Flexibility offerings

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 2128 | Smart Home/Commercial/Industrial/DR-Customer EMS | High level use case - Flexibility offerings | High-level 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* |
| 0.2 | 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* |
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| ***Prioritisation*** |
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| ***Generic, Regional or National Relation*** |
| Generic |
| ***View*** *- Technical / Business* |
| Technical |
| ***Further Keywords for Classification*** |
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* + *Scope and Objectives of Use Case*

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| ***Scope and Objectives of Function*** |
| Related business case  The flexibility concept assumes that parties connected to the grid produce offerings of flexibility in load and (distributed) generation. Thereby, so-called flex-offers are issued indicating these power profile flexibilities, e.g. shifting in time or changing the energy amount. In the flex-offer approach, consumers and producers directly specify their demand and supply power profile flexibility in a fine-grained manner (household and SME level). Flex-offers are dynamically scheduled in near real-time, e.g. in case when the energy production from renewable energy sources, such as wind turbines, deviates from the forecasted production of the energy system.  The use case introduces two conceptual roles: • Flexibility provider (role taken by e.g. parties connected to the grid with flexibility in production, consumption and/or storage of electricity). Relating this role to the functional architecture described below, this role is taken up by the CEMS, which identifies potential flexibilities of connected devices (appliances / generators / storage), calculates and sends a flexibility offering, keeping in mind constraints and preferences set by the end-user. •   Flexibility acquirer (role taken by e.g. suppliers or other parties which have a use for acquiring flexibility in supply / demand, e.g. integration of wind into their portfolio). Relating this role to the functional architecture described below, this role is taken up by Actor A and/or Actor B     Scope The scope of this use case is the communication between the CEM and "upstream" 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).   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). Note that multiple loads/generation resources (even from multiple premises) can be combined in the CEM to be mutually controlled.  From an architectural point of view the Smart Grid Coordination Group introduced the "Smart Grid Connection Point" (SGCP) entity as an interface between Smart Grid actors (applications and/or organizations) and in-home/building systems or devices. See the WGSP report (chapter 6.2) for further details.  Objectives  Exchange of offerings of the use of flexibility in supply and demand with another party, negotiation of these offerings and activation |

* + *Narrative of Use Case*

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| ***Narrative of Use Case*** |
| ***Short description*** *- max 3 sentences* |
| Flexibility offerings are sent from flexibility providers to one or more (potential) users of flexibility. These offerings are negotiated and if successful exercised by the acquiring party. The offerings state the available flexibility in the dimensions of time, power/energy and finance. |
| ***Complete description*** |
| This use case describes how two market roles offer, accept and assign demand or generation flexibility.  The central concept of the approach is the flex-offer specification. Essentially, a flex-offer is a request for demand or supply of energy with specified flexibilities.  On the prosumer level and within its CEM, a flex-offer is bound to one or more devices consuming or producing electricity, e.g. a dishwasher, dryer, washing machine, swimming pool pump, electrical heating, heat pump device, charging of an electric vehicle, and combined generation of heat and power.  In this use case, we assume that flexibility offers are only created in the CEM. The end user can set constraints on the capability of the CEM to create flexibility offers. Constraints may be set on:  -       Which loads and user specified conditions are available for providing flexibility  -       Start time of the flexibility (start time within a certain time period)  -       Duration of the flexibility (d)  -       Amount of flexible power at a point in time (p)  -       Amount of flexible energy (e = d \* p)  Such constraints may be set by legal / contractual entities, for example to avoid clogging of the network there may be a regulatory constraint that flexibility offers may only be sent every x minutes or only if the offered flexibility exceeds a certain amount of energy  Flexibility offerings are sent from flexibility providers to one or more (potential) users of flexibility. The offerings state the available flexibility in the dimensions of time (when can production / consumption take place) power and/or energy (what can be produced / consumed) and finance (in return for what compensation).  These offerings are negotiated by a process of offering, accepting or rejecting, possibly followed by providing a different offering. Reasons for accepting and rejecting include suitability of the offered flexibility (the expected value of the flexibility in e.g. a portfolio) and financial aspects. Finally after successful negotiation, the acquired flexibility exercised by the acquiring party. Exercising an accepted offering is done by assigning the variables in the offering which define the flexibility, i.e. time, power/energy and finance. |

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

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| ***Actor Name*** | ***Actor Type*** | ***Actor Description*** |
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* + *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* |
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* + *Preconditions, Assumptions, Post condition, Events*

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| ***Actor/System/Information/Contract*** | ***Triggering Event*** | ***Pre-conditions*** | ***Assumption*** |
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* + *Referenced Standards and / or Standardization Committees (if available)*

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| ***Relevant Standardization Committees*** | ***Standards supporting the Use Case*** | ***Standard Status*** |
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* + *General Remarks*

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| ***General Remarks*** |
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# Drawing or Diagram of Use Case

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| ***Drawing or Diagram of Use Case*** ***- recommended "context diagram" and "sequence diagram" in UML*** |
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# Step by Step Analysis of Use Case

| **S.No** | **Primary Actor** | **Triggering Event** | **Pre-Condition** | **Post-Condition** |
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