

## IEA DSM USER CENTRED ENERGY SYSTEMS TCP – SOCIAL LICENSE TO AUTOMATE

### COMMON TEMPLATE

This template was developed in order to collect information on a number of aspects of running and completed Demand Side Management Projects that are likely to be of relevance regarding end-user acceptance and the granting of a “Social License to Automate”. It consists of 8 sections:

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Please address sections as appropriate for the project in question but try to cover as many of the points as possible. The descriptions at the top of each section can be used to as a guide for more open answers with the detail questions below to be used as pointers for aspects to be considered.

## Section 1: Project Details

*This section concerns basic information around the project and should be fully completed.*

1. Project name:
2. Project lead organization:
3. Project partner organizations:
4. Project funding bodies:
5. Project funding amount:
6. Project start date
7. Project end date:
8. Project website:
9. Contact Name:
10. Contact Role:
11. Contact eMail:
12. Project aim:
13. Research focus:
14. Data sharing: possibilities and constraints:
15. Number of cases within study:
16. Case description:
17. Case location (Country, City/Region) :
18. For how long has the automation system been tested?

## Section 2: Context, aims and framing

*This section of the template covers the local starting point including the regional energy system characteristics and the user segment involved, the automation goal, and the involvement of end users to achieve it. This included the communicated rationale, expectations towards end-users, and opportunities provided for feedback and dialogue.*

19. What are the characteristics of the local/regional energy system (including energy mix, status of the grid in the area)?
20. What are the characteristics of the energy users involved?
21. How were end-users recruited?
22. What was the rationale for automation communicated to end-users?
23. What is the purpose of the automation? (*i.e. solve distribution grid congestion, transmission grid congestion, grid balancing, minimize network charges, minimize costs at day-ahead-market, maximization of self-consumption, innovation ...* )
24. What is expected from them in the project?
  - a. If this includes a change of energy practices, which practices were changed?
25. Which expectations and benefits are presented to end-users? Were costs and cons communicated as well?
26. Was a sense of fairness and reciprocity established and if yes, how?
27. Was dialogue with consumers (ways to receive feedback, answer questions, etc.) enabled and were consumers encouraged to give feedback?
28. Was accountability communicated to end-users and if yes, how?
29. Which technical components to enable the automation were installed in the house of clients and which actor owns them? (*i.e. smart meters, smart sensors, smart appliances, smart heating systems, batteries, EV charging systems ...*)

### Section 3: Involved Actors and Regulatory Aspects

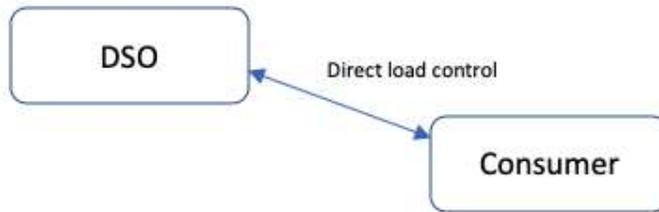
*This section of the template covers involved actors, their roles and tasks performed within them, as well as establishment of relationships and interactions between stakeholders. Further addressed are regulatory framework, market framework, and any accountability-related protocols.*

30. Who controls automated flexibility activation? (i.e. consumer/prosumer, aggregator/retailer, distribution system operator...)
31. Which actors were involved?
- Suppliers
  - DSOs
  - TSOs
  - Component manufacturers
  - Regulatory instances/authority
  - Aggregators
  - Other technology providers -> Please precise:
  - Others: Please precise
32. Which tasks each actor performed / currently performs within the project?

Task/Role	Actor
Frequency control	
Congestion management	
Voltage control/regulatory	
Trading flexibility in day-ahead market	
Trading flexibility in intra-day market	
Providing power reserves	
Technology provider	
Other, please specify	

33. With whom do the actors interact and why?

**Option 1:** Draw a diagram instead of answering yes or no, and write down the characteristics of the interaction. Example:



**Option 2:** Example:

Actor 1	Actor2	The relation
DSO	Consumer	Direct load control
Aggregator	Consumer	Smart meter roll out

34. How were the relationships between involved stakeholders established and how are they governed? (i.e. on mutual regard, bilateral contracts, regulatory framework (protocols etc.), market rules,...)
35. Briefly describe the regulatory framework for automation projects within the corresponding country context:
36. Briefly describe the market framework (e.g. rules) for automation project within the country context:
37. Are there any rules, protocols that hold energy companies accountable for their mistakes and unjust practices?

#### Section 4: Technical parameters of automatization and impact

*This section of the template covers the details of the implemented automation procedures including level of automation, load types to activate, restrictions around activation (frequency and duration) and communication of such restriction to end-users, advance notice of automation activation and options for end-users to veto such processes. Further addressed is the expected impact of automated processes on end-users.*

38. Which loads can be automatically activated? (*i.e. in-home-Battery, community battery, heat pump, e-car, electric boiler, EV charging system, air conditioning, smart appliances, other: please specify*)
39. Did you specify a uniform maximum duration per activation? (yes - same value for all participants, no- different values for each participant or choice, no- we did not specify this)
- *What was the maximum duration per activation? (hours)*
40. Did you specify a uniform maximum activation frequency? (yes - same value for all participants, no- different values for each participant or choice, no- we did not specify this); If yes:
- *Which units were used to specify maximum activation frequency? (none, activations per year/month/week)*
  - *What was the maximum frequency using these units? (activations per unit)*
41. Did you specify the time-window, when activations would take place? (yes - same value for all participants, no- different values for each participant or choice, no- we did not specify this)
- *During which time of the day were activations allowed? (please specify all allowed time-windows)*

<i>Season</i>	<i>Weekday</i>	<i>Hour</i>
<i>Summer/Winter/Anytime</i>	<i>Weekday/weekend/anytime</i>	<i>1,2,...24, anytime</i>

42. Did you specify how many times participants could veto activations? (yes - same value for all participants, no- different values for each participant or choice, no- we did not specify this); If yes:
- *Which units were used to specify maximum veto frequency? (none, vetos per year/month/week)*
  - *What was the maximum frequency using these units? (activations per unit)*
43. Did you specify a minimum advance notice period? (yes - same value for all participants, no- different values for each participant or choice, no- we did not specify this)
- *What was the minimum advance notice period? (hours)*

44. What is the automation level? (*i.e. manual demand response, manual automation, consensual automation, monitored automation, full automation...*)
45. Is a home energy management system involved?
46. How does flexibility activation impact end-users? (Please provide details on fluctuation/availability impact and if measures have been taken to minimize that impact)

## Section 5: Incentives

*This part of the template covers questions surrounding consumer incentives such as if incentives were offered to consumers for initial participation and if yes of which type and size, as well details on provided incentives for load shifting and the prize signals that served as base (TOU, CPP, RTP, etc.).*

47. Was there an incentive for consumers/prosumers for initial program participation? (*yes, no*)
  - *What form of incentive was chosen? (Bonus paid as reduction of monthly bill, shipping voucher, maintenance voucher, discount on purchase of new technologies but also sustainability reasons, curiosity (early adopters),...). If the incentive was monetary, how much / what was the value?*
  - *How high was this incentive?*
48. What price signals were used to incentivize load shifting? (*None, Time of Use pricing, Critical Peak Pricing, Peak Time Rebate, Real Time pricing, spot market prices, balancing market prices, other: please specify*)
49. What was the ratio between the highest price and the average price?
50. What are the overall achievable revenues of flexibility activation (for all stakeholders)? (*i.e. €/activation, €/component/a, €/customer/a, % of costs*)
51. How are the revenues split between stakeholders?
52. Have there been developed any business cases within the project? If yes, please describe them shortly.

## Section 6: Information provision and data sharing

*This section of the template covers information and data provided to consumers and channels used to do so. This includes reasons for DSM (only to include if not already addressed before / if communicated per automation incident), status- and process information, details provided on benefits, information on privacy and security measures, and options to access data.*

53. Which information channels are used to communicate with end-users? (*i.e. App, Online Portal, In-Home-Display, alternative ambient display, SMS, E-mail...*)
54. Which general information on the automation does the system provide? (automation rationale, automation conditions, general expected benefits)
55. Does the system provide process information to end-users such as automation status, as well as past and planned automation?
56. Does the system provide specific information on gained benefits (e.g. money saved, reduced CO<sub>2</sub>-Emissions, etc.)
57. Does the system provide information on safety, privacy and security measures?
58. Where is the consumer data stored and managed? (*i.e. Completely local, centralized cloud, decentralized cloud/blockchain, ...*)
59. Which consumer data was accessed and which actors have access to the data?

Data	Which actors have access to the data?					
	TSO	DSO	Aggregator	Technology provider	Component manufacturer	Other
Power demand (smart meter reading)		X				
Household temperature						
Hot water temperature						
Boiler temperature						
Photovoltaic production						
Battery charging level						
Charging levels of cars						

## Section 7: End-User Interaction with the Automation System

*This section covers questions regarding interaction offers provided to consumers such as if a system-interface for end-users exists, forms of engagement implemented including active contacting of end-users, and choices offered to end-users through the system. Any available information regarding the use and evaluation of such interaction offers is of interest.*

60. Does automation system provide an interface for end-users?
61. Are consumers actively contacted by the system and if yes
  - a. For which reasons? (*i.e. to inform about flexibility activation, for confirmation/rejection of flexibility activation, to suggest/request manual flexibility...*)
  - b. How often? (*i.e. multiple times a day, once a day, weekly ...*)
  - c. Is a response required?
62. Are end-users actively engaged through the system and if yes, how? (*i.e. self-monitoring and feedback, social comparisons, challenges, cooperation, rewards...*)
63. Does the system provide choices to end-users regarding:
  - a. Opt out
  - b. Flexibility activation (e.g. interruption or adjustment)
  - c. System personalization (e.g. comfort ranges)
  - d. Data access
  - e. Other
64. If available:
  - a. Do end-users use the system actively?
  - b. Did any aspects receive positive feedback?
  - c. Did any system aspects receive negative feedback?

## Section 8: Project Results (as available)

*This section of the template collects any information available regarding relevant results of the project. This includes the number of consumers who signed up, achieved flexibilization (in comparison to expected flexibilization), and any acceptance measures that were taken such as overall satisfaction, specific positive and negative experiences, experiences usefulness and ease of use, and experienced trust. Further covered are if users' lives were experienced as changed, if users would like to continue within the program and why / why not, and any further lessons learned.*

65. What were the main project results?
66. What percentage of invited consumers signed up for the project?
67. What was the average peak shifting that was achieved ?
68. Was the desired automation-outcome (e.g. shifts, peak-shaving) successfully achieved?
69. If acceptance of the system was directly measured:
  - a. How was this done?
  - b. Which acceptance factors were looked at? (such as usefulness, ease of use, trust, etc.)
  - c. What were the results? (if possible please rate considered acceptance factors on a scale of 1 = very low to 10 = very high additionally to your answer)
70. What has been learned so far?
  - a. What was the overall experience of the users? (broadly positive, negative, or mixed)
  - b. What are the strengths and weaknesses of the system?
  - c. Did it work as expected and if not, why?
  - d. For whom did it work and for whom not?
  - e. Other:
71. Has the system changed the users' lives and if yes, how?
  - a. Were energy practices changed?
  - b. Were household/workplace dynamics impacted?
  - c. Other changes?
72. Would users want to keep the automation after the demo?
  - a. Reasons for continuing it:
  - b. Reasons for quitting it: