Emergency load control

Link to explanations, examples and the selection list for indicated fields, please refer to document "Use Case Description draft ver0.55"

<http://www.cen.eu/cen/Sectors/Sectors/UtilitiesAndEnergy/SmartGrids/Pages/default.aspx>

Version of Template: 0.55, Sept 2011

# Description of the Use Case

* + *General*
  + *Name of Use Case*

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| --- | --- | --- | --- |
| ***ID*** | ***Domain*** | ***Name of Use Case*** | ***Level of Depth***  *Cluster, High Level Use Case, Detailed Use Case* |
| WGSP-2122 | Smart Home/Commercial/Industrial/DR-Customer EMS | Primary use case - Emergency load control | Detailed Use Case |

* + *Version Management*

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| --- | --- | --- | --- | --- | --- | --- |
| ***Changes / Version*** | ***Date*** | ***Name  Author(s) or Committee*** | ***Domain Expert*** | ***Area of Expertise / Domain / Role*** | ***Title*** | ***Approval Status***  *draft, for comments, for voting, final* |
| 0.4 | 30/07/2012 | ESMIG - Willem Strabbing &Tim Sablon | Primary | AMI | - | Proposed |
| 0.5 | 12/11/2012 | ESMIG - Willem Strabbing &Tim Sablon | Primary | AMI | - | Validated |

* + *Basic Information to Use Case*

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| --- | --- | --- |
| ***Source(s) / Literature*** | ***Link*** | ***Conditions (limitations) of Use*** |
| - | - | - |

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| ***Relation to Higher Level Use Case*** | |
| ***Cluster*** | ***Higher Level Use Case*** |
| - | - |

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| ***Maturity of Use Case*** *- in business operation, realized in demonstration project, realised in R&D, in preparation, visionary* |
| - |
| ***Prioritisation*** |
| - |
| ***Generic, Regional or National Relation*** |
| Generic |
| ***View*** *- Technical / Business* |
| Technical |
| ***Further Keywords for Classification*** |
| - |

* + *Scope and Objectives of Use Case*

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| ***Scope and Objectives of Function*** |
| See WGSP2120 |

* + *Narrative of Use Case*

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| ***Narrative of Use Case*** |
| ***Short description*** *- max 3 sentences* |
| See WGSP2120 |
| ***Complete description*** |
| When there is a risk of a blackout in a given area, an emergency signal from actor A or B can request Smart devices to turn to network standby according to a safe procedure set by the manufacturer. The signal may or may not contain predefined time duration. The grid may also provide a signal 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 signal is sent to the home and how the CEM reacts to this. Use case “WGSP-2300 Emergency Demand Signals - 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 signal is sent through the CEM, to the devices. In case the emergency load control signal 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. |

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

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| --- | --- | --- |
| ***Actor Name*** | ***Actor Type*** | ***Actor Description*** |
| - | - | - |

* + *Issues: Legal Contracts, Legal Regulations, Constraints and others*

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| --- | --- | --- |
| ***Issue -*** ***here specific ones*** | ***Impact of Issue on Use Case*** | ***Reference -*** *law, standard, others* |
| URL contains sequence digram of only first use case | - | - |

* + *Preconditions, Assumptions, Post condition, Events*

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| --- | --- | --- | --- |
| ***Actor/System/Information/Contract*** | ***Triggering Event*** | ***Pre-conditions*** | ***Assumption*** |
| ***-*** | - | - | - |

* + *Referenced Standards and / or Standardization Committees (if available)*

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| ***Relevant Standardization Committees*** | ***Standards supporting the Use Case*** | ***Standard Status*** |
| - | - | - |

* + *General Remarks*

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| ***General Remarks*** |
| URL to sequence diagram first scenario: http://www.lupiupload.de/images/2012/08/22/66d384be5179a5bb48a0cc681c8d76f2e02cf0ad.jpg  URL to secquence diagram second scenario: http://www.lupiupload.de/images/2012/08/22/53c0203482c9853d4d093912eb098119814ff9ae.jpg |

# Drawing or Diagram of Use Case

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| ***Drawing or Diagram of Use Case*** ***- recommended "context diagram" and "sequence diagram" in UML*** |
| http://www.lupiupload.de/images/2012/08/22/66d384be5179a5bb48a0cc681c8d76f2e02cf0ad.jpg |

# Step by Step Analysis of Use Case

| **S.No** | **Primary Actor** | **Triggering Event** | **Pre-Condition** | **Post-Condition** |
| --- | --- | --- | --- | --- |
| Emergency load control | Actor A or Actor B | The need for an emergency reduction of power consumption / feed-in is identified | Communication between all actors can be established | The CEM ordered all smart devices to switch off and sent confirmation back to actor A or to the HES |
| Announce end of emergency load control | Actor A or Actor B | There is no more need for an emergency reduction of power consumption / feed-in | Communication between all actors can be established | 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 |

* + ***Steps - Normal Scenario***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Scenario*** ***Name:*** | | ***Emergency load control*** | | | | |
| ***Step No.*** | ***Event*** | ***Description of Process/Activity*** | ***Information Producer*** | ***Information Receiver*** | ***Information Exchanged*** | ***Technical Require-ments ID***  *see* *Annex A Selection List* |
| 1 | The need for an emergency reduction of power consumption / feed-in is identified | Actor A sends an emergency signal to the Energy Management Gateway (alternative) | Actor A (external actor) | Energy management gateway | Emergency signal |  |
| 2 | The need for an emergency reduction of power consumption is identified | Actor B sends an emergency signal to the Smart metering gateway (LNAP (alternative) (via the metering channel) | Actor B (external actor) | Smart Metering gateway (LNAP) | Emergency signal |  |
| 3 | Smart Metering Gateway (LNAP) receives the emergency signal | Smart Metering Gateway (LNAP) sends emergeny signal to Energy Management Gateway | Smart Metering gateway (LNAP) | Energy management gateway | Emergency signal |  |
| 4 | Energy Management Gateway receives the emergency signal | Energy Management Gateway forwards the emergency signal to CEM | Energy management gateway | Customer Energy Manager (CEM) | Emergency signal |  |
| 5 | CEM receives the emergency signal | CEM orders all smart devices to switch to network standby | Customer Energy Manager (CEM) | Smart device | Emergency load management signal |  |
| 6 | Smart devices received emergency signal | Smart devices switch to network standby and send confirmation back to CEM | Smart device | Customer Energy Manager (CEM) | Confirmation |  |
| 7 | CEM receives confirmation | CEM sends confirmation to Energy Management Gateway | Customer Energy Manager (CEM) | Energy management gateway | Confirmation |  |
| 8 | Energy Management Gateway receives confirmation | Energy Management forwards confirmation to Actor A (Alternative) | Energy management gateway | Actor A (external actor) | Confirmation |  |
| 9 | Energy Management Gateway receives confirmation | Energy Management forwards confirmation to Smart metering gateway (LNAP) (Alternative) | Customer Energy Manager (CEM) | Smart Metering gateway (LNAP) | Confirmation |  |
| 10 | Smart Metering Gateway (LNAP) receives confirmation | Smart metering gateway forwards confirmation to Actor B (Alternative) (via the metering channel) | Smart Metering gateway (LNAP) | Actor B (external actor) | Confirmation |  |

* + ***Steps - Normal Scenario***

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| --- | --- | --- | --- | --- | --- | --- |
| ***Scenario*** ***Name:*** | | ***Announce end of emergency load control*** | | | | |
| ***Step No.*** | ***Event*** | ***Description of Process/Activity*** | ***Information Producer*** | ***Information Receiver*** | ***Information Exchanged*** | ***Technical Require-ments ID***  *see* *Annex A Selection List* |
| 1 | There is no more need for an emergency reduction of power consumption / feed-in | Actor A sends an end of emergency signal to the Energy Management Gateway (alternative) | Actor A (external actor) | Energy management gateway | End of emergency signal |  |
| 2 | There is no more need for an emergency reduction of power consumption / feed-in | Actor B sends an end of emergency signal to the Smart metering gateway (LNAP (alternative) (via the metering channel) | Actor B (external actor) | Smart Metering gateway (LNAP) | End of emergency signal |  |
| 3 | Smart Metering Gateway (LNAP) receives the signal | Smart Metering Gateway (LNAP) sends end of emergeny signal to Energy Management Gateway | Smart Metering gateway (LNAP) | Energy management gateway | End of emergency signal |  |
| 4 | Energy Management Gateway receives the emergency | Energy Management Gateway forwards the end of emergency signal to CEM | Energy management gateway | Customer Energy Manager (CEM) | End of emergency signal |  |
| 5 | CEM receives the end of emergency signal | CEM sends a message to smart devices, allowing them to operate in normal mode | Customer Energy Manager (CEM) | Smart device | End of emergency signal |  |
| 6 | CEM receives the end of emergency signal | CEM sends confirmation to Energy Management Gateway | Customer Energy Manager (CEM) | Energy management gateway | Confirmation |  |
| 7 | Energy Management Gateway receives confirmation | Energy Management forwards confirmation to Actor A (Alternative) | Energy management gateway | Actor A (external actor) | Confirmation |  |
| 8 | Energy Management Gateway receives confirmation | Energy Management forwards confirmation to Smart metering gateway (LNAP) (Alternative) | Customer Energy Manager (CEM) | Smart Metering gateway (LNAP) | Confirmation |  |
| 9 | Smart Metering Gateway (LNAP) receives confirmation | Smart metering gateway forwards confirmation to Actor B (Alternative) (via the metering channel) | Smart Metering gateway (LNAP) | Actor B (external actor) | Confirmation |  |