

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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A.3.16.4 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	PSCBA 的預設計畫設定 Default Plans Setting for PSCBA	行為者 A 之電網運營商 Grid Operator in Actor A	隨季節變化或需求變化 With every seasonal change or a change in the demand	電網運營商制定了預設計畫以執行 PSCBA。 Grid Operator makes default plans to be assumed to execute PSCBA.	Actor A 中的 Grid EMS 和 Battery SCADA 重新編碼預設計畫。 Grid EMS and Battery SCADA within Actor A recode the default plans.
2	顯示 PSCBA 默認計畫的潛力並收集客戶電池的原始操作計畫(案例 1) Displaying Potential for Default Plans of PSCBA with collecting Original Operation Plan of Customer's Battery (Case 1)	行為者 A 之電池 SCADA Battery SCADA in Actor A	在預定義的時間(例如, 提前 1 天下午 2 點)之前 By a pre-defined time (e.x. 2 pm. 1 day ahead)	依據契約, 與客戶端 EMS 之通訊路徑為啟動狀態 Under the contract, communication path with Customer-side EMS is active	Grid EMS 記錄每個默認計畫的總剩餘潛力以及每個默認計畫的電池計畫, 並根據要求將其顯示給 Grid Operator Grid EMS records the total surplus potential for each default plan and the schedule of batteries for each default plan and displays them to Grid Operator upon request
3	顯示 PSCBA 默認計畫的潛力並收集客戶電池的原始操作計畫(案例 2) Displaying Potential for Default Plans of PSCBA with collecting Original	行為者 A 之電池 SCADA Battery SCADA in Actor A	根據電網運營商的要求 Upon Grid Operator request	依據契約, 與客戶端 EMS 之通訊路徑為啟動狀態 Under the contract, communication path with Customer-side EMS is active	Grid EMS 記錄每個默認計畫的總剩餘潛力以及每個默認計畫的電池計畫, 並根據要求將其顯示給 Grid Operator Grid EMS records the total surplus potential

	Operation Plan of Customer's Battery (Case 2)				for each default plan and the schedule of batteries for each default plan and displays them to Grid Operator upon request
4	為PSCBA制定計畫 Making Plan for PSCBA	行為者 A 之電網運營商 Grid Operator in Actor A	應電網運營商要求 Upon Grid Operator Request	電網運營商制定計畫執行 Grid Operator makes plans to be executed	電池 SCADA 為計畫制定電池計畫，並將其發送給 Grid EMS 和 Grid Operator Battery SCADA makes the schedule of batteries for the plan and sends it to Grid EMS and Grid Operator
5	PSCBA 計畫的執行通知 Execution Notification of the Plan for PSCBA	行為者 A 之電網運營商 Grid Operator in Actor A	當電網運營商審核並批准計畫的電池計畫時 When Grid Operator review and approve The Schedule of Batteries for the Plan	該計畫的電池排程足夠 The schedule of batteries for the plan is sufficient	電池 SCADA 控制固定電池，客戶方 EMS 控制客戶電池。 Battery SCADA controls Stationary Battery and Customer side EMS controls Customer Battery.
6	固定電池的控制 Control of Stationary Battery	行為者 A 之電池 SCADA Battery SCADA in Actor A	在執行 PSCBA 計畫期間，每 1 秒 Every 1second during conducting the plan for PSCBA	電池 SCADA 接收執行通知 Battery SCADA receives the execution notification	Battery SCADA 為 PSCBA 計算虛擬電池的當前值 Battery SCADA calculates the current value of Virtual Battery for PSCBA
7	監視 PSCBA 的虛擬電池，客戶電池 Monitoring the Virtual Battery of PSCBA, Customer Battery	作為 CEM 之客戶端 EMS Customer side EMS as CEM	每 30 分鐘 Every 30 minutes	客戶方 EMS 收到執行通知 Customer side EMS receives the execution notification	客戶方 EMS 發送客戶電池的當前值，電池 SCADA 為 PSCBA 計算虛擬電池的當前值 Customer side

					EMS sends the current value of the customer's battery and Battery SCADA calculates the current value of Virtual Battery for PSCBA
8	監視PSCBA的虛擬電池，固定電池 Monitoring the Virtual Battery of PSCBA, Stationary Battery	行為者 A 之電池 SCADA Battery SCADA in Actor A	每 1 秒 Every 1 second	電池 SCADA 接收執行通知 Battery SCADA receives the execution notification	Battery SCADA 為 PSCBA 計算虛擬電池的當前值 Battery SCADA calculates the current value of Virtual Battery for PSCBA

步驟-情境

Steps – Scenarios

情境 Scenario								
情境名稱 Scenario name:		JWG2021 — PSCBA 的預設計畫設定 JWG2021 — Default Plans Setting for PSCBA						
步驟編號 Step No.	事件 Event	流程 / 活動的名稱 Name of process/activity	Description of process/activity	Service	Information producer (Actor)	Information receiver (Actor)	Information exchanged	Requirements, R-ID
1	隨著每個季節的變化或變化 With every seasonal change or a change in the demand	要求註冊默認計畫 Requesting default plans registered	電網操作員從 Grid EMS 終端請求 Grid EMS 顯示已註冊的默認計畫 Grid operator requests Grid EMS to display the default plans registered, from the terminal of Grid EMS	CREA TE	行為者 A 之電網運營商 Grid Operator in Actor A	行為者 A 之電網 EMS Grid EMS in Actor A	顯示默認計畫的請求 Display Request of Default plans	

2	應電網運營的要求 Upon Grid Operator's request	顯示已註冊的默認計畫 Displaying default plans registered	電網 EMS 顯示默認計畫 Grid EMS displays default plans	GET	行為者 A 之電網 EMS Grid EMS in Actor A	行為者 A 之電網運營商 Grid Operator in Actor A	PSCBA 的默認計畫 Default plan for PSCBA	
3	顯示完成 Completion of displaying	默認計畫設定 Default plan settings	電網運營符集(添加/刪除/編輯)默認計畫。 Grid Operator Sets (add/delete/edit) Default plan.	CHANGE	行為者 A 之電網運營商 Grid Operator in Actor A	行為者 A 之電網 EMS Grid EMS in Actor A	顯示默認計畫的請求 Display Request of Default plans	
4	完成設定默認計畫 Completion of setting default plan	發送默認計畫 Sending default plans	電網 EMS 將默認計畫(添加/刪除/編輯)發送到 Battery SCADA Grid EMS sends default plans (added/deleted/edited) to Battery SCADA	CHANGE	行為者 A 之電網 EMS Grid EMS in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	PSCBA 的默認計畫 Default plan for PSCBA	
5	接收默認計畫 Receiving default plan	記錄默認計畫 Recording default plan	Battery SCADA 接收默認計畫並記錄下來。 Battery SCADA receives default plan and records it.	CHANGE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	PSCBA 的默認計畫 Default plan for PSCBA	

情境

Scenario								
情境名稱 Scenario name:		JWG2022 – 顯示 PSCBA 的默認計畫的潛力並收集客戶電池的原始操作計畫(案例 1) JWG2022 – Displaying Potential for Default Plans of PSCBA with collecting Original Operation Plan of Customer's Battery (Case 1)						
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	到下午 2 點。提前 1 天 By 2 pm. 1 day ahead	傳送請求排程請求 Sending Request for Schedule	Battery SCADA 向客戶方 EMS 發送“排程請求” Battery SCADA sends 'Request for Schedule' to Customer side EMS	CERATE	行為者 A 之電池 SCADA Battery SCADA in Actor A	客戶端 EMS 作為 CEM Customer side EMS as CEM	請求排程 Request for Schedule	
2a (cf)	收到排程要求後 Upon Receiving Request for Schedule	發送客戶電池的詳細排程 Sending Detail Schedule of Customer's Battery	客戶方 EMS 將客戶電池的詳細計畫發送給電池 SCADA Customer side EMS sends Detailed Schedule of Customer's Battery to Battery SCADA	GET	客戶端 EMS 作為 CEM Customer side EMS as CEM	行為者 A 之電池 SCADA Battery SCADA in Actor A	客戶電池的詳細排程 Detail Schedule of Customer's Battery	
2b (cf)	收到排程要求後 Upon Receiving Request for Schedule	發送客戶電池大綱排程 Sending Outline Schedule of Customer's Battery	客戶方 EMS 將客戶電池的大綱計畫發送給電池 SCADA Customer side EMS sends Outline schedule of	GET	客戶端 EMS 作為 CEM Customer side EMS as CEM	行為者 A 之電池 SCADA Battery SCADA in Actor A	客戶電池計畫表 Outline Schedule of Customer's Battery	

			Customer's Battery to Battery SCADA					
2c (cf)	收到排程要求後 Upon Receiving Request for Schedule	發送客戶電池剩餘排程 Sending Surplus schedule of Customer's Battery	客戶方 EMS 將客戶電池的剩餘計畫發送給電池 SCADA Customer side EMS sends Surplus schedule of Customer's Battery to Battery SCADA	GET	客戶端 EMS 作為 CEM Customer side EMS as CEM	行為者 A 之電池 SCADA Battery SCADA in Actor A	客戶電池的剩餘排程 Surplus schedule of Customer's Battery	
3	收到詳細/概述/剩餘計畫後 Upon receiving Detail/Outline/Surplus schedules	記錄明細/大綱/剩餘排程 Recording Detail/Outline/Surplus schedules	電池 SCADA 記錄明細，大綱或剩餘排程 Battery SCADA records Detail, Outline or Surplus schedules	CHANGE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	客戶電池的詳細資訊，大綱或剩餘排程 Detail, Outline or Surplus Schedule of Customer's Battery	
4	從所有客戶 EMS 收到詳細/概述/剩餘計畫後 Upon receiving Detail/Outline/Surplus schedules from all Customer side EMS	計算每個默認計畫的總剩餘潛力以及每個默認計畫的電池計畫 Calculation of the total surplus potential for each default plan and the schedule of batteries for each default	電池 SCADA 計算每個默認計畫的總剩餘電勢以及每個默認計畫的電池計畫。 Battery SCADA calculates the total surplus potential for each default plan and the schedule of batteries for each default plan.	CHANGE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	默認計畫的潛在總剩餘電量以及默認計畫的電池計畫 The total surplus potential for the default plan and the schedule of batteries for the default plan	

		Plans						
5	完成計算 Completion of calculation	發送默認計畫的總潛在剩餘電量和默認計畫的電池計畫。 Sending the total surplus potential for the default plan and the schedule of batteries for the default plan.	電池 SCADA 將默認計畫的總剩餘潛力和默認計畫的電池計畫發送給 Grid EMS。 Battery SCADA sends the total surplus potential for the default plan and the schedule of batteries for the default plan to Grid EMS.	CHAN GE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電網 EMS Grid EMS in Actor A	默認計畫的潛在總剩餘電量以及默認計畫的電池計畫 The total surplus potential for the default plan and the schedule of batteries for the default plan	
6	接收默認計畫的總潛在剩餘電量和默認計畫的電池計畫。 Receiving the total surplus potential for the default plan and the schedule of batteries for the default plan.	記錄默認計畫的總潛在剩餘電量和默認計畫的電池計畫。 Recording the total surplus potential for the default plan and the schedule of batteries for the default plan.	Grid EMS 會接收默認計畫的總潛在剩餘電量和默認計畫的電池計畫，然後進行記錄。 Grid EMS receives the total surplus potential for the default plan and the schedule of batteries for the default plan, and then records them.	CHAN GE	行為者 A 之電網 EMS Grid EMS in Actor A	行為者 A 之電網 EMS Grid EMS in Actor A	默認計畫的潛在總剩餘電量以及默認計畫的電池計畫 The total surplus potential for the default plan and the schedule of batteries for the default plan	
7	根據電網運營商的要求 Upon Grid Operator request	請求默認計畫的總剩餘潛力和默認計畫的電池計畫 Requesting the total surplus	電網運營商請求默認計畫的總潛在剩餘 Grid Operator requests the total surplus potential for the default	CREA TE	電網運營商 Grid Operator	電網 EMS Grid EMS	顯示請求默認計畫的總剩餘潛力以及默認計畫的電池計畫 Display Request of	

		potential for the default plan and the schedule of batteries for the default plan	plan				the total surplus potential for default plan and the schedule of batteries for the default plan	
8	收到電網操作員的顯示請求後 Upon Receiving Grid Operator's display request	顯示默認計畫的總剩餘潛力和默認計畫的電池計畫 Displaying the total surplus potential for the default plan and the schedule of batteries for the default plan	電網 EMS 顯示默認計畫及/或默認計畫的電池計畫的總剩餘潛力 Grid EMS displays the total surplus potential for the default plan and/or the schedule of batteries for the default plan	GET	電網 EMS Grid EMS	電網運營商 Grid Operator	默認計畫的總潛在剩餘量和默認計畫的電池計畫 the total surplus potential for the default plan and the schedule of batteries for the default plan	
(cf)關於“詳細排程”，“概述排程”和“剩餘排程”，應根據客戶電池的管理方法使用其中之一。								
(cf) As for "Detail Schedule", "Outline Schedule" and "Surplus Schedule", one of them shall be used according to the management method of Customer's Battery.								

情境 Scenario								
情境名稱 Scenario name:		JWG2023－顯示 PSCBA 的默認計畫的潛力並收集客戶電池的原始操作計畫(案例 2) JWG2023 – Displaying Potential for Default Plans of PSCBA with collecting Original Operation Plan of Customer's Battery (Case 2)						
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	根據電網	要求計算	電網運營商	CRE	行為者	行為者 A	默認計畫的	

	<p>運營商的要求</p> <p>Upon Grid Operator request</p>	<p>默認計畫的總剩餘潛力和默認計畫的電池計畫</p> <p>Requesting to calculate the total surplus potential for default plan and the schedule of batteries for the default plan</p>	<p>要求計算默認計畫的總剩餘潛力和默認計畫的電池計畫</p> <p>Grid Operator requests to calculate the total surplus potential for default plan and the schedule of batteries for the default plan</p>	ATE	<p>A 之電網運營商</p> <p>Grid Operator in Actor A</p>	<p>之電網 EMS</p> <p>Grid EMS in Actor A</p>	<p>總剩餘潛力的計算請求以及默認計畫的電池計畫</p> <p>Calculation Request of the total surplus potential for default plan and the schedule of batteries for the default plan</p>	
2	<p>收到操作員要求後</p> <p>Upon Receiving Operator request</p>	<p>發送默認計畫的總剩餘潛力的計算請求以及默認計畫的電池計畫</p> <p>Sending Calculation Request of the total surplus potential for default plan and the schedule of batteries for the default plan</p>	<p>電網 EMS 發送默認計畫的總剩餘潛力的計算請求以及默認計畫的電池計畫</p> <p>Grid EMS Sends Calculation Request of the total surplus potential for default plan and the schedule of batteries for the default plan</p>	CRE ATE	<p>行為者 A 之電網 EMS</p> <p>Grid EMS in Actor A</p>	<p>行為者 A 之電池 SCADA</p> <p>Battery SCADA in Actor A</p>	<p>默認計畫的總剩餘潛力的計算請求和默認計畫的電池計畫</p> <p>Calculation Request of the total surplus potential for default plan and the schedule of batteries for the default plan</p>	
3	<p>收到計算請求後，默認工廠的潛在總剩餘量</p> <p>Upon receiving calculation Request of the</p>	<p>傳送請求排程</p> <p>Sending Request for Schedule</p>	<p>Battery SCADA 向客戶方 EMS 發送“排程請求”</p> <p>Battery SCADA sends 'Request for Schedule' to</p>	CER ATE	<p>行為者 A 之電池 SCADA</p> <p>Battery SCADA in Actor A</p>	<p>客戶端 EMS 作為 CEM</p> <p>Customer side EMS as CEM</p>	<p>請求排程</p> <p>Request for Schedule</p>	

	total surplus potential for default plant		Customer side EMS					
4a (cf)	收到排程要求後 Upon Receiving Request for Schedule	發送客戶電池的詳細排程 Sending Detail Schedule of Customer's Battery	客戶方 EMS 將客戶電池的詳細計畫發送給電池 SCADA Customer side EMS sends Detail Schedule of Customer's Battery to Battery SCADA	GET	客戶端 EMS 作為 CEM Customer side EMS as CEM	行為者 A 之電池 SCADA Battery SCADA in Actor A	客戶電池的詳細排程 Detail Schedule of Customer's Battery	
4b (cf)	收到排程要求後 Upon Receiving Request for Schedule	發送客戶電池大綱排程 Sending Outline Schedule of Customer's Battery	客戶方 EMS 將客戶電池的大綱計畫發送給電池 SCADA Customer side EMS sends Outline schedule of Customer's Battery to Battery SCADA	GET	客戶端 EMS 作為 CEM Customer side EMS as CEM	行為者 A 之電池 SCADA Battery SCADA in Actor A	客戶電池計畫表 Outline Schedule of Customer's Battery	
4c (cf)	收到排程要求後 Upon Receiving Request for Schedule	發送客戶電池剩餘排程 Sending Surplus schedule of Customer's Battery	客戶方 EMS 將客戶電池的剩餘計畫發送給電池 SCADA Customer side EMS sends Surplus schedule of Customer's Battery to Battery SCADA	GET	客戶端 EMS 作為 CEM Customer side EMS as CEM	行為者 A 之電池 SCADA Battery SCADA in Actor A	客戶電池的剩餘排程 Surplus schedule of Customer's Battery	
5	收到明細/大綱/剩餘排程後 Upon receiving Detail/Outline/Surpl	記錄詳細/大綱/剩餘排程 Recording Detail/Outline/Surpl	電池 SCADA 記錄明細, 大綱或剩餘排程 Battery SCADA	CHANGE	行為者 A 之電池 SCADA Battery SCADA	行為者 A 之電池 SCADA Battery SCADA in Actor	客戶電池的詳細資訊, 大綱或剩餘排程 Detail, Outline or	

	line/Surplus schedules	us schedules	records Detail, Outline or Surplus schedules		in Actor A	A	Surplus Schedule of Customer's Battery	
6	從所有客戶 EMS 收到詳細/概述/剩餘計畫後 Upon receiving Detail/Outline/Surplus schedules from all Customer side EMSs	計算每個默認計畫的總剩餘潛力以及每個默認計畫的電池計畫 Calculation of the total surplus potential for each default plan and the schedule of batteries for each default Plans	電池 SCADA 計算每個默認計畫的總剩餘電勢以及每個默認計畫的電池計畫。 Battery SCADA calculates the total surplus potential for each default plan and the schedule of batteries for each default plan.	CHANGE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	每個默認計畫的總剩餘潛力以及每個默認計畫的電池計畫 The total surplus potential for each default plan and the schedule of batteries for each default plan	
7	完成計算每個違約計畫的總潛在盈餘 Completion of calculation the total surplus potential for each default plan	發送每個默認計畫的總剩餘潛力以及每個默認計畫的電池計畫 Sending the total surplus potential for each default plan and the schedule of batteries for each default Plans	電池 SCADA 將每個默認計畫的總剩餘電勢和每個默認計畫的電池計畫發送到 Grid EMS Battery SCADA sends the total surplus potential for each default plan and the schedule of batteries for each default plans to Grid EMS	CHANGE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電網 EMS Grid EMS in Actor A	每個默認計畫的總剩餘潛力以及每個默認計畫的電池計畫 The total surplus potential for each default plan and the schedule of batteries for each default plans	
8	收到每個違約計畫的總潛在盈餘後 Upon	記錄每個默認計畫的總剩餘潛力，默認計畫的	Grid EMS 會接收每個默認計畫的總剩餘潛力以及每個默認	CHANGE	行為者 A 之電網 EMS Grid EMS in	行為者 A 之電網 EMS Grid EMS in Actor	每個默認計畫的總潛在剩餘電量以及每個默認計畫的電池	

	Receiving the total surplus potential for each default plan	電池計畫 Recording the total surplus potential for each default plan the schedule of batteries for the default plan	計畫的電池計畫，並進行記錄 Grid EMS receives the total surplus potential for each default plan and the schedule of batteries for each default plans and records them		Actor A	A	計畫 The total surplus potential for each default plan and the schedule of batteries for each default Plan	
9	完成記錄 Completion Recording	顯示每個默認計畫的總剩餘潛力以及該默認計畫的電池計畫 Displaying the total surplus potential for each default plan and the schedule of batteries for the default plan	Grid EMS 顯示每個默認計畫的總剩餘潛力以及該默認計畫的電池計畫 Grid EMS displays the total surplus potential for each default plan and the schedule of batteries for the default plan	GET	行為者 A 之電網 EMS Grid EMS in Actor A	行為者 A 之電網運營商 Grid Operator in Actor A	每個默認計畫的總剩餘潛力以及每個默認計畫的電池計畫 The total surplus potential for each default plan and the schedule of batteries for each default Plan	
(cf)關於“詳細排程”，“概述排程”和“剩餘排程”，應根據客戶電池的管理方法使用其中之一。 (cf) As for “Detail Schedule”, “Outline Schedule” and “Surplus Schedule”, one of them shall be used according to the management method of Customer’s Battery.								

情境 Scenario								
情境名稱 Scenario name:		JWG2024 – PSCBA 的製定計畫 JWG2024 –Making Plan for PSCBA						
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	資訊接收者(行為者) Information Receiver	資訊交換 Information Exchanged	要求，RID Requirements, R-ID

					(Actor)	(Actor)		
1	應電網運營商要求 Upon Grid Operator Request	制定 PSCBA 計畫 Setting the Plan for PSCBA	電網運營商制定 PSCBA 計畫 Grid Operator sets the Plan for PSCBA	CHANG	行為者 A 之電網運營商 Grid Operator in Actor A	行為者 A 之電網 EMS Grid EMS in Actor A	PSCBA 計畫 The Plan for PSCBA	
2	接收電網運營商的請求 Receiving Grid Operator's request	發送 PSCBA 計畫 Sending the Plan for PSCBA	電網 EMS 將 PSCBA 計畫發送給 Battery SCADA Grid EMS sends the Plan for PSCBA to Battery SCADA	CHANG	行為者 A 之電網 EMS Grid EMS in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	PSCBA 計畫 The Plan for PSCBA	
3	收到 PSCBA 計畫後 Upon receiving the Plan for PSCBA	計算計畫的總剩餘潛力和計畫的電池計畫 Calculating the total surplus potential for the plan and the schedule of Batteries for the plan	電池 SCADA 計算該計畫的總剩餘潛力以及該計畫的電池計畫 Battery SCADA calculates the total surplus potential for the plan and the schedule of batteries for the plan	CREATE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	計畫的總潛在盈餘 The total surplus potential for the plan 該計畫的電池排程 The schedule of batteries for the plan	
4	完成計算“計畫的總剩餘潛力” Completion of calculating 'the total surplus potential for the plan'	將剩餘總潛力與計畫進行比較 Comparing the total surplus potential with the plan	電池 SCADA 將總剩餘潛力與計畫 IF [計畫的總剩餘潛力] 燭 [PSCBA 計畫] 進行比較，然後轉到步驟 # 10.a.1，如果否，則轉到步驟 # 5。 Battery SCADA compares the total surplus	CREATE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	PSCBA 計畫 The Plan for PSCBA 計畫的總潛在盈餘 The total surplus potential for the plan	

			potential with the plan IF [the total surplus potential for the plan] 燦[The Plan for PSCBA], Then, move on to step #10.a.1, IF NOT, move on to step #5					
5	完成將總剩餘潛力與計畫進行比較的結果 Completion of comparing the total surplus potential with the plan	向客戶EMS發送“查詢”命令 Sending ‘inquiry’ command to Customer side EMS	Battery SCADA 向客戶方 EMS 發送“查詢”命令， Battery SCADA sends ‘inquiry’ command to Customer side EMS,	CRE ATE	行為者 A 之電池 SCADA Battery SCADA in Actor A	客戶端 EMS 作為 CEM Customer side EMS as CEM	'查詢' ‘Inquiry’	
6	完成向客戶EMS發送“查詢”命令後， Completion of sending ‘inquiry’ command to Customer side EMS,	等待客戶EMS的回覆， Waiting for response to inquiry from Customer side EMS,	電池 SCADA 等待來自客戶方 EMS 的查詢回應，如果在等待期間發生超時，則繼續執行步驟 # 10a.1；如果否，則繼續執行步驟 # 7.a.1 或步驟 # 7.b Battery SCADA waits for response to the inquiry from the Customer side EMS, If, time out occur during waiting, then move on to step #10.a.1, IF NOT,	EXE CUT E	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	'查詢' ‘Inquiry’	

			move on to step #7.a.1 or step #7.b					
7.a.1	收到“查詢”命令 Upon receiving ‘Inquiry’ command	發送“查詢拒絕” Sending ‘Inquiry rejection’	客戶方 EMS 向電池 SCADA 發送“查詢拒絕” Customer side EMS sends ‘inquiry rejection’ to Battery SCADA	CHARGE	客戶端 EMS 作為 CEM Customer side EMS as CEM	行為者 A 之電池 SCADA Battery SCADA in Actor A	查詢拒絕 Inquiry Rejection	
7.a.2	收到“查詢拒絕” Upon receiving ‘inquiry rejection’	接收“查詢拒絕”並更新該計畫的電池計畫 Receiving ‘Inquiry rejection’ and updating the schedule of batteries for the plan	Battery SCADA 收到“查詢拒絕”並更新該計畫的電池計畫(從計畫中刪除拒絕客戶的電池) Battery SCADA receives ‘Inquiry rejection’ and updates the schedule of batteries for the plan (deleting rejecting customer’s battery from the schedule)	CHARGE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	查詢拒絕該計畫的電池排程 Inquiry Rejection The schedule of batteries for the plan	
7.a.3	完成收到“查詢拒絕” Completion of receiving ‘inquiry rejection’	檢查電池的排程以選擇其他客戶的電池 Checking the batteries schedule of batteries for the plan to select another Customer’s battery	電池 SCADA 檢查電池計畫以選擇其他客戶的電池。如果否，則選擇其他客戶的電池，然後轉到步驟 # 10.a.1，否則轉到步驟 # 7.a.4。 Battery SCADA checks the battery	EXECUTE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	該計畫的電池排程 The schedule of batteries for the plan	

			schedule for the plan to select other Customer's battery If no, another customer's battery is selected, then move on to step #10.a.1, Else move on to step #7.a.4					
7.a.4	完成檢查電池排程以選擇其他客戶的電池的計畫 Completion of checking the batteries schedule of batteries for the plan to select other Customer's battery	向客戶EMS發送“查詢”命令 Sending ‘inquiry’ command to Customer side EMS	Battery SCADA 向客戶方 EMS 發送“查詢”命令，轉到步驟6 Battery SCADA sends ‘inquiry’ command to Customer side EMS, Move on to step #6	CRE ATE	行為者A之電池SCADA Battery SCADA in Actor A	客戶端EMS作為CEM Customer side EMS as CEM	查詢 ‘Inquiry’	
7.b	收到“查詢”命令 Upon receiving ‘Inquiry’ command	發送“查詢接受” Sending ‘Inquiry acceptance’	客戶端EMS將驗收發送給Battery SCADA Customer side EMS sends acceptance to Battery SCADA	CH ANGE	客戶端EMS作為CEM Customer side EMS as CEM	行為者A之電池SCADA Battery SCADA in Actor A	查詢接受 Inquiry acceptance	
8	收到“查詢接受” Upon receiving ‘Inquiry acceptance’	接收“查詢接受” Receiving ‘Inquiry acceptance’	Battery SCADA 收到“查詢接受” Battery SCADA receives ‘Inquiry acceptance’	CH ANGE	行為者A之電池SCADA Battery SCADA in Actor A	行為者A之電池SCADA Battery SCADA in Actor A	查詢接受 Inquiry acceptance	
9	完成接收	檢查計畫	電池SCADA	EXE	行為者	行為者	諮詢驗收	

	<p>“查詢接受”</p> <p>Completion of receiving inquiry acceptance</p>	<p>的電池排程，是否收到足夠的驗收</p> <p>Checking the schedule of batteries for the plan whether or not receiving enough acceptances</p>	<p>會檢查該計畫的電池計畫，無論該計畫是否已收到足夠的接受書。如果電池 SCADA 的接受程度不足，則轉到步驟 6，否則，轉到步驟 10.b1</p> <p>Battery SCADA checks the schedule of batteries for the plan whether it has received or not received enough acceptances. If Battery SCADA has not enough acceptances, then move on to step #6, Else, move on to step #10.b1</p>	CUT E	<p>A 之電池 SCADA</p> <p>Battery SCADA in Actor A</p>	<p>A 之電池 SCADA</p> <p>Battery SCADA in Actor A</p>	<p>計畫電池的排程</p> <p>Inquiry acceptance the schedule of batteries for the plan</p>	
10.a.1	<p>在步驟 # 4.4 中，總剩餘量不足，或者在步驟 # 4.6 中，發生超時，或者在步驟 # 4.7.a.3 中，未選擇其他客戶的電池</p> <p>In step #4.4, the total surplus is not enough, or in step #4.6, time</p>	<p>向 Grid EMS 發送缺少計畫的訊息</p> <p>Sending Message of lack of surplus for the plan to Grid EMS</p>	<p>電池 SCADA 向 Grid EMS 發送有關該計畫和該計畫的電池計畫不足的資訊</p> <p>Battery SCADA Sends Message of lack of surplus for the plan and the schedule of batteries for the plan to Grid EMS</p>	CHARGE	<p>行為者 A 之電池 SCADA</p> <p>Battery SCADA in Actor A</p>	<p>行為者 A 之電網 EMS</p> <p>Grid EMS in Actor A</p>	<p>計畫缺少盈餘和計畫電池計畫的訊息</p> <p>Message of lack of surplus for the plan and The schedule of batteries for the plan</p>	

	out occurs, or in step #4.7.a.3, no other customer's battery is selected							
10.a.2	收到該計畫缺乏盈餘的訊息 Upon receiving Message of lack of surplus for the plan	接收該計畫盈餘和該計畫電池計畫不足的訊息 Receiving Message of lack of surplus for the plan and the schedule of batteries for the plan	Grid EMS 收到有關該計畫和該計畫電池計畫不足的訊息 Grid EMS receives Message of lack of surplus for the plan and the schedule of batteries for the plan	CHANG	行為者 A 之電網 EMS Grid EMS in Actor A	行為者 A 之電網 EMS Grid EMS in Actor A	計畫缺乏盈餘和計畫電池計畫的訊息 Message of lack of surplus for the plan and The schedule of batteries for the plan	
10.a.3	完成接收訊息 Completion of receiving Message	顯示該計畫缺乏盈餘和該計畫的電池計畫的訊息 Display Message of lack of surplus for the plan and the schedule of batteries for the plan	電網 EMS 顯示該計畫缺乏剩餘電量以及該計畫的電池計畫不足的訊息。移至“退出”，或移至第 1 步以重試其他計畫 Grid EMS displays Message of lack of surplus for the plan and the schedule of batteries for the plan. Move on to Exit, Or move on to step #1 to retry with another plan	CHANG	行為者 A 之電網 EMS Grid EMS in Actor A	行為者 A 之電網運營商 Grid Operator in Actor A	計畫缺乏盈餘的訊息計畫電池的排程 Message of lack of surplus for the plan The schedule of batteries for the plan	
10.b.1	接受所有“查詢” Upon all 'Inquiry acceptanc	發送計畫的電池排程 Sending the schedule of batteries for	電池 SCADA 發送該計畫的電池計畫 Battery SCADA sends the	CHANG	行為者 A 之電池 SCADA Battery SCADA	行為者 A 之電網 EMS Grid EMS in	該計畫的電池排程 Schedule of batteries for the plan	

	e'	the plan	schedule of batteries for the plan		in Actor A	Actor A		
10.b2	收到計畫的電池排程後 Upon receiving the schedule of batteries for the plan	顯示計畫的電池排程 Display the schedule of batteries for the plan	電網 EMS 顯示該計畫的電池計畫 Grid EMS displays the schedule of batteries for the plan	GET	行為者 A 之電網 EMS Grid EMS in Actor A	行為者 A 之電網運營商 Grid Operator in Actor A	該計畫的電池排程 Schedule of batteries for the plan	

情境 Scenario								
情境名稱 Scenario name:		JWG2025 – PSCBA 計畫的執行通知 JWG2025 – Execution Notification of the Plan for PSCBA						
步驟編號 Step No.	事件 Event	流程/活動的名稱 Name of process/activity	Description of process/activity	Service	Information producer (Actor)	Information receiver (Actor)	資訊交換 Information Exchanged	Requirements, R-ID
1	當電網運營商審核並批准計畫的電池計畫時 When Grid Operator review and approve The Schedule of Batteries for the Plan	通知計畫執行 Notifying execution of the plan	電網運營商通知計畫執行 Grid Operator notifies execution of the plan	CHANGE	行為者 A 之電網運營商 Grid Operator in Actor A	行為者 A 之電網 EMS Grid EMS in Actor A	執行通知 Execution Notification	
2	收到執行通知後 Upon receiving Execution Notification	發送執行通知 Sending Execution Notification	電網 EMS 將執行通知發送到電池 SCADA。 Grid EMS sends Execution Notification to	CHANGE	行為者 A 之電網 EMS Grid EMS in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	執行通知 Execution Notification	

			Battery SCADA.					
3	收到執行通知後 Upon receiving Execution Notification	發送執行通知 Sending Execution Notification	電池 SCADA 將執行通知發送到客戶方 EMS Battery SCADA sends Execution Notification to Customer side EMS	CHANGE	行為者 A 之電池 SCADA Battery SCADA in Actor A	客戶端 EMS 作為 CEM Customer side EMS as CEM	執行通知 Execution Notification	

情境 Scenario								
情境名稱 Scenario name:		JWG2026 –Control of Stationary Battery						
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	在執行PSCBA計畫期間，每1秒 Every 1 second during conducting the plan for PSCBA	發送充電/放電命令 Sending Charging/Discharging command	電池 SCADA 根據該計畫的電池計畫將充電/放電命令發送到固定電池 Battery SCADA sends Charging/Discharge command to Stationary Battery according to the schedule of batteries for the plan	CHANGE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 中之固定電池 Stationary Battery in Actor A	充電/放電命令 Charging/Discharging command	

2	收到充電/放電命令 Upon receiving Charging/Discharging command	正在充電或正在放電發送當前狀態 Charging or Discharging Sending Current Status	固定電池根據充電/放電命令進行充電或放電，並將當前狀態發送到電池 SCADA Stationary Batteries charge or discharge according Charging/Discharge command And sends Current Status to Battery SCADA	CHANGE	行為者 A 中之固定電池 Stationary Battery in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	每個固定電池的當前狀態 Current Status of each stationary battery	
3	收到每個固定電池的當前狀態時 Upon receiving current Status of each stationary battery	記錄每個固定電池的電流狀態 Recording current Status of each stationary battery	電池 SCADA 記錄每個固定電池的當前狀態 Battery SCADA records current Status of each stationary battery	CHANGE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	每個固定電池的當前狀態 Current Status of each stationary battery	

情境 Scenario								
情境名稱 Scenario name:		JWG2027 - 監視 PSCBA 的虛擬電池，客戶電池 JWG2027 - Monitoring the Virtual Battery of PSCBA, Customer Battery						
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	每 30 分鐘 Every 30 minutes	發送“請求客戶電池的當前狀態” Sending ‘request for current	電池 SCADA 向客戶的 EMS 發送“對客戶電池的當前狀態的請求” Battery	CREATE	行為者 A 之電池 SCADA Battery SCADA in Actor A	客戶端 EMS 作為 CEM Customer side EMS as CEM	請求客戶電池的當前狀態 request for current status of Customer’s	

		status of Customer's Battery	SCADA sends 'request for current status of Customer's Battery' to customers' EMSs				Battery	
2	收到“要求了解客戶電池的當前狀態”後 Upon receiving 'request for current status of Customer's Battery'	發送每個客戶電池的當前狀態 Sending current status of each Customer's Battery	客戶方 EMS 發送每個客戶電池的當前狀態 Customers' side EMS sends current status of each Customer's Battery	GET	客戶端 EMS 作為 CEM Customer side EMS as CEM	行為者 A 之電池 SCADA Battery SCADA in Actor A	每個客戶電池的當前狀態 Current status of each Customer's Battery	
3	收到當前狀態 Upon receiving current status	接收並記錄每個客戶電池的當前狀態 Receiving and recording current status of each Customer's Battery	電池 SCADA 接收並記錄每個客戶電池的當前狀態 Battery SCADA receives and records current status of each Customer's Battery	CHANGE	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	每個客戶電池的當前狀態 Current status of each Customer's Battery	

情境 Scenario								
情境名稱 Scenario name:		JWG2028—監視 PSCBA 的虛擬電池，固定電池 JWG2028 –Monitoring the Virtual Battery of PSCBA, Stationary Battery						
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	資訊接收者(行為者)Information Receiver	資訊交換 Information Exchanged	要求，RID Requirements, R-ID

					(Actor)	(Actor)		
1	每 1 秒 Every 1 second	PSCAB 虛擬電池當前狀態的計算 Calculation of Current Status of Virtual Battery for PSCAB	Battery SCADA 使用每個客戶電池的當前狀態，每個固定電池的當前狀態以及該計畫的電池計畫來計算 PSCAB 的虛擬電池的當前狀態 Battery SCADA Calculates Current Status of Virtual Battery for PSCAB using Current Status of each Customer's Battery, Current Status of each Stationary Battery and the Schedule of Batteries for the Plan	CHANG E	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電池 SCADA Battery SCADA in Actor A	PSCAB 虛擬電池的當前狀態 Current Status of Virtual Battery for PSCAB	
2	完成 PSCAB 虛擬電池當前狀態的計算 Completion of calculating Current Status of Virtual Battery for PSCAB	發送 PSCAB 虛擬電池的當前狀態 Sending Current Status of Virtual Battery for PSCAB	電池 SCADA 將用於 PSCAB 的虛擬電池的當前狀態發送到 Grid EMS Battery SCADA sending Current Status of Virtual Battery for PSCAB to Grid EMS	CHANG E	行為者 A 之電池 SCADA Battery SCADA in Actor A	行為者 A 之電網 EMS Grid EMS in Actor A	PSCAB 虛擬電池的當前狀態 Current Status of Virtual Battery for PSCAB	
3	接收 PSCAB 虛	記錄 PSCAB 虛	電網 EMS 記錄 PSCAB	CHANG E	行為者 A 之電	行為者 A 之電	PSCAB 虛	

	擬電池的當前狀態 Receiving Current Status of Virtual Battery for PSCAB	擬電池的當前狀態 Recording Current Status of Virtual Battery for PSCAB	的虛擬電池的當前狀態 Grid EMS records Current Status of Virtual Battery for PSCAB		網 EMS Grid EMS in Actor A	網 EMS Grid EMS in Actor A	當前狀態 Current Status of Virtual Battery for PSCAB	
4	根據電網運營商的要求 Upon Grid Operator request	請求顯示 PSCAB 的虛擬電池的當前狀態 Requesting Display of Current Status of Virtual Battery for PSCAB	電網操作員請求顯示 PSCAB 的虛擬電池的當前狀態 Grid Operator request display of Current Status of Virtual Battery for PSCAB	CREATE	行為者 A 之電網運營商 Grid Operator in Actor A	行為者 A 之電網 EMS Grid EMS in Actor A	顯示 PSCAB 虛擬電池當前狀態的請求 Display Request of Current Status of Virtual Battery for PSCAB	
5	收到顯示請求後 Upon receiving Display Request	顯示 PSCAB 的虛擬電池的當前狀態 Displaying Current Status of Virtual Battery for PSCAB	電網 EMS 顯示 PSCAB 的虛擬電池的當前狀態 Grid EMS displays Current Status of Virtual Battery for PSCAB	GET	行為者 A 之電網 EMS Grid EMS in Actor A	行為者 A 之電網運營商 Grid Operator in Actor A	Current Status of Virtual Battery for PSCAB	

A.3.16.5 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
請求用戶電池的當前狀態 Request for Current Status of Customer's Battery	這是“用戶電池當前狀態”的請求命令。每 30 分鐘，此命令將從 Battery SCADA 發送到各客戶端 EMS。 This is a request command for Current Status of Customer's Battery. Every 30 min, this command will be sent from the Battery	此命令包括用戶 EMS 的 ID 作為此訊息的目的地 This command includes ID for customer side EMS as the destination of this message

	SCADA to each customer side EMS.	
各用戶電池的當前狀態 Current Status of each Customer's Battery	這是對“用戶電池當前狀態請求”的回應。 This is the response of the Request for Current Status of Customer's Battery.	此訊息包括有功功率，SOC 和用戶電池的運行狀況，這由客戶端 EMS 進行控制。 This information includes active power, SOC and operation condition of Customer's battery which is controlled by the customer side EMS.
各固定電池的當前狀態 Current Status of each Stationary Battery	該訊息包括有功功率，SOC 和操作狀況以及遠程/本地狀況。 This information includes active power, SOC and operation condition, and Remote/local condition.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]
PSCBA 的預設計畫 Default Plan for PSCBA	PSCBA 的常用模式。時槽以功率百分比顯示。 有關 PSCBA 的預設計畫，請參見第 1.4 節中的圖 1。 Commonly used pattern for PSCBA. Time period is displayed by power in percentage. See Fig. 1 in section 1.4 for Default Plan for PSCBA.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]
顯示預設計畫的請求 Display Request of Default plans	這是預設計畫的顯示請求。 This is a display request of Default plan.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]
計算預設計畫的總剩餘潛力的請求 Calculation Request of the total surplus potential for default plan	這是預設計畫的總潛在剩餘的計算請求。 This is a calculation Request of the total surplus potential for default plan.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]
計畫總剩餘潛力的計算請求 Calculation Request of the total surplus potential for the plan	這是該計畫潛在總盈餘的計算請求。 This is a calculation Request of the total surplus potential for the plan.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]
顯示預設計畫的總剩餘潛力的請求 Display Request of the total surplus potential for default plan	這是顯示預設計畫潛在總剩餘潛力的顯示請求。 This is a display request of the total surplus potential for default plan.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]

各違約計畫的總潛在盈餘 The total surplus potential for each default plan	絕對值(以 MW 為單位)模式，該模式表示透過匯總固定電池和用戶電池的剩餘電量，可對 PSCBA 的各預設計畫實際做出多少貢獻。單位為兆瓦每小時。各違約計畫的潛在總盈餘見圖 2。 Absolute value (in MW) pattern that showed how much contribution can be actually done to each default plan for PSCBA by summing up the surplus power of Stationary Batteries and customer's batteries. Unit is in MW per hour. See Fig.2 for the total surplus potential for each default plan.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]
計畫的總潛在盈餘 The total surplus potential for the plan	絕對值(以 MW 為單位)模式，顯示透過匯總固定電池和用戶電池的剩餘電量，可對 PSCBA 計畫實際做出多少貢獻。 Absolute value (in MW) pattern that showed how much contribution can be actually done to the plan for PSCBA by summing up the surplus power of Stationary Batteries and customer's batteries.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]
各預設計畫的電池排程 The schedule of batteries for each default plan	Battery SCADA 為各預設計畫提供此計畫。 此計畫包括預設計畫的所有固定電池和所有客戶端電池的計畫。有關各預設計畫的電池計畫，請參見圖 3。 This schedule is provided for each default plan by Battery SCADA. This schedule includes schedules of all Stationary Batteries and all Customer side Batteries for the default plan. See Fig3 for the schedule of batteries for each default plan.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]
請求排程 Request for Schedule	電池 SCADA 向用戶 EMS 之排程請求命令。將被列為隔天或同一天排程。收到此請求後，用戶的電池將詳細計畫，概要計畫或剩餘計畫發送給 Battery SCADA。 Request command for schedule from the Battery SCADA to the customer side EMS. It will be stated as the next day schedule or the same day schedule. Upon receiving this request, the customer's battery sends the detail schedule, outline schedule or surplus schedule of it to Battery SCADA.	該命令包括以下內容。 用戶 EMS 的 ID 作為此訊息的目的地 隔天或同一天排程的指示器 This command includes the followings. ID for customer side EMS as the destination of this message Indicator for the next day schedule or the same day schedule
用戶之電池的詳細排程(cf) Detail Schedule of Customer's Battery	此排程係各用戶電池的“日程”或“次日程”，包含在“請求排程”命令之回應中。 This schedule is On-the-day-Schedule or the next-day-Schedule of each customer's	此訊息包括初始 SOC，根據用戶原始排程的各時段的充電/放電功率以及包括成本訊息的用戶抵押條件。

(cf)	battery, which is included in the response of Request for Schedule command.	This information includes the initial SOC, charging/discharging power of each period according to the customer's original schedule and the customer collateral condition which includes cost information.
用戶電池計畫大綱 (cf) Outline schedule of Customer's Battery (cf)	此排程是各用戶電池的“日程”或“次日程”，包括於“請求排程”命令之回應中。 This schedule is On-the-day-Schedule or the next-day-Schedule of each customer's battery, which is included in the response of Request for Schedule command.	此訊息包括初始 SOC，根據用戶原始計畫的各時段的最大充電/放電功率，根據用戶原始計畫的各時段的充電/放電功率，各時段的 SOC 限制以及包括成本訊息的用戶附帶條件。 This information includes the initial SOC, maximum charging/discharging power of each period according to the customer's original schedule charging/discharging power of each period according to the customer's original schedule, restriction of SOC of each period and the customer collateral condition which includes cost information.
用戶電池剩餘排程 (cf) Surplus schedule of Customer's Battery (cf)	該排程是各用戶電池的“日程”或“次日程”，包含在“請求排程”命令的回應中。 This schedule is On-the-day-Schedule or the next-day-Schedule of each customer's battery, which is included in the response of Request for Schedule command.	該訊息包括初始 SOC，各時段的充電剩餘量/放電功率的剩餘量，各時段的 SOC 的限制以及包括成本訊息的用戶抵押條件。 This information includes the initial SOC, surplus of charging/surplus of discharging power of each period, restriction of SOC of each period and the customer collateral condition which includes cost information.
規劃 PSCBA Plan for PSCBA	這是電網運營商將要削減或轉移的功率值的一種模式，用各時槽的 MW 表示。有關 PSCBA 計畫的範例，請參見圖 4。 This is a pattern of the power values which a Grid Operator is going to cut or shift and is represented in MW per time period. See Fig 4 for example of the plan for PSCBA.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]
PSCAB 虛擬電池的當前狀態 Current Status of Virtual Battery for PSCAB	這是該計畫的電池計畫中包括的所有電池的性能結果的總和。電網運營商可認為這是虛擬能源儲存的性能結果。 This is the sum total of the performance results of all batteries that are included in the Schedule of Batteries for the Plan. A Grid Operator can suppose this to be the performance result of the virtual energy storage.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]

該計畫的電池排程 The Schedule of Batteries for the Plan	該排程包括該計畫的所有固定電池和所有客戶端電池的排程，由電池 SCADA 提供。有關該計畫的電池計畫，請參見圖 5。 This schedule includes schedules of all Stationary Batteries and all Customer side Batteries for the plan and is provided by Battery SCADA. See Fig.5 for the Schedule of Batteries for the Plan.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]
該計畫缺乏盈餘的訊息 Message of lack of surplus for the plan	當電池 SCADA 在計算該計畫的電池計畫期間檢測到所有電池的總剩餘量不足時，它將為 Grid Operator 顯示此訊息。 When Battery SCADA detects lack of surplus of the sum total of all batteries during calculation of The Schedule of Batteries for the Plan, it displays this message for the Grid Operator.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]
查詢 Inquiry	請求接受或拒絕用戶電池剩餘電量的使用。查詢中將包含計畫用於 PSCBA 的用戶電池的剩餘電量(各週期的千瓦)。它從電池 SCADA 發送到用戶 EMS。 Request for response on acceptance or rejection for surplus power usage of customer's battery. The surplus (kW for each period) of the customer's battery to be used by the plan for PSCBA is included in the inquiry. It is sent from the Battery SCADA to the customer side EMS.	該命令包括以下內容。 用戶 EMS 的 ID 作為此訊息的目的 地排程類型的標識符(與 CEM 相對 應的用戶電池所需的剩餘電量) 顯示的排程 充電/放電模式，在 IEC 61850-90-10 中定義 (IEC 61850 調度功能) This command includes the followings. ID for customer side EMS as the destination of this message Identifier for the type of the schedule (the required surplus of the Customer's battery corresponding to the CEM) The schedule which shows Charging/Discharging pattern, which is defined in IEC 61850-90-10 (IEC 61850 scheduling functions)
詢價接受 Inquiry Acceptance	接受回應詢問。它從用戶 EMS 發送到 Battery SCADA。 Acceptance in response to the inquiry made. It is sent from the customer side EMS to the Battery SCADA.	該命令包括以下內容。 用戶 EMS 的 ID 作為此訊息的來源 指標顯示接受 This command includes the followings. ID for customer side EMS as the source of this message

		Indicator showing acceptance
詢價拒絕 Inquiry Rejection	拒絕回應詢問。它從用戶 EMS 發送到 Battery SCADA。 Rejection in response to the inquiry made. It is sent from the customer side EMS to the Battery SCADA.	該命令包括以下內容。 用戶 EMS 的 ID 作為此訊息的來源 指標顯示接受 This command includes the followings. ID for customer side EMS as the source of this message Indicator showing rejection
執行通知 Execution Notification	這是執行計畫的通知。電網操作員確定通知。 This is the notification of Executing the plan. Grid Operator determines the notification.	該命令包括以下內容。 用戶 EMS 的 ID 作為此訊息的目的 This command includes the followings. ID for customer side EMS as the destination of this message
充電/放電命令 Charging/Discharging command	命令從電池 SCADA 發送到固定電池。 Command sent from the Battery SCADA to the Stationary Battery.	[不適用，行為者 A 內的訊息] [Not Applicable, Information within Actor A]
對於“詳細排程”，“概述排程”和“剩餘排程”，應根據用戶電池的管理方法使用其中之一。 (cf) As for “Detail Schedule”, “Outline Schedule” and “Surplus Schedule”, one of them shall be used according to the management method of Customer’s Battery.		

A.3.16.6 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.3.16.7 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.3.16.8 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.3.17 High level use case (JWG2041) Power Adjustment Normal Conditions

A.3.17.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

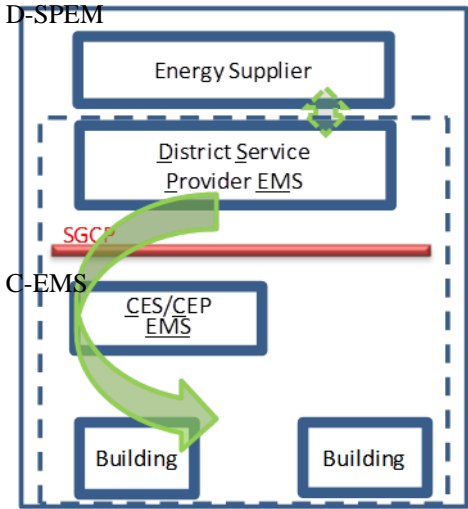
使用案例識別 Use case identification		
ID	區域/域/區 Area/Domain(s)/ Zone(s)	使用案例名稱 Name of use case
JWG2041	DER、客戶端 Customer Premises	正常情況下的能源生產和用電調整 Adjustment of energy production & consumption in normal conditions

Version management

Version management			
Version No.	Date	Changes	Approval status
0.1	18/02/2014	Initial Draft	Draft
0.2	07/03/2014	Added Use Case ID	Draft
0.3	24/02/2014	Updated JWG Use Case ID from JWG2011 to JWG2041	Draft

使用案例的範圍和目標 Scope and objectives of use case

使用案例的範圍和目標 Scope and objectives of use case

<p>範圍 Scope</p>	<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“擁有可再生資源的社區能源供應商(CES)/社區節能服務提供商(CEP)”之間的通訊。</p> <p>能源管理系統(C-EMS)和建築能源管理系統。</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>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> <p>EMS：能源管理系統 Energy Management System</p>
<p>目標 Objective(s)</p>	<p>該使用案例的目的是通過可再生能源加速發電。這是通過註冊有關以下方面的資訊來實現的：</p> <p>建築物和擁有可再生能源(CES)/社區節能服務提供商(CEP)的社區能源供應商。</p> <p>The objective of this use case is the acceleration of producing power by Renewable sources of Energy. This is achieved by registration of information regarding the building and the Community Energy Supplier owning Renewable sources of Energy (CES)/Community Energy saving service Provider (CEP).</p>

<p>相關業務案例 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)集成商，國內項目在日本。</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>(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 62746-2use 情況和要求的討論。)</p> <p>(This use case is independent from the national or regional market design. It should be agreed on the 62746-2use case & requirement discussion.)</p>
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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>本區服務提供商 EMS (d-SPEM)管理的生產的電力使用的可再生能源能源資(RES)的客戶。然後，在區服務提供商 EMS (d-SPEM)發送一個信號給所述 CEM 中順序到加速的生產或減速的生產。然後，該 CES/CEPEMS (C-CEM)更新生產計畫。</p> <p>The District Service Provider EMS (D-SPEM) manages the production of electricity using Renewable sources of Energy (REs) owned by Customers. Then, the District Service Provider EMS (D-SPEM) sends a signal to the CEM in order to accelerate the production or decelerate the production. Then, the CES/CEP EMS (C-CEM) updates the production plan.</p>
<p>完整說明 Complete description</p>
<p>(1) 該行為者 A (d-SPEM)估計的未來生產的電力使用的天氣資訊。然後，在行為者一(d-SPEM)決定是 在生產的電力將不足以對需求或超出需求在不久的將來。</p> <p>The Actor A (D-SPEM) estimates the future production of electricity using the weather information. Then, the Actor A (D-SPEM) decides that the production of electricity will be insufficient for the demand or exceed the demand in the near future.</p> <p>(2) 該行為者 A (d-SPEM)發送的信號進行加速的生產(生產計畫)或減速的生產(生產計畫)的 CEM (C-CEM)。</p> <p>The Actor A (D-SPEM) sends the signal for accelerating the production(production plan) or decelerating the production(production plan) to the CEM (C-CEM).</p> <p>(3) CEM (C-CEM)更新生產計畫。然後，CEM (C-CEM)將控制請求(智慧裝置 ID-功率剖繪)發送到 CEM (建築物 CEM)。</p> <p>The CEM (C-CEM) updates the production plan. Then, The CEM (C-CEM) sends the control request (Smart device ID-power profile) to the CEM (Building CEM).</p> <p>(4) CEM (建築物 CEM)接收確認從其終端。然後，CEM (建築物 CEM)將答復發送到 CEM (C-CEM)。</p> <p>The CEM (Building CEM) receives confirmation from its terminal. Then, The CEM (Building CEM) sends the reply to the CEM (C-CEM).</p> <p>(5) CEM (C-CEM)更新生產計畫。然後，CEM (C-CEM)將控制信號(智慧裝置 ID-功率剖繪)發送到 CEM (建築物 CEM)。</p>

The CEM (C-CEM) updates the production plan. Then, the CEM (C- CEM) sends the control signal (Smart device ID-power profile) to the CEM (Building CEM).

(6) CEM (建築物 CEM)發送的控制信號(電力剖繪)到所述智慧裝置。

The CEM (Building CEM) sends the control signal (power profile) to the smart device.

(7) 該智慧裝置發送的結果，以所述 CEM (建築物 EMS)。

The smart device sends the results to the CEM (Building EMS).

(8) CEM 發送的結果到所述 CEM (C-CEM)。

The CEM sends the results to the CEM (C- CEM).

(9) CEM (C-CEM)發送的控制信號(電力剖繪)到所述智慧裝置。

The CEM (C- CEM) sends the control signal(power profile) to the smart device.

(10) 智慧裝置發送的結果到所述 CEM (C-CEM)

The smart device sends the results to the CEM (C- CEM).

(11) CEM (C-CEM)發送的結果到該行為者 A (d-SPEM)。

12) The CEM (C- CEM) sends the results to the Actor A (D-SPEM).

一般說明 General remarks

一般說明 General remarks

A.3.17.2 使用案例圖 Diagram of use case

Figure A.26 shows a Diagram of use case.

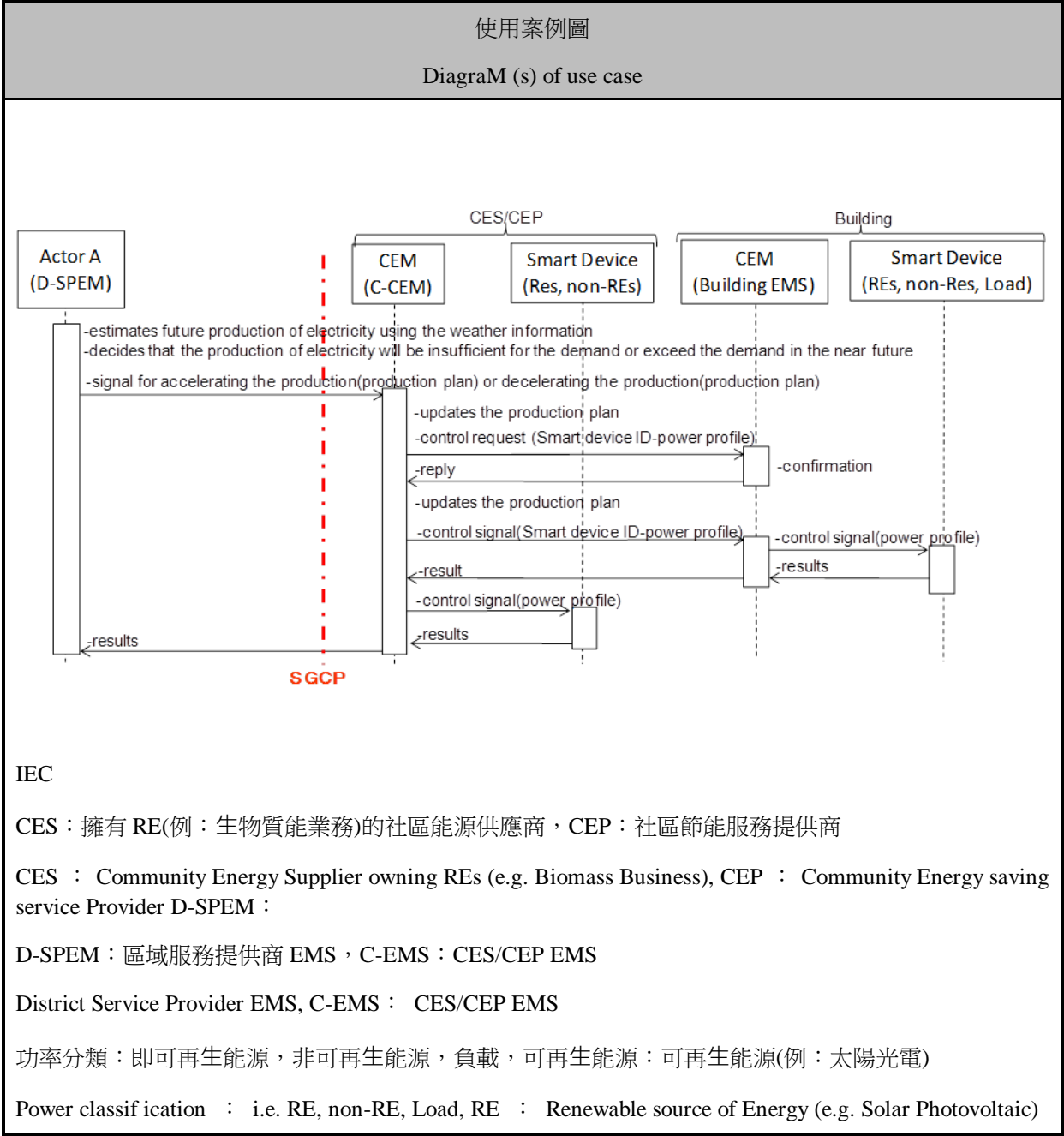


圖 A.26 序列圖

Figure A.26 – Sequence diagram

A.3.17.3 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	<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>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。反之亦然，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 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 & 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>	
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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> <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>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
行為者 A Actor A	<p>決定電力將不足以滿足需求或在不久的將來超過需求</p> <p>decides that the production of electricity will be insufficient for the demand or exceed the demand in the near future</p>		

參考文獻

References

參考文獻						
References						
項次 No.	引用類型 References Type	參考 Reference	狀態 Status	對使用案例的影響 Impact on use case	發起人/組織 Originator/Organization	鏈結 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

分類資訊 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
深度等級 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
智慧電網，自我維持區，災害恢復
Smart Grid, Self-sustaining District, Disaster Recovery

A.3.17.4 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					
項次 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
1	調整能源生產和用電正常情況 Adjustment of energy production & consumption in normal conditions	行為者 A Actor A	決定電力將不足以需求或超過在需求不遠的將來 decides that the production of electricity will be insufficient for the demand or exceed the demand in the near future		

步驟-情境

Steps – Scenarios

情境								
Scenario								
情境名稱： Scenario name：		第一，正常情況下的能源生產和用電調整 No. 1 Adjustment of energy production & consumption in normal conditions						
步驟編號 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	資訊監製(行為者) Information producer (Actor)	資訊接收者(行為者) Information receiver	資訊交流 Information exchanged	要求記憶，R-ID Requirements, R-ID

						(Actor)		
1			<p>行為者 A (D-SPEM) 使用天氣資訊估算未來的電力生產。然後，行為者 A (D-SPEM) 決定製作電力需求不足或在不久的將來會超過需求。</p> <p>The Actor A (D-SPEM) estimates the future production of electricity using the weather information. Then, the Actor A (D-SPEM) decides that the production of electricity will be insufficient for the demand or exceed the demand in the near future.</p>		<p>行為者 A Actor A</p>	-	-	
2			<p>行為者 A (D-SPEM) 發送信號加速生產(生產計畫)或減速 CEM 的生產(生產計畫)(C-CEM)。</p> <p>The Actor A (D-SPEM) sends the signal for accelerating the production (production plan) or decelerating the production (production plan) to the CEM (C-CEM).</p>		<p>行為者 A (D-SPEM) Actor A (D-SPEM)</p>	CEM (C-CEM)	<p>信號加速生產(生產計畫)或減速生產(生產計畫)</p> <p>signal for accelerating the production (production plan) or decelerating the production (production plan)</p>	
3			<p>CEM (C-CEM)更新生產計畫。然後，CEM (C-CEM)發送控制請求(智慧裝置 ID-功率剖面)到 CEM (建築物 CEM)。</p> <p>The CEM (C-CEM)</p>		CEM (C-CEM)	<p>CEM (正在建築 CEM)</p> <p>CEM (Building CEM)</p>	<p>控制請求(智慧裝置 ID-功率個人資料)</p> <p>control request (smart device ID-power)</p>	

			updates the production plan. Then, The CEM (C-CEM) sends the control request (smart device ID-power profile) to the CEM (Building CEM).				profile)	
4			CEM (建築 CEM) 接收來自其終端的確認。然後，CEM (建築 CEM)將答復發送給 CEM (C-CEM)。 The CEM (Building CEM) receives confirmation from its terminal. Then, The CEM (Building CEM) sends the reply to the CEM (C-CEM).		CEM (正在建築 CEM) CEM (Building CEM)	CEM (C-CEM)	回復 reply	
5			CEM (C-CEM)更新生產計畫。然後，CEM (C-CEM)發送的控制信號(智慧裝置 ID-功率剖繪)到 CEM (建築物 CEM)。 The CEM (C-CEM) updates the production plan. Then, the CEM (C-CEM) sends the control signal (smart device ID-power profile) to the CEM (Building CEM).		CEM (C-CEM)	CEM (正在建築 CEM) CEM (Building CEM)	控制信號 (智慧裝置 ID-功率剖繪) control signal (smart device ID-power profile)	
6			CEM (建築物 CEM)發送控制信號(功率剖繪)發送到智慧裝置。 The CEM (Building CEM) sends the control signal		CEM (正在建築 CEM) CEM (Building CEM)	智慧裝置 Smart device	控制信號 (功率剖繪) control signal(power profile)	

			(power profile) to the smart device.					
7			智慧裝置將結果發送到 CEM (建築物 EMS)。 The smart device sends the results to the CEM (Building EMS).		智慧裝置 Smart device	CEM (正在建築 CEM) CEM (Building EMS)	結果 results	
8			CEM將結果發送到 CEM (C-CEM)。 The CEM sends the results to the CEM (C-CEM).		CEM (正在建築 CEM) CEM (Building EMS)	CEM (C-CEM)	結果 results	
9			CEM (C-CEM)發送的控制信號(電力剖繪)到智慧裝置。 The CEM (C-CEM) sends the control signal(power profile) to the smart device.		CEM (C-CEM)	智慧裝置 Smart device	控制信號 control signal	
10			智慧裝置將結果發送到 CEM (C-CEM)。 The smart device sends the results to the CEM (C-CEM).		智慧裝置 Smart device	CEM (C-CEM)	結果 results	
11			CEM (C-CEM)將結果發送給行為者 A (D-SPEM)。 The CEM (C-CEM) sends the results to the Actor A (D-SPEM).		CEM (C-CEM)	行為者 A (D-SPEM) Actor A (D-SPEM)	結果 results	

A.3.17.5 資訊交換 Information exchanged

資訊交換

Information exchanged		
資訊名稱(ID) Name of information (ID)	交換資訊的說明 Description of information exchanged	資訊資料要求 Requirements for information data
加速生產的信號 (M4-2-1) signal for accelerating the production (M4-2-1)	該信號包括生產加速信號和生產計畫。 The signal includes production accelerating signal and production plan.	
減速生產的信號 (M4-2-2) signal for decelerating the production (M4-2-2)	該信號包括生產減速信號和生產計畫。 The signal includes production decelerating signal and production plan.	
控制請求(M4-2-3) control request (M4-2-3)	該信號包括控制請求，智慧裝置 ID 和功率剖繪。 The signal includes the request for control, the smart device id and the power profile.	
回覆(M4-2-4) reply (M4-2-4)	答復是控制請求的答案。 The reply is the answer for the control request.	
控制信號 I(M4-2-5) control signal I(M4-2-5)	信號由“智慧裝置 ID”組成和功率剖繪”或僅功率剖繪。 The signal consist of “the smart device id and the power profile” or only power profile.	
結果(M4-2-6) results (M4-2-6)	結果是由智慧裝置通過控制 CEM (建築物 EMS)或 CE M (C-CEM)而建立的。 The results are created by the Smart Device as a result of controlling the CEM (Building EMS) or CEM (C-CEM).	

A.3.17.6 要求事項(選項) Requirements (optional)

要求事項(選項) Requirements (optional)	
要求類別 Categories for requirements	類別說明 Category description
要求編號	需求說明

Requirement ID	Requirement description

A.3.17.7 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.3.17.8 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.3.18 高階別使用案例(JWG2042)災害條件下建築物的能量容納 High level use case (JWG2042) Energy accommodation for buildings under disaster conditions

A.3.18.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

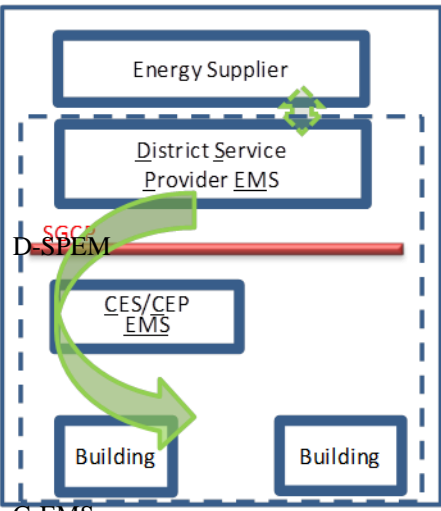
使用案例識別 Use case identification		
ID	區域/域/區 Area/Domain(s)/ Zone(s)	使用案例名稱 Name of use case
JWG2042	DER, 分散式, 客戶端 DER, Distribution, Customer Premises	災害條件下的能量調節 Energy accommodation in disaster conditions

Version management

Version management			
Version No.	Date	Changes	Approval status
0.1	18/02/2014	Initial Draft	Draft

0.2	07/03/2014	Added Use Case ID	Draft
0.3	24/03/2014	Updated JWG use case ID from JWG2012 to JWG2042	Draft

使用案例的範圍和目標 Scope and objectives of use case

使用案例的範圍和目標 Scope and objectives of use case	
範圍 Scope	<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“擁有可再生資源的社區能源供應商(CES)/社區節能服務提供商(CEP)”之間的通訊。EMS)和建築能源管理系統。</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>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>The diagram illustrates the scope of the use case. It shows a hierarchy of energy management systems. At the top is the 'Energy Supplier'. Below it is the 'District Service Provider EMS', which is part of the 'D-SPEM' (District Service Provider Energy Management System). Below that is the 'CES/CEP EMS' (Community Energy Supplier/Community Energy saving service Provider Energy Management System). At the bottom are two 'Building' boxes, which are part of the 'C-EMS' (Community Energy Management System). A red line labeled 'D-SPEM' connects the 'Energy Supplier' to the 'CES/CEP EMS'. A green arrow labeled 'SGCP' points from the 'CES/CEP EMS' to the 'Building' boxes.</p> <p>Building-EMS</p> <p>EMS：能源管理系統</p> <p>EMS：Energy Management System</p>
目標 Objective(s)	<p>該使用案例的目的是通過可再生能源加速發電。這是通過註冊有關以下方面的資訊來實現的：建築物和擁有可再生能源(CES)/社區節能服務提供商(CEP)的社區能源供應商。</p> <p>The objective of this use case is the acceleration of producing power by Renewable sources of Energy. This is achieved by registration of information regarding the</p>

	building and the Community Energy Supplier owning Renewable sources of Energy (CES)/Community Energy saving service Provider (CEP).
相關業務案例 Related business case(s)	<p>這種使用情況下是一個的通用使用情況下，的需求進行服務回應的建築物使用的一些公用事業，BEMS (樓宇能源管理系統)集成商，國內項目在日本。</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>(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 62746-2use 情況和要求的討論。)</p> <p>(This use case is independent from the national or regional market design. It should be agreed on the 62746-2use case & 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>發生災害時，擁有可再生能源(CES)的社區能源供應商/社區節能服務提供商(CEP)將“正常情況下的供電計畫”更改為“電力災害情況的供應計畫”，以便繼續為“災害控制中心”供電。在“災害情況下的供電計畫”中，CES/CEP 向“災害控制中心”提供電力和火力。</p> <p>In case of a disaster, the Community Energy Supplier owning Renewable sources of Energy (CES)/Community Energy saving service Provider (CEP) changes the “power supply plan for normal situations” to the “power supply plan for disaster situations,” in order to keep providing power to “disaster control centers.” On the “power supply plan for disaster situations,” the CES/CEP supplies the electrical and the thermal power to the “Disaster Control Center”.</p>
完整說明 Complete description

使用案例敘述 Narrative of use case
<ol style="list-style-type: none"> CEM (建築物 EMS) 將災害之功率剖繪發送至 CEM (C-CEM)。The CEM (Building EMS) sends the power profile for disaster situation to the CEM (C-CEM). 在 CEM (C-CEM)發送聚集功率剖繪的災情給行為者一個(能源供應商和 d-SPEM)。The CEM (C-CEM) sends the aggregated power profile for disaster situation to the Actor A (Energy supplier&D-SPEM). 的行為者 A (能源供應商和 d-SPEM)調整的聚集功率譜的災情。然後，在行為者 A (能源供應商和 d-SPEM)發送的合計功率剖繪的災情到 CEM (C-CEM)。The Actor A (Energy supplier&D-SPEM) adjust the the aggregated power profiles for disaster situation. Then, the Actor A (Energy supplier&D-SPEM) sends the aggregated power profile for disaster situation to the CEM (C-CEM). 在 CEM (C-CEM)發送的功率剖繪的災害情況，以對 CEM (建築物 EMS)。The CEM (C-CEM) sends the power profile for disaster situation to the CEM (Building EMS). CEM (C-CEM)和 CEM 的(建築物 EMS)發送狀態報告給行為者一個(能源供應商和 D-SPEM)。The CEM (C-CEM) and the CEM (Building EMS) send the status report to the Actor A (Energy supplier&D-SPEM).

- (6) 該行為者 A (能源供應商&d-SPEM)發送災害信號到所述 CEM (C-CEM) 。The Actor A (Energy supplier&D-SPEM) sends disaster signal to the CEM (C-CEM).

(7) CEM (C-CEM)改變計畫(功率剖繪的受災情況) 。然後，所述 CEM (C-CEM)發送放電信號到所述智慧裝置 。The CEM (C-CEM) changes the plan (to power profile for disaster situation). Then, the CEM (C-CEM) sends discharge signal to the smart device.

(8) CEM (C-CEM)發送-accommodation 報告到所述 CEM (建築物 EMS) 。The CEM (C-CEM) sends -accommodation report to the CEM (Building EMS).

(9) 該智慧裝置發送的結果，以所述 CEM (建築物 EMS) 。The smart device sends the results to the CEM (Building EMS).

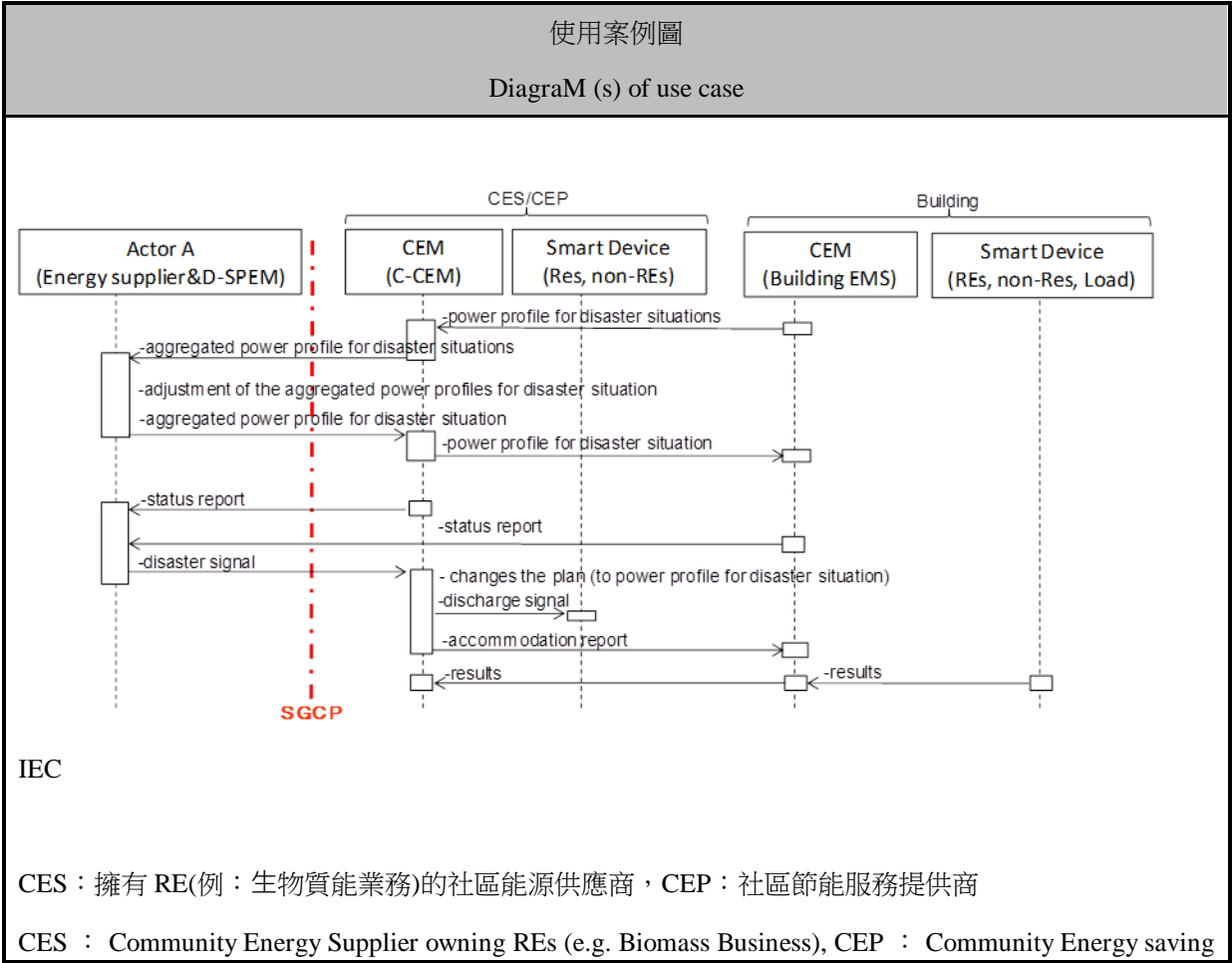
(10) CEM (建築物 EMS)發送的結果到所述 CEM (C-CEM) 。The CEM (Building EMS) sends the results to the CEM (C-CEM).

一般說明 General remarks

一般說明 General remarks

A.3.18.2 使用案例圖 Diagram of use case

Figure A.27 shows a Diagram of use case.



service Provider D-SPEM :
D-SPEM : 區域服務提供商 EMS , C-EMS : CES/CEP EMS
District Service Provider EMS, C-EMS : CES/CEP EMS
功率分類 : 即可再生能源 , 非可再生能源 , 負載 , 可再生能源 : 可再生能源(例 : 太陽光電)
Power classification : i.e. RE, non-RE, Load, RE : Renewable source of Energy (e.g. Solar Photovoltaic)

圖 A.27 序列圖

Figure A.27 – Sequence diagram

A.3.18.3 技術細節 Technical details

行為者

Actors

行為者 Actors			
分組 Grouping		Group 群組說明 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	<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>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 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>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 & 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>	
<p>智慧裝置</p> <p>Smart device</p>	<p>外部</p> <p>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>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> <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>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 (建築物 EMS) CEM (Building EMS)	將災害之功率剖繪發送至 CEM (C-CEM) sends the power profile for disaster situation to the CEM (C-CEM)		

參考文獻

References

參考文獻 References						
項次 No.	引用類型 References type	參考 Reference	狀態 Status	對使用案例的影響 Impact on use case	發起人/組織 Originator/Organisation	鏈結 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

分類資訊 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
深度等級 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 使用案例和需求會議上達成共識) Generic (This use case is independent from the national or regional market design. It should be agreed on the 62746-2 use case & requirement Meeting)
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
分類資訊 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
深度等級 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(這用情況下是獨立的從該國家或地區市場的設計。的原因，它應該被同意在該 62746-2 使用案例和要求的討論。) Generic (This use case is independent from the national or regional market design. of cause, 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.3.18.4 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					
項次 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
1	災害條件下的能量調節 Energy accommodation in disaster conditions	CEM (建築物 EMS) CEM (Building EMS)	將災害之功率剖繪發送至 CEM (C-CEM) sends the power profile for disaster situation to the CEM (C-CEM)		

步驟-情境

Steps – Scenarios

情境 Scenario								
情境名稱： Scenario name：		災害條件下的能量調節 No. 1 Energy accommodation in disaster conditions						
步驟編號 Step No.	事件 Event	名稱的過程/活動 Name of process /activity	工藝說明/活動 Description of process/activity	服務 Service	資訊製作人 (行為者) Information producer (Actor)	資訊接收者 (行為者) Information receiver (Actor)	資訊交流 Information exchanged	要求，R-ID Requirements, R-ID
1			CEM (建築物 EMS)將災害情況之功率剖繪發送至 CEM (C-CEM) CEM (Building EMS) sends the power profile for disaster situation to the CEM		CEM (建築物 CEM) CEM (Building EMS)	CEM (C-CEM)	功率的個人資料災害情況 power profile for disaster situation	

			(C-CEM).					
2			<p>CEM (C- CEM) 發送匯總的功率剖繪災害情況給行為者 A (能源供應商 &D- SPEM).</p> <p>The CEM (C-CEM) sends the aggregated power profile for disaster situation to the Actor A (Energy supplier&D-SPEM).</p>		CEM (C-CEM)	<p>行為者 A (能源供應商 &D-SPEM)</p> <p>Actor A (Energy supplier&D-SPEM)</p> <p>CEM (C-CEM)</p>	<p>匯總功率的個人資料災害情況</p> <p>aggregated power profile for disaster situation</p> <p>匯總功率的個人資料災害情況</p>	
3			<p>行為者 A (能源供應商 &D-SPEM) 調整匯總的功率剖繪災害情況。然後行為者 A (能源供應商 &D-SPEM) 發送匯總的功率剖繪災害情況到 CEM (C- CEM)</p> <p>The Actor A (Energy supplier&D-SPEM) adjust the the aggregated power profiles for disaster situation. Then, the Actor A (Energy supplier&D-SPEM) sends the aggregated power profile for</p>		<p>行為者 A (能源供應商 &D-SPEM)</p> <p>Actor A (Energy supplier&D-SPEM)</p>		<p>aggregated power profile for disaster situation</p>	

			disaster situation to the CEM (C-CEM).					
4			<p>CEM (C- CEM) 將災害情況之功率剖繪發送至 CEM (建築物 EMS)</p> <p>The CEM (C-CEM) sends the power profile for disaster situation to the CEM (Building EMS).</p>		CEM (C-CEM)	<p>CEM (建築物 EMS)</p> <p>CEM (Building EMS)</p>	<p>功率的個人資料災害情況</p> <p>power profile for disaster situation</p>	
5			<p>CEM (C-CEM) 和 CEM (建築物 EMS)將狀態報告發送給行為者 A (能源供應商 & D-SPEM)</p> <p>The CEM (C-CEM) and the CEM (Building EMS) send the status report to the Actor A (Energy supplier&D-SPEM)</p>		CEM (C-CEM)	<p>CEM (建築物 EMS)</p> <p>CEM (Building EMS)</p>	<p>狀況報告</p> <p>status report</p>	
6			<p>行為者 A (能源供應商 & D-SPEM) 發送給 CEM 的災害信號(C-CEM)。</p> <p>The Actor A (Energy supplier&D-SPEM) sends disaster signal to the CEM (C-CEM).</p>		<p>行為者 A (能源供應商 & D-SPEM)</p> <p>Actor A (Energy supplier&D-SPEM)</p>	CEM (C-CEM)	<p>災害信號</p> <p>disaster signal</p>	
7			<p>CEM (C-CEM) 更改計畫(更改為災害情況下的功率剖繪)。然後，CEM (C-CEM)將放電</p>		CEM (C-CEM)	<p>智慧裝置</p> <p>Smart device</p>	<p>放電信號</p> <p>discharge signal</p>	

			信號發送到智慧裝置。The CEM (C-CEM) changes the plan (to power profile for disaster situation). Then, the CEM (C-CEM) sends discharge signal to the smart device.					
8			CEM (C-CEM) 發送 - 向 CEM (建築物EMS)提交住宿報告。 The CEM (C-CEM) sends -accommodation report to the CEM (Building EMS).		CEM (C-CEM)	CEM (建築物EMS) CEM (Building EMS)	住宿報告 accommodation report	
9			智慧裝置將結果發送到 CEM (正在建築物EMS)。 The smart device sends the results to the CEM (Building EMS).		智慧裝置 Smart device	CEM (建築物EMS) CEM (Building EMS)	結果 results	
10			CEM (正在建築物EMS)將結果發送到 CEM (C-CEM)。 The CEM (Building EMS) sends the results to the CEM (C-CEM).		CEM (建築物EMS) CEM (Building EMS)	CEM (C-CEM)	結果 results	

A.3.18.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	交換資訊的說明 Description of information exchanged	資訊資料要求 Requirements for information data
災害情況之功率剖繪(M4-3-1)	該剖繪包含每種災害情況之功率剖繪。	

power profile for disaster situations (M4-3-1)	The profile consists of the power profiles of each disaster situation.	
災害情況下的匯總功率剖繪(M4-3-2) aggregated power profile for disaster situation (M4-3-2)	首先，通過匯總針對以下情況的災害情況的功率剖繪來建立剖繪建築物。 First, the profile is created by aggregating the power profile for disaster situations of buildings. 其次，由行為者 A（能源供應商和 D-SPEM）調整剖繪。 Second, the profile is adjusted by the Actor A (Energy supplier&D-SPEM) .	
狀態報告(M4-3-3) status report (M4-3-3)	該報告是 CEM (C-CEM)或 CEM (建築物 EMS)的狀態。 The report is the status of the CEM (C-CEM) or the CEM (Building EMS).	
災害信號(M4-3-4) disaster signal (M4-3-4)	該信號由行為者 A（能源供應商和 D-SPEM）建立。 The signal is created by the Actor A (Energy supplier&D-SPEM).	
放電信號(M4- 3-5) discharge signal (M4-3-5)	該信號是由 CEM (C-CEM)建立的，用於為建築物供電。 The signal is created by the CEM (C-CEM) for the accommodation of power to the Building.	
結果(M4-3-6) results (M4-3-6)	結果由智慧裝置建立，用於重新發布住宿。 The results is created by smart devices for reposting of accommodation.	

A.3.18.6 要求事項(選項) Requirements (optional)

要求事項(選項) Requirements (optional)	
要求類別 Categories for requirements	類別說明 Category description
要求編號 Requirement ID	需求說明 Requirement description

A.3.18.7 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.3.18.8 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.3.19 高階使用案例(JWG211x，係依 WGSP211x)費率-用電資訊交換 High level use case (JWG211x, based on WGSP211x) Tariff-Consumption information exchange

A.3.19.1 使用案例說明 Description of the use case

使用案例名稱 Name of use case

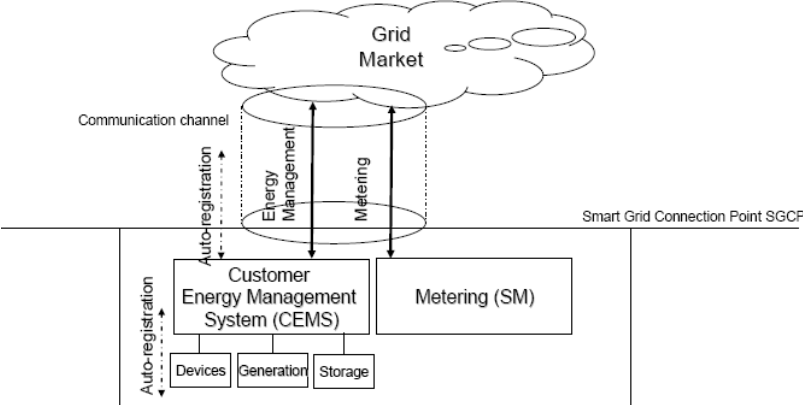
使用案例識別 Use case identification		
ID	區域/域/區 Area/Domain(s)/ Zone(s)	使用案例名稱 Name of use case
JWG- 211x	智慧電網 Smart Grid	與外部行為者和家庭內部交換有關用電，價格和警告的資訊 Exchanging information on consumption, price and warnings with external actors and within the home

Version management

Version management			
Version No.	Date	Changes	Approval status
0.2	01/03/2012	Initial draft	Draft
0.4	11/07/2012	Reviewed version	Version after commenting phase
0.5	12/11/2012	Reviewed version	Version for final

			commenting
0.51	03/02/2014	Fit description into IEC format	
0.6	24/03/014	Modified to new JWG Use Case ID	Draft

使用案例的範圍和目標 **Scope and objectives of use case**

使用案例的範圍和目標 Scope and objectives of use case	
<p>範圍 Scope</p>	<p>此使用案例之範圍為 CEM 與“上游”12 行為者間之通訊。CEM、消費者及(家庭)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(請參見行為者表格)。</p> <p>The scope of this use case is the communication between the CEM and "upstream" 12 actors. The communication between CEM, the consumer and (in-home) 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 (see table with actors).</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> <p>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).</p> <p>注意，多個負載/發電資源(來自多個場所)可被組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources (even from multiple premises) can be combined in the CEM to be mutually controlled.</p> <p>由架構角度來看，智慧電網協調小組引入“智慧電網連接點”(SG CP)個體作為智慧電網行為者(應用程序及/或組織)及室內/建築系統或裝置間之介面。下圖顯示其環境之 SGCP。</p> <p>From an architectural point of view the Smart Grid Coordination Group introduced the "Smart Grid Connection Point" (SG CP) entity as an interface between Smart Grid actors (applications and/or organizations) and in-home/building systems or devices. The diagram below shows the SG CP in its environment.</p>  <p>IEC</p>

	<p>注意，上圖中之方框具有功能性。智慧電錶及 CEM 可為一或兩個分開之實體盒。CEM 亦可被整合於智慧家庭裝置中。電網市場/應用程式可透過一或分開之基礎結構進行通訊。</p> <p>Please note that the boxes in the diagram above are functional. The Smart Meter and CEM can be one or two separate physical boxes. The CEM can also be integrated in Smart in-home devices. The communication with the Grid market/applications can be through one or through separate infrastructures.</p>
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8 在這種情況下，上游意味著朝向行為者 A 或 B（請參閱行為者定義）。

Upstream in this context means towards actor A or B (see actor definitions).

使用案例的範圍和目標 Scope and objectives of use case	
目標 Objective(s)	<p>此使用案例之目的為外部行為者及論述間交換資訊，以便：</p> <p>The objective of this use case is to exchange information between external actors and the premise in order to :</p> <ul style="list-style-type: none"> — 使消費者意識其能耗 <p>Make consumers aware of their energy consumption</p> <ul style="list-style-type: none"> — 提供外部市場角色有關(預測)能耗資訊 <p>Providing external market roles with information on (forecasted) energy consumption</p> <ul style="list-style-type: none"> — 使消費者或其能源管理系統對能源價格(變化)做出反應，從而支持消費者優化其能耗使用更便宜或更環保能源(取決於個人偏好) <p>Enable consumers or their Energy Management System to react on (changes in) energy prices, thus supporting consumers to optimize their consumption to use cheaper or greener energy (depending on personal preferences)</p> <ul style="list-style-type: none"> — 傳送警告給消費者，以保持能耗低於特定(契約)階層 <p>Send warnings to the consumer to keep consumption below a certain (contracted) level</p> <ul style="list-style-type: none"> — 使外部行為者能檢索家用智慧裝置之狀態 — Enable external actors to retrieve the state of in home smart devices
相關業務案例 Related business case(s)	<p>此用法中說明的功能組合支持“需量反應”，遵循在可持續過程工作組的報告中引用的 Eurelectric 定義。</p> <p>A combination of the functions described in this use support “Demand Response”, following the definition of Eurelectric, which is referenced in the Sustainable Processes workgroup’s report.</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>這用情況介紹如何關於資訊的價格和環保方面是從上游行為者發送到 CEM 和如何資訊有關的能耗或產生的以及作為智慧裝置的狀態是被發送回給消費者和上游行為者。也將這種情況下，遠程可控裝置被連接到 CEM 被說明。</p> <p>This use case describes how information regarding price and environmental aspects is sent from upstream actors to CEM and how information regarding energy consumption or generation as well as smart device statuses are being sent back to the consumer and upstream actors. Also the case that remote-controllable device is connected to CEM is described.</p>
<p>完整說明 Complete description</p> <p>這個高階使用案例包括四個不同的主要使用案例：</p> <p>This high level use case comprises four different primary use cases：</p> <p>WG 2111：功耗或發電相關資訊</p> <p>WG 2111：Information regarding power consumption or generation</p> <p>在智慧電錶，使現有的資訊上總電力消耗或產生在房子裡。在 CEM 接收該資訊，但可以還接收用電/發電資訊每智慧裝置。13 的速率的更新的所述資訊必須是成比例於所述速率的變化中的功率繪製。</p> <p>The Smart Meter makes available the information on total power consumption or generation in the house. The CEM receives this information but can also receive consumption/generation information per smart device. 13 The rate of update of the information must be proportional to the rate of change in the power drawn.</p> <p>該使用案例情境包括兩個情境：</p> <p>This use case scenario consists of two scenarios：</p> <ul style="list-style-type: none"> — 發送關於(未來的)資訊的功耗或產生的個人智慧裝置。此資訊被提供由所述智慧裝置到 CEM，其可以聚集它，並使用它來預測消耗/發電和發送這個到的顯示和外部行為者。由於在 CEM 可以是一個綜合功能的智慧裝置的客戶端，不止一個 CEM 在家裡可以執行這個情境。在這種情況下，一個 CEM 並無總住宅用電，但只有部分資訊。 — Sending information regarding (future) power consumption or generation of individual smart devices. This information is provided by the smart device to CEM, which may aggregate it and use it to forecast consumption/generation and send this to the display and external actors. As the CEM can be a function integrated in smart devices in the customer premises, more than one CEM in the house may execute this scenario. In this case, one CEM does not have the total house consumption, but only partial information. — 發送全功耗或發電相關資訊。此資訊被提供通過該智慧電錶，發送到 CEM 可以使用它來做出一個預測的消耗/發電並轉發此的顯示器和外部行為者。 — Sending information regarding total power consumption or generation. This information is provided by the smart meter, sent to the CEM that may use it to make a forecast of consumption/generation and forward this to the display and external actors. <p>注意，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。</p> <p>Note that 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</p>

binding from there on.

還注意，用電資訊可以通過不同的通道傳輸到行為者 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三個子用途的情況下，每一個與它自己的目標(發送的資訊，以行為者 A，發送的資訊給行為者 B 和發送的資訊以在簡單的外部客戶顯示器)。

Also note that the consumption 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 three sub-use cases, each with its own goal (sending the information to Actor A, sending the information to Actor B and sending the information to the Simple External Consumer Display).

在情況下的遠程可控裝置被連接到 CEM，CEM 詢問關於資訊功耗或產生於個人遠程可控裝置如果所述遠程可控裝置具有的能力的顯示此類資訊。

In case of Remote-controllable device is connected to CEM, CEM asks information regarding power consumption or generation to individual remote-controllable device if the remote-controllable device has the capability of showing such information.

JWG 2112：價格及/或環境資訊

JWG 2112：Price and/or environmental information

行為者 A 將發送資訊(例：價格，氣象，環境，成本相關資訊，警告訊息)通過能源管理閘道器發送給消費者或其智慧裝置；行為者 B 可以做的一樣通過智慧量測閘道器。的目標是，以使在消費者或他的裝置感知的量和成本消耗的能量和量和收入的銷售能量回饋到電網，或其他因素相關，以能源管理(如該比例量的綠色功率)。該消費者可以也收到一個通知費率已更改。

Actor A will send information (e.g. price, meteorological, environmental, cost related information, warning messages) to the consumer or his smart devices via the Energy management gateway; Actor B may do the same via the Smart Metering gateway. The goal is to make the consumer or his devices aware of the amount and cost of consumed energy and the amount and income for selling energy back to the grid, or of other elements relevant to energy management (e.g. the percentage amount of green power). The consumer can also receive a notification that the tariff has been changed.

要移到峰值負載，一個外部行為者可以提出一個費率的電力在高一定時期的的一天或在某些天的順序來邀請他的客戶來刪除或轉移的各種用途或降低其在這些時期內住房的用電。這些時槽和日期可能不會預先確定，而是根據智慧電網的彈性需求確定。當發生這樣一個較高的成本期時，客戶提前通知，以便他們可以對這些價格訊息做出反應。智慧裝置可以是參數化或管理理由所述 CEM 到開始時的能量成本更低或當所述相對量的綠色能源是在一組電平或暫時降低其功耗及/或轉移其前的操作或後一個峰的消耗週期。該參數的 CEM 和智慧裝置是在責任的消費者。

To move out peak loads, an external actor can propose a tariff of electricity higher during certain periods of the day or during certain days in order to invite his customers to delete or shift various uses or lower their consumptions in its housing during these periods. These periods and days may not be fixed in advance, but rather determined on the flexibility needs of the smart grid. When such a higher cost period occurs, the customers are notified in advance, so that they can be ready to react to these price messages. Smart devices can be parameterised or managed by the CEM to start when the energy costs less or when the relative amount of green energy is over a set level or to temporarily lowers its power consumption and/or shifts its operation before or after a peak consumption period. The parameterization of the CEM and smart devices are the responsibility of the consumer.

價格資訊可以是即時價格，即時組合的價格和數量訊息或固定的費率表。注意，動態定價需要一種計費系統，該計費系統必須能夠為或提供資訊計算成本的能源基礎上，一個彈性的資費方案。這意味著該價格相關的變化中的 CEM 的行為者一個或乙可以被結合與一個費率升級的智慧電錶；在使用案例 BI.03 中對此進行說明。的智慧電錶協調小組使用情況資料庫。

The price information can be either real-time price, real time combined price and volume messages or a fixed

tariff schedule. Note that dynamic pricing requires a metering system that is able to provide the information for, or to calculate the cost of energy based on, a flexible tariff scheme. This implies that price related changes in the CEM by actor A or B may be combined with a tariff update in the smart meter; this is described in use case BI.03. of the Smart Meters Coordination Group use case repository.

該說明的通訊功能在這種使用情況下，也可以使用，以發送警告資訊來自一個外部行為者到消費者，警告他說緊急負載控制會內發生的一個特定時期的時間，除非變化在用電/代取的地方。

The communication functionalities described in this use case may also be used to send warning messages from an external actor to the consumer, warning him that emergency load control will happen within a certain period of time, unless changes in consumption/generation take place.

- 9 注意，所述 CEM 可能是一個功能嵌入在所述智慧裝置(具有從而訪問到僅部分消耗的資訊)，在該情況下的資訊上總消耗被提供給 CEM 通過一個通訊用一個閘道器或所述智慧電錶。Note that the CEM may be a function embedded in the smart device (having thus access to only partial consumption information), in which case the information on total consumption is provided to the CEM by a communication with a gateway or the smart meter.

使用案例敘述 Narrative of use case

注意，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 that 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 (WGSP2112), which might be binding from there on.

還要備考，資訊可以由行為者 A 或行為者 B 替代地提供，這意味著可以將該使用案例有效地分為兩個子使用案例。

Also note that the information may be provided by Actor A or Actor B alternatively, which implies that this use case could be effectively split up in two sub-use cases.

如果將遠程控制裝置連接到 CEM，則 CEM 會解釋價格及/或環境資訊，並遠程控制此類裝置。

In case of Remote-controllable device is connected to CEM, CEM interprets the Price and/or environmental information and controls this type of device remotely.

JWG 2113：自CEM /智慧裝置之警告訊息

JWG 2113： Warning messages from CEM/smart device

此主要使用案例情境包括兩個情境：

This primary use case scenario consists of two scenarios：

- 甲警告訊息被發電由所述智慧裝置後估計，功耗的其中下一個動作將超過最大收縮能力。該智慧裝置接收資訊從該 CEM 上總的房子消耗和最大收縮力。該智慧裝置估計的最大電力將被消耗掉其在接下來的操作(例：循環)。如果存在是一個風險到超過所述閾值的所述最大收縮功率，一個警告被發電和顯示的上智慧裝置或其它的客戶接口(例：其他裝置或所述簡單外部消費者顯示)。該閾值是係依在接收到的限制從所述 CEM，它可以是範圍為即時功率或積累的能量消耗。在情況下的遠程

可控裝置被連接到 CEM，CEM 使得所述警告訊息，如果需要的。在為做到這一點，CEM 詢問關於資訊的功耗，以個別遠程可控裝置如果所述遠程可控裝置具有的能力的表示這樣的資訊。A warning message is generated by the smart device after estimating that the power consumed during its next operation will exceed maximum contracted power.

The smart device receives information from the CEM on total house consumption and maximum contracted power. The smart device estimates the maximum power that will be consumed during its next operation (ex : cycle). If there is a risk to exceed the threshold of the maximum contracted power, a warning is generated and displayed on the smart device or other customer interfaces (e.g. other devices or the simple external consumer display). The threshold is based on limits received from the CEM, which can be limits for instant power or accumulated energy consumption.

In case of Remote-controllable device is connected to CEM, CEM makes the warning message if needed. In order to do this, CEM asks information regarding power consumption to individual remote-controllable device if the remote-controllable device has the capability of showing such information.

- 該警告訊息是產生由 CEM 後備考到該契約功率被超過，係依資訊從該智慧電錶。需要備考的是在 CEM 也可以採取行動，以降低消耗的智慧裝置;因為這些動作是不是在範圍內的這種使用情況，並在工作中的 SG-CG，這種情況只介紹如何將警告資訊被發送。The warning message is generated by the CEM after noticing that contracted power is exceeded, based on information from the smart meter. Note that the CEM may also take action to lower the consumption of smart devices; since these actions are not in scope of this use case and the work of the SG-CG, this scenario only describes how the warning messages are being sent.

該限制(用於即時功率)可包含不只有上限的限制(例：當該客戶是接近到極限的他的契約功率)，但也下限(對於例：在餘下的平常瞬間功耗時，該客戶是出或在夜間)。

The limits (for instant power) can include not only upper limits (for example, when the customer is close to the limit of his contracted power) but also lower limits (for example, the remaining usual instant power consumption when the customer is out or during night time).

JWG 2114：智慧裝置之檢索狀態

JWG 2114： Retrieve status of smart devices

此使用情況介紹如何一個外部行為者檢索的狀態的一個智慧裝置直接從該 CEM。這種即時的時間資訊可被檢索通過一個外部行為者誰擁有一個業務關係到的客戶，確保他的某些智慧裝置(專有)由外部行為者控制。

This use case describes how an external actor retrieves the state of a smart device directly from the CEM. This real time information may be retrieved by an external actor who has a business relationship to the customer, having guaranteed that some of his smart devices are (exclusively) controlled by the external actor.

在情況下的遠程可控裝置被連接到 CEM，CEM 使得所述狀態訊息，如果需要的。在為以做這個，CEM 詢問狀態資訊到個體遠程可控裝置如果所述遠程可控裝置具有的能力的表示這樣的資訊。

In case of Remote-controllable device is connected to CEM, CEM makes the status message if needed. In order to do this, CEM asks status information to individual remote-controllable device if the remote-controllable device has the capability of showing such information.

另一個替代方案是，所述用戶本人檢索的狀態的智慧裝置經由顯示器，在這種情況下，該資訊被不必然發送到行為者 A 或 B。

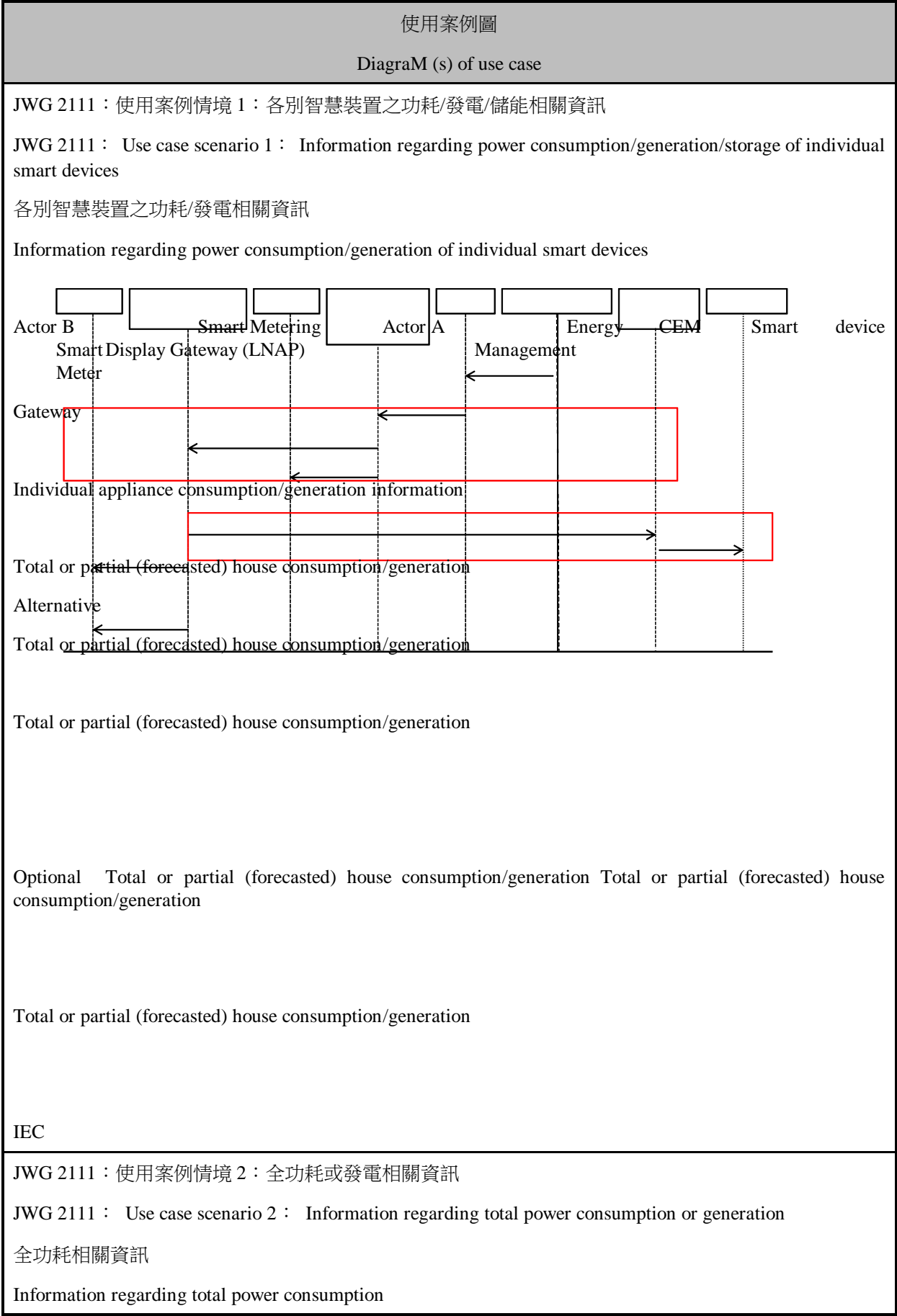
Another alternative is that the customer himself retrieves the state of smart devices via the display, in which case the information is not necessarily sent to actor A or B.

一般說明 General remarks

備考和未解決的問題 Notes and open issues	
Nr	備考 Note
1.	<p>將來可以將此高階使用案例分為兩個高階使用案例：</p> <p>This high level use case may in the future be split up in two high level use cases：</p> <ul style="list-style-type: none"> — 上游通訊(消耗，裝置狀態)upstream communication (consumption, device status) — 下游和家庭內部通訊(價格)downstream and within home communication (price)
2.	<p>在適當的情況下，可以根據外部行為者將所有主要使用案例(情境)分開</p> <p>Where relevant all primary use case (scenarios) may be split up according to external actors</p>
3.	<p>目前還沒有一個使用案例可以解決多個 CEM 和聚合發生在 SG CP 的電網側。(例：如何通知使用者他(即將)超過其契約權力)。縮小這一差距將是下一步</p> <p>There is not yet a use case covering the situation where there would be multiple CEMs and the aggregation takes place in the grid side of the SG CP. (e.g. how is the user being informed that he is (going to) exceed his contractual power). Closing this gap would be a next step</p>
4.	<p>下一步：使用自上而下的方法定義其他使用案例，將功能架構視為黑匣子，並確定哪些訊息將傳入/傳出</p> <p>Next step： define additonal use cases using the top down method, considering the functional architecture as a black box and identifying which messages would go in/come out</p>

A.3.19.2 使用案例圖 Diagrams of use case

Figure A.28 shows Diagrams of use case.



Actor B	Smart Metering	Actor A	Energy	Smart	device
CEM Smart	Display Gateway (LNAP)		Management		
Meter					
Gateway Total house consumption					
Total house consumption					
Total house consumption					
Total and/or forecased house consumption					
Alternative Forecased house consumption					
Total and/or forecased house consumption					
Optional Total and/or forecased house consumption Total and/or forecased house consumption					
IEC					

使用案例圖

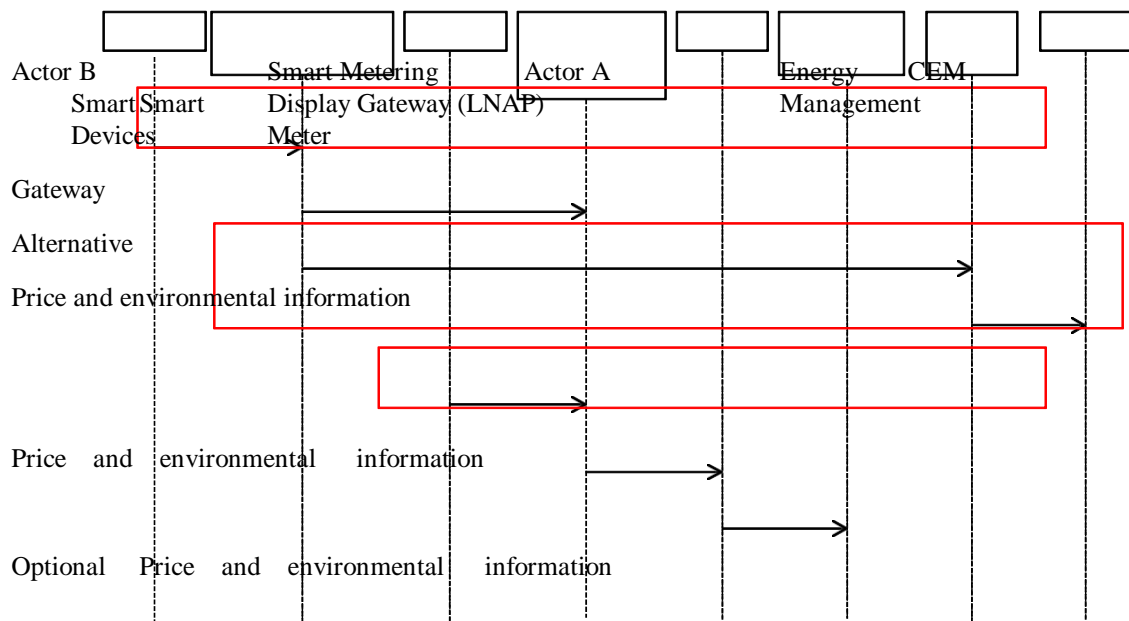
Diagram (s) of use case

JWG 2112：價格及環境資訊

JWG 2112 : Price and environmental information

價格及環境資訊

Price & environmental information



New price and environmental information

Alternative

Price and environmental information

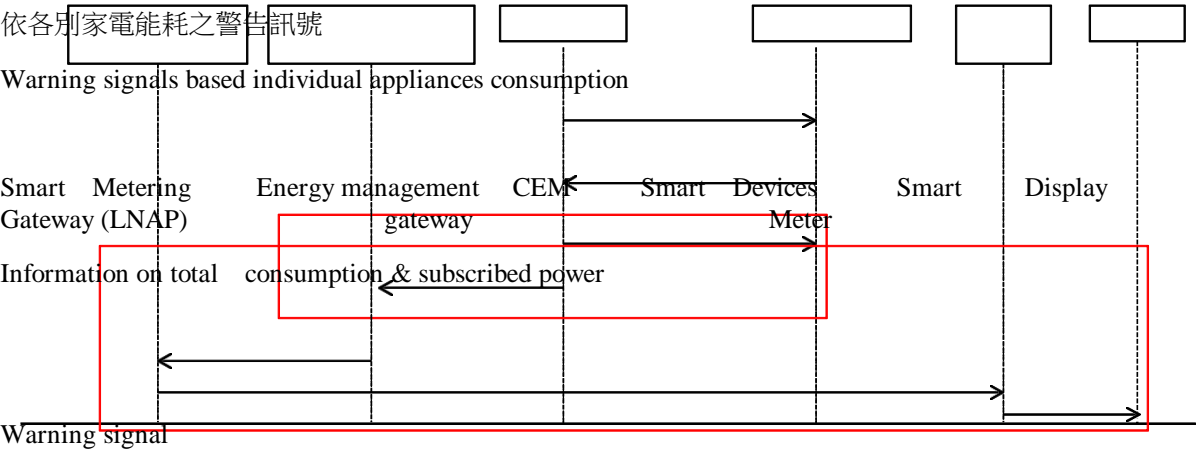
Price and environmental information

New price and environmental information

IEC

JWG 2113：使用案例情境 1：自智慧裝置之警告訊息

JWG 2113： use case scenario 1： Warning messages from smart devices



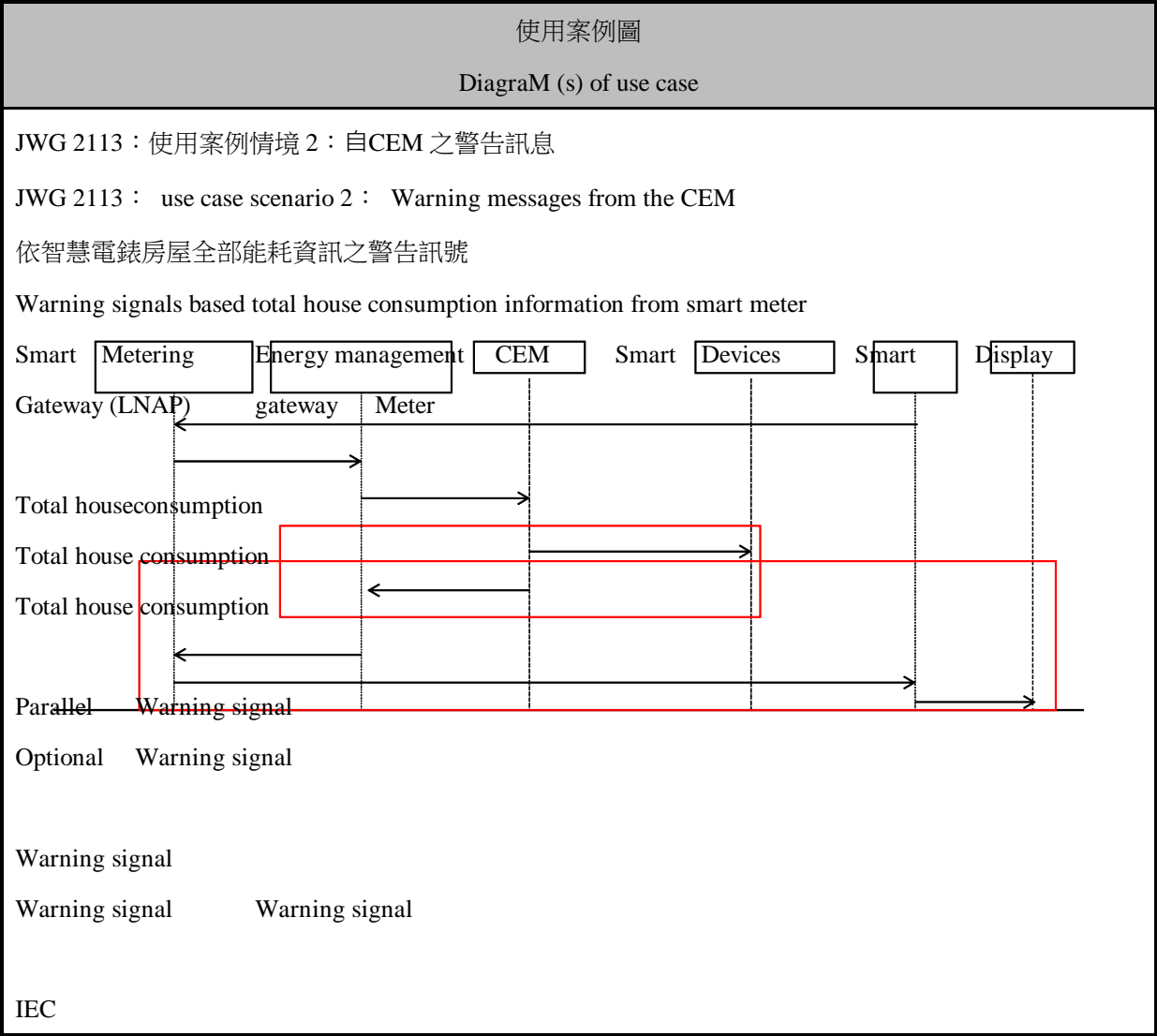
Parallel Warning signal

Optional Warning signal

Warning signal

Warning signal Warning signal

IEC



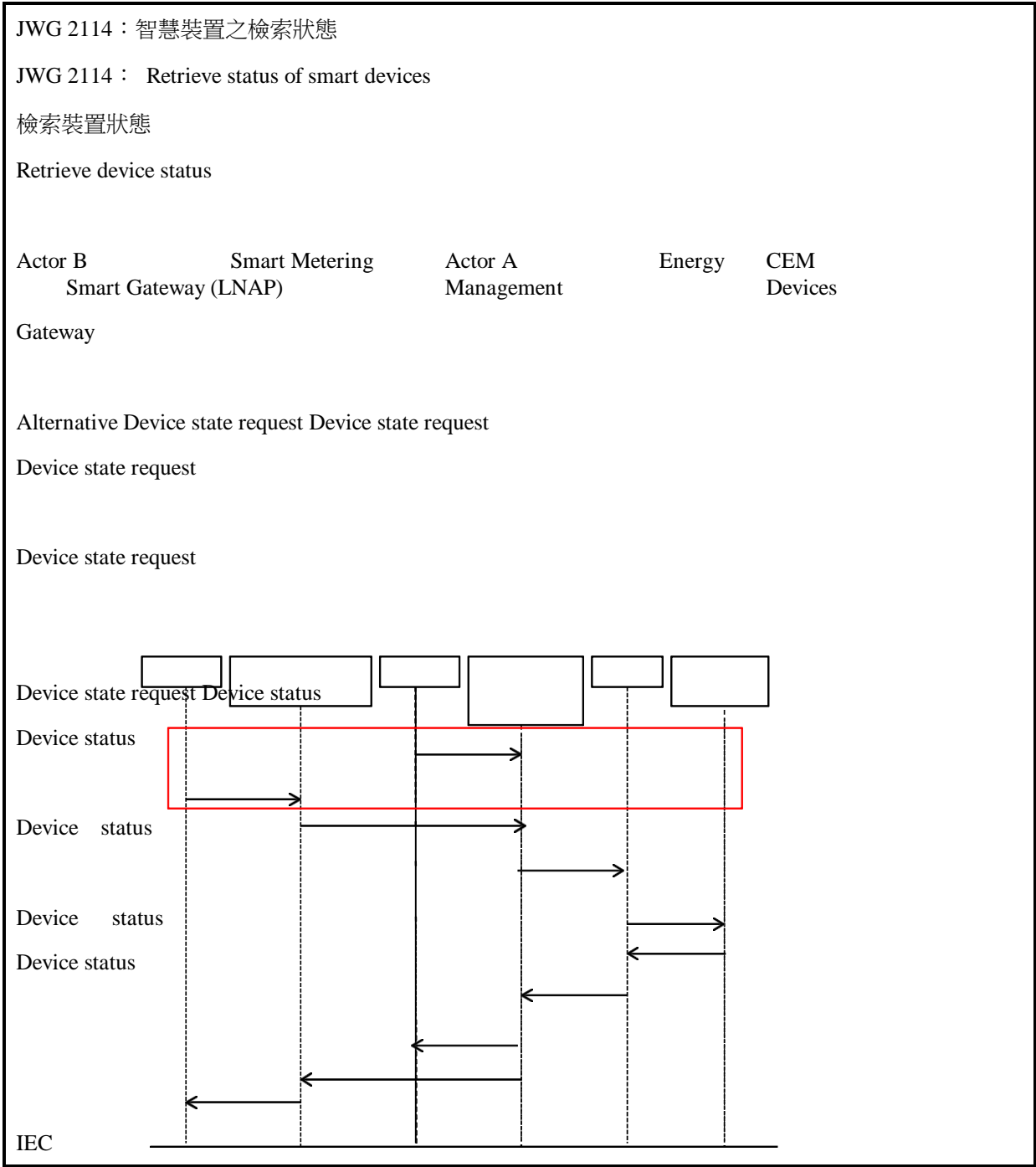
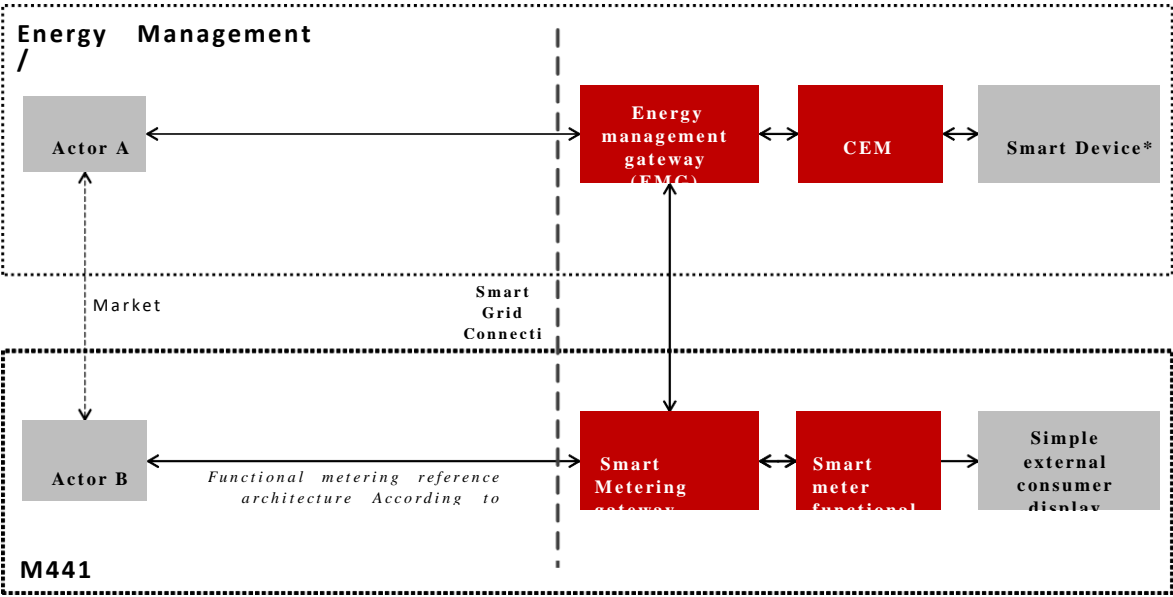


圖 A.28 序列圖 Figure A.28 – Sequence diagram

A.3.19.3 技術細節 Technical details

為定義此使用案例，已使用圖 A.29 中所示的架構作為基礎。

For the definition of this use case, the architecture shown in Figure A.29 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.29 SG CG 架構模型[9]

Figure A.29 – SG CG Architecture Model [9]

備考：上述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，等等。)

NOTE 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.)

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	更多的資訊 特定於此使用案例 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 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>	
能源管理閘道器 Energy management gateway	內部 Internal	<p>接取點(功能個體)用於發送及接收智慧電網相關資訊，命令行為者 A 及 CEM，使 CEM 決定該如何處理該事件。該通訊通常透過無線連接網路完成。</p> <p>An access point (functional entity) sending and receiving smart grid related information and commands between actor A and the CEM, letting the CEM decide how to process the events. The communication is often achieved through an internet connection or through a wireless connection.</p> <p>此閘道器亦可提供包含協議轉換、裝置管理、安全及服務能力之服務。</p> <p>This gateway may also provide services including</p>	

		protocol conversion, device management, security and service capabilities.	
智慧量測閘道器(LNAP) Smart Metering gateway (LNAP)	內部 Internal	<p>接取點(功能個體)，允許接取 1 或多個量測終端裝置及，當配備介面，以進階顯示/家庭自動化終端裝置連接至本地端網路。</p> <p>An access point (functional entity) that allows access to one or more metering end devices and, when equipped with an interface, to advanced display/home automation end devices connected to the local network.</p> <p>LNAP 亦可允許不同功能個體連接至相同 LN 之間的資料交換。LNAP 可簡單地作為路由量測終端裝置及/或顯示器/家庭自動化裝置與廣域網路之鄰近網路間傳遞訊息。</p> <p>A LNAP also may allow data exchange between different functional entities connected to the same LN. The LNAP may act simply as a router transferring messages between the metering end device and/or display/home automation devices and the Neighbourhood network of wide area network.</p> <p>其可提供包括協議轉換，裝置管理，安全性及服務能力等服務。服務可作為 LNAP 自身功能提供，或提供連接至本地端網路之有限功能裝置代表之代理服務。</p> <p>It may also provide services including protocol conversion, device management, security and service capabilities. Services may be provided as functions of the LNAP itself or provide proxy services on behalf of limited capability devices connected to the local network.</p>	
智慧電錶 Smart meter	內部 Internal	<p>量測終端裝置為智慧量測參考架構，以下量測相關功能之組合：</p> <p>The metering end device is a combination of the following meter-related functions from the Smart Metering reference architecture：</p> <ul style="list-style-type: none"> • MID 量測功能，包含傳統電錶顯示器(寄存器或索引)其為合法量測控制。當量測控制下，此等功能應滿足MID 基本要求 <p>MID;Metrology functions including the conventional meter display (register or index) that are under legal metrological control. When under metrological control, these functions shall meet the essential requirements of the MID;</p> <ul style="list-style-type: none"> • MID 未涵蓋 1 或多項附加功能。此等亦作為顯示之 使用； <p>One or more additional functions not covered by the MID. These may also make use of the display;</p> <p>電錶通訊功能。</p> <p>Meter communication functions.</p>	

NNAP	內部 Internal	<p>鄰近網路接取點為一功能個體，可接取至 1 或多個 LNAP、量測終端裝置、顯示及家用自動化終端裝置連接至鄰近網路(NN)。其允許不同功能個體連接至相同 NN 之資料交換。</p> <p>The Neighbourhood Network Access Point is a functional entity that provides access to one or more LNAP's, metering end devices, displays and home automation end devices connected to the neighbourhood network (NN). It may allow data exchange between different functional entities connected to the same NN.</p>	
簡單外部消費者顯示 Simple external consumer display	外部 External	<p>客戶可以使用與智慧電錶/ SG CP 相連的專用顯示器來檢查功耗，計畫的負載減少和歷史負載減少。還存在其他非專用的方式將用電資訊傳遞給客戶，例：個人電腦，手機或電視機。</p> <p>Dedicated display screen in connection with the smart meter/SG CP available to the customer to check power consumption, planned load reductions and load reductions historical. Other not dedicated means also exist to deliver consumption information to the customer, such as the personal computer, the mobile phone or the TV set.</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 towards the energy supply network. The message can be received from a utility or a</p>	

		<p>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>	
HES	內部 Internal	<p>負責擷取電錶及/或資料集中器讀值</p> <p>Responsible for acquiring the reads from meters and/or from data concentrators</p> <p>傳遞原始電錶讀值至 MDM</p> <p>Delivers the raw meter reads to MDM</p> <p>重複讀取任何遺失讀值</p> <p>Repeats the reading for any missing reads</p>	

		<p>是否用於短期臨時資料電錶讀值儲存(1-3 個月)</p> <p>Is the short-term interim data storage (1-3 months) for meter reads</p> <p>向上推送事件資訊至 MDM</p> <p>Pushes the event information upwards to MDM</p> <p>支援集中器及電錶之特定協議</p> <p>Supports the specific protocols of the concentrators and meters</p> <p>包含若干即插即用解決方案之拓撲資訊及聚合功能</p> <p>Contains some topology information and aggregation functionality for plug & play solutions</p>	
MDM	<p>內部</p> <p>Internal</p>	<p>所有量測資料是否使用單一電錶資料庫</p> <p>Is the single meter data repository for all metering data</p> <p>量測資料是否長期儲存</p> <p>Is the long-term storage for the metering data</p> <p>透過 VEE 確保更高階業務程序之資料品質</p> <p>Ensures the data quality by VEE for the higher level business processes</p> <p>連接所有前端系統</p> <p>Connects all head-end systems</p> <p>其他系統之連接點是否能接到智慧電錶，例：閘道器往返 HES。</p> <p>Is the connection point for other systems to reach the smart meters i.e. a gateway to HES and back</p> <p>將電錶讀數傳遞至其他業務系統以供進一步使用，作為業務及運營系統與進階量測基礎設施間之關鍵安全防火牆。</p> <p>Delivers the meter reads to other business systems for further usage Acts as the critical security firewall between business and operational systems and the advanced metering infrastructure.</p> <p>包含若干拓撲資訊及聚合功能。</p> <p>Contains some topology information and aggregation functionality</p>	
<p>行為者 B</p> <p>Actor B</p>	<p>外部</p> <p>External</p>	<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</p>	

		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.	
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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
		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						
項次 No.	引用類型 References type	參考 Reference	狀態 Status	對使用案例的影響 Impact on use case	發起人/組織 Originator/Or ganisation	鏈結 Link
1	使用範例案例 WGSP2111 Example use cases to WGSP2111	EDF-0023, EDF-0024, EDF-0025, EDF-0026, CECED0003, ESMIG-0001, FINS0048 (3.4.2 p 25-26), FINS0077, FINS0081, FINS0082, FINS0089, FINS0090, TC205-0043, AK716.0.1_UC4, AK716.0.1_UC5		原本的使用案例擔任為此的基礎使用案例 The original use cases that served as a basis for this use case		
2	使用範例案例	CECED-0001,		原本的使用		

	WGSP2112 Example use cases to WGSP2112	CECED-0002, CECED-0003, DKE-0014, EDF-0003, EDF-0016, EDF-0021, EDF-0027, ESMIG-0006, ESMIG0013, ESMIG-0014, FINS-0070, FINS-0071, PMA-0001, SCE-0001, TC205-0002 through -0012, AK716.0.1_UC4, AK716.0.1_UC5		案例擔任為此的基礎使用案例 The original use cases that served as a basis for this use case		
3	使用範例案例 WGSP2113 Example use cases to WGSP2113	FINS0088		原本的使用案例擔任為此的基礎使用案例 The original use cases that served as a basis for this use case		

有關分類/映射使用案例的更多資訊

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
彈性叢集 Flexibility cluster
深度等級 Level of depth
主要使用案例 Primary use case
優先序 Prioritisation
1

一般，區域或國家關係 Generic, Regional or National Relation
一般 Generic
觀點 Viewpoint
技術 Technical
分類的其他關鍵字 Further keywords for classification
需求面管理，需量反應，智慧電網 Demand side management, demand response, Smart Grid

A.3.19.4 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					
項次 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
211 1.1	各別智慧裝置之功耗/發電/儲能相關資訊 Information regarding power consumption/generation/storage of individual smart devices	智慧裝置 Smart device	新能耗/發電/儲能資訊在智慧裝置中可用 New consumption/generation/storage information is available in the smart device	通訊建立所有行為者之間的聯繫智慧裝置具有排程，指示其何時發送用電資訊發送給 CEM。 Communication connection between all actors is established The smart device has a schedule instructing it when to send consumption information to the CEM. CEM 有一個安排指示何時發送用電資訊給外部行為者/顯示器。	(預測)用電/發電 為接收由行為者 A 及/或行為者 B 及/或顯示 (forecasted) consumption/generation is received by actor A and/or actor B and/or display

				The CEM has a schedule instructing it when to send consumption information to the external actor/display.	
211 1.2	資訊關於總功率用電/發電 Information regarding total power consumption/generation	智慧電錶 Smart Meter	新用電/新一代資訊是可用在智慧電錶 New consumption/generation information is available in the Smart Meter	<p>通訊建立所有行為者之間的聯繫智慧電錶有一個排程，指示它何時發送用電資訊發送給 CEM。</p> <p>Communication connection between all actors is established</p> <p>The smart meter has a schedule instructing it when to send consumption information to the CEM.</p> <p>CEM 有一個安排指示何時發送用電資訊給外部行為者/顯示器。</p> <p>The CEM has a schedule instructing it when to send consumption information to the external actor/display.</p>	<p>(預測)用電/發電資訊是由行為者 A 及/或行為者 B 接收及/或顯示</p> <p>(forecasted) consumption/generation information is received by actor A and/or or Actor B and/or display</p>
211 2	價格和環境的資訊 Price and environmental information	行為者 A 或行為者 B Actor A or actor B	<p>新價格和環境的資訊可用在行為者 A 或行為者 B 中</p> <p>New price and environmental information is available in Actor A or Actor B</p>	<p>通訊所有人之間的聯繫行為者成立</p> <p>Communication connection between all actors is established</p>	<p>價格及環境資訊是收到者智慧裝置</p> <p>Price and environmental information is received by smart devices</p>

211 3.1	係依各裝置的警告訊息用電 Warning messages based on individual devices consumption	智慧裝置 Smart device	CEM 收到有關新操作的資訊被執行 The CEM received information on a new operation to be executed	使訂閱的功率限制對於智慧裝置是已知的 The subscribed power limits are made known to the smart device 全功耗相關資訊是在 CEM 中可用 Information on total consumption is available in the CEM	收到警告訊息顯示器及/或智慧裝置 Warning message is received by display and/or smart devices
211 3.2	警告訊息根據房屋總數用電從智慧電錶 Warning messages based on total house consumption from smart meter	智慧電錶 Smart meter	智慧電錶被觸發發送用電給 CEM 的資訊 Smart meter is triggered to send consumption information to CEM	CEM 知道訂閱的功率限制 The subscribed power limits are known to the CEM 智慧電錶有一個排程，指示何時發送用電給 CEM 的資訊 Smart meter has a schedule indicating when to send consumption information to CEM	收到警告訊息顯示器及/或智慧裝置 Warning message is received by display and/or smart devices
4	檢查狀態智慧裝置 Retrieve status of smart devices	行為者 A 或行為者 B Actor A or actor B	行為者 A 或行為者想要檢索狀態智慧裝置 Actor A or Actor B want to retrieve the state of a smart device	外部行為者是授權取回狀態選擇智慧裝置 The external actor is authorized to retrieve the state of the selected smart device(s)	外部行為者收到請求的資訊 The external actor received the requested information

步驟-情境

Steps – Scenarios

情境 Scenario								
情境名稱： Scenario name：		JWG 2111：使用案例情境 1：各別智慧裝置之功耗/發電/儲能相關資訊 JWG 2111：Use case scenario 1：Information regarding power consumption/generation/storage of individual smart devices						
步驟 編號 Step No.	事件 Event	過程/活動之名稱 Name of process/activity	過程/活動之說明 Description of process/activity	服務 Service	資訊 監製(行為者) Information	資訊 接收者(行為者) Information	資訊 交換 Information exchanged	要求 記憶，R-ID Requirements

					producer (Actor)	receiver (Actor)		, R-ID
1	新用電位置/代/儲能資訊可用在智慧裝置 New consumption / generation / storage information is available in the smart device		智慧裝置發送資訊於用電n到CEM Smart device sends information regarding consumption to the CEM		智慧裝置 Smart device	CEM	個人裝置用電位置/代/儲能 Individual device consumption / generation / storage	
2	CEM 已收到用電位置/代資訊每個人智慧裝置 CEM received consumption / generation information per individual smart device		CEM 骨科及/或預報用電n並發送這個資訊到能源管理閘道器 The CEM aggregates and/or forecasts consumption and sends this information to the Energy Management Gateway		CEM	能源管理閘道器 Energy Management Gateway	全部或部分(預測)房屋之能耗/發電/儲能 Total or partial (forecast-ed) house consumption/generation/storage	
3a	能源管理閘道器接		能源管理閘道器轉		能源管理閘道器	智慧量測閘道器	全部或部分(預測)房	

	收(預測)能 耗/發電 Energy Managemet Gateway received (forecasted) consumptin /generation		發 資 訊 智 慧 量 測 閘 道器(替代) Energy Manageme nt Gateway forwards information Smart Metering Gateway (alternative)		Energy Manageme nt Gateway	Smart Metering Gateway	屋之能耗/ 發電/儲能 Total or partial (forecasted) house cosumption /generation /storage	
3b	能 源 管 理 閘 道 器 接 收(預測)能 耗/發電 Energy Managemet Gateway received (forecasted) consumptin /generation		能 源 管 理 閘 道 器 轉 發 給 行 為 者 A 的 資 訊(替代) Energy Manageme nt Gateway forwards information to Actor A (alternative)		能 源 管 理 閘 道 器 Energy Manageme nt Gateway	行為者 A Actor A	全 部 或 部 份(預測)房 屋之能耗/ 發電/儲能 Total or partial (forecasted) house consumptio n /generation /storage	
4	智 慧 量 測 閘 道 器 (LNAP) 收 到(預測)用 電位置/代 Smart Metering Gateway (LNAP) receives (forecasted) consump- tion / generation		智 慧 量 測 閘 道 器 (LNAP) 發 送 資 訊 到 智 慧 電 錶 (選擇性的) Smart Metering Gateway (LNAP) sends information to the Smart Meter (optional)		智 慧 量 測 閘 道 器 (LNAP) Smart Metering Gateway (LNAP)	智慧電錶 Smart Meter	全 部 或 部 份(預測)房 屋之能耗/ 發電/儲能 Total or partial (forecasted) house cosumption /generation /storage	
5	智 慧 電 錶 接收(預測) 耗電/發電 Smart		智 慧 電 錶 發 送 資 訊 到 顯 示 (選 擇性的)		智慧電錶 Smart Meter	簡單外部 消費者顯 示 Simple	全 部 或 部 份(預測)房 屋之能耗/ 發電/儲能	

	Meter receives (forecasted) consumption/generation		Smart Meter sends information to the Display (optional)			external consumer display	Total or partial (forecasted) house consumption /generation /storage	
6	智慧量測閘道器(LNAP)收到(預測)用電 n/代 Smart Metering Gateway (LNAP) receives (forecasted) consumption / generation		智慧量測閘道器(LNAP)轉發資訊行為者 B(通過計算通道) Smart Metering Gateway (LNAP) forwards information to Actor B (via the metering channel)		智慧量測閘道器(LNAP) Smart Metering Gateway (LNAP)	行為者 B Actor B	全部或部份(預測)房屋之能耗/發電/儲能 Total or partial (forecasted) house consumption /generation /storage	

情境 Scenario								
情境名稱： Scenario name：		JWG 2111：使用案例情境 2：全功耗或發電相關資訊 JWG 2111： Use case scenario 2： Information regarding total power consumption or generation						
步驟編號 Step No.	事件 Event	的名字處理 / 活動 Name of process /	過程/活動之說明 Description of process/activity	服務 Service	資訊監製(行為者) Information producer (Actor)	資訊接收者(行為者) Information receiver (Actor)	資訊交換 Information exchanged	要求記憶，R-ID Requirements, R-ID

		activity						
1	新用電位置/代資訊 可用在智慧電錶 New consump- tion/ generation information is available in the Smart Meter		智慧的電錶轉發的 用電位置資訊到智 慧量測閘道器 (LNAP) The Smart Meter forwards the consump- tion informatio n to the Smart Metering Gateway (LNAP)		智慧電錶 Smart Meter	智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	消耗量位置資訊 Consump- tion information	
2	智慧量測閘道器 (LNAP) 收到資訊 Smart Metering Gateway (LNAP) receives the information		智慧量測閘道器 (LNAP) 轉發的用電 位置資訊能源管理 閘道器 Smart Metering Gateway (LNAP) forwards the consump- tion informatio n to Energy Manageme		智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	能源管理閘道器 Energy Manageme nt Gateway	消耗量位置資訊 Consump- tion information	

			nt Gateway					
3	能 源 管 理 精 神 閘 道 器 收 到 資 訊 Energy Manage- ment Gateway receives the information		能 源 管 理 精 神 閘 道 器 轉 發 的 用 電 位 置 資 訊 到 CEM Energy Manage- ment Gateway forwards the consump- tion informatio n to CEM		能 源 管 理 閘 道 器 Energy Manageme nt Gateway	CEM	消 耗 量 位 置 資 訊 Consump- tion information	
4	新 用 電 位 置 資 訊 可 用 在 CEM 中 New consump- tion information is available in the CEM		CEM 可能 預 測 總 用 電 和 發 送 (預測)用電 位 置 資 訊 到 能 源 管 理 閘 道 器 The CEM may forecast total consump- tion and sends (forecasted) consump- tion informatio n to the Energy		CEM	能 源 管 理 閘 道 器 Energy Manageme nt Gateway	總 計 及 / 或 預 測 的 屋 用 電 位 置 Total and/or forecasted house consump- tion	

			Manageme nt Gateway					
5a	能 源 管 理 閘 道 器 已 收 到(預 測) 用 電 位 置 Energy Manage- ment Gateway received (forecasted) consump- tion		能 源 管 理 閘 道 器 轉 發 資 訊 給 行 為 者 A (替 代) Energy Manage- ment Gateway forwards informatio n to Actor A (alternative)		能 源 管 理 閘 道 器 Energy Manage- ment Gateway	行 為 者 A Actor A	總 計 及 / 或 預 測 的 屋 用 電 位 置 Total and/or forecasted house consump- tion	
5b	能 源 管 理 閘 道 器 已 收 到(預 測) 用 電 位 置 Energy Manage- ment Gateway received (forecasted) consump- tion		能 源 管 理 閘 道 器 轉 發 資 訊 智 慧 量 測 閘 道 器 (LNAP)(替 代) Energy Manage- ment Gateway forwards informatio n to Smart Metering Gateway (LNAP) (alternative)		能 源 管 理 閘 道 器 Energy Manage- ment Gateway	智 慧 量 測 閘 道 器 (LNAP) Smart Metering Gateway (LNAP)	總 計 及 / 或 預 測 的 屋 用 電 位 置 Total and/or forecasted house consump- tion	
6	智 慧 量 測 閘 道 器 (LNAP) 收 到(預 測)用		智 慧 量 測 閘 道 器 (LNAP) 轉 發 資 訊 智		智 慧 量 測 閘 道 器 (LNAP)	智 慧 電 錶 Smart	總 計 及 / 或 預 測 的 屋 用 電 位 置	

	電位置 Smart Metering Gateway (LNAP) receives (forecasted) consump- tion		慧電錶(選 擇性的) Smart Metering Gateway (LNAP) forwards informatio n to Smart Meter (optional)		Smart Metering Gateway (LNAP)	Meter	Total and/or forecasted house consump- tion	
7	智 慧 電 錶 收到(預測) 用電位置 Smart Meter receives (forecasted) consump- tion		智 慧 電 錶 轉 發 資 訊 顯示(選擇 性的) Smart Meter forwards informatio n to Display (optional)		智慧電錶 Smart Meter	簡單外部 消費者顯 示 Simple external consumer display	總計及/或 預測的屋 用電位置 Total and/or forecasted house consump- tion	
8	智 慧 量 測 閘 道 器 (LNAP) 收 到(預測)用 電位置 Smart Metering Gateway (LNAP) receives (forecasted) consump- tion		智 慧 量 測 閘 道 器 (LNAP) 轉 發 資 訊 行 為 者 B(通 過 量 測 通 道) Smart Metering Gateway (LNAP) forwards informatio n to Actor B (via		智 慧 量 測 閘 道 器 (LNAP) Smart Metering Gateway (LNAP)	行為者 B Actor B	總計及/或 預測的屋 用電位置 Total and/or forecasted house consump- tion	

			metering channel)					
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情境 Scenario								
情境名稱： Scenario name：		JWG 2112：價格及環境資訊 JWG 2112： Price and environmental information						
步驟編號 Step No.	事件 Event	的 名字 處理 / 活動 Name of process / activity	過程/活動之 說明 Descrip- tion of process/ activity	服務 Servi- ce	資訊 監製(行 為者) Informa- tion producer (Actor)	資訊 接 收 者 (行為者) Informa- tion receiver (Actor)	資訊 交換 Informa- tion exchanged	要求 記 憶， R-ID Require- ments, R-ID
1a	新的價格及/或環境 tal 是在行為者 B(替 代-tive) New price and/or environme n tal is available in actor B (alterna- tive)		行為者 B 發 送價格及/或 環境的資訊 給智慧量測 閘 道 器 (LNAP) (通 過量測通道) Actor B sends price and/or environmenta l information to Smart Metering Gateway (LNAP) (via metering channel)		行為者 B Actor B	智慧量測 閘 道 器 (LNAP) Smart Metering Gateway (LNAP)	價格及/或 環境-心理 資訊 Price and/or environ- mental information	
1b	智慧量測 閘 道 器 (LNAP) 收 到資訊 Smart		智慧量測閘 道器 (LNAP) 遠期價格及/ 或環境的資 訊給能源管 理閘道器		智 慧 量 測 閘 道 器 (LNAP) Smart	能源管理 閘道器 Energy Manage- ment	價格及/或 環境-心理 資訊 Price and/or	

	Metering Gateway (LNAP) receives information		Smart Metering Gateway (LNAP) forwards price and/or environmental information to Energy Management Gateway		Metering Gateway (LNAP)	Gateway	environ-mental information	
1c	智慧量測閘道器 (LNAP) 收到資訊 Smart Metering Gateway (LNAP) receives information		智慧量測閘道器 (LNAP) 遠期價格及/或環境的資訊給智慧電錶 Smart Metering Gateway (LNAP) forwards price and/or environmental information to Smart Meter		智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	智慧電錶 Smart Meter	價格及/或環境-心理資訊 Price and/or environmental information	
1d	智慧量測閘道器 (LNAP) 收到資訊 Smart Meter receives information		智慧量測閘道器 (LNAP) 遠期價格及/或環境的資訊給顯示 Smart Meter forwards price and/or environmental information to		智慧電錶 Smart Meter	簡單外部消費者顯示 Simple external consumer display	價格及/或環境-心理資訊 Price and/or environmental information	

			Display					
2	新的價格及/或環境-精神是可在行為者 A (替代) New price and/or environmental is available in actor A (alternative)		行為者 A 發送資訊給能源管理閘道器 Actor A sends information to Energy Management Gateway		行為者 A Actor A	能源管理閘道器 Energy Management Gateway	價格及/或環境-心理資訊 Price and/or environmental information	
3	能源管理閘道器已收到資訊 Energy Management Gateway received information		能源管理閘道器遠期價格及/或環境資訊給 CEM Energy Management Gateway forwards price and/or environmental information to CEM		能源管理耳鼻喉閘道器 Energy Management Gateway	CEM	價格及/或環境-心理資訊 Price and/or environmental information	
4	CEM 已收到新的價格及/或環境-心理資訊 CEM received new price and/or environmental information		CEM 識別相關智慧裝置和轉發新的價格及/或環境資訊給智慧裝置 CEM identifies relevant Smart Devices and forwards the new price		CEM	智慧家電 Smart Appliances	價格及/或環境-心理資訊 Price and/or environmental information	

	n		and/or environmental information to the smart devices					
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情境 Scenario								
情境名稱： Scenario name：		JWG 2113：使用案例情境 1：自智慧裝置之警告訊息 JWG 2113： use case scenario 1： Warning messages from smart devices						
步驟 編號 Step No.	事件 Event	的名字 處理 / 活動 Name of process / activity	過程/活動之說明 Descrip- tion of process/ activity	服務 Servi- ce	資訊 監製(行為者) Informa- tion producer (Actor)	資訊 接收者(行為者) Informa- tion receiver (Actor)	資訊 交換 Informa- tion exchang ed	要求 記憶， R-ID Require- ments, R-ID
1	CEM 已收到資訊在新的操作到被執行 The CEM received information on a new operation to be executed		CEM 發送有關的資訊總房子用電並訂閱權力涉及的裝置 The CEM sends information on total house consumption and subscribed power to the device involved		CEM	智慧裝置 Smart device	宗亮用電和訂閱床功率 Total house consumption and subscribed power	
2	智慧裝置已收到資訊總共屋用電和已訂閱權力裝置 The smart		智慧裝置估計最大功率被消耗用於手術並扣除來自可用功率。如果有不足可用功率，它顯示一個警告		智慧裝置 Smart device	CEM	警告資訊 Warning message	

	device received information on total house consumption and subscribed power to the device		訊息和發出警告給的訊息 CEM The smart device estimates the maximum power to be consumed for the operation and deducts this from the available power. In case there is insufficient power available, it displays a warning message and sends a warning message to the CEM					
3a	CEM 收到一個警告資訊 The CEM received a warning message		CEM 發送警告訊息給(其他)智慧裝置 The CEM sends the warning message to (other) smart devices		CEM	智慧裝置 Smart device	警告資訊 Warning message	
3b	CEM 收到一個警告資訊 The CEM received a warning message		CEM 發送警告訊息給能源管理閘道器 The CEM sends the warning message to the Energy Management Gateway		CEM	能源管理閘道器 Energy Management Gateway	警告資訊 Warning message	
4	能源管理閘道器收到警告資訊 Energy		能源管理閘道器轉發給的訊息智慧量測閘道器(LNAP)		能源管理閘道器 Energy	智慧量測閘道器(LNAP) Smart	警告資訊 Warning	

	Management Gateway receives the warning message		Energy Management Gateway forwards message to the Smart Metering Gateway (LNAP)		Management Gateway	Metering Gateway (LNAP)	message	
5	智慧量測閘道器(LNAP)收到警告資訊 The Smart Metering Gateway (LNAP) receives the warning message		智慧量測閘道器(LNAP)轉發給的訊息智慧電錶 Smart Metering Gateway (LNAP) forwards message to the Smart Meter		智慧量測閘道器(LNAP) Smart Metering Gateway (LNAP)	智慧電錶 Smart Meter	警告資訊 Warning message	
6	智慧電錶收到警告資訊 The Smart Meter receives the warning message		智慧電錶發送給的訊息顯示 Smart Meter sends the message to the Display		智慧電錶 Smart Meter	簡單外部消費者顯示 Simple external consumer display	警告資訊 Warning message	

情境 Scenario								
情境名稱： Scenario name：		JWG 2113：使用案例情境 2：自 CEM 之警告訊息 JWG 2113： use case scenario 2： Warning messages from the CEM						
步驟編號 Step No.	事件 Event	的名字處理 / 活動	過程/活動之說明 Description of process/activity	服務 Service	資訊監製(行為者) Informant	資訊接收者(行為者) Informant	資訊交換 Information	要求記憶，R-ID Requirement

		Name of process / activity			tion producer (Actor)	tion receiver (Actor)	exchanged	-ments, R-ID
1	智慧電錶被觸發發送用電位置資訊到 CEM Smart meter is triggered to send consumption information to CEM		智慧電錶發送資訊總共屋用電智慧量測閘道器 (LNAP) Smart meter sends information on total house consumption to smart metering gateway (LNAP)		智慧電錶 Smart meter	智慧量測閘道器 (LNAP) Smart metering gateway (LNAP)	總房子用電位置 Total house consumption	
2	智慧量測閘道器收到總房子用電位置 Smart metering gateway receives total house consumption		智慧量測閘道器 (LNAP) 轉發資訊給能源管理閘道器 Smart metering gateway (LNAP) forwards information to energy management gateway		智慧量測閘道器 (LNAP) Smart metering gateway (LNAP)	能源管理人員閘道器 Energy management gateway	總房子用電位置 Total house consumption	
3	能源管理人員閘道器收到總房子用電位置 Energy management gateway receives total house consumption		能源管理閘道器轉發資訊給 CEM Energy management gateway forwards information to CEM		能源管理閘道器 Energy Management Gateway	CEM	總房子用電位置 Total house consumption	
4a	CEM 收到總房子用電和備考到最大簽		CEM 發送警告訊息給智慧裝置 The CEM		CEM	智慧裝置 Smart device	警告資訊 Warning message	

	約力量是存在超過 CEM receives total house consumption and notices that maximum contracted power is being exceeded		sends warning message to smart devices					
4b	CEM 收到總房子用電和備考到最大簽約力量是存在超過 CEM receives total house consumption and notices that maximum contracted power is being exceeded		CEM 發送警告訊息給能量管理閘道器 The CEM sends warning message to the Energy Management Gateway		CEM	能源管理閘道器 Energy Management Gateway	警告資訊 Warning message	
5	能源管理閘道器收到警告資訊 Energy Management Gateway receives the warning message		能源管理閘道器轉發訊息給智慧的能量測閘道器 (LNAP) Energy Management Gateway forwards message to the Smart Metering Gateway (LNAP)		能源管理閘道器 Energy Management Gateway	智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	警告資訊 Warning message	
6	智慧的能量測閘道器 (LNAP) 收到警告資訊 The Smart Metering Gateway (LNAP)		智慧量測閘道器 (LNAP) 轉發訊息給智慧的電錶 Smart Metering Gateway (LNAP) forwards		智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	智慧電錶 Smart Meter	警告資訊 Warning message	

	receives the warning message		message to the Smart Meter					
7	智慧電錶收到警告資訊 The Smart Meter receives the warning message		智慧電錶發送訊息給顯示器 Smart Meter sends the message to the Display		智慧電錶 Smart Meter	簡單外部消費者顯示 Simple external consumer display	警告資訊 Warning message	

情境 Scenario								
情境名稱： Scenario name：		JWG 2114：智慧裝置之檢索狀態 JWG 2114： Retrieve status of smart devices						
步驟編號 Step No.	事件 Event	的名字處理 / 活動 Name of process / activity	過程/活動之說明 Description of process/ activity	服務 Service	資訊 監製(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 記憶，R-ID Requirements, R-ID
1a	行為者 A 相要檢索狀態智慧裝置(替代) Actor A wants to retrieve the state of a smart device (Alternative)		行為者 A 發送一個裝置狀態要求能源管理閘道器 Actor A sends a device state request to the energy management gateway		行為者 A Actor A	能源管理閘道器 Energy management gateway	裝置州請求 Device state request	
1b	行為者 B 相要檢索狀態智慧裝置(替代) Actor B		行為者 B 發送一個裝置狀態要求智慧量測閘道器 (LNAP)(通過量測通道)		行為者 B Actor B	智慧量測閘道器 (LNAP) Smart Metering	裝置州請求 Device state request	

	wants to retrieve the state of a smart device (Alternative)		Actor B sends a device state request to the Smart Metering Gateway (LNAP) (via metering channel)			Gateway (LNAP)	request	
2	智慧量測閘道器 (LNAP) 收到裝置狀態請求 Smart Metering Gateway (LNAP) receives device state request		智慧量測閘道器 (LNAP) 轉發裝置提出要求 Smart Metering Gateway (LNAP) forwards device state request to Energy management gateway		智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	能源管理閘道器 Energy management gateway	裝置州請求 Device state request	
3	能源管理閘道器收到裝置狀態請求 Energy management gateway receives device state request		能源管理閘道器轉發裝置提出要求 CEM Energy management gateway forwards device state request to CEM		能源管理精神閘道器 Energy management gateway	CEM	裝置州請求 Device state request	
4	CEM 收到裝置狀態請求 CEM receives device state request		CEM 檢索裝置狀態從其內存中發送給能源管理閘道器 The CEM retrieves the device state		CEM	能源管理閘道器 Energy management gateway	裝置狀態 Device status	

			<p>from its memory and sends it to the</p> <p>energy management gateway</p> <p>選擇性地, CEM 可以詢問相關電器的當前狀態</p> <p>Optionally, the CEM may</p> <p>interrogate the relevant</p> <p>appliances on their current status</p>					
5a	<p>能源管理閘道器收到裝置狀態</p> <p>Energy management gateway receives device status</p>		<p>能源管理閘道器轉發裝置行為者 A 的身分(替代)</p> <p>Energy management gateway forwards device status to Actor A (Alternative)</p>		<p>能源管理精神閘道器</p> <p>Energy management gateway</p>	<p>行為者 A</p> <p>Actor A</p>	<p>裝置狀態</p> <p>Device status</p>	
5b	<p>能源管理閘道器收到裝置狀態</p> <p>Energy management gateway receives device status</p>		<p>能源管理閘道器轉發裝置裝置身份為智慧量測閘道器(LNAP)(替代)</p> <p>Energy management gateway forwards device status to A Smart Metering Gateway (LNAP)</p>		<p>能源管理精神閘道器</p> <p>Energy management gateway</p>	<p>智慧量測閘道器(LNAP)</p> <p>Smart Metering Gateway (LNAP)</p>	<p>裝置狀態</p> <p>Device status</p>	

			(Alternative)					
6	智慧量測 閘道器 (LNAP) 收到裝置狀態 Smart Metering Gateway (LNAP) receives device status		智慧量測閘道器 (LNAP) 轉發裝置行為者 B 的身份(通過量測通道) Smart Metering Gateway (LNAP) forwards device status to Actor B (via metering channel)		智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	行為者 B Actor B	裝置狀態 Device status	

A.3.19.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	交換資訊的說明 Description of information exchanged	資訊資料要求 Requirements for information data
用電/發電/儲能資訊 Consumption/generation/s torage information	全部或部分，實際或預測 Total or partial, actual or forecasted	
價格及/或環境資訊 Price and/or environmental information		
確認書 Confirmation		
有關訂購功率的資訊 Information regarding subscribed power		
警告資訊 Warning message		
裝置狀態請求 Device state request		
裝置狀態 Device status		

A.3.19.6 要求事項(選項) Requirements (optional)

要求事項(選項) Requirements (optional)	
要求類別 Categories for requirements	類別說明 Category description
要求編號 Requirement ID	需求說明 Requirement description

A.3.19.7 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.3.19.8 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.3.20 高階使用案例(WGSP 211x)與外部行為者和家庭內部交換有關用電，價格裝置狀態和警告的資訊 High level use case (WGSP 211x) Exchanging information on consumption, price device status, and warnings with external actors and within the home

A.3.20.1 使用案例說明

使用案例名稱

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
WGSP 2110	智慧電網	與外部行為者和家庭內部交換有關用電，價格和警告的資訊

	Smart Grid	Exchanging information on consumption, price and warnings with external actors and within the home
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Version management

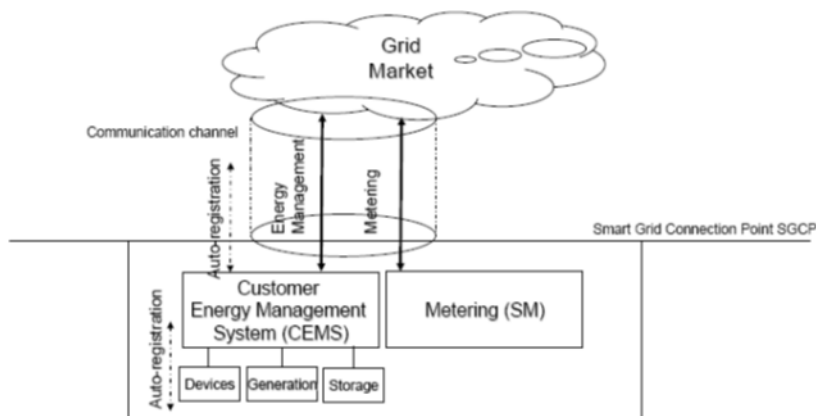
Version management			
Version No.	Date	Changes	Approval status
0.2	01/03/ 2012	Initial draft	Draft
0.4	11/07/ 2012	Reviewed version	Version after commenting phase
0.5	12/11/ 2012	Reviewed version	Version for final commenting
0.51	03/02/ 2014	Fit description into IEC format	

使用案例的範圍和目標 Scope and objectives of use case

使用案例的範圍和目標 Scope and objectives of use case	
範圍 Scope	<p>此使用案例之範圍為 CEM 與“上游”14 行為者間之通訊。CEM、消費者及(家庭)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(請參見行為者表格)。</p> <p>The scope of this use case is the communication between the CEM and "upstream" 14 actors. The communication between CEM, the consumer and (in-home) 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 (see table with actors).</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> <p>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).</p> <p>注意，多個負載/發電資源(來自多個場所)可被組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources (even from multiple premises) can be combined in the CEM to be mutually controlled.</p> <p>由架構角度來看，智慧電網協調小組引入“智慧電網連接點”(SG CP)個體作</p>

為智慧電網行為者(應用程式及/或組織)及室內/建築系統或裝置間之介面。下圖顯示其環境之 SGCP。

From an architectural point of view the Smart Grid Coordination Group introduced the "Smart Grid Connection Point" (SG CP) entity as an interface between Smart Grid actors (applications and/or organizations) and in-home/building systems or devices. The diagram below shows the SG CP in its environment.



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注意，上圖中之方框具有功能性。智慧電錶及 CEM 可為一或兩個分開之實體盒。CEM 亦可被整合於智慧家庭裝置中。電網市場/應用程式可透過一或分開之基礎結構進行通訊。

Please note that the boxes in the diagram above are functional. The Smart Meter and CEM can be one or two separate physical boxes. The CEM can also be integrated in Smart in-home devices. The communication with the Grid market/applications can be through one or through separate infrastructures.

目標

Objective(s)

此使用案例之目的為外部行為者及論述間交換資訊，以便：

The objective of this use case is to exchange information between external actors and the premise in order to :

— 使消費者意識其能耗

Make consumers aware of their energy consumption

— 提供外部市場角色有關(預測)能耗資訊

Providing external market roles with information on (forecasted) energy consumption

— 使消費者或其能源管理系統對能源價格(變化)做出反應，從而支持消費者優化其能耗使用更便宜或更環保能源(取決於個人偏好)

Enable consumers or their Energy Management System to react on (changes in) energy prices, thus supporting consumers to optimize their consumption to use cheaper or greener energy (depending on personal preferences)

— 傳送警告給消費者，以保持能耗低於特定(契約)階層

Send warnings to the consumer to keep consumption below a certain (contracted) level

	<p>— 使外部行為者能檢索家用智慧裝置之狀態</p> <p>Enable external actors to retrieve the state of in home smart devices</p>
相關業務案例 Related business case(s)	<p>此使用中說明的功能組合支持“需量反應”，遵循 Eurelectric 的定義，該定義在《可持續發展》中引用處理工作組的報告。</p> <p>A combination of the functions described in this use support “Demand Response”, following the definition of Eurelectric, which is referenced in the Sustainable Processes workgroup’s report.</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>該使用案例說明有關價格和環境方面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消費者和上游行為者。</p> <p>This use case describes how information regarding price and environmental aspects is sent from upstream actors to CEM and how information regarding energy consumption or generation as well as smart device statuses are being sent back to the consumer and upstream actors.</p> <p>完整說明 Complete description</p>

- 10 在這種情況下，上游意味著朝向行為者 A 或 B(請參閱行為者定義)。Upstream in this context means towards actor A or B (see actor definitions).

使用案例敘述 Narrative of use case
<p>這個高階使用案例包括四個不同的主要使用案例：</p> <p>This high level use case comprises four different primary use cases：</p> <p>1. WGSP 2111：功耗或發電相關資訊 WGSP 2111： Information regarding power consumption or generation</p> <p>智慧電錶可提供有關房屋總用電或發電量的資訊。CEM 接收此資訊，但也可以接收每個智慧裝置的用電/發電資訊。15 資訊的更新率必須與汲取功率的變化率成比例。</p> <p>The Smart Meter makes available the information on total power consumption or generation in the house. The CEM receives this information but can also receive consumption/generation information per smart device. 15 The rate of update of the information must be proportional to the rate of change in the power drawn.</p> <p>該使用案例情境包括兩個情境：</p> <p>This use case scenario consists of two scenarios：</p> <p>— 發送關於(未來的)資訊的功耗或產生的個人智慧裝置。此資訊被提供由所述智慧裝置到 CEM，其可以聚集它與使用它來預測消耗/發電和發送這個到顯示和外部行為者。由於在 CEM 可以是一個功能集成在智慧裝置中的客戶端，不止一個 CEM 在家裡可以執行這個情境。在這種情況下，一</p>

個 CEM 並沒有具有的總住宅用電，但只有部分資訊。

— Sending information regarding (future) power consumption or generation of individual smart devices. This information is provided by the smart device to CEM, which may aggregate it and use it to forecast consumption/generation and send this to the display and external actors. As the CEM can be a function integrated in smart devices in the customer premises, more than one CEM in the house may execute this scenario. In this case, one CEM does not have the total house consumption, but only partial information.

— 發送全功耗或發電相關資訊。此資訊被提供通過該智慧電錶，發送到可能的 CEM 用它做一個預測的消耗/發電並轉發此的顯示器和外部行為者。

— Sending information regarding total power consumption or generation. This information is provided by the smart meter, sent to the CEM that may use it to make a forecast of consumption/generation and forward this to the display and external actors.

注意，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 that 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.

還注意，用電資訊可以通過不同的通道傳輸到行為者 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三個子使用案例，每個子使用案例都有其自己的目標(將資訊發送給 Actor A，將資訊發送給 Actor B 和將資訊發送到簡單外部消費者顯示)。

Also note that the consumption 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 three sub-use cases, each with its own goal (sending the information to Actor A, sending the information to Actor B and sending the information to the Simple External Consumer Display).

2. WGSP2112：價格及/或環境資訊 WGSP 2112： Price and/or environmental information

行為者 A 將發送資訊(例：價格，氣象，環境，成本相關資訊，警告訊息)通過能源管理閘道器發送給消費者或其智慧裝置；行為者 B 可以做的一樣通過智慧量測閘道器。的目標是，以使在消費者或他的裝置感知的數量和成本的消耗能量，並在量和收入的銷售能量回至該電網，或的其他元素與能源管理相關(例：綠色能源的百分比)。消費者還可以收到有關費率已更改的通知。

Actor A will send information (e.g. price, meteorological, environmental, cost related information, warning messages) to the consumer or his smart devices via the Energy management gateway; Actor B may do the same via the Smart Metering gateway. The goal is to make the consumer or his devices aware of the amount and cost of consumed energy and the amount and income for selling energy back to the grid, or of other elements relevant to energy management (e.g. the percentage amount of green power). The consumer can also receive a notification that the tariff has been changed.

要移到峰值負載，一個外部行為者可以提出一個費率的電力在高一定時期的的一天或在某些天的順序來邀請他的客戶來刪除或轉移的各種用途或降低其在這些時期內住房的用電。這些時槽和日期可能不會預先確定，而是根據智慧電網的彈性需求確定。當發生這樣一個較高的成本期間時，客戶被通知在提前，這樣他們可以是準備來做出反應，以這些價格的訊息。智慧裝置可以被參數化或管理由所述 CEM 到開始時的能量成本更低或當所述相對量的綠色能源是在一組電平或以暫時降低其功耗及/或移動它的操作在高峰用電期之前或之後。CEM 和智慧裝置的參數化是使用者的責任。

To move out peak loads, an external actor can propose a tariff of electricity higher during certain periods of the day or during certain days in order to invite his customers to delete or shift various uses or lower their consumptions in its housing during these periods. These periods and days may not be fixed in advance, but rather determined on the flexibility needs of the smart grid. When such a higher cost period occurs, the customers are notified in advance, so that they can be ready to react to these price messages. Smart devices

can be parameterised or managed by the CEM to start when the energy costs less or when the relative amount of green energy is over a set level or to temporarily lowers its power consumption and/or shifts its operation before or after a peak consumption period. The parameterization of the CEM and smart devices are the responsibility of the consumer.

的價格資訊可以是任一的即時價格，實際時間合併的價格和量的資訊或一個固定的費率表。需要備考的是動態定價需要一個量測系統，該系統是能夠提供的資訊為，或以計算成本的能源基礎上，一個彈性的資費方案。這意味著該價格相關的變化中的 CEM 的行為者一個或乙可以被結合與一個費率更新中的智慧電錶；在使用案例 BI.03 中對此進行說明。的智慧電錶協調小組使用情況資料庫。

The price information can be either real-time price, real time combined price and volume messages or a fixed tariff schedule. Note that dynamic pricing requires a metering system that is able to provide the information for, or to calculate the cost of energy based on, a flexible tariff scheme. This implies that price related changes in the CEM by actor A or B may be combined with a tariff update in the smart meter; this is described in use case BI.03. of the Smart Meters Coordination Group use case repository.

該說明的通訊功能在這種使用情況下，也可以使用，以發送警告資訊來自一個外部行為者到消費者，警告他說緊急負載控制會內發生的一個特定時期的時間，除非變化在用電/代取的地方。

The communication functionalities described in this use case may also be used to send warning messages from an external actor to the consumer, warning him that emergency load control will happen within a certain period of time, unless changes in consumption/generation take place.

注意，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，調整價格並從那時時刻開始綁定。

Note that 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 (WGSP2112), which might be binding from there on.

還要備考，資訊可以由行為者 A 或行為者 B 替代地提供，這意味著可以將該使用案例有效地分為兩個子使用案例。

Also note that the information may be provided by Actor A or Actor B alternatively, which implies that this use case could be effectively split up in two sub-use cases.

3. WGSP2113：來自CEM/智慧裝置的警告訊息 WGSP 2113： Warning messages from CEM/smart device

此主要使用案例情境包括兩個情境：

This primary use case scenario consists of two scenarios：

- 一個警告訊息被產生由智慧裝置之後估計其的功耗的其中下一個動作將超過最大收縮能力。A warning message is generated by the smart device after estimating that the power consumed during its next operation will exceed maximum contracted power.

該智慧裝置接收資訊，從該 CEM 的總住宅用電和最大收縮功率。智慧裝置估計的，將最大功率被消耗掉其在接下來的操作(例：：循環)。如果有是一個風險，以超過閾值的最大收縮力，一個警告的產生

The smart device receives information from the CEM on total house consumption and maximum contracted power. The smart device estimates the maximum power that will be consumed during its next operation (ex：cycle). If there is a risk to exceed the threshold of the maximum contracted power, a warning is generated

11 備考，所述 CEM 可以是一個嵌入函數的智慧裝置(具有從而訪問到僅部分消耗的

資 訊)，在這種情況下，所述資訊上總消耗量被提供給 CEM 通過一個通訊用一個閘道 器或所述智慧電錶。

Note that the CEM may be a function embedded in the smart device (having thus access to only partial consumption information), in which case the information on total consumption is provided to the CEM by a communication with a gateway or the smart meter.

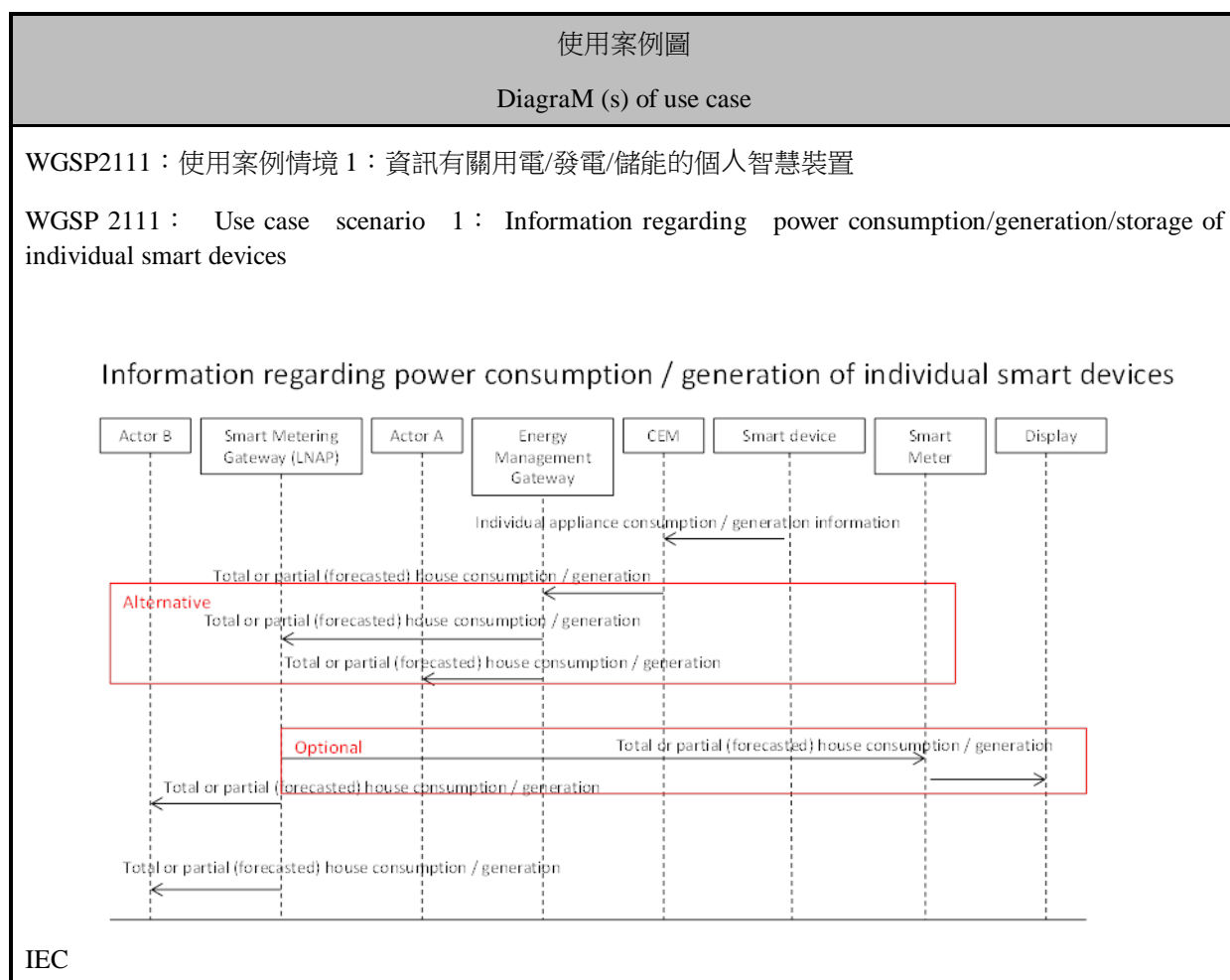
使用案例敘述 Narrative of use case	
<p>並顯示在智慧裝置或其他客戶界面(例：其他裝置或簡單外部消費者顯示)上。該閾值係依從 CEM 收到的限制，該限制可以是即時功率或累積能耗的限制。</p> <p>and displayed on the smart device or other customer interfaces (e.g. other devices or the simple external consumer display). The threshold is based on limits received from the CEM, which can be limits for instant power or accumulated energy consumption.</p> <p>–該警告訊息是產生由在 CEM 備考到後該契約功率是超過，係依資訊從該智慧電錶。需要備考的是，CEM 還可以採取行動，以降低對智慧的用電裝置；因為這些動作是不是在範圍內的這種使用情況和工作中的 SG-CG，這種情況只介紹如何將警告的訊息都被發送。The warning message is generated by the CEM after noticing that contracted power is exceeded, based on information from the smart meter. Note that the CEM may also take action to lower the consumption of smart devices; since these actions are not in scope of this use case and the work of the SG-CG, this scenario only describes how the warning messages are being sent.</p> <p>該限制(用於即時功率)可包含不只有上限的限制(例：當該客戶是接近到極限的他的契約功率)，但也下限(對於例：在餘下的平常瞬間功耗時，該客戶是出或在夜間)。</p> <p>The limits (for instant power) can include not only upper limits (for example, when the customer is close to the limit of his contracted power) but also lower limits (for example, the remaining usual instant power consumption when the customer is out or during night time).</p> <p>4. WGSP 2114：智慧裝置之檢索狀態 WGSP 2114： Retrieve status of smart devices</p> <p>此使用情況介紹如何一個外部行為者檢索的狀態的一個智慧裝置直接從該 CEM。這種即時的時間資訊可被檢索通過一個外部行為者誰擁有一個業務關係到的客戶，確保他的某些智慧裝置(專有)由外部行為者控制。</p> <p>This use case describes how an external actor retrieves the state of a smart device directly from the CEM. This real time information may be retrieved by an external actor who has a business relationship to the customer, having guaranteed that some of his smart devices are (exclusively) controlled by the external actor.</p> <p>另一種選擇是，客戶自己通過顯示器智慧裝置之檢索狀態，在這種情況下，資訊不一定發送給行為者 A 或 B。</p> <p>Another alternative is that the customer himself retrieves the state of smart devices via the display, in which case the information is not necessarily sent to actor A or B.</p>	

一般說明 General remarks

一般說明 General remarks	
備考和未解決的問題 Notes and open issues	
Nr	備考 Note

1.	<p>將來可以將此高階使用案例分為兩個高階使用案例：</p> <p>This high level use case may in the future be split up in two high level use cases：</p> <ul style="list-style-type: none"> — 上游通訊(消耗，裝置狀態)upstream communication (consumption, device status) — 下游和家庭內部通訊(價格)downstream and within home communication (price)
2.	<p>在適當的情況下，可以根據外部行為者將所有主要使用案例(情境)分開</p> <p>Where relevant all primary use case (scenarios) may be split up according to external actors</p>
3.	<p>目前還沒有一個使用案例可以解決多個 CEM 和聚合發生在 SGCP 的電網側。(例：如何通知使用者他(即將)超過其契約權力)。縮小這一差距將是下一步</p> <p>There is not yet a use case covering the situation where there would be multiple CEMs and the aggregation takes place in the grid side of the SGCP. (e.g. how is the user being informed that he is (going to) exceed his contractual power). Closing this gap would be a next step</p>
4.	<p>下一步：使用自上而下的方法定義其他使用案例，將功能架構視為黑匣子，並確定哪些訊息將傳入/傳出</p> <p>Next step： define additional use cases using the top down method, considering the functional architecture as a black box and identifying which messages would go in/come out</p>

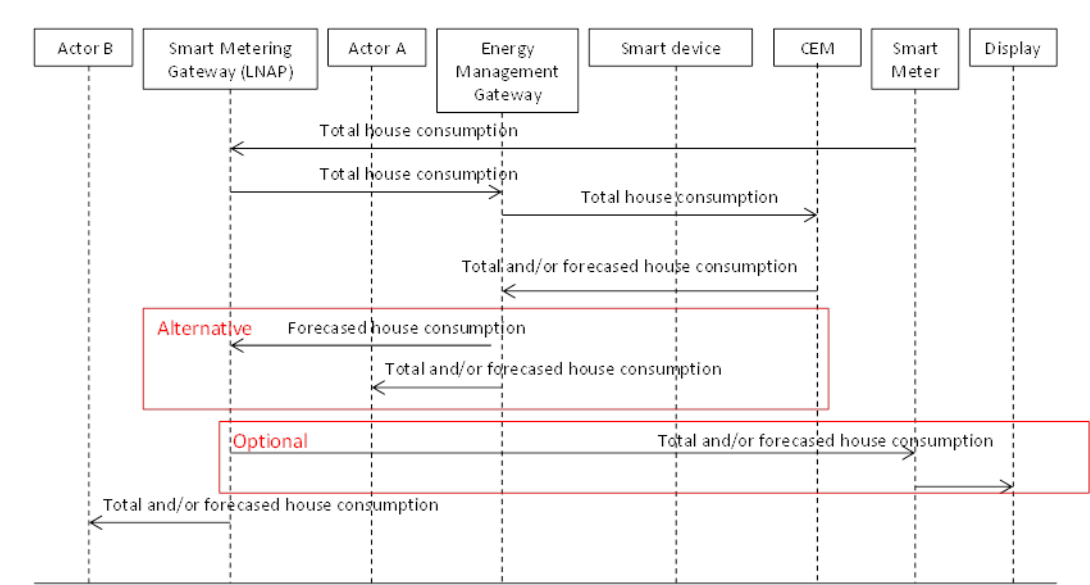
A.3.20.2 使用案例圖 Diagrams of use case



WGSP 2111：使用案例情境 2：全功耗或發電相關資訊

WGSP 2111： Use case scenario 2： Information regarding total power consumption or generation

Information regarding total power consumption



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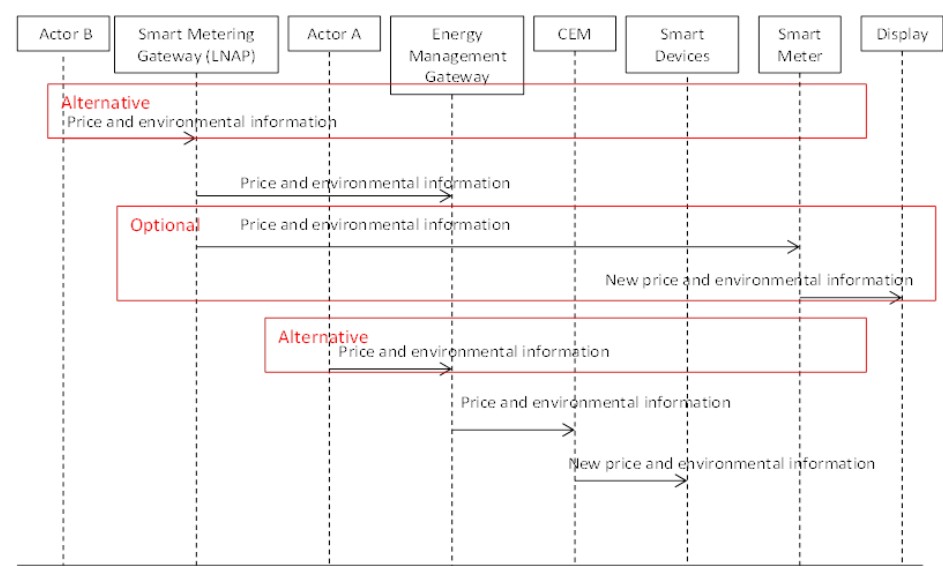
使用案例圖

Diagram (s) of use case

WGSP 2112：價格及環境資訊

WGSP 2112： Price and environmental information

Price & environmental information

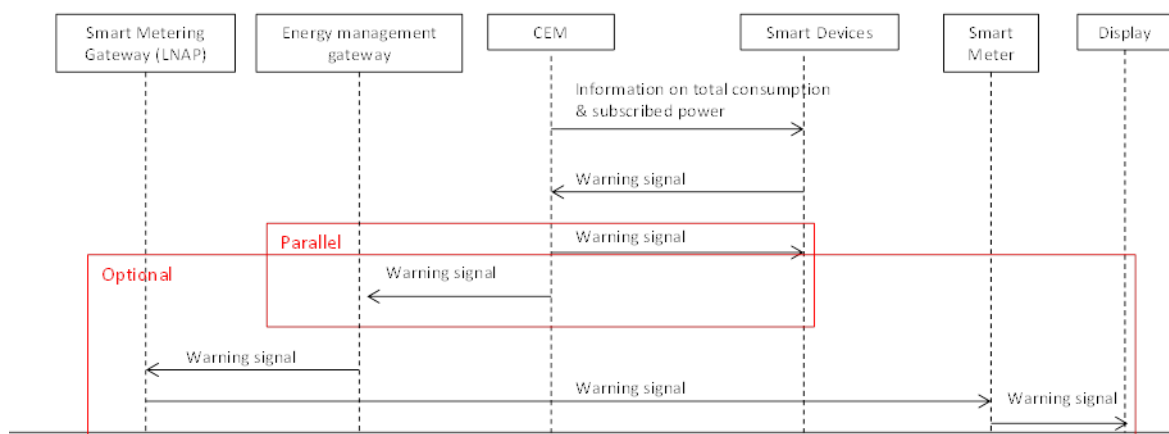


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WGSP 2113：使用案例情境 1：自智慧裝置之警告訊息

WGSP 2113： use case scenario 1： Warning messages from smart devices

Warning signals based individual appliances consumption



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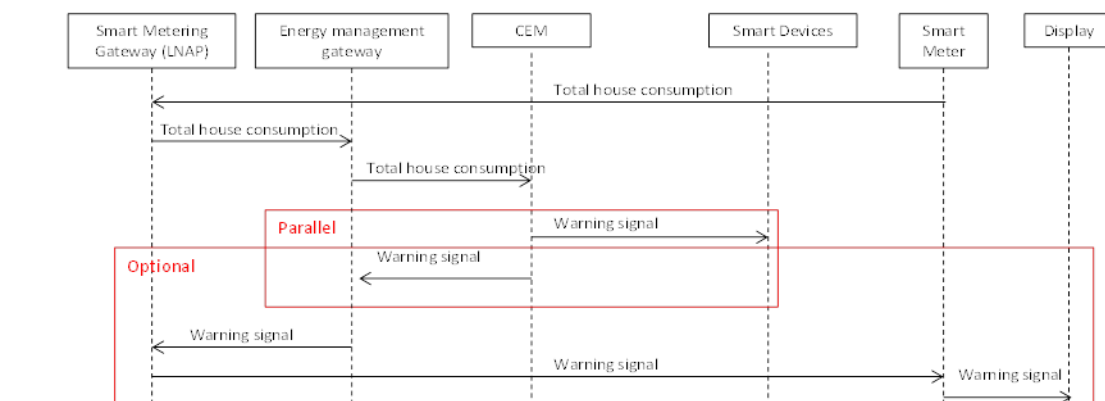
使用案例圖

Diagram (s) of use case

WGSP 2113：使用案例情境 2：自CEM 之警告訊息

WGSP 2113： use case scenario 2： Warning messages from the CEM

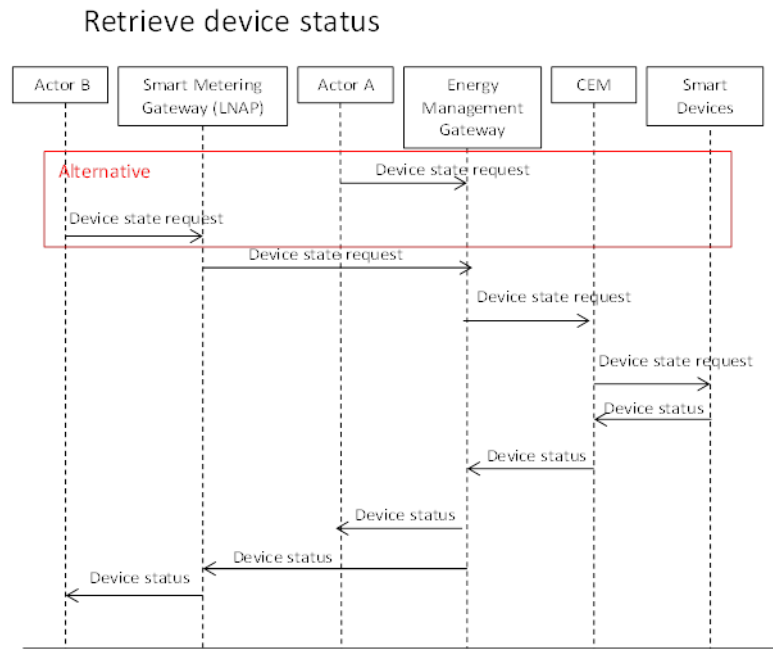
Warning signals based total house consumption information from smart meter



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WGSP 2114：智慧裝置之檢索狀態

WGSP 2114： Retrieve status of smart devices

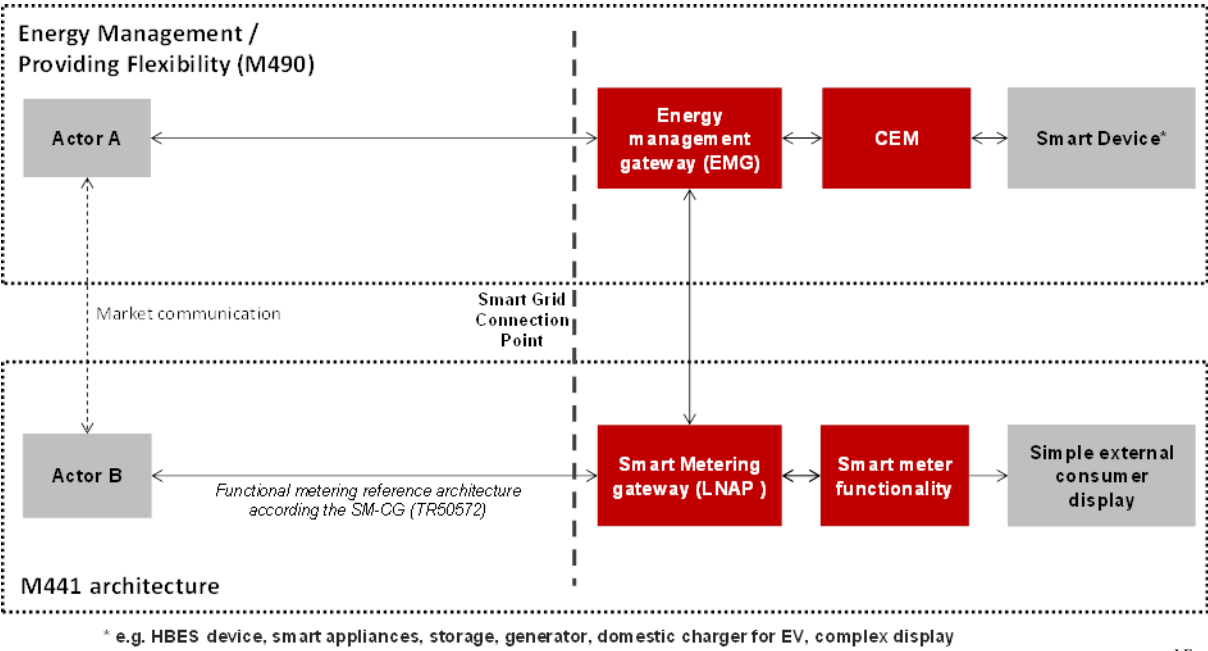


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A.3.20.3 技術細節 Technical details

為定義此使用案例，已將以下架構用作基礎。

For the definition of this use case, the following architecture has been used as a basis.



備考：上述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 that 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.)

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		行為者說明請參閱行為者列表 Actor description see Actor list	更多的資訊 特定於此使用案例 Further information specific to this
行為者類型請參閱行為者列表 Actor type see Actor list			

			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 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>	
能源管理閘道器 Energy management gateway	內部 Internal	<p>接取點(功能個體)用於發送及接收智慧電網相關資訊，命令行為者 A 及 CEM，使 CEM 決定該如何處理該事件。該通訊通常透過無線連接網路完成。</p> <p>An access point (functional entity) sending and receiving smart grid related information and commands between actor A and the CEM, letting the CEM decide how to process the events. The communication is often achieved through an internet connection or through a wireless connection.</p> <p>此閘道器亦可提供包含協議轉換、裝置管理、安全及服務能力之服務。</p> <p>This gateway may also provide services including protocol conversion, device management, security and service capabilities.</p>	
智慧量測閘道器	內部	接取點(功能個體)，允許接取 1 或多個量測終端裝	

(LNAP) Smart Metering gateway (LNAP)	Internal	<p>置及，當配備介面，以進階顯示/家庭自動化終端裝置連接至本地端網路。</p> <p>An access point (functional entity) that allows access to one or more metering end devices and, when equipped with an interface, to advanced display/home automation end devices connected to the local network.</p> <p>LNAP 亦可允許不同功能個體連接至相同 LN 之間的資料交換。LNAP 可簡單地作為路由量測終端裝置及/或顯示器/家庭自動化裝置與廣域網路之鄰近網路間傳遞訊息。</p> <p>A LNAP also may allow data exchange between different functional entities connected to the same LN. The LNAP may act simply as a router transferring messages between the metering end device and/or display/home automation devices and the Neighbourhood network of wide area network.</p> <p>其可提供包括協議轉換，裝置管理，安全性及服務能力等服務。服務可作為 LNAP 自身功能提供，或提供連接至本地端網路之有限功能裝置代表之代理服務。</p> <p>It may also provide services including protocol conversion, device management, security and service capabilities. Services may be provided as functions of the LNAP itself or provide proxy services on behalf of limited capability devices connected to the local network.</p>	
智慧電錶 Smart meter	內部 Internal	<p>量測終端裝置為智慧量測參考架構，以下量測相關功能之組合：</p> <p>The metering end device is a combination of the following meter-related functions from the Smart Metering reference architecture：</p> <ul style="list-style-type: none"> • MID 量測功能，包含傳統電錶顯示器(寄存器或索引)其為合法量測控制。當量測控制下，此等功能應滿足MID 基本要求 <p>MID;Metrology functions including the conventional meter display (register or index) that are under legal metrological control. When under metrological control, these functions shall meet the essential requirements of the MID;</p> <ul style="list-style-type: none"> • MID 未涵蓋 1 或多項附加功能。此等亦作為顯示之使用; <p>One or more additional functions not covered by the MID. These may also make use of the display;</p> <p>電錶通訊功能。</p> <p>Meter communication functions.</p>	

NNAP	內部 Internal	<p>鄰近網路接取點為一功能個體，可接取至 1 或多個 LNAP、量測終端裝置、顯示及家用自動化終端裝置連接至鄰近網路(NN)。其允許不同功能個體連接至相同 NN 之資料交換。</p> <p>The Neighbourhood Network Access Point is a functional entity that provides access to one or more LNAP's, metering end devices, displays and home automation end devices connected to the neighbourhood network (NN). It may allow data exchange between different functional entities connected to the same NN.</p>	
簡單外部消費者顯示 Simple external consumer display	外部 External	<p>客戶可以使用與智慧電錶/ SGCP 相連的專用顯示器來檢查功耗，計畫的負載減少和負載減少歷史。還存在其他非專用手段將用電資訊傳遞給客戶，例：個人電腦，手機或電視機。</p> <p>Dedicated display screen in connection with the smart meter/SGCP available to the customer to check power consumption, planned load reductions and load reductions historical. Other not dedicated means also exist to deliver consumption information to the customer, such as the personal computer, the mobile phone or the TV set.</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</p>	

		<p>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 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>	
HES	內部 Internal	<p>負責擷取電錶及/或資料集中器獲讀值</p> <p>Responsible for acquiring the reads from meters and/or from data concentrators</p> <p>傳遞原始電錶讀值至 MDM</p> <p>Delivers the raw meter reads to MDM</p>	

		<p>重複讀取任何遺失讀值</p> <p>Repeats the reading for any missing reads</p> <p>是否用於短期臨時資料電錶讀值儲存(1-3 個月)</p> <p>Is the short-term interim data storage (1-3 months) for meter reads</p> <p>向上推送事件資訊至 MDM</p> <p>Pushes the event information upwards to MDM</p> <p>支援集中器及電錶之特定協議</p> <p>Supports the specific protocols of the concentrators and meters</p> <p>包含若干即插即用解決方案之拓撲資訊及聚合功能</p> <p>Contains some topology information and aggregation functionality for plug & play solutions</p>	
MDM	<p>內部</p> <p>Internal</p>	<p>所有量測資料是否使用單一電錶資料庫</p> <p>Is the single meter data repository for all metering data</p> <p>量測資料是否長期儲存</p> <p>Is the long-term storage for the metering data</p> <p>透過 VEE 確保更高階業務程序之資料品質</p> <p>Ensures the data quality by VEE for the higher level business processes</p> <p>連接所有前端系統</p> <p>Connects all head-end systems</p> <p>其他系統之連接點是否能接到智慧電錶，例：閘道器往返 HES。</p> <p>Is the connection point for other systems to reach the smart meters i.e. a gateway to HES and back</p> <p>將電錶讀數傳遞至其他業務系統以供進一步使用，作為業務及運營系統與進階量測基礎設施間之關鍵安全防火牆。</p> <p>Delivers the meter reads to other business systems for further usage Acts as the critical security firewall between business and operational systems and the advanced metering infrastructure.</p> <p>包含若干拓撲資訊及聚合功能。</p> <p>Contains some topology information and aggregation functionality</p>	
行為者 B	外部	外部行為者(智慧電網市場角色)透過量測通訊通	

Actor B	External	<p>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>	
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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
		<p>為正確計費彈性地需求/發電，智慧電錶及 CEM 需要時間同步。</p> <p>In order to correctly bill demand/generation flexibility, the smart meter and CEM need to be time synchronized.</p>	

參考文獻

References

參考文獻 References						
項次 No.	引用類型 References type	參考 Reference	狀態 Status	對使用案例的影響 Impact on use case	發起人/組織 Originator/Organisation	鏈結 Link

1	WGSP2111 範例 使用案例 Example use cases to WGSP2111	EDF-0023, EDF-0024, EDF-0025, EDF-0026, CECED0003, ESMIG-0001, FINS0048 (3.4.2 p 25-26), FINS0077, FINS0081, FINS0082, FINS0089, FINS0090, TC205-0043, AK716.0.1_UC4, AK716.0.1_UC5		在原使用案例 是服務作為一 個為此的基礎 使用案例 The original use cases that served as a basis for this use case		
2	WGSP2112 範例 使用案例 Example use cases to WGSP2112	CECED-0001, CECED-0002, CECED-0003, DKE-0014, EDF-0003, EDF-0016, EDF-0021, EDF-0027, ESMIG-0006, ESMIG0013, ESMIG-0014, FINS-0070, FINS-0071, PMA-0001, SCE-0001, TC205-0002 through -0012, AK716.0.1_UC4, AK716.0.1_UC5		在原使用案例 是服務作為一 個為此的基礎 使用案例 The original use cases that served as a basis for this use case		

3	WGSP2113 範例 使用案例 Example use cases to WGSP2113	FINS0088		在原使用案例 是服務作為一 個為此的基礎 使用案例 The original use cases that served as a basis for this use case		
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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

分類資訊 Classification information
與其他使用案例關聯 Relation to other use cases
彈性叢集 Flexibility cluster
深度等級 Level of depth
主要使用案例 Primary use case
優先序 Prioritisation
1
一般，區域或國家關係 Generic, Regional or National Relation
一般 Generic
觀點 Viewpoint
技術 Technical
分類的其他關鍵字 Further keywords for classification

分類資訊 Classification information
需求面管理，需量反應，智慧電網 Demand side management, demand response, Smart Grid

A.3.20.4 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					
項次 No.	情境名稱 Scenario name	主要行為者 Primary actor	觸發事件 Triggering event	前提 Pre-Condition	條件後 Post-Condition
211 1.1	各別智慧裝置之功耗/發電/儲能相關資訊 Information regarding power consumption/generation/storage of individual smart devices	智慧裝置 Smart device	新的用電/發電/儲能資訊是在智慧裝置中可用 New consumption/generation/storage information is available in the smart device	通訊所有行為者之間的聯繫是已建立 智慧裝置有排程指示何時發送 用電資訊發送給 CEM。 Communication connection between all actors is established The smart device has a schedule instructing it when to send consumption information to the CEM. 該 CEM 有一個進度指示 它何時以發送用電給外部行為者的資訊/顯示。 The CEM has a schedule instructing it when to send consumption information to the external actor/display.	(預測)用電/發電 為接收由行為者 A 及/或行為者 B 及/或顯示 (forecasted) consumption/generation is received by actor A and/or actor B and/or display

211 1.2	資訊關於總功率用電/發電 Information regarding total power consumption/generation	智慧電錶 Smart Meter	新用電/代資訊是在智慧電錶中可用 New consumption/generation information is available in the Smart Meter	通訊所有行為者之間的聯繫是已建立 智慧電錶有排程指示何時發送用電資訊發送給 CEM。 Communication connection between all actors is established The smart meter has a schedule instructing it when to send consumption information to the CEM. 該 CEM 有一個進度指示 它何時以發送用電給外部行為者的資訊/顯示。 The CEM has a schedule instructing it when to send consumption information to the external actor/display.	(預測)用電/發電資訊是由行為者 A 及/或行為者 B 接收及/或顯示 (forecasted) consumption/generation information is received by actor A and/or Actor B and/or display
211 2	價格和環境的資訊 Price and environmental information	行為者 A 或行為者 B Actor A or actor B	新價格和環境的資訊是在行為者 A 中可用或行為者 B New price and environmental information is available in Actor A or Actor B	通訊之間的聯繫所有行為者是已建立 Communication connection between all actors is established	價格和環境的資訊是收到者智慧裝置 Price and environmental information is received by smart devices
211 3.1	係依各裝置的警告訊息用電 Warning messages based on individual devices	智慧裝置 Smart device	CEM 收到有關要執行的新操作 The CEM received information on a new operation to be executed	訂閱的功率限制為使智慧裝置知道 The subscribed power limits are made known to the smart device 全功耗相關資訊是	收到警告訊息顯示器及/或智慧裝置 Warning message is received by display and/or

	consumption			在 CEM 中可用 Information on total consumption is available in the CEM	smart devices
211 3.2	警告訊息根據房屋總數用電從智慧電錶 Warning messages based on total house consumption from smart meter	智慧電錶 Smart meter	智慧電錶被觸發發送用電給 CEM 的資訊 Smart meter is triggered to send consumption information to CEM	CEM 知道訂閱的功率限制 The subscribed power limits are known to the CEM 智慧電錶有一個排程，指示何時發送用電給 CEM 的資訊 Smart meter has a schedule indicating when to send consumption information to CEM	收到警告訊息顯示器及/或智慧裝置 Warning message is received by display and/or smart devices
4	檢索狀態智慧裝置 Retrieve status of smart devices	行為者 A 或行為者 B Actor A or actor B	行為者 A 或行為者 B 想要檢索智慧的狀態裝置 Actor A or Actor B want to retrieve the state of a smart device	外部行為者是授權給檢索狀態選定的智慧裝置 The external actor is authorized to retrieve the state of the selected smart device(s)	外部行為者收到請求的資訊 The external actor received the requested information

步驟-情境

Steps – Scenarios

情境 Scenario								
情境名稱： Scenario name：		WGSP 2111：使用案例情境 1：各智慧裝置之相關功耗/發電/儲能資訊 WGSP 2111：Use case scenario 1：Information regarding power consumption/generation/storage of individual smart devices						
步驟編號 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 監製(行為者) Information producer (Actor)	資訊接收者 (行為者) Information receiver (Actor)	資訊交流 Information exchanged	要求， R-ID Requirements, R-ID

1	智慧裝置中提供新的能耗/發電/儲能資訊 New consumption /generation/storage information is available in the smart device		智慧裝置發送能耗相關資訊至 CEM Smart device sends information regarding consumption to the CEM		智慧裝置 Smart device	CEM	各裝置能耗/發電/儲能 Individual device consumption / generation / storage	
2	CEM 接收各智慧裝置之能耗/發電資訊 CEM received consumption/generation information per individual smart device		CEM 聚合及/或預測能耗並發送資訊至能源管理閘道器 The CEM aggregates and/or forecasts consumption and sends this information to the Energy Management Gateway		CEM	能源管理閘道器 Energy Management Gateway	全部或部分(預測)房屋之能耗/發電/儲能 Total or partial (forecasted) house consumption/generation/storage	
3a	能源管理閘道器接收(預測)能耗/發電 Energy Management Gateway received(forecasted) consumption/generation		能源管理閘道器轉發資訊至智慧量測閘道器(替代性) Energy Management Gateway forwards information Smart Metering Gateway (alternative)		能源管理閘道器 Energy Management Gateway	智慧量測閘道器 Smart Metering Gateway	全部或部分(預測)房屋之能耗/發電/儲能 Total or partial (forecasted) house consumption/generation/storage	
3b	能源管理閘道器接收(預測)能耗/發電 Energy Management Gateway received(forec		能源管理閘道器轉發資訊至行為者 A (替代性) Energy		能源管理閘道器 Energy Management Gateway	行為者 A Actor A	全部或部分(預測)房屋之能耗/發電/儲能 Total or partial	

	asted) consumption/ generation		Managem entGateway forwards information to Actor A (alternative)				(forecasted) house cosumption/ge neration/stor age	
4	智慧量測閘 道器 (LNAP) 接收(預測)能 耗/發電 Smart Metering Gateway (LNAP) receives (forecasted) consumption/ generation		智慧量測 閘道器 (LNAP) 發 送資訊至 智慧電錶 (選擇性) Smart Metering Gateway (LNAP) sends information to the Smart Meter (optional)		智慧量測 閘道器 (LNAP) Smart Metering Gateway (LNAP)	智慧電錶 Smart Meter	全部或部份 (預測)房屋 之能耗/發電 /儲能 Total or partial (forecasted) house cosump-tion/ generation/st orage	
5	智慧電錶接 收(預測)能耗 /發電 Smart Meter receives (forecasted) consumption/ generation		智慧電錶 轉發資訊 至顯示器 (選擇性) Smart Meter forwards information to Display (optional)		智慧電錶 Smart Meter	簡單外部消 費者顯示 Simple external consumer display	全部或部份 (預測)房屋 之能耗/發電 /儲能 Total or partial (forecasted) house cosump-tion/ generation/st orage	
6	智慧量測閘 道器 (LNAP) 接收(預測)能 耗/發電 Smart Metering Gateway (LNAP) receives (forecasted) consumption/ generation		智慧量測 閘道器 (LNAP) 轉 發資訊至 行為者 B(透過量 測通道) Smart Metering Gateway (LNAP) forwards information to Actor B (via the Metering channel)		智慧量測 閘道器 (LNAP) Smart Metering Gateway (LNAP)	行為者 B Actor B	全部或部份 (預測)房屋 之能耗/發電 /儲能 Total or partial (forecasted) house cosump-tion/ generation/st orage	
5b	能源管理閘 道器接收(預		能源管理 閘道器轉		能源管理 閘道器	智慧量測閘 道器(LNAP)	全部及/或預 測之房屋能	

	測)能耗/發電 Energy Management Gateway received(forecasted) consumption/generation		發 資 訊 至 智 慧 量 測 閘 道 器 (LNAP)(替 代) Energy Management Gateway forwards information to Smart Metering Gateway (LNAP) (alternative)		Energy Management Gateway	Smart Metering Gateway (LNAP)	耗 Total and/or forecasted house consumption	
6	智 慧 量 測 閘 道 器 (LNAP) 接 收 (預 測) 能 耗 Smart Metering Gateway (LNAP) receives (forecasted) consumptionn		智 慧 電 錶 閘 道 器 (LNAP) 轉 發 資 訊 至 智 慧 電 錶 (選 擇 性) Smart Metering Gateway (LNAP) forwards information to Smart Meter (optional)		智 慧 量 測 閘 道 器 (LNAP) Smart Metering Gateway (LNAP)	智慧電錶 Smart Meter	全部及/或預測之房屋能耗 Total and/or forecasted house consumption	
7	智 慧 電 錶 接 收 (預 測) 能 耗 / 發 電 Smart Meter receives (forecasted) consumption/generation		智 慧 電 錶 轉 發 資 訊 至 顯 示 器 (選 擇 性) Smart Meter forwards information to Display (optional)		智慧電錶 Smart Meter	簡單外部消費者顯示 Simple external consumer display	全部及/或預測之房屋能耗 Total and/or forecasted house consumption	

8	智慧量測閘道器 (LNAP) 接收(預測)能耗 Smart Metering Gateway (LNAP) receives (forecasted) consumption		智慧量測閘道器 (LNAP) 轉發資訊至行為者 B(透過量測通道) Smart Metering Gateway (LNAP) forwards information to Actor B (via the Metering channel)		智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	行為者 B Actor B	全部及/或預測之房屋能耗 Total and/or forecasted house consumption	
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情境 Scenario								
情境名稱： Scenario name：		WGSP 2112：價格及環境資訊 WGSP 2112： Price and environmental information						
步驟編號 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	資訊監製(行為者) Information producer (Actor)	資訊接收者(行為者) Information receiver (Actor)	資訊交流 Information exchanged	要求，R-ID Requirements, R-ID
1a	行為者 B(備用) 中提供新的價格及/或環境 New price and/or environmental is avai-		行為者 B 將價格及/或環境資訊發送到智慧量測閘道器 (LNAP)(透過量測通道) Actor B sends price and/or environmental information		行為者 B Actor B	智慧量測閘道器(LNAP) Smart Metering Gateway (LNAP)	價格及/或環境資訊 Price and/or environmental information	

	lable in actor B (altern a tive)		to Smart Metering Gateway (LNAP) (via metering channel)					
1b	智慧量 測閘道 器 (LNAP) 接 收 資訊 Smart Mete- ring Gate- way (LNAP) recei- ves inform a -tion		智 慧 量 測 閘 道 器 (LNAP) 將 價 格 及 / 或 環 境 資 訊 轉 發 到 能 源 管 理 閘 道 器 Smart Metering Gateway (LNAP) forwards price and/or environ- mental information to Energy Manage- ment Gateway		智 慧 量 測 閘 道 器 (LNAP) Smart Metering Gateway (LNAP)	能源管理閘 道器 Energy Management Gateway	價格及/或 環境資訊 Price and/or environ- mental informatio n	
1c	智慧量 測閘道 器 (LNAP) 接 收 資訊 Smart Mete- ring Gate- way		智 慧 電 錶 閘 道 器 (LNAP) 將 價 格 及 / 或 環 境 資 訊 轉 發 給 智 慧電錶 Smart Metering Gateway (LNAP)		智 慧 電 錶 閘 道 器 (LNAP) Smart Metering Gateway (LNAP)	智慧電錶 Smart Meter	價格及/或 環境資訊 Price and/or environ- mental informatio n	

	(LNAP) receives information		forwards price and/or environmental information to Smart Meter					
1d	智慧電錶接收資訊 Smart Meter receives information		智慧電錶 將價格及/ 或環境資訊 轉發到 顯示器 Smart Meter forwards price and/or environmental information to Display		智慧電錶 Smart Meter	簡單外部消費者顯示 Simple external consumer display	價格及/或 環境資訊 Price and/or environmental information	
2	行為者 A (替代) 可以提供新的價格及/或環境 New price and/ or environmental is available in actor A (alternative)		行為者 A 將 資訊發送到 能源管理閘 道器 Actor A sends information to Energy Management Gateway		行為者 A Actor A	能源管理閘 道器 Energy Management Gateway	價格及/或 環境資訊 Price and/or environmental information	

3	能源管理閘道器收到資訊 Energy Management Gateway received information		能源管理閘道器將價格及/或環境資訊轉發給 CEM Energy Management Gateway forwards price and/or environmental information to CEM		能源管理閘道器 Energy Management Gateway	CEM	價格及/或環境資訊 Price and/or environmental information	
4	CEM 收到新的價格及 / 或環境資訊 CEM received new price and/or environmental information		CEM 識別相關的智慧裝置並將新的價格及/或環境資訊轉發到智慧裝置 CEM identifies relevant smart devices and forwards the new price and/or environmental information to the smart devices		CEM	智慧家電 Smart Appliances	價格及/或環境資訊 Price and/or environmental information	

情境 Scenario								
情境名稱： Scenario name：		WGSP 2113：使用案例情境 1：自智慧裝置之警告訊息 WGSP 2113： use case scenario 1： Warning messages from smart devices						
步驟編號 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	資訊監製(行為者) Information producer (Actor)	資訊接收者(行為者) Information receiver (Actor)	資訊交流 Information exchanged	要求，R-ID Requirements, R-ID
1	CEM 收到有關要執行的新操作的資訊 The CEM received information on a new operation to be executed		CEM 將有關房屋總消耗量和訂購功率的資訊發送到所涉及的裝置 The CEM sends information on total house consumption and subscribed power to the device involved		CEM	智慧裝置 Smart device	房屋總消耗量和訂購功率 Total house consumption and subscribed power	
2	智慧裝置接收到有關房屋總消耗量的資訊以及裝置的訂閱電量 The		智慧裝置估算操作消耗的最大功率，並從可用功率中扣除該最大功率。如果此處沒有足夠的功率，它將顯		智慧裝置 Smart device	CEM	警告資訊 Warning message	

	smart device received information on total house consumption and subscribed power to the device		<p>示警告訊息並將警告訊息發送到 CEM</p> <p>The smart device estimates the maximum power to be consumed for the operation and deducts this from the available power. In case there is insufficient power available, it displays a warning message and sends a warning message to the CEM</p>					
3a	CEM 收到警告訊息 The CEM received a		<p>CEM 將警告訊息發送到(其他)智慧裝置</p> <p>The CEM sends the warning</p>		CEM	智慧裝置 Smart device	警告資訊 Warning message	

	warning message		message to (other) smart devices					
3b	CEM 收到警告訊息 The CEM received a warning message		CEM 將警告訊息發送到能源管理閘道器 The CEM sends the warning message to the Energy Management Gateway		CEM	能源管理閘道器 Energy Management Gateway	警告資訊 Warning message	
4	能源管理閘道器收到警告訊息 Energy Management Gateway receives the warning message		能源管理閘道器將訊息轉發到智慧量測閘道器(LNAP) Energy Management Gateway forwards message to the Smart Metering Gateway (LNAP)		能源管理閘道器 Energy Management Gateway	智慧量測閘道器(LNAP) Smart Metering Gateway (LNAP)	警告資訊 Warning message	
5	智慧量測閘道器(LNAP)收到警告訊息		智慧量測閘道器(LNAP)將訊息轉發到智慧電錶		智慧量測閘道器(LNAP) Smart Metering	智慧電錶 Smart Meter	警告資訊 Warning message	

	The Smart Metering Gateway (LNAP) receives the warning message		Smart Metering Gateway (LNAP) forwards message to the Smart Meter		Gateway (LNAP)			
6	智慧電錶收到警告訊息 The Smart Meter receives the warning message		智慧電錶將訊息發送到人機界面 Smart Meter sends the message to the Display		智慧電錶 Smart Meter	簡單外部消費者顯示 Simple external consumer display	警告資訊 Warning message	

情境 Scenario								
情境名稱： Scenario name：		WGSP 2113：使用案例情境 2：自 CEM 之警告訊息 WGSP 2113： use case scenario 2： Warning messages from the CEM						
步驟編號 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	資訊監製(行為者) Information (Actor)	資訊接收者(行為者) Information receiver (Actor)	資訊交流 Information exchanged	要求，R-ID Requirements, R-ID

					producer (Actor)			
1	觸發智慧電錶將用電資訊發送到CEM Smart meter is triggered to send consumption information to CEM		智慧電錶將有關總房屋消耗的資訊發送到智慧電錶閘道器(LNAP) Smart meter sends information on total house consumption to smart metering gateway (LNAP)		智慧電錶 Smart meter	智慧電錶閘道器(LNAP) Smart metering gateway (LNAP)	房屋總用電 Total house consumption	
2	智慧量測閘道器接收房屋總消耗量 Smart metering gateway receives total house consumption		智慧量測閘道器(LNAP)將資訊轉發到能源管理閘道器 Smart metering gateway (LNAP) forwards information to energy management gateway		智慧量測閘道器(LNAP) Smart metering gateway (LNAP)	能源管理閘道器 Energy management gateway	房屋總用電 Total house consumption	
3	能源管理閘道		能源管理閘道器將		能源管理閘道器	CEM	房屋總用電	

	器接收 房屋總 消耗量 Energy mana- gement gate- way recei- ves total house consu m ption		資 訊 轉 發 到 CEM Energy manage- ment gateway forwards information to CEM		Energy manage- ment gateway		Total house consump- tion	
4a	CEM recei- ves total house consump- tion and notices that maxim- um contrac- ted power is being exceed- ed CEM recei- ves total house consum- ption and notices		CEM 向智 慧 裝 置 發 送 警 告 訊 息 The CEM sends warning message to smart devices		CEM	智慧裝置 Smart device	警告資訊 Warning message	

	that maxi- mum contrac ted power is being excee- ded							
4b	CEM 收到房 屋總消 耗量， 並注意 到已超 出最大 契約規 定的功 率 CEM recei- ves total house consu m ption and notices that maxi- mum contrac ted power is being excee-		CEM 將警 告 訊 息 發 送 到 能 源 管 理 閘 道 器 The CEM sends warning message to the Energy Manage- ment Gateway		CEM	能源管理閘 道器 Energy Management Gateway	警告資訊 Warning message	

	ded							
5	能源管理閘道器收到警告訊息 Energy Management Gateway receives the warning message		能源管理閘道器將訊息轉發到智慧量測閘道器(LNAP) Energy Management Gateway forwards message to the Smart Metering Gateway (LNAP)		能源管理閘道器 Energy Management Gateway	智慧量測閘道器(LNAP) Smart Metering Gateway (LNAP)	警告資訊 Warning message	
6	智慧量測閘道器(LNAP)收到警告訊息 The Smart Metering Gateway (LNAP) receives the warning message		智慧量測閘道器(LNAP)將訊息轉發到智慧電錶 Smart Metering Gateway (LNAP) forwards message to the Smart Meter		智慧量測閘道器(LNAP) Smart Metering Gateway (LNAP)	智慧電錶 Smart Meter	警告資訊 Warning message	
7	智慧電		智慧電錶		智慧電錶	簡單外部消	警告資訊	

	錶收到警告訊息 The Smart Meter receives the warning message		將訊息發送到人機界面 Smart Meter sends the message to the Display		Smart Meter	費者顯示 Simple external consumer display	Warning message	
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情境 Scenario								
情境名稱： Scenario name：		WGSP 2114：智慧裝置之檢索狀態 WGSP 2114： Retrieve status of smart devices						
步驟編號 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	資訊監製(行為者) Information producer (Actor)	資訊接收者(行為者) Information receiver (Actor)	資訊交流 Information exchanged	要求，R-ID Requirements, R-ID
1a	行為者 A 要智慧裝置之檢索狀態(替代) Actor A wants to retrieve the state of a smart device		行為者 A 向能源管理閘道器發送裝置狀態請求 Actor A sends a device state request to the energy management gateway		行為者 A Actor A	能源管理閘道器 Energy management gateway	裝置狀態請求 Device state request	

	(Alternative)							
1b	行為者 B 想智慧裝置之檢索狀態 (替代) Actor B wants to retrieve the state of a smart device (Alternative)		行為者 B (通過量測通道) 將裝置狀態請求發送到智慧量測閘道器 (LNAP)。 Actor B sends a device state request to the Smart Metering Gateway (LNAP) (via metering channel)		行為者 B Actor B	智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	裝置狀態請求 Device state request	
2	智慧量測閘道器 (LNAP) 接收裝置狀態請求 Smart Metering Gateway (LNAP) receives device state request		智慧量測閘道器 (LNAP) 將裝置狀態請求轉發到能源管理閘道器 Smart Metering Gateway (LNAP) forwards device state request to Energy management gateway		智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	能源管理閘道器 Energy management gateway	裝置狀態請求 Device state request	

3	<p>能源管理閘道器接收裝置狀態請求</p> <p>Energy management gateway receives device state request</p>		<p>能源管理閘道器將裝置狀態請求轉發到 CEM</p> <p>Energy management gateway forwards device state request to CEM</p>		<p>能源管理閘道器</p> <p>Energy management gateway</p>	CEM	<p>裝置狀態請求</p> <p>Device state request</p>	
4	<p>CEM 收到裝置狀態請求</p> <p>CEM receives device state request</p>		<p>CEM 從其內存中檢索裝置狀態，並將其發送到能源管理閘道器</p> <p>The CEM retrieves the device state from its memory and sends it to the energy management gateway</p> <p>選擇性地，CEM 可以詢問相關裝置的當前狀態</p> <p>Optionally, the CEM may interrogate the relevant appliances</p>		CEM	<p>能源管理閘道器</p> <p>Energy management gateway</p>	<p>裝置狀態</p> <p>Device status</p>	

			on their current status					
5a	能源管理閘道器接收裝置狀態 Energy management gateway receives device status		能源管理閘道器將裝置狀態轉發給行為者 A (替代) Energy management gateway forwards device status to Actor A (Alternative)		能源管理閘道器 Energy management gateway	行為者 A Actor A	裝置狀態 Device status	
5b	能源管理閘道器接收裝置狀態 Energy management gateway receives device status		能源管理閘道器將裝置狀態轉發到智慧量測閘道器 (LNAP)(替代) Energy management gateway forwards device status to A Smart Metering Gateway (LNAP) (Alternative)		能源管理閘道器 Energy management gateway	智慧量測閘道器(LNAP) Smart Metering Gateway (LNAP)	裝置狀態 Device status	

6	智慧量測閘道器 (LNAP) 接收裝置狀態 Smart Metering Gateway (LNAP) receives device status		智慧量測閘道器 (LNAP) 將裝置狀態轉發給行為者 B(通過量測通道) Smart Metering Gateway (LNAP) forwards device status to Actor B (via metering channel)		智慧量測閘道器(LNAP) Smart Metering Gateway (LNAP)	行為者 B Actor B	裝置狀態 Device status	
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A.3.20.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	交換資訊的說明 Description of information exchanged	資訊資料要求 Requirements for information data
用電/發電/儲能資訊 Consumption / generation/storage information	Total or partial, actual or forecasted	
價格及/或環境資訊 Price and/or environmental information		
確認書 Confirmation		
有關訂購功率的資訊 Information regarding subscribed		

power		
警告資訊 Warning message		
裝置狀態請求 Device state request		
裝置狀態 Device status		

A.3.20.6 要求事項(選項) Requirements (optional)

要求事項(選項) Requirements (optional)	
要求類別 Categories for requirements	類別說明 Category description
要求編號 Requirement ID	需求說明 Requirement description

A.3.20.7 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.3.20.8 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.3.21 高階使用案例(JWG212x，係依 WGSP212x)直接負載-發電管理(國際)

High level use case (JWG212x, based on WGSP212x) Direct load-generation management (international)

A.3.21.1 使用案例說明

使用案例名稱

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
JWG212x- WGSP	智慧電網 Smart Grid	直接負載/發電管理 Direct load/generation management

Version management

Version management			
Version No.	Date	Changes	Approval status
0.2	01/03/2012	Initial draft	Draft
0.4	11/07/2012	Reviewed version	Version after commenting phase
0.5	13/11/2012	Reviewed version	Version for final commenting
0.51	03/02/2014	Fit description into IEC format	
0.51-JP0.8	28/02/2014	Marge JP requirements	Draft for Comment

Version management			
Version No.	Date	Changes	Approval status
0.6	12/03/2014	Minor changes to include this initial SPWG Use Case into JWG-UC activities with a new JWG-UC ID. Initial WGSP-UC had been extended with Japanese requirements for the JWG activity.	Draft

使用案例的範圍和目標 Scope and objectives of use case

使用案例的範圍和目標 Scope and objectives of use case

範圍
Scope

此使用案例之範圍為 CEM 與“上游”16 行為者間之通訊。CEM、消費者及(家庭)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(請參見行為者表格)。

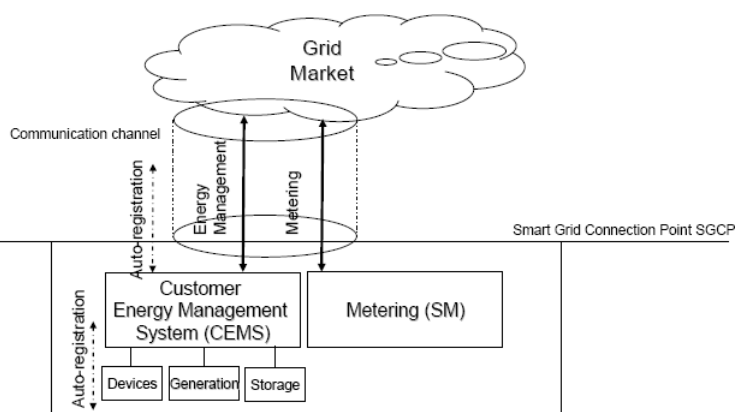
The scope of this use case is the communication between the CEM and "upstream" 16 actors. The communication between CEM, the consumer and (in-home) smart devices is officially not in this scope of this report, but will be included in the use case description for the sake of clarity. Smart devices cover also smart appliances, generators and storage (see table with actors).

注意，多個負載/發電資源(來自多個場所)可被組合於 CEM 中以便相互控制。

Note that multiple loads/generation resources (even from multiple premises) can be combined in the CEM to be mutually controlled.

由架構角度來看，智慧電網協調小組引入“智慧電網連接點”(SG CP)個體作為智慧電網行為者(應用程式及/或組織)及室內/建築系統或裝置間之介面。下圖顯示其環境之 SGCP。

From an architectural point of view the Smart Grid Coordination Group introduced the "Smart Grid Connection Point" (SG CP) entity as an interface between Smart Grid actors (applications and/or organizations) and in-home/building systems or devices. The diagram below shows the SG CP in its environment.



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注意，上圖中之方框具有功能性。智慧電錶及 CEM 可為一或兩個分開之實體盒。CEM 亦可被整合於智慧家庭裝置中。電網市場/應用程式可透過一或分開之基礎結構進行通訊。

Please note that the boxes in the diagram above are functional. The Smart Meter and CEM can be one or two separate physical boxes. The CEM can also be integrated in Smart in-home devices. The communication with the Grid market/applications can be through one or through separate infrastructures.

目標 Objective(s)	<p>此使用案例的目的是管理家用裝置，以便控制用電或發電資源，例：：</p> <p>The objective of this use case is to manage in-home devices in order to control power consumption or generation resources for example to :</p> <p>避免停電的風險</p> <p>Avoid the risk of black out</p> <p>對即時峰值功率訊息做出反應</p> <p>React to real time peak power messages</p> <p>平衡用電與本地生產之間的負擔</p> <p>Balance the load between consumption and local production</p> <p>優化消耗以使用更便宜及/或更綠色的能源(取決於個人喜好)</p> <p>Optimize the consumption to use cheaper and/or greener energy (depending on personal preferences)</p> <p>保持電能質量</p> <p>Maintain power quality</p>
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- 12 在這種情況下，上游是指朝向行為者 A 或 B(請參閱行為者定義)。Upstream in this context means towards actor A or B (see actor definitions).

使用案例的範圍和目標 Scope and objectives of use case	
相關業務案例 Related business case(s)	<p>需求方管理訊息發送到消費者能源管理器(CEM)，以通過與連接到 CEM 的許多家用智慧裝置進行互動來觸發管理負載的程序。</p> <p>Demand Side Management messages are sent to the Consumer Energy Manager (CEM) to trigger a program that manages load by interacting with a number of in-home smart devices connected to the CEM.</p> <p>遵循 Eurelectric 的定義，以下說明的功能可以標記為“直接負載控制”使用案例，在可持續過程工作組的報告中引用該定義。</p> <p>The functions described below can be labeled as a “Direct load control” use case, following the definition of Eurelectric, which is referenced in the Sustainable Processes Workgroup’s report</p> <p>與 Case 2110(支持需量反應)的不同之處在於，負責管理負載/發電彈性的操作員主動要求更改特定數量的消耗/發電。消費者對此請求的反應取決於消費者與發出訊息的組織之間的契約以及消費者或接收訊息的裝置做出的最終決定。</p> <p>The difference with Use Case 2110 (supporting Demand Response) is that the operator responsible for managing the load/generation flexibility actively asks to change consumption/generation with a specific amount. The consumer’s reaction to this request, however is depending on the contract between the consumer and the organisation sending out the message and the final decision made by the consumer or the device receiving the message.</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>訊息和量測資訊通過稱為智慧電網連接點(SG CP)的介面提供給房屋/建築物。 可以區分以下訊息：</p> <p>Messages and metrological information are provided to the home/building via an interface called the Smart Grid Connection Point (SG CP). The following messages can be distinguished：</p> <p>(a) 直接 – 加載/發電/儲能管理 Direct – load/generation/storage management</p> <p>(b) 緊急情況 Emergencies</p> <p>(1) 緊急負載控制 Emergency load control</p> <p>(2) 宣布緊急負載控制結束 Announce end of emergency load control</p> <p>遵循 Eurelectric 的定義，以下說明的功能可以標記為“直接負載控制”使用案例，在可持續過程工作組的報告中對此進行引用。</p> <p>The functions described below can be labeled as a “Direct load control” use case, following the definition of Eurelectric, which is referenced in the Sustainable Processes workgroup’s report.</p>
完整說明 Complete description
<p>該使用案例包括三個主要使用案例：</p> <p>This use case comprises three primary use cases：</p> <p>JWG2121：負載/發電/儲能管理</p> <p>負載/發電管理訊息由上游行為者發送，以增加，減少或限制負載，發電或儲能的能量。</p> <p>負載/發電管理訊息從行為者 A 或 B 發送到 CEM。 CEM 可以將訊息直接轉發到裝置/發電機/儲能，也可以(係依多個參數)將其轉換為單獨的控制訊息，發送給最適合執行該操作的智慧裝置。智慧裝置可以是家電，發電機或儲能裝置(例：蓄電池，熱泵，燃料電池等)。</p> <p>係依來自 CEM 的負載管理訊息，智慧裝置可以根據裝置類型，裝置當前正在執行的操作以及消費者設定來更改用電，發電或儲能。為避免在高峰時間消耗能量或避免超過設定的功率極限，還可以改變裝置的啟動，或者可以改變某些功能的啟動。</p> <p>CEM 可以向外部行為者提供請求負載/發電量變化的反饋，因此該行為者可以對預期的用電/發電量變化和更新其需求/發電量預測有一個想法。反饋也可以用於計費目的</p> <p>如果將遠程可控裝置連接到 CEM，則 CEM 解釋負載/發電管理訊息並遠程控制此類裝置。</p> <p>在某些情況下，由於高需求預測，行為者 A 或 B 提前(例：前一天的晚上)將負載/發電管理訊息發送到 CEM。</p> <p>可以考慮在行為者 A 或行為者 B 與 CEM 之間進行協議，以協議減少的電量。</p> <p>JWG2121： Load/generation/storage management</p> <p>A load/generation management message is sent by an upstream actor to increase, reduce or limit the load, generation or stored energy.</p> <p>A load/generation management message is sent from actor A or B to the CEM. The CEM can forward the message directly to the appliance/generator/storage or it may (based on a number of parameters) translate it into individual control messages to the smart devices that were found to best suited to fulfill the operation. A</p>

smart device may be an appliance, generator or storage device (e.g. storage batteries, heat pumps, fuel cells, etc.).

Based on the load management message from the CEM, the smart device may change the power consumption, generation or storage depending on the kind of device, what the device is currently doing and the consumer settings. The start of the device may also be shifted in order to avoid taking energy during the peak time or to avoid exceeding a set power limit or may shift the activation of certain features.

The CEM may provide feedback to the external actor requesting the load/generation change, so this actor can have an idea of which change in consumption/generation to expect and to update his demand/generation forecast. The feedback may also be used for billing purposes

In case of Remote-controllable device is connected to CEM, CEM interprets the load/generation management message and controls this type of device remotely.

In some case, Actor A or B sends a load/generation management message to the CEM in advance (for example, the night before the day) due to high demand forecast.

It can be considered that a negotiation process between Actor A or B and CEM exists in order to negotiate the amount of power reduction.

JWG2122：緊急情況

當在給定區域存在停電的危險時，來自行為者 A 或 B 的緊急訊息可以根據製造商設定的安全程序，請求智慧裝置轉為網路待機。該訊息可能包含也可能不包含預定義的持續時間。電網還可以提供一條訊息，通知緊急情況已結束並返回到正常狀態。

該使用案例從家庭角度說明緊急情況所涉及的功能。它顯示瞭如何將緊急訊息發送到家庭以及 CEM 如何對此做出反應。使用案例 “WGSP-2300 緊急需求訊息 – 負載減少” 從外部行為者(例：DSO)的角度說明緊急情況。

使用案例 WGSP-2112 說明瞭如何從外部行為者向消費者發送警告訊息，警告緊急負載控制將在一定時間內發生，除非消耗/發電發生變化。這通常可以在 WGSP-2122 之前進行。

主要使用案例包括兩種情況：

- “緊急負載控制” 說明瞭如何通過 CEM 將負載控制訊息發送到裝置。如果緊急負載控制訊息已經包含負載控制週期的持續時間，則 CEM 可以在緊急時間過去的正确時刻指示智慧裝置。最後一條指令不在此使用案例的範圍內，因此在詳細分析中不再進行說明。可以選擇將確認從 CEM 發送到行為者 A/B，以便該行為者可以了解預期的用電/發電量變化並更新其需求/發電量預測。該反饋也可以用於計費目的。
- “宣布緊急負載控制結束” 說明外部行為者如何指示 CEM 緊急時間結束。外部行為者可能會要求 CEM 進行確認，以確保所有 CEM 都收到該訊息。

如果將遠程控制裝置連接到 CEM，則 CEM 解釋緊急負載控制訊息/緊急信號結束，並遠程控制此類裝置。

在某些情況下，Actor A/B 可能會使用此訊息提前向 CEM 通知計畫停電的時間。

在嚴重的緊急情況下，停電的風險可能更高。發生這種情況時，CEM 可能會更改其操作計畫(例：為電池充電設定更高的優先級)。

JWG2122：Emergencies

When there is a risk of a blackout in a given area, an emergency message from actor A or B can request smart devices to turn to network standby according to a safe procedure set by the manufacturer. The message may or may not contain predefined time duration. The grid may also provide a message notifying the end of the emergency and the return to normal status.

This use case describes the functionalities involved with emergencies from the home perspective. It shows

how an emergency message is sent to the home and how the CEM reacts to this. Use case “WGSP-2300 Emergency Demand Messages – Load shedding” describes the emergency from the perspective of the external actor (e.g. DSO).

Use case WGSP-2112 describes how warning messages may be sent from an external actor to the consumer, warning that emergency load control will happen within a certain period of time, unless changes in consumption/generation take place. This may typically precede WGSP-2122.

The primary use cases consist of two scenarios :

— “Emergency load control” describes how a load control message is sent through the CEM, to the devices. In case the emergency load control message already contains the duration of the load control period, the CEM may instruct the smart devices at the right moment that the emergency period has passed. This last instruction is not in scope of this use case and is not described in the detailed analysis. Confirmations may optionally be sent from the CEM to Actor A/B so this actor can have an idea of which change in consumption/generation to expect and to update his demand/generation forecast. The feedback may also be used for billing purposes.

— “Announce end of emergency load control” describes how an external actor instructs the CEM that the emergency period is ended. Confirmation from the CEM may be requested by the external actor to ensure that all CEM’s have received the message.

In case of Remote-controllable device is connected to CEM, CEM interprets the Emergency load control message/end of emergency signal and controls this type of device remotely.

In some case, Actor A/B may use this message for notifying the period of scheduled-blackout to CEM in advance.

Under the severe emergency case, the risk of blackout may be higher. When this happens CEM may change its operation plan (for example, set higher priority to charging battery).

一般說明 General remarks

一般說明 General remarks

備考和未解決的問題

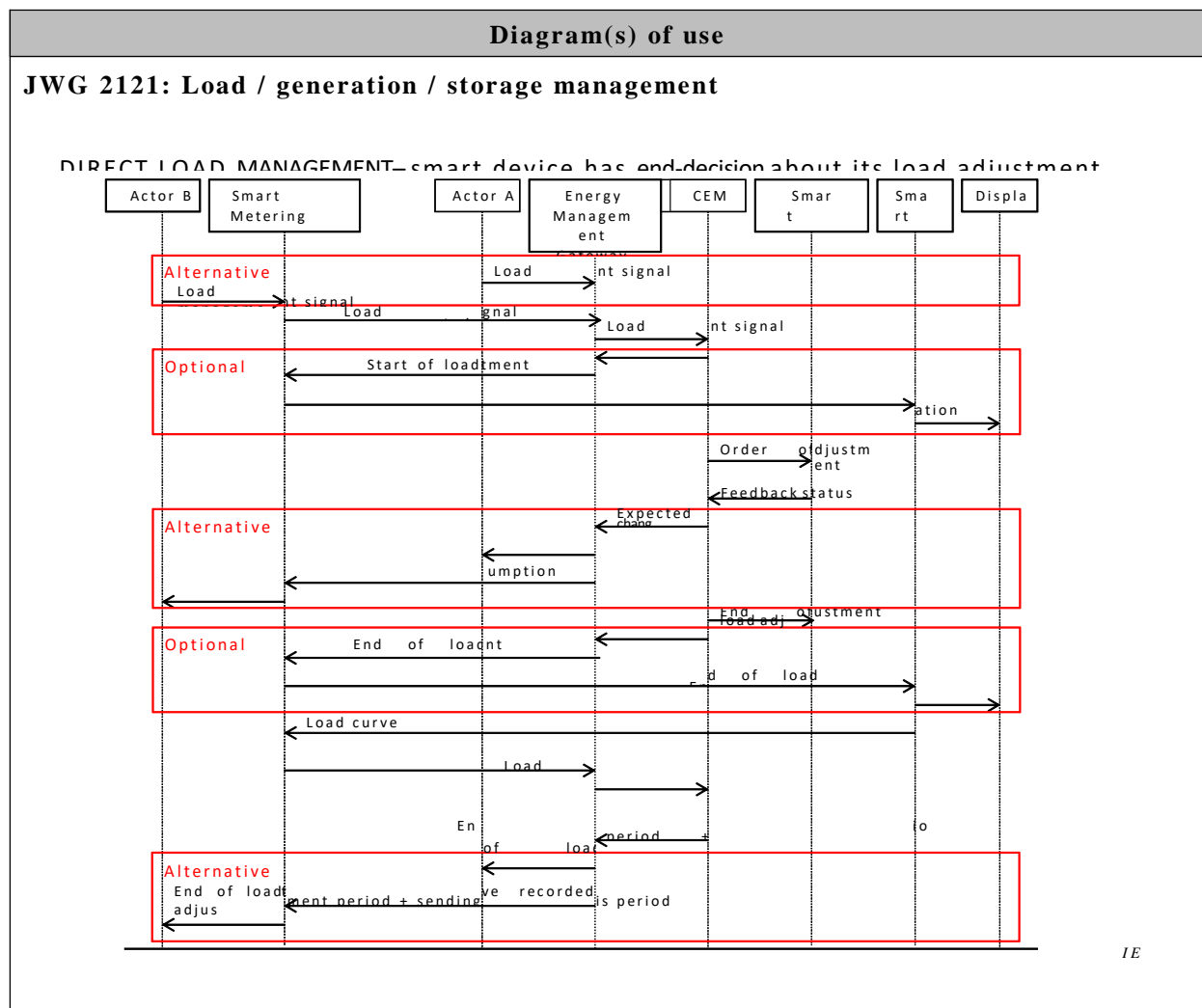
Notes and open issues

備考和未解決的問題 Notes and open issues	
Nr	備考 Note
1.	<p>在直接負載控制上可能出現的一個新的主要使用案例可以說明電網如何詢問哪些 CEM 願意改變能耗。電網接收報價並選擇要接受的報價。進一步發展可能是下一步。</p> <p>A possible new primary use case on direct load control could describe how the grid asks which CEMs are willing to change consumption; grid receives offers and chooses which ones to accept.</p> <p>Developing this further may be a next step.</p>
2.	適當時，可以根據外部行為者將所有主要使用案例(情境)分開

	Where relevant all primary use case (scenarios) may be split up according to external actors
3.	<p>尚沒有使用案例涵蓋可能存在多個 CEM 且聚合在 SG CP 的電網側進行的情況。(例：如何通知用戶他(即將)超出其契約權利)。縮小這一差距將是下一步</p> <p>There is not yet a use case covering the situation where there would be multiple CEMs and the aggregation takes place in the grid side of the SG CP. (e.g. how is the user being informed that he is (going to) exceed his contractual power). Closing this gap would be a next step</p>
4.	<p>下一步：使用自上而下的方法定義其他使用案例，將功能架構視為黑盒，並確定哪些訊息將傳入/傳出</p> <p>Next step : define additional use cases using the top down method, considering the functional architecture as a black box and identifying which messages would go in/come out</p>

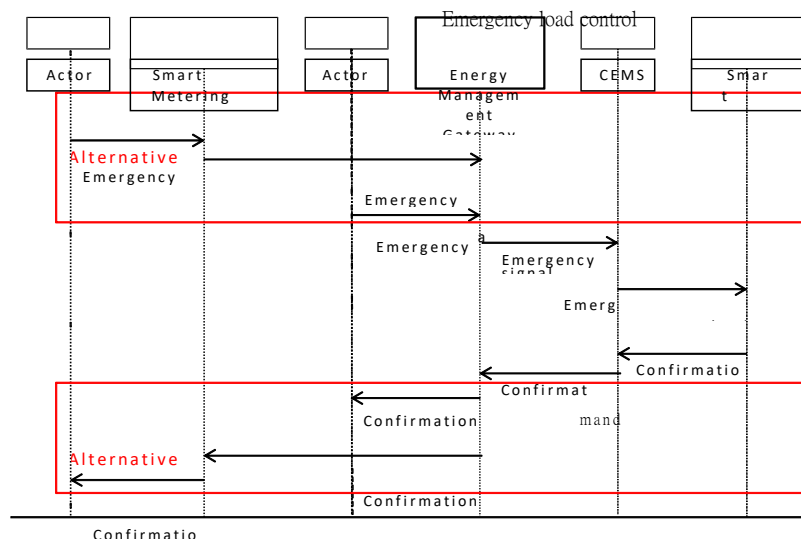
A.3.21.2 使用案例圖 Diagrams of use case

Figure A.30 shows Diagrams of use case.



JWG 2122 : Emergencies

JWG 2122 : Use case scenario 1 : Emergency load control



JWG 2122 : Use case scenario 2 : Announce end of emergency load control

Announce end of emergency load control

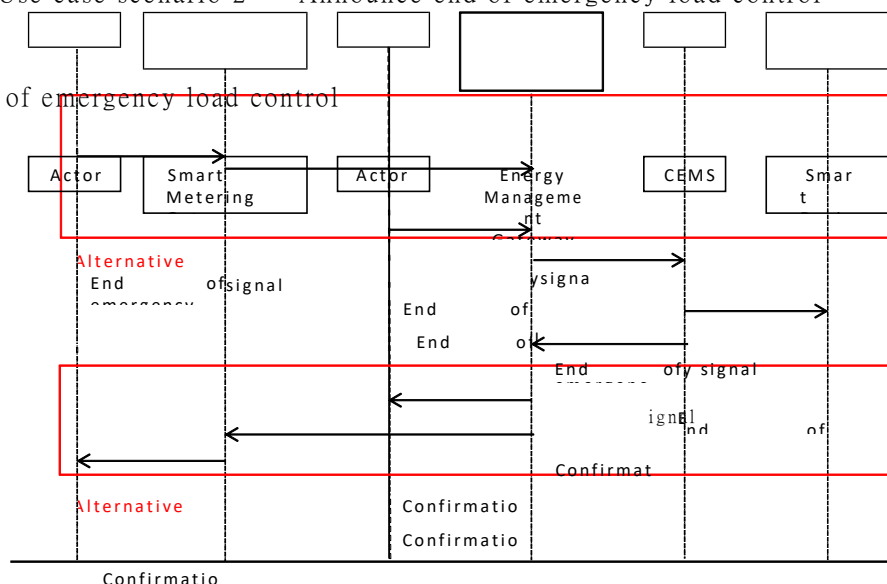


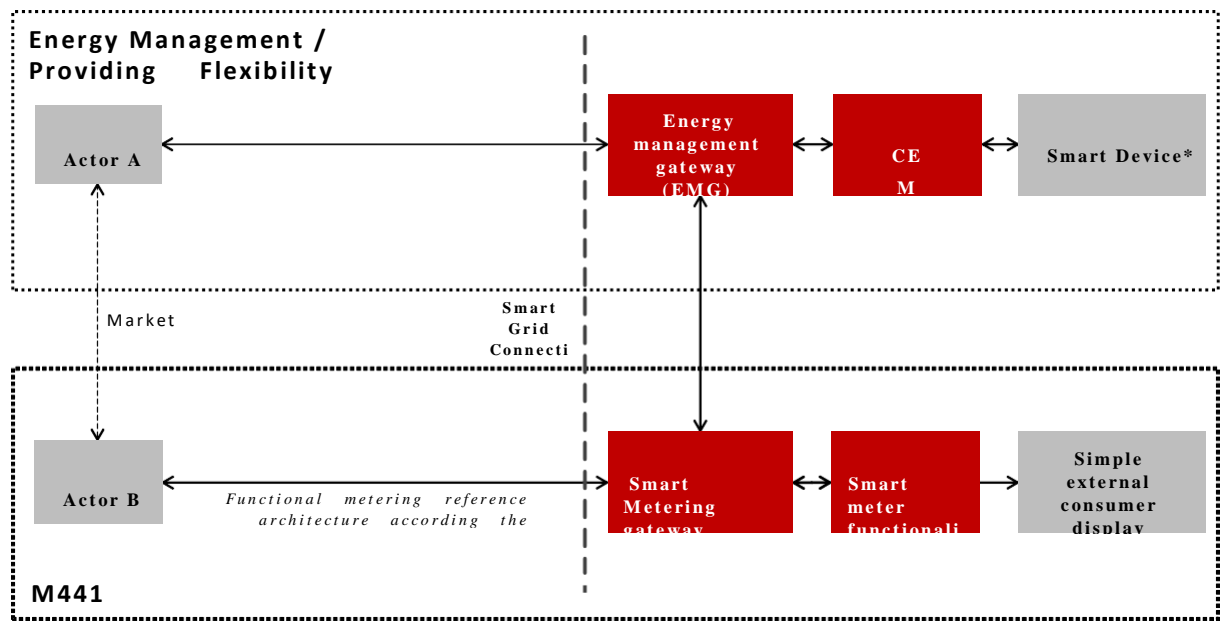
Figure A.30 Sequence diagram

A.3.21.3 技術細節 Technical details

為定義此使用案例，已將圖 A.31 中所示的架構用作基礎。

For the definition of this use case, the architecture shown in Figure A.31 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，遙控裝置
e.g. HBES device, smart appliances, storage, generator, domestic charger for EV, complex display, remote-controlled device

圖 A.31 SG CG 架構模型
Figure A.31 – SG CG Architecture Model [9]

備考：上述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，等等。)

NOTE 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.)

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
用戶能源管理者 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 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>	
能源管理閘道器 Energy management gateway	內部 Internall	<p>接取點(功能個體)用於發送及接收智慧電網相關資訊，命令行為者 A 及 CEM，使 CEM 決定該如何處理該事件。該通訊通常透過無線連接網路完成。</p> <p>An access point (functional entity) sending and receiving smart grid related information and commands between actor A and the CEM, letting the CEM decide how to process the events. The communication is often achieved through an internet</p>	

		<p>connection of through a wireless connection.</p> <p>此閘道器亦可提供包含協議轉換、裝置管理、安全及服務能力之服務。</p> <p>This gateway may also provide services including protocol conversion, device management, security and service capabilities.</p>	
<p>智慧量測閘道器 (LNAP)</p> <p>Smart Metering gateway (LNAP)</p>	<p>內部</p> <p>Internall</p>	<p>接取點(功能個體), 允許接取 1 或多個量測終端裝置及, 當配備介面, 以進階顯示/家庭自動化終端裝置連接至本地端網路。</p> <p>An access point (functional entity) that allows access to one or more metering end devices and, when equipped with an interface, to advanced display/home automation end devices connected to the local network.</p> <p>LNAP 亦可允許不同功能個體連接至相同 LN 之間的資料交換。LNAP 可簡單地作為路由量測終端裝置及/或顯示器/家庭自動化裝置與廣域網路之鄰近網路間傳遞訊息。</p> <p>A LNAP also may allow data exchange between different functional entities connected to the same LN. The LNAP may act simply as a router transferring messages between the metering end device and/or display/home automation devices and the Neighbourhood network of wide area network.</p> <p>其可提供包括協議轉換, 裝置管理, 安全性及服務能力等服務。服務可作為 LNAP 自身功能提供, 或提供連接至本地端網路之有限功能裝置代表之代理服務。</p> <p>It may also provide services including protocol conversion, device management, security and service capabilities. Services may be provided as functions of the LNAP itself or provide proxy services on behalf of limited capability devices connected to the local network.</p>	
<p>智慧電錶</p> <p>Smart meter</p>	<p>內部</p> <p>Internall</p>	<p>量測終端裝置為智慧量測參考架構, 以下量測相關功能之組合:</p> <p>The metering end device is a combination of the following meter-related functions from the Smart Metering reference architecture:</p> <ul style="list-style-type: none"> • MID 量測功能, 包含傳統電錶顯示器(寄存器或索引)其為合法量測控制。當量測控制下, 此等功能應滿足MID 基本要求 <p>MID;Metrology functions including the conventional meter display (register or index) that are under legal metrological control. When under metrological control, these functions shall meet the essential</p>	

		<p>requirements of the MID;</p> <ul style="list-style-type: none"> • MID 未涵蓋 1 或多項附加功能。此等亦作為顯示之使用; <p>One or more additional functions not covered by the MID. These may also make use of the display;</p> <p>電錶通訊功能。</p> <p>Meter communication functions.</p>	
NNAP	內部 Internall	<p>鄰近網路接取點為一功能個體，可接取至 1 或多個 LNAP、量測終端裝置、顯示及家用自動化終端裝置連接至鄰近網路(NN)。其允許不同功能個體連接至相同 NN 之資料交換。</p> <p>The Neighbourhood Network Access Point is a functional entity that provides access to one or more LNAP's, metering end devices, displays and home automation end devices connected to the neighbourhood network (NN). It may allow data exchange between different functional entities connected to the same NN.</p>	
簡單外部消費者顯示 Simple external consumer display	外部 External	<p>用戶可以使用與智慧電錶/ SG CP 相連的專用顯示屏來檢查用電，計畫的減負載和減負載歷史。還存在其他非專用手段來將用電資訊傳遞給用戶，例：個人計算機，移動電話或電視機。</p> <p>Dedicated display screen in connection with the smart meter/SG CP available to the customer to check power consumption, planned load reductions and load reductions historical. Other not dedicated means also exist to deliver consumption information to the customer, such as the personal computer, the mobile phone or the TV set.</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</p>	

		SG-CG, it must be seen as an external actor.	
智慧家電(白色家電) Smart appliance (white goods)	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>	

遙控裝置 Remote-Controllable device	外部 External	<p>遙控裝置的範例是空調或具有遙控功能的裝置。當 CEM 控制這種類型的裝置時，CEM 會解釋來自電網的訊息，並且 CEM 會遠程控制這種類型的裝置。由於遠程控制裝置不在 IEC/TC57/WG21 的範圍之內，因此必須將其視為外部角色</p> <p>Example of Remote-Controllable device is air-condition or which has capability of remote-control. When CEM controls this type of device, messages from the grid is interpreted by CEM and the CEM controls this type of device remotely. Since the Remote-controllable Device is outside the scope of IEC/TC57/WG21, it must be seen as an external actor</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>	
HES	內部 Internall	<p>負責擷取電錶及/或資料集中器獲讀值</p> <p>Responsible for acquiring the reads from meters and/or from data concentrators</p> <p>傳遞原始電錶讀值至 MDM</p> <p>Delivers the raw meter reads to MDM</p> <p>重複讀取任何遺失讀值</p> <p>Repeats the reading for any missing reads</p> <p>是否用於短期臨時資料電錶讀值儲存(1-3 個月)</p> <p>Is the short-term interim data storage (1-3 months) for meter reads</p> <p>向上推送事件資訊至 MDM</p> <p>Pushes the event information upwards to MDM</p> <p>支援集中器及電錶之特定協議</p> <p>Supports the specific protocols of the concentrators and meters</p> <p>包含若干即插即用解決方案之拓撲資訊及聚合功能</p> <p>Contains some topology information and aggregation functionality for plug & play solutions</p>	
MDM	內部	所有量測資料是否使用單一電錶資料庫	

	Internall	<p>Is the single meter data repository for all metering data 量測資料是否長期儲存</p> <p>Is the long-term storage for the metering data 透過 VEE 確保更高階業務程序之資料品質</p> <p>Ensures the data quality by VEE for the higher level business processes 連接所有前端系統</p> <p>Connects all head-end systems 其他系統之連接點是否能接到智慧電錶，例：閘道器往返 HES。</p> <p>Is the connection point for other systems to reach the smart meters i.e. a gateway to HES and back 將電錶讀數傳遞至其他業務系統以供進一步使用，作為業務及運營系統與進階量測基礎設施間之關鍵安全防火牆。</p> <p>Delivers the meter reads to other business systems for further usage Acts as the critical security firewall between business and operational systems and the advanced metering infrastructure. 包含若干拓撲資訊及聚合功能。</p> <p>Contains some topology information and aggregation functionality</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>	

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

		<p>為正確計費需求/發電彈性，智慧電錶和 CEM 需要時間同步</p> <p>In order to correctly bill demand/generation flexibility, the smart meter and CEM need to be time synchronized</p>	
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參考文獻

References

參考文獻						
References						
No.	參考資料型式[CE1] 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	WGSP2121 的範例使用 案例 Example use cases to WGSP2121	DKE-0015, DKE0019 through DKE0021, EDF-0002, EDF-0003, EDF-0007, EDF0008, EDF-0009, EDF-0017, EDF-0022, ESMIG-0012, ESMIG-0013, ESMIG-0014, ESMIG-0017, FINS0048, FINS0074, FINS0078, FINS0080, FINS0083, FINS0084, FINS0085, FINS0086, FINS0087, PMA-0001, TC205-0019 through 0038, TC205-0044 through 0046, TC205-0048, AK716.0.1_UC1, AK716.0.1_UC3; CECED load shedding.		用作該使用案例基礎的原始使用案例 The original use cases that served as a basis for this use case		
2	WGSP2122 的範例使用 案例 Example use cases to WGSP2122	FINS0048, FINS0085		用作該使用案例基礎的原始使用案例 The original use cases that served as a basis for this use case		

3	<p>JP 使用案例於 2012 年 5 月提供，JP 用戶案例於 2013 年 2 月提供給 IEC/TC57/W G21</p> <p>JP use cases contributed at May 2012 and JP user stories contributed at Feb. 2013 to IEC/TC57/W G21</p>	<p>JPUC#1, JPUC#2, JPUC#3, JPUC#4, JPUC#5, JPUC#6, JPUC#8, JPUC#9, JPUC #10, JPUC #11 and user stories related to above UCs.</p>		<p>這些使用案例顯示其他行為者和對訊息資料元素的要求</p> <p>These use cases show additional actor and requirements on data elements of messages</p>		
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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

分類資訊 Classification information
與其他使用案例關聯 Relation to other use cases
彈性叢集 Flexibility cluster
深度等級 Level of depth
主要使用案例 Primary use case
優先序 Prioritisation
1
一般，區域或國家關係

Generic, Regional or National Relation
一般 Generic
觀點 Viewpoint
技術 Technical
分類的其他關鍵字 Further keywords for classification
Demand side management, direct load control, Smart Grid

A.3.21.4 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					
項次 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
2121	直接 - 加載/ 發電/儲能管理 Direct – load / generation/st orage management	行為者 A 或行為者 B Actor A or Actor B	行為者 A 或行為者 B 想要向市場發送負 載管理訊息 Actor A or Actor B wants to send a load management message to the market	建立所有行為者之 間的通訊連接 Communication connection between all actors is established 消費者配置 CEM 及/ 或參與的裝置。 The consumer configured the CEM and/or the participating devices. 消費者配置裝置設 定和閾值 The consumer configured the device settings and thresholds Information on total consumption or	智慧裝置 17 執行負載管 理訊息，並且 Actor A 或 Actor B 接收到反饋，並 記錄該時槽的負載曲線。 The smart device 17 executed the load management message and Actor A or Actor B received feedback with a load curve recorded for this period. 如果將遠程可控裝置連 接到 CEM，則 CEM 解釋 負載管理訊息並遠程控 制此類裝置。 In case of Remote- controllable device is connected to CEM, the CEM interprets the load management message and controls this type of device remotely.

				consumption per device is available in the CEM CEM 中提供有關總消耗量或每台裝置消耗量的資訊	
2122.1	緊急負載控制 Emergency load control	行為者 A 或行為者 B Actor A or Actor B	確定緊急降低用電/饋電的需求 The need for an emergency reduction of power consumption/feed-in is identified	可以在所有行為者之間建立溝通 Communication between all actors can be established	CEM 命令關閉所有智慧裝置，然後將確認發送回給行為者 A 或 HES。 The CEM ordered all smart devices to switch off and sent confirmation back to actor A or to the HES. 如果將遠程可控裝置連接到 CEM，則 CEM 會解釋“緊急負載控制”訊息，並根據該訊息遠程控制此類裝置。 In case of Remote-controllable device is connected to CEM, the CEM interprets the Emergency load control message and controls this type of device remotely following the message.
2122.2	宣布緊急負載控制結束 Announce end of emergency load control	行為者 A 或行為者 B Actor A or Actor B	不再需要緊急降低用電/饋電 There is no more need for an emergency reduction of power consumption/feed-in	可以在所有行為者之間建立溝通 Communication between all actors can be established	CEM 通知所有智慧裝置緊急負載控制期已結束，並將確認發送回給行為者 A 或 HES。 The CEM informed all smart devices that the emergency load control period has ended and sent confirmation back to actor A or to the HES. 如果將可遠程控制的裝置連接到 CEM，則 CEM 會解釋“緊急情況”訊息的結尾，並在該訊息之後遠程控制此類裝置 In case of Remote-controllable device is connected to CEM, the CEM interprets the end of Emergency message and controls this type of device remotely following the message.

智慧裝置可以是家電，發電機或儲能裝置(例：電池)。

Smart device may be an appliance, generator or storage device (e.g. battery).

步驟 - 情境

Steps – Scenarios

情境 Scenario								
情境名稱： Scenario name：		JWG 2121：負載/發電/儲能管理 JWG 2121： Load/generation/storage management						
步驟 編號 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 監製(行為者) Information producer (Actor)	資訊接收者 (行為者) Information receiver (Actor)	資訊交流 Information exchanged	要求， R-ID Requirements, R-ID
1a	行為者 A 要向市場 發送負載 管理訊息 (替代) Actor A wants to send a load manage- ment message to the market (alternative)		行為者 A 將 負載管理訊 息發送到能 源管理閘道 器 Actor A sends a load management message to Energy Management Gateway		行為者 A Actor A	能源管理 閘道器 Energy Managem e nt Gateway	負載管理資 訊 Load manage- ment message	
1b	行為者 B 要 向市場發 送負載管 理訊息(替 代) Actor B wants to send a load		行為者 B(通 過量測通道) 將負載管理 訊息發送到 智慧量測閘 道器 (LNAP)。 Actor B sends a load management		行為者 B Actor B	智慧量測 閘道器 (LNAP) Smart Metering Gateway (LNAP)	負載管理資 訊 Load managem ent message	

	manage- ment message to the market (alternative)		message to Smart Metering Gateway (LNAP) (via the metering channel)					
2	智慧量測 閘道器 (LNAP) 收 到負載管 理訊息 Smart Metering Gateway (LNAP) receives the load manage- ment message		智慧量測閘 道器(LNAP) 將負載管理 訊息轉發到 能源管理閘 道器 Smart Metering Gateway (LNAP) forwards the load management message to the Energy Management Gateway		智慧量測 閘道器 (LNAP) Smart Metering Gateway (LNAP)	能源管理 閘道器 Energy Manage- ment Gateway	負載管理資 訊 Load manage- ment message	
3	能源管理 閘道器收 到負載管 理訊息 Energy Manage- ment Gateway receives a load manage- ment message		能源管理閘 道器將負載 管理訊息轉 發到 CEM Energy Management Gateway forwards the load management message to CEM		能源管理 閘道器 Energy Manage- ment Gateway	CEM	負載管理資 訊 Load manage- ment message	
4	CEM 收到 負載管理 訊息		(選擇性)當 需要在簡單 的外部用戶 顯示器上顯		CEM	能源管理 閘道器 Energy	開始進行負 載調整通知 Start of load	

	CEM receives load management message		示通知時，CEM 將通知發送到能源管理閘道器 Optionally, when a notification needs to be displayed on the simple external consumer display, the CEM sends a notification to the Energy Management Gateway			Management Gateway	adjustment notification	
5	能源管理閘道器收到負載管理訊息 Energy Management Gateway receives the load management message		能源管理閘道器將通知發送到智慧電錶 Energy Management Gateway sends the notification to Smart Meter		能源管理閘道器 Energy Management Gateway	智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	開始進行負載調整通知 Start of load adjustment notification	
6	智慧量測閘道器 (LNAP) 收到負載管理訊息 Smart		智慧電錶閘道器 (LNAP) 將通知發送到智慧電錶 Smart		智慧量測閘道器 (LNAP) Smart Metering	智慧電錶 Smart Meter	開始進行負載調整通知 Start of load adjustment	

	Metering		Metering		Gateway		notification	
	Gateway		Gateway		(LNAP)			
	(LNAP)		(LNAP)					
	receives the		sends					
	load		the					
	manage-		notification					
	ment		to					
	message		Smart Meter					
7	智慧電錶 收到負載 管理訊息 Smart Meter receives the load manage- ment message		智慧電錶將 負載管理開 始通知發送 到人機界面 Smart Meter sends the start of load management notification to the Display		智慧電錶 Smart Meter	簡單外部 消費者顯 示 Simple external consumer display	開始進行負 載調整通知 Start of load adjustment notification	
8	CEM 收到 負載管理 訊息 CEM received the load managemen t message		CEM 決定需 要調整哪些 智慧裝置,並 向它們發送 負載調整順 序 CEM decides which smart devices need to be adjusted and sends an order of load adjustment to them		CEM	智慧裝置 Smart devices	負載調整順 序 Order of load adjustment	
9	智慧裝置 收到負載 調整順序 Smart devices		智慧裝置決 定根據用戶 的設定打開/ 關閉並將反 饋發送到 CEM		智慧裝置 Smart devices	CEM	負載調整反 饋 Load adjustment feedback	

	receive the order of load adjustment		The Smart devices decide to switch on/off based on the consumer's settings and send feedback to CEM					
10	CEM 接收來自智慧裝置的反饋 CEM receives feedback from smart devices		CEM 通知能源管理閘道器預期的能耗變化。 CEM informs Energy Management Gateway on which change in consumption to expect.		CEM	能源管理閘道器 Energy Management Gateway	用電變化 Change in consumption	
11a	能源管理閘道器接收能耗變化 Energy Management Gateway receives the change in consumption		能源管理閘道器將能耗變化轉發給行為者 A (替代) Energy Management Gateway forwards the change in consumption to Actor A (alternative)		能源管理閘道器 Energy Management Gateway	行為者 A Actor A	用電變化 Change in consumption 用電變化 Change in consumption	
11b	能源管理閘道器接		能源管理閘道器將能耗		能源管理閘道器	智慧量測閘道器		

	收 能 耗 變 化 Energy Manage- ment Gateway receives the change in consump- tion		變化轉發到 智慧量測閘 道器 Energy Management Gateway forwards the change in consumption to Smart Metering Gateway		Energy Managem ent Gateway	(LNAP) Smart Metering Gateway (LNAP)		
12	智 慧 量 測 閘 道 器 接 收 到 消 耗 量 的 變 化 Smart Metering Gateway receives the change in consumptio n		智 慧 量 測 閘 道 器 將 用 電 變 化 轉 發 到 行 為 者 B(通 過 量 測 頻 道) Smart Metering Gateway forwards the change in consumption to Actor B (via the metering channel)		智 慧 量 測 閘 道 器 (LNAP Smart Metering Gateway (LNAP)	行 為 者 B Actor B	用 電 變 化 Change in consumptio n	
13	負 載 調 整 期 結 束 Load adjustment period is finished		CEM 向智慧 裝置發送負 載調整結束 CEM sends an end of load adjustment to Smart devices		CEM	智慧裝置 Smart devices	負載調整結 束 End of load adjustment	
14	智 慧 裝 置 收 到 來 自 CEM 的 負 載 調 整 結		智 慧 裝 置 打 開/關閉並向 CEM 發送反 饋		智慧裝置 Smart devices	CEM	負載調整結 束反饋 End of load	

	Smart devices receive the end of load adjustment from CEM		The smart devices switch on/off and send feedback to CEM				adjustment feedback	
15	CEM 收到來自智慧裝置的反饋 CEM receives the feedback from smart devices		CEMS 將負載調整通知發送到能源管理閘道器 CEMS sends load adjustment notification to the Energy Management Gateway		CEM	能源管理閘道器 Energy Management Gateway	負載調整結束反饋 End of load adjustment feedback	
16	能源管理閘道器收到反饋 Energy Management Gateway receives feedback		能源管理閘道器將負載調整結束通知發送到智慧量測閘道器(LNAP) Energy Management Gateway sends the end of load adjustment notification to the Smart Metering Gateway (LNAP)		能源管理閘道器 Energy Management Gateway	智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	負載調整結束通知 End of load adjustment notification	
17	智慧量測閘道器 (LNAP) 收		智慧量測閘道器 (LNAP) 將負載調整		智慧量測閘道器 (LNAP)	智慧電錶 Smart	負載調整結束通知	

	到通知 Smart Metering Gateway (LNAP) received notification		結束通知發 送到智慧電 錶 Smart Metering Gateway (LNAP) sends end of load adjustment notification to Smart Meter		Smart Metering Gateway (LNAP)	Meter	End of load adjustment notification	
18	智 慧 電 錶 收到通知 Smart Meter received notification		智 慧 電 錶 將 負 載 調 整 結 束 通 知 發 送 到 人 機 界 面 Smart Meter sends the end of load adjustment notification to Display		智慧電錶 Smart Meter	顯示器 Display	負載調整結 束通知 End of load adjustment notification	
19	智 慧 電 錶 收到通知 Smart Meter received notification		智 慧 電 錶 將 這 段 時 間 內 記 錄 的 負 載 曲 線 發 送 到 智 慧 量 測 閘 道 器(LNAP) Smart Meter sends the load curve recorded for this period to Smart Metering Gateway (LNAP)		智慧電錶 Smart Meter	智慧量測 閘 道 器 (LNAP) Smart Metering Gateway (LNAP)	負載曲線 Load curve	

20	智慧量測閘道器 (LNAP) 接收負載曲線 Smart metering gateway (LNAP) receives load curve		智慧量測閘道器 (LNAP) 將負載曲線發送到能源管理閘道器 Smart metering gateway (LNAP) sends load curve to Energy Management Gateway		智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	能源管理閘道器 Energy Management Gateway	負載曲線 Load curve	
21	能源管理閘道器接收負載曲線 Energy Management Gateway receives load curve		能源管理閘道器將負載曲線發送到 CEM Energy Management Gateway sends load curve to CEM		能源管理閘道器 Energy Management Gateway	CEM	負載曲線 Load curve	
22	CEM 從智慧電錶接收負載曲線 CEM receives load curve from smart meter		CEM 將負載調整期的結束發送到能源管理閘道器，並發送此期間記錄的負載曲線 CEM sends the end of load adjustment period to Energy Management Gateway and sends a load curve		CEM	能源管理閘道器 Energy Management Gateway	負載調整反饋 Load adjustment feedback	

			recorded for this period					
23a	能 源 管 理 閘 道 器 收 到 反 饋 Energy Manage- ment Gateway receives the feedback		能 源 管 理 閘 道 器 將 反 饋 轉 發 給 行 為 者 A (替 代) Energy Management Gateway forwards the feedback to Actor A (alternative)		能 源 管 理 閘 道 器 Energy Managem ent Gateway	行 為 者 A Actor A	負 載 調 整 反 饋 Load adjustment feedback	
23b	能 源 管 理 閘 道 器 收 到 反 饋 Energy Manage- ment Gateway receives the feedback		能 源 管 理 閘 道 器 將 反 饋 轉 發 到 智 慧 量 測 閘 道 器 (LNAP)(替 代) Energy Management Gateway forwards the feedback to Smart Metering Gateway (LNAP) (alternative)		能 源 管 理 閘 道 器 Energy Manage- ment Gateway	智 慧 量 測 閘 道 器 (LNAP) Smart Metering Gateway (LNAP)	負 載 調 整 反 饋 Load adjustment feedback	
24	智 慧 量 測 閘 道 器 (LNAP) 接 收 反 饋 Smart Metering Gateway (LNAP) receives the feedback		智 慧 量 測 閘 道 器 (LNAP) 將 反 饋 轉 發 給 行 為 者 B (通 過 量 測 通 道) Smart Metering Gateway (LNAP) forwards the feedback to		智 慧 量 測 閘 道 器 (LNAP) Smart Metering Gateway (LNAP)	行 為 者 B Actor B	負 載 調 整 反 饋 Load adjustment feedback	

			Actor B (via the metering channel)					
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情境 Scenario								
情境名稱：		JWG 2122：緊急情況 – 1，緊急負載控制						
Scenario name：		JWG 2122：Emergencies – 1, Emergency Load Control						
步驟 編號 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 監製(行為者) Information producer (Actor)	資訊接收者 (行為者) Information receiver (Actor)	資訊交流 Information exchanged	要求， R-ID Requi- rements, R-ID
1a	確定緊急降低用電 / 饋電的需求 The need for an emergency reduction of power consumption / feed-in is identified		行為者 A 向能源管理閘道器發送緊急訊息(替代) Actor A sends an emergency message to the Energy Management Gateway (alternative)		行為者 A Actor A	能源管理閘道器 Energy Management Gateway	緊急訊息 Emergency message	
1b	確定緊急降低用電的需求 The need for an emergency reduction of power consumption is identified		行為者 B(通過量測通道)向智慧量測閘道器(LNAP)(替代)發送緊急訊息。 Actor B sends an emergency message to the Smart metering gateway		行為者 B Actor B	智慧量測閘道器(LNAP) Smart metering gateway (LNAP)	緊急訊息 Emergency message	

			(LNAP (alternative) (via the metering channel)					
2	智慧量測 閘道器 (LNAP) 收到緊急 訊息 Smart Metering Gateway (LNAP) receives the emergen- cy message		智慧量測閘 道器 (LNAP) 向能源管理 閘道器發送 緊急訊息 Smart Metering Gateway (LNAP) sends emergency message to Energy Management Gateway		智慧量測 閘道器 (LNAP)S mart metering gateway (LNAP)	能 源 管 理 閘 道 器 Energy Manage ment Gateway	能源管理閘 道器 Emergency message	
3	能源管理 閘道器收 到緊急訊 息 Energy Manage- ment Gateway receives the emergen- cy message		能 源 管 理 閘 道 器 將 緊 急 訊 息 轉 發 到 CEM Energy Management Gateway forwards the emergency message to CEM		能 源 管 理 閘 道 器 Energy Managem e nt Gateway	CEM	能源管理閘 道器 Emergency message	
4	CEM 收 到緊急訊 息 CEM receives		CEM 命令所 有智慧裝置 切換到網路 待機 CEM orders all smart		CEM	智 慧 裝 置 Smart devices	緊急負載管 理訊息 Emergency load managemen t	

	the emergen- cy message		devices to switch to network standby				message	
5	智慧裝置 收到緊急 訊息 Smart devices received emergen- cy message		智慧裝置切 換到網路待 機狀態，並有 選擇地將確 認發送回 CEM Smart devices switch to network standby and optionally send confirmation back to CEM		智慧裝置 Smart devices	CEM	確認書(選 擇性的) Confirmatio n (optional)	
6	CEM 收 到確認 CEM receives confirma- tion		CEM 可以選 擇將確認發 送到能源管 理閘道器 CEM optionally sends confirmation to Energy Management Gateway		CEM	能 源 管 理 閘 道 器 Energy Manage- ment Gateway	確認書(選 擇性的) Confirmatio n (optional)	
5a	能源管理 閘道器收 到確認 Energy Manage- ment Gateway receives confirma-		能源管理將 確認轉發給 行為者 A (替 代) Energy Management forwards confirmation to Actor A		能源管理 閘道器 Energy Manage- ment Gateway	行 為 者 A Actor A	確認書(選 擇性的) Confirmatio n (optional)	

	tion		(Alternative)					
5b	能源管理 閘道器收到確認 Energy Manage- ment Gateway receives confirma- tion		能 源 管 理 將 確 認 轉 發 到 智 慧 量 測 閘 道 器 (LNAP)(替 代) Energy Management forwards confirmation to Smart metering gateway (LNAP) (Alternative)		CEM	智 慧 量 測 閘 道 器 (LNAP) Smart metering gateway (LNAP)	確 認 書 (選 擇 性 的) Confirmatio n (optional)	
6	智慧量測 閘道器 (LNAP) 收到確認 Smart Metering Gateway (LNAP) receives confirma- tion		智 慧 量 測 閘 道 器 將 確 認 轉 發 到 行 為 者 B (備 用)(通 過 量 測 通 道) Smart metering gateway forwards confirmation to Actor B (Alternative) (via the metering channel)		智 慧 量 測 閘 道 器 (LNAP) Smart metering gateway (LNAP)	行 為 者 B Actor B	確 認 書 (選 擇 性 的) Confirmatio n (optional)	

情境 Scenario								
情境名稱：		JWG 2122：緊急情況 – 1，緊急負載控制						
Scenario name：		JWG 2122：Emergencies – 1, Emergency Load Control						
步 驟	事件	流程/活	流程/活動說	服務	資訊	資訊接收	資訊交流	要求，

編號 Step No.	Event	動名稱 Name of process/activity	明 Description of process/activity	Servi ce	監製(行為者) Information producer (Actor)	者 (行為者) Informa-tion receiver (Actor)	Informati on exchange d	R-ID Requi- re- ments, R-ID
1a	不再需要緊急降低用電/供電 There is no more need for an emergency reduction of power consumption/feedin		行為者 A 將緊急情況結束訊息發送到能源管理閘道器(替代) Actor A sends an end of emergency message to the Energy Management Gateway (alternative)		行為者 A Actor A	能源管理閘道器 Energy Management Gateway	緊急訊息結束 End of emergency message	
1b	不再需要緊急降低用電/供電 There is no more need for an emergency reduction of power consumption/feed in		行為者 B 將緊急情況結束訊息發送到智慧量測閘道器(LNAP)(備用))(通過量測通道) Actor B sends an end of emergency message to the Smart metering gateway (LNAP (alternative) (via the metering channel))		行為者 B Actor B	智慧量測閘道器(LNAP) Smart metering gateway (LNAP)	緊急訊息結束 End of emergency message	
2	智慧量測閘道器(LNAP)收到訊息 Smart Metering Gateway (LNAP) receives the message		智慧量測閘道器(LNAP)將緊急情況結束訊息發送到能源管理閘道器 Smart Metering Gateway (LNAP) sends end of emergency message to Energy		智慧量測閘道器(LNAP) Smartmetering gateway (LNAP)	能源管理閘道器 Energy Management Gateway	緊急訊息結束 End of emergency message	

			Management Gateway					
3	能源管理閘道器收到緊急情況 Energy Management Gateway receives the emergency		能源管理閘道器將緊急訊息的結束轉發到 CEM Energy Management Gateway forwards the end of emergency message to CEM		能源管理閘道器 Energy Management Gateway	CEM	緊急訊息結束 End of emergency message	
4	CEM 收到緊急訊息結束 CEM receives the end of emergency message		CEM 向智慧裝置發送一條訊息，使它們可以在正常模式下運行 CEM sends a message to smart devices, allowing them to operate in normal mode		CEM	智慧裝置 Smart devices	緊急訊息結束 End of emergency message	
5	CEM 收到緊急訊息結束 CEM receives the end of emergency message		CEM 可以選擇將確認發送到能源管理閘道器 CEM optionally sends confirmation to Energy Management Gateway		CEM	能源管理閘道器 Energy Management Gateway	確認 (選擇性) Confirmation (optional)	
6a	能源管理閘道器收到確認 Energy Management Gateway receives confirmation		能源管理將確認轉發給行為者 A (替代) Energy Management forwards confirmation to Actor A (Alternative)		能源管理閘道器 Energy Management Gateway	行為者 A Actor A	確認 (選擇性) Confirmation (optional)	
6b	能源管理閘道器收到確認 Energy Management Gateway receives confirmation		能源管理將確認轉發到智慧量測閘道器 (LNAP)(替代) Energy Management forwards confirmation to Smart metering (LNAP) (Alternative)		CEM	智慧量測閘道器 (LNAP) Smart metering	確認 (選擇性) Confirmation (optional)	

	nt Gateway receives confirmation		Management forwards confirmation to Smart metering gateway (LNAP) (Alternative)			gateway (LNAP)		
7	智慧量測閘道器 (LNAP) 收到確認 Smart Metering Gateway (LNAP) receives confirmation		智慧量測閘道器將確認轉發到 Actor B(備用)(通過量測通道) Smart metering gateway forwards confirmation to Actor B (Alternative) (via the metering channel)		智慧量測閘道器 (LNAP) Smart metering gateway (LNAP)	行為者 B Actor B	確認 (選擇性) Confirmation (optional)	

A.3.21.5 資訊交換 Information exchanged

資訊交換 Information exchanged		
資訊名稱(ID) Name of information (ID)	交換資訊的說明 Description of information exchanged	資訊資料要求 Requirements for information data
負載管理資訊 Load management message	<p>這可能包括行為者 A/B 要求的彈性的經濟價值</p> <p>This may include an economic value for the flexibility requested by Actor A/B</p> <p>名為“通過智慧電網管理智慧裝置的能耗”的用戶案例需要提前通知負載管理。同樣，此用戶案例需要就行為者 A/B 與 CEM 之間的用電減少量進行協議。</p> <p>User Story named “Manage energy consumption of smart devices by Smart Grid” requires in-advance notification of load management. Also, this User Story requires a negotiation process for the amount of power reduction between Actor A/B and CEM.</p> <p>名為“回應電力供應商的節電請求而控制智慧家電”的用戶案例是一種激勵措施，要求每個時隙提前提供電費資訊。</p>	<p>提前通知的節電時槽“(日期，時間，窗口)”</p> <p>The time period for power reduction in advance</p> <p>“(date, time, window)” for in-advance notification.</p> <p>CEM 的回應狀態，接受或拒絕或不足以完成協議過程。</p> <p>The response status of CEM which is accept or reject or not-sufficient for a negotiation process.</p> <p>費率資訊(例：提前 24 小時)是一種激勵措施</p> <p>Tariff information (24 hours in advance, for</p>

	User Story named “Control of Smart home appliances in response to power saving request from Electric power supplier” requires tariff information at each time slot in advance as one type of incentive.	example) as one type of incentive
開始進行負載調整通知 Start of load adjustment notification		
負載調整通知 Announcement of load adjustment		
負載調整順序 Order of load adjustment		
負載調整反饋 Load adjustment feedback		
用電變化 Change in consumption		
負載調整結束 End of load adjustment		
負載調整結束反饋 End of load adjustment feedback		
負載調整結束通知 End of load adjustment notification		
負載曲線 Load curve		
負載調整反饋 Load adjustment feedback		
緊急訊息 Emergency message	<p>名為“斷電前控制智慧家電”的用戶案例需要時間資訊，如計畫的停電將無法供電。</p> <p>User Story named “Control of Smart home appliance before power cut” requires time period information when no power will be provided by scheduled blackout.</p> <p>名為“在自然災害情況下控制智慧家電”的使用者經歷需要緊急級別，以便 CEM 可以在嚴重緊急情況下更改其操作。</p>	<p>停電時間(日期，時間，窗口)</p> <p>Time period of power cut (date, time, window)</p> <p>警報級別：例：正常或嚴重</p> <p>Level of alert : for example normal or severe</p>

	User Story named “Control of Smart home Appliances in case of natural disaster” requires level of Emergency so that CEM may change its operation under the severe emergency case.	
緊急負載管理訊息 Emergency load management message		
確認書 Confirmation	<p>在收到負載管理訊息後發回給外部行為者的確認資訊可能包括：</p> <p>A confirmation sent back to an external actor after receiving a load management message may include：</p> <p>指示將要轉移的負載/發電量的指示，表明 CEM 將遵守請求，而無需估算</p> <p>an indication of the amount of load/generation that will be shifted an indication that the CEM will comply with the request, without an estimate</p>	
緊急訊息結束 End of emergency message		

A.3.21.6 要求事項(選項) Requirements (optional)

要求事項(選項) Requirements (optional)	
要求類別 Categories for requirements	類別說明 Category description
要求編號 Requirement ID	需求說明 Requirement description

A.3.21.7 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.3.21.8 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

高階使用案例(WGSP2120)直接負載/發電管理(歐洲)

A.3.22 High level use case (WGSP2120) Direct load/generation management (European)**A.3.22.1 使用案例說明**

使用案例名稱

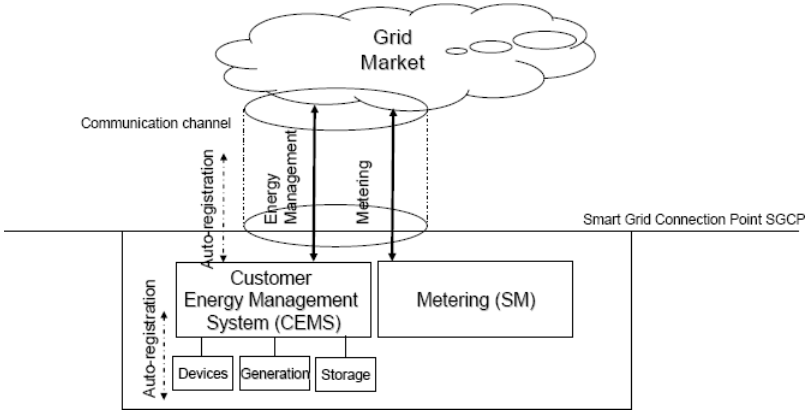
使用案例識別 Use case identification		
ID	網域 Domain(s)	使用案例名稱
WGSP 2120	智慧電網 Smart Grid	直接負載/發電管理 Direct load/generation management

版本管理 Version management

版本管理 Version management					
變化/版 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 Title	草案狀態，徵求意見，最終投票 Approval status draft, for comments, for voting, final
0.2	01/03/2012	領 域 專 家 Domain expert		初稿 Initial draft	草案 Draft
0.4	11/07/2012	編輯者 Editor		審 閱 版 本 Reviewed version	評論階段後的版本 Version after commenting phase
0.5	13/11/2012	編輯者 Editor		審 閱 版 本 Reviewed version	最終版本評論 Version for final commenting

使用案例的範圍和目標 Scope and objectives of use case

使用案例的範圍和目標 Scope and objectives of use case	
相關業務案例 Related business case	<p>需求方管理訊息發送到消費者能源管理器(CEM)，以通過與連接到 CEM 的許多家用智慧裝置進行互動來觸發管理負載的程序</p> <p>Demand Side Management messages are sent to the Consumer Energy Manager (CEM) to trigger a program that manages load by interacting with a number of in-home smart devices connected to the CEM.</p> <p>遵循 Eurelectric 的定義，以下說明的功能可以標記為“直接負載控制”使用案例，在可持續過程工作組的報告中引用了該定義。</p> <p>The functions described below can be labeled as a “Direct load control” use case, following the definition of Eurelectric, which is referenced in the Sustainable Processes Workgroup’s report</p> <p>與使用案例 2110(支持需量反應)的不同之處在於，負責管理負載/發電彈性的操作員主動要求更改特定數量的消耗/發電。消費者對此請求的反應取決於消費者與發出訊息的組織之間的契約以及消費者或接收訊息的裝置做出的最終決定。</p> <p>The difference with Use Case 2110 (supporting Demand Response) is that the operator responsible for managing the load/generation flexibility actively asks to change consumption/generation with a specific amount. The consumer’s reaction to this request, however is depending on the contract between the</p>

	<p>consumer and the organisation sending out the message and the final decision made by the consumer or the device receiving the message.</p>
<p>範圍 Scope</p>	<p>此使用案例之範圍為 CEM 與“上游”18 行為者間之通訊。CEM、消費者及(家庭)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(請參見行為者表格)。</p> <p>The scope of this use case is the communication between the CEM and "upstream" 18 actors. The communication between CEM, the consumer and (in-home) 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 (see table with actors).</p> <p>注意，多個負載/發電資源(來自多個場所)可被組合於 CEM 中以便相互控制。</p> <p>Note that multiple loads/generation resources (even from multiple premises) can be combined in the CEM to be mutually controlled.</p> <p>由架構角度來看，智慧電網協調小組引入“智慧電網連接點”(SG CP)個體作為智慧電網行為者(應用程序及/或組織)及室內/建築系統或裝置間之介面。下圖顯示其環境之 SGCP。</p> <p>From an architectural point of view the Smart Grid Coordination Group introduced the "Smart Grid Connection Point" (SG CP) entity as an interface between Smart Grid actors (applications and/or organizations) and in-home/building systems or devices. The diagram below shows the SG CP in its environment.</p>  <p>IEC</p> <p>注意，上圖中之方框具有功能性。智慧電錶及 CEM 可為一或兩個分開之</p>

	<p>實體盒。 CEM 亦可被整合於智慧家庭裝置中。電網市場/應用程式可透過一或分開之基礎結構進行通訊。</p> <p>Please note that the boxes in the diagram above are functional. The Smart Meter and CEM can be one or two separate physical boxes. The CEM can also be integrated in Smart in-home devices. The communication with the Grid market/applications can be through one or through separate infrastructures.</p>
<p>目的</p> <p>Objective</p>	<p>此使用案例的目的是管理家用裝置，以便控制功耗或發電資源，例如：</p> <p>The objective of this use case is to manage in-home devices in order to control power consumption or generation resources for example to:</p> <ul style="list-style-type: none"> — 避免停電的風險 Avoid the risk of black out — 對即時峰值功率訊息做出反應 React to real time peak power messages — 平衡能耗和本地生產之間的負擔 Balance the load between consumption and local production — 優化能耗以使用更便宜及/或更綠色的能源(取決於個人喜好) Optimize the consumption to use cheaper and/or greener energy (depending on personal preferences) — 保持電能質量 Maintain power quality

使用案例敘述 Narrative of use case

13 在這種情況下，上游是指行為者 A 或 B (請參見行為者定義)。

13 Upstream in this context means towards actor A or B (see actor definitions).

簡短說明 Short description – max 3 sentences

訊息和量測資訊通過稱為智慧電網連接點(SG CP)的介面提供給房屋/建築物。 可以區分以下訊息：

Messages and metrological information are provided to the home/building via an interface called the Smart Grid Connection Point (SG CP). The following messages can be distinguished:

- (a) 直接 – 加載/生成/儲存管理 Direct – load/generation/storage management
- (b) 緊急情況 Emergencies
 - (1) 緊急負載控制 Emergency load control
 - (2) 中宣布端的緊急負載控制 Announce end of emergency load control

遵循 Eurelectric 的定義，以下說明的功能可以標記為“直接負載控制”使用案例，在可持續過程工作組的報告中對此進行了引用。

The functions described below can be labeled as a “Direct load control” use case, following the definition of Eurelectric, which is referenced in the Sustainable Processes workgroup’s report.

完整說明 Short description

該使用案例包括三個主要使用案例： This use case comprises three primary use cases:

WGSP 2121：負載/生成/儲存管理 WGSP 2121: Load/generation/storage management

負載/發電管理訊息由上游行為者發送，以增加，減少或限制負載，發電或儲存的能量。

A load/generation management message is sent by an upstream actor to increase, reduce or limit the load, generation or stored energy.

負載/發電管理訊息從行為者 A 或 B 發送到 CEM。在 CEM 可以轉發直接訊息到器具/發電機/儲存或它可以(係依上一個數的 參數)轉換它 為單獨控制系統訊息的被發現，智慧裝置，以最適合於履行的操作。甲智慧裝置可以是器具，發電機或儲存裝置(例如蓄電池，熱泵，燃料電池等)。

A load/generation management message is sent from actor A or B to the CEM. The CEM can forward the message directly to the appliance/generator/storage or it may (based on a number of parameters) translate it into individual control messages to the smart devices that were found to best suited to fulfill the operation. A smart device may be an appliance, generator or storage device (e.g. storage batteries, heat pumps, fuel cells, etc.).

係依來自 CEM 的負載管理訊息，智慧裝置可以根據裝置的類型，當前正在執行的操作以及消費者設定來更改功耗，發電或儲存。為了避免在高峰時間消耗能量或避免超過設定的功率極限，還可以改變裝置的啟動，或者可以改變某些功能的啟動。

Based on the load management message from the CEM, the smart device may change the power consumption, generation or storage depending on the kind of device, what the device is currently doing and the consumer settings. The start of the device may also be shifted in order to avoid taking energy during the peak time or to avoid exceeding a set power limit or may shift the activation of certain features.

CEM 可以向要求負載/發電量變化的外部行為者提供反饋，因此，該行為者可以了解預期的能耗/發電量變化並更新其需求/發電量預測。反饋也可以用於計費目的

The CEM may provide feedback to the external actor requesting the load/generation change, so this actor can have an idea of which change in consumption/generation to expect and to update his demand/generation forecast. The feedback may also be used for billing purposes

WGSP 2122：緊急情況 WGSP 2122: Emergencies

當在給定區域存在停電的危險時，來自行為者 A 或 B 的緊急訊息可以根據製造商設定的安全程序，請求智慧裝置轉向網路待機。該訊息可以包含或不包含預定義的持續時間。電網還可以提供一條訊

息，通知緊急情況已結束並返回到正常狀態。

When there is a risk of a blackout in a given area, an emergency message from actor A or B can request smart devices to turn to network standby according to a safe procedure set by the manufacturer. The message may or may not contain predefined time duration. The grid may also provide a message notifying the end of the emergency and the return to normal status.

此使用情況說明的參與功能與突發事件，從該家庭的角度。它顯示了如何在緊急訊息被發送到家庭以及如何 CEM 發生反應來此。使用情況“WGSP-2300 緊急需求資訊-負載脫落”說明的緊急從該角度來看的外部行為者(如 DSO)。

This use case describes the functionalities involved with emergencies from the home perspective. It shows how an emergency message is sent to the home and how the CEM reacts to this. Use case “WGSP-2300 Emergency Demand Messages – Load shedding” describes the emergency from the perspective of the external actor (e.g. DSO).

使用案例 WGSP-2112 說明瞭如何從外部行為者向消費者發送警告訊息，警告緊急負載控制將在一定時間內發生，除非消耗/發電發生變化。這通常可以在 WGSP-2122 之前進行。

Use case WGSP-2112 describes how warning messages may be sent from an external actor to the consumer, warning that emergency load control will happen within a certain period of time, unless changes in consumption/generation take place. This may typically precede WGSP-2122.

主要使用案例包括兩種情況：

The primary use cases consist of two scenarios:

- “緊急負載控制”說明了如何一個負載控制訊息被發送通過所述 CEM，到該裝置。在情況下的緊急負載控制訊息已經包含了持續的負載控制期間，CEM 可以指示的智慧裝置在了正確的時刻是在緊急時期已經過去了。這最後一個指令是不是在範圍內的這種使用情況，並在沒有說明的詳細分析。確認可以選擇性地從發送的 CEM 到行為者 A/B 所以這個行為者能有一個想法的，其變化在能耗/產生期望，並更新自己的需求/生成預測。該反饋也可以用於計費目的。“Emergency load control” describes how a load control message is sent through the CEM, to the devices. In case the emergency load control message already contains the duration of the load control period, the CEM may instruct the smart devices at the right moment that the emergency period has passed. This last instruction is not in scope of this use case and is not described in the detailed analysis. Confirmations may optionally be sent from the CEM to Actor A/B so this actor can have an idea of which change in consumption/generation to expect and to update his demand/generation forecast. The feedback may also be used for billing purposes.
- “宣布結束的緊急負載控制”說明了如何在外部行為者指示的 CEM 了緊急時期的結束。確認從該 CEM 可能被要求由外部行為者，以確保所有商業電子訊息已經收到了訊息。“Announce end of emergency load control” describes how an external actor instructs the CEM that the emergency period is ended. Confirmation from the CEM may be requested by the external actor to ensure that all CEMs have received the message.

一般說明 General remarks

一般說明 General remarks

A.3.22.2 使用案例圖 Diagram 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

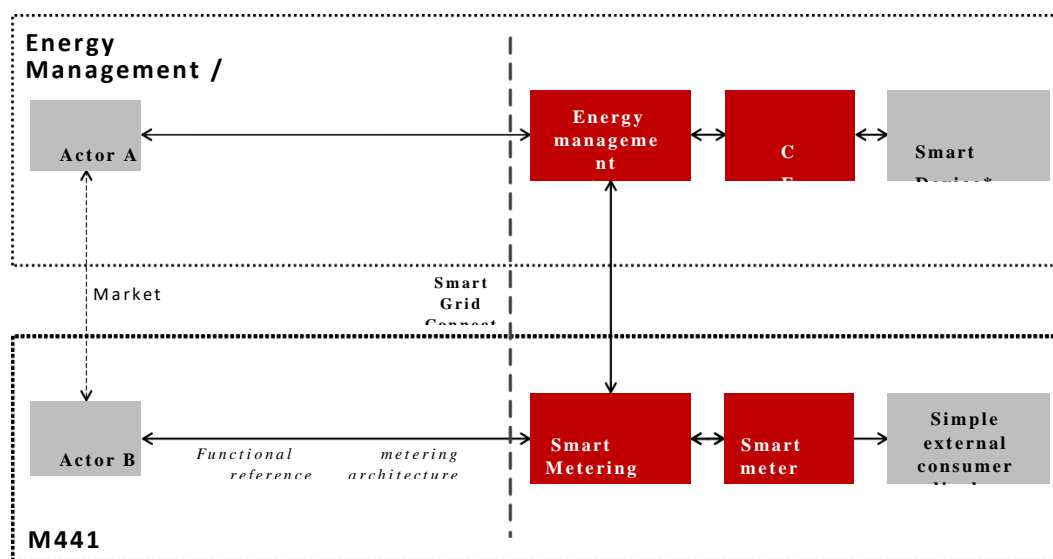
A.3.22.3 技術細節 Technical details

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

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。

備考 1.為定義此使用案例，已使用了圖 A.32 所示的架構作為基礎。

NOTE 1 For the definition of this use case, the architecture shown in Figure A.32 has been used as a basis.



*例如 HBES 裝置，智慧家電，儲存裝置，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.32 SG CG 架構模型[9]

Figure A.32 – 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.).

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 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 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>	

Actors			
Grouping (Community)		Group description	
Actor name see Actor list	Actor type see Actor list	Actor description see Actor list	Further information specific to this use case

能源管理閘道器 Energy management gateway	內部 Internal	<p>接取點(功能個體)用於發送及接收智慧電網相關資訊，命令行為者 A 及 CEM，使 CEM 決定該如何處理該事件。該通訊通常透過無線連接網路完成。</p> <p>An access point (functional entity) sending and receiving smart grid related information and commands between actor A and the CEM, letting the CEM decide how to process the events. The communication is often achieved through an internet connection of through a wireless connection.</p> <p>此閘道器亦可提供包含協議轉換、裝置管理、安全及服務能力之服務。</p> <p>This gateway may also provide services including protocol conversion, device management, security and service capabilities.</p>	
智慧量測閘道器(LNAP) Smart Metering gateway (LNAP)	Internal	<p>接取點(功能個體)，允許接取 1 或多個量測終端裝置及，當配備介面，以進階顯示/家庭自動化終端裝置連接至本地端網路。</p> <p>An access point (functional entity) that allows access to one or more metering end devices and, when equipped with an interface, to advanced display/home automation end devices connected to the local network.</p> <p>LNAP 亦可允許不同功能個體連接至相同 LN 之間的資料交換。LNAP 可簡單地作為路由量測終端裝置及/或顯示器/家庭自動化裝置與廣域網路之鄰近網路間傳遞訊息。</p> <p>A LNAP also may allow data exchange between different functional entities connected to the same LN. The LNAP may act simply as a router transferring messages between the metering end device and/or display/home automation devices and the Neighbourhood network of wide area network.</p> <p>其可提供包括協議轉換，裝置管理，安全性及服務能力等服務。服務可作為 LNAP 自身功能提供，或提供連接至本地端網路之有限功能裝置代表之代理服務。</p> <p>It may also provide services including protocol conversion, device management, security and service capabilities. Services may be provided as functions of the LNAP itself or provide proxy services on behalf of limited capability devices connected to the local network.</p>	
智慧電錶 Smart meter	Internal	<p>量測終端裝置為智慧量測參考架構，以下量測相關功能之組合：</p> <p>The metering end device is a combination of the following meter-related functions from the Smart Metering reference architecture：</p> <ul style="list-style-type: none"> • MID 量測功能，包含傳統電錶顯示器(寄存器或索引)其為合法量測控制。當量測控制下，此等功能應滿足MID基本要求 <p>MID;Metrology functions including the conventional meter display (register or index) that are under legal metrological control. When under metrological control, these functions</p>	

		<p>shall meet the essential requirements of the MID;</p> <ul style="list-style-type: none"> • MID 未涵蓋 1 或多項附加功能。此等亦作為顯示之使用; <p>One or more additional functions not covered by the MID. These may also make use of the display;</p> <p>電錶通訊功能。</p> <p>Meter communication functions.</p>	
NNAP	Internal	<p>鄰近網路接取點為一功能個體，可接取至 1 或多個 LNAP、量測終端裝置、顯示及家用自動化終端裝置連接至鄰近網路(NN)。其允許不同功能個體連接至相同 NN 之資料交換。</p> <p>The Neighbourhood Network Access Point is a functional entity that provides access to one or more LNAP's, metering end devices, displays and home automation end devices connected to the neighbourhood network (NN). It may allow data exchange between different functional entities connected to the same NN.</p>	
簡單外部消費者顯示 Simple external consumer display	外部 External	<p>客戶可以使用與智慧電錶/ SG CP 相連的專用顯示屏來檢查功耗，計畫的減負載和減負載歷史。還存在其他非專用手段來實現能耗</p> <p>Dedicated display screen in connection with the smart meter/SG CP available to the customer to check power consumption, planned load reductions and load reductions historical. Other not dedicated means also exist to deliver consumption</p> <p>提供給客戶的資訊，例如個人計算機，移動電話或電視機。</p> <p>information to the customer, such as the personal computer, the mobile phone or the TV set.</p>	
智慧裝置 Smart device	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))。</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>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>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>	

Actors			
Grouping (Community)		Group description	
Actor name see Actor list	Actor type see Actor list	Actor description see Actor list	Further information specific to this use case
智慧家電(白色家電) Smart appliance (white goods)	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>	
行為者 A Actor A	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。	

		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.	
HES	Internal	<p>負責擷取電錶及/或資料集中器獲讀值</p> <p>Responsible for acquiring the reads from meters and/or from data concentrators</p> <p>傳遞原始電錶讀值至 MDM</p> <p>Delivers the raw meter reads to MDM</p> <p>重複讀取任何遺失讀值</p> <p>Repeats the reading for any missing reads</p> <p>是否用於短期臨時資料電錶讀值儲存(1-3 個月)</p> <p>Is the short-term interim data storage (1-3 months) for meter reads</p> <p>向上推送事件資訊至 MDM</p> <p>Pushes the event information upwards to MDM</p> <p>支援集中器及電錶之特定協議</p> <p>Supports the specific protocols of the concentrators and meters</p> <p>包含若干即插即用解決方案之拓撲資訊及聚合功能</p> <p>Contains some topology information and aggregation functionality for plug & play solutions</p>	
MDM	Internal	<p>所有量測資料是否使用單一電錶資料庫</p> <p>Is the single meter data repository for all metering data</p> <p>量測資料是否長期儲存</p> <p>Is the long-term storage for the metering data</p> <p>透過 VEE 確保更高階業務程序之資料品質</p> <p>Ensures the data quality by VEE for the higher level business processes</p> <p>連接所有前端系統</p> <p>Connects all head-end systems</p> <p>其他系統之連接點是否能接到智慧電錶，例：開道器往返 HES。</p> <p>Is the connection point for other systems to reach the smart meters i.e. a gateway to HES and back</p> <p>將電錶讀數傳遞至其他業務系統以供進一步使用，作為業務及運營系統與進階量測基礎設施間之關鍵安全防火牆。</p>	

		<p>Delivers the meter reads to other business systems for further usage Acts as the critical security firewall between business and operational systems and the advanced metering infrastructure.</p> <p>包含若干拓撲資訊及聚合功能。</p> <p>Contains some topology information and aggregation functionality</p>	
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Actors			
Grouping (Community)		Group description	
Actor name see Actor list	Actor type see Actor list	Actor description see Actor list	Further information specific to this use case
行為者 B Actor B	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>	

前提條件，假設，後期條件，事件

Preconditions, assumptions, post condition, events

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
		<p>為正確計費彈性地需求/發電，智慧電錶及 CEM 需要時間同步。</p> <p>In order to correctly bill demand/generation flexibility, the smart meter and CEM need to be time synchronized.</p>	

參考文獻/問題

References/Issues

參考文獻 References						
No	參考資料型式 References type	參考 Reference	狀 態 Status	對使用案例的影響 Impact on use case	發起人/組織 Originator/Or ganisation	鏈 結 Link
1	WGSP2121 的 範例使用案例 Example use cases to WGSP2121	DKE-0015, DKE0019 through DKE0021,EDF-0002, EDF-0003, EDF-0007, EDF0008, EDF-0009, EDF-0017, EDF-0022, ESMIG-0012,ESMIG-0013, ESMIG-0014, ESMIG-0017,FINS0048, FINS0074,FINS0078, FINS0080,FINS0083, FINS0084,FINS0085, FINS0086,FINS0087, PMA-0001,TC205-0019 through 0038,TC205-0044 through 0046,TC205-0048,AK716.0.1_UC1,AK716.0.1_UC3; CECED load shedding.		用作該使用案例基礎的原始使用案例 The original use cases that served as a basis for this use case		
2	WGSP2122 的 範例使用案例 Example use cases to WGSP2122	FINS0048, FINS0085		用作該使用案例基礎的原始使用案例 The original use cases that served as a basis for this use case		

有關分類/映射使用案例的更多資訊

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
彈性叢集 Flexibility cluster
深度等級 Level of depth
主要使用案例 Primary use case
優先序 Prioritisation

1
一般，區域或國家關係 Generic, Regional or National Relation
Generic
View
Technical
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 Demand side management, direct load control, Smart Grid

A.3.22.4 使用案例的逐步分析 Step by step analysis of use case

WGSP 2121- Direct – load/generation/storage management

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
2121	直接 – 加載/生成/ 儲存管理 Direct – load/generation/st orage management	Actor A or Actor B	行為者 A 或行為 者 B 想要向市場 發送負載管理訊 息 Actor A or Actor B wants to send a load management message to the market	通訊之間的連接 的所有行為者是 建立消費者配置 了 CEM 及/或在參 與裝置。在消費者 中配置的裝置設 定和閾值對總能 耗或資訊每能耗 裝置是在 CEM 可 用 Communication connection between all actors is established The consumer configured the CEM and/or the participating devices. The consumer configured the device settings and thresholds Information on total consumption or consumption per device is available in the CEM	智慧裝置 19 執行負載管 理訊息，並且 Actor A 或 Actor B 接收 到反饋，並記 錄了該時槽 的負載曲線 The smart device 19 executed the load management message and Actor A or Actor B received feedback with a load curve recorded for this period

A.3.22.5 使用案例圖 Diagram of use case

Figure A.33 shows a 使用案例圖 Diagram of use case.

- 4
- 智慧裝置可以是一個裝置，發電機或儲存裝置(例如電池)。
- 14
- Smart device may be an appliance, generator or storage device (e.g. battery).

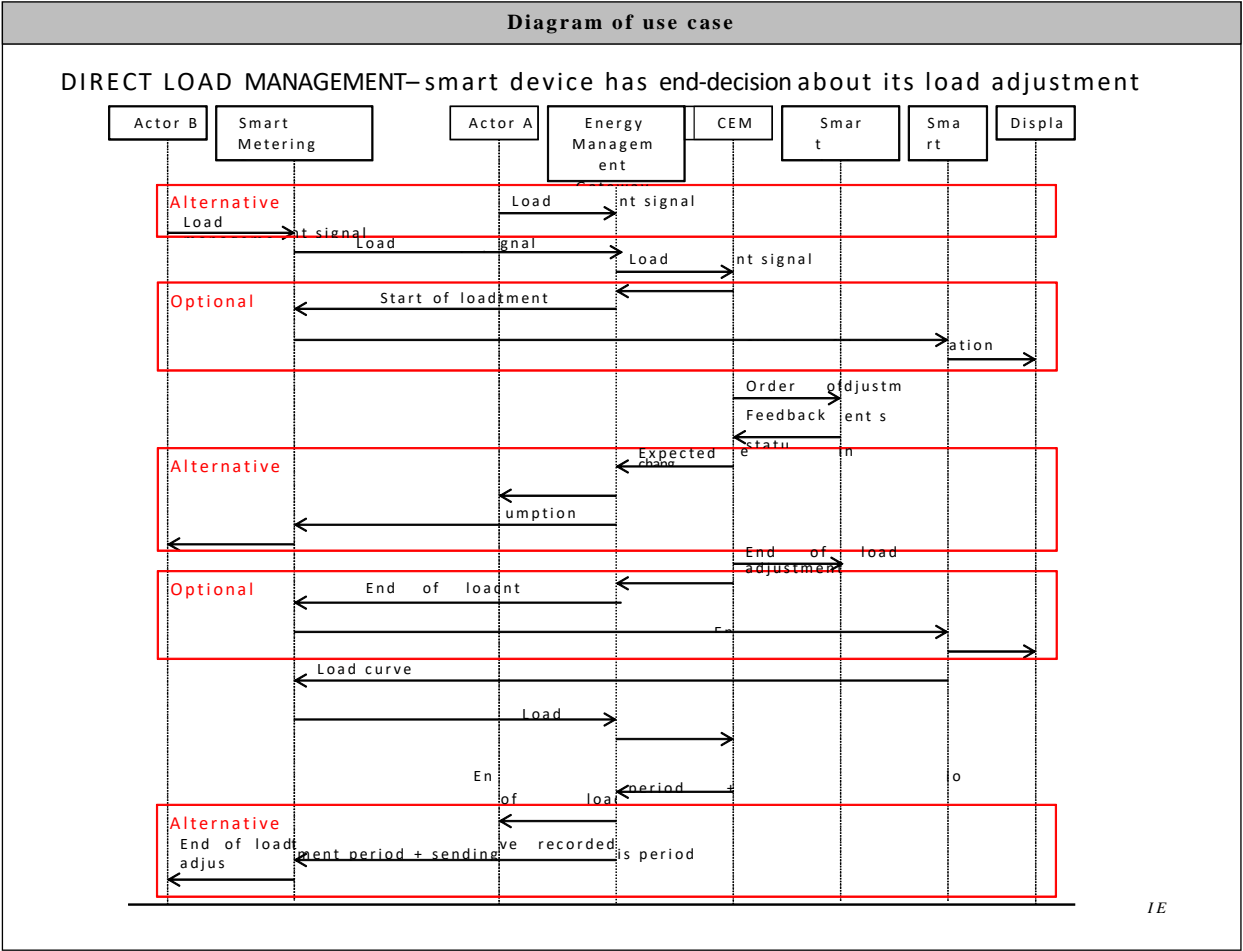


Figure A.33 Sequence diagram

Steps – Normal

情境 Scenario								
情境名稱提供彈性：Scenario name Provide flexibility:								
Step No.	Event	名稱的過程/活動 Name of process	流程/活動說明 Description of process/activity	區域/域 Zones/D omains	資訊生產者 Information producer	資訊接收者 Information receiver (Actor)	資訊交流 Information exchanged	Requirements, R-ID

		/activity			(Actor)			
1a	行為者 A 要向市場發送負載管理訊息(替代) Actor A wants to send a load management message to the market (alternative)		行為者 A 發送負載到能源管理閘道器的管理訊息 Actor A sends a load Management message to Energy Management Gateway	企業 - 領域/消費者 Enterprise - field/Customer premise	Actor A	能源管理閘道器 Energy Management Gateway	機械負載管理換貨資訊 Load management message	
1b	行為者 B 想要向市場發送負載管理訊息(替代) Actor B wants to send a load management message to the market (alternative)		行為者 B 發送一個負載管理訊息到智慧量測閘道器 (LNAP) (通過量測通道) Actor B sends a load management message to Smart Metering Gateway (LNAP) (via the metering channel)	企業 - 現場/消費者的前提 Enterprise -Field /Customer premise	Actor B	智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	機械負載管理換貨資訊 Load management message	

情境 Scenario								
情境名稱提供彈性：Scenario name Provide flexibility:								
Step No.	Event	名稱的過程/活動 Name of process/activity	流程/活動說明 Description of process/activity	區域/域 Zones/Domains	資訊生產者 Information producer (Actor)	資訊接收者 Information receiver (Actor)	資訊交流 Information exchanged	要求 Requirements, R-ID

2	智慧量測閘道器(LNAP)收到負載管理訊息 Smart Metering Gateway (LNAP) receives the load management message		智慧量測閘道器(LNAP)將負載管理訊息轉發到能源管理閘道器 Smart Metering Gateway (LNAP) forwards the load management message to the Energy Management Gateway	場域/客戶端 Field/Customer premise	智慧量測閘道器(LNAP) Smart Metering Gateway (LNAP)	能源管理閘道器 Energy Management Gateway	負載管理資訊 Load management message	
3	能源管理閘道器收到負載管理訊息 Energy Management Gateway receives a load management message		能源管理閘道器將負載管理訊息轉發到 CEM Energy Management Gateway forwards the load management message to CEM	場域/客戶端 Field/Customer premise	能源管理閘道器 Energy Management Gateway	CEM	負載管理資訊 Load management message	
4	CEM 收到負載管理訊息 CEM receives load management message		選擇性的，當一個通知需要進行顯示簡單的外部能耗顯示，在 CEM 發送到通知的能源管理閘道器 Optionally, when a notification needs to be displayed on the simple external consumer display, the CEM sends a notification to the Energy Management Gateway	場域/客戶端 Field/Customer premise	CEM	能源管理閘道器 Energy Management Gateway	開始進行負載調整通知 Start of load adjustment notification	

5	能源管理閘道器收到負載管理訊息 Energy Management Gateway receives the load management message		能源管理閘道器將通知發送到智慧電錶 Energy Management Gateway sends the notification to Smart Meter	場域/客戶端 Field/Customer premise	能源管理閘道器 Energy Management Gateway	智慧量測閘道器 (LNAP Smart Metering Gateway (LNAP	開始進行負載調整通知 Start of load adjustment notification	
6	智慧量測閘道器(LNAP)收到負載管理訊息 Smart Metering Gateway (LNAP) receives the load management message		智慧電錶閘道器(LNAP)將通知發送到智慧電錶 Smart Metering Gateway (LNAP) sends the notification to Smart Meter	場域/客戶端 Field/Customer premise	智慧量測閘道器 (LNAP Smart Metering Gateway (LNAP	智慧電錶 Smart Meter	開始進行負載調整通知 Start of load adjustment notification	
7	智慧電錶收到負載管理訊息 Smart Meter receives the load management message		智慧電錶將負載管理開始通知發送到人機界面 Smart Meter sends the start of load management notification to the Display	場域/客戶端 Field/Customer premise	智慧電錶 Smart Meter	簡單外部消費者顯示 Simple external consumer display	開始進行負載調整通知 Start of load adjustment notification	
8	CEM 收到了負載管理訊息 CEM received the load management message		CEM 決定需要調整哪些智慧裝置，並向它們發送負載調整順序 CEM decides which smart devices need to be adjusted and sends an order of load adjustment to them	場域/客戶端 Field/Customer premise	CEM	智慧裝置 Smart devices	負載調整順序 Order of load adjustment	

Scenario

Scenario name Provide flexibility:								
步驟 編號 Step No.	事件 Event	名稱的 過程/活動 Name of process/ activity	流程/活動說明 Description of process/activity	區域/域 Zones/D omains	資訊生 產者 Information producer (Actor)	資訊接 收者 Information receiver (Actor)	資訊交流 Information exchanged	要求 Requirements, R-ID
9	智慧裝置收到負載調整順序 Smart devices receive the order of load adjustment		智慧裝置決定根據用戶的設定打開/關閉並將反饋發送到 CEM The smart devices decide to switch on/off based on the consumer's settings and send feedback to CEM	場域/客戶端 Field/Customer premise	智慧裝置 Smart devices	CEM	負載調整反饋 Load adjustment feedback	
10	CEM 接收來自智慧裝置的反饋 CEM receives feedback from smart devices		CEM 告知能源管理閘道上，其變化在能耗來期待。 CEM informs Energy Management Gateway on which change in consumption to expect.	場域/客戶端 Field/Customer premise	CEM	能源管理閘道器 Energy Management Gateway	能耗變化 Change in consumption	
11a	能源管理閘道器接收能耗變化 Energy Management Gateway receives the change in consumption		能源管理閘道器轉發的變化在能耗到行為者 A 一個(二選一) Energy Management Gateway forwards the change in consumption to Actor A (alternative)	現場 - 企業/消費者前提 Field - enterprise/Customer premise	能源管理閘道器 Energy Management Gateway	Actor A	能耗變化 Change in consumption	

11b	能源管理閘道器接收能耗變化 Energy Management Gateway receives the change in consumption		能源管理閘道器將能耗變化轉發到智慧量測閘道器 Energy Management Gateway forwards the change in consumption to Smart Metering Gateway	現場 - 企業/消費者前提 Field – enterprise/Customer premise	能源管理閘道器 Energy Management Gateway	智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	能耗變化 Change in consumption	
12	智慧量測閘道器接收的變化在能耗 Smart Metering Gateway receives the change in consumption		智慧量測閘道器轉發在改變能耗至行為者 B(經由所述量測通道) Smart Metering Gateway forwards the change in consumption to Actor B (via the metering channel)	現場 - 企業/消費者前提 Field – Enterprise/Customer premise	智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	Actor B	能耗變化 Change in consumption	
13	負載調整期結束 Load adjustment period is finished		CEM 向智慧裝置發送負載調整結束 CEM sends an end of load adjustment to Smart devices	場域/客戶端 Field/Customer premise	CEM	智慧裝置 Smart devices	負載調整結束 End of load adjustment	
14	智慧裝置收到來自 CEM 的負載調整結束 Smart devices receive the end of load adjustment from CEM		該智慧裝置開/關和發送反饋給 CEM The smart devices switch on/off and send feedback to CEM	場域/客戶端 Field/Customer premise	智慧裝置 Smart devices	CEM	負載調整結束反饋 End of load adjustment feedback	

15	<p>CEM 收到來自智慧裝置的反饋</p> <p>CEM receives the feedback from smart devices</p>		<p>CEMS 將負載調整通知發送到能源管理閘道器</p> <p>CEMS sends load adjustment notification to the Energy Management Gateway</p>	<p>場域/客戶端</p> <p>Field/Customer premise</p>	CEM	<p>能源管理閘道器</p> <p>Energy Management Gateway</p>	<p>負載調整結束反饋</p> <p>End of load adjustment feedback</p>	
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情境 Scenario								
情境名稱提供彈性： Scenario name Provide flexibility:								
步驟 編號 Step No.	事件 Event	名稱的 過程/活動 Name of process/ activity	流程/活動說明 Description of process/activity	區域/域 Zones/D omains	資訊生產者 Information producer (Actor)	資訊接收者 Information receiver (Actor)	資訊交流 Information exchanged	要求 Requirements, R-ID
16	能源管理閘道器收到反饋 Energy Management Gateway receives feedback		能源管理閘道器將負載調整結束通知發送到智慧量測閘道器(LNAP) Energy Management Gateway sends the end of load adjustment notification to the Smart Metering Gateway (LNAP)	場域/客戶端 Field/Customer premise	能源管理閘道器 Energy Management Gateway	智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	負載結束調整通知 End of load adjustment notification	
17	智慧量測閘道器(LNAP)收到通知 Smart Metering Gateway (LNAP) received notification		智慧量測閘道器 (LNAP) 發送端的負載調整通知智慧電錶 Smart Metering Gateway (LNAP) sends end of load adjustment notification to Smart Meter	場域/客戶端 Field/Customer premise	智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	智慧電錶 Smart Meter	負載調整結束通知 End of load adjustment notification	
18	智慧電錶收到通知 Smart Meter received notification		智慧電錶將負載調整結束通知發送到人機界面 Smart Meter sends the end	場域/客戶端 Field/Customer premise	智慧電錶 Smart Meter	顯示 Display	負載調整結束通知 End of load adjustment	

			of load adjustment notification to Display				notificatio n	
19	智慧電錶收到通知 Smart Meter received notification		智慧電錶將 這段時間記 錄的負載曲 線發送到智 慧電錶閘道 器(LNAP) Smart meter sends the load curve recorded for this period to Smart Metering Gateway (LNAP)	場域/客 戶端 Field/ Custome r premise	智慧電 錶 Smart Meter	智慧量 測閘道 器 (LNAP) Smart Meterin g Gateway (LNAP)	負載曲線 Load curve	
20	智慧量測閘道器(LNAP) 接收負載曲 線 Smart metering gateway (LNAP) receives load curve		智慧量測閘 道器 (LNAP) 將負載曲線 發送到能源 管理閘道器 Smart metering gateway (LNAP) sends load curve to Energy Management Gateway	場域/客 戶端 Field/ Custome r premise	智慧量 測閘道 器 (LNAP) Smart Meterin g Gateway (LNAP)	能源管 理閘道 器 Energy Manage ment Gateway	負載曲線 Load curve	
21	能源管理閘 道器接收負 載曲線 Energy Management Gateway receives load curve		能源管理閘 道器將負載 曲線發送到 CEMEnergy Management Gateway sends load curve to CEM	場域/客 戶端 Field/ Custome r premise	能源管 理閘道 器 Energy Manage ment Gateway	CEM	負載曲線 Load curve	
22	CEM 從智慧 電錶接收負 載曲線 CEM receives load curve from smart meter		CEM 將負載 調整期的結 束髮送到能 源管理閘道 器，並發送此 期間記錄的 負載曲線 CEM sends the end of load adjustment	場域/客 戶端 Field/ Custome r premise	CEM	能源管 理閘道 器 Energy Manage ment Gateway	負載調整 反饋 Load adjustmen t feedback	

			period to Energy Management Gateway and sends a load curve recorded for this period					
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情境 Scenario								
情境名稱提供彈性： Scenario name Provide flexibility:								
步驟編號 Step No.	事件 Event	名稱的過程/活動 Name of process/activity	流程/活動說明 Description of process/activity	區域/域 Zones/Domains	資訊生產者 Information producer (Actor)	資訊接收者 Information receiver (Actor)	資訊交流 Information exchanged	要求 Requirements, R-ID
23a	能源管理閘道器收到的反饋 Energy Management Gateway receives the feedback		能源管理閘道器將反饋轉發給行為者 A (替代) Energy Management Gateway forwards the feedback to Actor A (alternative)	現場 – 企業/消費者前提 Field – enterprise/Customer premise	能源管理閘道器 Energy Management Gateway	Actor A	負載調整反饋 Load adjustment feedback	
23b	能源管理閘道器收到的反饋 Energy Management Gateway receives the feedback		能源管理閘道器將反饋轉發到智慧量測閘道器 (LNAP)(替代) Energy Management Gateway forwards the feedback to Smart Metering Gateway (LNAP) (alternative)	場域/客戶端 Field/Customer premise	能源管理閘道器 Energy Management Gateway	智慧量測閘道器 (LNAP) Smart Metering Gateway (LNAP)	負載調整反饋 Load adjustment feedback	
24	智慧量測閘道器 (LNAP)		智慧量測閘道器 (LNAP)	現場 – 企業/消	智慧量測閘道	Actor B	負載調整反饋	

	收到反饋 Smart Metering Gateway (LNAP) receives the feedback		將反饋轉發給 Actor B (通過量測通道) Smart Metering Gateway (LNAP) forwards the feedback to Actor B (via the metering channel)	費者前提 Field — Enterprise/ Customer premise	器 (LNAP) Smart Metering Gateway (LNAP)		Load adjustment feedback	
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WGSP 2122：使用案例情境 1：緊急負載控制

WGSP 2122: Use case scenario 1: Emergency load control

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
2122.1	緊急負載控制 Emergency load control	Actor A or Actor B	確定了緊急降低功耗/饋電的需求 The need for an emergency reduction of power consumption/feed-in is identified	可以在所有行為者之間建立溝通 Communication between all actors can be established	CEM 命令關閉所有智慧裝置，然後將確認發送回給行為者 A 或 HES The CEM ordered all smart devices to switch off and sent confirmation back to actor A or to the HES

使用案例圖 Diagram of use case

圖 A.34 顯示了一個使用案例圖

Figure A.34 shows a Diagram of use case.

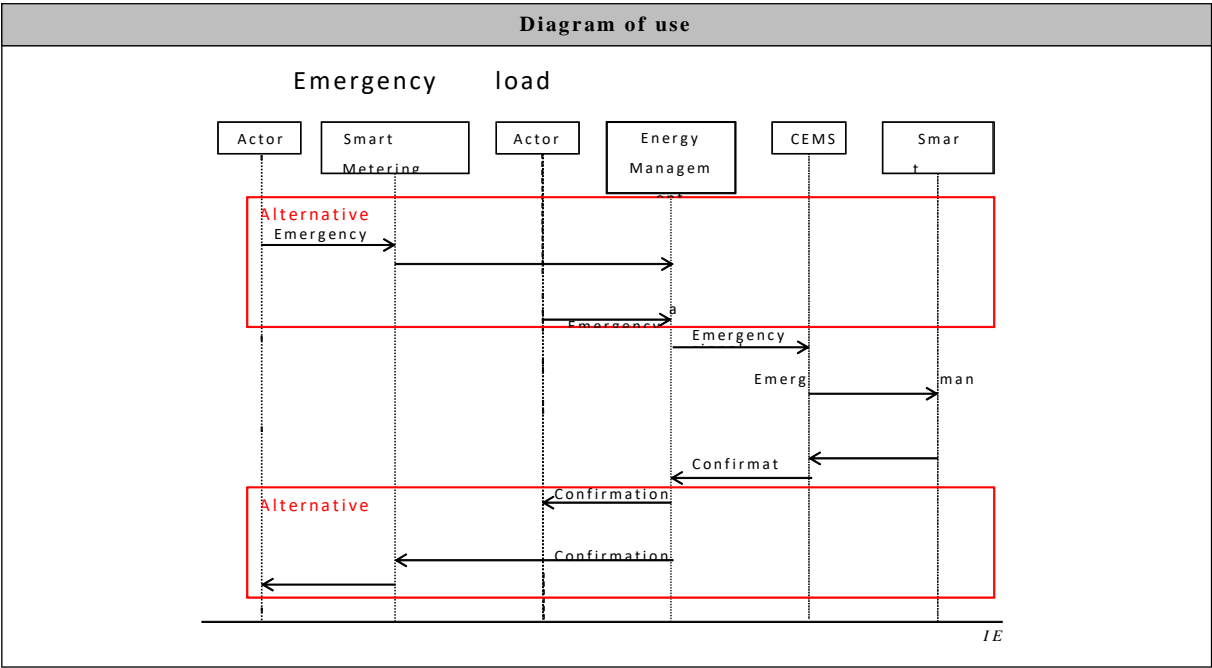


圖 A.34 序列圖

Figure A.34 – Sequence diagram

步驟 - 正常

Steps – Normal

情境 Scenario								
情境名稱提供彈性： Scenario name Provide flexibility:								
步驟編號 Step No.	事件 Event	名稱的過程/活動 Name of process/activity	流程/活動說明 Description of process/activity	區域/域 Zones/ Domains	資訊生產者 Information producer (Actor)	資訊接收者 Information receiver (Actor)	資訊交流 Information exchanged	要求 Requirements, R-ID
1a	確定了緊急降低功耗/饋電的需求 The need for an Emergency		行為者 A 向能源管理閘道器發送緊急訊息 (替代) Actor A sends	企業 - 場域/客戶端 Enterprise -field/	Actor A	能源管理閘道器 Energy Management	緊急訊息 Emergency message	

	reduction of power consumption /feed-in is identified		an emergency message to the Energy Management Gateway (alternative)	Customer premise		Gateway		
1b	需要一個緊急的降低功耗標識 The need for an emergency reduction of power consumption is identified		行為者 B 將緊急訊息發送到智慧量測閘道器 (LNAP (備用))(通過量測通道) Actor B sends an emergency message to the Smart metering gateway (LNAP (alternative) (via the metering channel)	企業 - 場域/客戶端 Enterprise -Field/ Customer premise	Actor B	智慧量測閘道器 (LNAP Smart metering gateway (LNAP	緊急訊息 Emergency message	
2	智慧量測閘道器(LNAP)收到緊急訊息 Smart Metering Gateway (LNAP) receives the emergency message		智慧量測閘道器(LNAP)向能源管理閘道器發送緊急訊息 Smart Metering Gateway (LNAP) sends emergency message to Energy Management Gateway	場域/客戶端 Field/ Customer premise	智慧量測閘道器 (LNAP) Smart metering gateway (LNAP)	能源管理閘道器 Energy Management Gateway	緊急訊息 Emergency message	
3	能源管理閘道器收到緊急訊息 Energy Management Gateway receives the emergency message		能源管理閘道器將緊急訊息轉發到 CEM Energy Management Gateway forwards the emergency message to CEM	場域/客戶端 Field/ Customer premise	能源管理閘道器 Energy Management Gateway	CEM	緊急訊息 Emergency message	

情境 Scenario	
情境名稱提供彈性：	

Scenario name Provide flexibility:								
步驟 編號 Step No.	事件 Event	名稱 的過程 / 活動 Name of process /activity	流程/活動說明 Description of process/ activity	區域/域 Zones/ Domain s	資訊生 產者 Information producer (Actor)	資訊接 收者 Information receiver (Actor)	資訊交流 Information exchanged	要求 Requirements, R-ID
4	CEM 收到 緊急訊息 CEM receives the emergency message		CEM命令所有 智慧裝置切換 到網路待機 CEM orders all smart devices to switch to network standby	場域/客 戶端 Field/ Custom er premise	CEM	智慧裝 置 Smart devices	緊急負載 管理訊息 Emergency load manageme nt message	
5	智慧裝置收到 緊急訊息 Smart devices received emergency message		智慧裝置切換 到網路待機狀 態，並有選擇 地將確認發送 回 CEM Smart devices switch to network standby and optionally send confirmation back to CEM	場域/客 戶端 Field/ Custom er premise	智慧裝 置 Smart devices	CEM	確認(選擇 性) Confirmati on (optional)	
6	CEM 收到 確認 CEM receives confirmation		CEM可以選擇 將確認發送到 能源管理閘道 器 CEM optionally sends confirmation to Energy Management Gateway	場域/客 戶端 Field/ Custom er premise	CEM	能源管 理閘道 器 Energy Manage ment Gatewa y	確認(選擇 性) Confirmati on (optional)	
5a	能源管理閘 道器收到確 認 Energy Management Gateway receives		能源管理將確 認轉發給行為 者 A (替代) Energy Management forwards confirmation	現場 - 企業/消 費者前 提 Field -e nterpris e/	能源管 理閘道 器 Energy Manage ment	Actor A	確認(選擇 性) Confirmati on (optional)	

	confirmation		to Actor A (Alternative)	Customer premise	Gateway			
5b	能源管理閘道器收到確認 Energy Management Gateway receives confirmation		能源管理將確認轉發到智慧量測閘道器 (LNAP)(替代) Energy Management forwards confirmation to Smart metering gateway (LNAP) (Alternative)	現場 – 企業/消費者前提 Field – enterprise/ Customer premise	CEM	智慧量測閘道器 (LNAP) Smart metering gateway (LNAP)	確認(選擇性) Confirmation (optional)	
6	智慧量測閘道器(LNAP)收到確認 Smart Metering Gateway (LNAP) receives confirmation		智慧量測閘道器(通過量測通道)將確認轉發給 Actor B (備用) Smart metering gateway forwards confirmation to Actor B (Alternative) (via the metering channel)	現場 – 企業/運營消費者前提 Field – Enterprise/ operation Customer premise	智慧量測閘道器 (LNAP) Smart metering gateway (LNAP)	Actor B	確認(選擇性) Confirmation (optional)	

WGSP 2122：使用案例情境 2：宣布緊急負載控制結束

WGSP 2122: Use case scenario 2: Announce end of emergency load control

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 Postcondition
2122.2	宣布緊急負載控制結束 Announce end of emergency load control	Actor A or Actor B	有沒有更多的需要的一個緊急功耗/饋以減少 There is no more need for an emergency reduction of power consumption/feed-in	可以在所有行為者之間建立溝通 Communication between all actors can be established	CEM 通知所有智慧裝置緊急負載控制期已結束，並將確認發送回給行為者 A 或 HES The CEM informed all smart devices

					that the emergency load control period has ended and sent confirmation back to actor A or to the HES
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使用案例圖 Diagram of use case

Figure A.35 shows a 使用案例圖 Diagram of use case.

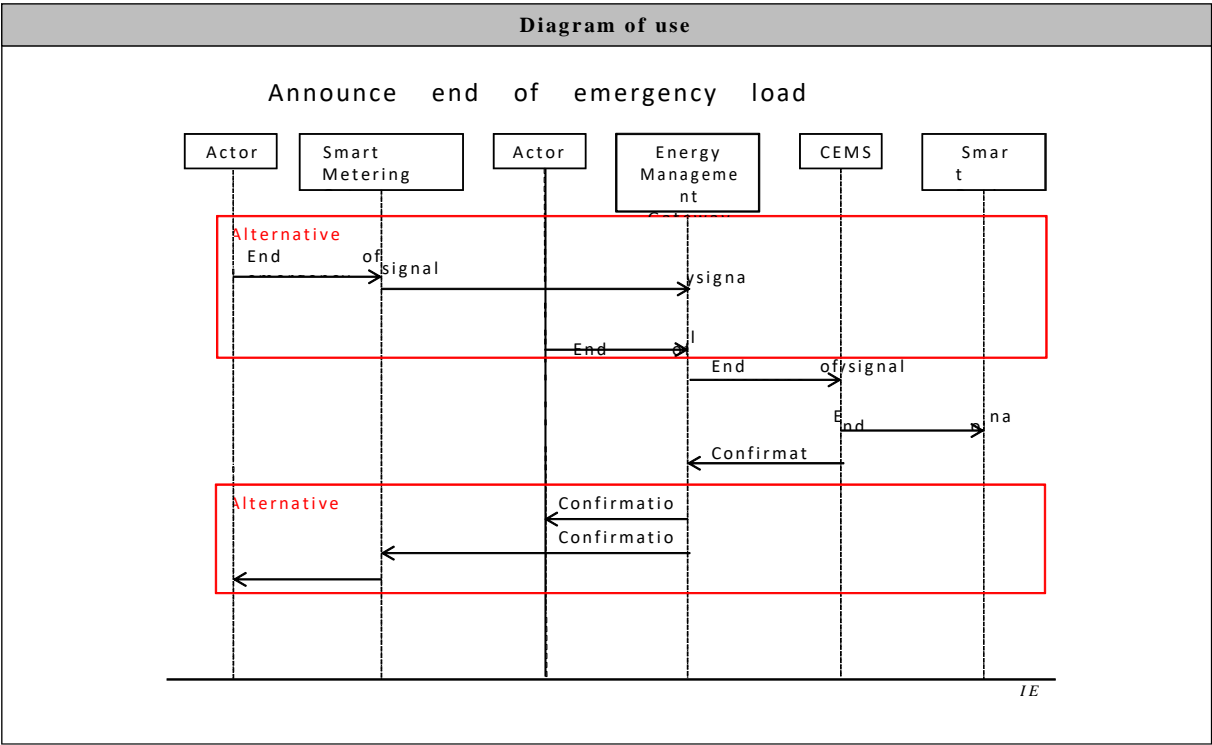


Figure A.35 Sequence diagram

情境 Scenario								
情境名稱提供彈性： Scenario name Provide flexibility:								
步驟編號 Step No.	事件 Event	名稱的過程/活動 Name of process/activity	流程/活動說明 Description of process/activity	區域/域 Zones/Domains	資訊生產者 Information producer (Actor)	資訊接收者 Information receiver (Actor)	資訊交流 Information exchanged	要求 Requirements, R-ID

1a	有沒有更需要一個緊急的減少功耗/饋入 There is no more need for an emergency reduction of power consumption/feed-in		行為者 A 向能源管理閘道器發送緊急結束訊息(替代) Actor A sends an end of emergency message to the Energy Management Gateway (alternative)	企業 - 場域 / 客戶端 Enterprise – field/Customer premise	Actor A	能源管理閘道器 Energy Management Gateway	緊急訊息結束 End of emergency message	
1b	有沒有更需要一個緊急的減少功耗/饋入 There is no more need for an emergency reduction of power consumption/feed-in		行為者 B 將緊急情況結束訊息發送到智慧量測閘道器 (LNAP (備用))(通過量測通道) Actor B sends an end of emergency message to the Smart metering gateway (LNAP (alternative) (via the metering channel))	企業 - 場域 / 客戶端 Enterprise – Field/Customer premise	Actor B	智慧量測閘道器 (LNAP) Smart metering gateway (LNAP)	緊急訊息結束 End of emergency message	

情境 Scenario								
情境名稱提供彈性： Scenario name Provide flexibility:								
步驟編號 Step No.	事件 Event	名稱的過程/活動 Name of process /activity	流程/活動說明 Description of process/activity	區域/域 Zones/Domains	資訊生產者 Information producer (Actor)	資訊接收者 Information receiver (Actor)	資訊交流 Information exchanged	要求 Requirements, R-ID

2	智慧量測閘道器 (LNAP) 收到訊息 Smart Metering Gateway (LNAP) receives the message		智慧量測閘道器 (LNAP) 將緊急情況結束訊息發送到能源管理閘道器 Smart Metering Gateway (LNAP) sends end of emergency message to Energy Management Gateway	場域 / 客戶端 Field/Customer premise	智慧量測閘道器 (LNAP) Smart metering gateway (LNAP)	能源管理閘道器 Energy Management Gateway	緊急訊息結束 End of emergency message	
3	能源管理閘道器收到緊急情況 Energy Management Gateway receives the emergency		能源管理閘道器將緊急訊息的結束轉發到 CEM Energy Management Gateway forwards the end of emergency message to CEM	場域 / 客戶端 Field/Customer premise	能源管理閘道器 Energy Management Gateway	CEM	緊急訊息結束 End of emergency message	
4	CEM 收到緊急訊息結束 CEM receives the end of emergency message		CEM 向智慧裝置發送一條訊息，使它們可以在正常模式下運行 CEM sends a message to smart devices, allowing them to operate in normal mode	場域 / 客戶端 Field/Customer premise	CEM	智慧裝置 Smart devices	緊急訊息結束 End of emergency message	
5	CEM 收到緊急訊息結束 CEM receives the end of emergency message		CEM 可以選擇將確認發送到能源管理閘道器 CEM optionally sends confirmation to Energy Management	場域 / 客戶端 Field/Customer premise	CEM	能源管理閘道器 Energy Management Gateway	確認 (選擇性) Confirmation (optional)	

			Gateway					
6a	能源管理閘道器收到確認 Energy Management Gateway receives confirmation		能源管理將確認轉發給行為者 A (替代) Energy Management forwards confirmation to Actor A (Alternative)	現場 - 企業 / 消費者前提 Field -enterprise/Customer premise	能源管理閘道器 Energy Management Gateway	Actor A	確認 (選擇性) Confirmation (optional)	
6b	能源管理閘道器收到確認 Energy Management Gateway receives confirmation		能源管理將確認轉發到智慧量測閘道器 (LNAP)(替代) Energy Management forwards confirmation to Smart metering gateway (LNAP) (Alternative)	現場 - 企業 / 消費者前提 Field -enterprise/Customer premise	CEM	智慧量測閘道器 (LNAP) Smart metering gateway (LNAP)	確認 (選擇性) Confirmation (optional)	
7	智慧量測閘道器 (LNAP) 收到確認 Smart Metering Gateway (LNAP) receives confirmation		智慧量測閘道器(通過量測通道)將確認轉發給 Actor B (備用) Smart metering gateway forwards confirmation to Actor B (Alternative) (via the metering channel)	領域 - 企業 / 運營消費者前提 Field -Enterprise/operation Customer premise	智慧量測閘道器 (LNAP) Smart metering gateway (LNAP)	Actor B	確認 (選擇性) Confirmation (optional)	

步驟 - 替代方案，錯誤管理及/或維護/備份情境

Steps - Alternative, Error Management, and/or Maintenance/Backup Scenario

情境 Scenario								
情境名稱提供彈性： Scenario name Provide flexibility:								
步驟編號 Step No.	事件 Event	名稱的過程/活動 Name of process /activity	流程/活動說明 Description of process/activity	區域/域 Zones/Domains	資訊生產者 Information producer (Actor)	資訊接收者 Information receiver (Actor)	資訊交流 Information exchanged	要求 Requirements, R-ID

A.3.22.6 資訊交換 Information exchanged

資訊交換 Information exchanged		
交換資訊的名稱 Name of information exchanged	交換資訊的說明 Description of information exchanged	資訊資料 R-ID 的要求 Requirements for information data R-ID
負載管理資訊 Load management message	這可能包括行為者 A/B 要求的彈性的經濟價值 This may include an economic value for the flexibility requested by Actor A/B	
開始進行負載調整通知 Start of load adjustment notification		
負載調整通知 Announcement of load adjustment		
負載調整順序 Order of load adjustment		
負載調整反饋 Load adjustment feedback		
能耗變化 Change in consumption		
負載調整結束 End of load adjustment		

負載調整結束反饋 End of load adjustment feedback		
負載調整結束通知 End of load adjustment notification		
負載曲線 Load curve		
負載調整反饋 Load adjustment feedback		
緊急訊息 Emergency message		
緊急負載管理訊息 Emergency load management message		
確認書 Confirmation	<p>在收到負載管理訊息後發回給外部行為者的確認資訊可能包括：</p> <p>A confirmation sent back to an external actor after receiving a load management message may include:</p> <p>指示將要轉移的負載/發電量</p> <p>an indication of the amount of load/generation that will be shifted</p> <p>表示 CEM 將遵守要求，而無需估算</p> <p>an indication that the CEM will comply with the request, without an estimate</p>	
緊急訊息結束 End of emergency message		

A.3.22.7 常用術語和定義 Common terms and definitions

常用術語和定義 Common terms and definitions	
Term	Definition

A.3.22.8 備考和未解決的問題

A.3.22.8 Notes and open issues

備考和未解決的問題 Notes and open issues	
Nr	注意 Note
1.	<p>一個可能的新的主要使用情況下的直接負載控制可以說明的是如何電網詢問其商業電子訊息都願意來改變能耗；網接收報價和選其中的人來接受。</p> <p>A possible new primary use case on direct load control could describe how the grid asks which CEMs are willing to change consumption; grid receives offers and chooses which ones to accept.</p> <p>進一步發展可能是下一步</p> <p>Developing this further may be a next step</p>
2.	<p>在適當的情況下，可以根據外部行為者將所有主要使用案例(情境)分開</p> <p>Where relevant all primary use case (scenarios) may be split up according to external actors</p>
3.	<p>尚沒有一個使用案例涉及將存在多個 CEM 且在 SG CP 的電網側進行聚合的情況(例如，如何通知用戶他(即將)超過其契約權力)。縮小這一差距將是下一步</p> <p>There is not yet a use case covering the situation where there would be multiple CEMs and the aggregation takes place in the grid side of the SG CP (e.g. how is the user being informed that he is (going to) exceed his contractual power). Closing this gap would be a next step</p>
4.	<p>下一步：使用自上而下的方法定義其他使用案例，將功能架構視為黑盒，並確定哪些訊息將傳入/傳出</p> <p>Next step: define additional use cases using the top down method, considering the functional architecture as a black box and identifying which messages would go in/come out</p>

A.3.23 高階使用案例 (WGSP2140) 資費同步

A.3.23 high level use case (WGSP2140) Tariff synchronization

A.3.23.1 使用案例說明

使用案例名稱

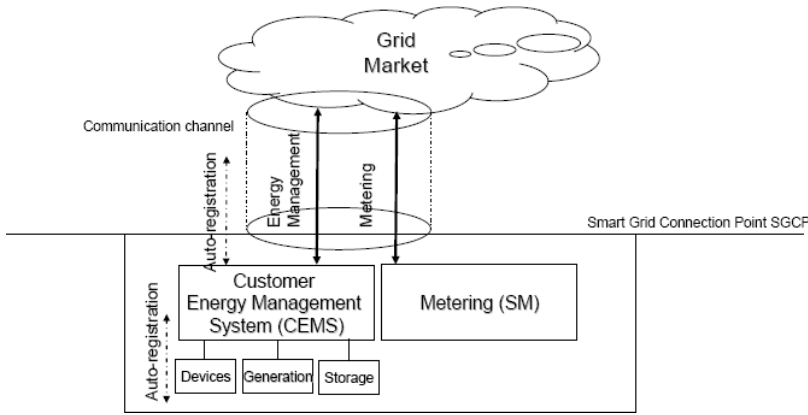
使用案例識別 Use case identification		
ID	Domain(s)	使用案例名稱
WGSP 2140	智慧電網	時間同步
	Smart Grid	Time synchronization

版本管理 Version management

版本管理 Version management					
變更/版本 Changes/Version	日期 Date	領域專家 Domain expert	專業領域/領域/ 作用 Area of expertise/ Domain/ Role	Title	批准狀態草案，徵 求意見，投票，最終 Approval status

					draft, comments, voting, final for
0.1	27/08/2012	領域專家 Domain expert		初稿 Initial draft	草案 Draft
0.5	12/11/2012	編輯者 Editor		初稿 Initial draft	草案 Draft

使用案例的範圍和目標 Scope and objectives of use case

使用案例的範圍和目標 Scope and objectives of use case	
相關業務案例 Related business case	<p>時間之間的同步的CEM和智慧電錶是一個先決條件為計費的CEM的回應，以彈性的費率。</p> <p>Time synchronization between the CEM and the Smart meter is a prerequisite for billing of the CEM's response to flexible tariffs.</p>
範圍 Scope	<p>此使用案例之範圍為CEM與“上游”20行為者間之通訊。CEM、消費者及(家庭)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(請參見行為者表格)。</p> <p>The scope of this use case is the communication between the CEM and "upstream" 20 actors. The communication between CEM, the consumer and (in-home) 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 (see table with actors).</p> <p>由架構角度來看，智慧電網協調小組引入“智慧電網連接點”(SG CP)個體作為智慧電網行為者(應用程式及/或組織)及室內/建築系統或裝置間之介面。下圖顯示其環境之SGCP。</p> <p>From an architectural point of view the Smart Grid Coordination Group introduced the "Smart Grid Connection Point" (SG CP) entity as an interface between Smart Grid actors (applications and/or organizations) and in-home/building systems or devices. The diagram below shows the SG CP in its environment.</p>  <p>注意，上圖中之方框具有功能性。智慧電錶及CEM可為一或兩個分開之實體盒。CEM亦可被整合於智慧家庭裝置中。電網市場/應用程式可透過一或分開之基礎結構進行通訊。</p> <p>Please note that the boxes in the diagram above are functional. The Smart Meter and CEM can</p>

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	be one or two separate physical boxes. The CEM can also be integrated in Smart in-home devices. The communication with the Grid market/applications can be through one or through separate infrastructures.
Objective	<p>該使用案例的目的是在CEM和智慧電錶之間交換資訊，以使CEM和智慧電錶中的有效電費保持同步。</p> <p>The objective of this use case is to exchange information between the CEM and smart meter in order the keep the active tariff in the CEM and smart meter synchronized.</p>

使用案例敘述 Narrative of use case

¹⁵ Upstream in this context means towards actor A or B (see actor definitions).

使用案例敘述 Narrative of use case
簡短說明 Short description – max 3 sentences
<p>此使用案例說明了 CEM 和智慧電錶之間的資費同步如何發生</p> <p>This use case describes how tariff synchronization between a CEM and a smart meter takes place</p>
完整說明 Short description
<p>由於 CEM 可以係依彈性的費率管理本地能耗/發電，而計費將係依智慧電錶中的資訊進行，因此智慧電錶和 CEM 都需要具有相同的費率表，並且需要知道何時應用新費率。這可以通過以下方式實現：</p> <p>Since the CEM can manage local consumption/generation based on flexible tariffs while the billing will take place based on information in the smart meter, both the smart meter and the CEM need to have the same tariff schedule and need to know when a new tariff applies. This can be achieved by:</p> <ul style="list-style-type: none"> — 時間同步之間的 CEM 和的智慧電錶;

Time synchronicity between the CEM and the smart meter;

- 在智慧電錶通知的 CEM 時的積極費率變化。

The smart meter notifying the CEM when the active tariff changes.

WGSP 2112 介紹了如何這種費率表(價格資訊)是從發送的外部行為者對 CEM 和對智慧電錶。

WGSP 2112 describes how this tariff schedule

(price information) is sent from an external actor to the CEM and to the smart meter.

WGSP-2141 說明瞭如何維護 CEM 和智慧電錶之間的時間同步。

WGSP-2141 describes how time synchronicity between CEM and Smart Meter is maintained.

CEM 可以定期從智慧電錶獲取帶有時間戳的訊息。根據這些訊息中的時間資訊，CEM 將使其時鐘與智慧電錶保持同步。上面的過程沒有在單獨的使用案例中說明，因為它在現有資訊交換的基礎上起作用。

The CEM may get time-stamped messages from the smart meter on regular intervals. Based on the time information in these messages, the CEM will keep its clock synchronized with the smart meter. The above process is not described in a separate use case since it works on top of existing information exchanges.

在上述過程之後，WGSP-2141 包含兩個情境，說明瞭如何也可以實現時間同步：

Next to the process described above, WGSP-2141 consists of two scenarios describing how time synchronization may also be achieved:

- (1) CEM 可能會向智慧電錶請求時間，CEM 將根據該時間同步其時鐘。此類請求可以定期發送(例如，當智慧電錶與 CEM 之間沒有其他常規通訊時)，也可以在 CEM 注意到它可能不同步後發送(例如，在發生類似 停電)。The CEM may request the time from the smart meter, based on which the CEM will synchronize its clock. Such a request may be sent on a regular basis (e.g. when there would be no other regular communication between smart meter and CEM) or it may be sent after the CEM has noticed that it may be out of synch (e.g. after an event like a power outage).
- (2) 係依來自 CEM 的時間戳訊息，智慧電錶可能會注意到前者不同步，此後，智慧電錶將向 CEM 發送同步參數，迫使其進行同步。Based on time stamped messages from the CEM, the smart meter may notice the former is out of synch, after which the smart meter will send a synchronization parameters to the CEM, forcing it to synchronize.

該使用案例假定智慧電錶的時間正確。智慧電錶協調小組(INCO.02)的一個使用案例說明了智慧電錶中的時間如何與 LNAP/NNAP/HES 同步。

This use case assumes that the smart meter has the correct time. A use case from the Smart Meters Coordination Group (INCO.02) describes how the time in the smart meter may be synchronized with the LNAP/NNAP/HES.

如果智慧電錶和 CEM 之間的時間差超過一定水平可以如引發報警說明在在主要使用案例 WGSP2142。在這種情況下，一個手動干預會經常被需要，因為這些較大的變化從該時間標準可以指示一個錯誤的時間時鐘，其需要跟進。

If the time difference between smart meter and CEM exceeds a certain level an alarm can be raised as described in primary use case WGSP2142. In this case, a manual intervention will often be required since these larger variations from the time standard may indicate a faulty time clock which may need follow-up.

另一種方式來維持運價同步，如果對在 CEM 和智慧電錶，以具有在相同的費率清單，其中的費率清單中的 CEM 包含了費率標識符和的價格，但也不能包含一個排程，指示其費率適用此時。在這種情況下，當活動費率發生變化時，智慧電錶將向 CEM 發送通知。該通知標識有效費率。WGSP 2143 說明了當活動費率改變時智慧電錶如何通知 CEM。

Another way to maintain tariff synchronicity is for the CEM and the Smart Meter to have the same tariff list,

where the tariff list in the CEM contains the tariff identifier and the price, but does not contain a schedule indicating which tariff is applicable at which time. In this case the smart meter will send a notification to the CEM when the active tariff has changed. This notification identifies the active tariff. WGSP 2143 describes how the Smart Meter notifies the CEM when the active tariff changes..

一般說明 General remarks

一般說明 General remarks

A.3.23.2 使用案例圖 Diagrams of use case

使用案例圖 Diagram of use case

查看詳細說明 os 使用案例

See detailed description os use cases

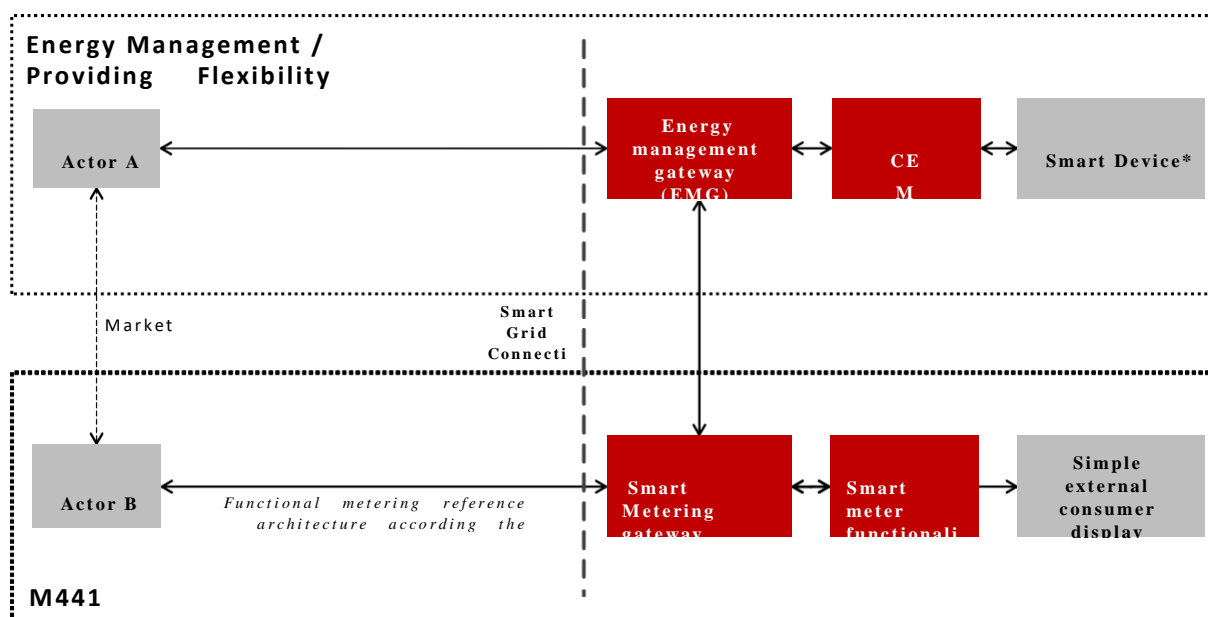
A.3.23.3 技術細節 Technical details

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

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。

備考 1.為定義此使用案例，已使用圖 A.36 中所示的架構作為基礎。

NOTE 1 For the definition of this use case, the architecture shown in Figure A.36 has been used as a basis.



*例如 HBES 裝置，智慧家電，儲存裝置，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.36 SG CG 架構模型[9]

Figure A.36 – 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.)

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	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。 The Customer Energy Manager collects messages sent to and received from connected devices; especially the	

		<p>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>	
能源管理閘道器 Energy management gateway	內部 Internal	<p>接取點(功能個體)用於發送及接收智慧電網相關資訊，命令行為者 A 及 CEM，使 CEM 決定該如何處理該事件。該通訊通常透過無線連接網路完成。</p> <p>An access point (functional entity) sending and receiving smart grid related information and commands between actor A and the CEM, letting the CEM decide how to process the events. The communication is often achieved through an internet connection or through a wireless connection.</p> <p>此閘道器亦可提供包含協議轉換、裝置管理、安全及服務能力之服務。</p> <p>This gateway may also provide services including protocol conversion, device management, security and service capabilities.</p>	

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
智慧量測閘道器 (LNAP) Smart Metering	內部 Internal	接取點(功能個體)，允許接取 1 或多個量測終端裝置及，當配備介面，以進階顯示/家庭自動化終端裝置連接至本地端網路。	

gateway (LNAP)		<p>An access point (functional entity) that allows access to one or more metering end devices and, when equipped with an interface, to advanced display/home automation end devices connected to the local network.</p> <p>LNAP 亦可允許不同功能個體連接至相同 LN 之間的資料交換。LNAP 可簡單地作為路由量測終端裝置及/或顯示器/家庭自動化裝置與廣域網路之鄰近網路間傳遞訊息。</p> <p>A LNAP also may allow data exchange between different functional entities connected to the same LN. The LNAP may act simply as a router transferring messages between the metering end device and/or display/home automation devices and the Neighbourhood network of wide area network.</p> <p>其可提供包括協議轉換，裝置管理，安全性及服務能力等服務。服務可作為 LNAP 自身功能提供，或提供連接至本地端網路之有限功能裝置代表之代理服務。</p> <p>It may also provide services including protocol conversion, device management, security and service capabilities. Services may be provided as functions of the LNAP itself or provide proxy services on behalf of limited capability devices connected to the local network.</p>	
智慧電錶 Smart meter	內部 Internal	<p>量測終端裝置為智慧量測參考架構，以下量測相關功能之組合：</p> <p>The metering end device is a combination of the following meter-related functions from the Smart Metering reference architecture：</p> <ul style="list-style-type: none"> • MID 量測功能，包含傳統電錶顯示器(寄存器或索引)其為合法量測控制。當量測控制下，此等功能應滿足MID基本要求 <p>MID;Metrology functions including the conventional meter display (register or index) that are under legal metrological control. When under metrological control, these functions shall meet the essential requirements of the MID;</p> <ul style="list-style-type: none"> • MID 未涵蓋 1 或多項附加功能。此等亦作為顯示之使用; <p>One or more additional functions not covered by the MID. These may also make use of the display;</p> <p>電錶通訊功能。</p> <p>Meter communication functions.</p>	
NNAP	內部 Internal	<p>鄰近網路接取點為一功能個體，可接取至 1 或多個 LNAP、量測終端裝置、顯示及家用自動化終端裝置連接至鄰近網路(NN)。其允許不同功能個體連接至相同 NN 之資料交換。</p> <p>The Neighbourhood Network Access Point is a functional entity that provides access to one or more LNAP's, metering</p>	

		end devices, displays and home automation end devices connected to the neighbourhood network (NN). It may allow data exchange between different functional entities connected to the same NN.	
簡單外部消費者顯示 Simple external consumer display	外部 External	客戶可以使用與智慧電錶/ SG CP相連的專用顯示屏來檢查功耗，計畫的減負載和減負載歷史。還存在其他非專用手段來將能耗資訊傳遞給客戶，例如個人計算機，移動電話或電視機。 Dedicated display screen in connection with the smart meter/SG CP available to the customer to check power consumption, planned load reductions and load reductions historical. Other not dedicated means also exist to deliver consumption information to the customer, such as the personal computer, the mobile phone or the TV set.	
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.	

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
智慧家電(白色家電)	外部 External	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	

Smart appliance (white goods)		<p>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>	
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>	
HES	內部 Internal	<p>負責擷取電錶及/或資料集中器獲讀值</p> <p>Responsible for acquiring the reads from meters and/or from data concentrators</p> <p>傳遞原始電錶讀值至 MDM</p>	

		<p>Delivers the raw meter reads to MDM</p> <p>重複讀取任何遺失讀值</p> <p>Repeats the reading for any missing reads</p> <p>是否用於短期臨時資料電錶讀值儲存(1-3 個月)</p> <p>Is the short-term interim data storage (1-3 months) for meter reads</p> <p>向上推送事件資訊至 MDM</p> <p>Pushes the event information upwards to MDM</p> <p>支援集中器及電錶之特定協議</p> <p>Supports the specific protocols of the concentrators and meters</p> <p>包含若干即插即用解決方案之拓撲資訊及聚合功能</p> <p>Contains some topology information and aggregation functionality for plug & play solutions</p>	
MDM	<p>內部</p> <p>Internal</p>	<p>所有量測資料是否使用單一電錶資料庫</p> <p>Is the single meter data repository for all metering data</p> <p>量測資料是否長期儲存</p> <p>Is the long-term storage for the metering data</p> <p>透過 VEE 確保更高階業務程序之資料品質</p> <p>Ensures the data quality by VEE for the higher level business processes</p> <p>連接所有前端系統</p> <p>Connects all head-end systems</p> <p>其他系統之連接點是否能接到智慧電錶，例：閘道器往返 HES。</p> <p>Is the connection point for other systems to reach the smart meters i.e. a gateway to HES and back</p> <p>將電錶讀數傳遞至其他業務系統以供進一步使用，作為業務及運營系統與進階量測基礎設施間之關鍵安全防火牆。</p> <p>Delivers the meter reads to other business systems for further usage Acts as the critical security firewall between business and operational systems and the advanced metering infrastructure.</p> <p>包含若干拓撲資訊及聚合功能。</p> <p>Contains some topology information and aggregation functionality</p>	

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
Actor B		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。 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.	

前提條件，假設，後期條件，事件

Preconditions, assumptions, post condition, events

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/問題

References/issues

參考文獻 References						
No	參考資料型式 References Type	參考 Reference	狀態 Status	對使用案例的影響 Impact on use case	發起人/組織 Originator/Organisation	鏈結 Link
1.	使用案例 Use case	SMCG 使用案例： INCO.02 - 時間同步 SMCG use case: INCO.02 - Time synchronization	草案 Draft		智慧電錶協調小組 Smart Meters Coordination Group	

有關分類/映射使用案例的更多資訊

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
彈性叢集 Flexibility cluster
深度等級 Level of depth
主要使用案例 Primary use case
優先序 Prioritisation
1
一般，區域或國家關係 Generic, Regional or National Relation
泛型 Generic
視圖 View
技術 Technical
分類的其他關鍵字 Further keywords for classification
需求面管理，需量反應，智慧電網 Demand side management, demand response, Smart Grid

A.3.23.4 使用案例的逐步分析 Step by step analysis of use case

WGSP 2141 – 情境 1：CEM 請求時間

WGSP 2141 – scenario 1: CEM requests time

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
2141	CEM 請求時間 CEM requests time	CEM	觸發 CEM 向智慧電錶請求時間 CEM is triggered to request time from smart meter	可以在所有行為者之間建立通訊。 有一個規則庫，其中列出了將觸發 CEM 請求時間的基礎規則 Communication between all actors can be established There is a rule base laying down the rules based on which the CEM will be triggered to request the time	CEM 收到了正確的時間並已同步其時鐘 CEM received the correct time and has synchronized its clock

使用案例圖 Diagram of use case

Figure A.37 shows a 使用案例圖 Diagram of use case.

使用案例圖Diagram of use case

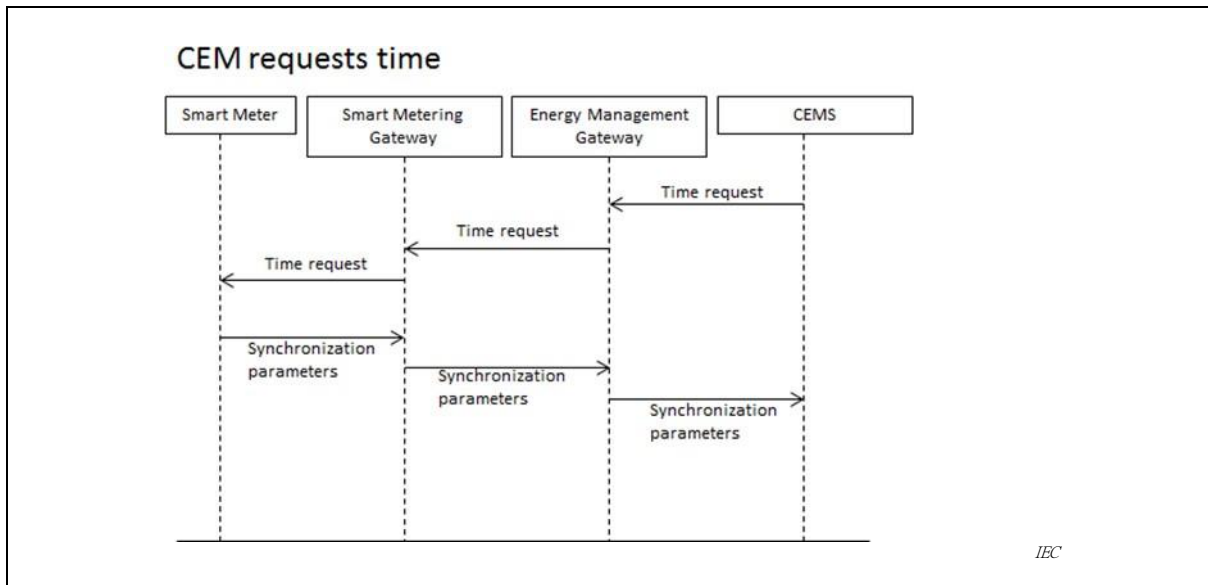


Figure A.37 Sequence diagram

步驟 - 正常

Steps - Normal

情境 Scenario								
情境名稱提供彈性： Scenario name Provide flexibility:								
步驟編號 Step No.	事件 Event	名稱的過程/活動 Name of process /activity	流程/活動說明 Description of process/ activity	區域/域 Zones/ Domains	資訊生產者 Information producer (Actor)	資訊接收者 Information receiver (Actor)	資訊交流 Information exchanged	要求 Requirements, R-ID
1	觸發CEM向智慧電錶請求時間 CEM is triggered to request time from smart meter		CEM 向智慧電錶請求時間 CEM requests time from smart meter		CEM	能源管理閘道器 Energy management gateway	時間要求 Time request	

2	能源管理閘道器收到時間請求 Energy management gateway receives time request		能源管理閘道器將請求轉發到智慧量測閘道器 Energy management gateway forwards request to smart metering gateway		能源管理閘道器 Energy management gateway	智慧量測閘道器 Smart metering gateway	時間要求 Time request	
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情境 Scenario								
情境名稱提供彈性： Scenario name Provide flexibility:								
步驟編號 Step No.	事件 Event	名稱的過程/活動 Name of process /activity	流程/活動說明 Description of process/ activity	區域/域 Zones/ Domains	資訊生產者 Information producer (Actor)	資訊接收者 Information receiver (Actor)	資訊交流 Information exchanged	要求 Requirements, R-ID
3	智慧量測閘道器接收時間請求 Smart metering gateway receives time request		智慧量測閘道器將請求轉發到智慧量測 Smart metering gateway forwards request to smart meter		智慧量測閘道器 Smart metering gateway	智慧電錶 Smart meter	時間要求 Time request	
4	智慧電錶收到時間請求 Smart meter receives time request		智慧電錶將同步參數發送到智慧電錶閘道器 Smart meter sends synchronization parameters to the smart metering gateway		智慧電錶 Smart meter	智慧量測閘道器 Smart metering gateway	同步參數 Synchronization parameters	
5	智慧量測閘道器接收同步參數 Smart metering		智慧量測閘道器將同步參數發送到能源管理閘道器 Smart metering gateway forwards synchronization parameters to energy management gateway		智慧量測閘道器 Smart metering gateway	能源管理閘道器 Energy management gateway	同步參數 Synchronization parameters	

	gateway receives synchronization parameters		Smart metering gateway sends the synchronization parameters to the energy management gateway		g gateway	ment gateway	ers	
6	能源管理閘道器接收同步參數 Energy management gateway receives synchronization parameters		能源管理閘道器將同步參數發送到 CEM Energy management gateway sends the synchronization parameters to the CEM.		能 源 管 理 閘 道 器 Energy manage ment gateway	CEM	同 步 參 數 Synchro nization paramet ers	

WGSP 2141 – 情境 2：智慧電錶發送時間

WGSP 2141 – scenario 2: Smart meter sends time

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
2141	智慧電錶發送時間 Smart meter sends time	智慧電錶 Smart meter	智慧電錶注意到 CEM 不同步 Smart meter notices that CEM is out of synch	可以在所有行為者之間建立溝通 Communication between all actors can be established 有一個規則庫，其中列出了觸發智慧電錶發送時間所係依的規則 There is a rule base laying down the rules based on which the Smart meter will be triggered to send the time	CEM 收到了正確的時間並已同步其時鐘 CEM received the correct time and has synchronized its clock

使用案例圖 Diagram of use case

Figure A.38 shows a 使用案例圖 Diagram of use case.

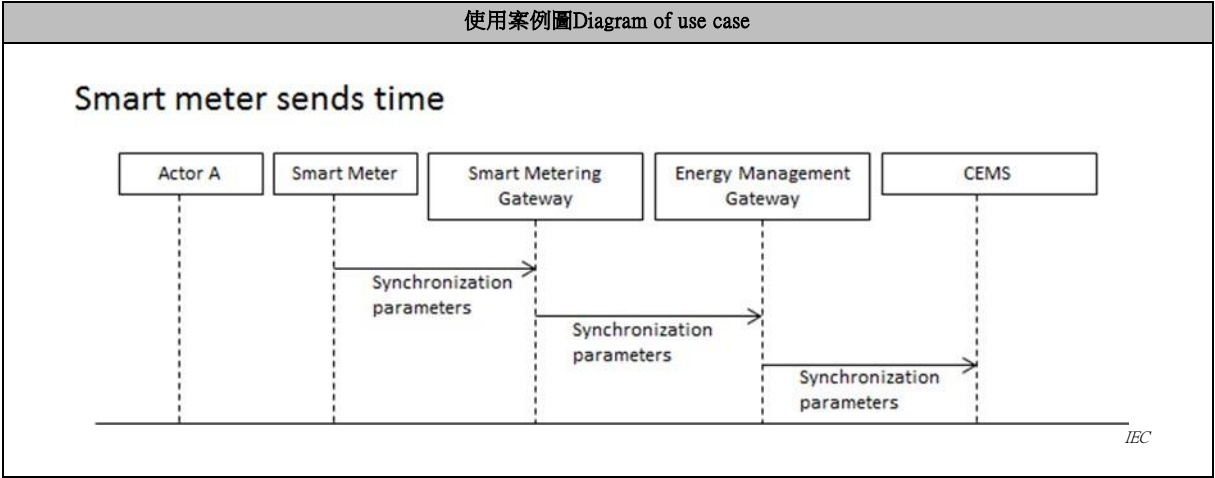


圖 A.38 序列圖

Figure A.38 – Sequence diagram

步驟 - 正常

Steps – Normal

情境								
Scenario								
情境名稱提供彈性：								
Scenario name								
Provide flexibility:								
步驟編號	事件	名稱的過程/活動	流程/活動說明	區域/域	資訊生產者	資訊接收者	資訊交流	要求
Step No.	Event	Name of process/activity	Description of process/ activity	Zones/D omain	Information producer (Actor)	Information receiver (Actor)	Information exchanged	Requirements, R-ID
1	智慧電錶通知即 CEM 是出的同步 Smart meter notices that CEM is out of synch		智慧電錶發送同步參數 Smart meter sends synchronization parameters		智慧電錶 Smart Meter	智慧量測閘道器 Smart metering gateway	同步參數 Synchronization parameters	

2	智慧量測管理閘道器接收資訊 Smart metering management gateway receives information		智慧量測閘道器將資訊轉發到能源管理閘道器 Smart metering gateway forwards information to energy management gateway		智慧量測閘道器 Smart metering gateway	能源管理閘道器 Energy management gateway	同步參數 Synchronization parameters	
3	能源管理閘道器接收資訊 Energy management gateway receives information		能源管理閘道器將同步參數轉發到 CEM Energy management gateway forwards synchronization parameters to CEM		能源管理閘道器 Energy management gateway	CEM	同步參數 Synchronization parameters	

WGSP 2142：CEM 發送不同步警報

WGSP 2142: CEM sends out-of-synch alarm

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
2142	CEM 發送不同步警報 CEM sends out of synch alarm	CEM	CEM 注意到時差超過警報級別 The CEM notices a time difference exceeding the alarm level	可以在所有行為者之間建立溝通 Communication between all actors can be established 有一個規則庫規定了閾值，這些閾值根據已確定的時間差來確定要做什麼 There is a rule base laying down thresholds identifying what to do depending on the time difference that has been identified	外部角色已收到警報 The alarm has been received by an external actor

使用案例圖 Diagram of use case

Figure A.39 shows a 使用案例圖 Diagram of use case.

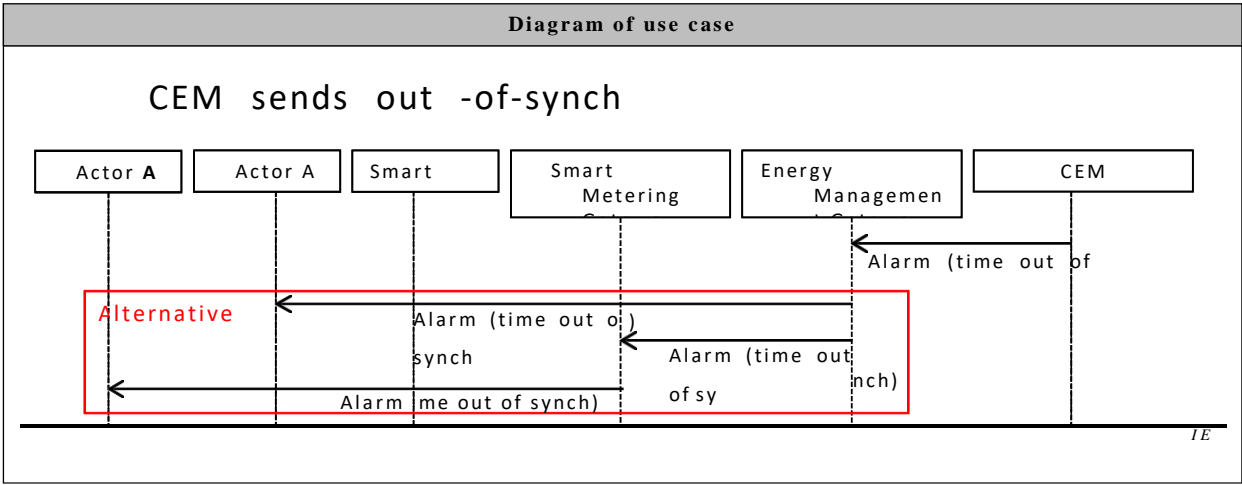


Figure A.39 Sequence diagram

步驟 - 正常

Steps - Normal

情境 Scenario								
情境名稱提供彈性： Scenario name Provide flexibility:								
步驟 編號 Step No.	事件 Event	名稱的 過程/活動 Name of process /activity	流程/活動說明 Description of process/ activity	區域/域 Zones/D omains	資訊生 產者 Informat ion producer (Actor)	資訊接 收者 Informat ion receiver (Actor)	資訊交 流 Informati on exchange d	要求 Requirements, R-ID
1	CEM 注意到 時差超過警 報級別 The CEM notices a time difference exceeding the alarm level		CEM 將警報 發送到能源管 理閘道器 CEM sends alarm to energy management Gateway		CEM	能源管 理閘道 器 Energy manage ment gateway	警報(時 差較大) Alarm (large time differenc e)	
2a	能源管理閘 道器收到警 報 Energy management gateway receives alarm		能源管理閘道 器將警報轉發 給行為者 A Energy management gateway forwards alarm to actor A		能源管 理閘道 器 Energy manage ment gateway	Actor A	警報(時 差較大) Alarm (large time differenc e)	
2b	能源管理閘 道器收到警 報 Energy management gateway receives alarm		能源管理閘道 器將警報轉發 到智慧量測閘 道器 Energy management gateway forwards alarm to smart metering gateway		能源管 理閘道 器 Energy manage ment gateway	智慧量 測閘道 器 Smart meterin g gateway	警報(時 差較大) Alarm (large time differenc e)	
3	智慧量測閘 道器收到警 報		智慧量測閘道 器將警報轉發 給行為者 B		智慧量 測閘道	Actor B	警報(時 差較大) Alarm	

	Smart metering gateway receives alarm		Smart metering gateway forwards alarm to actor B		器 Smart metering gateway		(large time difference)	
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WGSP 2143：智慧電錶通知現行電價變更

WGSP 2143: Smart meter notifies active tariff change

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
2143	智慧電錶通知有效的電價變動 Smart meter notifies active tariff change	智慧電錶 Smart Meter	智慧電錶改變了現行收費標準 The smart meter changed the active tariff	可以在所有行為者之間建立溝通 Communication between all actors can be established	CEM 獲悉新的現行費率 The CEM is informed of the new active tariff

A.3.23.5 使用案例圖 Diagram of use case

Figure A.40 shows a 使用案例圖 Diagram of use case.

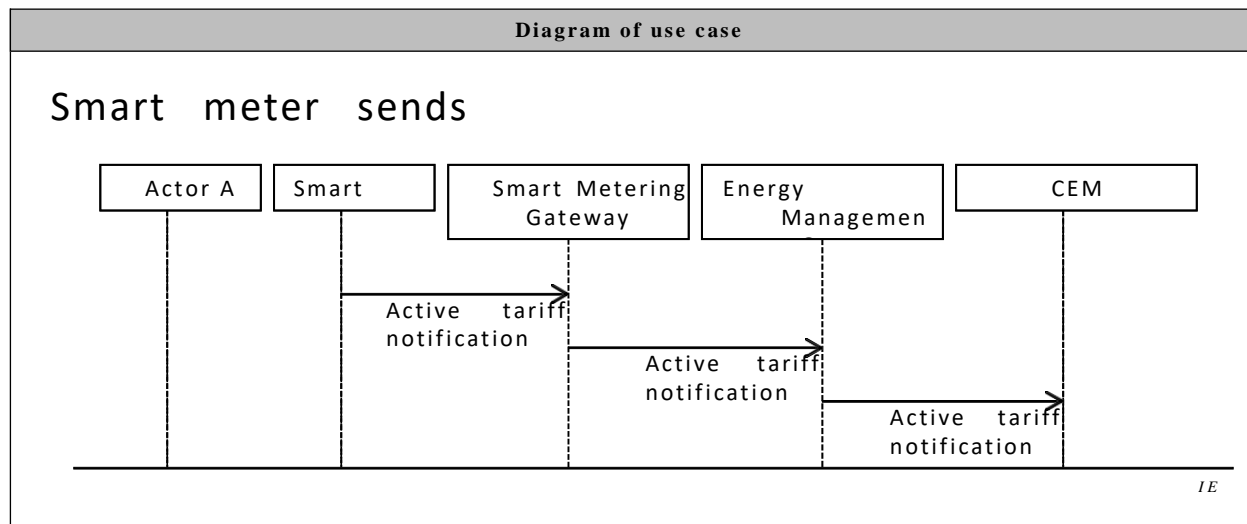


圖 A.40 序列圖

Figure A.40 – Sequence diagram

步驟 - 正常

Steps - Normal

情境 Scenario								
情境名稱提供彈性： Scenario name Provide flexibility:								
步驟 編號 Step No.	事件 Event	名稱的 過程/活動 Name of process /activity	流程/活動 說明 Description of process/ activity	區域/域 Zones/D omains	資訊生 產者 Informat ion producer (Actor)	資訊接 收者 Informat ion receiver (Actor)	資訊交 流 Informat ion exchang ed	要求 Require ments, R-ID
1	智慧電錶改變了現行收費標準 The smart meter changed the active tariff		智慧電錶向智慧電錶閘道器發送有效電價通知 Smart meter sends an active tariff notification to the smart metering gateway		智慧電錶 Smart Meter	智慧量測閘道器 Smart metering gateway	主動收費通知 Active tariff notification	
2	智慧量測閘道器接收通知 Smart metering gateway receives notification		智慧量測閘道器向能源管理閘道器發送通知 Smart metering gateway sends notification to energy management gateway		智慧量測閘道器 Smart metering gateway	能源管理閘道器 Energy management gateway	主動收費通知 Active tariff notification	
	能源管理閘道器收到通知 Energy management gateway receives notification		能源管理閘道器將通知發送到CEM Energy management gateway sends notification to CEM		能源管理閘道器 Energy management gateway	CEM	主動收費通知 Active tariff notification	

步驟 – 替代方案，錯誤管理及/或維護/備份情境

Steps – Alternative, Error Management, and/or Maintenance/Backup Scenario

情境 Scenario								
情境名稱提供彈性： Scenario name Provide flexibility:								
步驟 編號 Step No.	事件 Event	名稱的 過程/活動 Name of process /activity	流程/活動 說明 Description of process/ activity	區域/ 域 Zones/ Domai ns	資訊生 產者 Informat ion producer (Actor)	資訊接 收者 Informat ion receiver (Actor)	資訊交流 Information exchanged	要求 Requirements, R-ID

A.3.23.6 資訊交換 Information exchanged

資訊交換 Information exchanged		
交換資訊的名稱 Name of information exchanged	交換資訊的說明 Description of information exchanged	資訊資料 R-ID 的要求 Requirements for information data R- ID
Time request		
同步參數 Synchronization parameters	<p>該 COSEM 時鐘對象提供的方法設定和同步的時鐘。</p> <p>The COSEM Clock Object provides the means to set and synchronize the clock.</p> <p>參數可以是：Parameters may be:</p> <p>絕對時間 Absolute time</p> <p>相對於費率表的時間 Time relative to tariff schedule</p>	
警報(時差較大) Alarm (large time difference)		
主動收費通知 Active tariff notification		

A.3.23.7 常用術語和定義 Common terms and definitions

常用術語和定義 Common terms and definitions	
Term	Definition

A.3.23.8 備考和未解決的問題

A.3.23.8 Notes and open issues

Notes and open issues	
Nr	Note
1.	在適當的情況下，可以根據外部行為者將所有主要使用案例(情境)分開 Where relevant all primary use case (scenarios) may be split up according to external actors
2.	下一步：使用自上而下的方法定義其他使用案例，將功能架構視為黑盒，並確定哪些訊息將傳入/傳出 Next step: define additional use cases using the top down method, considering the functional architecture as a black box and identifying which messages would go in/come out

A.3.24 高階使用案例(JWG30xx)能源彈性管理

A.3.24 High level use case (JWG30xx) Energy Flexibility Management

A.3.24.1 使用案例說明

使用案例名稱 Name of the use case

ID	域請參閱附件 A 選擇列表 Domain see Annex A selection list	使用案例名稱	深度叢集階層，高階使用案例，詳細使用案例 Level of depth cluster, high level use case, detailed use case
JWG30xx	智慧電網中的智慧建築 Smart Building in Smart Grid	能源彈性管理 Energy Flexibility Management	高階使用案例 High level use cases

版本管理

Version management

版本管理 Version management

變更/版本 Changes/Version	日期 Date	領域專家 Domain expert	專業領域/領域/ 角色 Area of expertise/Domai n/Role	Title	批准狀態草案， 徵求意見，投 票，最終 Approval status draft, for comments, for voting, final
0.9	29/11/12	智慧電網 Smart Grid			草案 draft
1.0	08/01/13	智慧電網 Smart Grid			第一次評論 1st review
1.1	21/01/13	智慧電網 Smart Grid			最終草案版本 (內容) Final draft version (content)
2.0	25/02/14	智慧電網 Smart Grid			符合 IEC TC57 JWG Alignment for IEC TC57 JWG 使用案例 use case
2.1	07/03/20 14	家電 Home Appliances	使用案例 Use Cases	集成到 JWG 活 動中： Integration into JWG activity: — 使用案例 ID Use Case IDs — 基本 Basic 資訊部 information section	草案 Draft

使用案例基本資訊

Basic information on use case

參考文獻 References						
No.	參考資 料型式 Referen- ces type	參考 Reference	狀態 Status	對使用案例的影 響 Impact on use case	發起人/組織 Originator/Or ganisation	鏈結 Link

1	指導方針 Guideline	基本定義和通用程序 Basic definitions and common procedures	Final	術語和定義 Terms definitions and	SG-CG 可持續流程工作組 (SGTF EG1) SG-CG Sustainable Processes WG (SGTF EG1)	http://ec.europa.eu/energy/gas_electricity/smartgrids/doc/xpert_group1_sustainable_processes.pdf
2	技術報告 Technical Report	用戶案例和序列圖 User Story and Sequence diagrams	Draft	對情境的重大影響 Major impact on Scenario	IEC TC57/CLC TC205/CLC /TC59x	-
3	標準 Standard	使用案例範本 Use Case Template	Draft (FDIS)	範本說明 Template description	IEC TC8	-
4	指導方針 Guideline	智慧電網參考架構 Smart Grid Reference Architecture	Final	術語和定義 Terms definitions and	SG-CG Architecture Working Group (SGTF EG1)	http://ec.europa.eu/energy/gas_electricity/smartgrids/doc/xpert_group1_reference_architecture.pdf

與更高階使用案例的關係 Relation to higher level use case	
叢集 Cluster	更高階使用案例 Higher level use case

使用案例的成熟度 – 在業務運營中，在演示項目中實現，在研發中，準備中，有遠見的 Maturity of use case – in business operation, realized in demonstration project, , realised in R&D, in preparation, visionary
優先序 Prioritisation
一般，區域或國家關係

Generic, Regional or National Relation
查看 – 技術/業務 View – technical/business
分類的其他關鍵字 Further keywords for Classification

使用案例的範圍和目標 Scope and objectives of use case

職能範圍和目標 Scope and objectives of function
<p>目的是要定義使用案例的自動操作的 能量彈性管理在該 區域 的智慧樓宇在智慧電網</p> <p>The purpose is to define the use cases for the automated operation of energy flexibility management in the area of Smart Buildings in Smart Grids</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 – max 3 sentences
<p>一個能量彈性請求可被啟動通過一個電力系統操作者在回應於一個可靠性事件，例如，損失的一個產生站造成一個缺少的供給到滿足需求，或一個不受控制的組的電動汽車超載一個配電變壓器。能源彈性請求事件也可以由系統運營商係依經濟考慮啟動，例如，減少或轉移系統級別或特定饋線或設施的峰值負載。客戶還可以根據市場價格信號或有關所供應能源的“綠色指數”的資訊來使用能源彈性。綠色指數指定了可再生能源在實際能源結構中的份額。</p> <p>An energy flexibility request may be initiated by a power system operator in response to a reliability event, e.g., loss of a generating station causing a lack of supply to meet demand, or an uncontrolled set of PEVs overloading of a distribution transformer. An energy flexibility request event may also be initiated by system operator based on economic considerations, e.g., reducing or shifting peak load at the system level or at specific feeder or facility. Energy flexibility may also be used by a customer in response to a market pricing signal or information about the “green index” of the supplied energy. The green index specifies the share of renewable energy in the actual energy mix.</p> <p>能源彈性管理通常也稱為需量反應。</p> <p>Energy flexibility management is often named also Demand Response.</p>
完整說明 Short description

出於經濟或可靠性目的部署了需量反應。在較高的滲透水平下，需量反應必須與功率調度過程集成在一起，這可能會影響配電網的運行和可靠性，甚至可能影響輸電電網的運行和可靠性。因此，它是重要的包括了需要考慮的電網和系統級操作時，開發 DR 使用案例和 DR 信號標準。這種影響可能不會有顯著為低滲透水平；但是，必須適當考慮以支持將來部署的可伸縮性和可擴展性。

Demand Response is deployed for economic or a reliability purposes. At high penetration levels, demand response has to be integrated with the power supply scheduling process, and it may impact the distribution grid operation and reliability, and perhaps the transmission grid operation and reliability. Thus it is important to include the required considerations for the grid and system level operations when developing DR use cases and DR signal standards. Such impacts may not be significant at low penetration levels; however, proper considerations must be given to support scalability and expandability for future deployments.

電力系統運行係依上一個即時平衡的供應和需求。為了經濟地安排供應，一個準確的負載預測是必要的。傳統上，負載預測被生成的使用的歷史能耗模式，天氣預報和其它類似的參數。隨著對潛在的高滲透 DR，這將是必要的，以納入該計畫或預測 DR 級別到了負載預測。而且，災害恢復功能可用於支持電力系統容量或緊急功率(輔助服務)需求。此類服務需要適當的調度和監視功能。

Power system operates based on a real-time balancing of supply and demand. To economically schedule the supply, an accurate load forecast is needed. Traditionally, load forecast was generated using the historical consumption patterns, weather forecast and other similar parameters. With the potential of high-penetration of DR, it will be necessary to incorporate the planned or forecasted DR levels into the load forecast. Also, DR capabilities can be used to support the power system capacity or emergency supply (ancillary service) needs. Such services require proper scheduling and monitoring capabilities.

甲需量反應事件可以被發起通過一個電力系統操作者在回應於一個可靠性事件，例如，損失的一個產生站造成一個缺少的供給到滿足需求，或一個不受控制的組的電動汽車超載一個配電變壓器。需量反應事件也可以由系統係依經濟考慮啟動，例如，減少或轉移系統級別或特定饋線或設施的峰值負載。需量反應也可以由客戶回應於市場定價信號來發起。

A demand response event may be initiated by a power system operator in response to a reliability event, e.g., loss of a generating station causing a lack of supply to meet demand, or an uncontrolled set of PEVs overloading of a distribution transformer. A demand response event may also be initiated by system based on economic considerations, e.g., reducing or shifting peak load at the system level or at specific feeder or facility. Demand response may also be initiated by a customer in response to a market pricing signal.

考慮到許多國家的配電網是三相不平衡電路，即，許多客戶使用三相繫統的單相或兩相。因此，客戶負載模式的顯著變化可能會導致送料器上出現不良的不平衡狀況。此外，如果未適當分散/管理負載，則重大 DR 事件終止後的負載提取可能會導致過載和其他操作問題。

Considering that the distribution grid in a number of countries is a three-phase imbalance circuit, i.e., many customers are on a single-phase or two-phase of the three-phase system. Thus significant changes in customer load patters could result in undesirable imbalanced conditions on a feeder. Also, load pickup following the termination of a major DR event could possibly cause overloads and other operational problems, if the load pickup is not properly scattered/managed.

係依動態價格的災害恢復或即時定價(RTP)

Dynamic Price-based DR or Real-Time Pricing (RTP)

傳統上，零售資費已係依上一個固定的或分層的利率結構與可能考慮的 靜態速率 為預先設定的時間的使用(TOU)的條件。真正的時間或動態定價(RTP) 代表的零售電力率是可以改變作為一個功能的時間和被預期到修改的需求。它需要間隔量測以根據隨時間變化的價格進行準確計費。許多國家已實施 RTP 或其他動態

Traditionally, retail tariff has based on a fixed or tiered rate structure with possible considerations of static rates for pre-established time of use (TOU) conditions. Real time or dynamic pricing (RTP) represent retail electricity rate that could vary as a function of time and is intended to modify demand. It requires interval metering for accurate billing based on time-varying prices. A number of countries have implemented RTP or other dynamic

使用案例敘述

Narrative of use case

大客戶的定價費率。隨著高階電錶的廣泛部署，RTP 費率在全球範圍內對於較小的客戶也將變得更加普遍。

pricing tariffs for large customers. With a broader deployment of advanced meters, RTP rates may become more common world-wide also for smaller customers.

此處介紹的情境包括係依該位置的批發位置邊際價格(LMP)建立與位置相關的即時能源零售價格的情況。LMP 值通常由 ISO(針對 ISO/RTO 覆蓋的區域)在提前一天(小時分辨率)和即時(通常為五分鐘分辨率)的基礎上建立。對於在 RTP，這將是適當的使用的即時 LMP 作為的基礎上進行計算的零售動態費率。然而，決定應該被提出的時間和在空間分辨率的對 RTP。對於例如，一個小時 RTP 平均的 5 個分鐘的車定價值，或一個關鍵峰值定價模型，以反映在極端條件下唯一可能被採用。在除了到批發能源價格，在零售 RTP 率也可包括在適當的隆起費用來覆蓋對配電線路/服務收費，並為在功率損失的補償。需要注意的是該隆起費用是一般主體，以一個監管審查和批准。

The scenario presented here includes the case where a location-dependent real-time retail pricing for energy is established based on the wholesale Locational Marginal Price (LMP) for that location. LMP values are typically established by an ISO (for regions covered by an ISO/RTO) on a day-ahead (hourly resolution) and real-time basis, typically on a five minute resolution. For the RTP, it will be appropriate to use the real-time LMP as the basis for computing the retail dynamic tariff. However, decisions should be made on the time and the spatial resolution of the RTP. For example, an hourly RTP averaging the five minute pricing values, or a Critical Peak Pricing model to reflect the extreme conditions only, may be adopted. In addition to the wholesale energy price, the retail RTP rate may also include the appropriate uplift charges to cover for distribution wire/services charges and for the power loss compensations. Note that the uplift charges are typically subject to a regulatory review and approval.

必須特別注意 RTP 費率設計，以確保客戶的接受和適應。此外，可能還必須解決電網運行問題。例如，在低 LMP (RTP)時段(例如，晚上)期間，某些配電電路可能會超載(擁擠)，而客戶會將能耗(例如，對 PEV 充電)轉移到該時段。這改善了整個系統的經濟性，但可能導致電路擁塞。為了解決這個問題，有人提議使用按需收費或額外的獎勵金來減輕負載，這是緩解擁堵的地方性獎勵措施。

Special care must be given to the RTP rate design to ensure customer acceptance and adaptation. Also grid operational issues may have to be addressed. For example, during low LMP (RTP) periods (e.g., at night), certain distribution circuits may get over loaded (congested), with customers shifting consumption, e.g., charging PEVs, to that period. This improves the overall system economy, but may cause circuit congestion. To combat this, some have proposed use of demand charges or an additional incentive payment for load reduction, a locational incentive to relief congestion.

係依通知的災害恢復執行

Notification Based DR Execution

係依通知的災害恢復主要用於係依提前一天或提前小時的經濟目的。

Notification-based DR is mostly used for economic purposes based on a day-ahead or hour-ahead basis.

通知為基礎的 DR 也可以用於可靠性事件時的系統操作員期望一個應急或操作條件(例如，擁塞或計畫停機)上的分配或所述傳輸格那需要的減少(或分佈式的增加的過多的情況下給定位置的負載。

Notification-based DR may also be used for reliability events when the system operator expects a contingency or operating condition (e.g., congestion or planned outage) on the distribution or the transmission grid that requires a reduction (or an increase in case of too much distributed generation) on the load at a given location.

考慮到用於回應需求的業務流程尚未在各個國家/地區進行標準化，因此以下是一個具有代表性的情境，它捕獲了關鍵利益相關者(行為者)之間的某些互動。

Considering that the business processes for demand response have not yet been standardized across the nations, the following is a representative scenario that captures some of the interactions between the key stakeholders (actors).

在高滲透水平下，需要進行災害恢復操作，尤其是提前一天或一個小時

At high penetration levels, the DR operation, especially on a day-ahead or hour ahead basis, need to be

協調與在整體運營和供應調度過程。這可能需要一個及時更新的“區位”負載預測和先進的最新提名的 DR 功能。這個資訊可以被提供到“系統”及/或市場運營商將被併入在整體供給和需求調度過程。該 DR 功能被指定由該 DR 提供商(VPP 運營商)，以該系統操作員根據上一 DR 計畫，一個價格曲線，或其他提名協議。災害恢復提供商還可以將位置可用災害恢復功能通知能源零售商。

coordinated with the overall operations and supply scheduling process. This may require a timely update of the “locational” load forecast and an up-to-date nomination of the DR capabilities. This information may be supplied to the “system” and/or market operator to be incorporated in the overall supply and demand scheduling process. The DR capabilities are specified by the DR Provider (VPP operator) to the System Operator based on a DR Program, a price curve, or other nomination protocol. The DR Provider may also inform the energy retailer of the locational available DR capabilities.

係依通知的災害恢復調度過程通常由系統或市場運營商啟動；該過程也可以由零售商或 DSO 發起。根據市場機會(經濟運行)或係依預先建立的程序，DR 提供商(VPP 運營商)也可能是 DR 流程的發起者。

The notification-based DR dispatch process is typically initiated by the System or Market Operator; the process may also be initiated by the retailer or the DSO. It is also possible that the DR Provider (VPP operator) be the initiator of the DR process based on a market opportunity (economic operation) or based on a pre-established program.

在較高的災害恢復滲透水平下，預計災害恢復提供商將需要與配電電網運營商一起清除災害恢復排程。這是為了確保高穿透率 DR 對配電網的可靠性和電能質量沒有不利影響，例如，導致過度失衡，電壓違規或在負載拾取期間出現過載的原因。該 DSO，在一個及時，將通知該 DR 提供者，如果該計畫被清除或需要一個調整。請注意，如果該 DR 部署由一個公用事業公司，包括，零售商和 DSO 的功能，這樣的協調被執行公司內部業務系統(例如，DRMS，DMS，等)，或它可以是一個整體的部件的所述 DR 調度應用程式。

At high DR penetration levels, it is expected that the DR provider will need to clear the DR schedule with the Distribution Grid Operator. This is to insure that the high penetration DR has no adverse impact on the distribution grid reliability and power quality, e.g., cause of excessive imbalances, voltage violation, or an overload during load pickup period. The DSO, in a timely fashion, will inform the DR Provider, if the schedule is cleared or requires an adjustment. Please note that if the DR deployed by a utility company that includes both, retailer and DSO functions, such coordination is performed within the company's operational systems (e.g., DRMS, DMS, etc.), or it can be an integral part of the DR scheduling application.

清除災害恢復計畫後，通知將發送給客戶以進行災害恢復操作。在這種情況下，還向市場運營商和零售商通知了最終的災害恢復排程。

Following the clearing the DR schedule, notifications are sent to customers for DR operation. Under this scenario, the Market Operator and the retailer are also informed of the final DR schedule.

直接負載控制(DLC)

Direct Load Control (DLC)

直接負載控制通常用於係可靠性的事件，例如應急和緊急支持，平衡能量的供應或其他輔助服務。這些程序中的許多程序都需要快速的回應時間，例如五分鐘或更短的回應時間，這實際上只有通過 DLC 功能才能實現。直接負載控制還可用於經濟運行，例如熱水器程序，以減少或轉移峰值負載。

Direct-Load Control is typically used for reliability-based events such as contingency and emergency support, supply of balancing energy or other ancillary service. Many of these programs require quick response time, e.g., five minutes or faster, that is practically only possible through a DLC capability. Direct-Load Control may also be used for economic operations, e.g., water heater programs to reduce or shift peak load.

考慮到用於回應需求的業務流程尚未在全國範圍內標準化，以下是一個代表性的 DLC 情境，該情境捕獲了關鍵利益相關者(行為者)之間的互動。

Considering that the business processes for demand response have not yet been standardized across the nations, the following is a representative DLC scenario that captures the interactions between the key stakeholders (actors).

直接負載控制被通常稱為由一個系統操作員，一個傳輸或分佈運算符。它可以被 也發布由一個市場運營基礎上的配套服務 DR 獎，或由一個零售商或 DR 操作(VPP 運營商)為經濟的目的。在高滲透水平，DLC 操作需要以可協調與配電電網運營商。

Direct Load Control is typically called by a system operator, a transmission or distribution operator. It could be also issued by a Market Operator based on an ancillary service DR award, or by a retailer or DR operator (VPP operator) for an economic purpose. At high penetration levels, DLC operation needs to be coordinated with the distribution grid operator.

客戶災害恢復功能按位置聚合，並指定/指定給配電電網運營商，零售商及/或系統/市場運營商。除了位置之外，還可以通過 DR 回應時間(例如 4 秒，5 分鐘，30 分鐘等)來聚合功能。

The customer DR capabilities are aggregated by location and specified/nominated to the Distribution Grid Operator, retailer, and/or to the System/Market Operator. In addition to location, the capabilities may also be aggregated by the DR response time, e.g., four seconds, five minutes, 30 minutes, etc.

該 DLC 調度過程中通常會啟動由傳輸或配電運營商。該過程可能還可以發起由市場運營商的的零售商。該實際控制的的 DR 資源可以被完成由 DR 提供商(VPP 提供商)係依上的調度信號接收。

The DLC Dispatch process is typically initiated by the Transmission or Distribution Operator. The process may also be initiated by the Market Operator of the retailer. The actual control of the DR resources may be done by the DR provider (VPP provider) based on the dispatch signal received.

在高 DR 滲透級別下，預計 DLC 啟動排程將與

At high DR penetration levels, it is expected that the DLC activation schedule to be coordinated with the

使用案例敘述

Narrative of use case

配電網運營商。這是要確保有沒有不利影響上的分配電網的可靠性和功率質量，例如，電壓違反，過度相位失衡，或者一個過載期間負載拾取期間。如果 DLC 部署由一個公用事業公司這樣的協調可以被實現公司的內 DR 和配送管理系統，或執行作為一個不可分割的一部分的的 DR 控制功能。

Distribution Grid Operator. This is to insure that there are no adverse impact on the distribution grid reliability and power quality, e.g., voltage violation, excessive phase imbalances, or an overload during load pickup period. If the DLC deployed by a utility company such coordination can be accomplished within the company's DR and distribution management systems, or performed as an integral part of the DR control functions.

對於“快速” DR(例如，提供輔助服務)，需要遙測功能以實現對資源狀況及其對 DR 控制信號的回應的即時監控。

For a “fast” DR, e.g., provision of ancillary services, a telemetry capability is required to enable the real-time monitoring of the resource condition and its response to the DR control signal.

考慮到上述基本原理，將在本標準中說明以下使用案例。

Taking the above described base principles into consideration, the following use cases will be described in this document.

一些這些使用情況下，被分割在一個規劃的一個操作階段中，相應的映射被顯示在該表所示：

Some of these use cases are split in a planning and a operational phase, the corresponding mapping is shown in the table below:

使用案例：階段：

Use case: Phases:

- 長期需求計畫 Long term demand planning JWG3011
- 通過日間市場進行能源貿易 Energy trade through day-ahead market JWG3012a,b
- 通過日內市場進行能源貿易 Energy trade through intra-day market JWG3021
- 提供二級/三級儲量在該控制儲備市場 Providing secondary/ tertiary reserves at the control reserve market JWG3013, JWG3022
- 對電網擁堵(緊急情況)的反應 Reaction on grid congestions (emergencies) JWG3014, JWG3031-3

JWG3011-SPUC 長期能源採購： JWG3011-SPUC Long term energy procurement:

此情境說明的過程與該零售商的業務，以促使一個一定量的所需要的能量由他的客戶有更持久的契約(1週上漲至多年)。能源價格的這樣的契約是一般低於在過程上的日前市場。要確定的最佳量的能量，以從採購與長期限的契約，該零售商可能將支持通過負載預測資訊，從他的客戶。

This scenario describes the process with the retailer business to procure a certain amount of energy needed by his customers with longer lasting contract (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 might be supported by load forecast information from his customers.

JWG3012-SPUC 提前計畫： JWG3012-SPUC Day ahead planning:

情境 a—建築觸發 Scenario a – Building Triggered

該情境說明了通過長期契約在已採購的能源之上採購剩餘能源的過程(請參閱 JWG3011)。因此，客戶(實際上是樓宇自動化/管理系統)將為第二天提供更新的預測。這個預測包含要么只增量到初始長期預測或一個更新的總預測。比的零售商來推斷的增量來獲得能量採購。該零售商購買了所需的能量，在該市場，並發送該資訊有關的實現能源價格回至該客戶。This scenario describes the process to procure the remaining amount of energy which is needed on top of the already procured energy by long term contracts (see JWG3011). Therefore the customers (practically the building automation/management systems) are providing an updated forecast for the next day. This forecast contains either only the delta 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 buys the needed energy at the market and sends the information about the achieved energy prices back to the customer.

情境 a—市場觸發 Scenario a – Market triggered

此業務情景說明了一個純粹的價格驅動過程。該零售商接收的能源價格表，從市場，增加了價格資訊的最終可長期限契約，並轉發此資訊給他的客戶。該樓宇自動化/管理系統中的客戶會考慮價格的資訊，一個成本最小化。This scenario describes a pure price driven process. The retailer receives the energy price schedule from the market, adds price information of eventually available long term contracts and forwards this information to his customers. The building automation/management system of the customers will consider the price information for a cost minimization.

JWG3013-SPUC 儲能市場： JWG3013-SPUC Reserve energy market:

這種情況為參與儲備能源市場做好了準備。係依從裝置級別開始的可用能源彈性的預測，VPP 運營商可能會為儲備能源市場提供一定數量的彈性。由於對備用能源市場的需求做出反應時，我的原因與 JWG3011 和 2 情境中得出的能源計畫有無法預料的偏差，因此需要進行特殊的商業考慮，以避免零售商因對備用能源市場的要求作出反應而蒙受損失。

This scenario prepares the participation in the 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 to the reserve energy markets. Since reacting on demands from the reserve energy market may cause unpredicted deviations from the energy plans derived in the scenarios JWG3011 & 2, special commercial consideration needs to be done to avoid losses from the retailer for reacting on reserve energy market requests.

JWG3014-SPUC 電網擁塞管理：JWG3014-SPUC Grid congestion management:

此情境說明了由於計畫的電網中斷而導致配電電網運營商宣布電網擁堵的情況。通常，地區法規會授權配電電網運營商在電網緊急情況下推翻任何商業計畫。法規可能會為此干預定義商業補償。

This scenario describes the announcement of a grid congestion by the distribution grid operator due to a planned grid outage. Typically the regional regulations grant the distribution grid operator to overrule any commercial planning during grid emergencies. The regulations might define commercial compensation for this intervention.

JWG3021-SPUC 日內市場報價：JWG3021-SPUC Intra-day market offer:

此情境說明了當某人檢測到計畫的能源排程有重大偏離時的過程。這可能發生在一代的好上的能方。該責任方將放置一個報價，以補償該偏差在該盤中市場。在情景是假定要約被授予給零售商，他正在使用的可用能量的彈性以履行該承諾。根據對他們的契約與該零售商的一些客戶可能會在右到否認(選擇了)一個變化在他們的能耗進度。

This scenario describes the process when someone detects a major deviation from the planned energy scheduled. This might occur on generation as well as on the consumption side. The responsible party will place an offer to compensate the deviation at the intraday market. In the scenario it is assumed the offer is awarded to the retailer and he is using the available energy flexibility to fulfil the commitments. Depending on their contracts with the retailer some customers might have the right to deny (opt out) a change in their energy consumption schedule.

JWG3022-SPUC 提供承諾的備用能源：JWG3022-SPUC Provision of committed reserve energy:

此情境是 JWG3013 的操作延續。購買了備用能量的傳輸系統操作員可以隨時向 VPP 操作員發出需要備用能量的觸發信號。

This scenario is the operational continuation of JWG3013. The transmission system operator who bought the reserve energy may at any time give a trigger signal to the VPP operator that he needs reserve energy.

根據所採購的儲備能量的類型(二次或三次)，這可能是通訊裝置(SCR)傳輸的一定量儲備能量的設定點信號，或者是提供預定量能量(正負)的觸發器通常通過電話呼叫(TCR)發送。然後，VPP 操作員向其客戶發出了所需的命令，以提供所需的備用能量。

Depending on the kind of procured reserve energy (secondary or tertiary), this might be a set point signal for a certain amount of reserve energy transmitted by communication means (SCR) or the trigger to provide a predefined amount of energy (plus or minus) typically transmitted by a telephone call (TCR). The VPP operator then issued the needed commands to his customers to supply the demanded reserve energy.

使用案例敘述 Narrative of use case

JWG3031-SPUC, JWG3032-SPUC, JWG3033-SPUC：電網緊急情況：JWG3031-SPUC, JWG3032-SPUC, JWG3033-SPUC: Grid emergency:

這些情境說明了在緊急情況下臨時觸發預定義措施以減輕電網負擔的情況。這些措施還可包括通過提供適當量的無功功率來穩定電壓。根據地區法規和現有基礎設施，觸發信號可能以不同的方式發送。

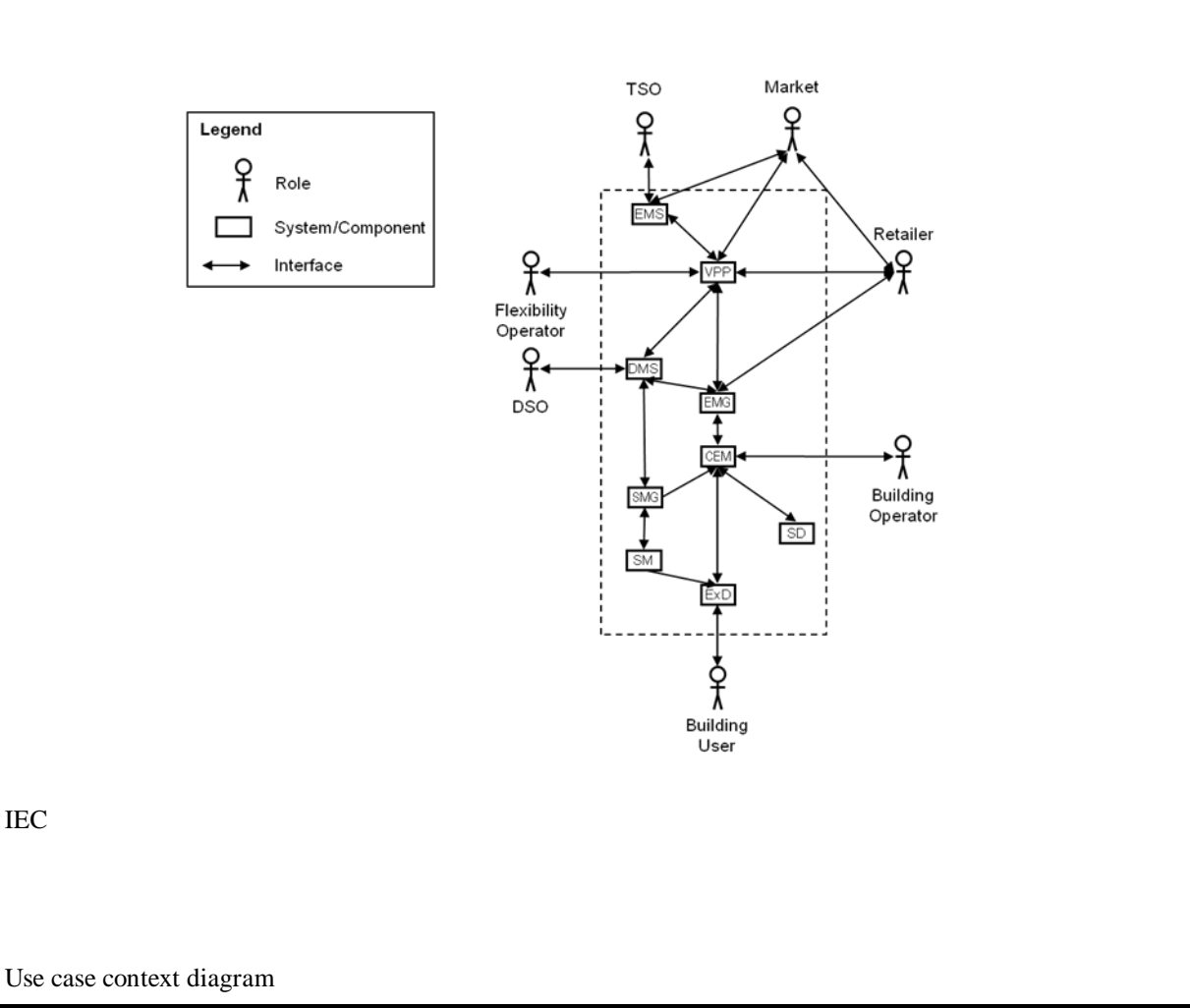
These scenarios describe the ad hoc triggering of predefined measures to relieve the grid during emergency situations. These measures may include also voltage stabilization by providing a suitable amount of reactive power. Depending on regional regulations and existing infrastructure the trigger signal may send via different ways.

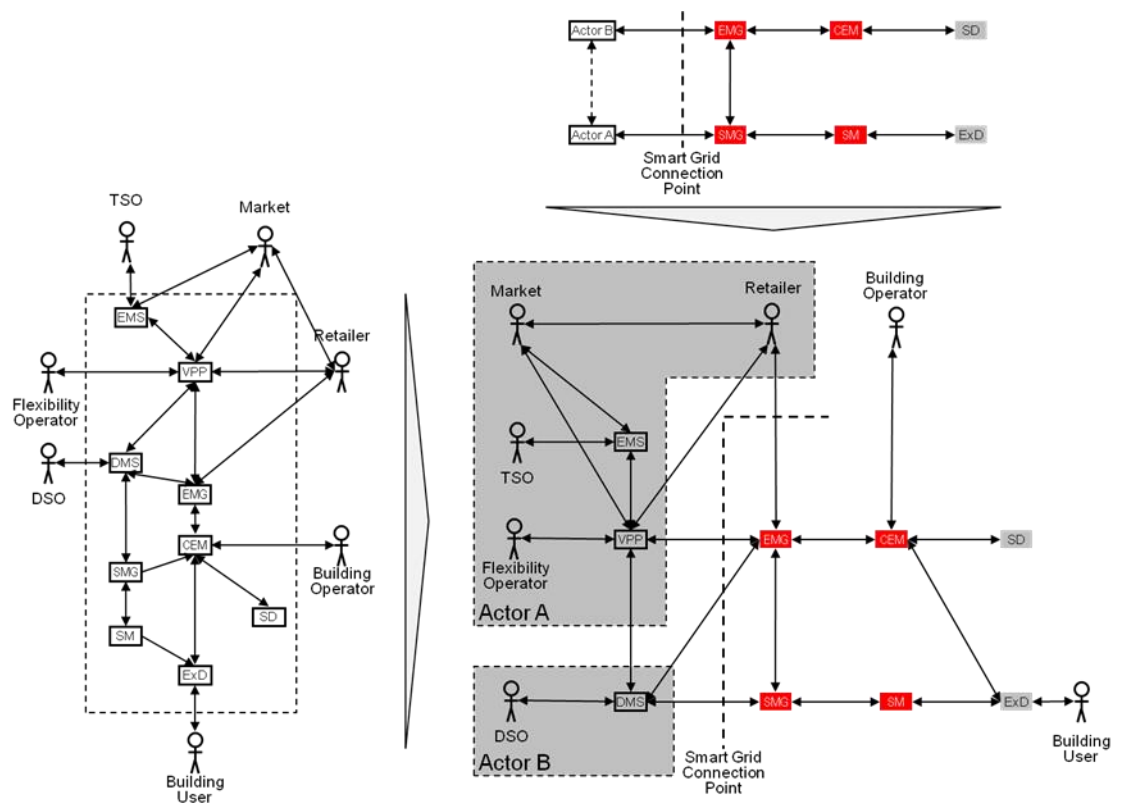
一般說明 General remarks

一般說明 General remarks
參閱相關叢集文件
See related cluster document

A.3.24.2 使用案例圖 Diagram of use case

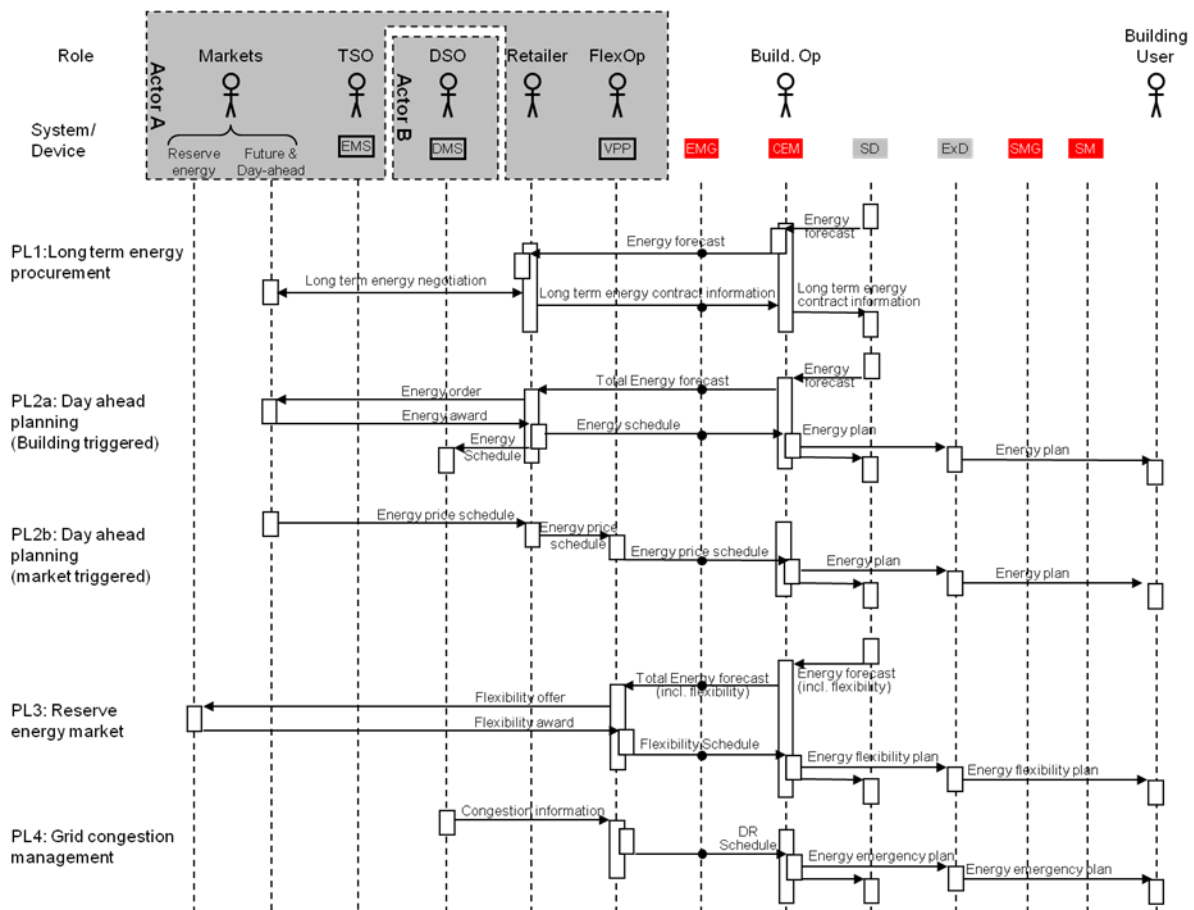
Drawing or 使用案例圖 Diagram of use case –recommended “context diagram” and “sequence diagram” in UML





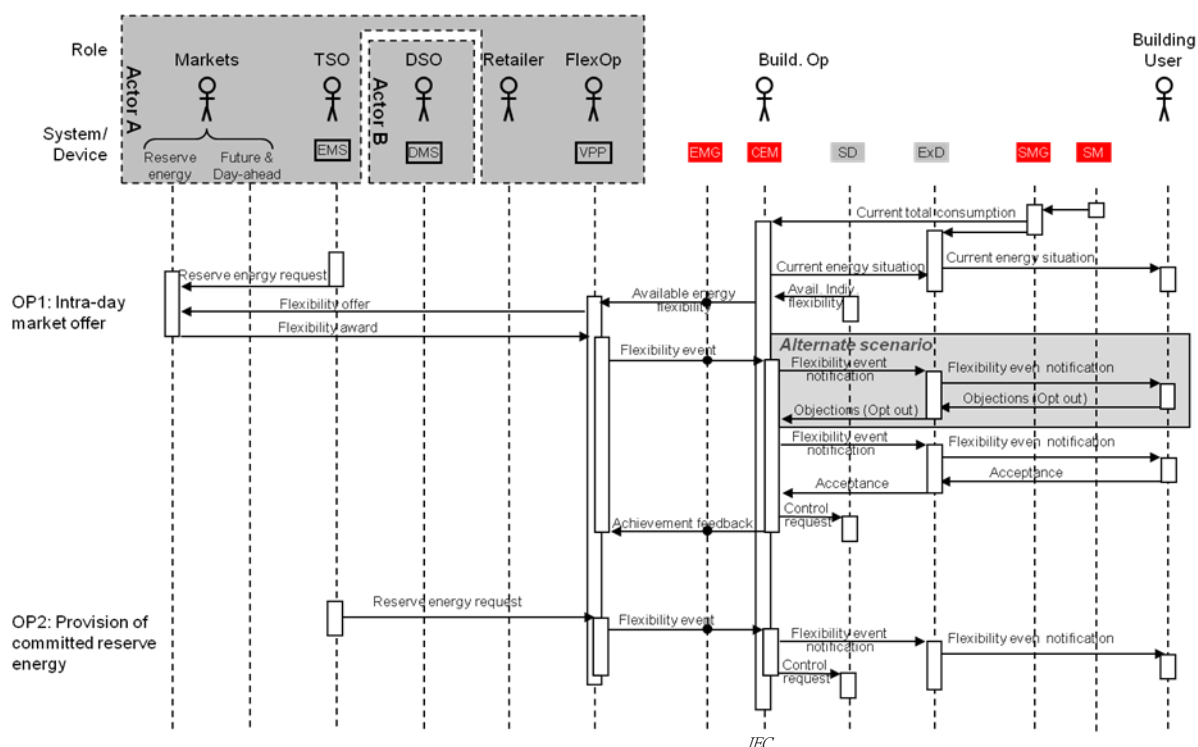
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Mapping of the detailed architecture to the generic M490/M441 architecture

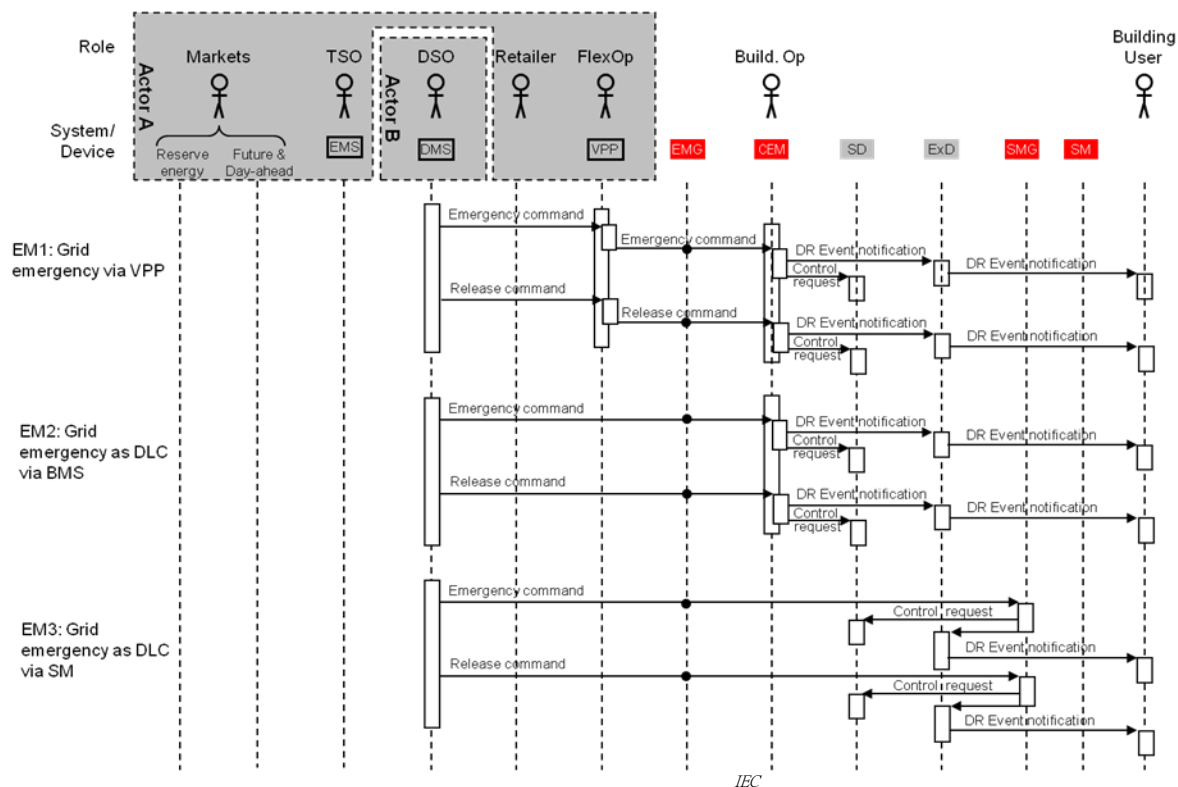


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Use cases sequence diagrams for planning phase



Use cases sequence diagrams for operational phase



Use cases sequence diagrams for grid emergency situation

A.3.24.3 技術細節 Technical details

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

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。

行為者名稱請參閱附件 A 選擇列表 Actor name see Annex A Selection List	行為者類型請參閱 附件 A 選擇列表 Actor type see Annex A Selection List	行為者說明請參閱附件 A 選擇列表 Actor description see Annex A Selection List	特定於此使用案例的更多資訊 Further information specific to this use case
市場經營者 Market Operator	角色 Role	市場運營商是管理能源市場的權威 Market operator is the authority which manages the energy markets	在一般 M490/M441 架構中，市場被視為 Actor B 的內部組成部分 In the generic M490/M441 architecture the market is considered as an internal part of Actor B
傳輸系統運營商 (TSO) Transmission System Operator (TSO)	角色 Role	傳輸系統運營商負責在超高壓或高壓網路上進行電力傳輸，以期將其交付給最終客戶或分銷商。傳輸的操作還包括系統運行的任務，涉及其能量流管理，系統的可靠性以及所有必要系統服務的可用性。 The Transmission System Operator is responsible for the transport of electricity on the extra high or high voltage network with a view to its delivery to final customers or to distributors. Operation of transmission includes as well the tasks of system operation concerning its management of energy flows, reliability of the system and availability of all necessary system services".	在一般 M490/M441 架構中，市場被視為 Actor B 的內部組成部分 In the generic M490/M441 architecture the market is considered as an internal part of Actor B
配電系統運營商 (DSO) Distribution System Operator (DSO)	角色 Role	配電系統運營商有責任將能源從供應商無誤地輸送到最終用戶，並維護配電網路。DSO 還必須通過促進透明和非歧視性地訪問網路和客戶資訊來實現競爭性零售市場。 Distribution System Operator have the responsibility for a faultless delivery of energy from	在一般 M490/M441 架構中，市場被視為 Actor A 的內部組成部分 In the generic M490/M441 architecture the market is considered as an internal part of Actor A

		suppliers to end-users and to maintain the distribution networks. DSOs also have to enable competitive retail markets by facilitating transparent and non-discriminatory access to network and customer information.	
能源零售商 Energy retailer	角色 Role	<p>能源零售商與客戶(例如建築物運營商,建築物租戶)簽訂了供應契約,並負責在能源批發市場上採購足夠的能源,以滿足其客戶的能源需求</p> <p>The energy retailer has a supply contracts with customers, e.g. building operator, building tenants and is responsible to procure sufficient energy at the wholesale energy market to satisfy the energy demand of its customers</p>	<p>在一般 M490/M441 架構中,市場被視為 Actor B 的內部組成部分</p> <p>In the generic M490/M441 architecture the market is considered as an internal part of Actor B</p>
彈性運營商 Flexibility operator	角色 Role	<p>提供降低客戶能源成本的公司,通常是通過分攤減少成本中的一部分,例如安裝和維修為此類升級提供資金。</p> <p>A company that offers to reduce a client's energy cost, often by taking a share of such reduced costs as repayment for installing and financing such upgrades.</p>	<p>在一般 M490/M441 架構中,市場被視為 Actor B 的內部組成部分</p> <p>In the generic M490/M441 architecture the market is considered as an internal part of Actor B</p>
建築物營運商 Building operator	角色 Role	<p>操作建築物,並負責確保建築物用戶同意的舒適度</p> <p>Operates a building and is responsible to assure the agreed comfort level for the building users</p>	
建築使用者 Building user	角色 Role	<p>在建築物中居住/工作</p> <p>Lives/works in a building</p>	
能源管理閘道器 (EMG) Energy Management Gateway (EMG)	系統 System	<p>接取點(功能個體)用於發送及接收智慧電網相關資訊,命令行為者 A 及 CEM,使 CEM 決定該如何處理該事件。該通訊通常透過無線連接網路完成。</p> <p>An access point (functional entity) sending and receiving smart grid related information and commands between actor A and the CEM, letting the CEM decide how to process the events. The communication is</p>	<p>在以下使用案例中,EMG 被認為是透明的,即所傳輸資訊的內容沒有改變,不同通訊協議之間可能只有轉換。</p> <p>In the following use case the EMG is considered as transparent, i.e. the content of the transmitted information</p>

		<p>often achieved through an internet connection of through a wireless connection.</p> <p>此閘道器亦可提供包含協議轉換、裝置管理、安全及服務能力之服務。</p> <p>This gateway may also provide services including protocol conversion, device management, security and service capabilities.</p>	<p>is not altered, there might only a translation between different communication protocols.</p>
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行為者名稱請參閱附件 A 選擇列表 Actor name see Annex A Selection List	行為者類型請參閱 附件 A 選擇列表 Actor type see Annex A Selection List	行為者說明請參閱附件 A 選擇列表 Actor description see Annex A Selection List	特定於此使用案例的更多資訊 Further information specific to this use case
<p>智慧電錶閘道器 (SMG)</p> <p>Smart Meter Gateway (SMG)</p>	<p>系統</p> <p>System</p>	<p>接取點(功能個體)，允許接取 1 或多個量測終端裝置及，當配備介面，以進階顯示/家庭自動化終端裝置連接至本地端網路。</p> <p>An access point (functional entity) that allows access to one or more metering end devices and, when equipped with an interface, to advanced display/home automation end devices connected to the local network.</p> <p>LNAP 亦可允許不同功能個體連接至相同 LN 之間的資料交換。LNAP 可簡單地作為路由量測終端裝置及/或顯示器/家庭自動化裝置與廣域網路之鄰近網路間傳遞訊息。</p> <p>A LNAP also may allow data exchange between different functional entities connected to the same LN. The LNAP may act simply as a router transferring messages between the metering end device and/or display/home automation devices and the Neighbourhood network of wide area network.</p> <p>其可提供包括協議轉換，裝置管理，安全性及服務能力等服務。服務可作為 LNAP 自身功能提供，或提供連接至本地端網路之有限功能裝置代表之代理服務。</p>	<p>在一般的 M490/M441 架構的智慧電錶閘道器是亦稱作為本地網路接取點(LNAP)</p> <p>In the generic M490/M441 architecture the Smart Meter Gateway is also known as Local Network Access Point (LNAP)</p>

		It may also provide services including protocol conversion, device management, security and service capabilities. Services may be provided as functions of the LNAP itself or provide proxy services on behalf of limited capability devices connected to the local network.	
客戶能源管理者 (CEM) Customer Energy Manager (CEM)	系統 System	<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 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>	

能源管理系統(EMS) Energy Management System (EMS)	系統 System	TSO 操作系統，負責輸電網內的能源管理 A TSO operated system in charge of energy management within the transmission grid	在一般 M490/M441 架構中，市場被視為 Actor A 的內部組成部分 In the generic M490/M441 architecture the market is considered as an internal part of Actor A
分配管理系統 (DMS) Distribution Management System (DMS)	系統 System	DSO 操作系統，負責分銷管理。 A DSO operated system in charge of distribution management.	在一般 M490/M441 架構中，市場被視為 Actor B 的內部組成部分 In the generic M490/M441 architecture the market is considered as an internal part of Actor B
虛擬電廠(VPP) Virtual Power Plant (VPP)	系統 System	由彈性操作員操作以管理分佈式能源的系統。 A system operated by a flexibility operator to manage distributed energy resources.	在一般 M490/M441 架構中，市場被視為 Actor A 的內部組成部分 In the generic M490/M441 architecture the market is considered as an internal part of Actor A

行為者名稱請參閱附件 A 選擇列表 Actor name see Annex A Selection List	行為者類型請參閱附件 A 選擇列表 Actor type see Annex A Selection List	行為者說明請參閱附件 A 選擇列表 Actor description see Annex A Selection List	特定於此使用案例的更多資訊 Further information specific to this use case
智慧裝置(SD) Smart Device (SD)	零件 Component	由 CEM 控制的主要裝置，可用於執行負載管理。可能有如此的本地情報。 A primary devices controlled by the CEM which can be used to perform load management. Might have so local intelligence.	為簡單起見，本文中的智慧裝置也可以代表智慧應用程式 For simplicity the smart devices in this context may also represent smart applications
簡單外部消費者顯示 (ExD) Simple external consumer display (ExD)	零件 Component	專用顯示屏與智慧連接提供給客戶，以檢查電能表/ SG CP 能耗，計畫負載的減少和負載降低的歷史。還存在其他非專用手段來將能耗資訊傳遞給客戶，例如個人計算機，移動電話或電視機。	

		Dedicated display screen in connection with the smart meter/SG CP available to the customer to check power consumption, planned load reductions and load reductions historical. Other not dedicated means also exist to deliver consumption information to the customer, such as the personal computer, the mobile phone or the TV set.	
智慧電錶(SM) Smart Meter (SM)	零件 Component	能夠執行間隔量測的收入等級量測器裝置 Revenue grade meter device capable to perform interval metering	

前提條件，假設，後期條件，事件

Preconditions, assumptions, post condition, events

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

引用的標準及/或標準化委員會(如果有)

Referenced standards and/or standardization committees (if available)

相關標準化委員會 Relevant Standardization Committees	支持使用案例的標準 Standards supporting the use case	標準狀態 Standard Status

問題：法律契約，法律法規，約束條件和其他

Issues: Legal contracts, legal regulations, constraints and others

問題－這裡具體 Issue – here specific ones	問題對使用案例的影響 Impact of issue on use case	參考－法律，標準等 Reference – law, standard, others

A.3.24.4 使用案例的逐步分析 Step by step analysis of use case

序號 S.No	主要行為者 Primary actor	觸發事件 Triggering event	前提 Pre-condition	後置條件 Post-condition
JWG 3011	零售商 Retailer	零售商的長期能源採購 Long term energy procurement by retailer	零售商了解其客戶的典型能耗行為(預測) Retailer knows typical energy consumption behaviour (forecast) of his customers	零售商已經採購了一個一定比例的在預期客戶能耗使用長長期能源契約。在剩餘的需求必須要通過在 day-提前或日內市場採購滿足。 Retailer has procured a certain percentage of the expected customer consumption using long term energy contracts. The remaining demand must be satisfied by procuring at the day-ahead or intra-day market.
JWG 3012a	CEM	樓宇自動化/管理觸發的提前計畫階段 Day ahead planning phase triggered by building automation/management	確定第二天的能耗 Energy consumption for the next day determined	由 CEM 計算並在建築物自動化中分配的能耗計畫 Energy consumption plan calculated by CEM and distributed within building automation
JWG 3012b	市場 Market	能源市場引發的提前計畫階段 Day ahead planning phase triggered by energy market	第二天的能源價格表已確定 Energy price schedule for next day settled	由 CEM 計算並在建築物自動化中分配的能耗計畫 Energy consumption plan calculated by CEM and distributed within building automation
JWG 3013	CEM	CEM 確定第二天或下一周的可用能源彈性 CEM determines available energy flexibility for the next day or week	建築物符合通過 VPP 參與儲備能源市場的資格 Building is qualified for participation at the reserve energy market via a VPP	可用的能源彈性在二次或三次能源市場上出售。 Available energy flexibility is sold either at the secondary or tertiary energy market.
JWG 3014	DSO	DSO 在驗證第二天的能量流計畫時檢測到擁堵 DSO detects congestion when verifying energy flow schedules for next day	DSO 知道的能流排程 Energy flow schedules known by DSO	由 CEM 計算並在建築物自動化中分配的能耗計畫 Energy consumption plan calculated by CEM and distributed within building automation

JWG 3021	CEM	循環執行 Cyclic execution	可以為日內市場提供能源彈性 Energy flexibility is available to be offered to the intra-day market	可用的能源彈性在市場上出售，並且相應地調整了電流消耗 The available energy flexibility is sold at the market and the current consumption adjusted accordingly
JWG 3022	TSO	循環執行 Cyclic execution	構建具有契約，可按需提供能源彈性 Build has contract to provide energy flexibility on demand	該建築已實現其承諾的能源彈性回應 The building has fulfilled its committed energy flexibility response
JWG 3031	DSO	DSO 的電網監控可檢測到意外的擁塞 DSO's grid monitoring detects unexpected congestion	DSO 有權(通過購買或根據法規)發出緊急請求 The DSO has the right (either bought or by regulation) to send out emergency requests	可用的能源彈性用於緩解擁堵 The available energy flexibility is used to mitigate congestion
JWG 3032	DSO	DSO 的電網監控可檢測到意外的擁塞 DSO's grid monitoring detects unexpected congestion	DSO 有權(通過購買或根據法規)發出緊急請求 The DSO has the right (either bought or by regulation) to send out emergency requests	可用的能源彈性用於緩解擁堵 The available energy flexibility is used to mitigate congestion
JWG 3033	DSO	DSO 的電網監控可檢測到意外的擁塞 DSO's grid monitoring detects unexpected congestion	DSO 有權(通過購買或根據法規)發出緊急請求 The DSO has the right (either bought or by regulation) to send out emergency requests	可用的能源彈性用於緩解擁堵 The available energy flexibility is used to mitigate congestion

步驟 - 正常順序 Steps – Normal sequence

情境名稱： Scenario name:		JWG 3011 長期能源採購 Long term energy procurement				
步驟編號 Step No.	事件 Event	流程/活動說明 Description of process/activity	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged	技術要求編號 Technical requirements ID
1a	確定長期能源需求 Determination of long	智慧裝置裝置確定其長期能源需求 Smart device	SD	CEM	能源需求預測排程 Energy demand forecast schedule	

	term energy demand	devices determine their long term energy demand				
1b		CEM 計算整個建築物的長期能源需求預測 The CEM calculates a forecast of the long term energy demand of the whole building				
2	發送預測資訊 Sending forecast information	CEM 將計算出的預測資訊發送給零售商 The CEM sends the calculated forecast information to the retailer	CEM	零售商 Retailer	能源需求預測排程 Energy demand forecast schedule	
3	優化能源採購 Optimizing energy procurement	零售商匯總其客戶的能源需求並得出最佳的採購策略 The retailer aggregates the energy demand for his customer and derives an optimal procurement strategy				
4	長期能源市場或類似市場的採購 Procurement at long term energy markets or similar	零售商通過長期能源供應契約採購一定數量的能源 The retailer procures a certain amount of energy by long term energy supply contracts	零售商/市場 Retailer/Market	市場/零售商 Market/Retailer	長期能源契約資訊 Long term energy contract information	
5a	長期的資訊長期能源契約 Information of long	零售商將長期能源契約的條件告知其客戶 The retailer informs his	零售商 Retailer	CEM	長期能源契約資訊 Long term energy contract information	

	term energy contract	customers about the conditions of the long term energy contracts				
5b		能源採購資訊被轉發到智慧負載 The energy procurement information is forwarded to the intelligent loads	CEM	SD	長期能源契約資訊 Long term energy contract information	

情境名稱： Scenario name:		JWG 3012a 提前計畫(已觸發構建) Day ahead planning (building triggered)				
步驟編號 Step No.	事件 Event	流程/活動說明 Description of process/activity	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged	技術要求編號 Technical requirements ID
1a	確定能源需求 Determination of energy demand	智慧裝置確定第二天的能源需求 Smart device determines their energy demand for the next day	SD	CEM	能源需求預測排程 Energy demand forecast schedule	
1b		樓宇自動化系統確定第二天的總能源需求預測 The building automation system determines the total energy demand forecast for the next day	CEM	零售商 Retailer	能源需求預測排程 Energy demand forecast schedule	
2a	前日市場能源採購 Procurement of energy at day ahead market	零售商在提前一天的市場下單，以彌補實際需求與長期供應契約之間的差額 The retailer places a energy order at the day ahead market to cover the gap between the real demand and the long term supply contracts	零售商 Retailer	市場 Market	能源訂單資訊 Energy order information	
2b		零售商因從市場獲得的能源訂單而獲得獎勵 The retailer gets the awards for his energy	市場 Market	零售商 Retailer	能源獎勵資訊 Energy award information	

		orders from the market				
3a	能源調度 Energy dispatch	零售商將可用能量分發給客戶 The retailer dispatches the available energy to his customers	零售商 Retailer	CEM	能源排程包含其價格資訊 Energy schedule including price information	
3b		零售商將能耗計畫發送給DSO Retailer sends the energy consumption plan to DSO	零售商 Retailer	DMS	能源排程 Energy schedule	
4	能源優化 Energy optimization	CEM 根據收到的能源排程優化建築運營並分配能源計畫 The CEM optimizes the building operation according to the received energy schedule and distributes the energy plan	CEM	SD	能源能耗計畫 Energy consumption plan	
5a	能源計畫可視化 Energy plan visualization	CEM 可視化建築使用者的能源計畫 CEM visualizes energy plan for building user	CEM	ExD	能源能耗計畫可視化 Energy consumption plan visualization	
5b		建築使用者注意能源計畫 Building user notices energy plan	ExD	建築使用者 Building user	渲染的能耗計畫可視化 Rendered Energy consumption plan visualization	

情境名稱： Scenario name:		JWG 3012b 提前計畫(觸發能源市場) Day ahead planning(energy market triggered)				
步驟編號 Step No.	事件 Event	流程/活動說明 Description of process/activity	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged	技術要求編號 Technical requirements ID

1	關於市場能源價格的公告 Announcement of market energy prices	市場向市場行為者分配批發能源價格排程 Market distributes wholesale energy prices schedule to market participants	市場 Market	零售商 Retailer	批發能源價格表 Wholesale energy price schedule	
2	客戶能源價格分佈 Distribution of customer energy prices	零售商將最終客戶的能源價格分配給他的客戶 Retailer distributes end customer energy prices to his customer	零售商 Retailer	VPP (彈性運算符) (Flexibility operator)	客戶能源價格表 Customer energy price schedule	
3	分發 VPP 內部激勵資訊 Distribution of VPP internal incentive information	VPP 向其行為者分發內部激勵資訊 VPP distributes internal incentive information to its participants	VPP (彈性運算符) (Flexibility operator)	CEM	獎勵資訊排程 Incentive information schedule	
4	CEM 優化 CEM optimization	CEM 根據給定的標準(經濟, 生態等)優化能耗剖繪 CEM optimizes energy consumption profile(s) according to given criteria (Economical, ecological, etc.)				
5	能耗剖繪分佈 Energy consumption profile distribution	CEM 送出優化能耗剖繪, 以負載下控制 CEM send out optimized energy consumption profile to loads under control	CEM	SD	能耗剖繪 Energy consumption profile	

6a	能源計畫可視化 Energy plan visualization	CEM 可視化建築使用者的能源計畫 CEM visualizes energy plan for building user	CEM	ExD	能耗計畫可視化 Energy consumption plan visualization	
6b		建築使用者注意能源計畫 Building user notices energy plan	ExD	建築使用者 Building user	渲染的能耗計畫可視化 Rendered Energy consumption plan visualization	

情境名稱： Scenario name:		JWG 3013 儲備能源市場 Reserve energy market				
步驟編號 Step No.	事件 Event	流程/活動說明 Description of process/activity	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged	技術要求編號 Technical requirements ID
1	收集個人能源需求 Collection of individual energy demands	所有受 CEM 控制的裝置都向 CEM 發送自己的能源需求和彈性 All devices under control of CEM send their own energy demand and flexibility to CEM	SD	CEM	能耗及彈性分佈 Energy consumption and flexibility profile	
2	發送總的能源需求和彈性 Sending of aggregated energy demand and flexibility	CEM 將匯總的能源需求剖繪發送給 VPP CEM send the aggregated energy demand profile to VPP	CEM	VPP (彈性運算符) (Flexibility operator)	能源彈性剖繪 Energy flexibility profile	
3	提供可用的能源彈性 Offering of available energy flexibility	彈性運營商在市場上提供可用的能源彈性 Flexibility operator offers available energy flexibility at the market	VPP (彈性運算符) (Flexibility operator)	市場 Market	能源彈性排程 Energy flexibility schedule	

4	能源彈性獎 Award of energy flexibility	市場因其提供的能源彈性而授予彈性運營商獎 Market sends award for offered energy flexibility to Flexibility operator	市場 Market	VPP (彈性運算符) (Flexibility operator)	能源彈性獎資訊 Energy flexibility award information	
5	需量反應調度 Demand response dispatching	彈性運營商將獎勵的能耗變更發送給其行為者 Flexibility operator dispatches awarded energy consumption change to its participants	VPP (彈性運算符) (Flexibility operator)	CEM	能耗變更排程 Energy consumption change schedule	
6	CEM 優化 CEM optimization	CEM 根據變更請求優化能耗剖繪 CEM optimizes energy consumption profile(s) according to change request				
7	能耗剖繪分佈 Energy consumption profile distribution	CEM 送出優化能耗剖繪，以負載下控制 CEM send out optimized energy consumption profile to loads under control	CEM	SD	能耗剖繪 Energy consumption profile	
8a	能源計畫可視化 Energy plan visualization	CEM 可視化建築使用者的能源計畫 CEM visualizes energy plan for building user	CEM	ExD	能源能耗計畫的可視化 Energy consumption plan visualization	
8b		建築使用者注意能源計畫 Building user notices energy	ExD	建築使用者 Building	渲染的能耗計畫可視化 Rendered Energy consumption plan	

		plan		user	visualization	
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情境名稱： Scenario name:		JWG 3014 電網擁塞管理 Grid congestion management				
步驟編號 Step No.	事件 Event	流程/活動說明 Description of process/activity	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged	技術要求編號 Technical requirements ID
1	DSO 檢測到擁塞 DSO detects congestion	DSO 發出有關檢測到的攝入的資訊 DSO sends out information about detected ongestion	DSO	VPP (操作員) (Operator)	擁塞資訊(排程) Congestion information (schedule)	
2	VPP 確定合適的行為者 VPP determines suitable participants	VPP 檢查哪些行為者可能有助於減輕電網問題 The VPP checks which of its participants might help to mitigate the grid problem				
3	電網緊急通知 Grid emergency notification	VPP 發出了電網應急信號來選擇參加 VPP sends out grid emergency signal to selected participants	VPP (操作員) (Operator)	CEM	緊急通知(排程) Emergency notification (schedule)	
4	CEM 優化 CEM optimization	CEM 根據緊急情況優化能耗剖繪 CEM optimizes energy consumption profile(s) according to emergency equest				
5	能耗剖繪分佈 Energy consumption profile	CEM 送出優化能耗剖繪，以負載下控制 CEM send out optimized	CEM	SD	能耗剖繪 Energy consumption profile	

	distribution	energy consumption profile to loads under control				
6a	能源計畫可視化 Energy plan visualization	CEM 可視化建築使用者的能源計畫 CEM visualizes energy plan for building user	CEM	ExD	能耗(緊急)計畫可視化 Energy consumption (emergency) plan visualization	
6b		建築使用者注意能源計畫 Building user notices energy plan	ExD	建築使用者 Building user	渲染的能源(緊急)消耗計畫可視化 Rendered energy (emergency) consumption plan visualization	

情境名稱： Scenario name:		JWG 3021 日內市場報價 Intra-day market offer				
步驟編號 Step No.	事件 Event	流程/活動說明 Description of process/activity	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged	技術要求編號 Technical requirements ID
1a	進行中 Ongoing	電流量測 The current consumption is metered	SM	SMG	能耗 Energy consumption	
1b		監控電流消耗 The current consumption is monitored	SMG	CEM	能耗 Energy consumption	
1c		電流消耗可視化 The current consumption is visualized	SMG	ExD	能耗 Energy consumption	
1d		可視化其他能耗資訊 Additional energy consumption information is visualized	CEM	ExD	能源狀況報告 Energy situation report	
1e		建築物用戶注意當前的能源狀況 The building user notices the current energy situation	ExD	建築使用者 Building user	渲染的能耗和情況報告 Rendered energy consumption and situation report	
2	循環 Cyclic	智慧裝置向CEM發送當前可用的能源彈性 Smart device send current available energy flexibility to CEM	SD	CEM	能源彈性資訊(包括成本) Energy flexibility information (incl. costs)	
3	循環	CEM根據現有計畫控制電流				

	Cyclic	消耗並獲得剩餘的能源彈性 CEM controls current consumption according to the exiting plan and derives remaining energy flexibility				
4	循環 Cyclic	CEM將有關當前可用能源彈性的資訊發送給VPP CEM send information about current available energy flexibility to VPP	CEM	VPP (彈性運算符) (Flexibility operator)	能源彈性資訊(包括成本) Energy flexibility information (incl. costs)	
5	循環 Cyclic	VPP 匯總了其行為者當前的可用能源彈性並將相應的報價發送給市場 VPP aggregates current available energy flexibility of its participants and sends corresponding offer to the market	VPP (彈性運算符) (Flexibility operator)	市場 Market		
6	TSO 或其他實用程序的彈性要求 Flexibility request from TSO or other utility	TSO 或其他具有平衡責任的公用事業向市場提出了能源彈性的要求 The TSO or another utility with balancing responsibility places an energy flexibility request at the market	TSO	市場 Market		
7	彈性的需求，在市場上，例如三	市場向 VPP 頒發了能源彈性獎	市場 Market	VPP (彈性運算符)	能源彈性獎勵資訊(包括價格)	

	次儲備 Flexibility demand at market, e.g. tertiary reserve	The market sends an award for energy flexibility to the VPP		(Flexibility operator)	Energy flexibility award information (incl. price)	
8	VPP 確定合適的行為者 VPP determines suitable participants	的 VPP 確定其中的它的行為者能滿足的需求，根據給定的標準 (經濟，生態等) The VPP determines which of its participants can satisfy the demand according given criteria (Economical, ecological, etc.)				
9	彈性事件 Flexibility event Notification	VPP 向選定的行為者發送彈性事件信號 VPP sends out Flexibility event signal to selected participants	VPP (彈性運算符) (Flexibility Operator)	CEM	彈性事件通知 Flexibility event notification	
10	CEM 優化 CEM optimization	CEM 根據彈性要求調整能耗設定點 CEM adapts energy consumption setpoints according to Flexibility request				
11a	彈性事件可視化 Flexibility event visualization	CEM 將緊急事件操作可視化為建築物用戶 CEM visualizes emergency event actions to building user	CEM	ExD	執行彈性事件對構建功能的影響 Impact on building functionality caused by executing flexibility event	

11b		建築使用者注意緊急事件動作 Building user notices emergency event actions	ExD	建築使用者 Building user	執行DR事件導致對建築物功能的渲染影響 Rendered impact on building functionality caused by executing DR event	
12	緊急事件接受 Emergency event acceptance	建築使用者不反對彈性事件操作 Building user has no objections against flexibility event action				
13	能耗設定點分佈 Energy consumption setpoint distribution	CEM將消耗設定值發送到受控制的負載 CEM send out consumption setpoints to loads under control	CEM	SD	能耗進度/設定 Energy consumption schedule/setpoint	
14	成就反饋 Achievement feedback	CEM發送回實現彈性應對VPP CEM send back achieved flexibility response to VPP	CEM	VPP (彈性運算符) (Flexibility operator)	能耗變化 Energy consumption change	

情境名稱： Scenario name:		JWG 3022 提供承諾的備用能源 Provision of committed reserve energy				
步驟編號 Step No.	事件 Event	流程/活動說明 Description of process/activity	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged	技術要求編號 Technical requirements ID
1	TSO 要求儲備能量 TSO requests reserve energy	TSO 將實際需求通知契約儲備能源供應商 The TSO notifies the contracted reserve energy provider about	DSO	VPP (彈性運算符) (Flexibility Operator)	儲備能源需求資訊 Reserve energy demand information	

情境名稱： Scenario name:		JWG 3022 提供承諾的備用能源 Provision of committed reserve energy				
步驟編號 Step No.	事件 Event	流程/活動說明 Description of process/activity	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged	技術要求編號 Technical requirements ID
		the actual the demand				
2	VPP 確定合適的行為者 VPP determines suitable participants	VPP 確定其中的它的參加者可以減輕所述擁塞根據其義務 The VPP determines which of its participants can mitigate the congestion according its obligations				
3	預約活動通知 Reserve event notification	VPP 發送儲備事件信號到選擇的行為者 VPP sends out reserve event signal to selected participants	VPP (彈性運算符) (Flexibility Operator)	CEM	預約活動通知 Reserve event notification	
4	CEM 反應 CEM reaction	CEM 根據災害恢復要求調整能耗設定點 CEM adapts energy consumption setpoints according to DR request				
5	能耗設定點分佈 Energy consumption setpoint distribution	CEM 將消耗設定值發送到受控制的負載 CEM send out consumption setpoints to loads under control	CEM	SD	消耗設定點 Energy consumption setpoint	
6a	保留事件	CEM 將預留事	CEM	ExD	執行保留事件對	

情境名稱： Scenario name:		JWG 3022 提供承諾的備用能源 Provision of committed reserve energy				
步驟編號 Step No.	事件 Event	流程/活動說明 Description of process/activity	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged	技術要求編號 Technical requirements ID
	可視化 Reserve event visualization	件操作可視化為建築物用戶 CEM visualizes reserve event actions to building user			建築物功能的影響 Impact on building functionality caused by executing reserve event	
6b		建立用戶通知保留事件操作 Building user notices reserve event actions	ExD	建築使用者 Building user	執行儲備金事件對建築物功能產生的影響 Rendered impact on building functionality caused by executing reserve event	

情境名稱： Scenario name:		JWG 3031 電網緊急事件發送到 VPP (操作員) Grid emergency-event send to VPP (Operator)				
步驟編號 Step No.	事件 Event	流程/活動說明 Description of process/activity	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged	技術要求編號 Technical requirements ID
1	檢測到電網問題 Grid problem detected	該 DSO 通知的 VPP 有關的檢測電網中的擁擠 The DSO notifies the VPP about an detected congestion in the grid	DSO	VPP (彈性運算符) (Flexibility Operator)	電網擁堵資訊 Grid congestion information	
2	VPP 確定合適的行為者 VPP determines	VPP 確定其中的它的參加者可以減輕所述擁塞根據其義務				

	suitable participant s	The VPP determines which of its participants can mitigate the congestion according its obligations				
3	緊急事件通知 Emergency event notification	VPP 向選定的行為者發送緊急事件信號 VPP sends out emergency event signal to selected participants	VPP (彈性運算符) (Flexibility Operator)	CEM	緊急事件通知 Emergency event notification	
4	CEM 反應 CEM reaction	CEM 根據災害恢復要求調整能耗設定點 CEM adapts energy consumption setpoints according to DR request				
5	能耗設定點分佈 Energy consumption setpoint distribution	CEM 將消耗設定值發送到受控制的負載 CEM send out consumption setpoints to loads under control	CEM	SD	消耗設定點 Energy consumption setpoint	
6a	緊急事件可視化 Emergency event visualization	CEM 將緊急事件操作可視化為建築物用戶 CEM visualizes emergency event actions to building user	CEM	ExD	執行緊急事件對建築物功能的影響 Impact on building functionality caused by executing emergency event	
6b		建築使用者注意緊急事件動作 Building user notices emergency event actions	ExD	建築使用者 Building user	執行緊急事件對建築物功能的影響 Rendered impact on building functionality caused by executing	

					emergency event	
7	電網問題已清除 Grid problem cleared	DSO 通知電網用戶緊急情況清除 The DSO notifies the grid user about an emergency clearance	DSO	VPP (彈性運算符) (Flexibility Operator)	電網擁堵清除資訊 Grid congestion clearance information	
8	VPP 確定合適的行為者 VPP determines suitable participants	VPP 確定其中的它的行為者都參與到減輕所述擁塞 The VPP determines which of its participants were involved to mitigate the congestion				
9	緊急事件通知 Emergency event notification	VPP 發送 DR 間隙信號到選擇的行為者 VPP sends out DR clearance signal to selected participants	VPP (彈性運算符) (Flexibility Operator)	CEM	緊急通關通知 Emergency clearance notification	
10	CEM 反應 CEM reaction	CEM 根據正常運行調整能耗設定值 CEM adapts energy consumption setpoints according to normal operation				
11	能耗設定點分佈 Energy consumption setpoint distribution	CEM 將消耗設定值發送到受控制的負載 CEM send out consumption setpoints to loads under control	CEM	SD	能耗設定點 Energy consumption setpoint	
12a	緊急事件可視化	CEM 可視化為建築使用者清除災害恢復事	CEM	ExD	緊急清關資訊 Emergency	

	Emergency event visualization	件 CEM visualizes DR event clearance to building user			clearance information	
12b		建築使用者通知DR事件清除 Building user notices DR event clearance	ExD	建築使用者 Building user	呈現的緊急通關資訊 Rendered emergency clearance information	

情境名稱： Scenario name:		JWG 3032 電網緊急事件直接發送到 CEM Grid emergency-event sent directly to CEM				
步驟編號 Step No.	事件 Event	流程/活動說明 Description of process/activity	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged	技術要求編號 Technical requirements ID
1	發生電網問題 Grid problem occurs	DSO 發出緊急命令 DSO sends out emergency command	DSO	CEM	DLC 命令 DLC command	
2	CEM 回應 CEM response	CEM 得出必要/可能的緊急應對措施 The CEM derives necessary/possible emergency counteractions				
3	當地反應 Local response	DMS 發出緊急命令 DMS sends out emergency command	CEM	SD	DLC 命令 DLC command	
4a	緊急可視化 Emergency visualization	CEM 為建築物用戶可視化緊急情況 CEM visualizes emergency for building user	CEM	ExD	緊急可視化 Emergency visualization	
4b		建築使用者注意緊急情況	ExD	建築使用者	呈現的緊急可視化	

		Building user notices emergency		Building user	Rendered emergency Visualization	
5	電網問題已清除	DSO 發出緊急檢查命令 DSO sends out emergency clearance command	DSO	CEM	DLC 命令 DLC command	
6	CEM 回應 CEM Response	CEM 確定恢復正常運行 The CEM determines turn back to normal operation				
7	當地反應 Local response	CEM 將 DLC 命令轉發到內部裝置 CEM forwards DLC command to inhouse device	CEM	SD	DLC 命令 DLC command	
8a	緊急情況清除可視化 Emergency clearance visualization	CEM 為建築物用戶可視化緊急情況清除 CEM visualizes emergency clearance for building user	CEM	ExD	緊急情況清除可視化 Emergency clearance visualization	
8b		建築物用戶注意緊急通關 Building user notices emergency clearance	ExD	建築使用者 Building user	呈現的應急通關可視化 Rendered emergency clearance visualization	

情境名稱： Scenario name:		JWG 3033 電網緊急事件通過智慧電錶直接發送到專用智慧裝置 Grid emergency event-sent directly to dedicated smart device via smart meter				
步驟編號 Step No.	事件 Event	流程/活動說明 Description of process/activity	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged	技術要求編號 Technical requirements ID
1	發生電網問題	DSO 發出緊急命令	DSO	SMG	DLC 命令	

	Grid problem occurs	DSO sends out emergency command			DLC command	
2	當地反應 Local response	SMG 將 DLC 命令轉發到專用智慧裝置 SMG forwards DLC command to dedicated smart device	SMG	SD	DLC 命令 DLC command	
3a	緊急可視化 Emergency visualization	SMG 為建築物用戶可視化緊急情況 SMG visualizes emergency for building user	SMG	ExD	緊急可視化 Emergency visualization	
3b		建築使用者注意緊急情況 Building user notices emergency	ExD	建築使用者 Building user	呈現的緊急可視化 Rendered emergency visualization	
4	電網問題已清除 Grid problem cleared	DSO 發出緊急檢查命令 DSO sends out emergency clearance command	DSO	SMG	DLC 命令 DLC command	
5	當地反應 Local response	SMG 將 DLC 命令轉發到專用智慧裝置 SMG forwards DLC command to dedicated smart device	SMG	SD	DLC 命令 DLC command	
6a	緊急情況清除可視化 Emergency clearance visualization	SMG 為建築物用戶可視化緊急情況清除 SMG visualizes emergency clearance for building user	BACS	ExD	緊急情況清除可視化 Emergency clearance visualization	
6b		建築物用戶注意緊急通關 Building user notices emergency	ExD	建築使用者 Building user	呈現的應急通關可視化 Rendered emergency clearance	

		clearance			visualization	
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步驟－替代，錯誤管理及/或維護/備份情境

Steps – Alternative, error management, and/or maintenance/backup scenario

情境名稱： Scenario name:		JWG 3021a 帶有用戶反對 DR 事件操作的日內市場報價 JWG 3021a with building user objection against DR event action Intra-day market offer				
1-11		與基本情境相同。 Same as base scenario.				
A1a	DR 事件分歧 DR event disagreement	建築使用者在 ExD 提出反對彈性事件行動的意見 Building user enters his objections against flexibility event action at the ExD	建築使用者 Building user	ExD	使用者輸入 User input	
A1b		ExD 將使用者輸入發送到 CEM ExD sends user input to CEM	ExD	CEM	使用者輸入 User input	
A2	CEM 優化 CEM reoptimization	CEM 尋找替代能耗的適應方案來滿足彈性要求 CEM looks for alternative energy consumption adaptation to satisfy flexibility request				
A3a	彈性事件可視化 Flexibility event visualization	CEM 可視化替代彈性事件操作，以培養用戶 CEM visualizes alternative	CEM	ExD	執行彈性事件對構建功能的影響 Impact on building functionality caused by executing	

	on	flexibility event actions to building user			flexibility event	
A3b		建立用戶通知 替代彈性事件 操作 Building user notices alternative flexibility event actions	ExD	Building user	執行彈性事件導 致對建築物功能 的渲染影響 Rendered impact on building functionality caused by executing flexibility event	
A4	彈性事件 接受 Flexibility event acceptance	建築使用者不 反對其他彈性 事件操作 Building user has no objections against alternative flexibility event action				
13-14		與基本情境相 同。 Same as base scenario.				

A.3.25 專用使用案例(JWG3101)能源生產/儲存集成

A.3.25 Specialized use case (JWG3101) Energy production/storage integration

A.3.25.1 General

使用案例名稱

使用案例識別 Use case identification		
ID	域/區域 Domain(s)/ Zone(s)	使用案例名稱
JWG3101	域：客戶端、DER Domain: Customer Premises, DER 區：過程，場域，變電所 Zones: Process, Field, Station	能源生產/儲存整合 Energy production/storage integration

版本管理 Version management

版本管理 Version management					
版本管理 Changes/Version	Date	領域專家 Domain expert	區 的 專 業 知 識 / 域/角色 Area of expertise/ Domain/ Role	標題/變更 Title/Changes	批准狀態草案, 徵求意見, 投票, 最終 Approval status draft, for comments, for voting, final
0.1	07/05/2014	量測 Metering	Use Cases	初稿 Initial Draft	Draft
0.2	17/12/2014	家電 Home Appliances	Use Cases	對 IEC 格式的微小改動 Minor changes on formatting towards IEC JWG-UC	Draft

使用案例基本資訊 Basic information on use case

參考文獻 References						
No.	參考文獻 References	參考 Reference	狀態 Status	對使用案例的影響 Impact on use case	發起人/組織 Originator/Organisation	Link
1	技術報告 Technical Report	Use Cases 3.0	Draft	UC 初始版本 UC initial version	Energy@home Association	

更高階使用案例的關係 Relation to higher level use case	
叢集 Cluster	更高階使用案例 Higher level use case

使用案例的成熟度 – 在業務運營中, 在演示項目中實現, 在研發中, 準備中, 有遠見的

Maturity of use case – in business operation, realized in demonstration project, , realised in R&D, in preparation, visionary

優先序 Prioritisation
一般，區域或國家關係 Generic, Regional or National Relation
查看 - 技術/業務 View – technical/business
查看 - 技術/業務 Further keywords for classification

使用案例的範圍和目標 Scope and objectives of use case

使用案例的範圍和目標 Scope and objectives of use case	
範圍 Scope	將國內太陽能(PV)電場及儲存系統的生產集成到家庭局域網管理中。 Integrate the production from domestic photovoltaic (PV) plants and the storage systems into home area network management.
目標 Objective(s)	監視系統中與生產系統有關的所有重要數量。 Monitoring system for all the significant quantities that regard the production system.
相關業務案例 Related business case(s)	

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>該使用案例的目的是向客戶提供有關生產工廠當前狀況的資訊，包括不僅應根據當前和預測的消耗量，而且還應根據當前和預測的消耗量來建議何時使用裝置。太陽能發電廠</p> <p>The aim of this use case is to provide customer with information on the current situation of the production plant, including suggestions about when an appliance should be used based not only on the current and forecasted consumptions, but also on the current and forecasted production of the photovoltaic plant</p>

此使用案例說明了從客戶 EMS 控制器到蓄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 控制器從蓄電池控制器請求狀態或日誌資訊。從蓄電池控制器接收到資訊後，EMS 控制器將顯示該資訊。

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.

完整說明 Short description

該整合國內太陽能(PV)電場，並在儲存系統的目標有一個雙受益 的最終用戶：上的一個手的用戶將是能夠以監測從一個用戶友好界面所有的顯著大量這方面的生產系統：當前功率，能量產生，電池充電狀態，預測資料等...

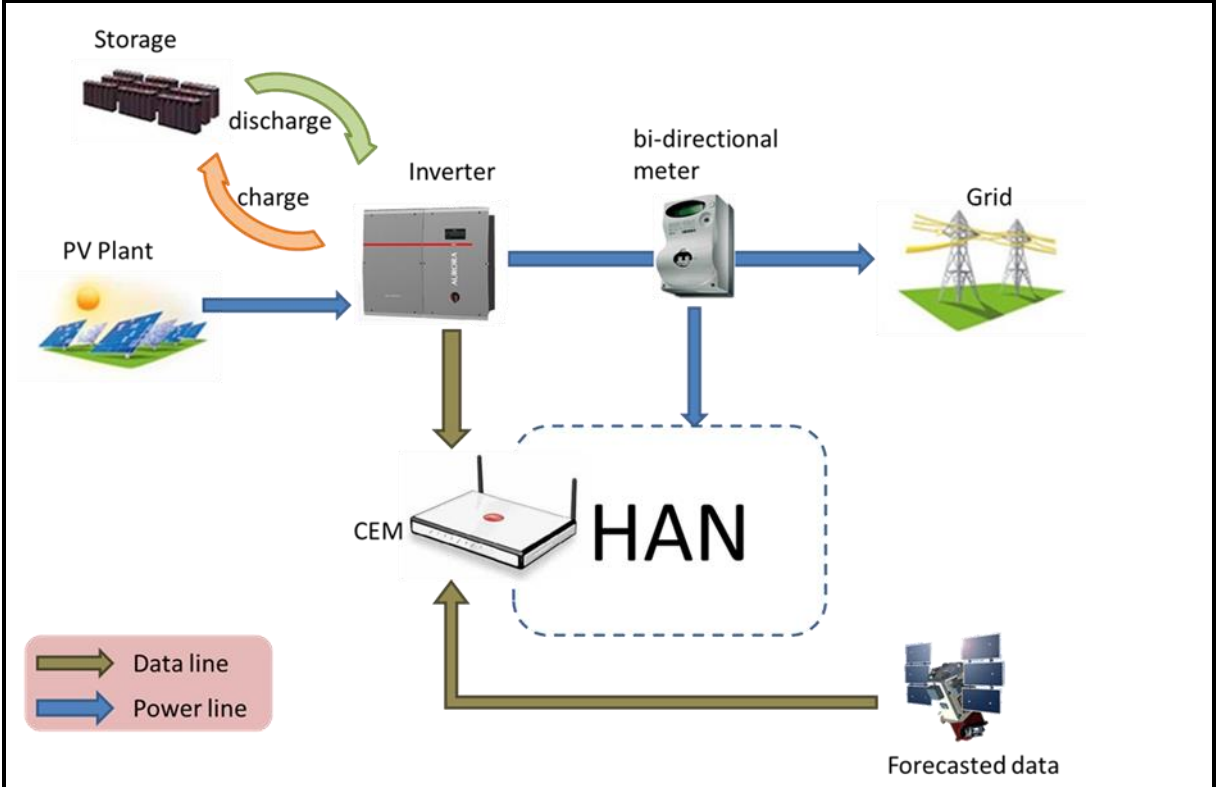
The integration of the domestic photovoltaic (PV) plants and the storage systems aims to have a dual benefit for the final user: on the one hand user will be able to monitor from a user-friendly interface all the significant quantities that regard the production system: current power, energy production, battery state of charge, forecast data, etc...

在與其他手資訊關於當前和預測的能源生產將被用於內部的算法，即定義了最佳的執行時間在其中的器具應啟動。

On the other hand information about current and forecasted energy production will be used inside the algorithm that defines the best execution time in which an appliance should start.

在電池系統中儲存能量可以使系統在不同的時槽內釋放電能，因此系統可以實現成本優化/峰值能耗降低。在另一方面的情境可能被執行，其中來自太陽能電廠多餘的能量可被儲存成 DHW(家用熱水)儲存，緩衝主水(用於加熱或冷卻)，有時本人房子的液壓迴路或直接送入 所述電路。在這種情況下，儲存的能量到一個熱儲存允許所述系統以限制使用的電能量從電網最大化 autoconsumption 到來。例如，CEMS，接收有關資訊如何多少電力被出口到了電網可以採用的算法可以，作為一個目標，要減少到零值的給定能量對電網本身。電能量 autoconsumption 可以根據允許以 經濟上的原因。在實際上它 可能是更便宜的儲存能量為電池/儲熱，而不是賣電的能量來 從太陽能電廠甚至如果它可以降低的全球系統的能源效率。

Storing energy in a battery system allow the system to release electric power in a different period and so the system can achieve cost optimization/peak consumption reduction. On the other hand a scenario could be executed where the excess energy from PV plant could be stored into a DHW (Domestic Hot Water) storage, buffer primary water (for heating or cooling) sometimes present into house's hydraulic circuit or directly feed into the circuit. In this case storing energy into a thermal storage allow the system to limit use of electric energy coming from the grid maximizing autoconsumption. For example the CEMS, receiving information about how much electricity is exported into the grid can adopt an algorithm able, as a target, to reduce to zero the value of energy given to the grid itself. Electric energy autoconsumption can be allowed according to economic reasons. In fact it could be cheaper to store energy into battery/thermal storage rather than sell electric energy coming from PV plant even if it could reduce the global system energy efficiency.



IEC

所述儲存組件可以被安裝，如果一個電池儲存將被使用的，內部的逆變器和其管理通過逆變器控制器，否則可以被安裝在所述液壓迴路作為 DHW 緩衝器或 CH /冷卻緩衝器通過加熱控制器逆變器管理的主水/儲存系統將通過 zigbee 模塊將太陽能發電廠和儲存資訊傳達給 CEMS。CEMS 將能夠檢索調用遠程 Web 服務的預測資訊。

The storage component could be installed, if a battery storage will be used, inside the inverter and it is managed by inverter controller, otherwise could be installed in the hydraulic circuit as DHW buffer or CH/Cooling buffer primary water managed by heating controller The inverter/storage system will communicate PV plant and storage information to the CEMS through a zigbee module. The CEMS will be able to retrieve forecast information invoking a remote Web Service.

問題：法律契約，法律法規，約束條件和其他
Issues: Legal contracts, legal regulations, constraints and others

使用案例條件			
Use case conditions			
行為者/系統/資訊/ 契約	觸發事件	前提條件	假設條件
Actor/System/Infor mation/Contract	Triggering event	Pre-conditions	Assumption
HAN 用戶 HAN user	用戶開始在 CEM GUI 中填寫 工廠註冊表格		

	User starts to fill the plant registration form in the CEM GUI		
CEMS	CEM 定期開始向太陽能逆變器請求工廠生產值 CEM periodically starts to request plant production values to the PV inverter		在執行此步驟之前，必須在 CEM 和逆變器之間建立連接 Connection between CEM and inverter has to be establish before executing this step
CEMS	CEM 定期開始向 Forecast Web 服務請求工廠產量預測 CEM periodically starts to request plant production forecast to the Forecast Web Service	步驟 1 (植物預測註冊) Step 1 (Plant Forecast registration)	
HAN 用戶 HAN user	用戶訪問 CEM GUI 以監視太陽能發電廠變量 User accesses to the CEM GUI to monitor PV plant variables	步驟 2 (逆變器資料採集)和步驟 3 (預測資料採集) Step 2 (Inverter data acquisition) & 3 (Forecast data acquisition)	

前提條件，假設，後期條件，事件

Preconditions, assumptions, post condition, events

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

引用的標準及/或標準化委員會(如果有)

Referenced standards and/or standardization committees (if available)

相關標準化委員會 Relevant Standardization Committees	支持使用案例的標準 Standards supporting the use case	標準狀態 Standard status

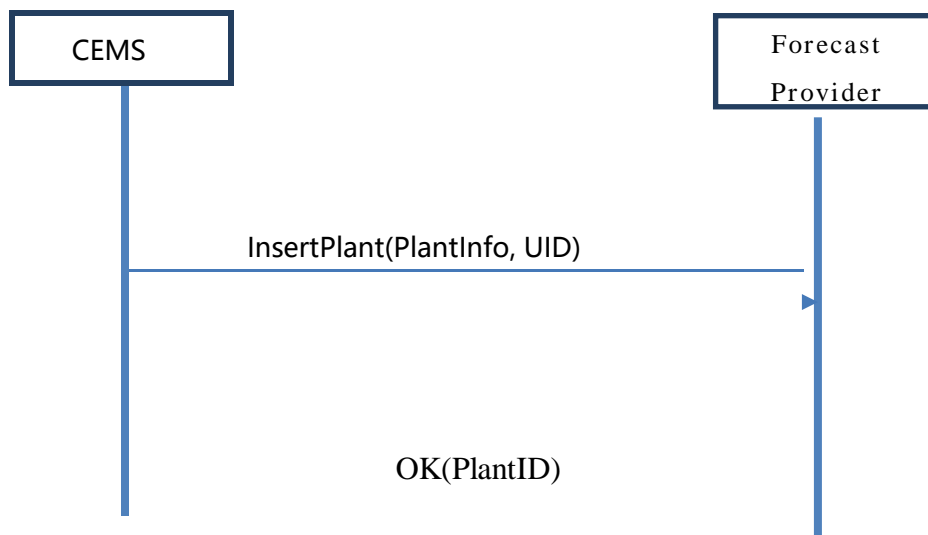
一般說明 General remarks

一般說明 General remarks
參閱相關叢集文件 See related cluster document

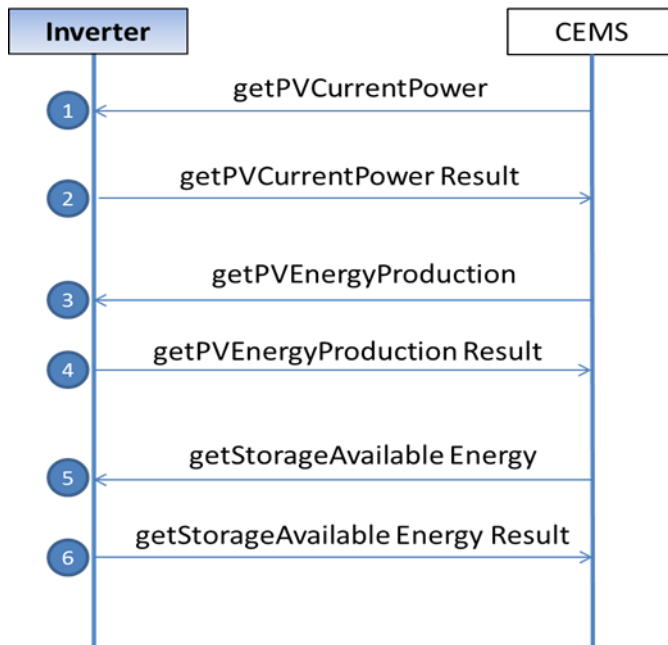
A.3.25.2 Drawing or 使用案例圖 Diagram of use case

使用案例圖 Diagram of use case

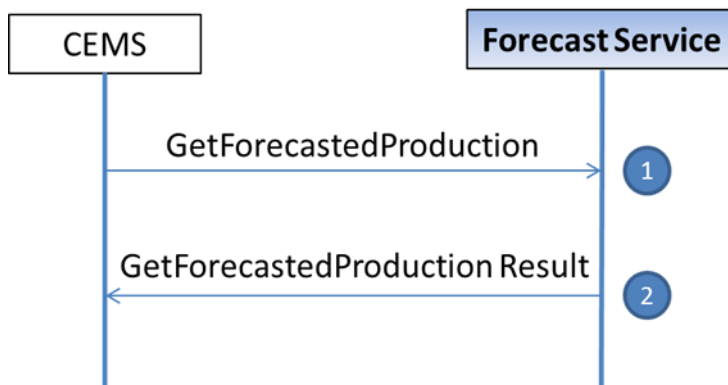
Step 1: Plant Forecast registration



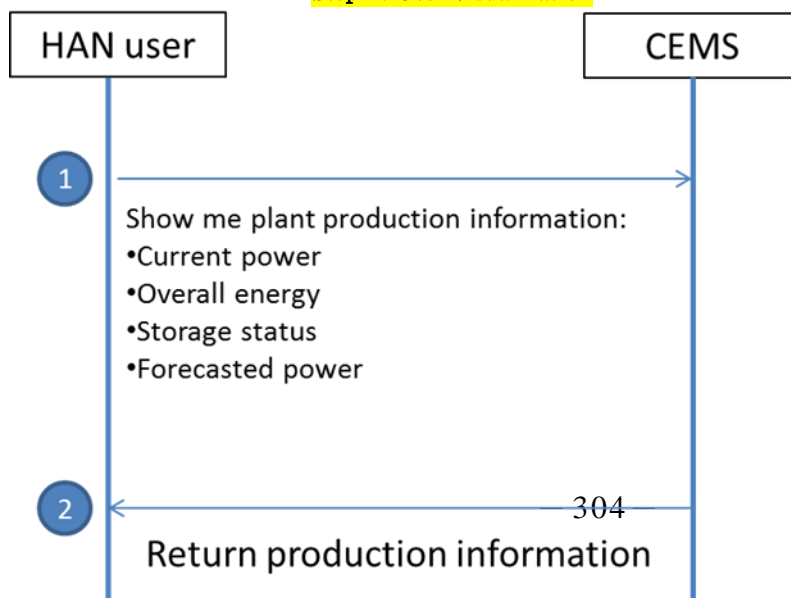
Step 2: Inverter data acquisition



Step 3: Forecast data acquisition



Step 4: User visualization



A.3.25.3 技術細節 Technical details

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

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。

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 Customer Energy Manager	內部 Internal	<p>承載一個 Web 應用程式，該應用程式從 Inverter 和預測服務收集資料並組織它們以進行用戶友好的演示。</p> <p>Hosts a Web application that collects data from Inverter and forecast service and organizes them for a user-friendly presentation.</p> <p>CEMS 將每隔一定時間定期觸發資料收集，具體取決於要查詢的組件(例如，每天一次進行預測，每分鐘一次進行逆變器)。</p> <p>Data collection will be triggered by the CEMS periodically every a certain amount of time, depending on the component to query (e.g. once a day for the forecast, once a minute for the inverter).</p>	
逆變器/儲存系統 Inverter/Storage system	外部 External	<p>提供一組資料，這些資料可通過太陽能發電廠的生產狀態以及可能的儲存系統來檢索。儲存系統可以包含在變頻器內部或液壓迴路內部，因此儲存與 CEM 之間存在直接通訊。資料根據請求發送。變頻器發送的資料僅代表當前值，因此 CEM 將儲存這些資料以保留歷史資料。</p> <p>Provides a set of data retrieved by photovoltaic plant production status and, possibly, by the storage system. The storage system is could be included inside the inverter or inside the hydraulic circuit, so there is direct communication between the storage and the CEM. Data are</p>	

		dispatched upon request. Data sent by inverter represents exclusively current values, so CEM will store these data to keep historical data.	
預測網路服務 Forecast Service	外部 Web External	<p>預測提供程序使服務可用，該服務在被調用時將返回安裝在特定家庭中的工廠的預期工廠功率值的集合。</p> <p>Forecast provider makes available a service that, when invoked, returns a collection of expected plant power values for the plant installed in a specific home.</p> <p>該服務提供 72 個功率值，接下來的 72 小時每小時一次。</p> <p>The service provides 72 power values, once an hour for the next 72 hours.</p>	
HAN 用戶 HAN user	外部 External	<p>是家庭用戶與 CEMS GUI 進行互動以獲取有關生產和儲存系統的資訊</p> <p>It's the home user that interacts with CEMS GUI to get information about production and storage system</p>	

A.3.25.4 使用案例的逐步分析 Step by step analysis of use case

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
1	生產和儲存資訊 Production and storage information	HAN 用戶, CEMS HAN user, CEMS	用戶訪問 CEMS GUI 監視太陽能發電廠變量 User accesses to the CEMS GUI to monitor PV plant variables	逆變器和預測資料採集正在運行。太陽能發電廠已在預報服務中註冊 Inverter and forecast data acquisition is running. PV plant has been registered in the forecast service	用戶訪問工廠生產和預測資訊 User accesses to the plant production and forecast information

情境 Scenario							
情境名稱： Scenario name:		生產和儲存資訊 Production and storage information					
步驟	事件	流程/活動名稱	流程/活動說明	服務	資訊生產者	資訊接收者	資訊交流

編號 Step No.	Event	Name of process/ activity	Description of process/ activity	Service	Information producer (Actor)	Information receiver (Actor)	Information exchanged
1	沒有 None	工廠預報登記 Plant forecast registration	<p>CEMS 向用戶提供註冊表格以填寫太陽能發電廠資料。之後提交，資料被發送到預測的 Web 服務，即把它們儲存並提供了一個 ID 用於預測請求</p> <p>CEMS provides a registration form to the user to fill PV plant data. After submission, data are sent to the forecast web service, that stores them and provides an ID to be used for forecast requests</p>	CREATE	CEMS	預報服務 Forecast Service	工廠資訊 Plant info
2	沒有 None	變頻器資料採集 Inverter data acquisition	<p>CEMS 會定期啟動逆變器資料採集過程：CEMS 發出 4 個請求，詢問主要的四個變量。</p> <p>Periodically the CEMS starts the inverter data acquisition process: the CEMS makes 4 requests asking for the main four variables.</p> <p>逆變器使用 CEMS 儲存在資料庫中的 4 個值來回應這些請求，以使用戶在請求工廠生產資訊時可以使用它們。</p> <p>The inverter responds to these requests with 4 values that are stored by CEMS in a database to let them be available by user when he/she requests the plant production information.</p>	GET	逆變器/儲存系統 Inverter/Storage system	CEMS	<p>當前太陽能發電 Current PV power</p> <p>總體能源生產由該工廠 Overall energy produced by the plant</p> <p>儲存中可用的當前能量(如果存在) Current energy available in storage (if present)</p> <p>電池可提供瞬時功率 Instantaneous power available from the battery</p>

3	Step 1	<p>預測資料採集</p> <p>forecast data acquisition</p>	<p>定期的 CEMS 開始預測資料採集過程：在 CEMS 使一個請求到預測的 Web 服務請求的預期植物功率的下一個小時。</p> <p>Periodically the CEMS starts the forecast data acquisition process: the CEMS makes a request to the Forecast Web Service asking for the expected plant power of the next hours.</p> <p>預測服務將返回一個序列預計權力在一個特定的日期是時間的 儲存通過 CEMS 在一個資料庫中，以讓它可通過用戶，當他/她要求預計工廠生產資訊。</p> <p>Forecast service returns a sequence of expected powers in a specific date time that is stored by CEMS in a database to let it be available by user when he/she requests the expected plant production information.</p>	GET	<p>預測網路服務</p> <p>Forecast Web Service</p>	CEMS	<p>72 個功率值，接下來的72小時每小時一次</p> <p>72 power values, once an hour for the next 72 hours</p>
4	Step 2/3	<p>用戶可視化</p> <p>User visualization</p>	<p>用戶通過家庭閘道器 Web 應用程式向 CEMS 請求有關其能源生產系統的資訊。</p> <p>User requests information about his/her Energy Production System to the CEMS through the Home Gateway web application.</p> <p>CEMS 顯示此資訊在一個用戶友好的界面。</p> <p>CEMS shows this</p>	REPORT	CEMS	HAN 用戶 HAN User	<p>沒有資訊交換 (僅顯示有關能源生產系統的資訊)</p> <p>No information exchanged (information about Energy Production System are only shown)</p>

			information in a user-friendly interface.				
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A.3.25.5 資訊交換**A.3.25.5 Information exchanged**

資訊交流 Information exchanged		
資訊名稱(ID) Name of information (ID)	交換資訊的說明 Description of information exchanged	資訊資料要求 Requirements for information data
工廠資訊 Plant info	有關太陽能發電廠的重要統計資訊和一般資訊 Vital statistics and general information about PV plant	
能源總產量(千瓦時) Total Energy production (kWh)	CEMS 向逆變器查詢太陽能產量。逆變器返回當前的太陽能產量 CEMS queries the Inverter for the PV Energy production. Inverter returns the current PV Energy production	
儲存可用能量(千瓦時) Storage available energy (kWh)	CEMS 向逆變器查詢儲存的可用能量。逆變器返回儲存的可用能量(如果有) CEMS queries the Inverter for the Storage available energy. Inverter returns the Storage available energy (if any)	
電池峰值功率 Peak power from the battery	CEMS 要求電池提供瞬時功率(如果有)。逆變器返回電池可提供的峰值功率 CEMS Asks for the instantaneous power available from the battery (if any). Inverter returns the Peak power deliverable from the battery	
工廠預測功率 Plant forecast power	CEMS 要求提供當前太陽能發電的預報服務。預測服務返回預期的電站功率 CEMS asks the forecast service for the current PV power. Forecast service returns the expected plant power	必須為 72 個預測值，每小時一次(3 天) Must be 72 forecast values, once per hour (3 days)

A.3.26 專用使用案例(JWG3102)斷電通知和分析

A.3.26 Specialized use case (JWG3102) Power loss notification and analysis

A.3.26.1 General

使用案例名稱

使用案例識別 Use case identification		
ID	域/區 Domain(s)/ Zone(s)	使用案例名稱
JWG310 2	Domain: Customer Premises, DER Zones: Process, Field, Station	斷電通知和分析 Power loss notification and analysis

版本管理

Version management

版本管理 Version management					
變化 /版本 Changes / Version	Date	領域專家 Domain expert	專業領域/領域/ 角色 Area of expertise/Domai n/Role	標題/變更 Title/Changes	批准狀態草案，徵 求意見，投票，最 終 Approval status draft, for comments, for voting, final
1.0	08/05/2014		使用案例 Use Cases	初稿 Initial Draft	草案 Draft
0.2	17/12/2014	家電 Home Appliances	使用案例 Use Cases	符合 IEC JWG-UC 格式的微小更改 Minor changes on formatting towards IEC JWG-UC	草案 Draft

使用案例基本資訊

Basic information on use case

參考文獻 References						
No.	參 考 資	參考	狀態	對 使 用 案 例	發起人/組織	鏈結

	料型式 Referenc es type	Reference	Status	的影響 Impact on use case	Originator/Organisation	Link
1	技 術 報 告 Technica l Report	使用案例 3.0 Use Cases 3.0	草案 Draft	UC 初始版本 UC initial version	能源@家庭協會 Energy@home Association	

更高階使用案例的關係 Relation to higher level use case	
叢集 Cluster	更高階使用案例 Higher level use case

使用案例的成熟度 – 在業務運營中，在演示項目中實現，在研發中，準備中，有遠見的 Maturity of use case – in business operation, realized in demonstration project, , realised in R&D, in preparation, visionary
優先序 Prioritisation
一般，區域或國家關係 Generic, Regional or National Relation
查看 – 技術/業務 View – technical/business
分類的其他關鍵字 Further keywords for classification

使用案例的範圍和目標 Scope and objectives of use case

使用案例的範圍和目標 Scope and objectives of use case	
範圍 Scope	在能量黑出 CEMS，配備有 UPS 的情況下，是能夠保證的正確活動為一個最小時間(60 秒)。它可以提醒該客戶有關的與事件的報警(如短信，電話呼叫)。如果一個 UPS 是 不存在，這是典型 的“事後”的情境的的過載管理使用

	<p>情況。</p> <p>In case of energy black out the CEMS, equipped with an UPS, is able to guarantee the correct activity for a minimum time (60 sec.). It can alert the customer about the event with an alarm (e.g. SMS, phone call). If an UPS is not present, this is typically the “ex-post” scenario of the Overload Management use case.</p>
目標 Objective(s)	<p>遵循使用案例的目的是幫助客戶了解斷電事件的原因，並在發生故障後管理適當的負載恢復。</p> <p>The aim of following use case is to help the customer to understand the cause of a power loss event and to manage proper load recovery after it.</p>
相關業務案例 Related business case(s)	

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>客戶能源管理向客戶發送 SMS，以通知他發生了斷電事件。事件結束時，CEM 重新開始向客戶發送有關事件之前家庭和裝置消耗的報告。用戶最終可以選擇做一些減少負載的事情。</p> <p>The Customer Energy Management sends an SMS to the customer to inform him that a power loss event occurred. At the end of the event the CEM restarts sending to the customer a report about home and appliances consumption before the event; the user can eventually choose to do something to reduce the loads.</p>
<p>完整說明 Short description</p> <p>在功率損耗可測量的負載之前，通常會將功耗資料發送到 CEMS。此外，SmartInfo 還會定期發送全局消耗和警報。該客戶能源管理系統 如果具有 UPS 功能切換到 UPS 和發送一個短信到的客戶。</p> <p>Before the power loss measurable loads routinely send consumption data to the CEMS. Also SmartInfo routinely sends global consumption and alerts. The Customer Energy Management System if has UPS capabilities switches to UPS and sends an SMS to the customer.</p> <p>如果 UPS 功能不可用或發生故障，則可以由外部服務器執行斷電檢測，例如，在閘道器閒置 1/2 小時後。</p> <p>If UPS capability is not available or fail, power loss detection could be performed by an external server, e.g. after ½ hour of gateway inactivity.</p> <p>在斷電事件結束時，必須告知客戶斷電的類型和原因，並可以做出適當的選擇來避免例如 斷路器的新行程。負載將按照其自己的過程重新啟動。智慧裝置將以發生斷電時的相同狀態重新啟動。CEM 重新啟動，從 SmartInfo 接收事件發生之前發生的警報，併計算事件的持續時間和類型(電網/斷路器跳閘停電)，並向客戶發送報告，其中還包含斷電之前的家庭和裝置消耗 用戶最終可以選擇做一些事情以減少負擔。</p> <p>At the end of the power loss event, the customer has to be informed about the type and cause of the power loss and can make appropriate choices to avoid e.g. a new trip of the circuit breaker. The loads restart following their own procedures. Smart Appliances will restart in the same state they were when black out occurred. The CEM restarts, receives from the SmartInfo the alert occurred before the event, and calculate the duration and type of the event (blackout on the grid/circuit breaker trip) and sends to the customer a report containing also home and appliances consumption before power loss. The user can eventually choose to do something to reduce the loads.</p>

問題：法律契約，法律法規，約束條件和其他

Issues: Legal contracts, legal regulations, constraints and others

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
HAN 用戶 HAN user	用戶開始在 CEM GUI 中填寫工廠註冊表格 User starts to fill the plant registration form in the CEM GUI		
CEMS	CEM 定期開始向太陽能逆變器請求工廠生產值 CEM periodically starts to request plant production values to the PV inverter		在執行此步驟之前，必須在 CEM 和逆變器之間建立連接 Connection between CEM and inverter has to be established before executing this step
CEMS	CEM 定期開始向 Forecast Web 服務請求工廠產量預測 CEM periodically starts to request plant production forecast to the Forecast Web Service	步驟 1 (工廠預報註冊) Step 1 (Plant Forecast registration)	
HAN 用戶 HAN user	用戶訪問 CEM GUI 以監視太陽能發電廠變量 User accesses to the CEM GUI to monitor PV plant variables	步驟 2 (逆變器資料採集)和步驟 3 (預測資料採集) Step 2 (Inverter data acquisition) & 3 (Forecast data acquisition)	

前提條件，假設，後期條件，事件

Preconditions, assumptions, post condition, events

使用案例條件 Use case conditions			
行為者/系統/資訊/	觸發事件	前提條件	假設條件

契約 Actor/System/Information/Contract	Triggering event	Pre-conditions	Assumption
智慧資訊 SmartInfo	過載警告通知 Overload notification Warning	高於契約功率之 能耗 Consumption above contractual power	事件之前，智慧資訊會通知 CEM 有過載警告 Before the event Smart Info notifies the CEM that there is an overload warning

引用的標準及/或標準化委員會(如果有)

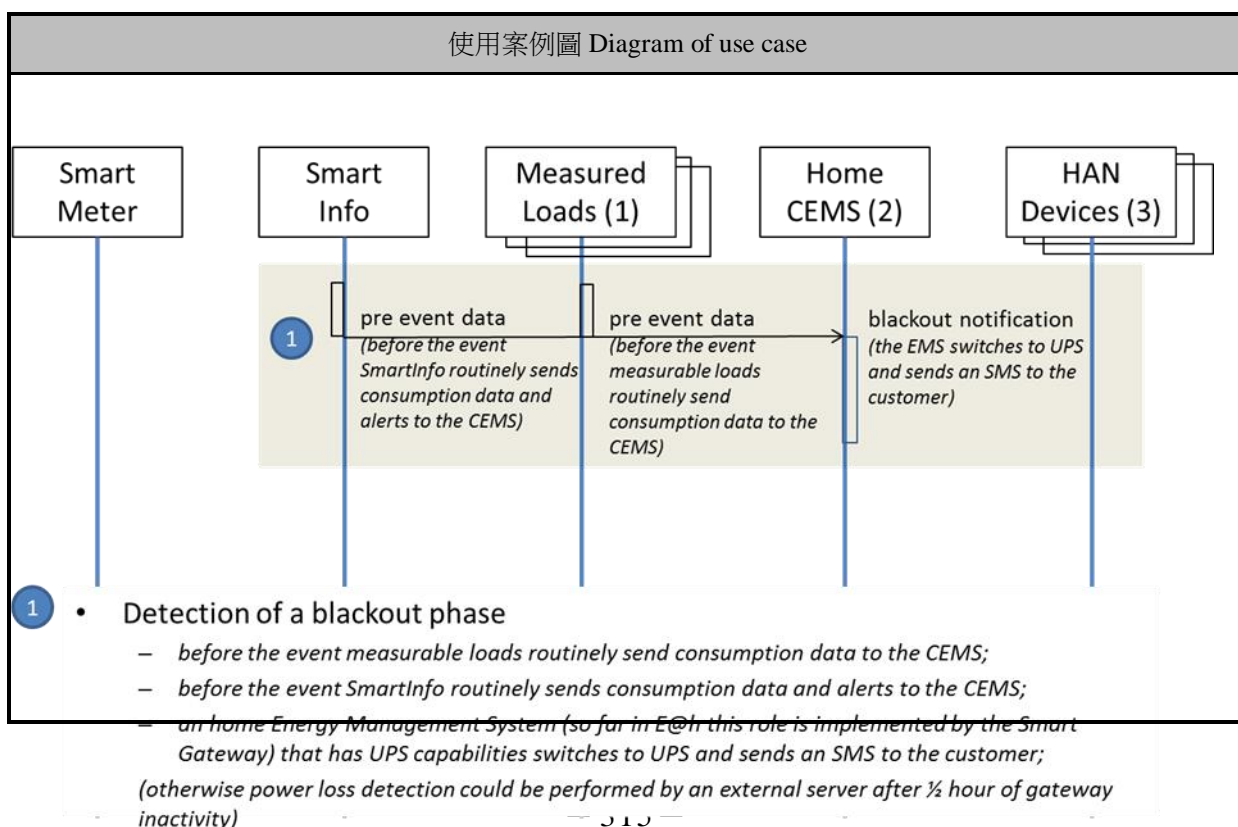
Referenced standards and/or standardization committees (if available)

相關標準化委員會 Relevant Standardization Committees	支持使用案例的標準 Standards supporting the use case	標準狀態 Standard status

一般說明 General remarks

一般說明 General remarks
參閱相關叢集文件 See related cluster document

A.3.26.2 Drawing or 使用案例圖 Diagram of use case

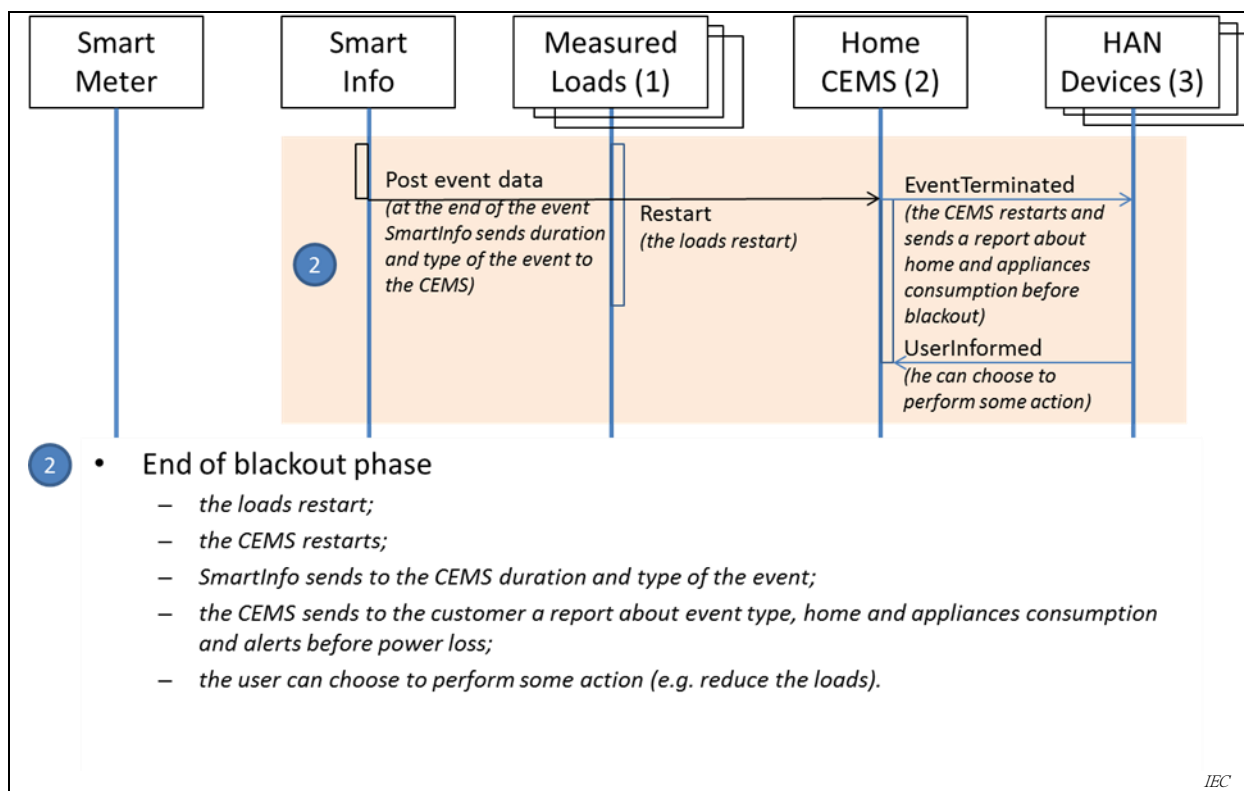


(1) Devices that have some load measurement capability, including devices connected to a smart plug

(2) Home Customer Energy Management System

(3) Devices that have user notification capabilities (e.g. display, SMS, buzzer, ...)

IEC



A.3.26.3 技術細節 Technical details

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

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			
分組(社群)		群組說明	
Grouping (Community)		Group description	
行為者名稱請參閱行為者列表		行為者說明請參閱行為者列表	
Actor	name	see	特定於此使用案例的更多資訊
	行為者類型請參閱行	Actor description see Actor list	

Actor list	為者列表 Actor type see Actor list		Further information specific to this use case
智慧資訊 Smart Info	待定 TBD	<p>智慧電錶使用智慧資訊作為到家庭用戶裝置的通訊橋樑。</p> <p>The Smart Meter uses the Smart Info as a communication bridge to the user devices in the home premises.</p> <p>該智慧資訊在功率損耗事件上不活躍，在事件結束時，智慧電錶透過智慧資訊，提供事件發生前之警報給 CEMS。</p> <p>The Smart Info is not active during the power loss event. At the end of the event the Smart Meter, by means of the Smart Info, provides to the CEMS the alert occurred before the event.</p> <p>若停電智慧資訊連到達電錶，因此它不會向 HAN 送出任何專用訊息。</p> <p>In case of black out the Smart Info will not be able to reach the Meter, hence it shall not emit any dedicated message toward the HAN.</p>	
CEM	待定 TBD	<p>若客戶能源管理系統具有 UPS 功能，其將傳送 SMS 給客戶，否則外部服務器可進行斷電檢測，例：在閘道器閒置 0.5 小時後。</p> <p>The Customer Energy Management System sends an SMS to the customer if it has UPS capabilities otherwise power loss detection could be performed by an external server, e.g. after ½ hour of gateway inactivity.</p> <p>事件結束時，CEMS 將能計算事件持續時間及類型(電網/斷路器跳閘之停電)。</p> <p>At the end of the event the CEMS will have the possibility to calculate the duration and type of the event (blackout on the grid/circuit breaker trip).</p> <p>CEMS 可啟動 SMS 或聲音警報</p> <p>CEMS could activate a SMS or a voice call alarm</p>	
智慧家電 Smart Appliances	TBD	<p>智慧家電：</p> <p>The Smart Appliances:</p> <ul style="list-style-type: none"> 事件前定期傳送能耗資料至 CEMS。 before the event routinely send consumption data to the CEMS 事件結束時恢復先前的狀態。 at the end of the event return to the status they were before 	

		the event.	
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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
行為者類型請參閱行為者列表 Actor type see Actor list			
用戶 User		<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>	

A.3.26.4 使用案例的逐步分析 Step by step analysis of use case

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
1	斷電通知和分析 Power loss notification and analysis	CEM, SmartInfo	高於契約功率之能耗 Consumption above contractual power	過載警告通知 Overload Warning notification	建築物停電 Premises black out

情境 Scenario							
情境名稱： Scenario name:		斷電通知和分析 Power loss notification and analysis					
步驟編號	事件 Event	流程/活動名稱 Name of process/	流程/活動說明 Description of process/ activity	服務 Service	資訊生產者 Information producer	資訊接收者 Information receiver	資訊交流 Information exchanged

Step No.		activity			(Actor)	(Actor)	
1	1	停電通知 Blackout notification	CEM 切換到 UPS 並向客戶發送 SMS The CEM switches to UPS and sends an SMS to the customer		CEM	User	賽前資料 Pre event data
	2	智慧裝置重啟 Smart Device restart	CEM 和智慧裝置將按照其自身的程序重新啟動。 CEM and smart device restart following their own procedures.		智慧裝置 Smart device	CEM	
	3	發布活動 Post event	智慧資訊發送到 CEM 持續時間和類型的的事件 Smart Info sends to the CEM duration and type of the event		智慧資訊 Smart Info	CEM	發布事件資料 Post event data
	4	報告事件 Report about the event	CEM 向用戶發送有關事件類型，家庭和裝置消耗以及斷電前警報的報告 The CEM sends to the user a report about event type, home and appliances consumption and alert before power loss		CEM	User	活動終止 EventTerminated
	5	用戶執行的操作 Action performed by user	用戶可以選擇執行一些操作以減少負載 The user can choose to perform some action to reduce the loads		User	智慧裝置 Smart device	

A.3.26.5 資訊交流

A.3.26.5 Information exchanged

資訊交流 Information exchanged		
資訊名稱(ID)	交換資訊的說明	資訊資料要求

Name of information (ID)	Description of information exchanged	Requirements for information data
停電通知 Blackout notification	短信給客戶 SMS to the customer	
發布事件資料 Post event data	活動的持續時間和類型 Duration and type of the event	
活動終止 Event Terminated	報告 Report	

A.3.27 專用使用案例(JWG3103)歷史資料可視化(外部資料處理和儲存)

A.3.27 Specialized use case (JWG3103) Historical data visualization (external data processing and storage)

A.3.27.1 General

使用案例名稱

使用案例識別 Use case identification		
ID	域/區 Domain(s)/ Zone(s)	使用案例名稱
JWG3103	域：客戶端、DER Domain: Customer Premises, DER 區：過程，場域，變電所 Zones: Process, Field, Station	查看歷史資料(外部資料處理和儲存) Historical data viewing (external data processing & storage)

版本管理

Version management

版本管理 Version management					
變化 /版本 Changes / Version	Date	領域專家 Domain expert	專業領域/ 領域/角色 Area of expertise/D omain/Role	標題/變更 Title/Changes	批准狀態草案， 徵求意見，投票，最終 Approval status draft, for comments, for voting, final
1.0	21/10/2014			初稿	草案

				Initial Draft	Draft
0.2	17/12/2014	家電 Home Appliances	使用案例 Use Cases	符合 IEC JWG-UC 格式的 微小更改 Minor changes on formatting towards IEC JWG-UC	草案 Draft

使用案例基本資訊

Basic information on use case

參考文獻 References						
No.	參考資料型式 References type	參考 Reference	狀態 Status	對使用案例的影響 Impact on use case	發起人/組織 Originator/Organisation	Link
1	技術報告 Technical Report	使用案例 3.0 Use Cases 3.0	草案 Draft	UC 初始版本 UC initial version	能源@家庭協會 Energy@home Association	

更高階使用案例的關係 Relation to higher level use case	
叢集 Cluster	更高階使用案例 Higher level use case

使用案例的成熟度 – 在業務運營中，在演示項目中實現，在研發中，準備中，有遠見的 Maturity of use case – in business operation, realized in demonstration project, , realised in R&D, in preparation, visionary
優先序 Prioritisation
一般，區域或國家關係 Generic, Regional or National Relation

查看 - 技術/業務 View – technical/business
分類的其他關鍵字 Further keywords for classification

使用案例的範圍和目標 Scope and objectives of use case

使用案例的範圍和目標 Scope and objectives of use case	
範圍 Scope	將歷史資料從 CEMS 導出到外部(專用)服務器 Export historical data from CEMS toward external (private) server
目標 Objective(s)	最終用戶選擇來設定了該上傳的自己的資料向一個互聯網服務器進行後期處理和儲存。的服務器的所有者將提供處理如同意與該最終用戶(即資料聚集，歷史消耗曲線圖等)。 The end user choose to set-up the uploading of own data toward an internet server for post process and storage. The server owner will provide processing as agreed with the end-user (i.e. data aggregation, historical consumption graphs etc.).
相 關 業 務 案 例 Related business case(s)	

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 Short description
<p>在 CEM 上，用戶將發現與“目標服務器”，身份驗證模式，要觸發的計時器/事件，要標記為要導出的資料列表有關的可配置設定。</p> <p>On CEMs the user will find configurable set up related to “destination server”, authentication mode, timer/events to trigger, data list to be flag for export.</p> <p>設定完成後，觸發發生時，CEMS 將打開與目標服務器的安全連接，並使用身份驗證建立安全會話，在此期間 CEMS 上載資料(即使用 SFTP 協議，CEMS 可以發送 XML 文件)</p> <p>Once the setup is complete, when the trigger occurs the CEMS opens a secure connection with the destination server and using the authentication establishes the secured session, during whom CEMS uploads data (i.e. using SFTP protocol, CEMS can send an XML file)</p>

問題：法律契約，法律法規，約束條件和其他

Issues: Legal contracts, legal regulations, constraints and others

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	行為者類型請參閱行為者列	行為者說明請參閱行為者列表	特定於此使用案例的更多資訊

Actor name see Actor list	表 Actor type see Actor list	Actor description see Actor list	Further information specific to this use case
CEMS		<p>其收集通過 HAN 裝置發送之狀態通知、事件、警報</p> <p>It collects the status notification , events, alarms sent from the devices over the HAN</p> <p>其接收遠端 GUI 請求，以修改裝置狀態(例：週期選擇、裝置開關、開始/停止命令)</p> <p>It receives from the Remote GUI the request to modify the status of the devices (e.g. selection of a cycle, ON/OFF of the device, start/stop commands)</p> <p>其傳送修改請求至通過 HAN 裝置</p> <p>It sends the modification request to the devices over the HAN</p> <p>其傳送裝置狀態通知至遠端 GUI</p> <p>It sends the device status notification to the Remote GUI</p> <p>依據採用之技術方案，CEMS 可以作為裝置與遠端 GUI 間之簡單通道，或對接收之資料實作類別解析。</p> <p>Depending on the adopted technical solution, the CEMS can act as a simple tunnel between the device and the Remote GUI or can implement some type of parsing of the data received.</p> <p>其可對短時間可匯出之歷史資料進行解析及儲存。</p> <p>It can also parse and store, for a small amount of time, historical data ready for export.</p>	
目的地 服務器 Dest. Server		<p>其提供與 CEMS 安全會談及收集/儲存/處理資料，檢索與終端使用者(服務訂閱者)一致資料。</p> <p>It provides the secure session with CEMS (s) and collect/store/process data retrieved as agreed with</p>	

		end-users (service subscribers).	
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前提條件，假設，後期條件，事件

Preconditions, assumptions, post condition, events

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
用戶 User	用戶將EV停在EVSE附近並符合充電偏好。 The user parks the EV near the EVSE and fits the charging preferences.		

引用的標準及/或標準化委員會(如果有)

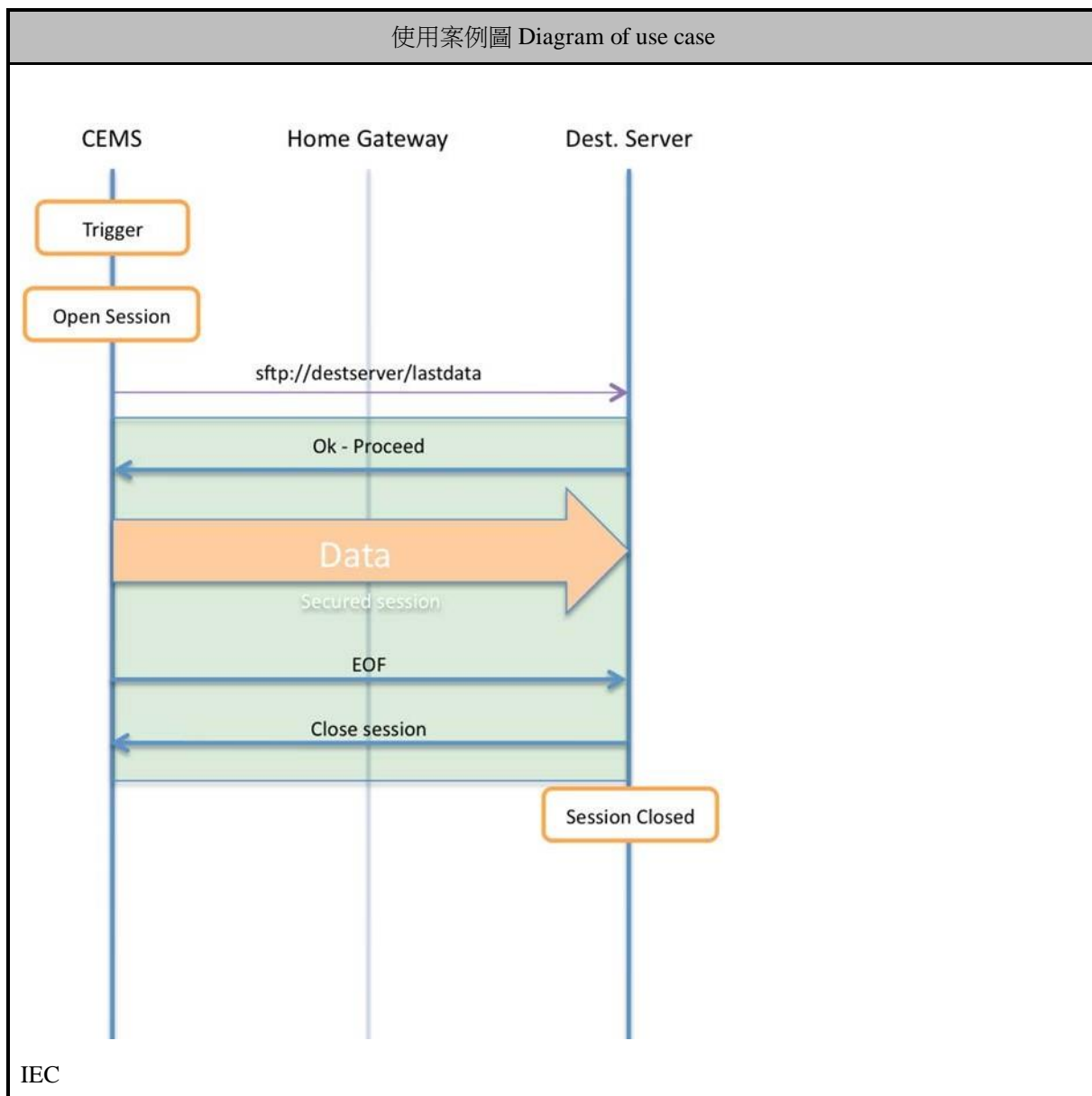
Referenced standards and/or standardization committees (if available)

相關標準化委員會 Relevant Committees	Standardization	支持使用案例的標準 Standards supporting the use case	標準狀態 Standard status

一般說明 General remarks

一般說明 General remarks
<p>該提案以讓該 CEMS 發起的安全會議上向一個外部服務器是由於事實，即並非所有最終用戶都能夠以配置“端口轉發”或“防火牆規則”在他們自己的家連接調製解調器/路由器。此外，在問“口口”或使用的自動配置為 UPnP 的公開最終用戶對不必要的安全隱患，並且該財團可能會被認為是“負責任”由該用戶在任何入侵檢測的情況下，社區。</p> <p>The proposal to let the CEMS initiate the secure session toward an external server is due to the fact that not all end users are able to configure “port forwarding” or “firewalls rules” on their own home connection modem/routers. Moreover, the ask for “port openings” or the use of automatic provisioning as upnp exposes the end user to unnecessary security risks, and the consortium could be considered “responsible” by the users community in case of any intrusion detection.</p> <p>相反，如果 CEMS 建立連接和資料上傳，則唯一的責任是“目標服務器”設定的最終用戶和資料管理/保護的服務器所有者。</p> <p>On the contrary, if the CEMS establishes the connection and data uploading, the only responsibilities are end- user for the “destination server” setup and the server owners for data management/protection.</p>

A.3.27.2 Drawing or 使用案例圖 Diagram of use case



A.3.27.3 技術細節 Technical details

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

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	
分組(社群)	群組說明
Grouping (Community)	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
智慧資訊 Smart Info	TBD	<p>智慧電錶使用智慧資訊作為到家庭用戶裝置的通訊橋樑。</p> <p>The Smart Meter uses the Smart Info as a communication bridge to the user devices in the home premises.</p> <p>該智慧資訊在功率損耗事件上不活躍，在事件結束時，智慧電錶透過智慧資訊，提供事件發生前之警報給 CEMS。</p> <p>The Smart Info is not active during the power loss event. At the end of the event the Smart Meter, by means of the Smart Info, provides to the CEMS the alert occurred before the event.</p> <p>若停電智慧資訊連到達電錶，因此它不會向 HAN 送出任何專用訊息。</p> <p>In case of black out the Smart Info will not be able to reach the Meter, hence it shall not emit any dedicated message toward the HAN.</p>	

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
CEM	待 定 TBD	<p>若客戶能源管理系統具有 UPS 功能，其將傳送 SMS 給客戶，否則外部服務器可進行斷電檢測，例：在閘道器閒置 0.5 小時後。</p> <p>The Customer Energy Management System sends an SMS to the customer if it has UPS capabilities otherwise power loss detection could be performed by an external server, e.g. after ½ hour of gateway inactivity.</p> <p>事件結束時，CEMS 將能計算事件</p>	

		<p>持續時間及類型(電網/斷路器跳開之停電)。</p> <p>At the end of the event the CEMS will have the possibility to calculate the duration and type of the event (blackout on the grid/circuit breaker trip).</p> <p>CEMS 可啟動 SMS 或聲音警報</p> <p>CEMS could activate a SMS or a voice call alarm</p>	
智慧家電 Smart Appliances	待定 TBD	<p>智慧家電：</p> <p>The Smart Appliances:</p> <ul style="list-style-type: none"> 事件前定期傳送能耗資料至 CEMS。 before the event routinely send consumption data to the CEMS 事件結束時恢復先前的狀態。 at the end of the event return to the status they were before the event. 	
用戶 User		<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>	

A.3.27.4 使用案例的逐步分析 Step by step analysis of use case

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

情境 Scenario	
情境名稱： Scenario name:	斷電通知和分析 Power loss notification and analysis

步驟編號 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 Information producer (Actor)	資訊接收者 Information receiver (Actor)	資訊交流 Information exchanged

A.3.27.5 資訊交流

A.3.27.5 Information exchanged

資訊交流 Information exchanged		
資訊名稱(ID) Name of Information (ID)	交換資訊的說明 Description of information exchanged	資訊資料要求 Requirements for information data