



TEKNOLOGISK  
INSTITUT

# SRI-Servicekatalog

Version 4.4, 2022



# Forord

I forbindelse med nationale test af EU-ordningen for Smart Readiness Indicator, stiller EU-Kommissionen et beregningsværktøj til rådighed. Værktøjet indeholder et katalog med 54 servicefunktioner, der relaterer sig til en bygnings installationer og automatik.

Servicefunktionerne er fordelt på 9 tekniske områder: Opvarmning, varmt vand til husholdningsbrug, køling, ventilation, belysning, dynamisk klimaskærm, elektricitet, opladning af elektriske køretøjer samt overvågning og kontrol.

I det følgende gengives det samlede servicekatalog fra beregningsværktøjet version 4.4, som er fra januar 2022. Kataloget er på engelsk.

Der anvendes forskellige forkortelser i kataloget, hvor enkelte skal fremhæves her. TBS står for Technical Building System og er det tekniske udstyr, der er forbundet med de tekniske områder og TABS står for Thermally Activated Building Systems og er bygningskonstruktioner, der aktivt kan opvarmes eller køles.

Læs mere om Smart Readiness Indicator på <https://sri.teknologisk.dk>

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# Heating: Control heat production facilities

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Heating	H-1c	Control heat production facilities	Storage and shifting of thermal energy	None	HW storage vessels available	HW storage vessels controlled based on external signals (from BACS or grid)		
Heating	H-2a	Control heat production facilities	Heat generator control (all except heat pumps)	Constant temperature control	Variable temperature control depending on outdoor temperature	Variable temperature control depending on the load (e.g. depending on supply water temperature set point)		
Heating	H-2b	Control heat production facilities	Heat generator control (for heat pumps)	On/Off-control of heat generator	Multi-stage control of heat generator capacity depending on the load or demand (e.g. on/off of several compressors)	Variable control of heat generator capacity depending on the load or demand (e.g. hot gas bypass, inverter frequency control)	Variable control of heat generator capacity depending on the load AND external signals from grid	
Heating	H-2d	Control heat production facilities	Sequencing in case of different heat generators	Priorities only based on running time	Control according to fixed priority list: e.g. based on rated energy efficiency	Control according to dynamic priority list (based on current energy efficiency, carbon emissions and capacity of generators, e.g. solar, geothermal heat, cogeneration plant, fossil fuels)	Control according to dynamic priority list (based on current AND predicted load, energy efficiency, carbon emissions and capacity of generators)	Control according to dynamic priority list (based on current AND predicted load, energy efficiency, carbon emissions, capacity of generators AND external signals from grid)



# Heating: Heat control – demand side

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Heating	H-1a	Heat control - demand side	Heat emission control	No automatic control	Central automatic control (e.g. central thermostat)	Individual room control (e.g. thermostatic valves, or electronic controller)	Individual room control with communication between controllers and to BACS	Individual room control with communication and occupancy detection
Heating	H-1b	Heat control - demand side	Emission control for TABS (heating mode)	No automatic control	Central automatic control	Advanced central automatic control	Advanced central automatic control with intermittent operation and/or room temperature feedback control	
Heating	H-1d	Heat control - demand side	Control of distribution pumps in networks	No automatic control	On off control	Multi-Stage control	Variable speed pump control (pump unit (internal) estimations)	Variable speed pump control (external demand signal)
Heating	H-1f	Heat control - demand side	Thermal Energy Storage (TES) for building heating (excluding TABS)	Continuous storage operation	Time-scheduled storage operation	Load prediction based storage operation	Heat storage capable of flexible control through grid signals (e.g. DSM)	





# Heating: Information to occupants and facility managers

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Heating	H-3	Information to occupants and facility managers	Report information regarding heating system performance	None	Central or remote reporting of current performance KPIs (e.g. temperatures, submetering energy usage)	Central or remote reporting of current performance KPIs and historical data	Central or remote reporting of performance evaluation including forecasting and/or benchmarking	Central or remote reporting of performance evaluation including forecasting and/or benchmarking; also including predictive management and fault detection

# Heating: Flexibility and grid interaction

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Heating	H-4	Flexibility and grid interaction	Flexibility and grid interaction	No automatic control	Scheduled operation of heating system	Self-learning optimal control of heating system	Heating system capable of flexible control through grid signals (e.g. DSM)	Optimized control of heating system based on local predictions and grid signals (e.g. through model predictive control)



# Domestic hot water: Control DHW production facilities

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Domestic hot water	DHW-1a	Control DHW production facilities	Control of DHW storage charging (with direct electric heating or integrated electric heat pump)	Automatic control on / off	Automatic control on / off and scheduled charging enable	Automatic control on / off and scheduled charging enable and multi-sensor storage management		
Domestic hot water	DHW-1d	Control DHW production facilities	Control of DHW storage charging (with solar collector and supplementary heat generation)	Manual selected control of solar energy or heat generation	Automatic control of solar storage charge (Prio. 1) and supplementary storage charge	Automatic control of solar storage charge (Prio. 1) and supplementary storage charge and demand-oriented supply or multi-sensor storage management	Automatic control of solar storage charge (Prio. 1) and supplementary storage charge, demand-oriented supply and return temperature control and multi-sensor storage management	
Domestic hot water	DHW-2b	Control DHW production facilities	Sequencing in case of different DHW generators	Priorities only based on running time	Control according to fixed priority list: e.g. based on rated energy efficiency	Control according to dynamic priority list (based on current energy efficiency, carbon emissions and capacity of generators, e.g. solar, geothermal heat, cogeneration plant, fossil fuels)	Control according to dynamic priority list (based on current AND predicted load, energy efficiency, carbon emissions and capacity of generators)	Control according to dynamic priority list (based on current AND predicted load, energy efficiency, carbon emissions, capacity of generators AND external signals from grid)



# Domestic hot water: Information to occupants and facility managers

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Domestic hot water	DHW-3	Information to occupants and facility managers	Report information regarding domestic hot water performance	None	Indication of actual values (e.g. temperatures, submetering energy usage)	Actual values and historical data	Performance evaluation including forecasting and/or benchmarking	Performance evaluation including forecasting and/or benchmarking; also including predictive management and fault detection

# Domestic hot water: Flexibility DHW production facilities

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Domestic hot water	DHW-1b	Flexibility DHW production facilities	Control of DHW storage charging	None	HW storage vessels available	Automatic charging control based on local availability of renewables or information from electricity grid (DR, DSM)	0	



# Cooling: Control cooling production facilities

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Cooling	C-2a	Control cooling production facilities	Generator control for cooling	On/Off-control of cooling production	Multi-stage control of cooling production capacity depending on the load or demand (e.g. on/off of several compressors)	Variable control of cooling production capacity depending on the load or demand (e.g. hot gas bypass, inverter frequency control)	Variable control of cooling production capacity depending on the load AND external signals from grid	
Cooling	C-2b	Control cooling production facilities	Sequencing of different cooling generators	Priorities only based on running times	Fixed sequencing based on loads only: e.g. depending on the generators characteristics such as absorption chiller vs. centrifugal chiller	Dynamic priorities based on generator efficiency and characteristics (e.g. availability of free cooling)	Load prediction based sequencing: the sequence is based on e.g. COP and available power of a device and the predicted required power	Sequencing based on dynamic priority list, including external signals from grid





# Cooling: Cooling control – demand side

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Cooling	C-1a	Cooling control - demand side	Cooling emission control	No automatic control	Central automatic control	Individual room control	Individual room control with communication between controllers and to BACS	Individual room control with communication and occupancy detection
Cooling	C-1b	Cooling control - demand side	Emission control for TABS (cooling mode)	No automatic control	Central automatic control	Advanced central automatic control	Advanced central automatic control with intermittent operation and/or room temperature feedback control	
Cooling	C-1c	Cooling control - demand side	Control of distribution network chilled water temperature (supply or return)	Constant temperature control	Outside temperature compensated control	Demand based control		
Cooling	C-1d	Cooling control - demand side	Control of distribution pumps in networks	No automatic control	On off control	Multi-Stage control	Variable speed pump control (pump unit (internal) estimations)	Variable speed pump control (external demand signal)
Cooling	C-1f	Cooling control - demand side	Interlock: avoiding simultaneous heating and cooling in the same room	No interlock	Partial interlock (minimising risk of simultaneous heating and cooling e.g. by sliding setpoints)	Total interlock (control system ensures no simultaneous heating and cooling can take place)		
Cooling	C-1g	Cooling control - demand side	Control of Thermal Energy Storage (TES) operation	Continuous storage operation	Time-scheduled storage operation	Load prediction based storage operation	Cold storage capable of flexible control through grid signals (e.g. DSM)	



# Cooling: Information to occupants and facility managers

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Cooling	C-3	Information to occupants and facility managers	Report information regarding cooling system performance	None	Central or remote reporting of current performance KPIs (e.g. temperatures, submetering energy usage)	Central or remote reporting of current performance KPIs and historical data	Central or remote reporting of performance evaluation including forecasting and/or benchmarking	Central or remote reporting of performance evaluation including forecasting and/or benchmarking; also including predictive management and fault detection

# Cooling: Flexibility and grid interaction

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Cooling	C-4	Flexibility and grid interaction	Flexibility and grid interaction	No automatic control	Scheduled operation of cooling system	Self-learning optimal control of cooling system	Cooling system capable of flexible control through grid signals (e.g. DSM)	Optimized control of cooling system based on local predictions and grid signals (e.g. through model predictive control)



# Ventilation: Air flow control

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Ventilation	V-1a	Air flow control	Supply air flow control at the room level	No ventilation system or manual control	Clock control	Occupancy detection control	Central Demand Control based on air quality sensors (CO <sub>2</sub> , VOC, humidity, ...)	Local Demand Control based on air quality sensors (CO <sub>2</sub> , VOC,...) with local flow from/to the zone regulated by dampers
Ventilation	V-1c	Air flow control	Air flow or pressure control at the air handler level	No automatic control: Continuously supplies of air flow for a maximum load of all rooms	On off time control: Continuously supplies of air flow for a maximum load of all rooms during nominal occupancy time	Multi-stage control: To reduce the auxiliary energy demand of the fan	Automatic flow or pressure control without pressure reset: Load dependent supplies of air flow for the demand of all connected rooms.	Automatic flow or pressure control with pressure reset: Load dependent supplies of air flow for the demand of all connected rooms (for variable air volume systems with VFD).



# Ventilation: Air temperature control

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Ventilation	V-2c	Air temperature control	Heat recovery control: prevention of overheating	Without overheating control	Modulate or bypass heat recovery based on sensors in air exhaust	Modulate or bypass heat recovery based on multiple room temperature sensors or predictive control		
Ventilation	V-2d	Air temperature control	Supply air temperature control at the air handling unit level	No automatic control	Constant setpoint: A control loop enables to control the supply air temperature, the setpoint is constant and can only be modified by a manual action	Variable set point with outdoor temperature compensation	Variable set point with load dependant compensation. A control loop enables to control the supply air temperature. The setpoint is defined as a function of the loads in the room	



# Ventilation: Free cooling

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Ventilation	V-3	Free cooling	Free cooling with mechanical ventilation system	No automatic control	Night cooling	Free cooling: air flows modulated during all periods of time to minimize the amount of mechanical cooling	H,x- directed control: The amount of outside air and recirculation air are modulated during all periods of time to minimize the amount of mechanical cooling. Calculation is performed on the basis of temperatures and humidity (enthalpy).	

# Ventilation: Feedback – Reporting information

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Ventilation	V-6	Feedback - Reporting information	Reporting information regarding IAQ	None	Air quality sensors (e.g. CO2) and real time autonomous monitoring	Real time monitoring & historical information of IAQ available to occupants	Real time monitoring & historical information of IAQ available to occupants + warning on maintenance needs or occupant actions (e.g. window opening)	



# Lighting: Artificial lighting control

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Lighting	L-1a	Artificial lighting control	Occupancy control for indoor lighting	Manual on/off switch	Manual on/off switch + additional sweeping extinction signal	Automatic detection (auto on / dimmed or auto off)	Automatic detection (manual on / dimmed or auto off)	

# Lighting: Control artificial lighting power based on daylight levels

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Lighting	L-2	Control artificial lighting power based on daylight levels	Control artificial lighting power based on daylight levels	Manual (central)	Manual (per room / zone)	Automatic switching	Automatic dimming	Automatic dimming including scene-based light control (during time intervals, dynamic and adapted lighting scenes are set, for example, in terms of illuminance level, different correlated colour temperature (CCT) and the possibility to change the light distribution within the space according to e. g. design, human needs, visual tasks)





# Dynamic building envelope: Window control

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Dynamic building envelope	DE-1	Window control	Window solar shading control	No sun shading or only manual operation	Motorized operation with manual control	Motorized operation with automatic control based on sensor data	Combined light/blind/HVAC control	Predictive blind control (e.g. based on weather forecast)
Dynamic building envelope	DE-2	Window control	Window open/closed control, combined with HVAC system	Manual operation or only fixed windows	Open/closed detection to shut down heating or cooling systems	Level 1 + Automised mechanical window opening based on room sensor data	Level 2 + Centralized coordination of operable windows, e.g. to control free natural night cooling	

# Dynamic building envelope: Feedback – Reporting information

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Dynamic building envelope	DE-4	Feedback - Reporting information	Reporting information regarding performance of dynamic building envelope systems	No reporting	Position of each product & fault detection	Position of each product, fault detection & predictive maintenance	Position of each product, fault detection, predictive maintenance, real-time sensor data (wind, lux, temperature...)	Position of each product, fault detection, predictive maintenance, real-time & historical sensor data (wind, lux, temperature...)



# Electricity: DER-Optimization

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Electricity	E-4	DER- Optimization	Optimizing self-consumption of locally generated electricity	None	Scheduling electricity consumption (plug loads, white goods, etc.)	Automated management of local electricity consumption based on current renewable energy availability	Automated management of local electricity consumption based on current and predicted energy needs and renewable energy availability	

# Electricity: DER-Storage

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Electricity	E-3	DER - Storage	Storage of (locally generated) electricity	None	On site storage of electricity (e.g. electric battery)	On site storage of energy (e.g. electric battery or thermal storage) with controller based on grid signals	On site storage of energy (e.g. electric battery or thermal storage) with controller optimising the use of locally generated electricity	On site storage of energy (e.g. electric battery or thermal storage) with controller optimising the use of locally generated electricity and possibility to feed back into the grid



# Electricity: DER-Production

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Electricity	E-5	DER - Generation Control	Control of combined heat and power plant (CHP)	CHP control based on scheduled runtime management and/or current heat energy demand	CHP runtime control influenced by the fluctuating availability of RES; overproduction will be fed into the grid	CHP runtime control influenced by the fluctuating availability of RES and grid signals; dynamic charging and runtime control to optimise self-consumption of renewables		

# Electricity: DSM-Storage

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Electricity	E-8	DSM- Storage	Support of (micro)grid operation modes	None	Automated management of (building-level) electricity consumption based on grid signals	Automated management of (building-level) electricity consumption and electricity supply to neighbouring buildings (microgrid) or grid	Automated management of (building-level) electricity consumption and supply, with potential to continue limited off-grid operation (island mode)	



# Electricity: Feedback – Reporting information

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Electricity	E-2	Feedback - Reporting information	Reporting information regarding local electricity generation	None	Current generation data available	Actual values and historical data	Performance evaluation including forecasting and/or benchmarking	Performance evaluation including forecasting and/or benchmarking; also including predictive management and fault detection
Electricity	E-11	Feedback - Reporting information	Reporting information regarding energy storage	None	Current state of charge (SOC) data available	Actual values and historical data	Performance evaluation including forecasting and/or benchmarking	Performance evaluation including forecasting and/or benchmarking; also including predictive management and fault detection
Electricity	E-12	Feedback - Reporting information	Reporting information regarding electricity consumption	None	reporting on current electricity consumption on building level	real-time feedback or benchmarking on building level	real-time feedback or benchmarking on appliance level	real-time feedback or benchmarking on appliance level with automated personalized recommendations



# Electric vehicle charging: EV charging

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Electric vehicle charging	EV-15	EV Charging	EV Charging Capacity	not present	ducting (or simple power plug) available	0-9% of parking spaces has recharging points	10-50% of parking spaces has recharging point	>50% of parking spaces has recharging point

# Electric vehicle charging: EV charging - Grid

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Electric vehicle charging	EV-16	EV Charging - Grid	EV Charging Grid balancing	Not present (uncontrolled charging)	1-way controlled charging (e.g. including desired departure time and grid signals for optimization)	2-way controlled charging (e.g. including desired departure time and grid signals for optimization)		

# Electric vehicle charging: EV charging - Connectivity

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Electric vehicle charging	EV-17	EV Charging - connectivity	EV charging information and connectivity	No information available	Reporting information on EV charging status to occupant	Reporting information on EV charging status to occupant AND automatic identification and authorization of the driver to the charging station (ISO 15118 compliant)		



# Monitoring and control: Single platform

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Monitoring and control	MC-30	Single platform that allows automated control & coordination between TBS + optimization of energy flow based on occupancy, weather and grid signals	Single platform that allows automated control & coordination between TBS + optimization of energy flow based on occupancy, weather and grid signals	None	Single platform that allows manual control of multiple TBS	Single platform that allows automated control & coordination between TBS	Single platform that allows automated control & coordination between TBS + optimization of energy flow based on occupancy, weather and grid signals	

# Monitoring and control: HVAC interaction control

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Monitoring and control	MC-3	HVAC interaction control	Run time management of HVAC systems	Manual setting	Runtime setting of heating and cooling plants following a predefined time schedule	Heating and cooling plant on/off control based on building loads	Heating and cooling plant on/off control based on predictive control or grid signals	

# Monitoring and control: TBS interaction control

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Monitoring and control	MC-9	TBS interaction control	Occupancy detection: connected services	None	Occupancy detection for individual functions, e.g. lighting	Centralised occupant detection which feeds in to several TBS such as lighting and heating		





# Monitoring and control: Smart grid integration

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Monitoring and control	MC-25	Smart Grid Integration	Smart Grid Integration	None - No harmonization between grid and TBS; building is operated independently from the grid load	Demand side management possible for (some) individual TBS, but not coordinated over various domains	Coordinated demand side management of multiple TBS		

# Monitoring and control: Override control

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Monitoring and control	MC-29	Override control	Override of DSM control	No DSM control	DSM control without the possibility to override this control by the building user (occupant or facility manager)	Manual override and reactivation of DSM control by the building user	Scheduled override of DSM control (and reactivation) by the building user	Scheduled override of DSM control and reactivation with optimised control



# Monitoring and control: Fault detection

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Monitoring and control	MC-4	Fault detection	Detecting faults of technical building systems and providing support to the diagnosis of these faults	No central indication of detected faults and alarms	With central indication of detected faults and alarms for at least 2 relevant TBS	With central indication of detected faults and alarms for all relevant TBS	With central indication of detected faults and alarms for all relevant TBS, including diagnosing functions	

# Monitoring and control: Feedback – Reporting information

Domain	Code	Service group	Smart ready service	Functionality level 0 (as non-smart default)	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Monitoring and control	MC-13	Feedback - Reporting information	Central reporting of TBS performance and energy use	None	Central or remote reporting of realtime energy use per energy carrier	Central or remote reporting of realtime energy use per energy carrier, combining TBS of at least 2 domains in one interface	Central or remote reporting of realtime energy use per energy carrier, combining TBS of all main domains in one interface	
Monitoring and control	MC-28	Feedback - Reporting information	Reporting information regarding demand side management performance and operation	None	Reporting information on current DSM status, including managed energy flows	Reporting information on current historical and predicted DSM status, including managed energy flows		