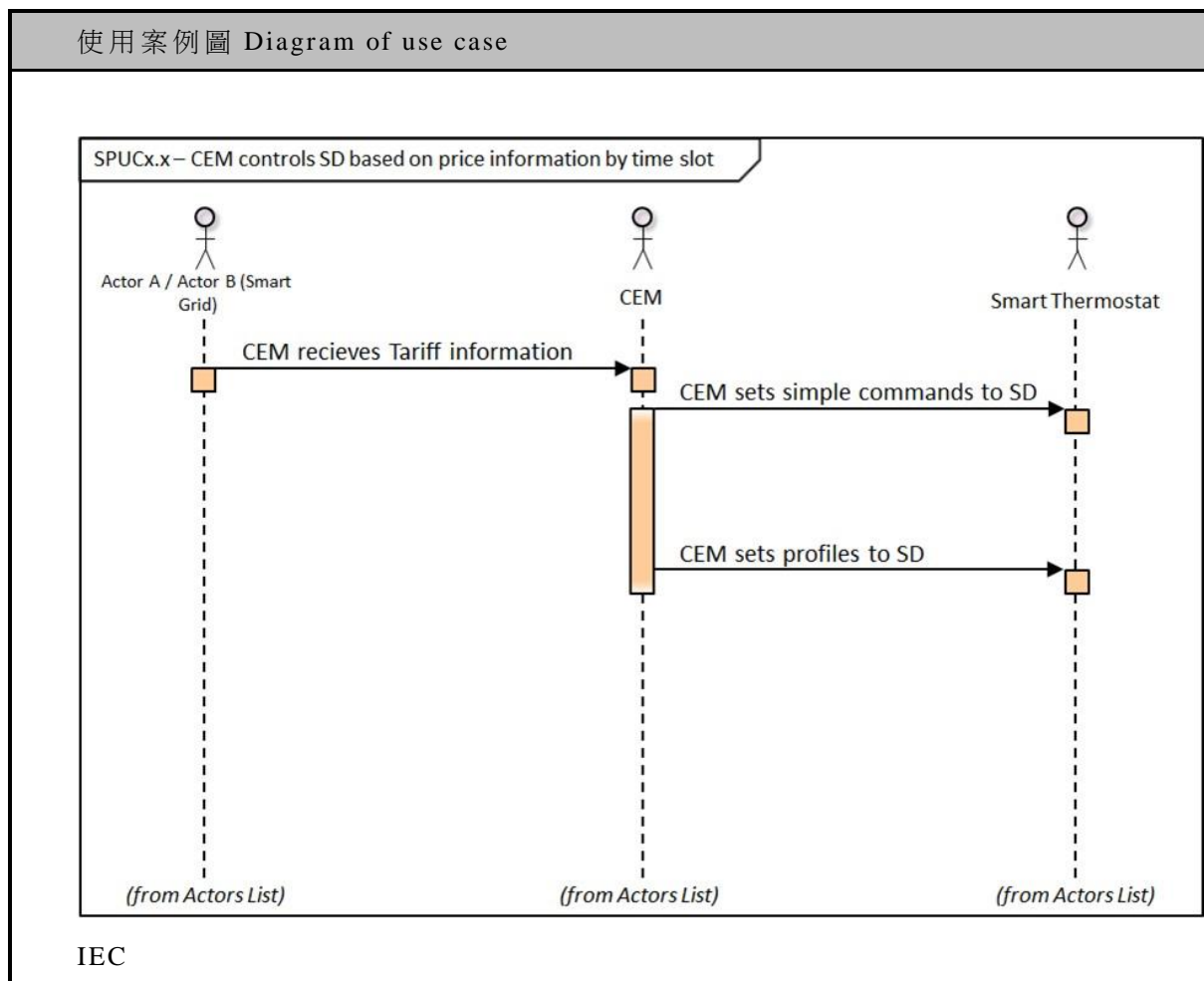


圖 A.10 序列圖

Figure A.10 – Sequence diagram

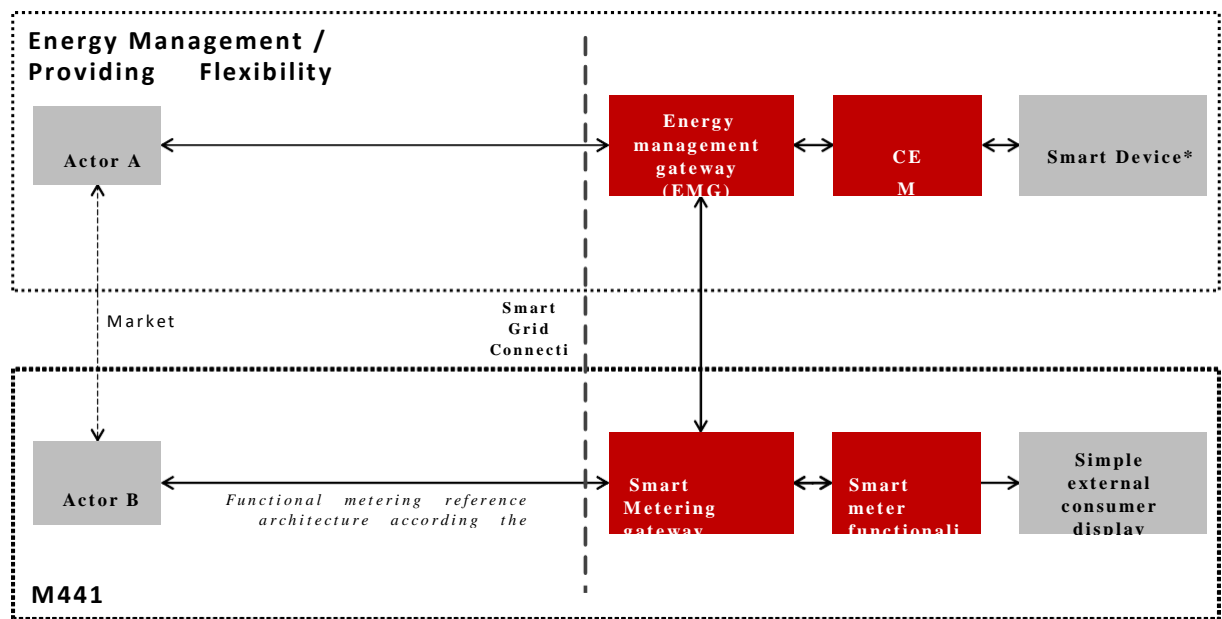
### A.3.6.3 技術細節 Technical details

行為者：人員，系統，應用程式，資料庫，電力系統和其他利益相關者。

Actors: people, systems, applications, databases, the power system, and other stakeholders

備考 1.為定義該使用案例，已使用圖 A.11 中給出的架構作為基礎。

NOTE 1 For the definition of this use case, the architecture given in Figure A.11 has been used as a basis.



\*例：HBES 裝置，智慧家電，儲能裝置，發電機，EV 家用充電器，複雜顯示器

\* e.g. HBES device, smart appliances, storage, generator, domestic charger for EV, complex display

圖 A.11 SG CG 架構模型

Figure A.11 – SG CG Architecture Model

備考 2. 以上架構中之行為者為功能個體，這意味著它們中的一些可能是同一實體裝置的一部分(例：CEM 功能可能是智慧裝置的一部分，智慧電錶也可能包含智慧量測閘道器和 CEM 等)。

NOTE 2 The actors in the above architecture are functional entities, which means that some of them may be part of the same physical device (e.g. CEM functionality may be part of a smart device, the smart meter might also encompass the smart metering gateway and CEM, etc.).

備考 3. 請考慮這種高階使用的範圍並不需要上圖所示的所有行為者。下表顯示了參與之行為者。

NOTE 3 Please consider that the scope of this high level use does not require all actors shown on the figure above. The following table shows involved actors.

行為者	
Actors	
分組(社群)	群組說明
Grouping (Community)	Group description

行為者名稱參照 行為者列表 Actor name see Actor list	行為者名稱參照 行為者列表 Actor name see Actor list	行為者名稱參照行為者列表 Actor name see Actor list	特定使用案例之進 一步資訊  Further information specific to this use case
客戶能源管理者 Customer Energy Manager	內部 Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the " grid/market " .</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 整合通訊功能時則稱為客戶能源管理系統。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System.</p>	
智慧恆溫器 Smart Thermostat	外部 External	<p>使用智慧或可程式恆溫器，可依預設排程調整溫度設定、開啟暖氣或空調。智慧或可程式恆溫器可儲存和重複多個每日設定(每天 6 或多個溫度設定)，並可手動複寫而不影響其它每日或每週程式。</p> <p>Using a Smart or programmable thermostat, one can adjust the temperature settings or the times turn on the heating or air-conditioning according to a pre-set schedule. Smart or programmable thermostats can store and repeat multiple daily settings (six or more temperature</p>	



		<p>settings a day) that one can manually override without affecting the rest of the daily or weekly program.</p> <p>可使用平板電腦，智慧手機或電腦透過網路連接。智慧恆溫器可連接到 CEM 裝置，並從 CEM 編寫其設定程式。</p> <p>One can access it via the web using your tablet, smart phone or computer. The Smart Thermostat can be a device which is connected to the CEM and is programmed its settings from the CEM.</p>	
<p>智慧裝置</p> <p>Smart device</p>	外部 External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>智慧裝置不在 SG-CG 範圍內，因此須將其視為外部行為者。</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc.).</p> <p>The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and messages from the grid in an intelligent way.</p> <p>Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor.</p>	

行為者 Actors			
分組(社群) Grouping (Community)		群組說明 Group description	
行為者名稱參照 行為者列表 Actor name see Actor list	行為者名稱參 照行為者列表 Actor name see Actor list	行為者名稱參照行為者列表 Actor name see Actor list	<p>特定使用案例之進一步資訊</p> <p>Further information specific to this use case</p>

<p>智慧家電(白色家電)</p> <p>Smart appliance (white goods)</p>	<p>外部 External</p>	<p>智慧裝置的一個範例為智慧白色家電，家電具備與電網互動回應訊息的能力，並透過向能源供應網路優化自身能力。該訊息可直接或透過客戶能源管理系統，自公用事業或第三方能源服務提供商接收。</p> <p>An example of a smart device is a smart white goods appliance which is an appliance that has the capability to act in response to a message from the grid and there by optimize its behaviour towards the energy supply network. The message can be received from a utility or a third party energy service provider directly or via a customer energy management system.</p> <p>該訊息可為能源成本或可用再生能源之總和資訊，亦可為家電必須接收之需量反應訊息(延遲負載訊息或其他相關資訊)，依預設或啟動消費者輸入進行解釋及反應。智慧家電不保證進行回應，但會依其狀態及使用者設定進行回應，以確保達到預期性能。</p> <p>The message can be information like the cost of energy or the amount of available renewable energy, or it can be a Demand Respond message (delay load message or other related information) that the appliance must receive, interpret and react upon based on pre-set or active consumer input. The smart appliance is not guaranteed to respond, but will do so based on its status and user settings in order to ensure the expected performance.</p> <p>消費者擁有家電之最終控制權，可以複寫任何特定模式(例：複寫延遲以允許立即運轉，延遲限制不超過數小時或維持房間溫度)。</p> <p>The consumer has the ultimate control of the appliance and can override any specific mode (e.g. override a delay to allow immediate operation, limit delays to no more than a certain number of hours, or maintain a set room temperature).</p> <p>任何家電運轉設定或模式對於普通、非技術消費者來說皆應易於啟動或實作。</p> <p>Any appliance operation settings or modes shall be easy for an average, non-technical consumer to activate or implement.</p>	
<p>行為者 A Actor A</p>	<p>外部 External</p>	<p>外部行為者(智慧電網市場角色)透過能源管理通道與家庭或家庭自動化網路之</p>	

		<p>系統功能及組件進行互動。此市場角色諸如能源提供商、能源服務提供商及聚合商等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the energy management communication channel. Examples of such market roles are the energy provider, the energy services Provider, the aggregator, etc.</p>	
行為者 B Actor B	外部 External	<p>外部行為者(智慧電網市場角色)透過量測通訊通道與家庭或家庭自動化網路之系統功能及組件進行互動。該行為者負責收集量測資料。此市場角色諸如 DSO、量測公司等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the metering communication channel. This actor is responsible for collecting metering data. Examples of such market roles are the DSO, metering company, etc.</p>	
User	外部 External	<p>已購買智慧裝置之終端客戶。終端客戶負責配置及設定智慧裝置之運轉模式。</p> <p>The end customer who has acquired a smart device. The end customer is responsible for configuring and setting operation mode of the smart device.</p>	

觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件 Use case conditions			
行為者/系統/資訊/契約 Actor/System/Information/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption
	資費資訊 Tariff Information.		<p>CEM 依操作計畫條件以程式控制各家電，或 CEM 依操作計畫條件定義透過設定剖繪(例：溫度剖繪、計時器)控制家電</p> <p>CEM controls each appliance as programmed according to conditions</p>

			of operating plan or CEM controls appliance by setting profile (e.g. temperature profile, Timer) defined according to conditions of operating plan
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## 參考文獻

## References

參考文獻 References						
No.	參考資料型式 References Type	參考 Reference	狀態 Status	使用案例之影響 Impact on use case	發起人/組織 Originator/Organisation	鏈結 Link
1	指導方針 Guideline	基本定義和通用程序 Basic definitions and common procedures	定稿 Final	術語及定義 Terms and definitions	SG-CG 可持續流程工作組 SG-CG Sustainable Processes WG	<a href="ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf">ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf</a>
2	技術報告 Technical Report	使用者經歷及序列圖 User Story and Sequence diagrams	草案 Draft	情境之主要影響 Major impact on Scenario	IEC TC57/CLC TC205/CLC /TC59x	-
3	標準 Standard	使用案例範本 Use Case Template	草案 Draft (FDIS)	範本說明 Template description	IEC TC8	-

## 分類/對映使用案例之更多資訊

## Further Information on the use case for classification/mapping

分類資訊 Classification information
與其他使用案例關聯

Relation to Other use cases
深度 Level of Depth
高階使用案例 High level use case
優先序 Prioritisation
一般，區域或國家關係 Generic, Regional or National Relation
高階使用案例可用於任何智慧裝置之類型。該高級使用案例成為通用使用案例。 High level use case which can be applied to any kind of smart device. Once the regions agreed and confirmed correctness, that high level use case becomes a generic use case.
觀點 Viewpoint
此高階使用案例具有使用者視角及 SD 與全體客戶能源管理系統之互動。其不考慮彈性提供或特定於電網實作之市場機制。 This high level use case has the user perspective and the interaction of the SD with an overall customer energy management system. it does not consider market mechanisms for flexibility offering or power grid specific implementations.
分類的其他關鍵字 Further Keywords for Classification
通用高階使用案例 Generic high level use case

#### A.3.6.4 使用案例的逐步分析 Step by step analysis of use case

步驟 - 情境名稱

Steps - Scenario Name

情境條件 Scenario conditions					
No.	情境名稱 Scenario name	主要行為者 Primary actor	觸發事件 Triggering event	前提 Pre-condition	後置條件 Post-condition

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步驟 - 情境

Steps - Scenarios

情境 Scenario								
情境名稱： Scenario name:		第一位 - 家電彈性啟動時間 No. 1 – Flexible start time of appliance						
Step No.	事件 Event	流程/活動名稱 Name of process/activity	流程/活動說明 Description of process/activity	服務 Service	資訊生產者(行為者) Information producer (Actor)	資訊接收者(行為者) Information receiver (Actor)	資訊交換 Information exchanged	要求事項, R-ID Requirements, R-ID
1	每天中午發行 Issued at noon every day	資費資訊 Tariff information	CEM 接收資費資訊。 The CEM receives Tariff information.	準備 Preparation	外部行為者 External Actor	CEM	資費 Tariff	
2		用戶偏好 User preference	使用者輸入 SD 的運行條件 The user inputs operating conditions of SD	準備 Preparation	User/CEM	CEM/User		
3	-	CEM 計算運營計畫 CEM calculates an operating plan	CEM 依價目表資訊和使用者輸入來計算操作計畫 The CEM calculates an operating plan based on the Tariff information and User input	準備 Preparation	CEM	CEM	-	
3	CEM 通知	CEM 將剖繪設定為	CEM 將簡單命令	簡單的 SD 管理	CEM	SD	設定開/關/開始/停	

	CEM Notification	SD CEM sets profile to SD	或 剖 繪 (例：溫度 剖繪)設定 為 SD  CEM sets the simple command or profile (e.g. temperatu re profile) to SD	Simple SD manage ment			止 / 暫停 / 繼續 / 中止 / 模糊設定 剖繪  Set On/Off/St art /Stop/Paus e /Resume/ Ab ort/Dim Set Profile	
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## A.3.6.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements to information data
簡單命令 Simple Commands	<p>開/關/開始/停止/暫停/繼續/中止/模糊 定時器</p> <p>空調模式： 冷卻、加熱、模式 1-n 風：自動、高、低等。 其他設定： On/Off/Start/Stop/Pause/Resume/Abort/Dim Timer Air conditioner mode: cooling down, heating up, mode 1-n Wind: auto, high, low, etc. Other settings:</p>	<p>此等資訊很敏感，任何修改皆可能 開關 SD。因此，通訊資料必須被 保護避免濫用及受外部影響。</p> <p>Such information is sensitive in a way that any modification might turn on or off a SD. Therefore, the communication data must be protected from misuse and external influences.</p>
溫度剖繪 Temperature Profile	<p>溫度剖繪定義隨時間變化之溫度設定點 (例：各房溫之設定點)。溫度剖繪可能分 成多個時槽。此時槽具有固定之溫度量以 設定離散溫度剖繪。簡單的溫度剖繪將包 含一個溫度值及持續時間，並且可能含有 每週溫度剖繪，各溫度剖繪皆包含工作日 (週一至週五)/週末剖繪。</p> <p>A temperature profile defines the temperature set point over time (e.g. set point of each room temperature). A temperature profile might be split into</p>	<p>溫度剖繪很敏感，任何修改皆可能 劇烈影響房溫變化。因此，通訊資 料必須被保護以避免濫用及受外 部影響。</p> <p>Temperature Profile is sensitive in a way that any modification might affect drastic room temperature change.</p> <p>Therefore, the communication data must be protected from misuse and external influences.</p>



	multiple time slots. Such time slots have a fix amount of temperature to set a discrete temperature profile. A simple temperature profile will contain only one temperature value and its duration and there might be weekly temperature profiles each of which contains weekdays (Monday to Friday)/weekend profile.	
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#### A.3.6.6 要求事項(選項) Requirements (optional)

#### A.3.6.7 通用術語及定義 Common terms and definitions

通用術語及定義 Common terms and definitions	
術語 Term	定義 Definition
溫度剖繪 Temperature Profile	<p>溫度剖繪定義隨時間變化之溫度設定點(例：各房溫之設定點)。溫度剖繪可能分成多個時槽。此時槽具有固定之溫度量以設定離散溫度剖繪。簡單的溫度剖繪將包含一個溫度值及持續時間，並且可能含有每週溫度剖繪，各溫度剖繪皆包含工作日(週一至週五)/週末剖繪。</p> <p>A temperature profile defines the temperature set point over time (e.g. set point of each room temperature). A temperature profile might be split into multiple time slots. Such time slots have a fix amount of temperature to set a discrete temperature profile. A simple temperature profile will contain only one temperature value and its duration and there might be weekly temperature profiles each of which contains weekdays (Monday to Friday)/weekend profile.</p>

#### A.3.6.8 自定義資訊(選項) Custom information (optional)

自定義資訊(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Refers to section

#### A.3.7 High level use case (JWG1111) fuel cell operation with fixed tariff profile

##### A.3.7.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	域/區 Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG1111	域：客戶端、DER Domain: Customer Premises, DER 區：過程，場域，變電所 Zones: Process, Field, Station	依固定費率表[CE19](剖繪)控制燃料電池(FC)的運行。 Control of Fuel Cell (FC) operation according to a fixed tariff schedule (profile).

## 版本管理

## Version management

版本管理 Version management					
變化/版本 Changes /Version	日期 Date	領域專家 Domain expert	區的专业知識/網域 /角色 Area of expertise/Domain/Role	標題/變更 Title/Changes	批准狀態 草案、用於評論、投票、最終 Approval status draft, for comments, for voting, final
0.1	07/03/ 2014	家電 Home Appliances	使用案例 Use Cases	初稿 Initial Draft	草案 Draft

## 使用案例之範圍及目標 Scope and objectives of use case

使用案例之範圍及目標 Scope and objectives of use case	
Scope	<p>此使用案例說明了客戶能源管理(CEM)系統依從能源供應商處收到的費率表(給定間隔時間的價格剖繪)資訊對燃料電池進行的控制。目的是使從電網輸入的電能最小化。</p> <p>This use case describes the control of a fuel cell by a customer Energy Management (CEM) System based upon tariff schedule (a profile of price for a given set of intervals) information received from an Energy Supplier. The objective is to minimise the amount of electrical energy imported from the grid.</p>
Objective(s)	<p>最佳運行(為了提高能源效率和減少碳排放)需要了解未來電價區間，建築物特徵(例：熱質量)，當前條件(例：溫度)和居住者期望的系統行為(例：未來溫度剖繪)的預測價格。在其他復合/詳細使用情況下，可以考慮使用此方法。</p>

	Optimum operation (for energy efficiency and minimising carbon emissions) requires knowledge of forecast pricing for future tariff intervals, building characteristics (e.g. thermal mass), current conditions (e.g. temperature) and the occupant's desired system behaviour (e.g. future temperature profile). This may be considered in other compound/elaborated used cases.
相關業務案例 Related business case(s)	<ul style="list-style-type: none"> <li>— 需量反應(DR)</li> <li>— 需求面管理(DSM)</li> <li>— Demand Response (DR)</li> <li>— Demand Side Management (DSM)</li> </ul>

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case
簡短說明 Short description
<p>此使用案例說明，客戶能源管理(CEM)系統依從能源供應商處收到的費率表(給定間隔時間的價格剖繪)資訊對家用燃料電池進行的控制。EMS 依從能源供應商處接收到的費率表資訊和家庭客戶設定的電價(價格)閾值，請求燃料打開/增加輸出或關閉/減少輸出。</p> <p>This use case describes the control of a domestic fuel cell by a Customer Energy Management (CEM) System based upon tariff schedule (a profile of price for a given set of intervals) information received from an Energy Supplier. The EMS requests the fuel to turn on/increase output or turn off/decrease output depending upon both the tariff schedule information received from the Energy Supplier and a tariff (price) threshold set by the Home Customer.</p>
完整說明 Complete description
<p>該使用案例假設 EMS 從能源供應商處接收到費率表(給定間隔時間的價格剖繪)資訊。</p> <p>This use case assumes that the EMS receives tariff schedule (a profile of price for a given set of intervals) information from the Energy Supplier.</p> <p>在這種使用案例中，EMS 將請求發送到燃料電池控制器並從燃料電池控制器接收通知。燃料電池控制器負責控制燃料電池子系統的運行，並在必要時可以覆蓋來自 EMS 的請求。</p> <p>In this use case, an EMS sends requests to, and receives notifications from, a Fuel Cell Controller. The fuel cell controller has responsibility for controlling the operation of the Fuel Cell sub-system and may override the requests from the EMS if necessary.</p> <p>該使用案例假定本地客戶已為即時電價(價格)值設定了一個閾值，高於該閾值通常將打開燃料電池。</p> <p>This use case assumes that the Home Customer has set a threshold for the real-time tariff (price) value, above which the fuel cell will normally be turned on.</p> <p>本地客戶的 EMS 從能源供應商處接收費率表資訊。費率表可能在給定期間內有效，或者直到提供新的費率表為止。</p> <p>The Home Customer's EMS receives tariff schedule information from the energy supplier. The tariff schedule may be valid for a given period or until a new tariff schedule is provided.</p> <p>若該時間間隔的價格超過閾值，則在該時間間隔開始時，EMS 控制器向燃料電池控制器發送燃料電池開啟請求或燃料電池增加輸出 x 瓦特請求到燃料電池控制器，以開啟燃料電池，或在該間隔內增加燃料電池的輸出。燃料電池控制器向 EMS 控制器發送狀態訊息，以指示該命令是否已成功實作。</p> <p>If the price of that interval exceeds the threshold, then at the beginning of that interval the EMS controller sends a fuel cell turn on request or a fuel cell increase output by x Watt request to the Fuel Cell Controller</p>

in order to turn on the Fuel Cell, or to increase the Fuel Cell output, for that interval. The Fuel Cell Controller sends a status message to the EMS controller in order to indicate that the command has been successfully implemented or not.

若某個時間間隔的價格低於或等於家庭客戶設定的閾值，則在該時間間隔開始時，EMS 控制器將燃料電池關閉請求或燃料電池減少輸出(以瓦特請求)發送到燃料電池控制器，以便在該時間間隔內關閉燃料電池或降低燃料電池輸出。

燃料電池控制器向 EMS 控制器發送狀態訊息，以指示該命令是否已成功實作。

If the price for an interval is below or equal to the threshold set by the Home Customer, then at the beginning of that interval the EMS controller sends a fuel cell turn off request or a fuel cell decrease output by y Watt request to the Fuel Cell Controller in order to turn off the Fuel Cell, or to decrease the Fuel Cell output, for that interval.

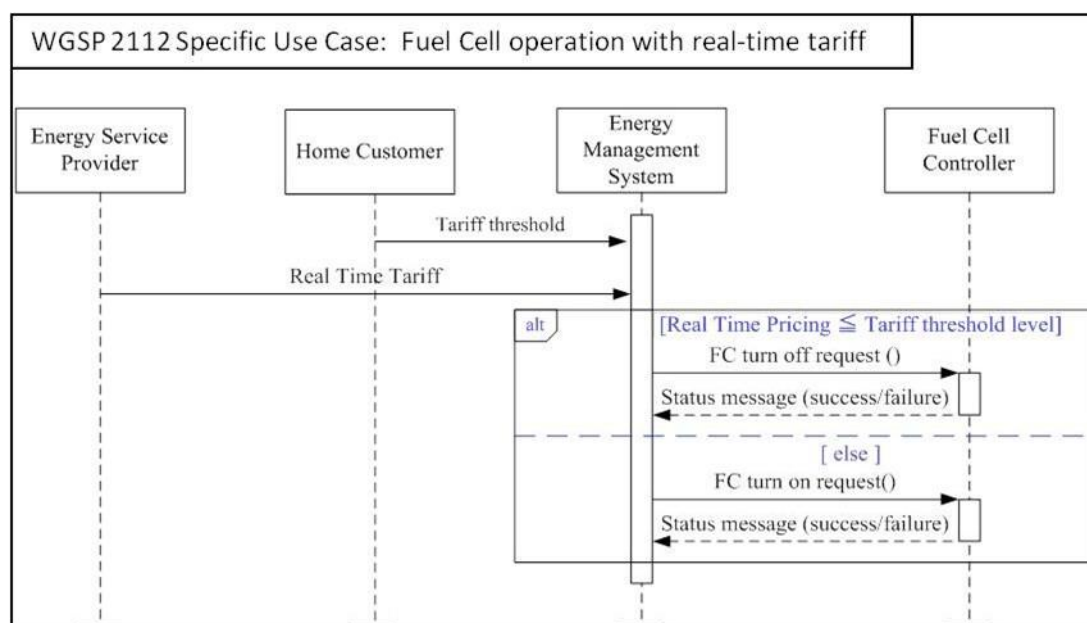
The Fuel Cell Controller sends a status message to the EMS controller in order to indicate that the command has been successfully implemented or not.

#### 一般說明 General remarks

一般說明 General remarks

#### A.3.7.2 使用案例圖 Diagram of use case

##### 使用案例圖 Diagram of use case



IEC

#### A.3.7.3 技術細節 Technical details

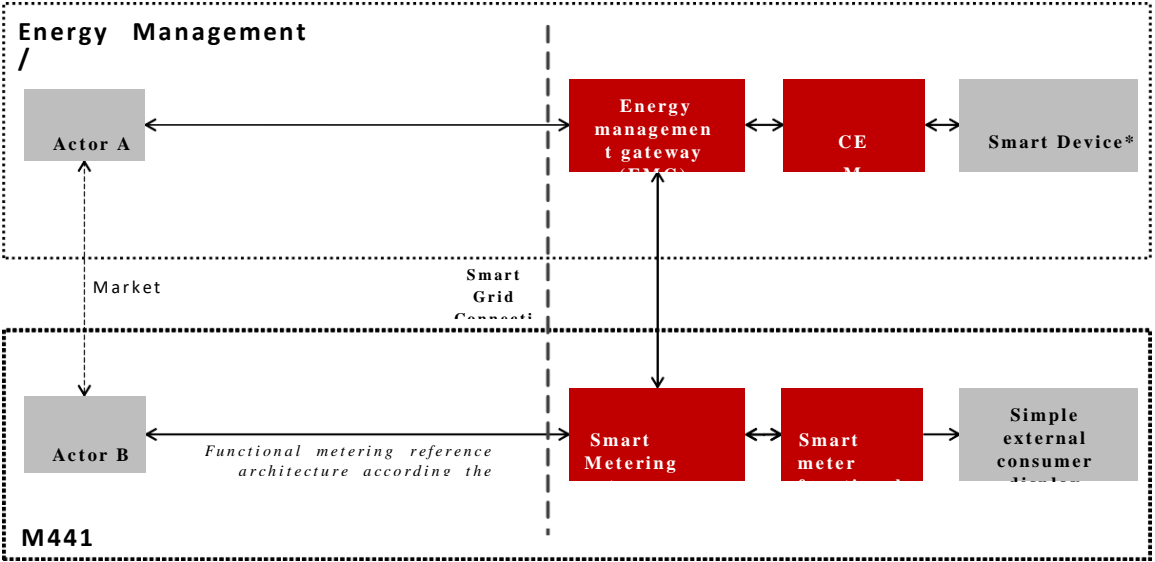
行為者：人員，系統，應用程式，資料庫，電力系統和其他利益相關者。

Actors: people, systems, applications, databases, the power system, and other

stakeholders

備考 1.為定義該使用案例，已使用了圖 A.12 所示的架構作為基礎。

NOTE 1 For the definition of this use case, the architecture shown in Figure A.12 has been used as a basis.



\*例： HBES 裝置，智慧家電，儲能裝置，發電機，EV 家用充電器，複雜顯示器

\* e.g. HBES device, smart appliances, storage, generator, domestic charger for EV, complex display

圖 A.12 SG CG 架構模型

Figure A.12 – SG CG Architecture Model

備考 2. 以上架構中之行為者為功能個體，這意味著它們中的一些可能是同一實體裝置的一部分(例：CEM 功能可能是智慧裝置的一部分，智慧電錶也可能包含智慧量測閘道器和 CEM 等)。

備考 3. 請考慮這種高階使用的範圍並不需要上圖所示的所有行為者。下表顯示了參與的行為者。

NOTE 2 The actors in the above architecture are functional entities, which means that some of them may be part of the same physical device (e.g. CEM functionality may be part of a smart device, the smart meter might also encompass the smart metering gateway and CEM, etc.).

NOTE 3 Please consider that the scope of this high level use does not require all actors shown on the figure above. Following table shows involved actors.

行為者 Actors			
分組(社群) Grouping (Community)		群組說明 Group description	
行為者名稱參照 行為者列表 Actor name see Actor list	行為者名稱參照 行為者列表 Actor name see Actor list	行為者名稱參照行為者列表 Actor name see Actor list	特定使用案例之進一步資訊 Further information specific to this use case
客戶能源管理者 Customer Energy Manager	內部 Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the " grid/market " .</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 整合通訊功能時則稱為客戶能源管理系統。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System.</p>	

<p>智慧恆溫器</p> <p>Smart Thermostat</p>	<p>外部 External</p>	<p>使用智慧或可程式恆溫器，可依預設排程調整溫度設定、開啟暖氣或空調。智慧或可程式恆溫器可儲存和重複多個每日設定(每天 6 或多個溫度設定)，並可手動複寫而不影響其它每日或每週程式。</p> <p>Using a Smart or programmable thermostat, one can adjust the temperature settings or the times turn on the heating or air- conditioning according to a pre-set schedule. Smart or programmable thermostats can store and repeat multiple daily settings (six or more temperature settings a day) that one can manually override without affecting the rest of the daily or weekly program.</p> <p>可使用平板電腦，智慧手機或電腦透過網路連接。智慧恆溫器可連接到 CEM 裝置，並從 CEM 編寫其設定程式。</p> <p>One can access it via the web using your tablet, smart phone or computer. The Smart Thermostat can be a device which is connected to the CEM and is programmed its settings from the CEM.</p>	
<p>智慧裝置</p> <p>Smart device</p>	<p>外部 External</p>	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>智慧裝置不在 SG-CG 範圍內，因此須將其視為外部行為者。</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc...). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and messages from the grid in an intelligent way.</p> <p>Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor.</p>	

<p>智慧家電(白色家電)</p> <p>Smart appliance (white goods)</p>	<p>外部 External</p>	<p>智慧裝置的一個範例為智慧白色家電，家電具備與電網互動回應訊息的能力，並透過向能源供應網路優化自身能力。該訊息可直接或透過客戶能源管理系統，自公用事業或第三方能源服務提供商接收。</p> <p>An example of a smart device is a smart white goods appliance which is an appliance that has the capability to act in response to a message from the grid and there by optimize its behaviour towards the energy supply network. The message can be received from a utility or a third party energy service provider directly or via a customer energy management system.</p> <p>該訊息可為能源成本或可用再生能源之總和資訊，亦可為家電必須接收之需量反應訊息(延遲負載訊息或其他相關資訊)，依預設或啟動消費者輸入進行解釋及反應。智慧家電不保證行進回應，但會依其狀態及使用者設定進行回應，以確保達到預期性能。</p> <p>The message can be information like the cost of energy or the amount of available renewable energy, or it can be a Demand Respond message (delay load message or other related information) that the appliance must receive, interpret and react upon based on pre-set or active consumer input. The smart appliance is not guaranteed to respond, but will do so based on its status and user settings in order to ensure the expected performance.</p> <p>消費者擁有家電之最終控制權，可以複寫任何特定模式(例：複寫延遲以允許立即運轉，延遲限制不超過數小時或維持房間溫度)。</p> <p>The consumer has the ultimate control of the appliance and can override any specific mode (e.g. override a delay to allow immediate operation, limit delays to no more than a certain number of hours, or maintain a set room temperature).</p> <p>任何家電運轉設定或模式對於普通、非技術消費者來說皆應易於啟動或實作。</p> <p>Any appliance operation settings or modes shall be easy for an average, non-technical consumer to activate or implement.</p>	
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行為者 A Actor A	外部 External	<p>外部行為者(智慧電網市場角色)透過能源管理通道與家庭或家庭自動化網路之系統功能及組件進行互動。此市場角色諸如能源提供商、能源服務提供商及聚合商等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the energy management communication channel. Examples of such market roles are the energy provider, the energy services Provider, the aggregator, etc.</p>	
行為者 B Actor B	外部 External	<p>外部行為者(智慧電網市場角色)透過量測通訊通道與家庭或家庭自動化網路之系統功能及組件進行互動。該行為者負責收集量測資料。此市場角色諸如 DSO、量測公司等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the metering communication channel. This actor is responsible for collecting metering data. Examples of such market roles are the DSO, metering company, etc.</p>	
用戶 User	外部 External	<p>已購買智慧裝置之終端客戶。終端客戶負責配置及設定智慧裝置之運轉模式。</p> <p>The end customer who has acquired a smart device. The end customer is responsible for configuring and setting operation mode of the smart device.</p>	

觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件 Use case conditions			
行為者/系統/資訊/契約 Actor/System/Information/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption
	資費資訊 Tariff Information.		<p>CEM 依操作計畫條件以程式控制各家電，或 CEM 依操作計畫條件定義透過設定剖繪(例：溫度剖繪、計時器)控制家電</p> <p>CEM controls each appliance as</p>

			programmed according to conditions of operating plan or CEM controls appliance by setting profile (e.g. temperature profile, Timer) defined according to conditions of operating plan
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參考文獻  
References

參考文獻 References						
No.	參考資料 型式 Reference s Type	參考 Reference	狀態 Status	使用案例之 影響 Impact on use case	發起人/組織 Originator/Organisat ion	鏈結 Link
1	指導方針 Guideline	基本定義和 通用程序 Basic definitions and common procedures	定稿 Final	術語及定義 Terms and definitions	SG-CG 可持續流程 工作組 SG-CG Sustainable Processes WG	<a href="ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf">ftp://ftp.cen.eu/EN/Eu ropeanStandardizatio n/HotTopics/SmartGri ds/Sustainable Processes.pdf</a>
2	技術報告 Technical Report	使用者經歷 及序列圖 User Story and Sequence diagrams	草案 Draft	情境之主要 影響 Major impact on Scenario	IEC TC57/CLC TC205/CLC /TC59x	-
3	標準 Standard	使用案例範 本 Use Case Template	草案 Draft (FDIS)	範本說明 Template description	IEC TC8	-

有關使用案例分類/對映的更多資訊

Further Information to the use case for classification/mapping

分類資訊 Classification information
與其他使用案例關聯 Relation to Other use cases
深度

Level of Depth
高階使用案例 High level use case
優先序 Prioritisation
一般，區域或國家關係 Generic, Regional or National Relation
高階使用案例可用於任何智慧裝置之類型。該高級使用案例成為通用使用案例。 High level use case which can be applied to any kind of smart device. Once the regions agreed and confirmed correctness, that high level use case becomes a generic use case.
觀點 Viewpoint
此高階使用案例具有使用者視角及 SD 與全體客戶能源管理系統之互動。其不考慮彈性提供或特定於電網實作之市場機制。 This high level use case has the user perspective and the interaction of the SD with an overall customer energy management system. it does not consider market mechanisms for flexibility offering or power grid specific implementations.
分類的其他關鍵字 Further Keywords for Classification
通用高階使用案例 Generic high level use case

#### A.3.7.4 使用案例的逐步分析 Step by step analysis of use case

步驟 – 情境名稱

Steps – Scenario name

情境條件 Scenario conditions					
No.	情境名稱 Scenario name	主要行為者 Primary actor	觸發事件 Triggering event	前提 Pre-condition	後置條件 Post-condition

步驟 – 情境

Steps – Scenarios

情境 Scenario								
情境名稱： Scenario name:	第一位 - 家電彈性啟動時間 No. 1 – Flexible start time of appliance							
Step No.	事件 Event	流程/活動名稱 Name of process/activity	流程/活動說明 Description of process/activity	服務 Service	資訊生產者(行為者) Information producer (Actor)	資訊接收者(行為者) Information receiver (Actor)	資訊交換 Information exchanged	要求事項, R-ID Requirements, R-ID
1	每天中午發行 Issued at noon every day	資費資訊 Tariff information	CEM 接收資費資訊。 The CEM receives Tariff information.	彈性資費 Flexible Tariff	外部行為者 External Actor	CEM	資費 Tariff	
2	-	計算智慧裝置的排程 Calculate schedule for smart device	計算智慧裝置的最佳運行時間 Calculate the optimal running time for the smart device	準備 Preparation	CEM	CEM		
3	SD 可用之新命令 New command for SD available	打開/關閉智慧裝置 Turn on/off smart device	CEM 向 SD 發送命令以將其打開/關閉/暫停/等。 The CEM send a command to the SD to turn it on/off/pause/etc.	對新資費信號的回應 Response to new tariff signal	CEM	SD	設定開/關/開始/停止/暫停/繼續/中止/模糊設定 剖繪 Set On/Off/Start/Stop/Pause/Resume/Abort/Dim	

							Set Profile	
3	-	SD confirms command	SD 通過相應的回應來確認命令  The SD confirms the command by responding accordingly	確認  Confirmation	SD	CEM	-	

#### A.3.7.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements to information data
簡單命令 Simple Commands	開/關/開始/停止/暫停/繼續/中止/模糊 定時器 空調模式： 冷卻、加熱、模式 1-n 風：自動、高、低等。 其他設定： On/Off/Start/Stop/Pause/Resume/Abort/Dim Timer Air conditioner mode: cooling down, heating up, mode 1-n Wind: auto, high, low, etc. Other settings:	此等資訊很敏感，任何修改皆可能開關 SD。因此，通訊資料必須被保護避免濫用及受外部影響。  Such information is sensitive in a way that any modification might turn on or off a SD. Therefore, the communication data must be protected from misuse and external influences.
資費資訊 Tariff Information	資費資訊可能分成多個時槽。此時槽在某此時間區間內具有固定值，以設定離散剖繪。簡單的溫度剖繪將包含一個溫度值及持續時間，並且可能含有每週溫度剖繪，各溫度剖繪皆包含工作日(週一至週五)/週末剖繪。  Tariff information might be split into multiple time slots. Such time slots have a fix value for a certain period of time to set a discrete profile. A simple temperature	溫度剖繪很敏感，任何修改皆可能劇烈影響房溫變化。因此，通訊資料必須被保護以避免濫用及受外部影響。  Temperature Profile is sensitive in a way that any modification might affect drastic room temperature change.  Therefore, the communication data

	profile will contain only one temperature value and its duration and there might be weekly temperature profiles each of which contains weekdays (Monday to Friday)/weekend profile.	must be protected from misuse and external influences.
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**A.3.7.6 要求事項(選項) Requirements (optional)****A.3.7.7 通用術語及定義 Common terms and definitions**

通用術語及定義 Common terms and definitions	
術語 Term	定義 Definition

**A.3.7.8 自定義資訊(選項) Custom information (optional)**

自定義資訊(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Refers to section

**A.3.8 High level use case (JWG112x) manage mixed energy system like heat pumps with pv, storage battery****A.3.8.1 使用案例說明 Description of the use case**

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	域/區 Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG112x	域：客戶端、DER Domain: Customer Premises, DER 區：過程，場域，變電所 Zones: Process, Field, Station	具有各種與能源相關的裝置(例：熱泵和能源儲能)的使用案例(摘自 TR 62746-2 版本 0.5.1)。 Use cases that have various energy related devices like heat pumps and energy storage (taken from TR 62746-2 version 0.5.1).

## 版本管理

## Version management

版本管理 Version management					
變化/版本 Changes/ Version	日期 Date	領域專家 Domain expert	區的专业知識 /網域/角色 Area of expertise/Doma in/Role	標題/變更 Title/Changes	批准狀態 草案，用於評論，投票，最終 Approval status draft, for comments, for voting, final
0.1	07/03/ 2014	家電 Home Appliances	使用案例 Use Cases	初稿(摘自 TR 62746-2 版本 0.5.1)  Initial Draft (taken from TR 62746-2 version 0.5.1)	草案 Draft
0.2	17/12/ 2014	家電 Home Appliances	使用案例 Use Cases	係依 2014 年 9 月對 WS 的討 論，在“一般 性評論”部分 添加了評論。  Added a comment to the “General Remarks Section”based on the discussion of the WS in September 2014.	草案 Draft

## 使用案例之範圍及目標 Scope and objectives of use case

使用案例之範圍及目標 Scope and objectives of use case	
Scope	<p>借助 CEM 的適當管理/指示，熱水器，空調和其他裝置等裝置可以智慧運行。對某些有限的簡單命令和訊息做出反應的智慧裝置或配備複雜的恆溫器，適配器(例：開/關水龍頭)等的裝置均屬於此使用案例的範圍。</p> <p>With proper management/instruction by CEM, devices such as water heater, air conditioner and other appliances can act smart. Smart devices which react to some limited simple commands and messages or devices which equip sophisticated thermostat, adopter (e.g. on/off tap) etc. fall within the scope of this use case.</p>

Objective(s)	該使用案例定義了使用熱泵加熱水所需的基本資訊交換。 This use case defines the basic information exchange which is required to heat up the water using a heat pump.
相關業務案例 Related business case(s)	<ul style="list-style-type: none"> <li>－ 需量反應(DR)</li> <li>－ 需求面管理(DSM)</li> <li>－ Demand Response (DR)</li> <li>－ Demand Side Management (DSM)</li> </ul>

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case
簡短說明 Short description
<p>此使用案例說明，熱泵控制器在不同情境下的操作。</p> <p>This use case describes the operation of the Heat pump controller in different scenarios.</p>
完整說明 Complete description
<p><b>JWG1121 – 使用熱泵請求額外熱水</b></p> <p>客戶要求打開熱泵來加熱水。只要沒有緊急情況，客戶將否決現有的配置(若處於活動狀態)。因此，用戶界面將請求轉發到 CEM，然後 CEM 告知熱泵控制器。熱泵控制器啟動熱水生成並相應地告知 CEM。</p> <p><b>JWG1121 – Request for extra hot water using a heat pump</b></p> <p>The Customer has the request to turn on the heat pump for heating up water. As long there is no emergency situation the customer overrules an existing configuration if active. Therefore, the user interface forwards the request to the CEM which then informs the heat pump controller. The heat pump controller activates the hot water generation and informs the CEM accordingly.</p> <p><b>JWG1122 – 使用熱泵和儲能電池請求額外熱水</b></p> <p>此使用案例說明了當客戶臨時請求額外熱水時(不是計畫的操作)熱泵，EMS 和儲能電池控制器的操作。熱泵控制器啟動熱泵的操作以加熱水並廣播它的運行狀態。EMS 接收此資訊，並請求儲能電池控制器啟動儲能電池放電。</p> <p><b>JWG1122 – Request for extra hot water using a heat pump and storage battery</b></p> <p>This use case describes the operation of the Heat Pump, EMS and Storage Battery controllers when the customer requests additional hot water in an ad hoc manner (not a scheduled operation). The Heat Pump controller initiates operation of the heat pump to heat water and broadcasts its operation status. The EMS receives this information and requests the Storage Battery controller to initiate storage battery discharge.</p> <p><b>JWG1123 – 使用熱泵和儲能電池請求額外熱水</b></p> <p>此使用案例說明了當客戶臨時請求額外熱水時(不是計畫的操作)熱泵，EMS 和儲能電池控制器的操作。熱泵控制器啟動熱泵的操作以加熱水並廣播它的運行狀態。EMS 接收此資訊，並請求儲能電池控制器啟動儲能電池放電。</p> <p><b>JWG1123 – Request for extra hot water using a heat pump and storage battery</b></p> <p>This use case describes the operation of the Heat Pump, EMS and Storage Battery controllers when the</p>



customer requests additional hot water in an ad hoc manner (not a scheduled operation). The Heat Pump controller initiates operation of the heat pump to heat water and broadcasts its operation status. The EMS receives this information and requests the Storage Battery controller to initiate storage battery discharge.

#### JWG1124 – 即時資費[CE20]之熱泵操作[CE21]

此使用案例說明，客戶能源管理(CEM)系統依從能源供應商處收到的即時電價(價格)資訊對家用熱泵進行的控制。EMS 要求熱泵依從能源供應商處收到的即時費率(價格)資訊和家庭客戶設定的費率(價格)閾值來打開/增加操作功率或關閉/降低操作功率。

#### JWG1124 – Heat Pump Operation with Real-Time Tariff

This use case describes the control of a domestic heat pump by a Customer Energy Management (CEM) System based upon real time tariff (price) information received from an Energy Supplier. The EMS requests the heat pump to either turn on/increase operating power or turn off/decrease operating power depending upon both real time tariff (price) information received from the Energy Supplier and a tariff (price) threshold set by the Home Customer.

#### JWG1125 – 即時資費之熱泵及太陽能發電操作

此使用案例說明，當太陽能發電(PV)系統運行時，客戶能源管理(CEM)系統依從能源供應商處接收到的即時電價(價格)資訊對家用熱泵進行控制的情況。EMS 會依從能源供應商處收到的即時費率(價格)資訊和家庭客戶設定的費率(價格)閾值來請求開關熱泵。太陽能發電系統的運行不會影響 EMS 和熱泵控制器的相互作用。

#### JWG1125 – Heat pump and Photovoltaic Operation with Real-Time Tariff

This use case describes the control of a domestic heat pump by a Customer Energy Management (CEM) System based upon real time tariff (price) information received from an Energy Supplier, when a Photovoltaic (PV) system is in operation. The EMS requests the heat pump to turn on or turn off depending upon both real time tariff (price) information received from the Energy Supplier and a tariff (price) threshold set by the Home Customer. The operation of the PV system does not affect the interaction of the EMS and Heat Pump Controller.

### 一般說明 General remarks

#### 一般說明 General remarks

熱泵，儲能電池和熱水箱僅是用於智慧裝置的佔位符。使用案例對這些特定裝置的功能進行了更多解釋，但一般而言，它還可以擴展到聯合熱電系統(CHP)和其他系統。

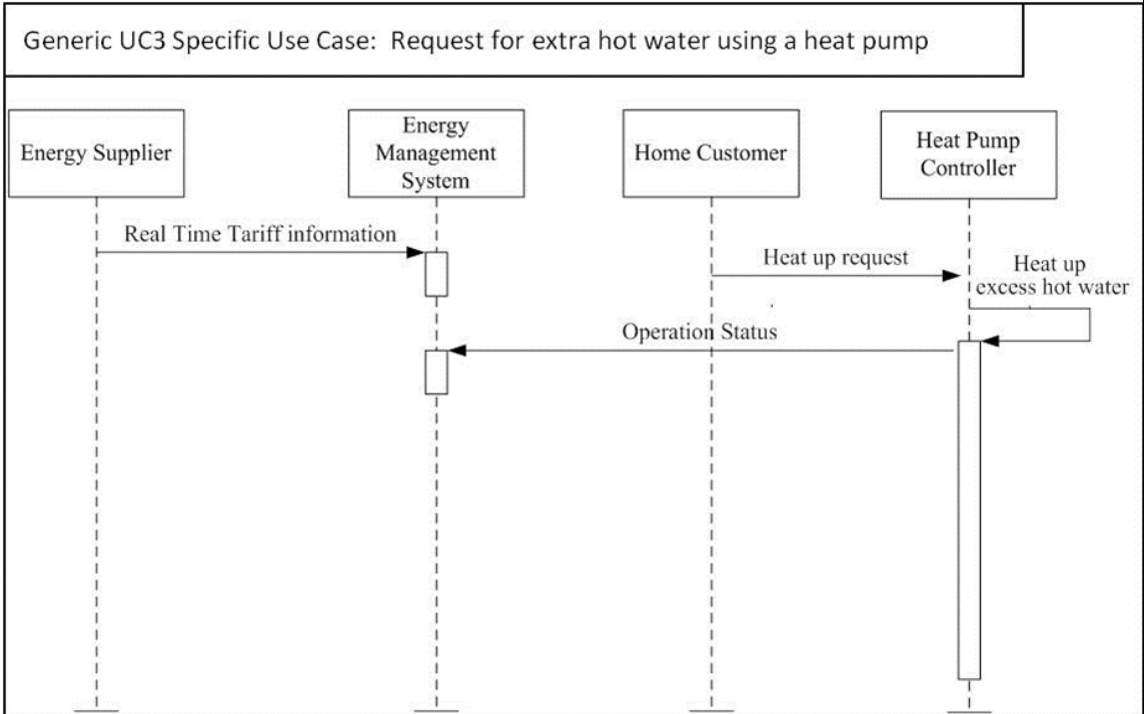
The heat-pump, storage battery, and the hot water tank are placeholders only for a smart device. The use case gives some more explanation on the capabilities of these specific devices but in general it might be also extended to combined heat-power systems (CHP) and others as well.

### A.3.8.2 使用案例圖 Diagrams of use case

Figure A.13 shows 使用案例圖 Diagrams of use case.

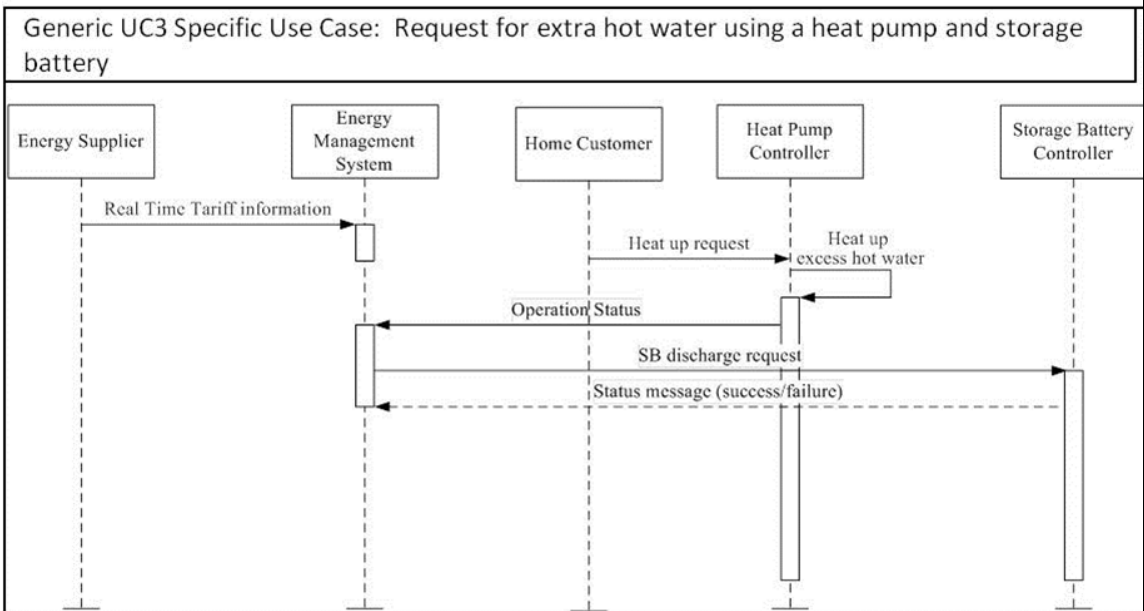
使用案例圖 Diagram of use case

JWG1121 – Request for extra hot water using a heat pump



IEC

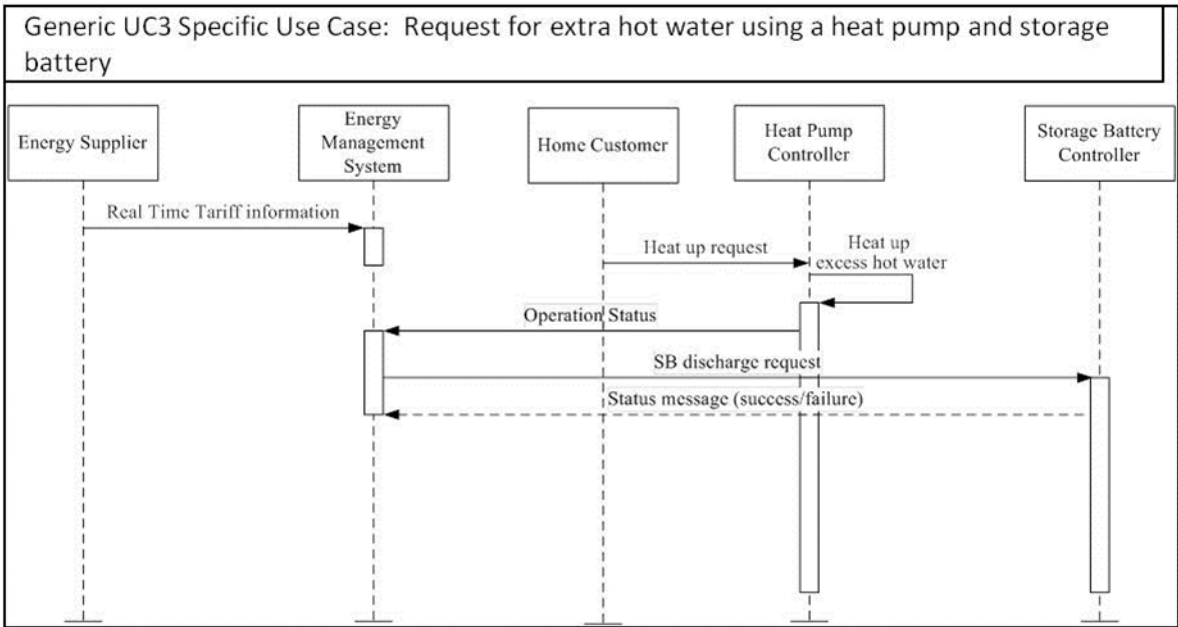
JWG1122 – Request for extra hot water using a heat pump and storage battery



IEC

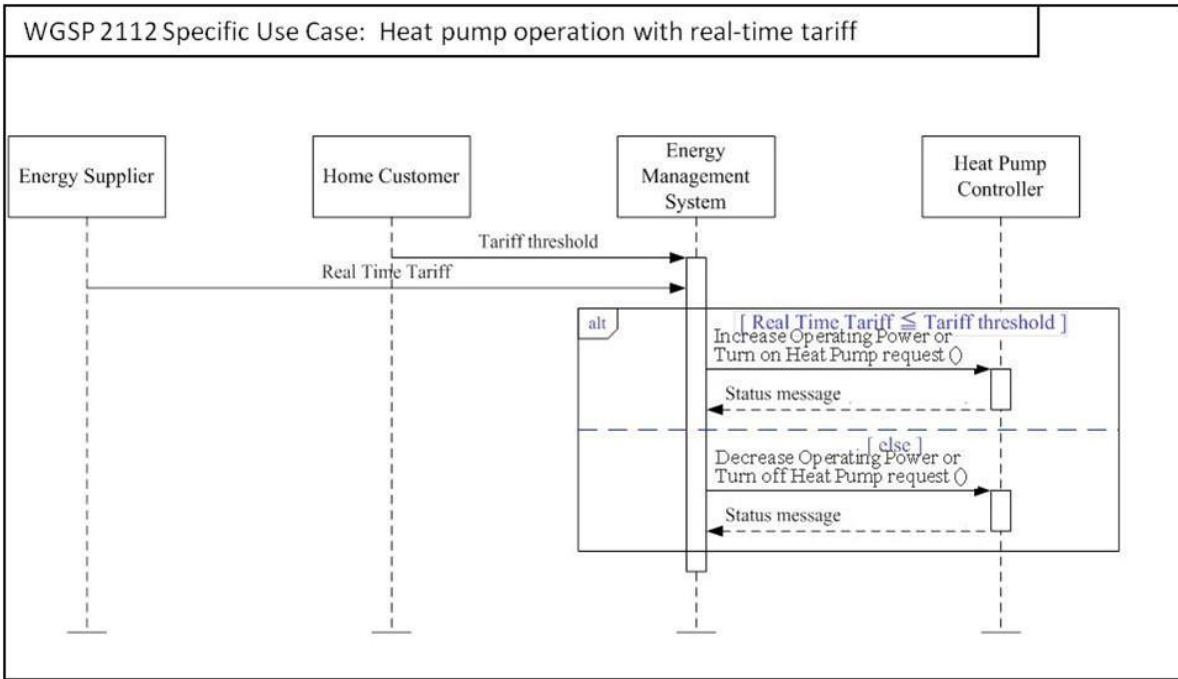
使用案例圖 Diagram of use case

JWG1123 – Request for extra hot water using a heat pump and storage battery



IEC

JWG1124 – Heat Pump Operation with Real-Time Tariff



IEC

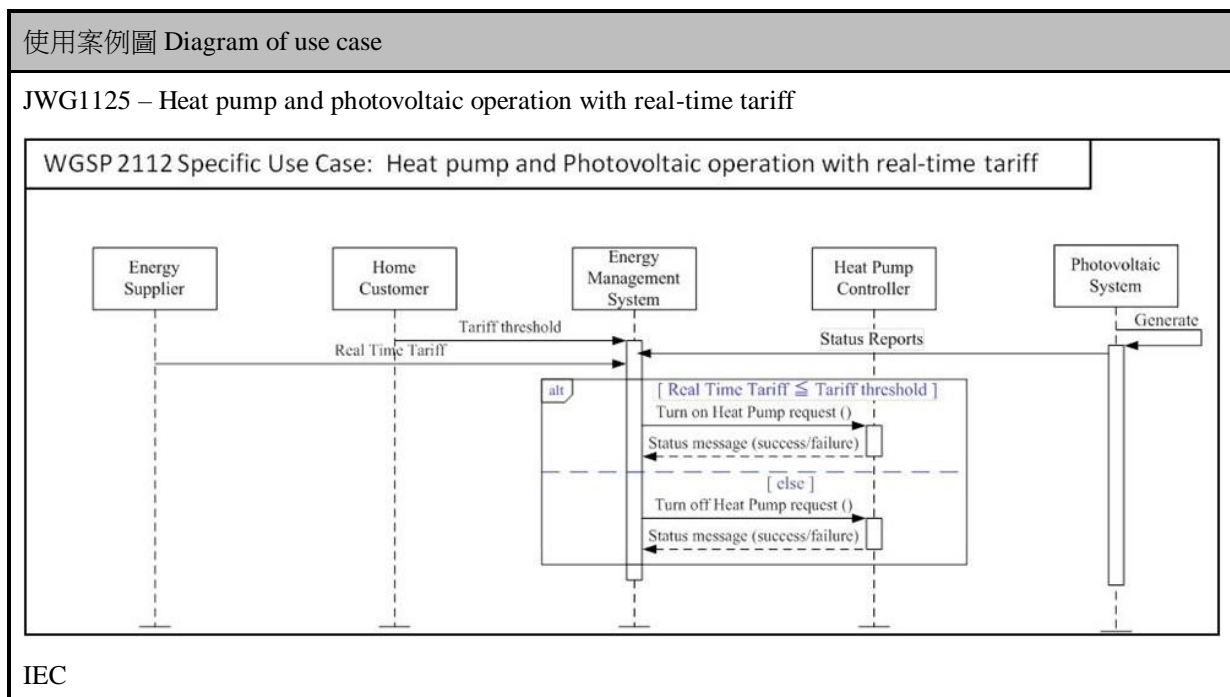


Figure A.13 – Sequence Diagram

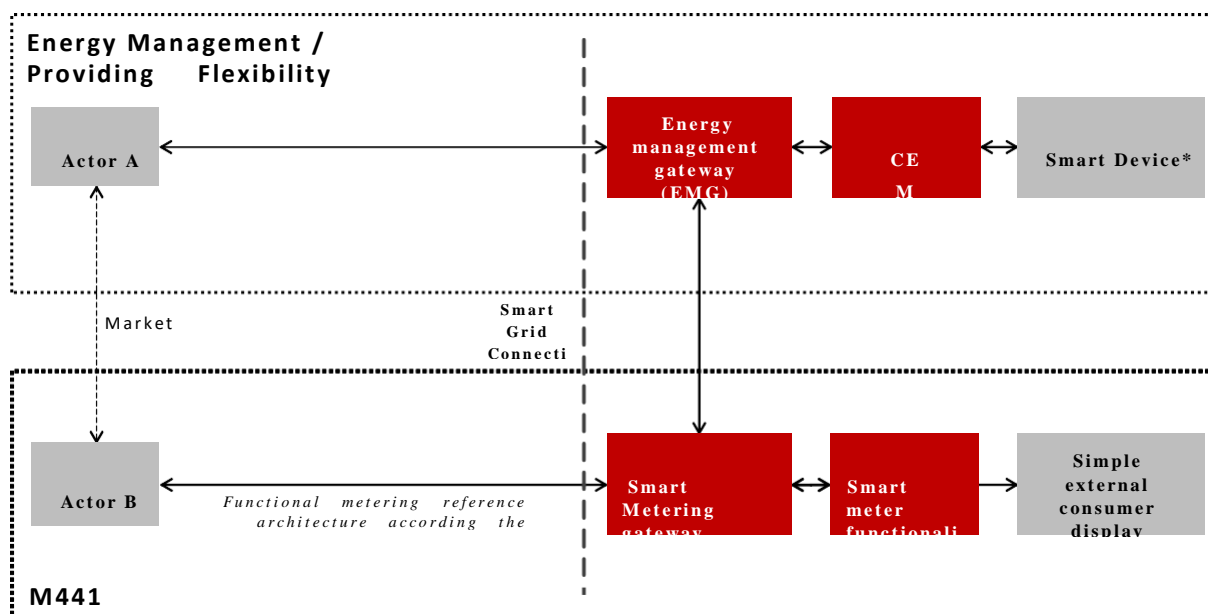
### A.3.8.3 技術細節 Technical details

行為者：人員，系統，應用程式，資料庫，電力系統和其他利益相關者。

Actors: people, systems, applications, databases, the power system, and other stakeholders

備考 1.為定義該使用案例，已經使用了圖 A.14 所示的架構作為基礎。

NOTE 1 For the definition of this use case, the architecture shown in Figure A.14 has been used as a basis.



\*例：HBES 裝置，智慧家電，儲能裝置，發電機，EV 家用充電器，複雜顯示

器

\* e.g. HBES device, smart appliances, storage, generator, domestic charger for EV, complex display

Figure A.14 – SG CG Architecture Model [9]

備考 2. 以上架構中之行為者為功能個體，這意味著它們中的一些可能是同一實體裝置的一部分(例：CEM 功能可能是智慧裝置的一部分，智慧電錶也可能包含智慧量測閘道器和 CEM 等)。

NOTE 2 The actors in the above architecture are functional entities, which means that some of them may be part of the same physical device (e.g. CEM functionality may be part of a smart device, the smart meter might also encompass the smart metering gateway and CEM, etc.).

備考 3. 請考慮這種高階使用的範圍並不需要上圖所示的所有行為者。下表顯示了參與的行為者。

NOTE 3 Please consider that the scope of this high level use does not require all actors shown on the figure above. Following table shows involved actors.

行為者 Actors			
分組(社群) Grouping (Community)		群組說明 Group description	
行為者名稱參照行為者列表 Actor name see Actor list	行為者名稱參照行為者列表 Actor name see Actor list	行為者名稱參照行為者列表 Actor name see Actor list	特定使用案例之進一步資訊 Further information specific to this use case
客戶能源管理者 Customer Energy Manager	內部 Internal	CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。  The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.  客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或	

		<p>專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the " grid/market " .</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 整合通訊功能時則稱為客戶能源管理系統。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System.</p>	
智慧恆溫器 Smart Thermostat	外部 External	<p>使用智慧或可程式恆溫器，可依預設排程調整溫度設定、開啟暖氣或空調。智慧或可程式恆溫器可儲存和重複多個每日設定(每天 6 或多個溫度設定)，並可手動複寫而不影響其它每日或每週程式。</p> <p>Using a Smart or programmable thermostat, one can adjust the temperature settings or the times turn on the heating or air- conditioning according to a pre-set schedule. Smart or programmable thermostats can store and repeat multiple daily settings (six or more temperature settings a day) that one can manually override without affecting the rest of the daily or weekly program.</p> <p>可使用平板電腦，智慧手機或電腦透過網路連接。智慧恆溫器可連接到 CEM 裝置，並從 CEM 編寫其設定程式。</p> <p>One can access it via the web using your tablet, smart phone or computer. The Smart Thermostat can be a device which is connected to the CEM and is programmed its settings from the CEM.</p>	
智慧裝置 Smart device	外部 External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>智慧裝置不在 SG-CG 範圍內，因此須將其視為外部行為者。</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc...). The smart device can receive data directly from the</p>	

		<p>grid, though an interface with the CEM and can react to commands and messages from the grid in an intelligent way.</p> <p>Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor.</p>	
<p>智慧家電(白色家電)</p> <p>Smart appliance (white goods)</p>	<p>外部</p> <p>External</p>	<p>智慧裝置的一個範例為智慧白色家電，家電具備與電網互動回應訊息的能力，並透過向能源供應網路優化自身能力。該訊息可直接或透過客戶能源管理系統，自公用事業或第三方能源服務提供商接收。</p> <p>An example of a smart device is a smart white goods appliance which is an appliance that has the capability to act in response to a message from the grid and there by optimize its behaviour towards the energy supply network. The message can be received from a utility or a third party energy service provider directly or via a customer energy management system.</p> <p>該訊息可為能源成本或可用再生能源之總和資訊，亦可為家電必須接收之需量反應訊息(延遲負載訊息或其他相關資訊)，依預設或啟動消費者輸入進行解釋及反應。智慧家電不保證行進回應，但會依其狀態及使用者設定進行回應，以確保達到預期性能。</p> <p>The message can be information like the cost of energy or the amount of available renewable energy, or it can be a Demand Respond message (delay load message or other related information) that the appliance must receive, interpret and react upon based on pre-set or active consumer input. The smart appliance is not guaranteed to respond, but will do so based on its status and user settings in order to ensure the expected performance.</p> <p>消費者擁有家電之最終控制權，可以複寫任何特定模式(例：複寫延遲以允許立即運轉，延遲限制不超過數小時或維持房間溫度)。</p> <p>The consumer has the ultimate control of the appliance and can override any specific mode (e.g. override a delay to allow immediate operation, limit delays to no more than a certain number of hours, or maintain a set room temperature).</p> <p>任何家電運轉設定或模式對於普通、非技術消費者來說皆應易於啟動或實作。</p> <p>Any appliance operation settings or modes shall be easy for an average, non-technical consumer to activate or implement.</p>	
<p>行為者 A Actor A</p>	<p>外部</p> <p>External</p>	<p>外部行為者(智慧電網市場角色)透過能源管理通道與家庭或家庭自動化網路之系統功能及組件進行互動。此市場角色諸如能源提供商、能源服務提供商及聚合商等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home</p>	

		automation network through the energy management communication channel. Examples of such market roles are the energy provider, the energy services Provider, the aggregator, etc.	
行為者 B Actor B	外部 External	<p>外部行為者(智慧電網市場角色)透過量測通訊通道與家庭或家庭自動化網路之系統功能及組件進行互動。該行為者負責收集量測資料。此市場角色諸如 DSO、量測公司等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the metering communication channel. This actor is responsible for collecting metering data. Examples of such market roles are the DSO, metering company, etc.</p>	
用戶 User	外部 External	<p>已購買智慧裝置之終端客戶。終端客戶負責配置及設定智慧裝置之運轉模式。</p> <p>The end customer who has acquired a smart device. The end customer is responsible for configuring and setting operation mode of the smart device.</p>	

觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件 Use case conditions			
行為者/系統/資訊/契約 Actor/System/Information/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption
	資費資訊 Tariff Information.		<p>CEM 依據操作計畫條件以程式控制各個家電，或者 CEM 通過設定依操作計畫的條件定義的剖繪(例：溫度剖繪、計時器)來控制家電</p> <p>controls each appliance as programmed according to conditions of operating plan or CEM controls appliance by setting profile (e.g. temperature profile, Timer) defined according to conditions of operating plan</p>

參考文獻

References



參考文獻 References						
No.	參考資料型式 References Type	參考 Reference	狀態 Status	使用案例之影響 Impact on use case	發起人/組織 Originator/Organisation	鏈結 Link
1	指導方針 Guideline	基本定義和通用程序 Basic definitions and common procedures	定稿 Final	術語及定義 Terms and definitions	SG-CG 可持續流程工作組 SG-CG Sustainable Processes WG	<a href="ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf">ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf</a>
2	技術報告 Technical Report	使用者經歷及序列圖 User Story and Sequence diagrams	草案 Draft	情境之主要影響 Major impact on Scenario	IEC TC57/CLC TC205/CLC/TC59x	-
3	標準 Standard	使用案例範本 Use Case Template	草案 Draft (FDIS)	範本說明 Template description	IEC TC8	-

分類/對映使用案例之更多資訊

Further Information on the use case for classification/mapping

分類資訊 Classification information
與其他使用案例關聯 Relation to Other use cases
深度 Level of Depth
高階使用案例 High level use case
優先序 Prioritisation

一般，區域或國家關係 Generic, Regional or National Relation
通用高階使用案例可用於任何智慧裝置之類型。 Generic high level use case which can be applied to any kind of smart device.
觀點 Viewpoint
此高階使用案例具有使用者視角及 SD 與全體客戶能源管理系統之互動。其不考慮彈性提供或特定於電網實作之市場機制。 This high level use case has the user perspective and the interaction of the SD with an overall customer energy management system. it does not consider market mechanisms for flexibility offering or power grid specific implementations.
分類的其他關鍵字 Further Keywords for Classification
通用高階使用案例 Generic high level use case

#### A.3.8.4 使用案例的逐步分析 Step by step analysis of use case

步驟 - 情境名稱

Steps - Scenario name

情境條件 Scenario conditions					
No.	情境名稱 Scenario name	主要行為者 Primary actor	觸發事件 Triggering event	前提 Pre-condition	後置條件 Post-condition

步驟 - 情境

Steps - Scenarios

#### A.3.8.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements to information data
簡單命令	開/關/開始/停止/暫停/繼續/中止/模糊	此等資訊很敏感，任何修改皆可能

Simple Commands	<p>定時器</p> <p>空調模式：</p> <p>冷卻、加熱、模式 1-n</p> <p>風：自動、高、低等。</p> <p>其他設定：</p> <p>On/Off/Start/Stop/Pause/Resume/Abort/Dim Timer</p> <p>Air conditioner mode:</p> <p>cooling down, heating up, mode 1-n</p> <p>Wind: auto, high, low, etc.</p> <p>Other settings:</p>	<p>開關 SD。因此，通訊資料必須被保護避免濫用及受外部影響。</p> <p>Such information is sensitive in a way that any modification might turn on or off a SD. Therefore, the communication data must be protected from misuse and external influences.</p>
溫度剖繪 Temperature Profile	<p>溫度剖繪定義隨時間變化之溫度設定點(例：各房溫之設定點)。溫度剖繪可能分成多個時槽。此時槽具有固定之溫度量以設定離散溫度剖繪。簡單的溫度剖繪將包含一個溫度值及持續時間，並且可能含有每週溫度剖繪，各溫度剖繪皆包含工作日(週一至週五)/週末剖繪。</p> <p>A temperature profile defines the temperature set point over time (e.g. set point of each room temperature). A temperature profile might be split into multiple time slots. Such time slots have a fix amount of temperature to set a discrete temperature profile. A simple temperature profile will contain only one temperature value and its duration and there might be weekly temperature profiles each of which contains weekdays (Monday to Friday)/weekend profile.</p>	<p>溫度剖繪很敏感，任何修改皆可能劇烈影響房溫變化。因此，通訊資料必須被保護以避免濫用及受外部影響。</p> <p>Temperature Profile is sensitive in a way that any modification might affect drastic room temperature change.</p> <p>Therefore, the communication data must be protected from misuse and external influences.</p>
資費資訊 Tariff Information	<p>外部行為者傳送若干資費資訊至 CEM，並進一步處理此資訊。</p> <p>An external actor send some tariff information to the CEM which then further processes this information.</p>	

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements to information data
儲能電池命令 Storage Battery	儲能電池系統可向本地電網供電或充電。此資訊須在 CEM 和 SD 間交換。	

Commands	The storage battery system can feed in power to the local power network or can be charged. That information must be exchanged between the CEM and the SD.	
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**A.3.8.6 要求事項(選項) Requirements (optional)**

**A.3.8.7 通用術語及定義 Common terms and definitions**

通用術語及定義 Common terms and definitions	
術語 Term	定義 Definition

#### A.3.8.8 自定義資訊(選項) Custom information (optional)

自定義資訊(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Refers to section

A.3.9 高階使用案例(JWG113x)記錄具有太陽能發電，儲能電池的熱泵的混合能源系統事件

A.3.9 High level use case (JWG113x) log mixed energy system events of heat pumps with pv, storage battery

##### A.3.9.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	域/區 Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG113x	域：客戶端、DER Domain: Customer Premises, DER 區：過程，場域，變電所 Zones: Process, Field, Station	顯示各種與能源相關的裝置(例：熱泵和能源儲能)的狀態和系統事件(摘自 IEC TR 62746-2)。  Show status and system events of various energy related devices like heat pumps and energy storage (taken from IEC TR 62746-2).

版本管理

Version management

版本管理

Version management

變化/版本 Changes/ Version	日期 Date	領域專家 Domain expert	區的专业知識 /網域/角色 Area of expertise /Domain /Role	標題/變更 Title/Changes	批准狀態草案，用於評論，投票，最終 Approval status draft, for comments, for voting, final
0.1	07/03/ 2014	家電 Home Appliances	使用案例 Use Cases	初稿(摘自 IEC TR 62746-2)  Initial Draft (taken from IEC TR 62746-2)	草案 Draft
0.2	17/12/ 2014	家電 Home Appliances	使用案例 Use Cases	Changed the description and corrected  copy&paste mistakes  from JWG113x	草案 Draft

## 使用案例之範圍及目標 Scope and objectives of use case

使用案例之範圍及目標 Scope and objectives of use case	
Scope	<p>借助 CEM 的適當管理/指示，熱水器，空調和其他裝置等裝置可以智慧運行。事件可能會導致狀態更改，並且系統行為可能取決於直接互動。此使用案例說明，系統日誌記錄的不同情境。</p> <p>With proper management/instruction by CEM, Devices such as water heater, air conditioner and other appliances can act Smart. Events might cause state changes and system behavior might depend on direct interaction. This use case describes different scenarios for system logging.</p>
Objective(s)	<p>該使用案例定義了跟踪各種事件和系統更改所需的基本資訊交換。</p> <p>This use case defines the basic information exchange which is required to track events and system changes for various needs.</p>
相關業務案例 Related business case(s)	<ul style="list-style-type: none"> <li>– 需量反應(DR)</li> <li>– 需求面管理(DSM)</li> <li>– Demand Response (DR)</li> <li>– Demand Side Management (DSM)</li> </ul>

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case

**簡短說明 Short description**

此使用案例說明，各種日誌記錄和狀態，事件捕獲情境。

This use case describes various logging and status, event capturing scenarios.

**完整說明 Complete description****JWG1131 – 顯示狀態及日誌資訊：儲能電池**

此使用案例說明了從客戶 EMS 控制器到儲能電池控制器的狀態請求和已記錄資訊的請求以及所接收資訊的顯示。EMS 控制器從儲能電池控制器請求狀態或日誌資訊。從儲能電池控制器接收到資訊後，EMS 控制器將顯示該資訊。

日誌資訊可以包括測量的累積充電/放電電功率(Wh)和瞬時測量的充電/放電電功率(W)，電流(A)，電壓(V)的歷史記錄。

狀態資訊可以包括累積充電/放電電力(Wh)，剩餘電力(kWh，%)和瞬時充電/放電電力(W)，電流(A)，電壓(V)等。

**JWG1131 – Display status and log information: Storage Battery**

This use case describes the request for status and logged information from the customer EMS controller to a storage battery controller and the display of the received information. The EMS controller requests status or log information from the Storage Battery Controller. After the information is received from the Storage Battery controller it is displayed by the EMS controller.

Log information may include measured cumulative charge/discharge electric power (Wh) and history of momentarily measured charge/discharge electric power (W), current (A), voltage (V) etc.

Status information may include cumulative charge/discharge electric power (Wh), remaining electric power (kWh, %) and momentary charge/discharge electric power (W), current (A), voltage (V), etc.

**JWG1132 – 顯示狀態及日誌資訊：熱泵**

此使用案例說明，從客戶 EMS 控制器到熱泵控制器的狀態請求和已記錄資訊的請求以及所接收資訊的顯示。EMS 控制器從熱泵控制器請求狀態或日誌資訊。從熱泵控制器接收到資訊後，EMS 控制器將顯示該資訊。

日誌資訊可以包括測量的累積功耗(Wh)和瞬時測量的熱水溫度(C)，熱水剩餘值(l)，電功率(W)的歷史記錄。

狀態資訊可能包括瞬時熱水溫度(C)，熱水剩餘值(l)，客戶 EMS 控制器的電功率(W)等。

**JWG1132 – Display status and log information: Heat Pump**

This use case describes the request for status and logged information from the customer EMS controller to a heat pump controller and the display of the received information. The EMS controller requests status or log information from the heat pump controller. After the information is received from the heat pump controller it is displayed by the EMS controller.

Log information may include measured cumulative power consumption (Wh) and history of momentarily measured hot water temperature (C), hot water remaining value (l), electric power (W) etc.

Status information may include momentary hot water temperature (C), hot water remaining value (l), electric power (W) to the Customer EMS Controller etc.

**JWG1133 – 顯示狀態及日誌資訊：燃料電池**

此使用案例說明，從客戶 EMS 控制器到燃料電池控制器的狀態請求和已記錄資訊的請求以及所接收資訊的顯示。EMS 控制器從燃料電池控制器請求狀態或日誌資訊。從燃料電池控制器接收到資訊後，EMS 控制器將顯示該資訊。

日誌資訊可能包括測量的累計發電量(Wh)，測量的瞬時氣體消耗量(m3)，測量的累積氣體消耗量(m3)和瞬時測量的熱水溫度的歷史記錄(C)，水箱中的熱量(MJ)，熱水剩餘量(L)，發電量(W)

狀態資訊可能包括瞬時熱水溫度(C)，水箱中的熱量(MJ)，熱水剩餘值(L)，發電量(W)，測得的累積發電量(Wh)，測得的瞬時氣體消耗量(m3)，測量的累計氣體消耗量(m3)。

#### JWG1133 – Display status and log information: Fuel Cell

This use case describes the request for status and logged information from the customer EMS controller to a fuel cell controller and the display of the received information. The EMS controller requests status or log information from the fuel cell controller. After the information is received from the fuel cell controller it is displayed by the EMS controller.

Log information may include measured cumulative generated electric power (Wh), measured momentary gas consumption (m3), measured cumulative gas consumption (m3) and history of momentarily measured hot water temperature (C), heat quantity in the water tank (MJ), hot water remaining value (L), generated electric power (W)

Status information may include momentary hot water temperature (C), heat quantity in the water tank (MJ), hot water remaining value (L), generated electric power (W), measured cumulative generated electric power (Wh), measured momentary gas consumption (m3), measured cumulative gas consumption (m3).

#### JWG1134 – 顯示狀態及日誌資訊：太陽能發電

此使用案例說明了從客戶 EMS 控制器到 PV 控制器的狀態請求和已記錄資訊的請求，以及接收到的資訊的顯示。EMS 控制器從 PV 控制器請求狀態或日誌資訊。從 PV 控制器接收到資訊後，EMS 控制器將顯示該資訊。

日誌資訊可以包括測量的累積發電功率(Wh)，測量的累積輸出功率(Wh)以及瞬時測量的發電功率(W)，測量的瞬時輸出功率(W)的歷史記錄等。

狀態資訊可以包括瞬時發電功率(W)，瞬時輸出功率(W)，測得的累積發電功率(Wh)，測得的累積輸出功率(Wh)等。

#### JWG1134 – Display status and log information: Photovoltaic

This use case describes the request for status and logged information from the customer EMS controller to a PV controller and the display of the received information. The EMS controller requests status or log information from the PV controller. After the information is received from the PV controller it is displayed by the EMS controller.

Log information may include measured cumulative generated power (Wh), measured cumulative exported power (Wh) and history of momentarily measured generated power (W), measured momentary exported power (W) etc.

Status information may include momentary generated power (W), momentary exported power (W), measured cumulative generated power (Wh), measured cumulative exported power (Wh) etc.

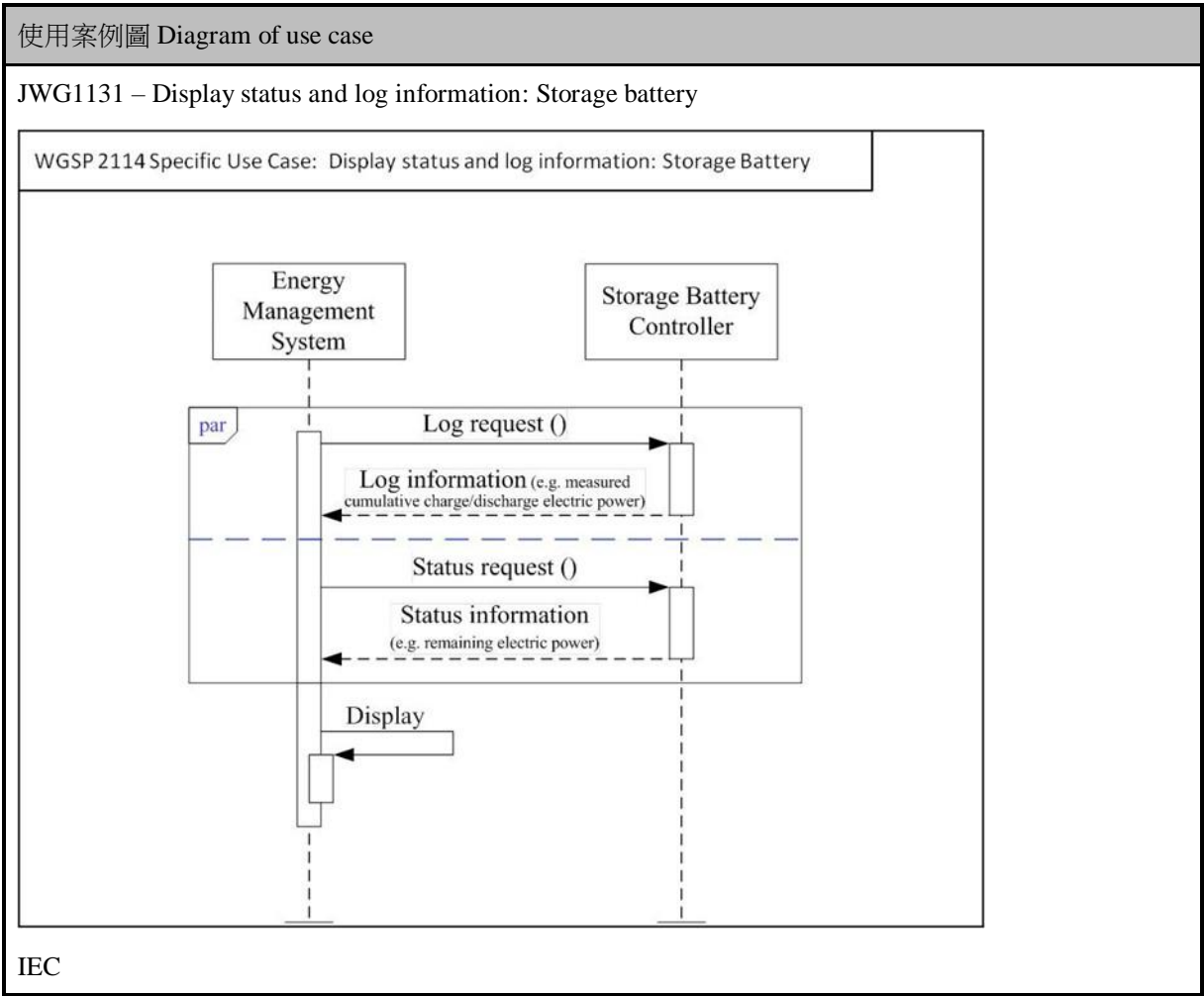
一般說明 General remarks

一般說明 General remarks

### A.3.9.2 使用案例圖 Diagrams of use case

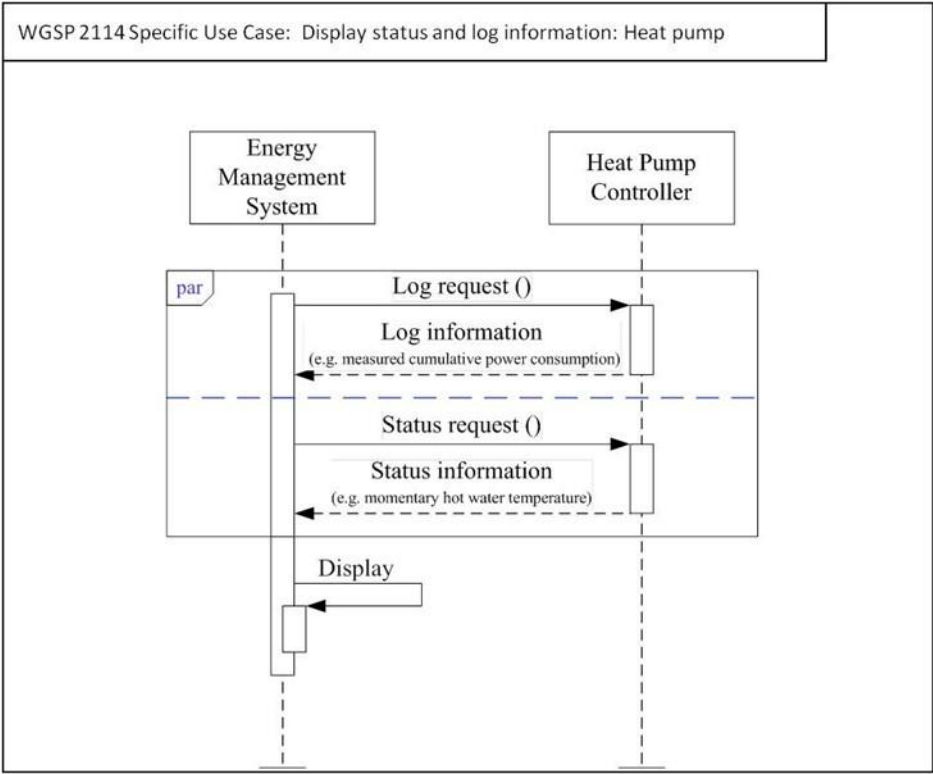
Figure A.15 shows 使用案例圖 Diagrams of use case.





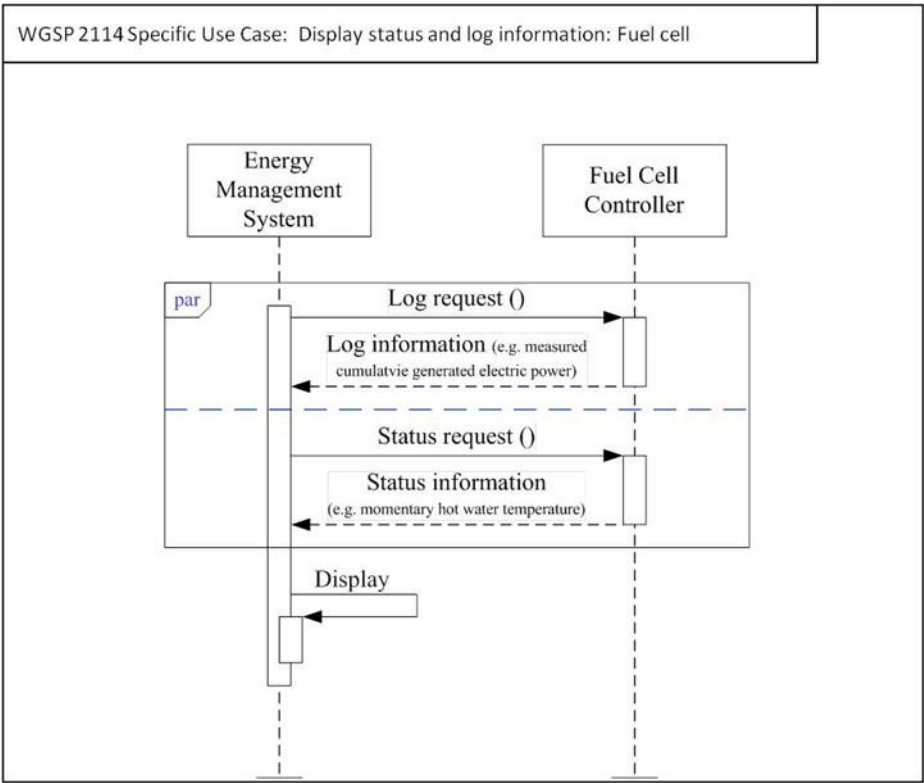
使用案例圖 Diagram of use case

JWG1132 – Display status and log information: Heat pump



IEC

JWG1133 – Display status and log information: Fuel Cell



IEC

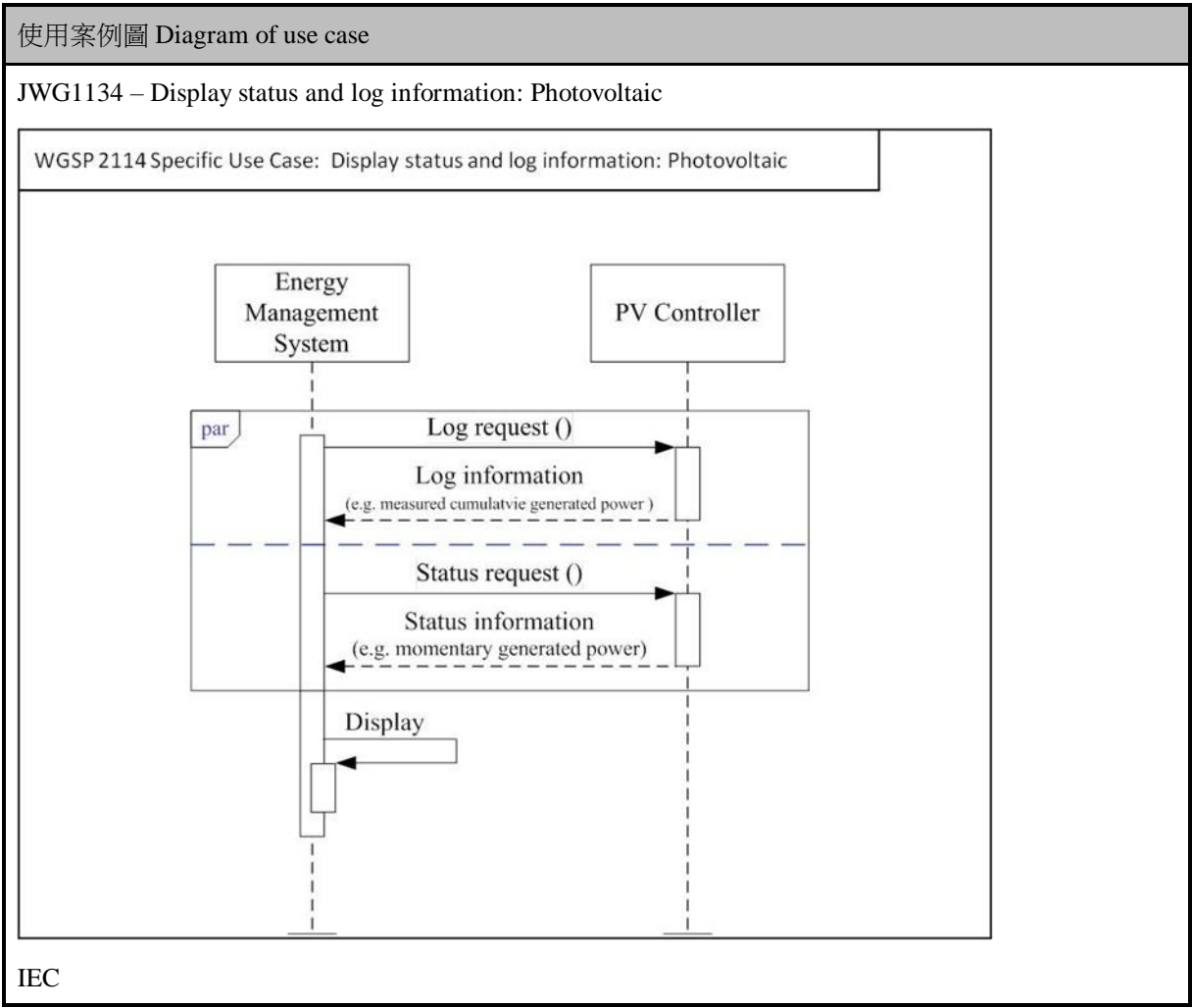


Figure A.15 Sequence diagram

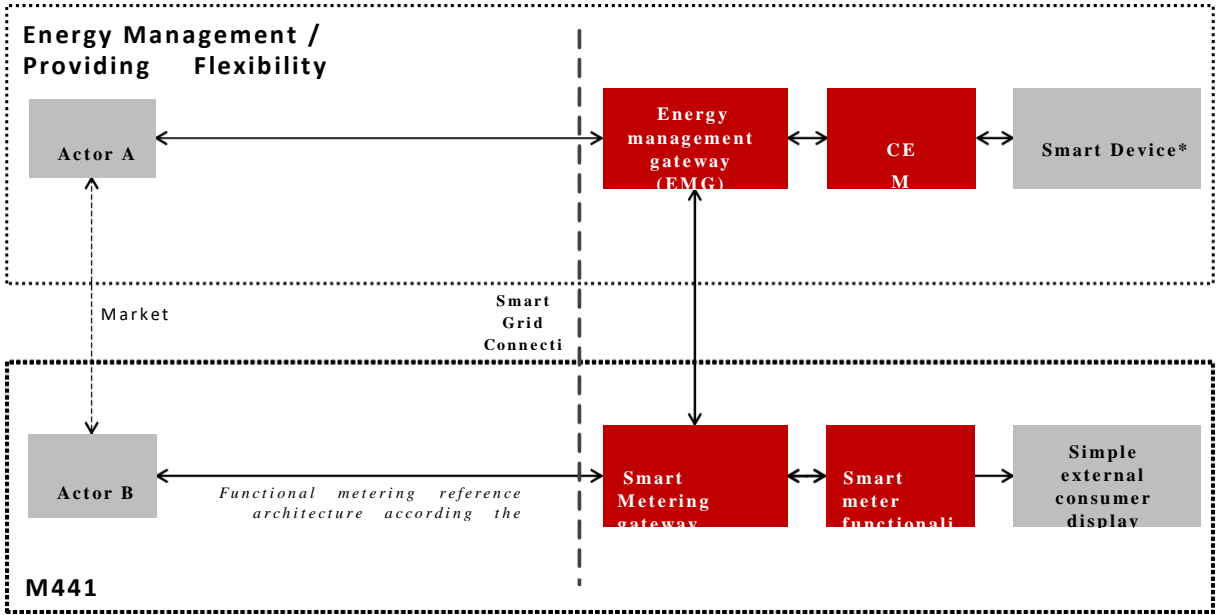
A.3.9.3 技術細節 Technical details

行為者：人員，系統，應用程式，資料庫，電力系統和其他利益相關者。

Actors: people, systems, applications, databases, the power system, and other stakeholders

備考 1.為定義此使用案例，已使用了圖 A.16 所示的架構作為基礎。

NOTE 1 For the definition of this use case, the architecture shown in Figure A.16 has been used as a basis



\*例： HBES 裝置，智慧家電，儲能裝置，發電機，EV 家用充電器，複雜顯示器

\* e.g. HBES device, smart appliances, storage, generator, domestic charger for EV, complex display

Figure A.16 SG CG Architecture Model [9]

備考 2. 以上架構中之行為者為功能個體，這意味著它們中的一些可能是同一實體裝置的一部分(例：CEM 功能可能是智慧裝置的一部分，智慧電錶也可能包含智慧量測閘道器和 CEM 等)。

NOTE 2 The actors in the above architecture are functional entities, which means that some of them may be part of the same physical device (e.g. CEM functionality may be part of a smart device, the smart meter might also encompass the smart metering gateway and CEM, etc.).

備考 3. 請考慮這種高階使用的範圍並不需要上圖所示的所有行為者。下表顯示了參與的行為者。

NOTE 3 Please consider that the scope of this high level use does not require all actors shown on the figure above. the following table shows involved actors.

行為者 Actors			
分組(社群) Grouping (Community)		群組說明 Group description	
行為者名稱參照行為者列表 Actor name see Actor list	行為者名稱參照行為者列表 Actor name see Actor list	行為者名稱參照行為者列表 Actor name see Actor list	特定使用案例之進一步資訊 Further information specific to this use case
客戶能源管理者 Customer Energy Manager	內部 Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the "grid/market" .</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 整合通訊功能時則稱為客戶能源管理系統。</p> <p>When the CEM is integrated with</p>	

		communication functionalities it is called a Customer Energy Management System.	
智慧恆溫器 Smart Thermostat	外部 External	<p>使用智慧或可程式恆溫器，可依預設排程調整溫度設定、開啟暖氣或空調。智慧或可程式恆溫器可儲存和重複多個每日設定(每天 6 或多個溫度設定)，並可手動複寫而不影響其它每日或每週程式。</p> <p>Using a Smart or programmable thermostat, one can adjust the temperature settings or the times turn on the heating or air- conditioning according to a pre-set schedule. Smart or programmable thermostats can store and repeat multiple daily settings (six or more temperature settings a day) that one can manually override without affecting the rest of the daily or weekly program.</p> <p>可使用平板電腦，智慧手機或電腦透過網路連接。智慧恆溫器可連接到 CEM 裝置，並從 CEM 編寫其設定程式。</p> <p>One can access it via the web using your tablet, smart phone or computer. The Smart Thermostat can be a device which is connected to the CEM and is programmed its settings from the CEM.</p>	
智慧裝置 Smart device	外部 External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>智慧裝置不在 SG-CG 範圍內，因此須將其視為外部行為者。</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc...). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and messages from the</p>	

		<p>grid in an intelligent way.</p> <p>Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor.</p>	
<p>智慧家電(白色家電)</p> <p>Smart appliance (white goods)</p>	外部 External	<p>智慧裝置的一個範例為智慧白色家電，家電具備與電網互動回應訊息的能力，並透過向能源供應網路優化自身能力。該訊息可直接或透過客戶能源管理系統，自公用事業或第三方能源服務提供商接收。</p> <p>An example of a smart device is a smart white goods appliance which is an appliance that has the capability to act in response to a message from the grid and there by optimize its behaviour towards the energy supply network. The message can be received from a utility or a third party energy service provider directly or via a customer energy management system.</p> <p>該訊息可為能源成本或可用再生能源之總和資訊，亦可為家電必須接收之需量反應訊息(延遲負載訊息或其他相關資訊)，依預設或啟動消費者輸入進行解釋及反應。智慧家電不保證進行回應，但會依其狀態及使用者設定進行回應，以確保達到預期性能。</p> <p>The message can be information like the cost of energy or the amount of available renewable energy, or it can be a Demand Respond message (delay load message or other related information) that the appliance must receive, interpret and react upon based on pre-set or active consumer input. The smart appliance is not guaranteed to respond, but will do so based on its status and user settings in order to ensure the expected performance.</p> <p>消費者擁有家電之最終控制權，可以複寫任何特定模式(例：複寫延遲以允許立即運轉，延遲限制不超過數小時或維持房間溫度)。</p> <p>The consumer has the ultimate control of the appliance and can override any specific mode (e.g. override a delay to allow immediate operation, limit delays to no more than a certain number of hours, or maintain a set room temperature).</p>	



		<p>任何家電運轉設定或模式對於普通、非技術消費者來說皆應易於啟動或實作。</p> <p>Any appliance operation settings or modes shall be easy for an average, non-technical consumer to activate or implement.</p>	
行為者 A Actor A	外部 External	<p>外部行為者(智慧電網市場角色)透過能源管理通道與家庭或家庭自動化網路之系統功能及組件進行互動。此市場角色諸如能源提供商、能源服務提供商及聚合商等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the energy management communication channel. Examples of such market roles are the energy provider, the energy services Provider, the aggregator, etc.</p>	
行為者 B Actor B	外部 External	<p>外部行為者(智慧電網市場角色)透過量測通訊通道與家庭或家庭自動化網路之系統功能及組件進行互動。該行為者負責收集量測資料。此市場角色諸如 DSO、量測公司等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the metering communication channel. This actor is responsible for collecting metering data. Examples of such market roles are the DSO, metering company, etc.</p>	
用戶 User	外部 External	<p>已購買智慧裝置之終端客戶。終端客戶負責配置及設定智慧裝置之運轉模式。</p> <p>The end customer who has acquired a smart device. The end customer is responsible for configuring and setting operation mode of the smart device.</p>	

觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件

Use case conditions

行為者/系統/資訊/ 契約 Actor/System/Infor mation/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption
	資費資訊 Tariff Information.		CEM 依操作計畫條件以程式 控制各家電，或 CEM 依操作 計畫條件定義透過設定剖繪 (例：溫度剖繪、計時器)控制 家電  CEM controls each appliance as programmed according to conditions of operating plan or CEM controls appliance by setting profile (e.g. temperature profile, Timer) defined according to conditions of operating plan

## 參考文獻

## References

參考文獻 References						
No.	參考資料型式 References Type	參考 Reference	狀態 Status	使用案例之影 響 Impact on use case	發起人/組織 Originator/Org anisation	鏈結 Link
1	指導方針 Guideline	基本定義和通 用程序  Basic definitions and common procedures	定稿 Final	術語及定義  Terms and definitions	SG-CG 可持續 流程工作組  SG-CG Sustainable Processes WG	<a href="ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf">ftp://ftp.cen.eu/ EN/Euro peanStandardiz ation/H otTopics/Smart Grids/Su stainable Processes.pdf</a>
2	技術報告 Technical Report	使用者經歷及 序列圖  User Story and Sequence diagrams	草案 Draft	情境之主要影 響  Major impact on Scenario	IEC TC57/CLC TC205/CLC /TC59x	-
3	標準 Standard	使用案例範本  Use Case Template	草 案 Draft (FDIS)	範本說明  Template description	IEC TC8	-

分類/對映使用案例之更多資訊

Further Information on the use case for classification/mapping

分類資訊
Classification information
與其他使用案例關聯
Relation to Other use cases
深度
Level of Depth
高階使用案例
High level use case
優先序
Prioritisation
一般，區域或國家關係
Generic, Regional or National Relation
<p>高階使用案例可用於任何智慧裝置之類型。該高級使用案例成為通用使用案例。</p> <p>High level use case which can be applied to any kind of smart device. Once the regions agreed and confirmed correctness, that high level use case becomes a generic use case.</p>
觀點
Viewpoint
<p>此高階使用案例具有使用者視角及 SD 與全體客戶能源管理系統之互動。其不考慮彈性提供或特定於電網實作之市場機制。</p> <p>This high level use case has the user perspective and the interaction of the SD with an overall customer energy management system. it does not consider market mechanisms for flexibility offering or power grid specific implementations.</p>
分類的其他關鍵字
Further Keywords for Classification
通用高階使用案例
Generic high level use case

#### A.3.9.4 使用案例的逐步分析 Step by step analysis of use case

步驟 - 情境名稱

Steps - Scenario name

情境條件 Scenario conditions					
No.	情境名稱 Scenario name	主要行為者 Primary actor	觸發事件 Triggering event	前提 Pre-condition	後置條件 Post-condition

步驟 - 情境

Steps – Scenarios

#### A.3.9.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements to information data
狀態資訊及事件 Status Information and Events	指示系統或智慧裝置行為之事件可能會交換。一般而言，系統相關資訊應被交換。 Events that indicate system or smart device behaviour might be exchanged. In general, system relevant information shall be exchanged.	此等資訊很敏感，任何修改皆可能導致客戶特定及機密資訊。因此，通訊資料必須被保護避免濫用及受外部影響。 Such information is sensitive in a way that any modification might customer specific and confidential information. Therefore, the communication data must be protected from misuse and external influences.

#### A.3.9.6 要求事項(選項) Requirements (optional)

#### A.3.9.7 通用術語及定義 Common terms and definitions

通用術語及定義 Common terms and definitions	
術語 Term	定義 Definition

#### A.3.9.8 自定義資訊(選項) Custom information (optional)

自定義資訊(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Refers to section

### A.3.10 High level use case (JWG120x) Provide local power managing capabilities

#### A.3.10.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	域/區 Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG113x	域：客戶端、DER Domain: Customer Premises, DER 區：過程，場域，變電所 Zones: Process, Field, Station	本地能源管理(摘自 TR 62746-2 版本 0.5.1)。 Local energy management (taken from TR 62746-2 version 0.5.1).

版本管理

Version management

版本管理 Version management					
變化/版本 Changes/ Version	日期 Date	領域專家 Domain expert	區的專業知識 /網域/角色 Area of expertise /Domain /Role	標題/變更 Title/Changes	批准狀態草案，用於評論，投票，最終 Approval status draft, for comments, for voting, final
0.1	07/03/ 2014	家電 Home Appliances	使用案例 Use Cases	初稿(摘自 IEC TR 62746-2) Initial Draft (taken from IEC TR 62746-2)	草案 Draft

## 使用案例之範圍及目標 Scope and objectives of use case

使用案例之範圍及目標 Scope and objectives of use case	
Scope	<p>將負載與發電機組合時，可以實作本地能源管理。可能存在各種發電裝置，並且耗電裝置代表負載。</p> <p>Local energy management can be implemented when combining loads with generators. There are various power generation devices possible and power consuming device represents a load.</p>
Objective(s)	<p>該使用案例定義了提供本地能源管理所需的基本資訊交換。</p> <p>This use case defines the basic information exchange which is required to provide local energy management.</p>
相關業務案例 Related business case(s)	<ul style="list-style-type: none"> <li>- 需量反應(DR)</li> <li>- 需求面管理(DSM)</li> <li>- Demand Response (DR)</li> <li>- Demand Side Management (DSM)</li> </ul>

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case
簡短說明 Short description
完整說明 Complete description

**JWG1201 – 使用負載從太陽能發電輸出功率控制**

此使用案例說明，PV 和 EMS 控制器以及負載在 PV 用於輸出功率且能源供應商要求減少輸出功率時的負載。能源供應商監視輸出功率，並要求本地客戶的 EMS 降低輸出功率階層。EMS 通過使用一定比例的 PV 輸出與打開的功率負載進行回應。

**JWG1201 – Exported power control from Photovoltaic using a load**

This use case describes the operation of the PV and EMS controllers and loads when the PV is being used to export power and the energy supplier requests a reduction of exported power. The energy supplier monitors the exported power and requests the home customer's EMS to reduce the exported power level. The EMS responds by using a proportion of the PV output to power loads which it turns on.

**JWG1202 – 使用負載從燃料電池輸出功率控制**

此使用案例說明，當燃料電池用於輸出功率且能源供應商要求減少輸出功率時，燃料電池和 EMS 控制器的操作以及負載。能源供應商監視輸出功率，並要求本地客戶的 EMS 降低輸出功率階層。EMS 通過使用一定比例的燃料電池輸出對功率負載的回應來進行回應。

**JWG1202 – Exported power control from Fuel Cell using a load**

This use case describes the operation of the fuel cell and EMS controllers and loads when the fuel cell is being used to export power and the energy supplier requests a reduction of exported power. The energy supplier monitors the exported power and requests the home customer's EMS to reduce the exported power level. The EMS responds by using a proportion of the fuel cell output to power loads which it turns on.

**JWG1203 – 使用熱泵從太陽能發電輸出功率控制**

此使用案例說明，當 PV 用於輸出功率並且能源供應商要求減少輸出功率時，PV，EMS 和熱泵控制器的操作。能源供應商監視輸出功率，並要求本地客戶的 EMS 降低輸出功率階層。EMS 通過使用一定比例的 PV 輸出為熱泵供電，請求熱泵控制器增加運行功率或開啟功率並有選擇地請求熱泵控制器修改恆溫器設定來做出回應。

**JWG1203 – Exported power control from PV using Heat Pump**

This use case describes the operation of the PV, EMS and heat pump controllers when the PV is being used to export power and the energy supplier requests a reduction of exported power. The energy supplier monitors the exported power and requests the home customer's EMS to reduce the exported power level. The EMS responds by using a proportion of the PV output to power the heat pump, by requesting the heat pump controller to either increase operating power or turn on and optionally requesting the heat pump controller to modify thermostat settings.

**JWG1204 – 使用熱泵和負載從太陽能發電輸出功率控制**

此使用案例說明，當 PV 用於輸出功率並且能源供應商要求減少輸出功率時，PV，EMS 和熱泵控制器的操作。能源供應商監視輸出功率，並要求本地客戶的 EMS 降低輸出功率階層。EMS 通過使用一定比例的 PV 輸出為熱泵供電以及通過選擇性地請求熱泵控制器修改恆溫器設定做出回應，若熱泵儲罐已經處於加熱狀態，則另外要求打開一個或多個負載容量。

**JWG1204 – Exported power control from PV using Heat Pump and Load(s)**

This use case describes the operation of the PV, EMS and heat pump controllers when the PV is being used to export power and the energy supplier requests a reduction of exported power. The energy supplier monitors the exported power and requests the home customer's EMS to reduce the exported power level. The EMS responds by using a proportion of the PV output to power the heat pump and by optionally requesting the heat pump controller to modify thermostat settings, additionally requesting that one or more loads turn on in the case that the heat pump storage tank is already at capacity.

一般說明 General remarks



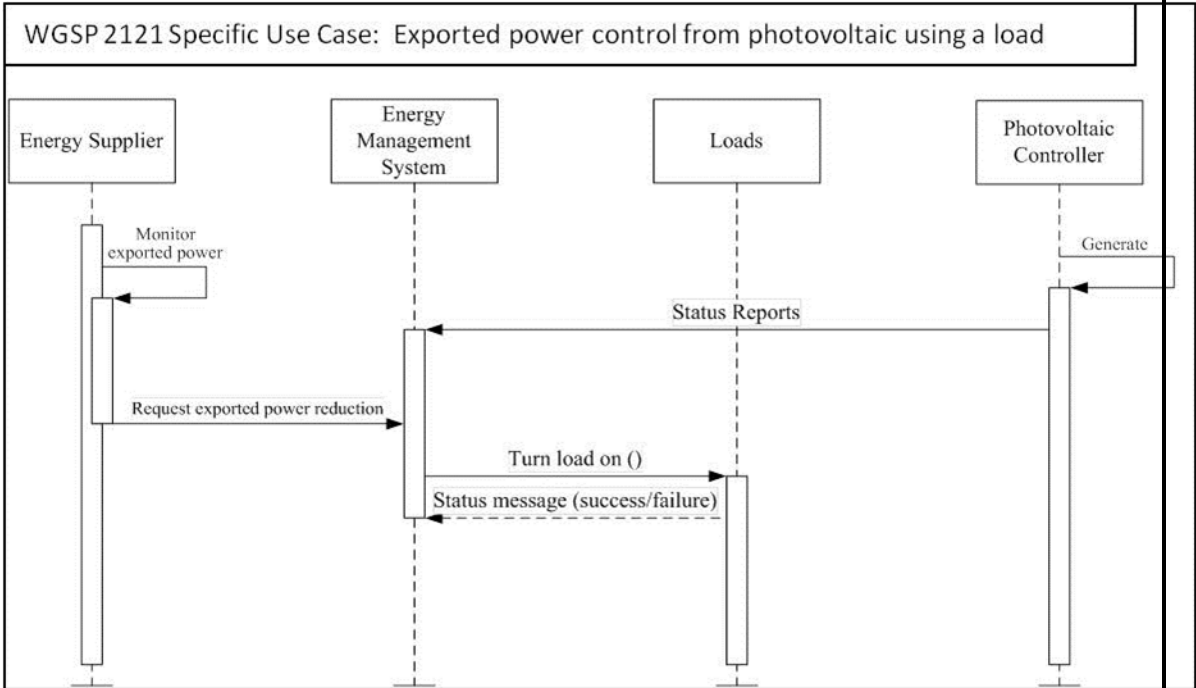
一般說明 General remarks

**A.3.10.2 使用案例圖 Diagrams of use case**

Figure A.17 shows 使用案例圖 Diagrams of use case.

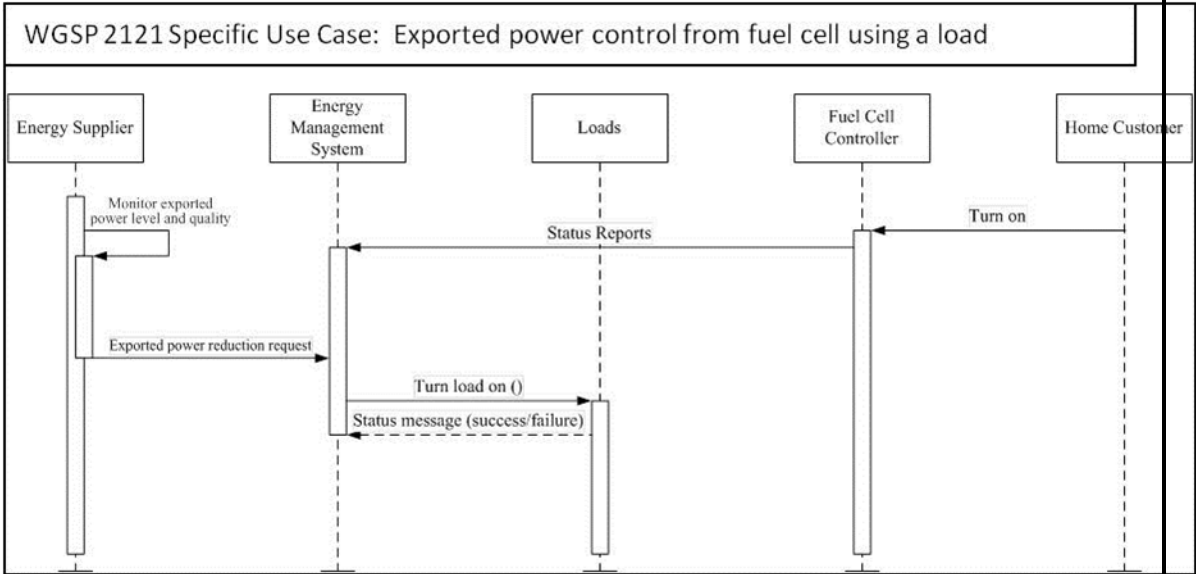
使用案例圖 Diagram of use case

JWG1201 – Exported power control from Photovoltaic using a load



IEC

JWG1202 – Exported power control from Fuel Cell using a load



IEC

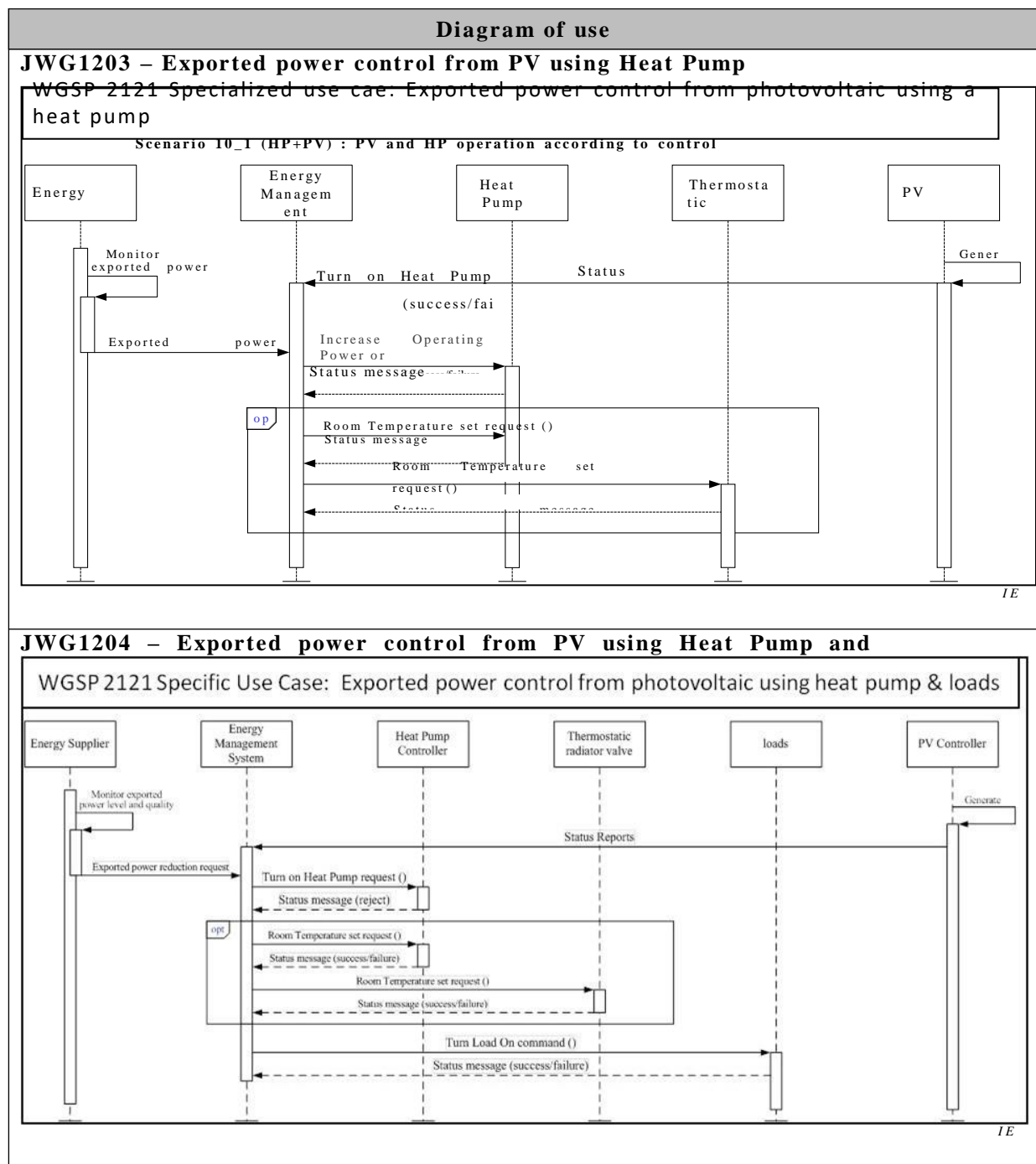


圖 A.17 序列圖

Figure A.17 – Sequence diagram

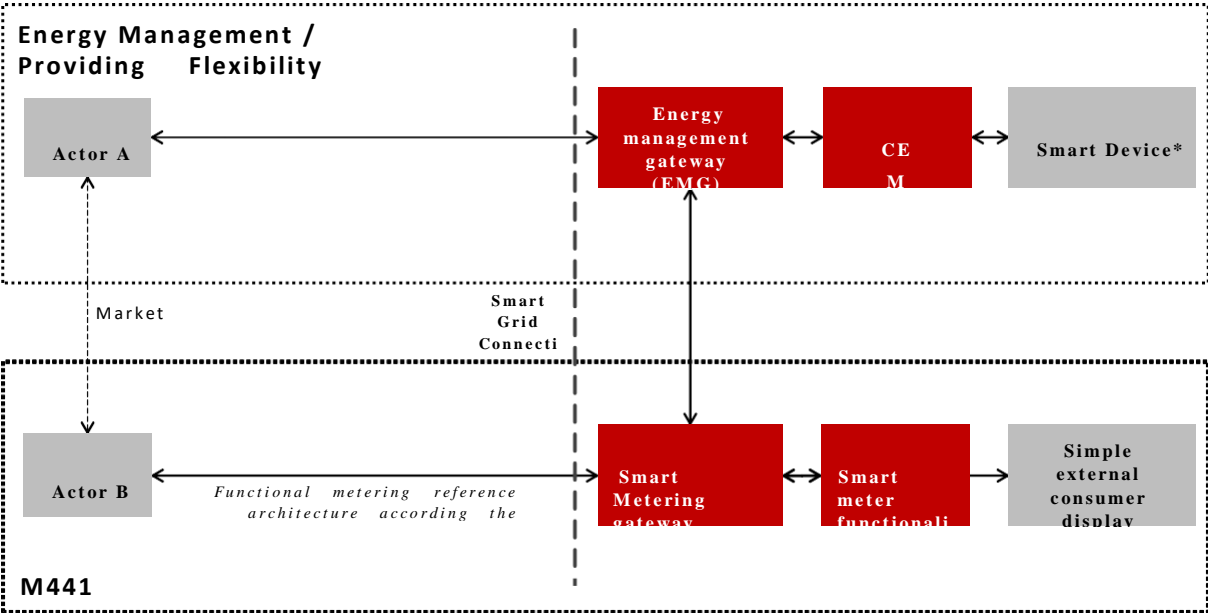
### A.3.10.3 技術細節 Technical details

行為者：人員，系統，應用程式，資料庫，電力系統和其他利益相關者。

Actors: people, systems, applications, databases, the power system, and other stakeholders

備考 1.為定義該使用案例，已使用了圖 A.18 所示的架構作為基礎。

NOTE 1 For the definition of this use case, the architecture shown in Figure A.18 has been used as a basis.



\*例： HBES 裝置，智慧家電，儲能裝置，發電機，EV 家用充電器，複雜顯示器

\* e.g. HBES device, smart appliances, storage, generator, domestic charger for EV, complex display

Figure A.18 – SG CG Architecture Model [9]

備考 2. 以上架構中之行為者為功能個體，這意味著它們中的一些可能是同一實體裝置的一部分(例：CEM 功能可能是智慧裝置的一部分，智慧電錶也可能包含智慧量測閘道器和 CEM 等)。

NOTE 2 The actors in the above architecture are functional entities, which means that some of them may be part of the same physical device (e.g. CEM functionality may be part of a smart device, the smart meter might also encompass the smart metering gateway and CEM, etc.).

備考 3. 請考慮這種高階使用的範圍並不需要上圖所示的所有行為者。下表顯示了參與的行為者。

NOTE 3 Please consider that the scope of this high level use does not require all actors shown on the figure above. The following table shows involved actors.

行為者 Actors			
分組(社群) Grouping (Community)		群組說明 Group description	
行為者名稱參照行為者列表 Actor name see Actor list	行為者名稱參照行為者列表 Actor name see Actor list	行為者名稱參照行為者列表 Actor name see Actor list	特定使用案例之進一步資訊 Further information specific to this use case
客戶能源管理者 Customer Energy Manager	內部 Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the " grid/market " .</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 整合通訊功能時則稱為客戶能源管理系統。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System.</p>	

智慧恆溫器 Smart Thermostat	外部 External	<p>使用智慧或可程式恆溫器，可依預設排程調整溫度設定、開啟暖氣或空調。智慧或可程式恆溫器可儲存和重複多個每日設定(每天 6 或多個溫度設定)，並可手動複寫而不影響其它每日或每週程式。</p> <p>Using a Smart or programmable thermostat, one can adjust the temperature settings or the times turn on the heating or air- conditioning according to a pre-set schedule. Smart or programmable thermostats can store and repeat multiple daily settings (six or more temperature settings a day) that one can manually override without affecting the rest of the daily or weekly program.</p> <p>可使用平板電腦，智慧手機或電腦透過網路連接。智慧恆溫器可連接到 CEM 裝置，並從 CEM 編寫其設定程式。</p> <p>One can access it via the web using your tablet, smart phone or computer. The Smart Thermostat can be a device which is connected to the CEM and is programmed its settings from the CEM.</p>	
智慧裝置 Smart device	外部 External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>智慧裝置不在 SG-CG 範圍內，因此須將其視為外部行為者。</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc...). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and messages from the grid in an intelligent way.</p> <p>Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor.</p>	
智慧家電(白色家	外部 External	智慧裝置的一個範例為智慧白色家	

<p>電)</p> <p>Smart appliance (white goods)</p>		<p>電,家電具備與電網互動回應訊息的能力,並透過向能源供應網路優化自身能力。該訊息可直接或透過客戶能源管理系統,自公用事業或第三方能源服務提供商接收。</p> <p>An example of a smart device is a smart white goods appliance which is an appliance that has the capability to act in response to a message from the grid and there by optimize its behaviour towards the energy supply network. The message can be received from a utility or a third party energy service provider directly or via a customer energy management system.</p> <p>該訊息可為能源成本或可用再生能源之總和資訊,亦可為家電必須接收之需量反應訊息(延遲負載訊息或其他相關資訊),依預設或啟動消費者輸入進行解釋及反應。智慧家電不保證進行回應,但會依其狀態及使用者設定進行回應,以確保達到預期性能。</p> <p>The message can be information like the cost of energy or the amount of available renewable energy, or it can be a Demand Respond message (delay load message or other related information) that the appliance must receive, interpret and react upon based on pre-set or active consumer input. The smart appliance is not guaranteed to respond, but will do so based on its status and user settings in order to ensure the expected performance.</p> <p>消費者擁有家電之最終控制權,可以複寫任何特定模式(例:複寫延遲以允許立即運轉,延遲限制不超過數小時或維持房間溫度)。</p> <p>The consumer has the ultimate control of the appliance and can override any specific mode (e.g. override a delay to allow immediate operation, limit delays to no more than a certain number of hours, or maintain a set room temperature).</p> <p>任何家電運轉設定或模式對於普通、非技術消費者來說皆應易於啟動或實作。</p> <p>Any appliance operation settings or modes shall be easy for an average, non-technical consumer to activate or implement.</p>	
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行為者 A Actor A	外部 External	<p>外部行為者(智慧電網市場角色)透過能源管理通道與家庭或家庭自動化網路之系統功能及組件進行互動。此市場角色諸如能源提供商、能源服務提供商及聚合商等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the energy management communication channel. Examples of such market roles are the energy provider, the energy services Provider, the aggregator, etc.</p>	
行為者 B Actor B	外部 External	<p>外部行為者(智慧電網市場角色)透過量測通訊通道與家庭或家庭自動化網路之系統功能及組件進行互動。該行為者負責收集量測資料。此市場角色諸如 DSO、量測公司等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the metering communication channel. This actor is responsible for collecting metering data. Examples of such market roles are the DSO, metering company, etc.</p>	
用戶 User	外部 External	<p>已購買智慧裝置之終端客戶。終端客戶負責配置及設定智慧裝置之運轉模式。</p> <p>The end customer who has acquired a smart device. The end customer is responsible for configuring and setting operation mode of the smart device.</p>	

觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件 Use case conditions			
行為者/系統/資訊/ 契約 Actor/System /Information/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption

參考文獻

References





參考文獻 References						
No.	參考資料型式 References Type	參考 Reference	狀態 Status	使用案例之影響 Impact on use case	發起人/組織 Originator/Organisation	鏈結 Link
1	指導方針 Guideline	基本定義和通用程序 Basic definitions and common procedures	定稿 Final	術語及定義 Terms and definitions	SG-CG 可持續流程工作組 SG-CG Sustainable Processes WG	<a href="ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf">ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf</a>
2	技術報告 Technical Report	使用者經歷及序列圖 User Story and Sequence diagrams	草案 Draft	情境之主要影響 Major impact on Scenario	IEC TC57/CLC TC205/CLC /TC59x	-
3	標準 Standard	使用案例範本 Use Case Template	草案 Draft (FDIS)	範本說明 Template description	IEC TC8	-

分類/對映使用案例之更多資訊

Further Information on the use case for classification/mapping

分類資訊 Classification information
與其他使用案例關聯 Relation to Other use cases
深度 Level of Depth
高階使用案例 High level use case
優先序 Prioritisation

一般，區域或國家關係 Generic, Regional or National Relation
高階使用案例可用於任何智慧裝置之類型。該高級使用案例成為通用使用案例。 High level use case which can be applied to any kind of smart device. Once the regions agreed and confirmed correctness, that high level use case becomes a generic use case.
觀點 Viewpoint
此高階使用案例具有使用者視角及 SD 與全體客戶能源管理系統之互動。其不考慮彈性提供或特定於電網實作之市場機制。 This high level use case has the user perspective and the interaction of the SD with an overall customer energy management system. it does not consider market mechanisms for flexibility offering or power grid specific implementations.
分類的其他關鍵字 Further Keywords for Classification
通用高階使用案例 Generic high level use case

#### A.3.10.4 使用案例的逐步分析 Step by step analysis of use case

Steps – Scenario name

情境條件 Scenario conditions					
No.	情境名稱 Scenario name	主要行為者 Primary actor	觸發事件 Triggering event	前提 Pre-condition	後置條件 Post-condition

步驟 – 情境

Steps – Scenarios

#### A.3.10.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements to information data
狀態資訊及事件 Status Information and Events	指示系統或智慧裝置行為之事件可能會交換。一般而言，系統相關資訊應被交換。 Events that indicate system or smart device behaviour might be exchanged. In general,	此等資訊很敏感，任何修改皆可能導致客戶特定及機密資訊。因此，通訊資料必須被保護避免濫用及受外部影響。

	system relevant information shall be exchanged.	Such information is sensitive in a way that any modification might customer specific and confidential information. Therefore, the communication data must be protected from misuse and external influences.
簡單命令 Simple Commands	開/關/開始/停止/暫停/繼續/中止/模糊 定時器  空調模式： 冷卻、加熱、模式 1-n 風：自動、高、低等。 其他設定： On/Off/Start/Stop/Pause/Resume/Abort/Dim Timer Air conditioner mode: cooling down, heating up, mode 1-n Wind: auto, high, low, etc. Other settings:	此等資訊很敏感，任何修改皆可能開關 SD。因此，通訊資料必須被保護避免濫用及受外部影響。  Such information is sensitive in a way that any modification might turn on or off a SD. Therefore, the communication data must be protected from misuse and external influences.

## A.3.10.6 要求事項(選項) Requirements (optional)

## A.3.10.7 通用術語及定義 Common terms and definitions

通用術語及定義 Common terms and definitions	
術語 Term	定義 Definition

## A.3.10.8 自定義資訊(選項) Custom information (optional)

自定義資訊(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Refers to section

### A.3.11 High level use case (JWG121x) 提供本地功率管理能力 Provide local power managing capabilities

#### A.3.11.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	域/區 Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG121x	域：客戶端、DER 區：過程，場域，變電所 Domain: Customer Premises, DER Zones: Process, Field, Station	本地能源管理(摘自 IEC TR 62746-2) Local energy management (taken from IEC TR 62746-2).

版本管理

Version management

版本管理 Version management					
變化/版本 Changes/Version	日期 Date	領域專家 Domain expert	專業範圍/領域/角色 Area of expertise/Domain/Role	標題/變化 Title/Changes	批准狀態 草案，徵求意見，投票，定稿 Approval status draft, for comments, for voting, final
0.1	07/03/2014	家電 Home Appliances	使用案例 Use Cases	初始草案(摘自 TR 62746-2) Initial Draft (taken from TR 62746-2)	草案 Draft

使用案例之範圍及目標 Scope and objectives of use case

使用案例之範圍及目標 Scope and objectives of use case	
範圍	可透過各種能源裝置以實作向電網提供本地能源管理。此使用案例擷取各種能源。

	Providing local energy management to the power grid can be implemented with various energy devices. This use case captures various energy sources.
目標	此使用案例定義向電網提供本地能源所需之基本資訊交換。 This use case defines the basic information exchange which is required to provide local energy to the grid.
相關業務案例 Related business case(s)	需量反應(DR) 需求面管理(DSM) Demand Response (DR) Demand Side Management (DSM)

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case
簡短說明 Short description
完整說明 Complete description
<p><b>JWG1211 – 由燃料電池輸出的功率控制</b></p> <p>該使用案例說明了當燃料電池用於輸出功率並且能源供應商要求減少輸出功率時，燃料電池和 EMS 控制器的操作。能源供應商監視輸出的功率，並要求本地客戶的 EMS 降低輸出的功率水平。EMS 通過請求燃料電池控制器關閉燃料電池來做出回應。</p> <p><b>JWG1211 – Exported power control from Fuel Cell</b></p> <p>This use case describes the operation of the fuel cell and EMS controllers when the fuel cell is being used to export power and the energy supplier requests a reduction of exported power. The energy supplier monitors the exported power and requests the home customer's EMS to reduce the exported power level. The EMS responds by requesting the fuel cell controller to turn off the fuel cell.</p> <p><b>JWG1212 – 太陽能系統的輸出功率控制</b></p> <p>該使用案例說明了當 PV 系統用於輸出功率並且能源供應商要求減少輸出功率時，PV 和 EMS 控制器的操作。能源供應商監視輸出的功率，並要求本地客戶的 EMS 降低輸出的功率水平。EMS 通過請求 PV 控制器關閉 PV 系統來做出回應。</p> <p><b>JWG1212 – Exported power control from a photovoltaic system</b></p> <p>This use case describes the operation of the PV and EMS controllers when the PV system is being used to export power and the energy supplier requests a reduction of exported power. The energy supplier monitors the exported power and requests the home customer's EMS to reduce the exported power level. The EMS responds by requesting the PV controller to turn off the PV system.</p> <p><b>JWG1213 – 燃料電池和太陽能系統的輸出功率控制</b></p> <p>該使用案例說明了當燃料電池和太陽能系統用於輸出功率且能源供應商要求減少輸出功率時，燃料電池，PV 和 EMS 控制器的操作。能源供應商監視輸出的功率，並要求本地客戶的 EMS 降低輸出的功率水平。EMS 通過請求燃料電池和 PV 控制器關閉 PV 系統來做出回應。</p> <p><b>JWG1213 – Exported power control from fuel cell and photovoltaic systems</b></p> <p>This use case describes the operation of the fuel cell, PV and EMS controllers when fuel cell and PV systems</p>

are being used to export power and the energy supplier requests a reduction of exported power. The energy supplier monitors the exported power and requests the home customer's EMS to reduce the exported power level. The EMS responds by requesting the fuel cell and PV controllers to turn off the PV system.

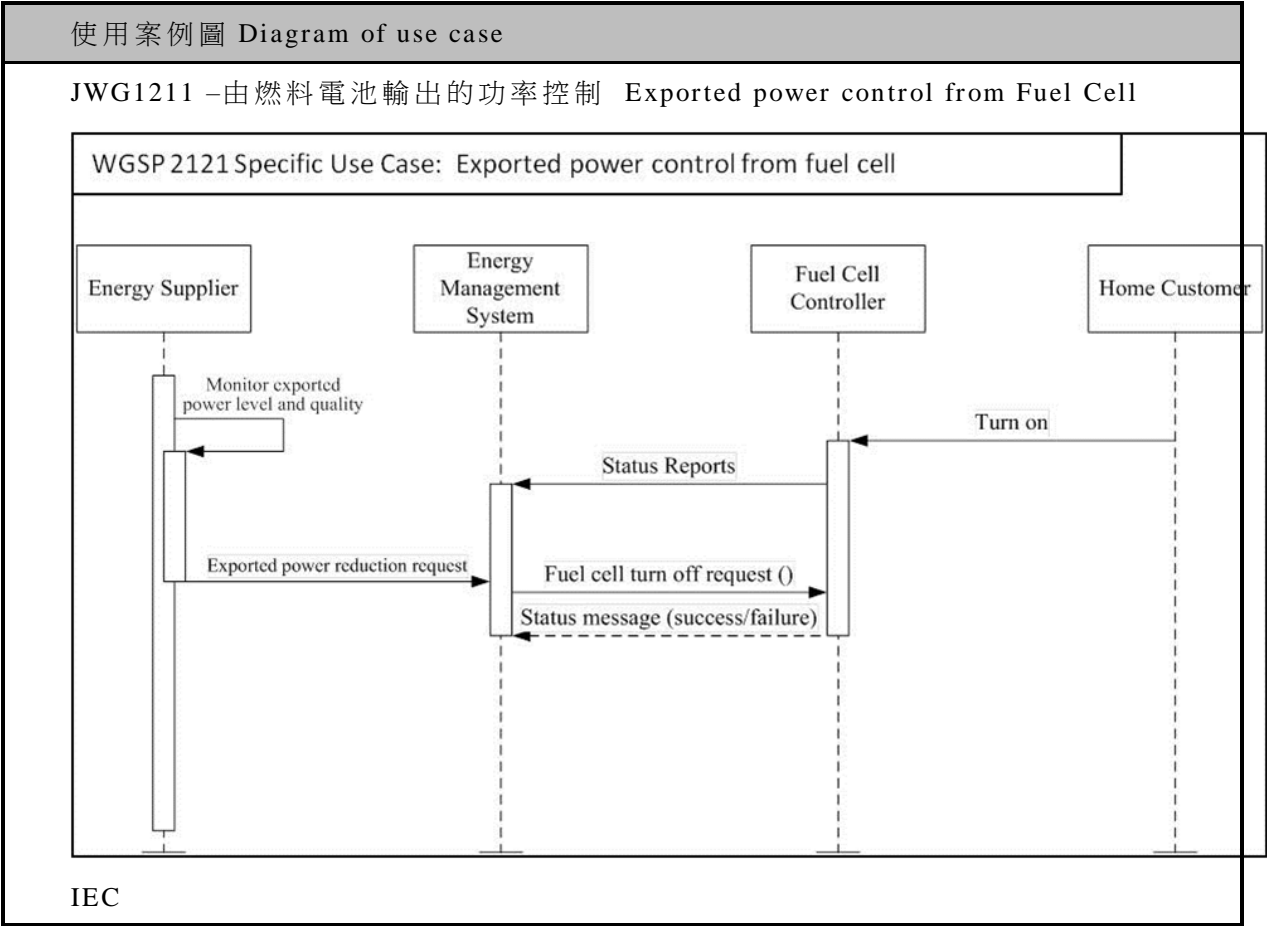
一般說明 General remarks

一般說明 General remarks

A.3.11.2 使用案例圖 Diagrams of use case

圖 A.19示出使用案例圖的使用案例圖。

Figure A.19 shows Diagrams of use case.



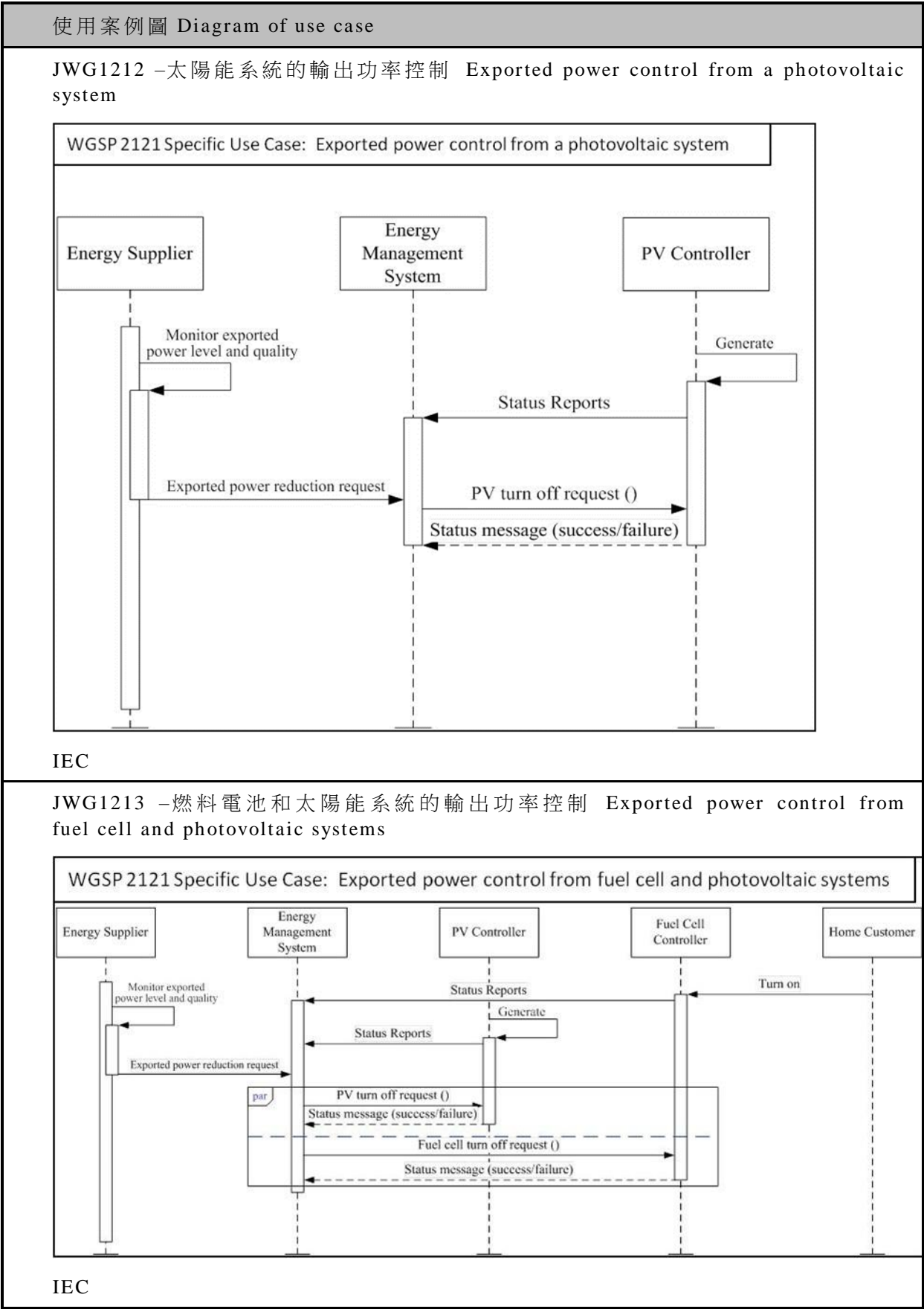


圖 A.19 序列圖

Figure A.19 – Sequence diagram

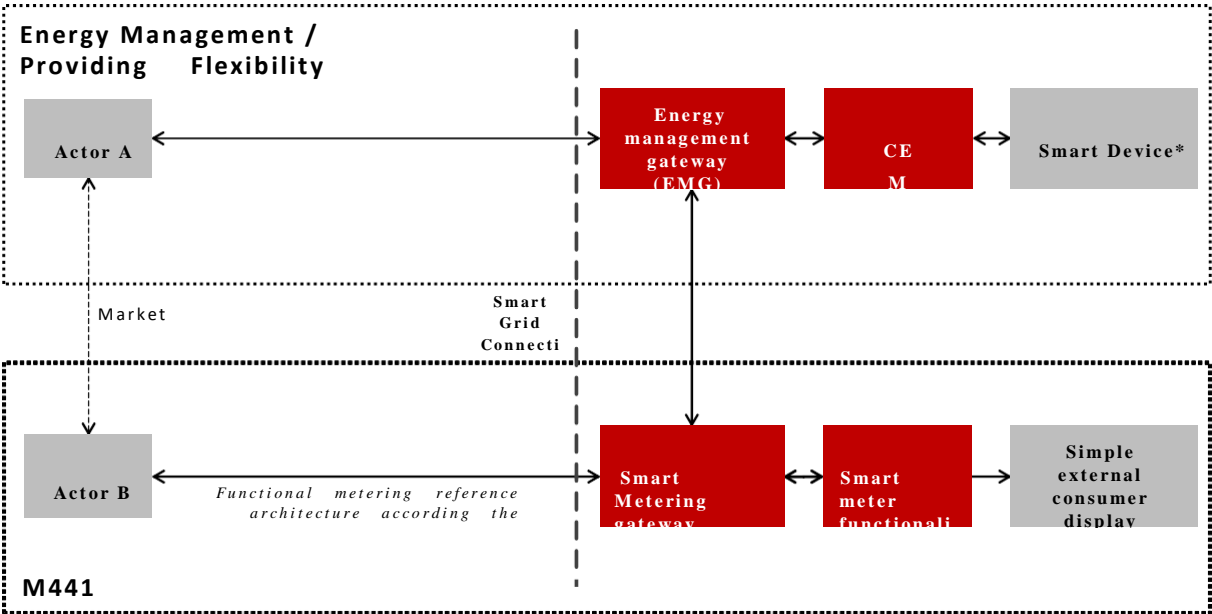


A.3.11.3 技術細節 Technical details

行為者：人員，系統，應用程式，資料庫，電力系統和其他利益相關者。  
Actors: people, systems, applications, databases, the power system, and other stakeholders

備考：為定義該使用案例，已使用圖 A.20 所示的架構作為基礎。

NOTE 1 For the definition of this use case, the architecture shown in Figure A.20 has been used as a basis.



\*例如 HBES 裝置，智慧家電，儲能裝置，發電機，EV 家用充電器，複雜的顯示器  
\* e.g. HBES device, smart appliances, storage, generator, domestic charger for EV, complex display

圖 A.20 SG CG 架構模型[9]  
Figure A.20 – SG CG Architecture Model [9]

備考 2.以上架構中的行為者是功能個體，這意味著它們中的一些可能是同一實體裝置的一部分(例如 CEM 功能可能是智慧裝置的一部分，智慧電錶也可能包含智慧量測閘道器和 CEM 等)。

NOTE 2 The actors in the above architecture are functional entities, which means that some of them may be part of the same physical device (e.g. CEM functionality may be part of a smart device, the smart meter might also encompass the smart metering gateway and CEM, etc.).

備考 3. 請考慮這種高階別使用的範圍並不需要上圖所示的所有行為者。下表顯示參與的行為者。

NOTE 3 Please consider that the scope of this high level use does not require all actors shown on the figure above. The following table shows

involved actors.

行為者 Actors			
分組(社群) Grouping (Community)		群組說明 Group description	
行為者名稱 請參閱 行為者列表 Actor name see Actor list		行為者說明請參閱 行為者列表 Actor description see Actor list	特定於此使用案例的更多資訊 Further information specific to this use case
客戶能源管理者 Customer Energy Manager	內部 Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the "grid/market".</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 整合通訊功能時則稱為客戶能源管理系統。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System.</p>	

智慧恆溫器 Smart Thermostat	外部 External	<p>使用智慧或可程式恆溫器，可依預設排程調整溫度設定、開啟暖氣或空調。智慧或可程式恆溫器可儲存和重複多個每日設定(每天 6 或多個溫度設定)，並可手動複寫而不影響其它每日或每週程式。</p> <p>Using a Smart or programmable thermostat, one can adjust the temperature settings or the times turn on the heating or air- conditioning according to a pre-set schedule. Smart or programmable thermostats can store and repeat multiple daily settings (six or more temperature settings a day) that one can manually override without affecting the rest of the daily or weekly program.</p> <p>可使用平板電腦，智慧手機或電腦透過網路連接。智慧恆溫器可連接到 CEM 裝置，並從 CEM 編寫其設定程式。</p> <p>One can access it via the web using your tablet, smart phone or computer. The Smart Thermostat can be a device which is connected to the CEM and is programmed its settings from the CEM.</p>	
智慧裝置 Smart device	外部 External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc...). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and signals from the grid in an intelligent way.</p> <p>智慧裝置不在 SG-CG 範圍內，因此須將其視為外部行為者。</p> <p>Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor.</p>	
智慧家電(白色家電) Smart appliance (white goods)	外部 External	<p>智慧裝置之一範例為智慧白色家電，其具備扮演回應電網訊息之能力及優化自身向能源供應網路之表現。此訊息可直接從公共事業或第三方能源服務提供商或透過房屋能源管理 (CEM)系統接收，</p> <p>An example of a smart device is a smart white goods appliance which is an appliance that has the capability to act in response to a message from the grid and there by optimize its behaviour</p>	

		<p>towards the energy supply network. The message can be received from a utility or a third party energy service provider directly or via a home energy management (CEM) system,</p> <p>此訊息可為能源成本或有效再生能源的數量資訊或家電需依預設或活躍消費者輸入，接收、解釋並回應的需量反應訊息(延遲負載訊息或其他相關資訊)。智慧家電不保證會回應，但會依自身狀態及使用者設定回應，以確保達到預期效能。</p> <p>The message can be information like the cost of energy or the amount of available renewable energy, or it can be a Demand Respond message (delay load message or other related information) that the appliance must receive, interpret and react upon based on pre-set or active consumer input. The smart appliance is not guaranteed to respond, but will do so based on its status and user settings in order to ensure the expected performance.</p> <p>消費者擁有對家電最終控制權，可以複寫任何特定模式(例：複寫延遲允許立即操作，將延遲限制為不超過數小時數或保持設定之房溫)。</p> <p>The consumer has the ultimate control of the appliance and can override any specific mode (e.g. override a delay to allow immediate operation, limit delays to no more than a certain number of hours, or maintain a set room temperature).</p> <p>任何家電操作設定或模式應易於普通非技術消費者啟動或實作。</p> <p>Any appliance operation settings or modes shall be easy for an average, non-technical consumer to activate or implement.</p>	
行為者 A Actor A	外部 External	<p>外部行為者(智慧電網市場角色)透過能源管理通道與家庭或家庭自動化網路之系統功能及組件進行互動。此市場角色諸如能源提供商、能源服務提供商及聚合商等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the energy management communication channel. Examples of such market roles are the energy provider, the energy services Provider, the aggregator, etc.</p>	
行為者 B Actor B	外部 External	<p>外部行為者(智慧電網市場角色)透過量測通訊通道與家庭或家庭自動化網路之系統功能及組件進行互動。該行為者負責收集量測資料。此市場角色諸如 DSO、量測公司等。</p> <p>External actor (Smart Grid Market Role)</p>	

		interacting with the system functions and components in the home or home automation network through the metering communication channel. This actor is responsible for collecting metering data. Examples of such market roles are the DSO, metering company, etc.	
用戶 User	外部 External	已購買智慧裝置之終端客戶。終端客戶負責配置及設定智慧裝置之運轉模式。  The end customer who has acquired a smart device. The end customer is responsible for configuring and setting operation mode of the smart device.	

觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件 Use case conditions			
行為者/系統/資訊/契約 Actor/System/Information/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption

參考文獻

References

參考文獻 References						
No.	參考型態 References type	參考 Reference	狀態 Status	對使用案例之影響 Impact on use case	發起人/組織 Originator/Organisation	連結 Link
1	指導方針 Guideline	基本定義和通用程序 Basic definitions and common procedures	最後 Final	術語和定義 Terms and definitions	SG-CG Sustainable Processes WG	<a href="ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf">ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SustainableProcesses.pdf</a>
2	技術報告 Technical Report	使用者經歷及序列圖 User Story and Sequence diagrams	草案 Draft	重大的對情境的影響 Major impact on Scenario	IEC TC57/CLC TC205/CLC /TC59x	-

3	標準 Standard	使用案例範本 Use Case Template	草案 Draft (FDIS)	範本說明 Template description	IEC TC8	-
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有關分類/映射使用案例的更多資訊

Further information on the use case for classification/mapping

資訊分類 Classification information
與其他使用案例關聯 Relation to other use cases
深度 Level of depth
高階使用案例 High level use case
優先序 Prioritisation
一般、區域或國家關係 Generic, regional or national relation
<p>高階使用案例可用於任何智慧裝置之類型。經區域同意並確認其正確性，該高級使用案例成為通用使用案例。</p> <p>High level use case which can be applied to any kind of smart device. Once the regions agreed and confirmed correctness, that high level use case becomes a generic use case.</p>
觀點 Viewpoint
<p>此高階使用案例具有使用者視角及 SD 與全體客戶能源管理系統之互動。其不考慮彈性提供或特定於電網實作之市場機制。</p> <p>This high level use case has the user perspective and the interaction of the SD with an overall customer energy management system. it does not consider market mechanisms for flexibility offering or power grid specific implementations.</p>
分類的其他關鍵字 Further keywords for classification
一般高階使用案例

Generic high level use case

**A.3.11.4 使用案例的逐步分析 Step by step analysis of use case**

步驟-情境名稱

Steps – Scenario name

情境條件 Scenario conditions					
No.	情境名稱 Scenario name	主行為者 Primary actor	觸發事件 Triggering event	前提條件 Pre-condition	後置條件 Post-condition

步驟-情境 Steps – Scenarios

**A.3.11.5 資訊交換 Information exchanged**

資訊交換 Information exchanged		
訊息名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements for information data
狀態資訊及事件 Status Information and Events	指示系統或智慧裝置行為之事件可能會交換。一般而言，系統相關資訊應被交換。 Events that indicate system or smart device behaviour might be exchanged. In general, system relevant information shall be exchanged.	此等資訊很敏感，任何修改皆可能導致客戶特定及機密資訊。因此，通訊資料必須被保護避免濫用及受外部影響。 Such information is sensitive in a way that any modification might customer specific and confidential information. Therefore, the communication data must be protected from misuse and external influences.
簡單命令 Simple Commands	開/關/開始/停止/暫停/繼續/中止/模糊定時器 空調模式： 冷卻、加熱、模式 1-n 風：自動、高、低等。 其他設定： On/Off/Start/Stop/Pause/Resume/Abort/Dim Timer Air conditioner mode:	此等資訊很敏感，任何修改皆可能開關 SD。因此，通訊資料必須被保護避免濫用及受外部影響。 Such information is sensitive in a way that any modification might turn on or off a SD. Therefore, the communication data must be protected from misuse and external influences.

	cooling down, heating up, mode 1-n Wind: auto, high, low, etc. Other settings:	
能源剖繪 Energy Profile	能源剖繪定義針對適用於智慧裝置特定運轉模式之特徵。 An energy profile defines characteristics towards s specific operational mode which is applicable to the smart device. 此等資訊可用於功耗，亦可用於發電。 Such information can be used for power consumption but also power generation.	能源剖繪不包含敏感資料，以至於在特定運轉模式下給予已使用能源指示。 The energy profile does not contain sensitive data in a way that it gives indication on the used Energy for a specific operational mode.

**A.3.11.6 要求事項(選項) Requirements (optional)****A.3.11.7 常用術語和定義 Common terms and definitions**

常用術語和定義 Common terms and definitions	
術語 Term	定義 Definition

**A.3.11.8 自定義訊息(選項) Custom information (optional)**

自定義訊息(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Refers to Section

**A.3.12 高階使用案例(JWG2000)需量供應調整 High level use case (JWG2000)**  
**Demand Supply Adjustment**
**A.3.12.1 使用案例說明 Description of the use case**

使用案例名稱 Name of use case

使用案例識別 Use case identification



ID	區域/域/區 Area/Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG2000	區域：能源系統 域：客戶端 區：運轉，變電所，場域，過程 Area: Energy System Domain: Customer Premises Zones: Operation, Station, Field, Process	供需雙方合作的供需調整 Demand-supply Adjustment of Cooperation between Supplier and Customer

## 版本管理

## Version management

版本管理 Version management			
版本號碼 Version No.	日期 Date	變化 Changes	批准狀態 Approval status
0.1	23/02/2014	初始創作 Initial Creation	草案 Draft
0.2	06/03/2014	對樣式的小修改 Minor Modifications towards style	草案 Draft
0.3	07/03/2014	添加了使用案例 ID Added Use Case ID	草案 Draft

## 使用案例的範圍及目標 Scope and objectives of use case

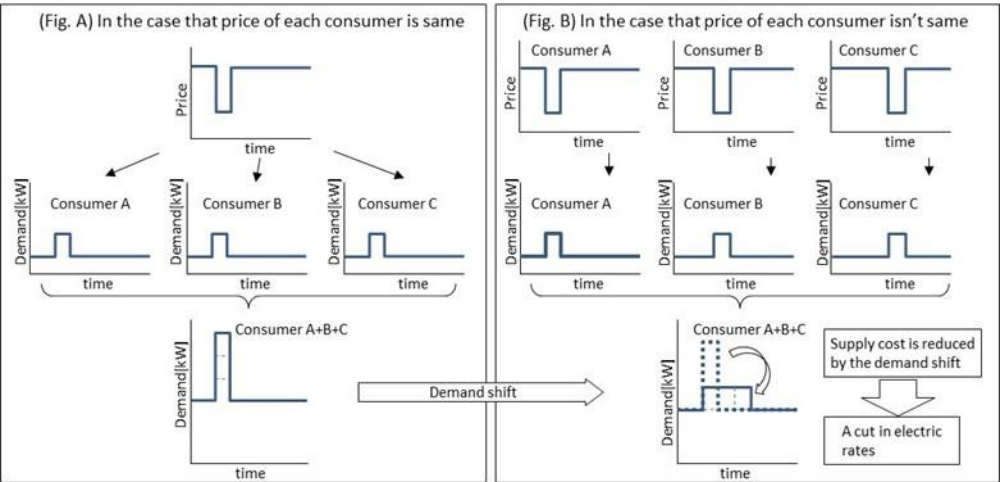
使用案例的範圍及目標 Scope and objectives of use case	
範圍	<p>此使用案例之範圍為 CEM 與上游行為者間之通訊。CEM、消費者及智慧裝置間之通訊基本上不屬於本標準之範圍，但為清楚起見，將包含於使用案例說明中。智慧裝置亦涵蓋智慧家電，發電機和儲能裝置。</p> <p>The scope of this use case is the communication between the CEM and upstream actors. The communication between CEM, the consumer and smart devices is officially not in this scope of this report, but will be included in the use case description for the sake of clarity. Smart devices cover also smart appliances, generators and storage.</p> <p>當消費者具有價格相依能源資費及/或時間相依資費分佈時，價格依需量反應透過消費者建立激勵負載管理被啟用或 CEM 價格變化之回應(RTP、CPP、ToU)。</p>

使用案例的範圍及目標 Scope and objectives of use case

When the consumer has a price dependent energy tariff and/or a time dependent distribution tariff, price based demand response is enabled by creating an incentive for load management by consumers or a CEM in response to price changes (RTP, CPP, ToU).

即，係依價格激勵，消費者在價格高時抑制能量耗用，並且在價格便宜時也增加耗用。但是，如果很多客戶端耗用相同的能源，需求將被抑制得比必要的更多，而增加的幅度將超過預期(見圖 A)。為避免此類問題，足以為各客戶端分配不同的能源價格。如果客戶端之間的價格不同，則可以分散能源耗用並分配需求(見圖 B)。如果我們根據用戶的瞭解調整價格，則可降低供應成本以最小的供應成本接近最佳需求曲線。降低的供應成本可透過降低電費來償還給客戶端。

That is, consumer suppresses energy consumption when a price is high and also increase consumption when a price is cheap on the basis of price incentive. However, if many consumers took same consumption of energy, demand will be suppressed more than necessary and increase more than expected (See Figure A). In order to avoid such problems, it is sufficient to assign a different energy price for each consumer. If prices among consumers were different, it is possible to disperse energy consumption and distribute demands (See Figure B). A supply cost is reduced if we adjust the informed price to customers for getting closer to the optimal demand curve with the minimum supply cost. Reduced supply cost can be repaid to consumers through a cut in electric rates. 2

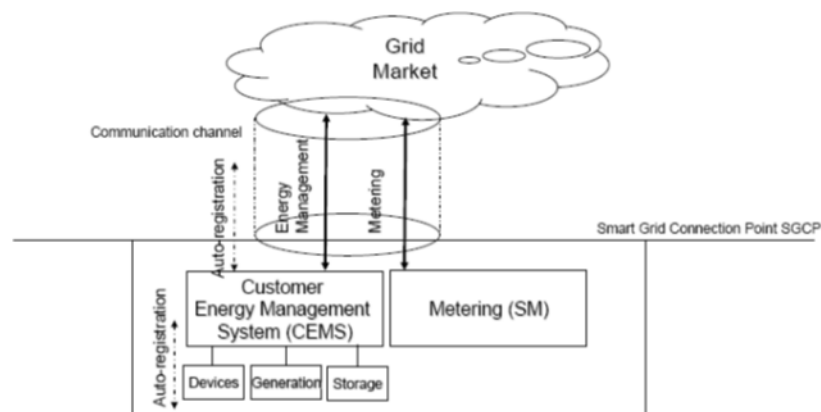


IEC

下圖顯示環境中之 SG CP。

The diagram below shows the SG CP in its environment.

## 使用案例的範圍及目標 Scope and objectives of use case



IEC

## 使用案例的範圍及目標

## Scope and objectives of use case

## 目標

該使用案例的目的是在外部行為者和前提之間交換資訊，以便：

The objective of this use case is to exchange information between external actors and the premise in order to:

使消費者或其客戶能源管理系統對能源價格(的變化)做出反應，從而支持消費者優化能耗以使用更便宜的能源(取決於個人喜好)

Enable consumers or their Customer Energy Management System to react on (changes in) energy prices, thus supporting consumers to optimize their consumption to use cheaper energy (depending on personal preferences)

使消費者能夠通過接收適當的價格警報來降低電價，從而避免抑製過多的能源使用和能耗集中

Enable consumers to reduce the electricity tariff by receiving an appropriate price alert to avoid suppression of excessive energy use and the concentration of energy consumption 3

使外部行為者能夠檢索智慧裝置中的狀態

Enable external actors to retrieve the state of in smart devices

## 相關業務案例 Related business case(s)

此使用案例係針對需求的需量反應服務的通用使用案例之一。某些公用事業中使用的建築物，BEMS (建築能源管理系統)用戶群代表/聚合商，日本國內項目。

This use case is one of the generic use cases of the demand response services for the buildings using in some utilities, BEMS(Building Energy Management System) aggregators, domestic projects in Japan.

(這用情況下是獨立的由該國家或地區市場設計的。它應該被同意在該 62746-2 使用情況和要求的討論。)

(This use case is independent from the national or regional market design. It should be agreed on the 62746-2 use case & requirement discussion.)

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case
<p>簡短說明 Short description</p> <p>此使用案例說明了有關價格的資訊如何從上游行為者發送到 CEM，以及如何將有關能耗或發電以及智慧裝置狀態的資訊發送回上游行為者。</p> <p>This use case describes how information regarding price is sent from a upstream actor to CEM and how information regarding energy consumption or generation as well as smart device statuses is sent back to a upstream actor.</p>
<p>完整說明 Complete description</p> <p>此使用案例旨在通過一個以上的消費者與能源供應商之間的合作來降低總能源成本。每個消費者都參考能源供應商提供的有關價格的初始資訊(例如每天的每小時價格)對能耗進行配置。能源供應商匯總每個消費者的能耗狀況，並參考匯總後的能源供應商狀況與目標狀況之間的差異，再次確定價格。每個消費者都從能源供應商處獲得更新的價格資訊，並查看功率剖繪。通過執行幾次上述交換資訊，聚合的剖繪更接近於能源供應商的目標剖繪。因此，能源供應商可以降低總供應成本。每個消費者的電費都會因總供電成本的減少而打折。</p> <p>This use case is intended to achieve lower total energy cost by means of cooperation between more than one consumer and an energy supplier. Every consumer makes a profile of energy consumption with reference to initial information on prices (e.g. Hourly prices in a day) from the energy supplier. The energy supplier aggregates a profile of energy consumption from each consumer and fixes the prices again with reference to a difference between an aggregated profile and a target profile of the energy supplier. Every consumer receives renewed price information from the energy supplier and reviews a power profile. By performing several times exchanging the information mentioned above, an aggregated profile gets closer to a target profile of the energy supplier. Thus the energy supplier can reduce total supply cost. An electricity charge of every consumer is discounted by a reduction of the total supply cost.</p> <p>程序</p> <p>(1)的能源供應商確定價格後確定一個供應和需求情況和市場價格。</p> <p>(2)CEM 接收價格資訊由所述能量供應商。</p> <p>(3)智慧裝置獲得價格資訊為規劃一個電力剖繪。</p> <p>(4)的能量供應商接收一個功率分佈由各客戶端。</p> <p>(5)的能源供應商審查的價格透過引用到的接收電力剖繪。</p> <p>(6)轉到回至(1)。</p> <p>(7)是進行多次由(1)到(6)與各消費者接收最終價格資訊由所述供應商。</p> <p>Procedure</p> <ol style="list-style-type: none"> <li>1) An energy supplier determines prices after confirming a supply &amp; demand situation and market prices.</li> <li>2) A CEM receives price information from the energy supplier.</li> <li>3) Smart devices receive price information for planning a power profile.</li> <li>4) The energy supplier receives a power profile from each consumer.</li> <li>5) The energy supplier reviews the prices by reference to the received power profiles.</li> <li>6) Go back to 1).</li> <li>7) Is performed multiple times from 1) to 6) and each consumer receives final price information from the supplier.</li> </ol>

此外，該使用案例包括兩個不同的主要使用案例：

(1)WGSP 2111：訊息關於電力耗用或產生

(2)WGSP 2112：價格及/或環境訊息

In addition, this use case comprises two different primary use cases:

1) WGSP 2111: Information regarding power consumption or generation

2) WGSP 2112: Price and/or environmental information

一般說明 General remarks

一般說明 General remarks

與其他使用案例的差異。

Difference with other use cases.

#### A.3.12.2 使用案例圖 Diagram of use case

圖 A.21示出使用案例圖的使用案例圖。

Figure A.21 shows a Diagram of use case.

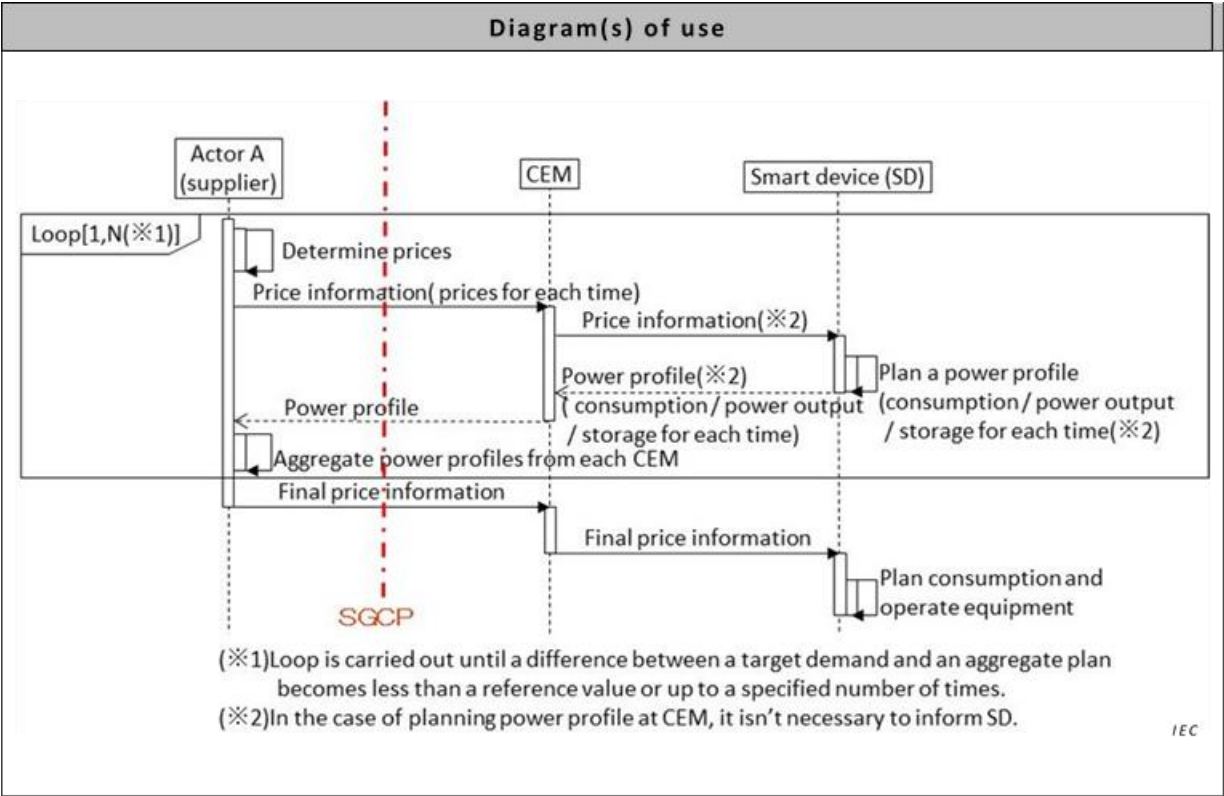


Figure A.21 Sequence diagram

A.3.12.3 技術細節 Technical details

行為者 Actors

行為者 Actors			
分組 Grouping		群組說明 Group Description	
行為者名稱 請參閱行為者列表 Actor Name see Actor List	行為者類型 請參閱行為者列表 Actor Type see Actor List	行為者說明請參閱行為者列表 Actor Description see Actor List	特定於此使用案例的更多資訊 Further information specific to this use case

客戶能源管理 者(CEM)  Customer Energy Manager (CEM)	內部  Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the " grid/market " .</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 整合通訊功能時則稱為客戶能源管理系統。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System.</p>	
智慧裝置  智慧家電(白色家電)  Smart device  Smart appliance (white goods)	外部  External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP (諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>A smart device may be an appliance, generator or stor-age device (Local storage devices include direct and functional electricity storages such as electrochemical bat-teries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc.). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and signals from the grid in an intelligent way.</p>	

通過 SG CP 的行為者 A Actor A via SG CP	外部 External	外部行為者(智慧電網市場角色)透過能源管理通道與家庭/建築物之系統功能及組件進行互動。此市場角色諸如能源提供商、能源服務提供商及聚合商等。  External actor (Smart Grid Market Role) is interacting with the system functions and components in the home/building through the energy management communication channel. Examples of such market roles are the Energy Provider, the Energy Services Provider, the aggregator, etc....	
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觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件 Use case conditions			
行為者/系統/資訊/契約 Actor/System/Information/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption
行為者 A 消費者 Actor A Consumer		事先共同協議(訊息內容、費用結算方法)  A mutual agreement in advance (Information content, fee settlement method)	
行為者 A Actor A	在從供應商向消費者發出價格預警之前  Before price alert to a consumer from a supplier	事先，行為者 A 藉由考慮供需狀況，能耗計畫，其他供應商及市場詢價以決定價格。  In advance, Actor A determines prices by taking into consideration supply and demand situation, plans of energy consumption, an asking price from other suppliers and market.	
		為正確計費彈性地需求/發電，智慧電錶及 CEM 需要時間同步。  In order to correctly bill demand/generation flexibility, the smart meter and CEM need to be time synchronized.	

參考文獻

References



參考文獻						
References						
No.	參考型態 References type	參考 Reference	狀態 Status	對使用案例之影響 Impact on use case	發起人/組織 Originator/Organisation	連結 Link
	WGSP2111 的範例使用案例 Example use cases to WGSP2111				SG-CG 可持續流程工作組 SG-CG Sustainable Processes WG	
	WGSP2112 的範例使用案例 Example use cases to WGSP2112				SG-CG 可持續流程工作組 SG-CG Sustainable Processes WG	

有關分類/映射使用案例的更多資訊 Further information on the use case for classification/mapping

資訊分類
Classification information
與其他使用案例關聯
Relation to other use cases
分銷管理系統 Distribution Management System
深度
Level of depth
高階使用案例 High Level use case
優先序
Prioritisation
高 High
一般、區域或國家關係
Generic, regional or national relation
通用(此使用案例獨立於國家或地區市場設計。應在 62746-2 使用案例和需求討論中達成共識。) Generic (This use case is independent from the national or regional market design. It should be agreed on

the 62746-2 use case & requirement discussion.)
觀點 Viewpoint
技術 Technical
分類的其他關鍵字 Further keywords for classification
合作，需量反應，智慧電網 Cooperation, Demand response, Smart Grid

#### A.3.12.4 使用案例的逐步分析 Step by step analysis of use case

##### 情境概述 Overview of scenarios

情境條件 Scenario conditions					
No.	情境名稱 Scenario name	主行為者 Primary actor	觸發事件 Triggering event	前提條件 Pre-condition	後置條件 Post-condition
1	確定初始價格 Determine initial prices			行為者 A 在向 CEM 發送價格資訊之前有一個排程來指示它。 Actor A has a schedule instructing it before sending price information to the CEM.	行為者 A 儲存確定的價格。 Actor A stores the determined prices.
WGSP 2112	價格資訊 Price information	行為者 A Actor A	價格資訊可在 Actor A 中獲得。 Price information is available in Actor A.	建立所有用戶之間的通訊連接 Communication connection between all consumers is established	價格資訊由智慧裝置接收 Price information is received by smart devices
WGSP 2111	有關能耗/發電的資訊 Information regarding energy consumption / generation	智慧裝置 Smart device	CEM 中提供了功率剖繪(每次的功耗/功率輸出/儲存)。 A power profile (consumption/power output/storage for each time) is available in the	通訊 建立所有行為者之間的聯繫 智慧裝置有一個排程，指示它何時將電力剖繪發送到 CEM。 CEM 有一個排程，指示它何時將電力剖繪發送	行為者 A 收到電力剖繪 A power profile is received by Actor A

			CEM.	到外部行為者。 Communication connection between all actors is established  The smart device has a schedule instructing it when to send a power profile to the CEM.  The CEM has a schedule instructing it when to send a power profile to the external actor.	
2	匯總功率剖繪並查看價格  Aggregate power profiles and review prices	CEM	電力剖繪在 Actor A 中可用。  Power profiles are available in Actor A.	行為者 A 由各 CEM 接收電力剖繪。  Actor A receives a power profile from each CEM.	行為者 A 儲存評論的價格。  Actor A stores the reviewed prices.
3	從 1 循環到 2  Loop from No.1 to No.24				聚合的設定檔接近目標設定檔。  An aggregated profile gets close to a target profile.
WGSP 2112	最終價格資訊  Final Price information	行為者 A  Actor A	聚合的剖繪接近目標剖繪。  An aggregated profile gets close to a target profile.	建立所有用戶之間的通訊連接  Communication connection between all consumers is established	CEM 或智慧裝置收到最終價格資訊  Final price information is received by CEM or smart devices

## 步驟-情境 Steps – Scenarios

3 與其他使用案例的差異。 Difference with other use cases.

情境 Scenario								
情境名稱 Scenario name:		1. 價格資訊 No.1 Price information						
步驟編號 Step No.	事件 Event	流程/活動的名稱 Name of	流程/活動說明 Description of	服務 Service	資訊產生者(行為者)Information	資訊接收者(行為者)Information	資訊交換 Information	要求, RID Requirements,

		process/activity	Process/Activity		Producer (Actor)	Receiver (Actor)	Exchanged	R-ID
1	CEM 接收初始價格資訊。 CEM receives initial price information.		行為者 A 決定價格的考慮到考慮供應和需求情況，能源計畫能耗，問其他價格供應商和市場。 Actor A determines prices by taking into consideration supply and demand situation, plans of energy consumption, an asking price from other suppliers and market. 行為者 A 發送價格資訊發送給 CEM。 Actor A sends price information to CEM.		行為者 A Actor A	CEM	價格資訊 (價格資訊於週期內具有每次之價格，以便規畫其能耗) Price information (The price information has prices for each time in a period in order to make a plan of energy consumption.)	
3	智慧裝置收到初始價		CEM 發送價格資訊向		CEM	智慧裝置 Smart	價格資訊 Price	

	格資訊。 Smart device receives initial price information. (在 CEM 進行規劃的情況下，無需發送到智慧裝置) (In case of planning at CEM, it isn't necessary to send to smart devices)		智慧裝置。 CEM sends price information to smart devices.			devices	informati on	
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情境								
Scenario								
情境名稱		2.有關能耗/發電的訊息						
Scenario name:		No. 2 Information regarding energy consumption/generation						
步驟編號 Step No.	事件 Event	流程/活動的名稱 Name of process/activity	流程/活動說明 Description of Process/Activity	服務 Service	資訊產生者(行為者)Informa- tion Producer (Actor)	資訊接收者(行為者)Infor ma- tion Receiver (Actor)	資訊交換 Informati on Exchang ed	要求，RID Requirements, R-ID
1	CEM 或 SD 建立電力剖繪。 CEM or SD creates a power profile.		CEM 或 SD 透過使用接收到的價格資訊建立電力剖繪。 CEM or SD creates a power		CEM /SD			

			profile by using the received price information.					
2	CEM 接收電力剖繪。 (如果計畫在 SD 上配置電力剖繪)CEM receives a power profile. (In case of planning a power profile at SD)		SD 將電力剖繪發送到 CEM。 SD sends a power profile to CEM.		SD	CEM	電力剖繪 (電力剖繪具有耗用/電力輸出/儲存為一段時間內的每次。) Power profile (The power profile has consumption/power output/storage for each time in a period.)	
3	角色 A 接收電力剖繪。 Actor A receives power profiles.		CEM 匯總來自各 SD 的電力剖繪，並將用戶的電力剖繪發送給 Actor A。 CEM aggregates a power profile from each SD and sends a power profile of a consumer to Actor		CEM	行為者 A Actor A	電力剖繪 Power profiles	

			A.					
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情境 Scenario								
情境名稱 Scenario name:		3. 匯總剖繪及查看價格 No. 3 Aggregate profiles and review prices						
步驟編號 Step No.	事件 Event	流程/活動的名稱 Name of process/activity	流程/活動說明 Description of Process/Activity	服務 Service	資訊產生者(行為者)Information Producer (Actor)	資訊接收者(行為者)Information Receiver (Actor)	資訊交換 Information Exchanged	要求, RID Requirements, R-ID
1	行為者 A 匯總功率剖繪並查看價格。 Actor A aggregates power profiles and reviews prices.		行為者 A 匯總每個消費者的功率剖繪。 Actor A aggregates a power profile from each consumer.  行為者 A 再次參考行為者 A 的匯總剖繪和目標剖繪之間的差異來定價。 Actor A fixes prices again with reference to a difference between an aggregated profile and a target profile of Actor A.  行為者 A 評論價格。 Actor A reviews prices.					

情境 Scenario	
情境名稱	步驟 4 循環



Scenario name:		No. 4 Loop 5						
步驟編號 Step No.	事件 Event	流程/活動的名稱 Name of process/activity	流程/活動說明 Description of Process/Activity	服務 Service	資訊產生者(行為者)Information Producer (Actor)	資訊接收者(行為者)Information Receiver (Actor)	資訊交換 Information Exchanged	要求，RID Requirements, R-ID
1	行為者 A 和 CEM 交換資訊 Actor A and CEM exchange information		行為者 A 和 CEM 多次交換價格資訊和功率剖繪，直到聚合的剖繪更接近行為者 A 的目標剖繪。  Actor A and CEM exchange price information and a power profile several times until an aggregated profile gets closer to a target profile of Actor A.				價格資訊電力剖繪 Price information Power profile	

<sup>4</sup> 與其他使用案例的差異。 Difference with other use cases.

情境 Scenario								
情境名稱 Scenario name:		步驟 5 最終價格資訊 No.5 Final price information						
步驟編號 Step No.	事件 Event	流程/活動的名稱 Name of process/activity	流程/活動說明 Description of Process/Activity	服務 Service	資訊產生者(行為者)Information Producer (Actor)	資訊接收者(行為者)Information Receiver (Actor)	資訊交換 Information Exchanged	要求，RID Requirements, R-ID
1	CEM 收到最終價格		行為者 A 將價格資訊發		行為者 A	CEM	最終價格資訊	

	資訊 CEM receives final price information		送給 CEM。 Actor A sends price information to CEM.		Actor A		Final price information	
2	智慧裝置會收到最終價格資訊  (在 CEM 計畫電力剖繪的情況下，無需發送到智慧裝置)  Smart device receives final price information  (In the case of planning a power profile at CEM, it isn't necessary to send to smart devices)		CEM 將價格資訊發送到智慧裝置。  CEM sends price information to smart devices.		CEM	智慧裝置 Smart device	最終價格資訊 Final price information	

## A.3.12.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements for information data
價格資訊(M1-1) Price information (M1-1)	價格為各時間在一個週期(例如每小時的價格在一個日)6 Prices for each time in a period (e.g. Hourly prices in a day) 6	
功率剖繪(M1-2) Power profile (M1-2)	一段時間內的每次耗用/電力輸出/儲存7 Consumption/power output/storage for each time in a period 7	

**A.3.12.6 要求事項(選項) Requirements (optional)**

要求事項(選項) Requirements (optional)	
要求類別 Categories for Requirements	分類說明 Category Description
要求編號 Requirement ID	要求說明 Requirement Description

**A.3.12.7 常用術語和定義 Common terms and definitions**

常用術語和定義 Common terms and definitions	
術語 Term	定義 Definition

5 與其他使用案例的區別。Difference with other Use Cases.

6 與其他使用案例的區別。Difference with other Use Cases.

**A.3.12.8 自定義訊息(選項) Custom information (optional)**

自定義訊息(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Refers to Section

**A.3.13 高階使用案例 (JWG2001) High level use case (JWG2001) 級聯 CEM**  
**Cascaded CEM**
**A.3.13.1 使用案例說明 Description of the use case**

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	區域/域/區 Area/Domain(s)/ Zone(s)	使用案例名稱 Name of use case
JWG2001	智慧電網/客戶 Smart Grid/Customer	“建築能源管理(模型 2)” 節能，個別建築物的供需控制 “ Building Energy Management (Model 2)” Energy saving, Demand-supply control for individual buildings

## 版本管理

## Version management

版本管理 Version management			
版本號碼 Version No.	日期 Date	變化 Changes	批准狀態 Approval status
0.1	24/02/2014	初始草案 Initial Draft	草案 Draft
0.2	07/03/2014	添加了使用案例 ID Added Use Case ID	草案 Draft

## 使用案例的範圍及目標 Scope and objectives of use case

使用案例的範圍及目標 Scope and objectives of use case	
範圍	<p>此使用案例的範圍是 Actor A 與 CEM 之間的通訊。CEM 具有優先序資訊，作為管理設施的使用者定義的分類資訊。</p> <p>The scope of this use case is the communication between Actor A and CEM. The CEM has the priority information as the triage information defined by the user who manages the facilities.</p> <p>在這種情況下，SG CP 位於角色A 和 CEM 之間。</p> <p>In this case, SG CP is located between the Actor A and the CEM.</p>
目標	<p>該使用案例的目標是對個別建築物進行節能，供需控制。</p> <p>對於供應商要求的減少需求，服務提供商(行為者 A)可節省能源，並根據以下內容調整能源使用計畫。</p> <ul style="list-style-type: none"> <li>–用途的個人智慧裝置</li> <li>–物理位置的個人智慧裝置</li> <li>–分配給各個配電線路的重要程度</li> </ul>

	<p>—分配給各裝置的優先事項</p> <ul style="list-style-type: none"> <li>— “能耗/發電排程” 和</li> <li>— “趨勢的能耗/能耗的結果”</li> </ul> <p>The objective of this use case is the Energy saving, Demand-supply control for individual buildings.</p> <p>For the demand reduction requested by the Supplier, the Service Provider (Actor A) saves energy, and adjusts the energy usage plan based on these, below.</p> <ul style="list-style-type: none"> <li>— uses of individual smart devices</li> <li>— physical positions of individual smart devices</li> <li>— degrees of importance allocated to individual distribution line</li> <li>— priorities allocated to individual equipment</li> <li>— “ consumption/generation schedules “ and</li> <li>— “ trends of consumption/consumption result”</li> </ul>
<p>相關業務案例</p> <p>Related business case(s)</p>	<p>這種使用情況下是一個的通用使用情況下，的的需量反應服務的建築物使用的一些公用事業，BEMS(樓宇能源管理系統)用戶群代表/聚合商，國內項目在日本。</p> <p>(這用情況下是獨立的從該國家或地區市場設計的。它應該被同意在該 62746-2 use 情況和要求的討論。)</p> <p>This use case is one of the generic use cases of the demand response services for the buildings using in some utilities, BEMS(Building Energy Management System) aggregators, domestic projects in Japan.</p> <p>(This use case is independent from the national or regional market design. It should be agreed on the 62746-2use case &amp; requirement discussion.)</p>

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case
簡短說明 Short description
<p>在預先在建築物 EMS(CEM)發送估計量的削減，在優先序的智慧裝置和所述區域資訊的所述建築物到的行為者 A.所以，該行為者可執行的最佳抑制控制。</p> <p>In advance, the building EMS (CEM) sends the estimated amount of curtailment, the priorities of smart devices and the area information of the building to the Actor A. So, the Actor A can perform the optimum suppression control.</p> <p>行為者 A 計算各個建築物的用電量和發電量。然後，Actor A 執行能量抑制控制以有效執行負載減少。行為者 A 係依上述能量抑制控制來調整能量使用計畫。</p> <p>The Actor A calculates the consumption and generation of the electricity in individual buildings. Then Actor A executes energy suppression control to perform load reduction effectively. The Actor A adjusts the energy usage plan based on above energy suppression control.</p>
完整說明 Complete description

行為者 A 從 CEM 接收重要程度，優先序和能耗/發電排程的訊息。

行為者 A 計算各個建築物的用電量和發電量。

當需要抑制功率控制時，角色A 執行能量抑制控制以有效地執行負載減少。行為者 A 係依上述能量抑制控制來調整能量使用計畫。

- (1) 的使用者將度的重要性，優先序和耗用/發電計畫到終端的該 CM。
- (2) CEM 將此等註冊到 Actor A。
- (3) 該行為者 A 建立電力剖繪係依上用途的個人智慧裝置，物理位置的個人智慧裝置，耗用/產生排程及耗用之趨勢/耗用結果。各電力剖繪包括一個操作計畫的智慧裝置和激勵。

行為者 A 向 CEM 顯示帶有激勵訊息的功率設定檔。

在緊急情況下，執行者 A 在上述過程中係依“重要程度”和“優先序”建立用於分類管理的電力剖繪。

- (4) 將使用者選擇的電力剖繪係依上的操作計畫的智慧裝置和所述的激勵。
- (5) 行為者 A 發送減少耗用之請求至係依電力剖繪的 CEM。
- (6) 然後 CEM 調整的電力剖繪係依上抑制所述請求的減少耗用。

The Actor A received information of the degrees of importance, priorities and consumption/generation schedules from CEM.

The Actor A calculates the consumption and generation of the electricity in individual buildings.

When suppression power control is needed, the Actor A executes energy suppression control to perform load reduction effectively. The Actor A adjusts the energy usage plan based on above energy suppression control.

- 1) The user puts degrees of importance, priorities and consumption/generation schedules into terminal of the CM.
- 2) (The CEM registers these to Actor A.
- 3) The Actor A creates power profile based on uses of individual smart devices, physical positions of individual smart devices, consumption/generation schedules and trends of consumption/consumption result. Each power profile includes an operation plan of smart devices and incentive.

And the Actor A displays power profile with incentive information to the CEM.

In case of the emergency, the Actor A creates power profile for the triage control based on “degrees of importance” and “priorities” on the above process.

- 4) The user selects the power profile based on the operation plan of smart devices and the incentive.
- 5) (The Actor A sends the request of reduce consumption to the CEM based on the power profile.
- 6) Then the CEM adjusts the power profile based on suppression the request of reduce consumption.

#### 一般說明 General remarks

#### 一般說明 General remarks

#### A.3.13.2 使用案例圖 Diagram of use case

圖 A.22 顯示了使用案例圖。Figure A.22 shows a Diagram of use case.

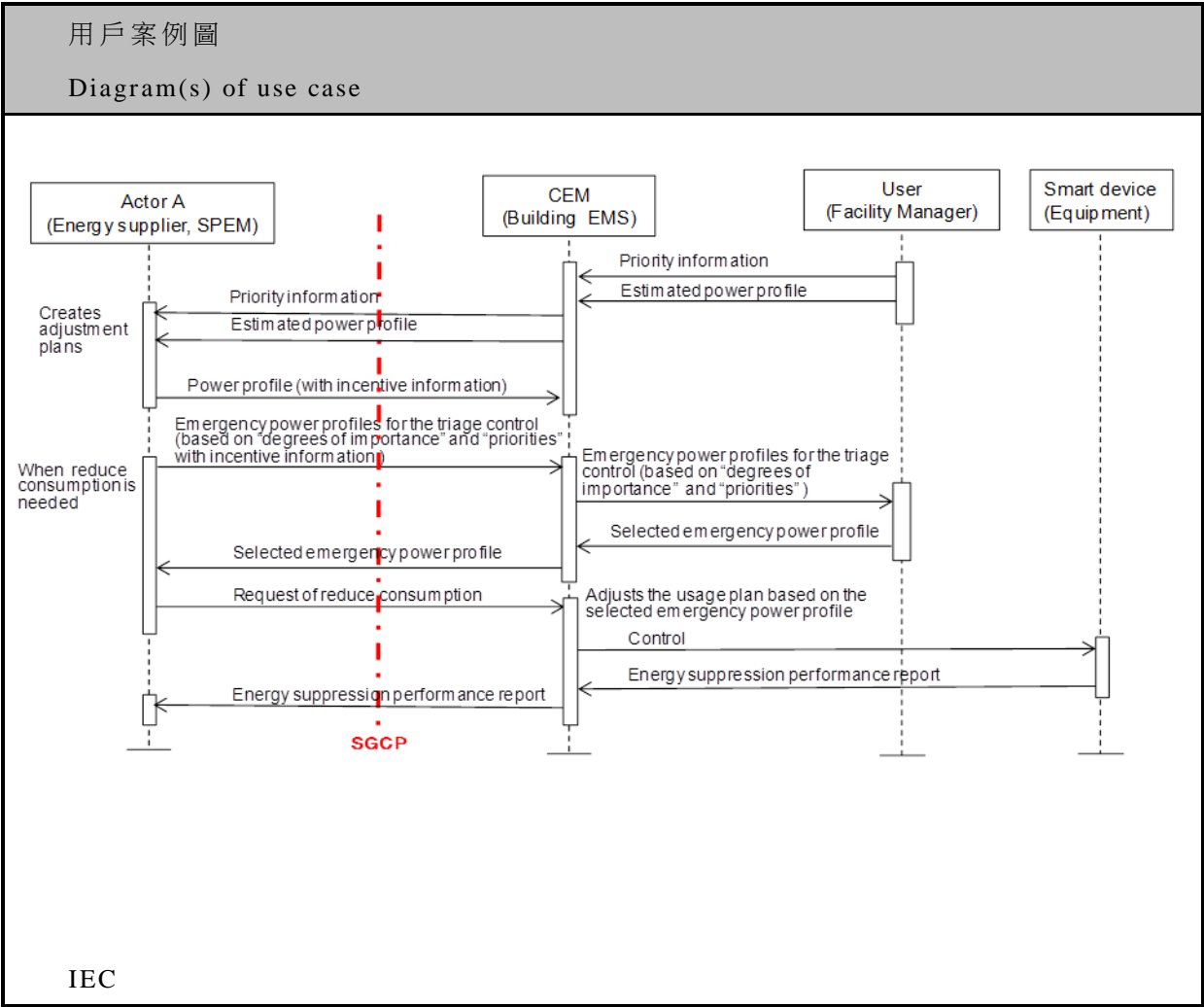


圖 A.22 序列圖

Figure A.22 – Sequence diagram

A.3.13.3 技術細節 Technical details

行為者 Actors

行為者 Actors			
分組		群組說明	
Grouping		Group Description	
行為者名稱請參閱 行為者列表	行為者類型請參閱行為者列表	行為者說明請參閱 行為者列表 Actor Description see Actor List	特定於此使用案例的更多資訊 Further information

Actor Name see Actor List	Actor Type see Actor List		specific to this use case
行為者 A Actor A	外部 External	<p>為終端客戶提供電力的公司。能源提供商，能源服務提供商，聚合商等...</p> <p>A company that delivers electricity to end use customers. the Energy Provider, the Energy Services Provider, the ag-gregator, etc....</p>	
客戶能源管理者(CEM) Customer Energy Manager (CEM)	內部 Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the " grid/market " .</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p>	
用戶 User	內部 Internal 角色個人 Role Person	<p>負責裝置維護和操作的人員。在住宅市場中，這是房主，房東或建築物負責人。</p> <p>(設施管理者)</p> <p>Person responsible for the maintenance and operation of the facility. In the Residential market, this is the home owner, landlord, or building superintendent.</p> <p>(Facility Manager)</p>	



智慧裝置 Smart device	外部 External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc.). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and signals from the grid in an intelligent way.</p> <p>智慧裝置不在 SG-CG 範圍內，因此須將其視為外部行為者。</p> <p>Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor.</p>	
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觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件 Use Case conditions			
行為者/系統/資訊/契約 Actor/System/Information/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption
行為者 A Actor A	要求減少耗用 Request reduce consumption		當需要減少耗用時 When reduce consumption is needed

參考文獻

References

參考文獻 References						
No.	參考型態 References type	參考 Reference	狀態 Status	對使用案例之影響 Impact on use case	發起人/組織 Originator/Organization	連結 Link

1	模型 2 中的減少 控制範例使用案 例  Example use cases to the reduce control in Model 2	WGSP2120:  直接負載/發電 管理  Direct load /generation management				
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有關分類/映射使用案例的更多資訊 Further information on the use case for  
classification/mapping

資訊分類 Classification information
與其他使用案例關聯 Relation to other use cases
日本使用案例 Model 3 Japanese use case Model 3
深度 Level of depth
高階使用案例 High level use case
優先序 Prioritisation
高 High
一般、區域或國家關係 Generic, regional or national relation
通用(此使用案例獨立於國家或地區市場設計。應在 62746-2 使用案例和需求討論中達成共識。) Generic (This use case is independent from the national or regional market design. It should be agreed on the 62746-2 use case & Requirement discussion.)
觀點 Viewpoint
技術 Technical

資訊分類
Classification information
分類的其他關鍵字
Further keywords for classification
需求面管理，直接負載控制，智慧電網，建築能源管理
Demand side management, direct load control, Smart Grid, Building Energy Management

#### A.3.13.4 使用案例的逐步分析 Step by step analysis of use case

##### 情境概述 Overview of scenarios

情境條件					
Scenario conditions					
No.	情境名稱	主行為者	觸發事件	前提條件	後置條件
	Scenario name	Primary actor	Triggering event	Pre-condition	Post-condition
1	<p>“《建築節能管理(模型二)》” 節能降耗，個別建築物的供需控制”</p> <p>“ Building Energy Management(Model 2) ”Energy saving, Demand-supply control for individual buildings</p>	<p>行為者 A</p> <p>Actor A</p>	<p>減少能耗的要求</p> <p>Request of reduce consumption</p>	<p>建立了所有行為者之間的通訊連接</p> <p>Communication connection between all actors is established</p> <p>用戶配置了 CEM 及/或參與的智慧裝置。用戶為 CEM 設定智慧裝置的優先級。</p> <p>The user configured the CEM and/or the participating smart devices. The user set the priorities of smart devices to the CEM.</p> <p>有關總消耗量或每台裝置消耗量的資訊會通知 CEM</p> <p>Information on total consumption or consumption per device is notified to the CEM</p>	<p>電力剖繪是在行為者 A 和 CEM 之間協議的。</p> <p>The power profile is negotiated between Actor A and CEM.</p> <p>智慧裝置由 CEM 根據協議的電力剖繪進行控制。</p> <p>The smart devices are controlled by the CEM based on the negotiated power profile.</p>

##### 步驟-情境 Steps – Scenarios

情境 Scenario								
情境名稱 Scenario name:		“建築能源管理(模型 2)” ，針對個別建築物的節能，供需控制 “ Building Energy Management(Model 2)” Energy saving, Demand-supply control for individual buildings						
步驟編號 Step No.	事件 Event	流程/活動的名稱 Name of process/activity	流程/活動說明 Description of process/activity	服務 Service	資訊產生者(行為者)Information Producer (Actor)	資訊接收者(行為者)Information Receiver (Actor)	資訊交換 Information Exchanged	要求，RID Requirements, R-ID
1	對 CEM 設定重要程度、優先序 Set degrees of importance, priorities to the CEM		用戶設定 CEM 的重要度和優先序。 The User sets the degrees of importance, priorities to the CEM.	現場 / 建築 Field/Building	用戶 User	CEM	個別智慧裝置之優先序、重要程度 degrees of importance, priorities for individual smart devices	
2	對 CEM 設定估計電力剖繪 Set estimated power profile to the CEM		用戶將估計的功率剖繪設定到 CEM。 The User sets the estimated power profile to the CEM.	現場 / 建築 Field/Building	用戶 User	CEM	估計功率剖繪 estimated power profile	
3	對行為者 A 設定重要程度、優先序 Set degrees Of importance, priorities to the Actor A		CEM 設定角色 A 的重要度和優先序。 The CEM sets the degrees of importance, priorities to the Actor A.	現場 / 建築 Field/Building	CEM	行為者 A Actor A	個別智慧裝置之優先序、重要程度 degrees of importance, priorities for individual smart devices	

4	對行為者 A 設定估計電力剖繪  Set estimated power profile to the Actor A		CEM 設定行為者 A 的估計功率剖繪。  The CEM sets the estimated power profile the Actor A.	現場 / 建築  Field/ Building	CEM	行為者 A  Actor A	估計功率剖繪  estimated power profile	
5	建立電力剖繪  Create power profile		行為者 A 在考慮重要性程度，優先序和估計的功率剖繪時建立功率分佈。  Actor A creates power profile in consideration of degrees of importance, priorities and estimated power profile.	現場  Field	--	--	--	
6	發送電力剖繪至 CEM  Send power profile to the CEM		行為者 A 發送帶有激勵資訊的功率剖繪。  Actor A sends power profile with a incentive information.	現場 / 建築  Field/ Building	行為者 A  Actor A	CEM	帶有激勵資訊的功率剖繪  power profile with a incentive information	
7	偵測減少耗用之需求  Detect the need for reduce consumption		行為者 A 檢測到需要減少耗用  Actor A detects the need for reduce consumption	現場  Field	--	--	--	

8	通知緊急功率剖繪 Notify the emergency power profiles		行為者A將係依“重要程度”和“優先序”的緊急情況剖繪進行分流控制發送給CEM。  Actor A sends the Emergency power profiles for the triage control based on “degrees of importance” and “priorities” to the CEM.	現場 / 建築 Field/ Building	行為者A Actor A	CEM	用於根據“重要度”和“優先序”進行分流控制的應急功率剖繪  Emergency power profiles for the triage control based on “degrees of importance” and “priorities”	
9	通知緊急功率剖繪 Notify the emergency power profiles		CEM 根據“重要程度”和“優先序”向用戶發送用於分流控制的應急功率剖繪。  CEM sends the emergency power profiles for the triage control based on “degrees of importance” and “priorities” to User.	建築 Building	CEM	用戶 User	用於根據“重要度”和“優先序”進行分流控制的應急功率剖繪  Emergency power profiles for the triage control based on “degrees of importance” and “priorities”	
10	選擇緊急電功率剖繪 Selects the emergency power profiles		用戶將所選的緊急功率剖繪發送到CEM。  User sends the selected emergency power profile to the CEM.	建築 Building	用戶 User	CEM	選定的緊急功率剖繪  Selected emergency power profile	

11	選擇緊急電功率剖繪 Selects the emergency power profiles		CEM 將選定的緊急功率剖繪發送給行為者 A。 CEM sends the selected emergency power profile to the Actor A.	現場 / 建築 Field/ Building	CEM	行為者 A Actor A	選定的緊急功率剖繪 Selected emergency power profile	
12	減少耗用之要求 Request of reduce consumption		行為者 A 將減少耗用的請求發送到 CEM。 Actor A sends the request of reduce consumption to the CEM.	現場 / 建築 Field/ Building	行為者 A Actor A	CEM	減少耗用之要求 Request of reduce consumption	
13	負載控制 Load control		裝置的 CEM 控制。 CEM controls to the equipment.	建築 Building	CEM	Smart devices	智慧裝置控制信號 Smart device control signal	
14	報告 Report		智慧裝置報告抑制性能 Smart devices report suppression performance	建築 Building	Smart devices	CEM	能量抑制性能報告 Energy suppression performance report	
15	報告 Report		CEM 報告抑制性能 CEM reports suppression performance	現場 / 建築 Field/ Building	CEM	行為者 A Actor A	能量抑制性能報告 Energy suppression performance report	

#### A.3.13.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements for information data

(ID)		
優先訊息 (M2-1) Priority information (M2-1)	用戶建築物中各智慧裝置(負載)的優先序資訊(重要程度, 優先序), 用於分類控制。  Priority information (degrees of importance, priorities) of the each smart devices(loads) in the customer building for triage control.	
估計功率剖繪(M2-2) Estimated Power Profile (M2-2)	個別智慧裝置耗用/產生用戶估計之資訊。  Individual smart device consumption/Generation information estimated by the user.	
電力剖繪(M2-3) Power Profile (M2-3)	電力剖繪包括用戶之建築的耗用排程、發電排程之激勵計畫及重新建立計畫。  Power profile includes incentive and re-created plans of consumption schedules, generation schedules of the customer's building.	
減少耗用的要求 (M2-4) Request of reduce consumption (M2-4)	緊急通知包括減少用戶建築物電力耗用的請求訊息。  Emergency Notification includes the request information to reduce the power consumption in the customer building.	
分流控制的緊急功率剖繪(M2-5) Emergency Power Profile for the triage control (M2-5)	用於分類控制的調整後功率剖繪包括係依分類控制和激勵資訊的重新計算的功耗/控制計畫  Adjusted Power Profile for the triage control includes the re-calculated power consumption/control plan based on the triage control with incentive information	
所選電力剖繪(M2-6) Selected Power Profile (M2-6)	對分流控制的應急電力剖繪的回應, 包括使用者選擇的電力剖繪。  Response to the Emergency Power Profile for the triage control, including the power profile selected by user.	
減少耗用的要求 (M2-7) Request of reduce consumption (M2-7)	減少消耗的請求是抑制信號, 該抑制信號是係依所選電力簡檔開始對建築物中的智慧裝置進行抑制控制的請求資訊。  Request of reduce consumption is the suppression signal which is the request information to start suppression control of smart devices in the building based on the Selected Power Profile.	
控制(M2-8) Control (M2-8)	該信號是建築物中智慧裝置的控制信號。  This signal is the control signal for the	



	smart devices in the building.	
能量抑制性能報告 (M2-9)  Energy suppression performance report (M2-9)	能量抑制性能報告。  Report of energy suppression performance.	

#### A.3.13.6 要求事項(選項) Requirements (optional)

要求事項(選項) Requirements (optional)	
要求類別 Categories for requirements	分類說明 Category Description
要求編號 Requirement ID	要求說明 Requirement Description

#### A.3.13.7 常用術語和定義 Common terms and definitions

常用術語和定義 Common terms and definitions	
術語 Term	定義 Definition

#### A.3.13.8 自定義訊息(選項) Custom information (optional)

自定義訊息(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Refers to Section

### A.3.14 High level use case (JWG2002)區域能源管理 District Energy Management

#### A.3.14.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	區域/域/區 Area/Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG2002	智慧電網/客戶 Smart Grid/Customer	<p>“地區建築群的能源管理(模型 3)”</p> <p>節能，建築物群的供需控制</p> <p>“ Energy Management of Groups of Building in the District(Model 3)”</p> <p>Energy saving, Demand-supply control for group of buildings</p>

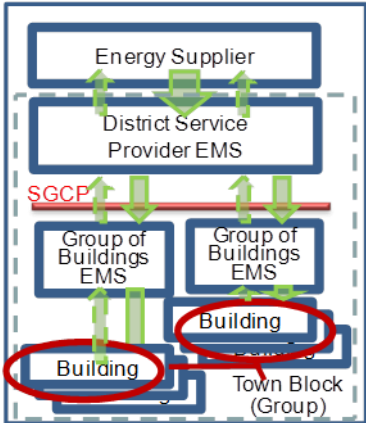
## 版本管理

## Version management

版本管理 Version management			
版本號碼 Version No.	日期 Date	變化 Changes	批准狀態 Approval status
0.1	21/02/ 2014	初始草案 Initial Draft	草案 Draft
0.2	07/03/ 2014	添加了使用案例 ID Added Use Case ID	草案 Draft

## 使用案例的範圍及目標 Scope and objectives of use case

使用案例的範圍及目標 Scope and objectives of use case	
範圍	<p>該使用案例的範圍是區域服務提供商 EMS (D-SPEM)與建築物 EMS 組(G-CEM)之間的通訊。建築環境管理系統(G-CEM)組具有該區域中的組資訊(例如，街區)，並收集設施管理員定義的每座建築物的能源資訊。</p> <p>在這種情況下，SG CP 位於區域服務提供商 EMS(D-SPEM)與建築物 EMS 組(G-CEM)之間。</p> <p>The scope of this use case is the communication between the District Service Provider EMS (D-SPEM) and the Groups of Building EMS (G-CEM). The Groups of Building EMS (G-CEM) has the group information (e.g. town block) in the district with gather energy information of each buildings defined by the facility manager.</p> <p>In this case, SG CP is located between the District Service Provider EMS (D-SPEM) and the Groups of Building EMS (G-CEM).</p>

	 <p>Groups of Buildings Energy Management</p> <p>區域服務提供商 EMS(D-SPEM)</p> <p>District Service Provider EMS (D-SPEM)</p> <p>建築物 EMS(G-CEM)建築物 EMS 的組</p> <p>Groups of Building EMS (G-CEM) Building EMS</p> <p>IEC</p> <p>EMS：能源管理系統</p> <p>EMS: Energy Management System</p>
目標	<p>該使用案例的目標是建築物群的節能，供需控制。</p> <p>對於能源供應商的減少需求請求，區域服務提供商 EMS(D-SPEM)可節省能源，並根據以下內容調整“區域需求”。</p> <ul style="list-style-type: none"> <li>— 各裝置的使用</li> <li>— 區域服務提供商 EMS (D-SPEM)根據優先序，用電計畫以及建築物和裝置的耗用量製定“調整計畫提案”。</li> <li>— “能耗/發電排程”和“能耗/能耗結果趨勢”</li> <li>— 計算區域的需求縮減能力。</li> </ul> <p>可透過對一組建築物(城鎮區)進行能源管理來實現能源使用優化，例如抑制需求，節能，減排，促進可再生能源使用。</p> <p>因此，用戶獲得的收益如下：</p> <ul style="list-style-type: none"> <li>— 可擴展性：由於總能耗增加，因此可調整能耗的數量可增加。</li> <li>— 多樣性：許多種類的分佈式能源和負載可實現互補的能源運營。輕鬆實現能量平衡。</li> </ul> <p>The objective of this use case is the Energy saving, Demand-supply control for groups of buildings.</p> <p>For the demand reduction request by the Energy Supplier, the District Service Provider EMS (D-SPEM) saves energy, and adjusts “ demands of the district” based on these, below.</p>

	<ul style="list-style-type: none"> <li>– Uses of individual equipment</li> <li>– District Service Provider EMS (D-SPEM) creates "proposal for adjustment plans" based on the priority, the power usage plan and the consumption of buildings and equipment.</li> <li>– "consumption/generation schedules" and "trends of consumption/consumption result"</li> <li>– Calculates the demand curtailment ability of the district.</li> </ul> <p>Energy usage optimization – such as demand suppression, energy saving, emission reduction, renewable energy usage promotion – can be achieved by energy management of group of buildings (town block).</p> <p>So user benefits are obtained as follows:</p> <ul style="list-style-type: none"> <li>– Scalability: The amount of adjustable energy consumption can be Increases because of a total amount of energy consumption increases.</li> <li>– Diversity: Mutually complementary energy operation is attained by many Kinds of distributed energy resources and loads. It is easy to take energy balance.</li> </ul>
相關業務案例 Related business case(s)	<p>該使用案例是建築物的需量反應服務的一般使用案例之一，在某些公用事業，BEMS(建築能源管理系統)用戶群代表/聚合商，日本國內專案中使用。</p> <p>(該使用案例獨立於國家或地區市場設計。應在 62746-2 使用案例和需求討論中達成共識。)</p> <p>This use case is one of the generic Use Cases of the demand response services for the buildings using in some utilities, BEMS(Building Energy Management System) aggregators, domestic projects in Japan.</p> <p>(This use case is independent from the national or regional market design. It should be agreed on the 62746-2use case &amp; requirement discussion.)</p>

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case
<p>簡短說明 Short description</p> <p>能源供應商通過收集每個建築物的能源資訊來計算一個地區的電力消耗和發電量。然後，能量供應商執行能量抑制控制以有效執行負載減少。區域服務提供商 EMS(D-SPEM)根據上述能量抑制控制來調整能量使用計畫。</p> <p>The energy supplier calculates the consumption and generation of the electricity in a district with gathering each building energy information. Then energy supplier executes energy suppression control to perform load reduction effectively. The district service provider EMS (D-SPEM) adjusts the energy usage plan based on above energy suppression control.</p>
<p>完整說明 Complete description</p>

區域服務提供商(D-SEPM)接收建築物的優先序和用電計畫，然後為建築物組建立用電計畫和裝置運行計畫。能源供應商計算區域中的電力耗用和發電量。然後，能量供應商執行能量抑制控制以有效執行負載減少。區域服務提供商(D-SPEM)根據上述能量抑制控制來調整能量使用計畫。

(1) 設施管理員將建築物的優先序和用電計畫輸入建築物 EMS。

G-CEM 匯總此等資訊並添加建築物資訊(例如，公寓房，商業建築物，公共設施，工廠等)。

然後，G-CEM 將這些註冊到 D-SPEM 和能源供應商。

(2) D-SPEM 為 Town Block(係依契約的一組建築物)建立“用電計畫”和“裝置運行計畫”。G-CEM 分解各建築物的這些資訊，然後將其註冊到他的建築物 EMS。

(3) 當需要抑制功率時，供應商計算區域的需求縮減能力。然後，供應商建立一個新的區域用電計畫。接下來，供應商將其發送到 D-SPEM。

D-SPEM 收到此通知後，他會根據優先序，用電計畫以及建築物和裝置的耗用量製定“調整計畫建議”。這些建議中的每一個都包括“裝置運行計畫”和激勵措施。然後 D-SPEM 將這些建議發送給 G-CEM。然後，G-CEM 對每座建築物進行分解，然後將它們發送到建築物 EMS。

(4) 設施管理者在用戶建築物的建築物 EMS 終端檢查這些建議。然後，設施管理者根據“裝置運行計畫”和激勵條件選擇這些建議之一。

建築物 EMS 將選定的提案發送給 G-CEM。G-CEM 匯總這些建議並發送給 D-SPEM。

(5) D-SPEM 收到用戶選擇的建議後，D-SPEM 根據建議發送信號。

(6) 建築物 EMS 根據收到的信號和控制裝置調整用電計畫。

(7) 裝置向建築物 EMS，G-CEM，D-SPEM 和能源供應商報告能量抑制性能。

The district service provider (D-SEPM) receives priority and power usage plan of the building, then creates power usage plan and equipment operation plan for group of the building. The energy supplier calculates the consumption and generation of the electricity in a district. Then energy supplier executes energy suppression control to perform load reduction effectively. The district service provider (D-SPEM) adjusts the energy usage plan based on above energy suppression control.

1) The facility manager inputs the priority and the power usage plan of the building into the Building EMS.

G-CEM aggregates these information and add building information (e.g. apartment house, commercial building, public facilities, factory, ..).

Then, the G-CEM registers these to the D-SPEM and Energy Supplier.

2) The D-SPEM creates the “power usage plan” and the “equipment operation plan” for the Town Block (a group of buildings based on a contract). G-CEM decomposes these information for each building and then registers these to his Building EMS.

3) When a suppression control of power is needed, the supplier calculates the demand curtailment ability of the district. Then the Supplier creates a new power usage plan of the district. Next, the supplier sends it to the D-SPEM.

After the D-SPEM receives it, he creates “proposal for adjustment plans” based on the priority, the power usage plan and the consumption of buildings and equipment. Each of these proposals includes an “equipment operation plan” and an incentive. Then the D-SPEM sends these proposals to G-CEM. Then G-CEM decomposes them for each building and sends them to Building EMS.

4) The Facility manager checks these proposals at the Building EMS terminal in the Customer's building. Then the Facility manager selects one of these proposals based on the “equipment operation plan” and incentive.

The Building EMS sends the selected proposal to G-CEM. G-CEM aggregates these proposals and sends to

D- SPEM.

- 5) After the D-SPEM receives the proposal selected by the Customer, the D-SPEM sends signals according to the proposal.
- 6) The Building EMS adjusts the power usage plan based on signals received, and control equipments.
- 7) The Equipment reports energy suppression performance to Building EMS, G-CEM, D-SPEM and Energy Supplier.

一般說明 General remarks

一般說明 General remarks

#### A.3.14.2 使用案例圖 Diagram of use case

圖 A.23 顯示了一個使用案例圖。Figure A.23 shows a Diagram of use case.

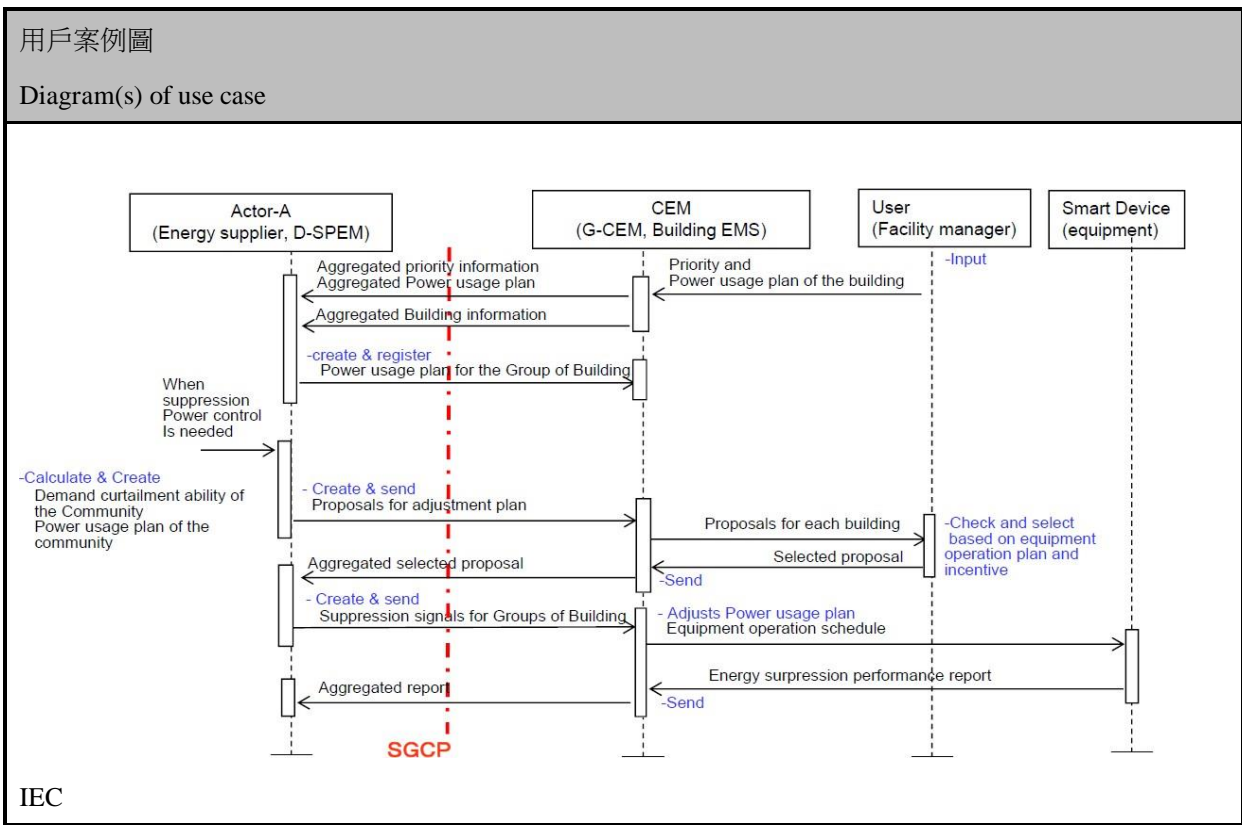


圖 A.23 序列圖

Figure A.23 – Sequence diagram

A.3.14.3 技術細節 Technical details

行為者 Actors

行為者 Actors			
分組 Grouping		群組說明 Group Description	
行為者名稱 請參閱 行為者列表 Actor name See Actor list	行為者類型 請參閱 行為 者列表 Actor type see Actor list	行為者說明請參閱 行為者列表 Actor description see Actor list	特定於此使用案 例的更多資訊 Further information specific to this use case
行為者 A Actor A	外部 External	外部行為者(智慧電網市場角色)透過能源管理通訊 通道與房屋/建築物或房屋/建築物自動化網路之系 統功能及組件進行互動。此市場角色諸如能源提供 商、能源服務提供商及聚合商等。 External actor (Smart Grid Market Role) interacting	

		<p>with the system functions and components in the home/building or home/building automation network through the energy management communication channel. Examples of such market roles are the Energy Provider, the Energy Services Provider, the aggregator, etc.</p> <p>此外於此使用案例中，行為者 A 係由能源供應商及區域服務提供商 EMS(D-SPEM)組成。</p> <p>In addition in this use case, Actor A consists of Energy Supplier and District Service Provider EMS (D-SPEM).</p> <p>能源供應商為終端客戶提供電力的公司。</p> <p>Energy Supplier is a company that delivers electricity to end use customers.</p> <p>D-SPEM 管理節能及自給自足區域/災害恢復之需量供應。</p> <p>D-SPEM manages energy saving and demand-supply for Self-sustaining District/Disaster Recovery.</p>	
CEM	內部 Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the " grid/market " .</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 整合通訊功能時則稱為客戶能源管理系統。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System.</p>	



用戶 User	內部 Internal 角色個人 Role Person	裝置經理負責裝置的維護和操作。在住宅市場中，這是房主，房東或建築物負責人。  Facility manager responsible for the maintenance and operation of the facility. In the Residential market, this is the home owner, landlord, or building superintendent.	
智慧裝置 Smart device	外部 External	智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。  A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc.). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and signals from the grid in an intelligent way.  智慧裝置不在 SG-CG 範圍內，因此須將其視為外部行為者。  Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor.	

觸發事件，前提條件，假設

Triggering event, preconditions, assumptions

使用案例條件 Use case conditions			
行為者/系統/資訊/契約 Actor/System/Information/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption
行為者 A (能源供應商) Actor A (Energy Supplier)	要求抑制功率控制  Request of Suppression power control		

參考文獻

References

參考文獻 References
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No.	參考型態 References type	參考 Reference	狀態 Status	對使用案例之 影響 Impact on use case	發起人/組織 Originator/Organi sation	連結 Link

有關分類/映射使用案例的更多資訊 Further Information on the use case  
for classification/mapping

資訊分類 Classification information
與其他使用案例關聯 Relation to other use cases
日本使用案例 Model 2，Model 4 Japanese use case Model 2, Model 4
深度 Level of depth
高階使用案例 High level use case
優先序 Prioritisation
高 High
一般、區域或國家關係 Generic, regional or national relation
一般(此使用案例獨立於國家或地區市場設計。應在 62746-2 使用案例和需求討論中達成共識。) Generic (This use case is independent from the national or regional market design. It should be agreed on the 62746-2 use case & requirement discussion.)
觀點 Viewpoint
技術 Technical
分類的其他關鍵字 Further keywords for classification
需求面管理，智慧電網，建築能源管理。區 Demand side management, Smart Grid, Building Energy Management. District

## A.3.14.4 使用案例的逐步分析 Step by step analysis of use case

## 情境概述 Overview of scenarios

情境條件 Scenario conditions					
No.	情境名稱 Scenario name	主行為者 Primary actor	觸發事件 Triggering event	前提條件 Pre-condition	後置條件 Post-condition
	地區建築群(模型3)" Group of Buildings in the District(Model 3)" 節能，地區供需調整 Energy saving, Demand-supply adjustment for the district	行為者 A (能源供應商) Actor A (Energy Supplier)	要求抑制功率控制 Request of Suppression power control		

## 步驟-情境 Steps – Scenarios

情境 Scenario								
情境名稱 Scenario name:		節能，地區供需調整 Energy saving, Demand-supply adjustment for the district						
步驟編號 Step No.	事件 Event	流程/活動的名稱 Name of process/activity	流程/活動說明 Description of process/activity	服務 Service	資訊產生者(行為者) Information Producer (Actor)	資訊接收者(行為者) Information Receiver (Actor)	資訊交換 Information Exchanged	要求，RID Requirements, R-ID
1			設施管理員將建築物的優先序和用電計畫輸入到建築物EMS中。  G-CEM 匯總這些資訊並添加建築物資訊(例如，公寓，商業建築，公共設施，工廠等)。		用戶 (設施管理員)  CEM (建築物EMS，建築物EMS(G-C	CEM (建築物EMS)  行為者 A (地區服務提供商 EMS(D-SP EM)，能源	匯總的優先序訊息(M3-1)  建築物的總用電計畫(M3-2)  匯總和	

			<p>然後，G-CEM 將這些註冊到 D-SPEM 和能源供應商。</p> <p>Facility manager inputs the priority and the power usage plan of the building into the Building EMS.</p> <p>G-CEM aggregates these information and add building information (e.g. apartment house, commercial building, public facility, factory, ..).</p> <p>Then, the G-CEM registers these to the D-SPEM and Energy Supplier.</p>		<p>EM))</p> <p>User</p> <p>(Facility Manager)</p> <p>CEM</p> <p>(Building EMS, Group of Buildings EMS (G-CEM))</p>	<p>供應商)</p> <p>CEM</p> <p>(Building EMS)</p> <p>Actor A</p> <p>(District Service Provider EMS (D-SPEM), Energy Supplier)</p>	<p>建築物通知 (M3-3)</p> <p>Aggregated Priority information (M3-1)</p> <p>Aggregated Power usage plan of the building (M3-2)</p> <p>Aggregated Building information (M3-3)</p>	
2			<p>D-SPEM 為 Town Block(係依契約的一組建築物)建立“用電計畫”和“裝置運行計畫”。</p> <p>G-CEM 分解各建築物的這些資訊，然後將其註冊到他的建築物 EMS。</p> <p>The D-SPEM creates the “power usage plan” and the “equipment operation plan” for the Town Block (a group of buildings based on a contract).</p> <p>G-CEM decompose these information for each building and then registers these to his Building EMS.</p>		<p>行為者 A</p> <p>(地區服務提供者 EMS(D-SPEM))</p> <p>Actor A</p> <p>(District Service Provider EMS (D-SPEM))</p>	<p>CEM</p> <p>(建築物 EMS(G-CEM), 建築物 EMS(CEM) 組)</p> <p>CEM</p> <p>(Group of Buildings EMS (G-CEM), Building EMS (CEM))</p>	<p>建築物組的電力使用計畫 (M3-4)</p> <p>Power usage plan for the Group of Buildings (M3-4)</p>	

3	<p>當 需 要 抑 制 功 率 時</p> <p>When a suppression control of power is needed</p>	<p>能源供應商計算區域的需求縮減能力。然後，能源供應商建立該區域的新用電計畫。接下來，能源供應商將其發送給 D-SPEM 提供商。</p> <p>D-SPEM 收到該建議後，他建立“調整計畫建議”。然後 D-SPEM 將這些建議發送給 G-CEM。</p> <p>然後，G-CEM 對每座建築物進行分解，然後將它們發送給建築物 EMS 和設施管理員。</p> <p>The energy supplier calculates the demand curtailment ability of the district. Then the energy supplier creates a new power usage plan of the district. Next, the energy supplier sends it to the D-SPEM Provider.</p> <p>After the D-SPEM receives it, he creates "proposal for adjustment plans".. Then the D- SPEM sends these proposals to G- CEM.</p> <p>Then G-CEM decomposes them for each building and sends them to Building EMS and Facility manager.</p>	<p>行為者 A</p> <p>(能源供應商，地區服務提供商 EMS(D-SPEM))</p> <p>Actor A</p> <p>(Energy Supplier, District Service Provider EMS (D-SPEM) )</p>	<p>CEM</p> <p>(建築物 EMS(G-CEM)組，建築物 EMS)</p> <p>用戶</p> <p>(設施管理者)</p> <p>CEM</p> <p>(Group of Buildings EMS (G-CEM), Building EMS)</p> <p>User</p> <p>(Facility manager)</p>	<p>調整計畫提案 (M3-7)</p> <p>Proposal s for adjustme nt plan (M3-7)</p>	
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4			<p>設施管理者在用戶建築物的建築物EMS 終端中檢查這些建議。</p> <p>然後，設施管理者根據“裝置運行計畫”和激勵條件選擇這些建議之一。</p> <p>建築物 EMS 將選定的提案發送給 G-CEM。</p> <p>G-CEM 匯總這些建議並發送給 D-SPEM。</p> <p>The Facility manager checks these proposals at the Building EMS terminal in the Customer's building.</p> <p>Then the Facility manager selects one of these proposals based on the "equipment operation plan" and incentive.</p> <p>The Building EMS sends the selected proposal to G-CEM.</p> <p>G-CEM aggregates these proposals and sends to D-SPEM.</p>		<p>用戶 (設施管理者) User (Facility manager)</p>	<p>CEM (建築物EMS, 建築物EMS(G-CEM)) 行為者 A (地區服務提供商 EMS(D-SPEM))</p> <p>CEM (Building EMS, Group of Buildings EMS (G-CEM)) Actor A (District Service Provider EMS (D-SPEM))</p>	<p>匯總的選定提案 (M3-8) Aggregated Selected proposal (M3-8)</p>	
5			<p>在 D-SPEM 收到用戶選擇的建議後，D-SPEM 根據建議向建築物組發送抑制信號。</p> <p>After the D-SPEM receives the proposal selected by the Customer, the D-SPEM sends suppression signals for groups of building according to the proposal.</p>		<p>行為者 A (地區服務提供商 EMS(D-SPEM)) Actor A (District Service Provider EMS (D-SPEM))</p>	<p>CEM (建築物EMS(G-CEM)組, 建築物EMS)</p> <p>CEM (Group of Buildings EMS (G-CEM), Building EMS)</p>	<p>建築物的停頓信號 (M3-9) Suppression signal for group of building (M3-9)</p>	

6			<p>建築物 EMS 根據收到的抑制信號調整用電計畫。</p> <p>然後建築物 EMS 將裝置運行排程及/或控制發送給裝置。</p> <p>The Building EMS adjusts the power usage plan based on suppression signals received.</p> <p>Then Building EMS sends Equipment operation schedule and/or control to the equipment</p>		<p>CEM ( 構 建 EMS)  CEM (Building EMS)</p>	<p>智慧裝置 (裝置)  Smart device (Equipment )</p>	<p>裝置運行排程 (M3-10)  Equipment operation schedule (M3-10)</p>	
7			<p>裝置報告能量抑制性能</p> <p>The Equipment reports the energy suppression performance</p>		<p>智慧裝置 (裝置)  Smart device (Equipment)</p>	<p>CEM, ( 建 築 物 EMS , 建築 物 EMS(G-CE M) CEM, (Building EMS, Group of Buildings EMS (G- CEM)  行為者 A ( 地 區 服 務 提 供 商 EMS(D-SP EM) , 能源 供 應 商 ) 。 Actor A  (District Service Provider EMS (D-SPEM), Energy Supplier).</p>	<p>匯總報告 (M3-11)  Aggregated report (M3-11)</p>	

## A.3.14.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements for information data
匯總的優先級資訊 (M3-1)  Aggregated Priority information (M3-1)	建築物組的匯總優先序訊息。  Aggregated Priority information for the group of building.  優先序訊息是建築物中各裝置(例如照明，辦公裝置，空調等)的功率優先序。可對優先序等級進行分類，例如“關鍵”，“可縮減”等。  Priority information is a power supply priority level for each equipment in a building (e.g. lighting, office equipment, air conditioner, .. ). Priority level may be categorized such as Critical, Curtailable, and so on.	
建築物的總用電計畫(M3-2)  Aggregated Power usage plan of the building (M3-2)	透過匯總各建築物聲明，針對該建築物組的未來(例如，提前一天，提前一周，..)的功耗計畫的時間序列。  Time series of power consumption plan in the future (e.g. day ahead, week ahead, .. ) for the group of building by aggregating each building declaration.	
匯總建築資訊(M3-3)  Aggregated Building information (M3-3)	該建築物組的匯總建築物訊息。  Aggregated Building information for the group of building.  建築物訊息包括建築物類別和特徵，例如公寓房，商店，公共設施等。  Building information includes building category and characteristic such as apartment house, store, public facilities, and so on.	
建築物組的用電計畫(M3-4)  Power usage plan for the Group of Buildings (M3- 4)	行為者A(地區服務提供商 EMS(D-SPEM))給出的建築群在未來(例如，提前一天，提前一周，..)的功耗計畫的時間序列。電力使用計畫包括與各電力耗用計畫相對應的裝置操作計畫(例如，開/關，設定點等)。  Time series of power consumption plan in the future (e.g. day ahead, week ahead, .. ) for the group of building given by Actor A (District service provider EMS (D-SPEM)). Power usage plan includes equipment operation schedule (e.g. on/off, set-point, .. ) correspondence with each power consumption plan.	
地區需求縮減能力 (M3-5)  Demand curtailment ability of the District (M3- 5)	減少區域的耗電量。  Power consumption curtailment margin for the district.	[不適用，步驟 3 中行為者 A 內的資訊]  [Not Applicable, Information within Actor A at Step No.3]



地區用電計畫(M3-6) Power usage plan of the district (M3-6)	該地區未來的耗電量計畫時間序列(例如，提前一天，提前一周，..)。 Time series of power consumption plan in the future (e.g. day ahead, a week ahead, .. ) for the district.	[不適用，步驟 3 中行為者 A 內的資訊] [Not Applicable, Information within Actor A at Step No.3]
調整計畫提案(M3-7) Proposals for adjustment plan (M3-7)	根據優先序，用電計畫以及建築物和裝置的耗用量製定調整計畫的建議。這些建議包括裝置運行計畫和激勵措施。 Proposals for adjustment plan are created based on priority, power usage plan and consumption of buildings and equipments. These proposals include equipment operation plan and incentive.	
匯總的選定提案(M3-8) Aggregated Selected proposal (M3-8)	匯總選定的提案組。 Aggregated selected proposal for group of building. 選定的提案是設施管理者為 CEM 提供的每座建築物選擇的提案。 Selected proposal is facility manager's selection of proposals for each building offered by CEM.	
建築物組(M3-9)的抑制信號 Suppression signals for Groups of Building (M3-9)	Actor A(地區服務提供商 EMS(D-SPEM))給出的建築物組的功耗要求。 Power consumption requirement to the group of building given by Actor A (District service provider EMS (D-SPEM)).	
裝置運行排程(M3-10) Equipment operation schedule (M3-10)	根據 Actor A 的建築物群的抑制信號，對建築物中各裝置的裝置運行排程。 Equipment operation schedule for each equipment in a building according with Actor A's Suppression signals for group of building.	
匯總報告(M3-11) Aggregated report (M3-11)	建築群的綜合能源抑制性能報告。 Aggregated energy suppression performance report of group of building.	

#### A.3.14.6 要求事項(選項) Requirements (optional)

要求事項(選項) Requirements (optional)	
要求類別 Categories for requirements	分類說明 Category Description
要求編號 Requirement ID	要求說明 Requirement Description

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#### A.3.14.7 常用術語和定義 Common terms and definitions

常用術語和定義 Common terms and definitions	
術語 Term	定義 Definition

#### A.3.14.8 自定義訊息(選項) Custom information (optional)

自定義訊息(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Refers to Section

### A.3.15 High level use case (JWG2010) 使用 RES 的分佈式功率系統上的訊息交換 Information exchange on distributed power systems with RES

#### A.3.15.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	區域/域/區 Area/Domain(s)/Zone(s)	使用案例名稱 Name of use case
JWG2010	DER，客戶端 DER, Customer Premises	使用 RES 的分佈式功率系統上的資訊交換 Information exchange on distributed power systems with RES

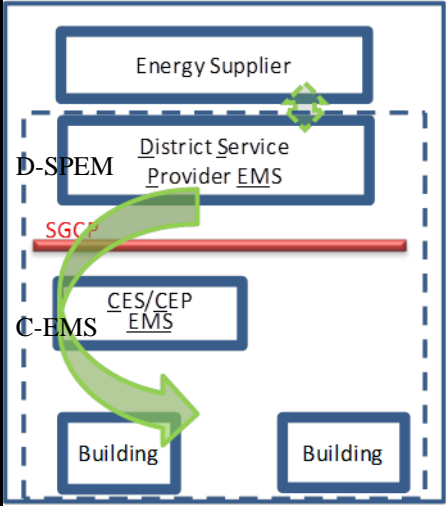
版本管理

Version management

版本管理 Version management			
版本號碼 Version No.	日期 Date	變化 Changes	批准狀態 Approval status

0.1	18/02/2014	初始草案 Initial Draft	草案 Draft
0.2	07/03/2014	添加了使用案例 ID Added Use Case ID	草案 Draft
0.3	16/12/2014	Modified the objective and the name of the use  case that it does not overlap with JWG2041	草案 Draft

## 使用案例的範圍及目標 Scope and objectives of use case

使用案例的範圍及目標 Scope and objectives of use case	
範圍	<p>該使用案例的範圍是區域服務提供商能源管理系統(D-SPEM)與“擁有可再生資源(CES)的社區能源供應商/社區節能服務提供商(CEP)”之間的通訊。</p> <p>The scope of this use case is the communication among the District Service Provider Energy Management System(D-SPEM), the "Community Energy Supplier owning Renewable sources(CES)/Community Energy saving service Provider (CEP)"</p> <p>能源管理系統(C-EMS)和建築能源管理系統。</p> <p>Energy Management System (C-EMS) and the Building Energy Management System.</p> <p>在這種情況下，SG CP 位於 D-SPEM，C-EMS 和建築能源管理系統之間。</p> <p>In this case, SG CP is located among the D-SPEM, the C-EMS and the Building Energy Management System.</p>  <p>Building-EMS</p>

	IEC EMS：能源管理系統 EMS: Energy Management System
目標	該使用案例的目的是在建築物所有者與能源供應商之間進行彈性註冊時的訊息交換。 The objective of this use case is the information exchange between building owners and energy suppliers on registering for flexibility.
相關業務案例 Related business case(s)	該使用案例是建築物的需量反應服務的一般使用案例之一，該建築物在某些公用事業機構，BEMS（建築能源管理系統）用戶群代表/聚合商，日本國內專案中使用。 (該使用案例獨立於國家或地區市場設計。應在 62746-2 使用案例和需求討論中達成共識。) This use case is one of the generic use cases of the demand response services for the buildings using in some utilities, BEMS (Building Energy Management System) aggregators, domestic projects in Japan. (This use case is independent from the national or regional market design. It should be agreed on the 62746-2 use case & requirement discussion.)

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case
簡短說明 Short description
<p>區域服務提供商 EMS(D-SPEM)計算擁有可再生能源(RE)的用戶對區域的能源貢獻率。然後，區域服務提供商 EMS(D-SPEM)根據擁有 RE 的用戶對區域的個人能量貢獻為其提供獎勵。</p> <p>The District Service Provider EMS (D-SPEM) calculates the ratio of energy contribution to the district by Customers owning Renewable sources of Power (REs). Then the District Service Provider EMS (D-SPEM) gives Customers owning REs an incentive based on their individual energy contribution to the district.</p>
完整說明 Complete description
<ol style="list-style-type: none"> <li>CEM (建築物 EMS，C-EMS)向智慧裝置 A (能源供應商和 D-SPEM)註冊“關於智慧裝置的各功率分類 8 的建築物 ID 和估計的能源分佈”。</li> <li>行為者 A (能源供應商和 D-SPEM)估算可再生能源發電量和用戶耗用量。</li> <li>行為者 A (能源供應商和 D-SPEM)建立分配給用戶的計畫。</li> <li>行為者 A (能源供應商和 D-SPEM)發送分配計畫。</li> <li>CEM (建築物 EMS，C-EMS)從其終端接收確認，並將控制信號發送到 SmartDevice。</li> <li>智慧裝置將結果發送到 CEM (建築物 EMS，C-EMS)。</li> <li>CEM (建築物 EMS，C-EMS)將 RE 產生的電量發送給行為者 A (能源供應商和 D-SPEM)。</li> <li>行為者 A (能源供應商和 D-SPEM)計算激勵。</li> <li>行為者 A (能源供應商和 D-SPEM)將激勵訊息發送到 CEM (建築物 EMS，C-EMS)。</li> </ol>

(10) CEM (建築物 EMS, C-EMS)收到其終端的確認。

- 1) The CEM (Building EMS, C-EMS) registers " the building id and estimated energy profile with respect to each power classification 8 of smart devices" to the Actor A(Energy supplier&D-SPEM).
- 2) The Actor A (Energy supplier&D-SPEM) estimates the power produced by REs and the consumption of Customers.
- 3) The Actor A (Energy supplier&D-SPEM) creates the plan for the distribution to Customers.
- 4) The Actor A (Energy supplier&D-SPEM) sends the plan for the distribution.
- 5) The CEM (Building EMS, C-EMS) receives confirmation from his terminal, and sends control signals to the SmartDevice.
- 6) The smart device sends results to the CEM(Building EMS, C-EMS).
- 7) The CEM (Building EMS, C-EMS] sends amount of the power produced by REs to the Actor A (Energy supplier&D-SPEM).
- 8) The Actor A (Energy supplier&D-SPEM) calculate incentive.
- 9) The Actor A (Energy supplier&D-SPEM) sends incentive information to the CEM (Building EMS, C-EMS).
- 10) The CEM (Building EMS, C-EMS) receives confirmation from his terminal.

#### 一般說明 General remarks

一般說明 General remarks

#### A.3.15.2 使用案例圖 Diagram of use case

圖 A.24 顯示了一個使用案例圖。Figure A.24 shows a Diagram of use case.

<sup>7</sup> 即 RE, non-RE, 負載。i.e. RE, non-RE, Load.

用戶案例圖

Diagram(s) of use case

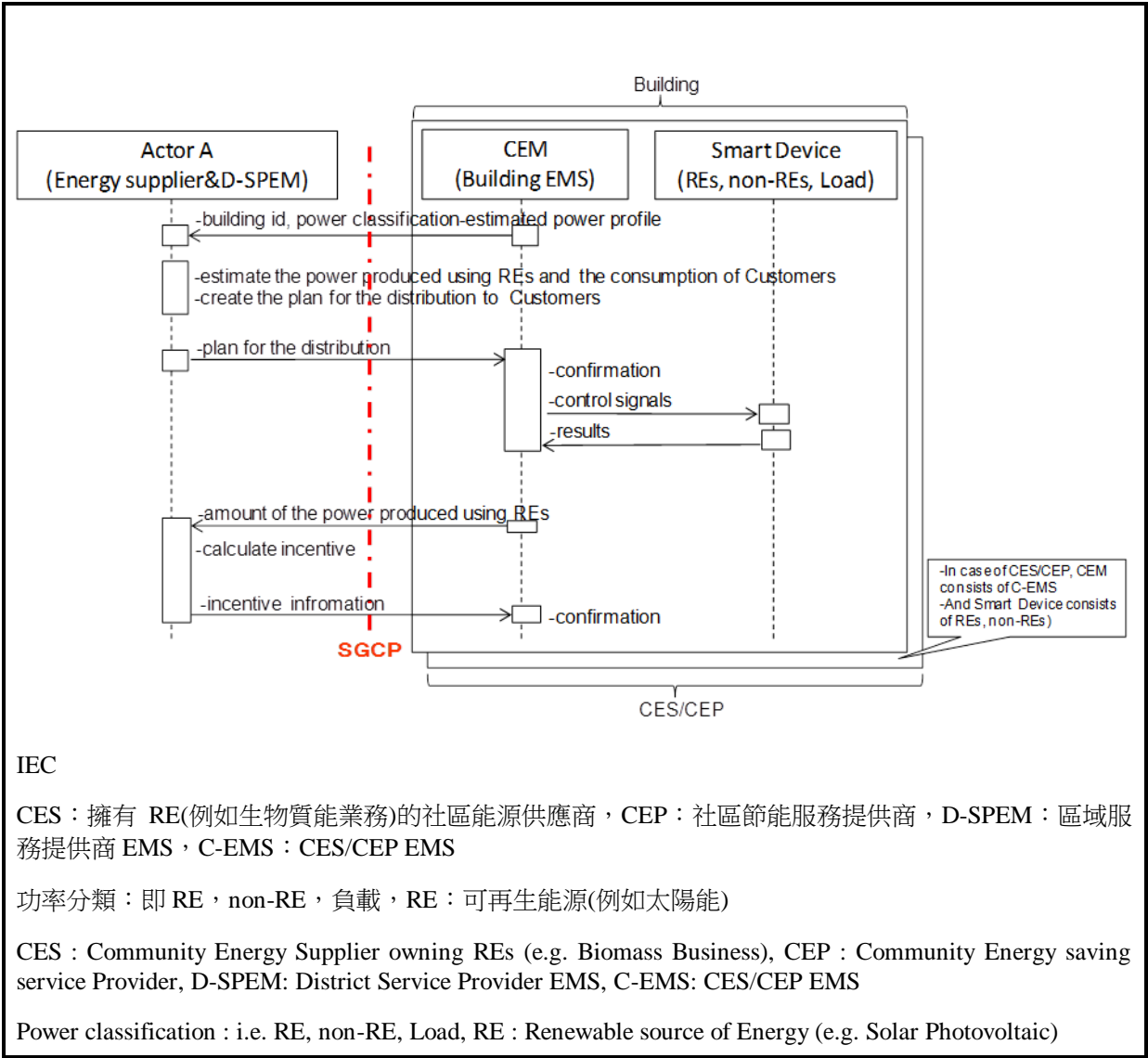


Figure A.24 Sequence diagram

A.3.15.3 技術細節 Technical details

行為者 Actors

行為者 Actors			
分組		群組說明	
Grouping		Group Description	
行為者名稱 請參閱 行為者列表	行為者類型 請參閱 行為者列表	行為者說明請參閱 行為者列表 Actor description see Actor list	Further information specific to this use case
Actor name see Actor list	Actor type see Actor list		

行為者 A Actor A	外部 External	<p>外部行為者(智慧電網市場角色)透過能源管理通訊通道與房屋/建築物或房屋/建築物自動化網路之系統功能及組件進行互動。此市場角色諸如能源提供商、能源服務提供商及聚合商等。</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home/building or home/building automation network through the energy management communication channel. Examples of such market roles are the Energy Provider, the Energy Services Provider, the aggregator, etc.</p> <p>此外於此使用案例中，行為者 A 係由能源供應商及區域服務提供商 EMS(D-SPEM)組成。</p> <p>In addition in this use case, Actor A consists of Energy Supplier and District Service Provider EMS (D-SPEM).</p> <p>能源供應商為終端客戶提供電力的公司。</p> <p>Energy Supplier is a company that delivers electricity to end use customers.</p> <p>D-SPEM 管理節能及自給自足區域/災害恢復之需量供應。</p> <p>D-SPEM manages energy saving and demand-supply for Self-sustaining District/Disaster Recovery.</p>	
CEM	內部 Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the " grid/market " .</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can</p>	

		<p>be combined in the CEM to be mutually controlled.</p> <p>當 CEM 與通訊功能集整合時，稱為用戶能源管理系統或 CEMS。</p> <p>此外，於此使用案例中，CEM 係由 CES/CEP EMS(C-CEM)和建築物 EMS 組成。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System or CEMS.</p> <p>In addition in this use case, CEM consists of CES/CEP EMS(C-CEM) and Building EMS.</p> <p>C-CEM 管理"正常條件之產生及能耗調整"及"災害條件下之能源容納"。</p> <p>C-CEM manages " adjustment of energy production &amp; consumption in normal conditions " and " Energy accommodation in disaster conditions. "</p> <p>建築物 EMS 係為用於監視及控制智慧裝置的系統。</p> <p>Building EMS is a system used to monitor and control smart devices.</p>	
智慧裝置 Smart device	外部 External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>智慧裝置不在 SG-CG 範圍內，因此須將其視為外部行為者。</p> <p>此外於此使用案例中，智慧裝置係由"REs，non-REs 及負載"組成。</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc...). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and signals from the grid in an intelligent way.</p> <p>Since the smart device is outside the scope of the SG-CG, it must be seen as an external actor</p> <p>In addition in this use case, smart device consists of " REs, non-REs and load."</p>	

觸發事件，前提條件，假設



## Triggering event, preconditions, assumptions

使用案例條件 Use case conditions			
行為者/系統/資訊/契約 Actor/System/Information/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption
CEM	註冊有關建築物和擁有 RE /社區節能服務提供商(CES/CEP)的社區能源供應商的訊息  Registration of information regarding the building and the Community Energy Supplier owning REs/Community Energy saving service Provider (CES/CEP)		

## 參考文獻

## References

參考文獻 References						
No.	參考型態 References type	參考 Reference	狀態 Status	對使用案例之影響 Impact on use case	發起人/組織 Originator/Organization	連結 Link

有關分類/映射使用案例的更多資訊 Further information on the use case for classification/mapping

資訊分類
Classification information
與其他使用案例關聯
Relation to other use cases
日本使用案例 Model2，Model3
Japanese use case Model2, Model3
深度
Level of depth
高階使用案例
High level use case
優先序
Prioritisation
高 High
一般、區域或國家關係
Generic, regional or national relation
一般(此使用案例獨立於國家或地區市場設計。應在 62746-2 使用案例和需求討論中達成共識。)
Generic (This use case is independent from the national or regional market design. It should be agreed on the 62746-2 use case & requirement discussion.)
觀點
Viewpoint
技術 Technical
分類的其他關鍵字
Further keywords for classification
智慧電網，自我維持區，災害恢復
Smart Grid, Self-sustaining District, Disaster Recovery

#### A.3.15.4 使用案例的逐步分析 Step by step analysis of use case

##### 情境概述 Overview of scenarios

情境條件					
Scenario conditions					
No.	情境名稱	主行為者	觸發事件	前提條件	後置條件
	Scenario name	Primary actor	Triggering event	Pre-condition	Post-condition

1	可再生能源加速發電  Acceleration of producing power by REs	CEM	註冊有關建築物的訊息。  registration of information regarding the building.		
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## 步驟-情境 Steps – Scenarios

情境 Scenario								
情境名稱 Scenario name:		No. 1 Acceleration of producing power by REs						
步驟編號 Step No.	事件 Event	流程/活動的名稱 Name of process/activity	流程/活動說明 Description of Process/Activity	服務 Service	資訊產生者(行為者) Information Producer (Actor)	資訊接收者(行為者) Information Receiver (Actor)	資訊交換 Information Exchanged	要求, RID Requirements, R-ID
1			CEM  (建築物 EMS, C-EMS) 向行為者 A (能源供應商 & D-SPEM) 註冊“建築物 ID 和與智慧裝置的每個功率分類的估計能源分佈”。  The CEM  (Building EMS, C-EMS) registers “the building id and estimated energy profile with respect to each power classification of smart devices” to the Actor A (Energy supplier & D-SPEM).		CEM  (建築物 EMS, C-EMS)  CEM (Building EMS, C-EMS)	行為者 A  (能源供應商 & D-SPEM)  Actor A (Energy supplier & D-SPEM)	建築物 ID  building id  關於智慧裝置的每個功率分類的估計能源分佈  estimated energy profile with respect to each power classification of smart devices	
2			行為者 A (能源供應商和 D-SPEM) 估計可		行為者 A (能源供應			

			<p>再生能源生產的電力和客戶的能耗。</p> <p>The Actor A (Energy supplier&amp;D-SPEM) estimates the power produced by REs and the consumption of Customers.</p>		<p>商 和 D-SPEM)</p> <p>Actor A (Energy supplier&amp;D-SPEM)</p>			
3			<p>行為者 A(能源供應商和 D-SPEM)建立分配給客戶的計畫。</p> <p>The Actor A (Energy supplier&amp;D-SPEM) creates the plan for the distribution to Customers.</p>		<p>行為者 A (能源供應商和 D-SPEM)</p> <p>The Actor A (Energy supplier&amp;D-SPEM)</p>			
4			<p>行為者 A(能源供應商和 D-SPEM)發送分配計畫。The Actor A (Energy supplier&amp;D-SPEM) sends the plan for the distribution.</p>		<p>行為者 A (能源供應商和 D-SPEM)</p> <p>The Actor A (Energy supplier&amp;D-SPEM)</p>	<p>CEM (建築物 EMS, C-EMS)</p> <p>CEM (Building EMS, C-EMS)</p>	<p>分配計畫 plan for the distribution</p>	
5			<p>CEM(建築物 EMS, C-EMS)從其終端接收確認，並將控制信號發送到 SmartDevice。</p> <p>The CEM(Building EMS, C-EMS) receives confirmation from his terminal, and sends control signals to the SmartDevice.</p>		<p>CEM (建築物 EMS, C-EMS)</p> <p>CEM (Building EMS, C-EMS)</p>	<p>智慧裝置 Smart device</p>	<p>控制信號 control signals</p>	
6			智慧裝置將結果		智慧裝置	CEM	結果	

			發送到 CEM(建築物 EMS , C-EMS)。  The smart device sends results to the CEM(Building EMS, C-EMS).		Smart device	(建築物 EMS , C-EMS)  CEM (Building EMS, C-EMS)	results	
7			CEM(建築物 EMS , C-EMS) 將 RE 產生的電量發送給行為者 A(能源供應商和 D-SPEM)  The CEM (Building EMS, C-EMS) sends amount of the power produced by REs to the Actor A (Energy supplier&D-SPEM).		CEM (建築物 EMS , C-EMS)  CEM (Building EMS, C-EMS)	行為者 A (能源供應商和 D-SPEM)  Actor A (Energy supplier&D-SPEM)	可再生能源發電量  amount of the power produced by REs	
8			行為者 A(能源供應商和 D-SPEM)計算激勵。  The Actor A (Energy supplier&D-SPEM) calculate incentive.		-	-		
9			行為者 A(能源供應商和 D-SPEM)將激勵資訊發送到 CEM(建築物 EMS , C-EMS)  The Actor A (Energy supplier&D-SPEM) sends incentive information to the CEM (Building EMS, C-EMS)		行為者 A (能源供應商和 D-SPEM)  Actor A (Energy supplier&D-SPEM)	CEM (建築物 EMS , C-EMS)  CEM (Building EMS, C-EMS)	獎勵資訊  Incentive information	
10			CEM(建築物 EMS , C-EMS) 收到其終端的確認		-	-		

			The CEM (Building EMS, C-EMS) receives confirmation from his terminal					
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## A.3.15.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	資訊交換說明 Description of information exchanged	資訊資料要求 Requirements for information data
建築物編號(M4-1-1) building id (M4-1-1)	建築物 ID 是用於識別單個建築物的資訊。 The building id is information to identify individual building.	
關於智慧裝置的每個功率分類 11 的估計能量剖繪(M4-1-2) estimated energy profile with respect to each power classification 11 of smart devices (M4-1-2)	估計的能量分佈包括與智慧裝置的每種功率分類有關的能量分佈。 The estimated energy profile consists of energy profile with respect to each power classification of smart devices.	
分配計畫(M4-1-3) plan for the distribution (M4-1-3)	該計畫是計畫資訊以向客戶分配電力。 The plan is planning information to distribute electrical power to Customers.	
控制信號(M4- 1-4) control signals (M4-1-4)	控制信號包括用於控制智慧裝置的信號。 The control signals consists signals for control smart devices.	
結果(M4-1-5) results(M4-1-5)	結果包括控制智慧裝置的結果。 The results includes results of controlling smart device.	
可再生能源發電量(M4-1-6) amount of the power produced by REs (M4-1-6)	CEM 產生的電量是控制可再生能源發電的智慧裝置的結果。 The amount of power is created by CEM as results of controlling smart device that produce power by REs.	
獎勵資訊(M4-1-7) Incentive information (M4-1-7)	該資訊是由行為者 A (能源供應商和 D-SPEM)計算得出的 The information is calculated by Actor A(Energy supplier&D-SPEM)	

**A.3.15.6 要求事項(選項) Requirements (optional)**

要求事項(選項) Requirements (optional)	
要求類別 Categories for requirements	分類說明 Category Description
要求編號 Requirement ID	要求說明 Requirement Description

**A.3.15.7 常用術語和定義 Common terms and definitions**

常用術語和定義 Common terms and definitions	
術語 Term	定義 Definition

**A.3.15.8 自定義訊息(選項) Custom information (optional)**

自定義訊息(選項) Custom information (optional)		
鍵 Key	值 Value	參考章節 Refers to Section

**A.3.16 High level use case (JWG202x) 電池聚合對尖峰移轉之貢獻 Peak Shift  
Contribution by Battery Aggregation**
**A.3.16.1 使用案例說明 Description of the use case**

使用案例名稱 Name of use case

使用案例識別 Use case identification		
ID	區域/域/區	使用案例名稱 Name of use case

	Area/Domain(s)/Zone(s)	
JWG202x	域：分佈式能源(DER)，客戶端 Domains: Distributed Energy Resources (DER), Customer Premises, 區：變電所、場域 Zones: Station, Field	電池聚合對尖峰移轉之貢獻 Peak Shift Contribution by Battery Aggregation (PSCBA)

## 版本管理

## Version management

版本管理 Version management			
版本號碼 Version No.	日期 Date	變化 Changes	批准狀態 Approval status
0	09/08/ 2011	審核草案(版本 1) Draft for Review (version 1)	
1	02/09/ 2011	審查和修訂(版本 2) Reviewed and revised (version 2)	
3	01/10/ 2011	審查和修訂 3 Reviewed and revised 3	
4	04/10/ 2011	審查和修訂 4 Reviewed and revised 4	

版本管理 Version management			
版本號碼 Version No.	日期 Date	變化 Changes	批准狀態 Approval status
5	05/10 2011	審查和修訂 5 Reviewed and revised 5	
6	06/10 2011	審查和修訂 6 Reviewed and revised 6	
0.80	12/02/ 2014	從文檔以 EPRI 格式製作 IEC 格式版本 Made IEC format version from the document in EPRI format	



0.85	17/02 2014	在 2014 年 1 月與 IEC UC 團隊討論進行了修訂  Revised with IEC UC Team discussion at Jan. 2014	
0.90	21/02/ 2014	審查和修訂  Reviewed and revised	工作組徵求意見稿  Draft for WG comments
0.91	12/03 2014	對 JWG 包含的少量修改：  — JWG 使用案例 ID  — 選定的域/區域  Minor modification towards JWG inclusion:  — JWG Use Case IDs  — Domains/Zones selected	

## 使用案例的範圍及目標 Scope and objectives of use case

使用案例的範圍及目標 Scope and objectives of use case	
範圍	電池聚合對尖峰移轉之貢獻  Peak Shift Contribution by Battery Aggregation (PSCBA)
目標	PSCBA 通過使用固定電池和客戶的電池製作虛擬電池來實現高峰時段的高峰轉換。根據協議，客戶 EMS 可能會以客戶電池的剩餘容量參與 PSCBA 服務。  PSCBA realizes peak shift during peak hours by making a Virtual Battery from Stationary Batteries and customer's Batteries. Under a contract, customer side EMS may participate the PSCBA service with surplus capacity of customer's batteries.
相關業務案例 Related business case(s)	因此，PSCBA 有助於提高功率的效率和功率的穩定性。  PSCBA therefore helps to improve efficiency of electric power supply and power supply stabilization.

## 使用案例敘述 Narrative of use case

使用案例敘述 Narrative of use case
簡短說明 Short description
<p>此使用案例說明在透過電池聚合(PSCBA)實現峰移動貢獻期間，電網運營商，電網 EMS，電池 SCADA，固定電池和客戶端 EMS 之間的互動。電池 SCADA 將許多固定電池控制為虛擬電池。客戶端 EMS 可在客戶端 EMS 的控制下參與 PSCBA 服務。</p> <p>This use case describes interactions between the Grid Operator, Grid EMS, Battery SCADA, Stationary Batteries and customer side EMS during Peak Shift Contribution by Battery Aggregation (PSCBA). Battery</p>

使用案例敘述 Narrative of use case
SCADA controls many Stationary Batteries as a Virtual Battery. Customer side EMS may participate PSCBA service under the control of Customer side EMS.
完整說明 Complete description
<p>1 Overview</p> <p>1 概述</p> <p>智慧電網中正在部署許多電池。這些電池是小型且分散的。這些電池可聚合併控制為虛擬能量儲存，可用於峰值移動或負載均衡。控制技術包括電網 EMS，電網運營商以及透過 Battery SCADA 進行的通訊。在此使用案例中引入一種情境，該情境說明透過電池聚合實現峰值偏移貢獻的控制功能。</p> <p>“透過電池聚合產生的峰移貢獻”(PSCBA)是用於透過聚集的電池進行峰移或負載均衡的功能。PSCBA 支持電網運營商制定峰值移動計畫。它封裝固定電池以進行控制，並與用戶的電池進行通訊，以便電網運營商可執行該計畫。</p> <p>在這種情況下說明的互動如下：</p> <p>PSCBA 計算電網中部署的所有電池的總剩餘電勢，並將計算結果作為虛擬能源儲存顯示給電網運營商。電網運營商可使用 PSCBA 來檢查是否可實現峰值轉移計畫。PSCBA 計算固定電池和用戶電池的總剩餘潛力，並與用戶 EMS(例如 HEMS 或 BEMS)就電池剩餘電量的利用進行協議。然後，PSCBA 評估峰移動計畫並將結果顯示給 Grid Operator。</p> <p>在沒有客戶端 EMS 且直接由 PSCBA 控制用戶電池的情況下，在此使用案例中，用戶電池承擔電池控制和 EMS 的角色。</p> <p>Many batteries are being deployed in the smart grid. These batteries are small scale and distributed. These batteries can be aggregated and controlled as Virtual Energy Storage which can be used for peak shifting or load leveling. The control technology comprises a Grid EMS, Grid Operator, and communications via Battery SCADA. A scenario that describes control functions for Peak Shift Contribution by Battery Aggregation is introduced in this use case.</p> <p>"Peak Shift Contribution by Battery Aggregation" (PSCBA) is the function for peak shifting or load levelling by the aggregated batteries. PSCBA supports a Grid Operator to make the plan for peak shifting. It encapsulates Stationary Batteries to control and customer's batteries to communicate with so that a Grid Operator can conduct the plan.</p> <p>The interactions described in this scenario are as follows:</p> <p>PSCBA calculates the total surplus potential of all batteries deployed in the grid and displays the calculated result as virtual energy storage to the Grid Operator. The Grid Operator can use the PSCBA to check whether a peak shifting plan can be realized or not. PSCBA calculates the total surplus potential of Stationary Batteries and customer's batteries and negotiates with a customer side EMS, such as HEMS or BEMS, about utilization of its battery surplus power. Then, PSCBA evaluates the peak shifting plan and displays the result to the Grid Operator.</p> <p>Where there is no customer side EMS and the customer's battery is controlled directly from PSCBA, the customer's battery assumes the roles of both battery control and EMS in this use case.</p> <p>2 敘述性說明</p> <p>2.1 功能概述</p> <p>PSCBA 是支持電網運營商的峰值移動或負載均衡計畫的功能。PSCBA 透過與固定電池和用戶的固定電池進行通訊和控制，來支持電網運營商實施這些計畫。</p> <p>2.2 PSCBA 的功能</p> <p>PSCBA 的功能包括八個子功能：</p>

## 使用案例敘述 Narrative of use case

1 PSCBA 的預設計畫設定

2 顯示 PSCBA 預設計畫的潛力

3 PSCBA 製作計畫

4 PSCBA 計畫的執行通知

5 固定電池的控制

6 用戶電池的操作

7 收集用戶電池的原始操作計畫

8 對 PSCBA 的監控

2 Narrative Description

2.1 Overview of Functions

PSCBA is the function that supports peak shifting or load levelling plans for Grid Operators. PSCBA supports the Grid Operator's implementation of these plans by communicating with and controlling Stationary Batteries and customers' Stationary Batteries.

2.2 Functions of PSCBA

Function of PSCBA comprises eight sub functions:

1 Default Plans Setting for PSCBA

2 Displaying Potential for Default Plans of PSCBA

3 Making Plan for PSCBA

4 Execution Notification of the Plan for PSCBA

5 Control of the Stationary Battery

6 Operation of the Customer's battery

7 Collecting Original Operation Plan of Customer's Battery

8 Monitoring of PSCBA

JWG2021 – PSCBA 的預設計畫設定

預設計畫是典型模式，例如峰值偏移或功率需求減少。電網運營商可根據電力系統負載特性設定預設計畫。如圖 1 所示，預設計畫由系統負載增加/減少值(%)的模式表示。電網操作員可添加或刪除預設計畫。例如，根據季節變化，可針對特定季節制定新的預設計畫，並且直到下一個季節才需要進行更改。

JWG2021 – Default Plans Settings for PSCBA

Default plan is the typical pattern such as peak shift or reduction of power demand. A Grid Operator can set default plans based on power system load characteristics. Default plans are represented by a pattern of system load increased/decreased value (%) depending on the time as shown in Fig.1. A Grid Operator can add or delete default plans. For example, upon season change, a new default plan with regards to the specific season can be made and no changes would be required until the next season.

使用案例敘述 Narrative of use case

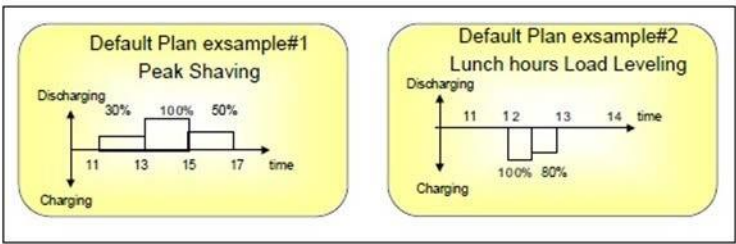


Fig.1 Default Plan

JWG2022 –顯示 PSCBA 預設計畫的潛力

PSCBA 透過使用用戶的原始電池運行計畫來計算與各預設計畫相對應的所有電池的總剩餘電勢。然後，它將結果表示為好像虛擬儲能的虛擬容量幾乎等於所有電池的總剩餘電勢。根據電網操作員的請求，PSCBA 將顯示計算結果，該結果由系統負載增加/減少值(W)的模式表示，具體取決於各預設計畫的時間，如圖 2 所示。

JWG2022 – Displaying Potential for Default plans of PSCBA

PSCBA calculates the total surplus potential of all batteries corresponding to each default plan by using customer's original operation plan of their batteries. It then represents the result as if there is a virtual energy storage that has a virtual capacity nearly equal to the total surplus potential of all batteries. Upon a Grid Operator request, PSCBA displays the calculated result that is represented by a pattern of system load increased/decreased value (W) depending on the time for each default plan as shown Fig.2.

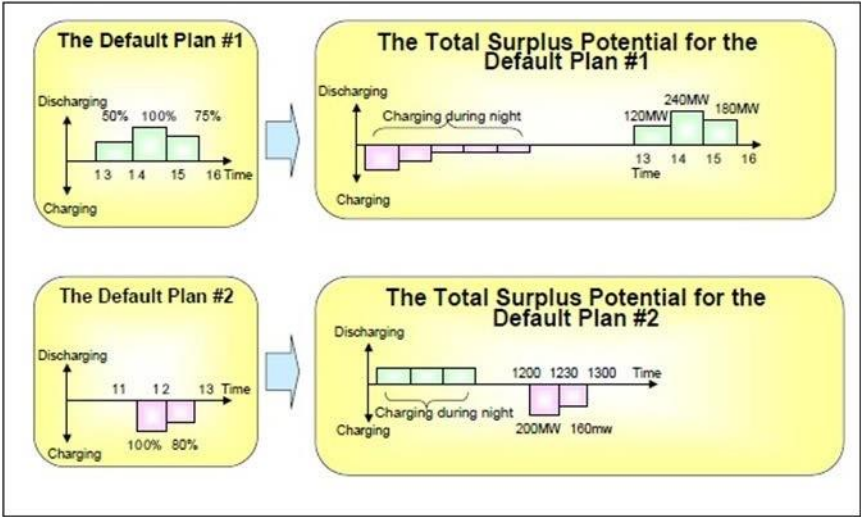


Fig.2 Total Surplus Potential for Default Plan

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PSCBA 還計算預設計畫的電池計畫，如圖 3 所示，並根據要求顯示給電網運營商。

PSCBA also calculates Schedule of Batteries for the Default Plan as shown Fig.3 and displays to Grid Operator upon Request.

## 使用案例敘述 Narrative of use case

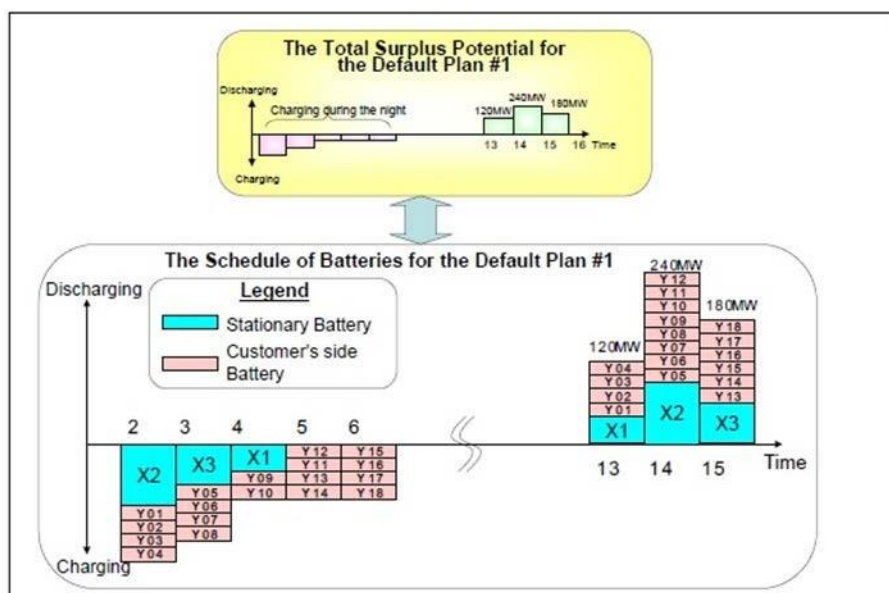


Fig.3 Schedule of Batteries for the Default Plan

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## JWG2023 – PSCBA 計畫

如有必要，電網運營商可指定 PSCBA 的計畫。如圖 4 所示，該計畫由取決於時間的系統負載增加/減少值(W)的模式表示。PSCBA 計算所有電池的總剩餘電勢，並評估計畫的總剩餘電量是否大於計畫。PSCBA 會不斷選擇用戶的電池來製定計畫的電池計畫。屆時，將選擇價格較低的用戶電池。然後，PSCBA 將評估結果顯示為好像有一個虛擬電池的虛擬容量幾乎等於所有電池的總剩餘電勢。評估結果包括固定電池的排程和該計畫的用戶電池，如圖 5 所示。

總盈餘是固定電池和所有用戶電池的所有盈餘之和。在累計用戶剩餘電池電量之前，電池 SCADA 會詢問接受還是拒絕參與，以最大程度地轉移到各用戶 EMS。僅當 PSCBA 獲得客戶端 EMS 的認可時，它才對用戶電池的剩餘電量進行求和。

## JWG2023 – Plan for PSCBA

A Grid Operator can specify the plan for PSCBA, if necessary. The plan is represented by a pattern of system load increased/decreased value (W) depending on the time as shown in Fig.4. PSCBA calculates the total surplus potential of all batteries, and evaluates the plan whether the total surplus is greater than the plan. Continuously, PSCBA selects customer's batteries to make the schedule of batteries for the plan. At that time, the customer's batteries with the lower price are chosen. Then PSCBA displays the evaluation result as if there is one Virtual Battery that has a virtual capacity nearly equal to the total surplus potential of all batteries. The evaluation result includes schedules of Stationary Batteries and customer's batteries for the plan as shown in Fig 5.

The total surplus is the sum of all surpluses of Stationary Batteries and all customers' batteries. Before summing surplus of the customer's battery, Battery SCADA inquires acceptance or rejection of participation to peak shift to each customer side EMS. It sums surplus of the customer's battery, only when PSCBA get acceptance from the customer side EMS.

使用案例敘述 Narrative of use case

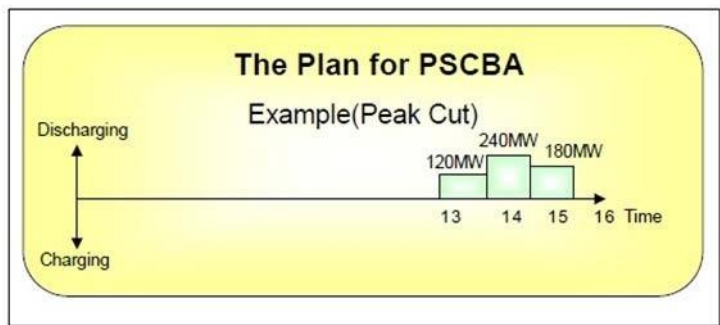


Fig.4 Example of the Plan for PSCBA requested by a Grid Operator

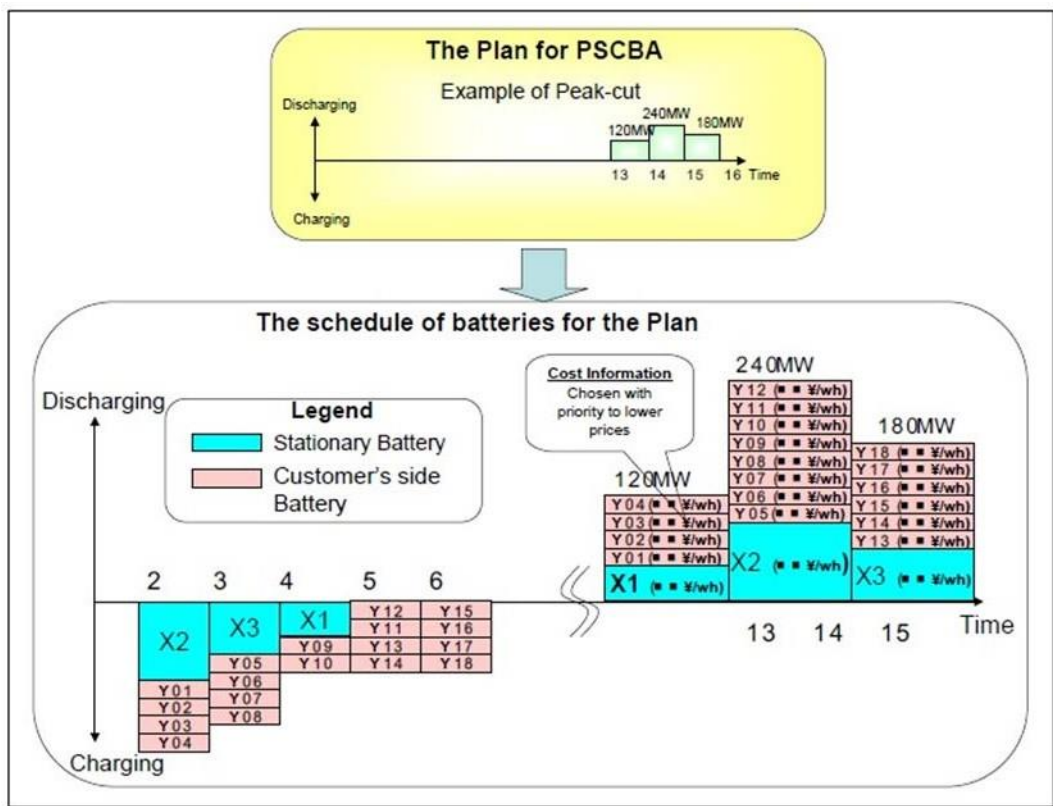


Fig.5 Schedule of Batteries for the Plan

JWG2024 – PSCBA 計畫的執行通知

當電網操作員確定可使用 PSCBA 的計畫時，他會透過 PSCBA 的終端通知計畫的執行。計畫的執行通知將發送到相應的客戶端 EMS (例如 HEMS，BEMS 等)。

JWG2025 –固定電池的控制

在執行針對 PSCBA 的計畫通知後，將根據計畫的電池計畫來控制固定電池。

JWG2026 –用戶電池的控制

當客戶端 EMS 收到計畫的執行通知時，它將根據 PSCBA 發送的充放電計畫來控制用戶的蓄電池。

JWG2027 –收集用戶電池的原始操作計畫

客戶端 EMS 將其用戶電池的原始運行計畫發送給 Battery SCADA，以參加 PSCBA 實施的計畫。PSCBA

## 使用案例敘述 Narrative of use case

記錄並使用它們來計算所有電池的總剩餘電勢。用戶電池的原始運行計畫是以下之一。

- 詳細排程
- 大綱排程
- 剩餘排程

用戶根據用戶電池的管理方法選擇上述選項之一。

## JWG2028 – 監視 PSCBA

PSCBA 顯示 “PSCBA 計畫” 和 “該計畫的電池排程”。它還可計算計畫中列出的電池的充放電總和，並根據電網運營商的要求顯示它們。電網操作員可監視 PSCBA 的運行情況。

## 2.3 實現 PSCBA 服務的活動/服務

要實現 PSCBA 服務，需要以下活動/服務。

## 2.3.1 計算預設計畫的潛在總盈餘

固定電池和客戶端電池的總剩餘電量是根據電池的各詳細訊息/大綱/剩餘排程以及預設計畫(以%模式表示)來計算的，如圖 6 所示。顯示電網營運者的計算結果，如下所示。

## JWG2024 – Execution Notification of Plan for PSCBA

When the Grid Operator determines that the plan for PSCBA is possible, he notifies the execution of the plan via the terminal of PSCBA. Execution notification of the plan will be sent to respective customer side EMS (e.g. HEMS, BEMS, etc.).

## JWG2025 – Control of the Stationary Battery

Upon execution notification of plan for PSCBA, the stationary battery is controlled according to the schedule of batteries for the plan.

## JWG2026 – Control of the Customer's Battery

When the customer side EMS receives execution notification of the plan, it controls the customer's storage battery according to the electrical charge and discharge schedule sent from PSCBA.

## JWG2027 – Collecting Original Operation Plan of Customer's Battery

The customer side EMS sends its Original Operation Plan of Customer's Battery to Battery SCADA to participate the plan conducted by PSCBA. PSCBA records and uses them to calculate the total surplus potential of all batteries. The Original Operation Plan of Customer's Battery is one of the following.

- the detail schedule
- the outline schedule
- the surplus schedule

The Customer selects one of the above depending on the management method of Customer's battery.

## JWG2028 – Monitoring of PSCBA

PSCBA displays ‘the plan for PSCBA’ and ‘the schedule of batteries for the plan’. It also calculates the sum total of charging/discharging of batteries which are listed in the plan, and displays them upon the Grid Operator's request. The Grid Operator can monitor the operation situation of PSCBA.

## 2.3 Activities/Services to realize PSCBA service

The following activities/services are required to realize PSCBA service.

使用案例敘述 Narrative of use case

2.3.1 Calculation of the total surplus potential for the default plan

The total surplus power of Stationary Batteries and customer side batteries are calculated based on each detail/outline/surplus schedule of battery and the default plan that is represented as % pattern as shown in Fig.6. The calculation result is displayed for a Grid Operator as shown below.

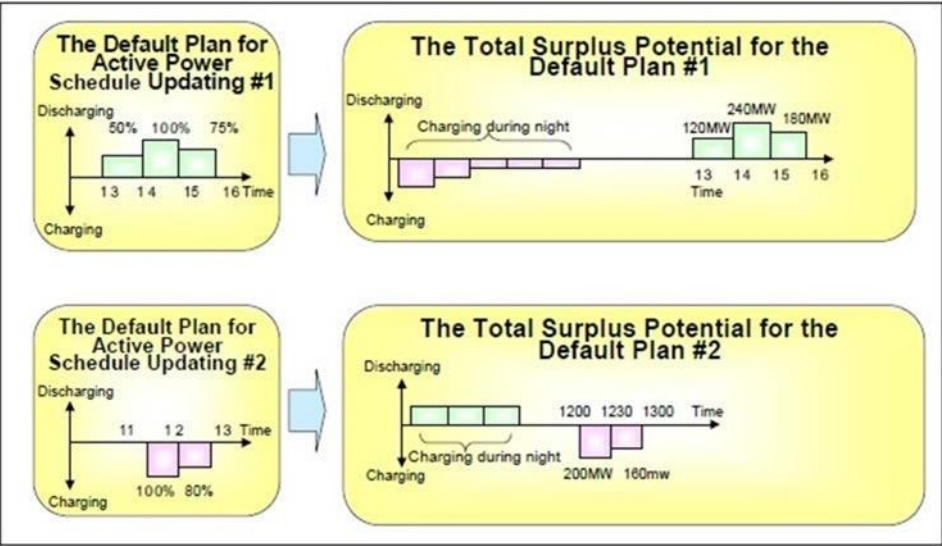


Fig.6 Calculation of the total surplus potential for the default plan

2.3.2 計算預設計畫的電池計畫

根據預設計畫的總潛在剩餘電量的計算結果，電池 SCADA 制定預設計畫的電池計畫，如圖 7 所示。

2.3.2 Calculation of the schedule of batteries for the default plan

From the result of calculated total surplus potential for the default plan, Battery SCADA makes the schedule of batteries for the default plan that is shown in Fig.7.



使用案例敘述 Narrative of use case

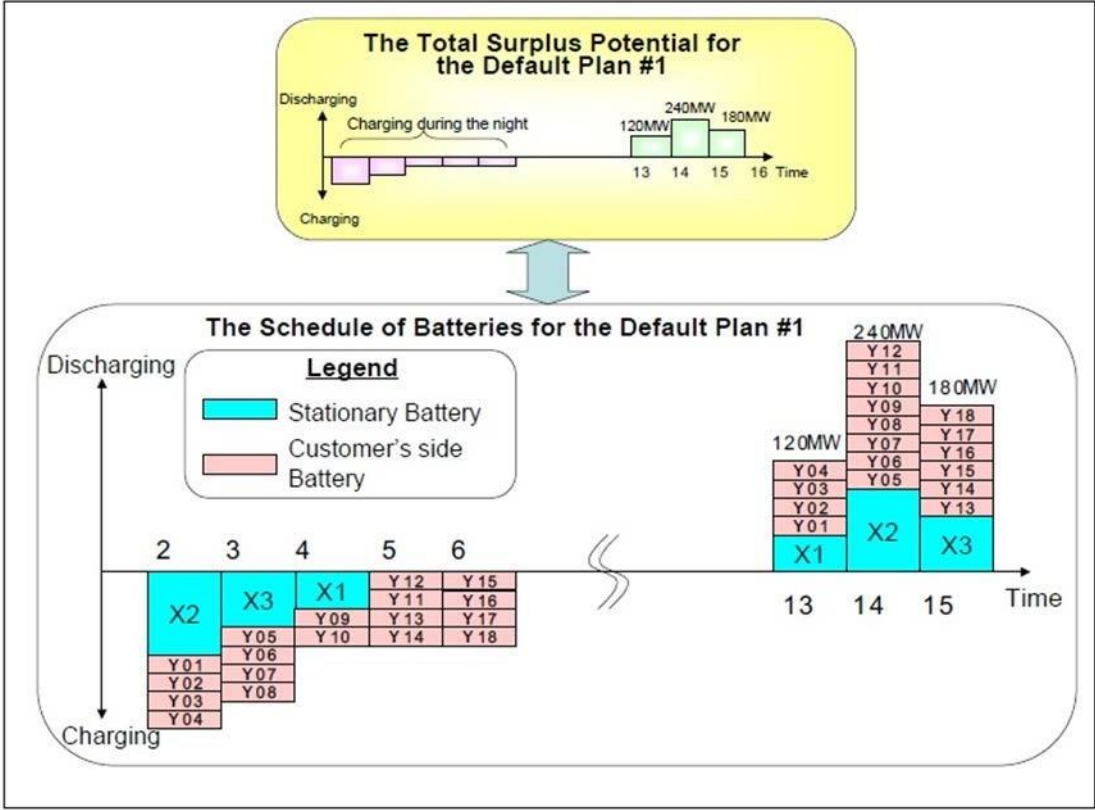


Fig. 7 Calculation of the schedule of batteries for the default plan

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預設計畫的電池計畫包括由費用，電力公司的狀況，電力公司的政策狀況以及各用戶指定的用戶抵押條件得出的成本訊息。

The schedule of batteries for the default plan includes the cost information that is derived from expenses, condition of electrical companies, the policy condition of electric power company and the customer collateral condition specified by each customer.

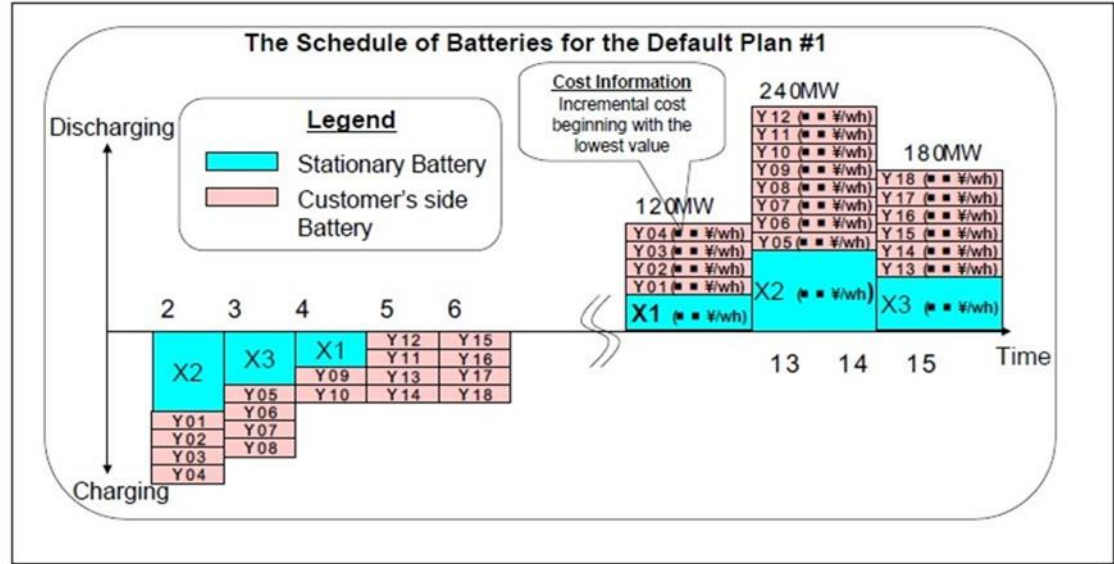


Fig.8 Calculation of the schedule of batteries for the default plan

2.3.3 計畫之電池排程的計算

根據電池的各詳細/大綱/剩餘排程以及以 kW 模式表示的計畫來計算電池計畫，如圖 9 所示。顯示電網營運者的計算結果，如下所示。

2.3.3 Calculation of the schedule of batteries for the plan

The schedule of batteries is calculated based on each detail/outline/surplus schedule of battery and the plan that is represented as kW pattern as shown in Fig.9. The calculation result is displayed for a Grid Operator as shown below.

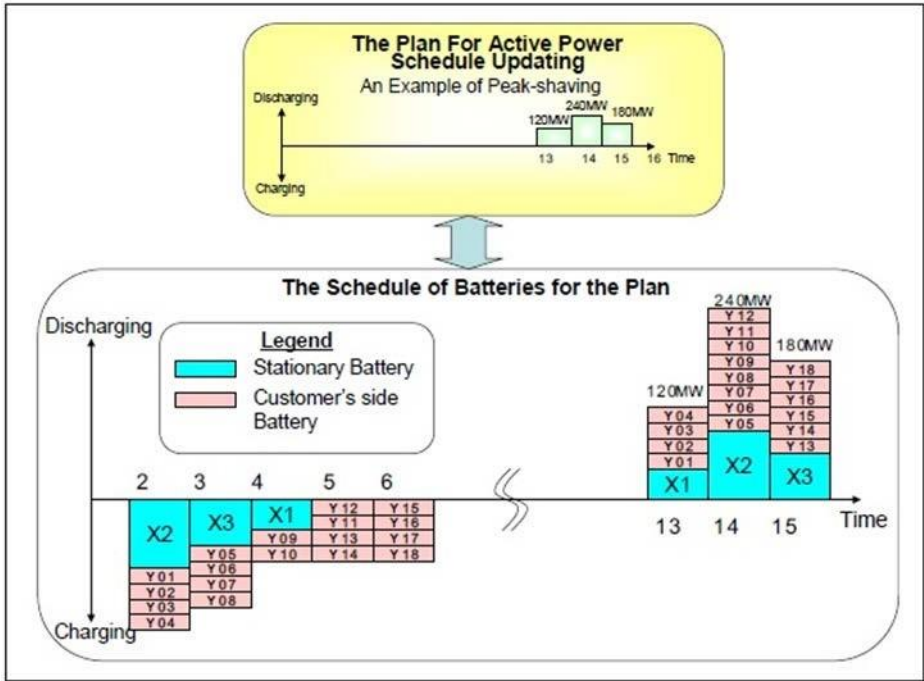


Fig.9 Calculation of the schedule of batteries for the plan

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一般說明 General remarks

一般說明 General remarks

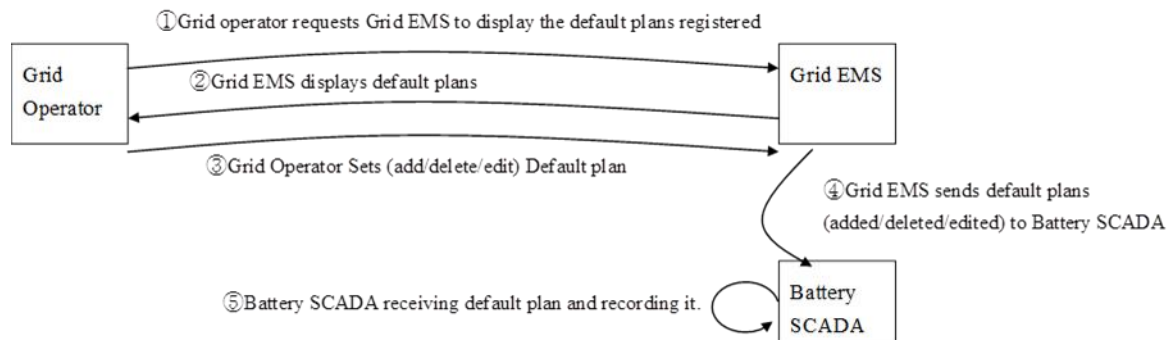
A.3.16.2 使用案例圖 Diagrams of use case

圖 A.25 顯示了使用案例圖。Figure A.25 shows Diagrams of use case.

## 用戶案例圖

## Diagram(s) of use case

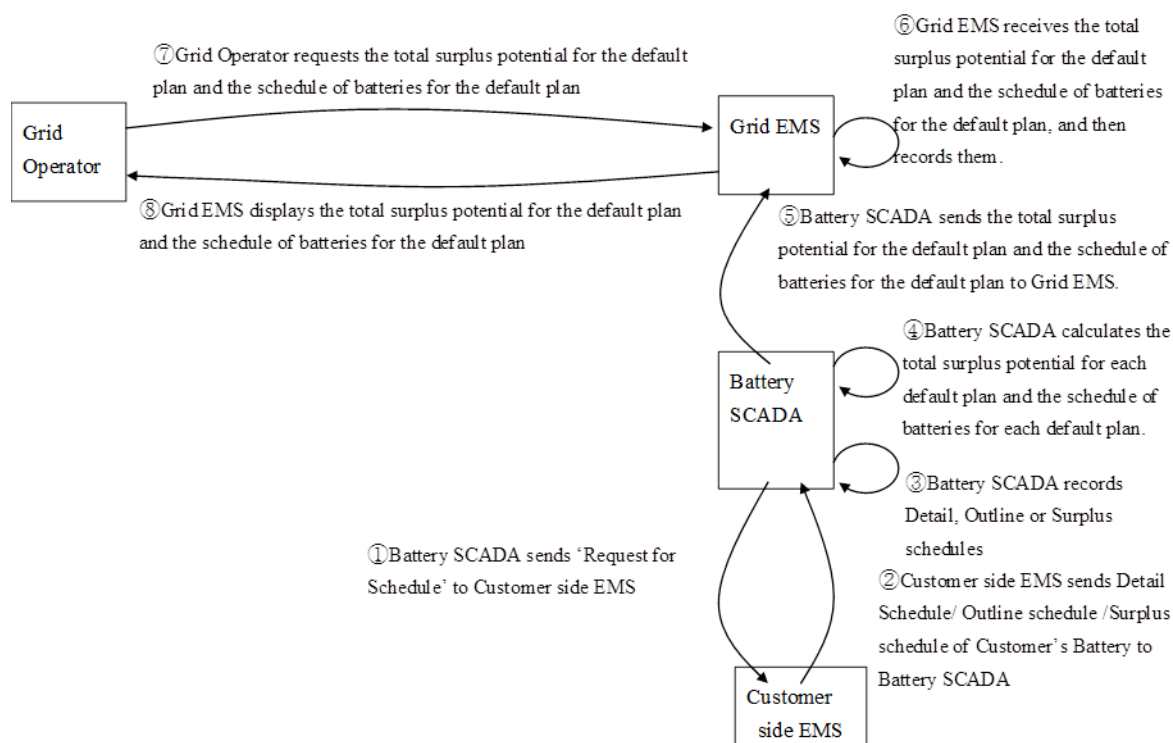
(通訊圖 1) PSCBA 的預設計畫設定 (Communication Diagram 1) Default Plans Setting for PSCBA



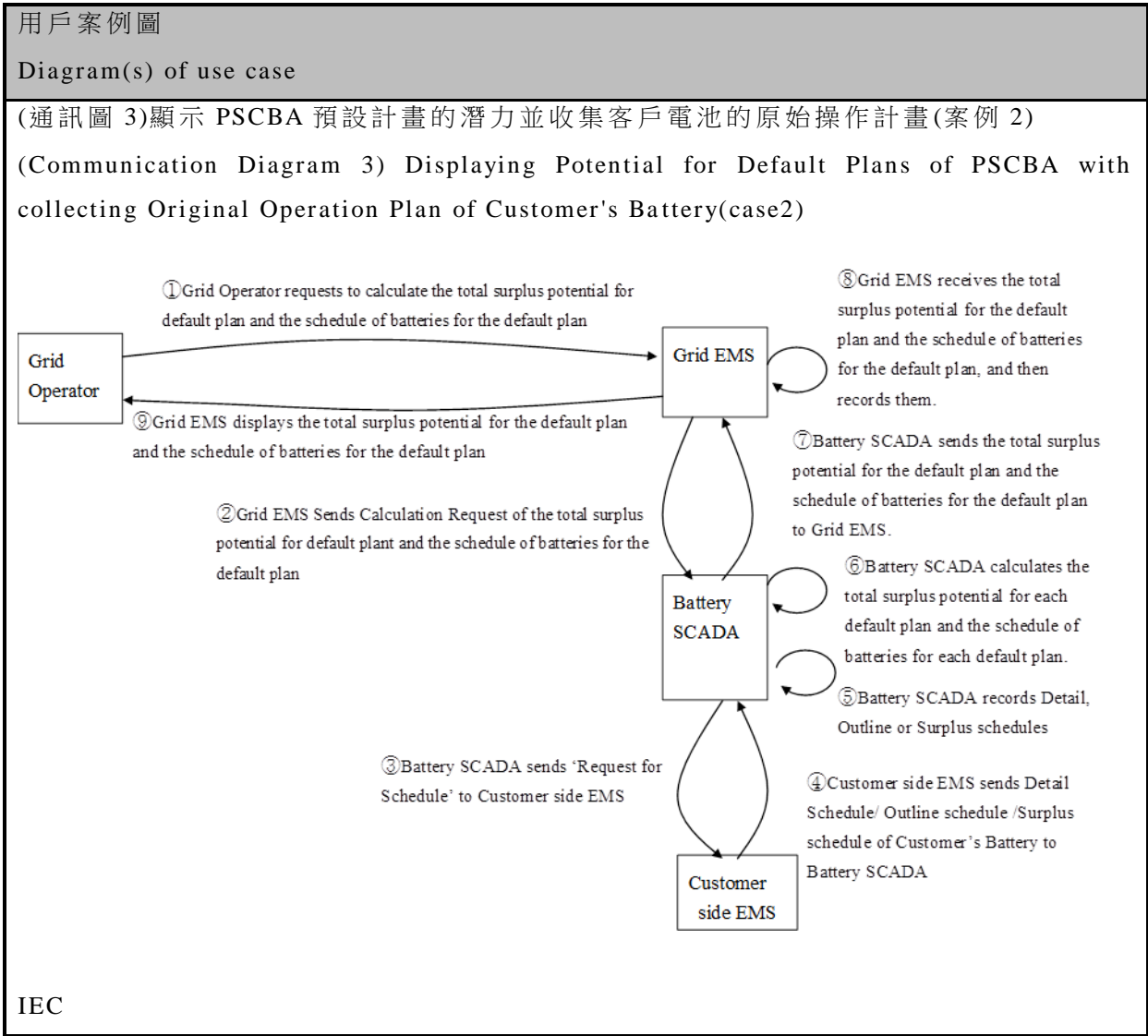
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(通訊圖 2)顯示 PSCBA 預設計畫的潛力並收集客戶電池的原始操作計畫(案例 1)

(Communication Diagram 2) Displaying Potential for Default Plans of PSCBA with collecting Original Operation Plan of Customer's Battery(case 1)

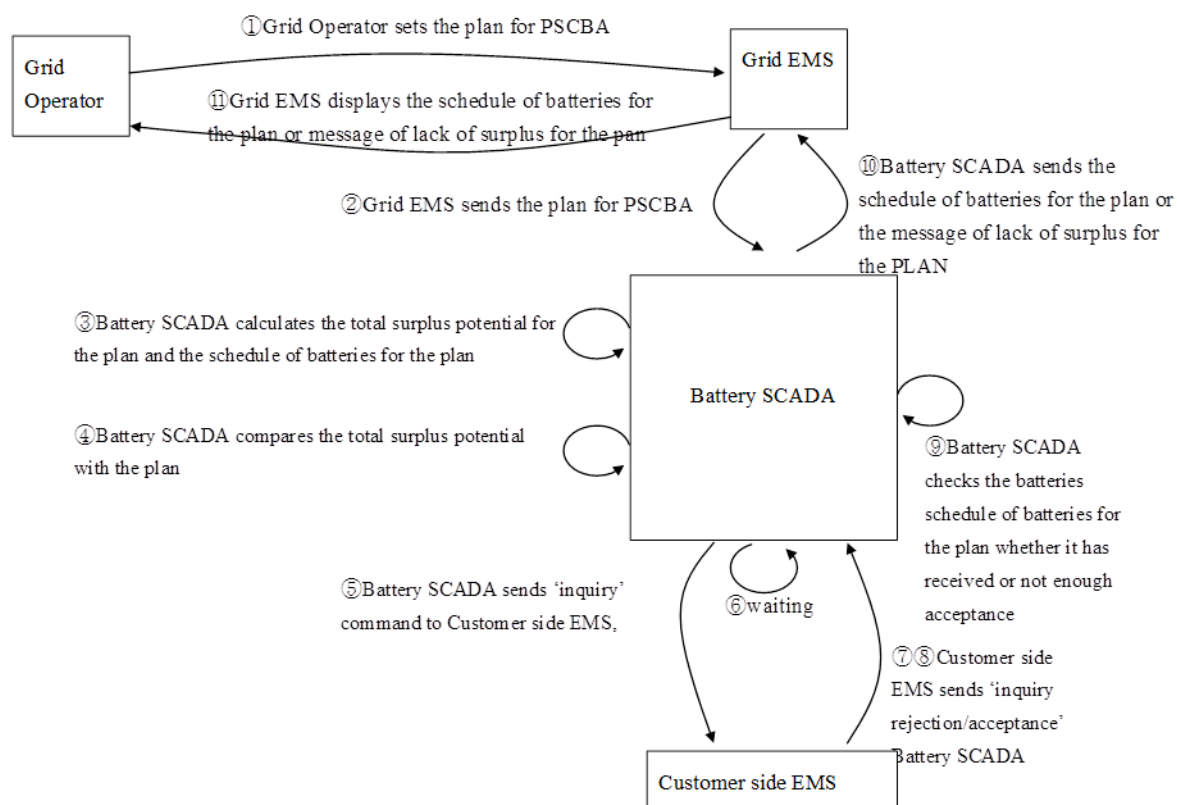


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(通訊圖 4) PSCBA 的製定計畫

(Communication Diagram 4) Making Plan for PSCBA



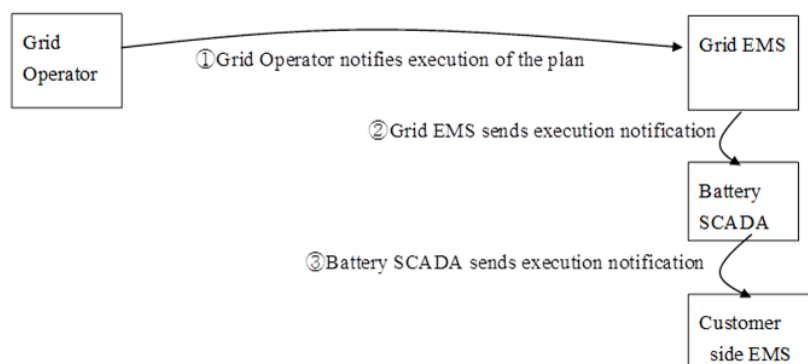
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## 用戶案例圖

Diagram(s) of use case

(通訊圖 5) PSCBA 計畫的執行通知

(Communication Diagram 5) Execution Notification of the Plan for PSCBA



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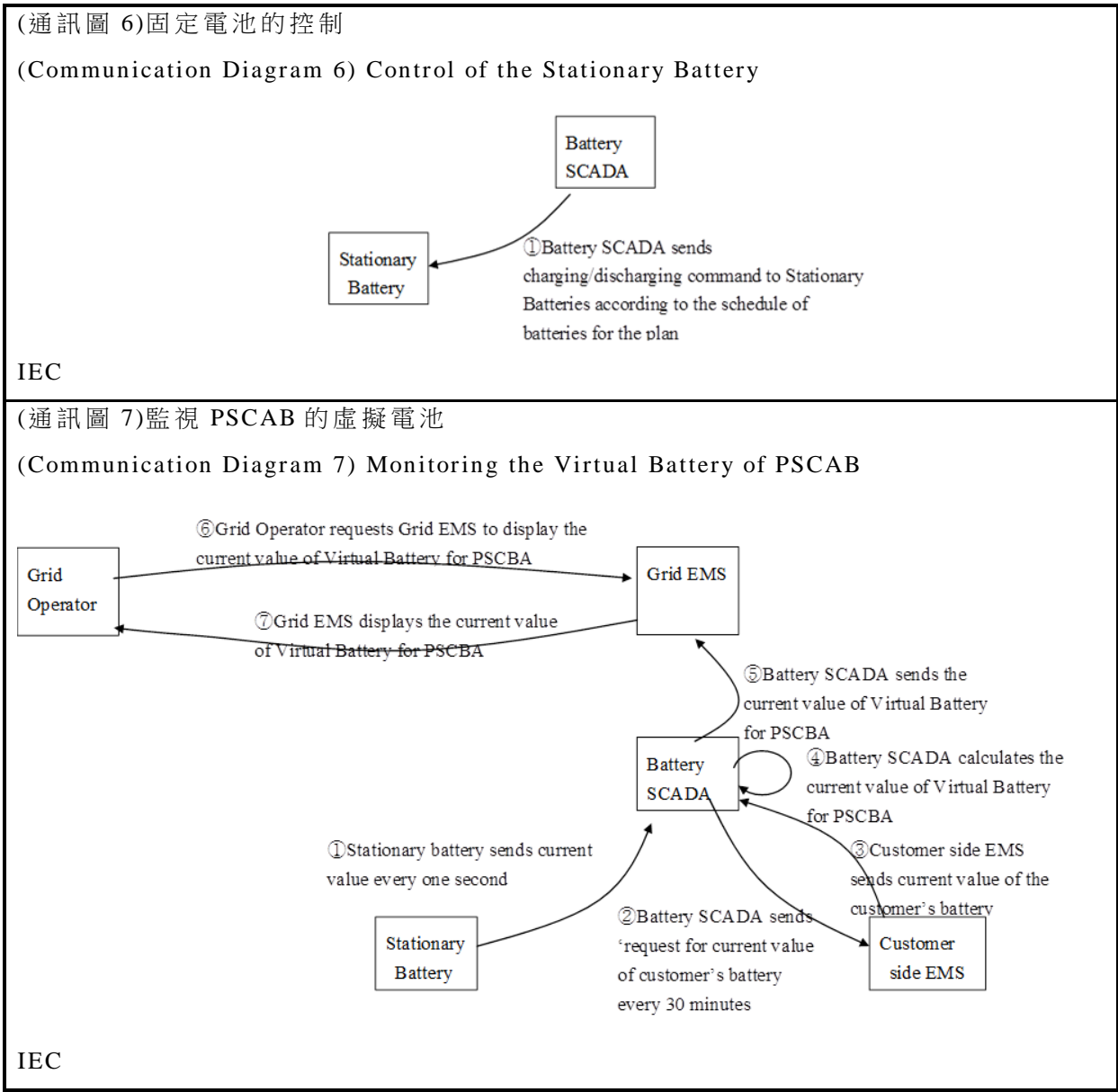


圖 A.25 使用案例圖

Figure A.25 – Use case diagram

A.3.16.3 技術細節 Technical details

行為者 Actors

Actors			
分組 Grouping		群組說明 Group Description	
行為者名稱請參閱行為者列表	行為者類型請參閱行為者列表 Actor Type see	行為者說明請參閱行為者列表 Actor Description see Actor List	特定於此使用案例的更多資訊 Further information

Actor Name see Actor List	Actor List		specific to this use case
透過 SG CP 的行為者 A Actor A via SG CP	外部 External	<p>外部行為者(智慧電網市場角色)透過能源管理通訊通道與家庭或家庭自動化網路中的系統功能和組件進行互動。此類市場角色的範例包括能源提供者，能源服務提供者，聚合商等。</p> <p>在此使用案例中，下面顯示的 Actor 存在於 Actor A 中</p> <p>External actor (Smart Grid Market Role) interacting with the system functions and components in the home or home automation network through the energy management communication channel. Examples of such market roles are the Energy Provider, the Energy Services Provider, the aggregator, etc.</p> <p>In this use case, the Actors shown below exist within Actor A</p>	
從這裡行為者 A 中的行為者 Actors within Actor A from here			
電網 EMS Grid EMS	系統 System	<p>該角色在電網的監視和控制方面具有許多功能。這包括電網的頻率和電壓質量維護，電網的經濟運行和可靠性。</p> <p>Grid EMS 為 Grid Operator 提供人機界面。</p> <p>This actor possesses many functions with regards the monitoring and controlling of the grid. That includes frequency and voltage quality maintenance of the grid, economical operation and reliability of the grid.</p> <p>Grid EMS provides man-machine interface for a Grid Operator.</p>	
電網營運商 Grid Operator	個人 Person	<p>負責維護電網的頻率和電壓質量，經濟運行和電網可靠性。</p> <p>總需求將在 24 小時前預測，並製定旨在滿足總需求的發電計畫。由於在製定發電計畫之後，對需求的預測發生很大變化，或者由於指定使用的發電機停運，電網運營商必須制定並執行峰值調峰計畫。這時，需要 PSCBA(電池聚合的峰值偏移貢獻)。</p> <p>Responsible for the maintenance of the grid's frequency and voltage quality, economic operation and grid reliability.</p> <p>The total demand will be forecasted 24 hours ahead, and the generation schedule designed to cover the total demand is made. Due to the considerable change in the forecast in the demand after making the plan for generation schedule, or due to outage of the power</p>	



		generator appointed for use, the Grid Operator has to make the plan of peak shift and conduct it. At this time, PSCBA (Peak shift contribution by Battery Aggregation) is required.	
電池 SCADA Battery SCADA	系統 System	<p>電池 SCADA 使電網運營商能夠單獨使用固定電池和用戶電池的剩餘容量，將其作為一個大型虛擬電池。</p> <p>電池 SCADA 可計算固定電池的總電勢和用戶電池的剩餘電量。並且，它可為電網運營商編輯計算結果，就好像他們擁有大量虛擬電池一樣。</p> <p>電池 SCADA 控制固定電池，以透過電池聚合實現峰值偏移。它還發送需求請求以使用客戶端 EMS 的剩餘資源。</p> <p>電池 SCADA 收集用戶電池的詳細計畫或剩餘計畫，並以此為基礎計算用戶電池的總剩餘量。</p> <p>電池 SCADA 從客戶端 EMS 接收與電池聚合產生的峰值偏移貢獻相對應的實際充電/放電功率。</p> <p>Battery SCADA enables the Grid Operators to utilize Stationary Batteries and the surplus capability of the customers' batteries as one large Virtual Battery on its own.</p> <p>The Battery SCADA conducts the calculation of the total potential of the stationary battery's and the customer's battery's surplus power. And It edits calculated results for the Grid Operators as if they have a large Virtual Battery.</p> <p>Battery SCADA controls Stationary Batteries to carry out peak shift contribution by Battery Aggregation. It also sends demand request to use surplus of customer side EMS.</p> <p>Battery SCADA collects detail schedule or surplus schedule of customer's batteries based on which it calculates the total surplus of customer's batteries.</p> <p>Battery SCADA receives the real charging/discharging power corresponding to peak shift contribution by Battery Aggregation from customer side EMS.</p>	
固定式電池 Stationary Battery	裝置 Device	<p>固定電池依據電池 SCADA 充電/放電命令進行充電及放電。</p> <p>Stationary Battery charges and discharges according to the charging/discharging commands from Battery SCADA.</p>	

行為者 A 中的行為者到這裡 Actors within Actor A to here			
智慧裝置 Smart device	外部 External	<p>智慧裝置可能為家電、發電機或儲能裝置(本地端儲能裝置包含直接及功能性電儲能器(諸如電化學電池、熱泵)與微 CHP(諸如熱緩存器之燃料電池、冷氣及熱慣性製冷裝置，等))。智慧裝置可透過 CEM 介面直接接收電網資料，並智慧地反應電網端的命令及訊息。</p> <p>A smart device may be an appliance, generator or storage device (Local storage devices include direct and functional electricity storages such as electrochemical batteries, heat pumps and micro CHP such as fuel cells with heat buffers, air conditioning and cooling devices with thermal inertia, etc.). The smart device can receive data directly from the grid, though an interface with the CEM and can react to commands and signals from the grid in an intelligent way.</p> <p>於此使用案例，行為者以下表示為智慧裝置。</p> <p>In this use case, the Actor shown below is used as smart device.</p>	
行為者由此作為智慧裝置 Actor used as smart device from here			
客戶的電池 Customer's battery	裝置 Device	<p>用戶的電池由客戶端 EMS 控制。</p> <p>Customer's batteries are controlled by Customer side EMS.</p>	
行為者至此作為智慧裝置 Actor used as smart device to here			
客戶能源管理者(CEM) Customer Energy Manager (CEM)	內部 Internal	<p>CEM 為一種邏輯功能，可依從電網接收之訊號、消費者設定及契約與裝置最低性能標準來優化能耗及/或產能。</p> <p>The CEM is a logical function optimizing energy consumption and or production based on signals received from the grid, consumer's settings and contracts, and devices minimum performance standards.</p> <p>客戶能源管理系統收集從連接裝置發送及接收之訊息，特別為提及室內/建築物的部份。其可處理一般或專用負載及發電管理命令，然而轉發至連接之裝置。並向"電網/市場"提供資訊。</p> <p>The Customer Energy Manager collects messages sent to and received from connected</p>	

		<p>devices; especially the in-home/building sector has to be mentioned. It can handle general or dedicated load and generation management commands and then forwards these to the connected devices. It provides vice versa information towards the "grid/market".</p> <p>注意，多個負載/發電資源可組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources can be combined in the CEM to be mutually controlled.</p> <p>當 CEM 與通訊功能集整合時，稱為用戶能源管理系統或 CEMS。</p> <p>When the CEM is integrated with communication functionalities it is called a Customer Energy Management System or CEMS.</p> <p>此外，於此使用案例中，CEM 係由 CES/CEP EMS(C-CEM)和建築物 EMS 組成。</p> <p>於此使用案例，行為者以下表示為智慧裝置。</p> <p>In this use case, the Actor shown below is used as smart device.</p>	
<p>行為者由此作為 CEM</p> <p>Actor used as CEM from here</p>			
<p>客戶端 EMS</p> <p>Customer side EMS</p>	<p>系統 System</p>	<p>客戶端 EMS 依據客戶指定之條件(例：抵押條件及電池輸出功率之最大值和最小值)決定是否參與非限制性需量反應。</p> <p>Customer side EMS determines participation in the unrestrictive Demand Response according to the conditions such as the collateral condition and the maximum and minimum value of the battery output power that are specified by the customer.</p> <p>參與後，客戶端 EMS 依據 Battery SCADA 之請求控制客戶之電池。</p> <p>Upon participation, Customer side EMS controls the Customer's Battery according to the request from Battery SCADA.</p>	
<p>行為者至此作為 CEM</p> <p>Actor used as CEM to here</p>			

觸發事件，前提條件，假設

Triggering event, preconditions, assumptions



使用案例條件 Use case conditions			
行為者/系統/資訊/契約 Actor/System/Information/Contract	觸發事件 Triggering event	前提條件 Pre-conditions	假設條件 Assumption
電力公司與用戶之間的契約 Contract between Electric Power Company and the Customer			<p>電氣公司與用戶之間簽訂契約。它包括以下內容：</p> <ul style="list-style-type: none"> <li>— 電池 SCADA 與客戶端 EMS 相互通訊。</li> <li>— 當用戶接受時，電力公司將使用用戶剩餘的電池。</li> <li>— 作為回報，用戶將根據 Battery SCADA 的要求獲得使用電池的獎勵。</li> </ul> <p>Contract is made between the electric company and the customer. It includes following:</p> <ul style="list-style-type: none"> <li>— Battery SCADA and the customer side EMS communicate each other.</li> <li>— The electric company uses the surplus of customer's battery when the customer accepts.</li> <li>— In return, the customer gets a reward for operating its battery according to requests from Battery SCADA.</li> </ul>
電網運營商 Grid Operator		<p>電網運營商將計畫 PSCBA，例如峰值移動，負載均衡或在夜間調整電力負載的波動。</p> <p>Grid Operator is going to plan PSCBA such as peak shifting, load levelling, or smoothing the fluctuations of the power load during night hours.</p>	
電網 EMS Grid EMS		<p>Grid EMS 為 Grid Operator 提供人機界面。</p> <p>Grid EMS provides man-machine interface for a Grid</p>	

		Operator.	
電池 SCADA Battery SCADA		電池 SCADA 已準備就緒，可控制固定電池，與用戶 EMS 進行通訊並與 Grid EMS 進行通訊。  Battery SCADA is ready to control Stationary Batteries, communicate with customer side EMS and communicate with Grid EMS.	
固定式電池 Stationary Battery		固定電池可由 SCADA 電池控制。  Stationary Batteries can be controlled by Battery SCADA.	
客戶端 EMS Customer side EMS		客戶端 EMS 已準備好與 Battery SCADA 通訊並可控制用戶的電池。  Customer side EMS is ready to communicate with Battery SCADA and can control Customer's battery.	

## 參考文獻

## References

參考文獻 References						
No.	參考型態 References type	參考 Reference	狀態 Status	對使用案例之影響 Impact on use case	發起人/組織 Originator/Organization	連結 Link
1	使用案例 Use case	透過電池聚合(虛擬能量儲存)的峰值偏移貢獻  Peak Shift Contribution by Battery Aggregation		本 UC 原件 Original of this UC	EPRI 使用案例資料庫 EPRI Use Case Repository	

		(Virtual Energy Storage)				
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有關分類/映射使用案例的更多資訊 Further information on the use case for classification/mapping

資訊分類 Classification information
與其他使用案例關聯 Relation to other use cases

資訊分類 Classification information
深度 Level of depth
詳細的使用案例 Detailed use case
優先序 Prioritisation
一般、區域或國家關係 Generic, regional or national relation
一般 Generic
觀點 Viewpoint
技術 Technical
Further keywords for classification
智慧電網，固定電池，用戶電池，電池聚合，虛擬電池 Smart Grid, Stationary Battery, Customer Battery, Battery Aggregation, Virtual Battery