Energinet
Tonne Kjærsvej 65
DK-7000 Fredericia

+45 70 10 22 44
info@energinet.dk
VAT no. 28 98 06 71

IMPLEMENTATION GUIDE

EXCHANGE OF OPERATIONAL SCHEDULES

Publication date: 5 April 2022 (translation)

Contents

List of figures

List of tables

1. Scope

This document aims to clarify and describe the business processes for submitting operational schedules for balance-responsible parties (BRPs) operating in the Danish electricity market.

2. Terms and definitions

The following business types are used in this operational schedule document:

A01 (Production): Production of an adjustable generation unit.

A04 (Consumption): Consumption of an adjustable demand unit.

A60 (Minimum): Minimum capacity per unit.

A61 (Maximum): Maximum capacity per unit.

C11 (RegulationWindStopped): Wind turbines active in the Elspot, intraday or regulating power markets must report the amount of retained installed capacity.

The following registeredResource.mRID is used in the operational schedule document:

GRSN for production/consumption units >= 10 MW: For all units with a capacity larger than or equal to 10MW, a separate time series must be submitted with the expected generation of the unit.

A10: Global Location Number (GLN 13) or Global Service Relation Number (GSRN 18), which is maintained by GS1 (gs1.dk).

The following mktPSRType.psrType is used in the operational schedule document:

When reporting sums for production/consumption units < 10MW, mktPSRType.psrType must be filled in with the main fuel type

A03 (Mix production and consumption unit): Unit that can both store and consume energy, e.g. batteries.

A05 (Decentralised Consumption): The sum of local consumption.

B01 (Biomass): Total production for units using straw, rapeseed oil, woodchips, wood waste.

B04 (Fossil Gas): Total production for units using refinery gas, natural gas, LPG.

B05 (Fossil Hard coal): Total production for units using hard coal, furnace coke, coke.

B06 (Fossil Oil): Total production for units using diesel, fuel oil, gas oil.

B11 (Hydro Run-of-river and poundage): Total production for units using hydropower.

B15 (Other renewable): Total production for other types of renewable energy such as biogas waste gasification, biogas landfill gas, biogas liquid manure, biogas water treatment plant, wave power.

B17 (Waste): Total production for waste.

3. Business process for operational schedule

3.1 Overview

Requirements for the operational schedule process are stated in market regulation C3. A 'use case' is linked to the operational schedule process. The process for exchanging data and the way in which this is done is described below.

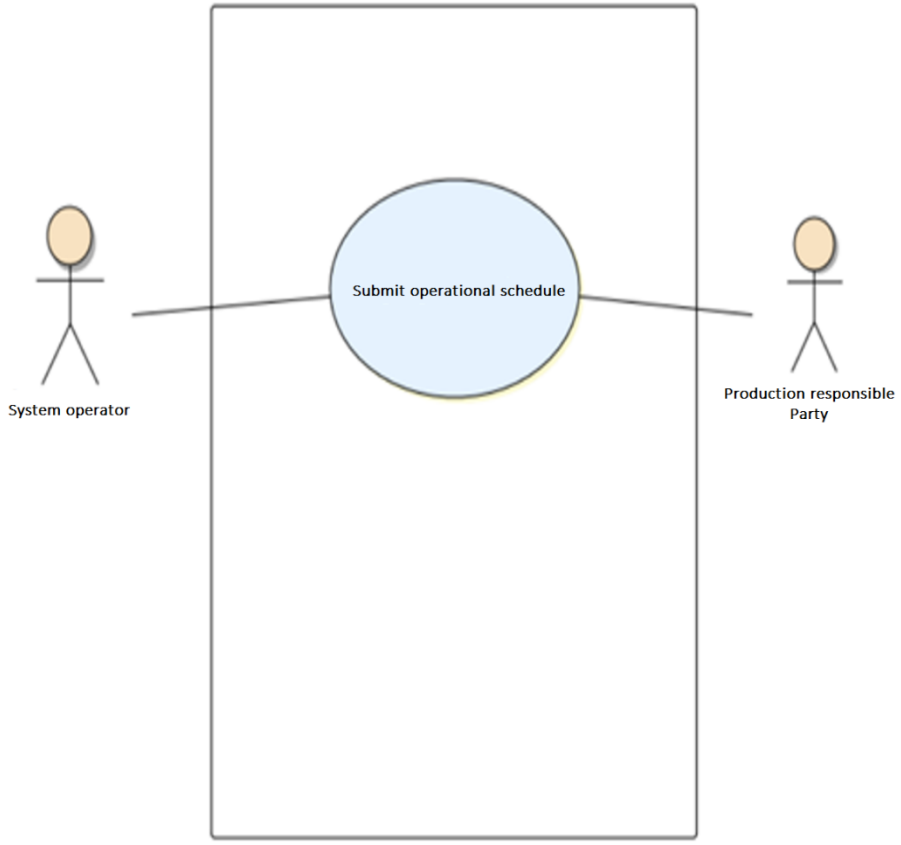

Figure 1 Use case Submit operational schedule

3.2 General outline

An operational schedule contains a balance responsible party's aggregated set of schedules for adjustable production, consumption, and reduction of wind for a 24-hour period. Operational schedules are submitted for western Denmark (DK1) and eastern Denmark (DK2), respectively.

Regulation C3, section 5, lists the production and consumption units that operational schedules must be submitted for.

The operational schedule for BRPs for production must include the following time series:

- Production schedule per generator/sum per main fuel type of unit in MW
- Current minimum capacity per generator/sum per main fuel type of unit in MW

- Current maximum capacity per generator/sum per main fuel type of unit in MW

The operational schedule for BRPs for consumption must include the following time series:

- A consumption schedule per generator/sum of units in MW
- Current minimum capacity schedule per generator/sum of units in MW
- Current maximum capacity schedule per generator/sum of units in MW

For wind turbines participating in the day-ahead, intraday or regulating power market, the following time series must be submitted:

- Schedule for the amount of installed power which has been closed down (MW)

3.3 Business process

Figure 2 and the following description explain the process of submitting operational schedules.

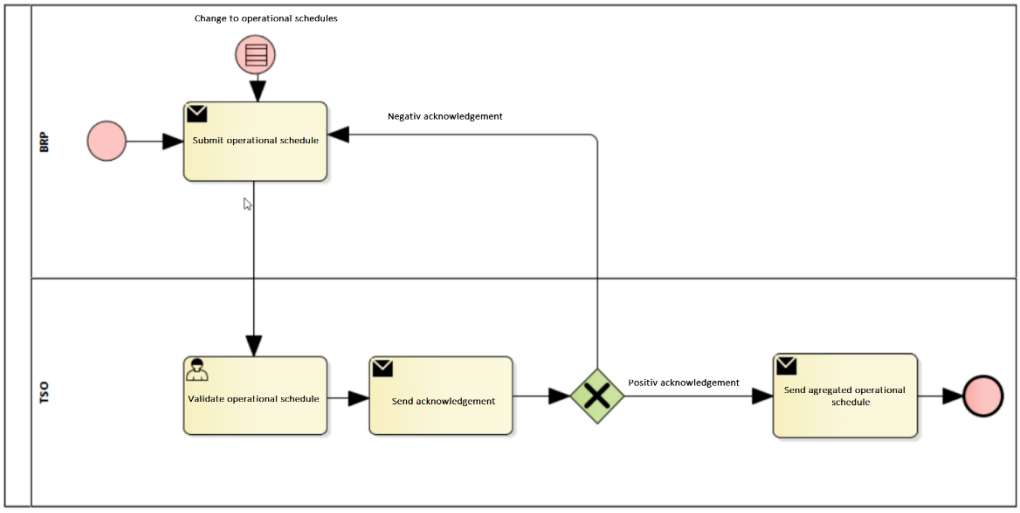

Figure 2 Schedule submission process for operational schedules (DK1 and DK2)

3.3.1 Initial status before submission of operational schedules

Prior to submitting an operational schedule, a balance responsible party has planned production and/or consumption for the next day of operation.

3.3.2 Operational schedule submission process

1. Submit schedule

All BRPs for production and BRPs for consumption with adjustable consumption/production submit individual operational schedules for the next day of operation. An operational schedule must always describe how operation is expected to be conducted for the generators/units that the respective party is responsible for. An operational schedule must always cover a full day of operation.

However, the first operational schedule submitted must reach Energinet before the deadline but after ”gate open”: D-1 kl. 00:10.

1B. Changes to operational schedules

If a balance responsible party (BRP) makes operational changes or receives an order for mFRR activation (regulating power order), which is accepted, the BRP must submit a revised operational schedule to Energinet as described in section 1.

The revised operational schedule is “merged” with previously submitted schedules. When an operational schedule is revised and submitted to Energinet, changes from the previous to the revised schedule will take place during a period known as “dead time” (delay period). The last value before the delay period will refer to the previous operational schedule, whereas the first value after the delay period will refer to the revised operational schedule. Energinet will merge the two operational schedules to create a new schedule, which will be the sum of the previous schedule adjusted to match the revised schedule.

Figure 3 below illustrates how the two operational schedules are merged.

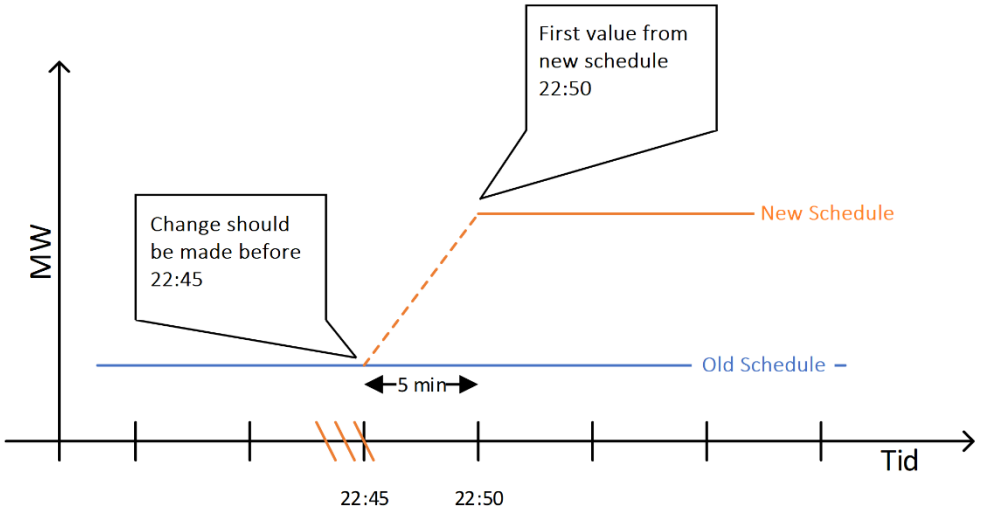

Figure 3 Merging to create new operational schedule

The example shows that the party who wants to change the schedule at 22:50 must have submitted a revised operational schedule to Energinet by 22:45.

2A. Validate operational schedule

On receipt of an operational schedule, Energinet will check the content for general errors, for example whether the codes used are correct and the necessary message elements are present. The identification of the individual parties is verified, and a check is done of whether the schedule covers a 24-hour period.

If a unit producing more than 10 MW submits an operational schedule with values below 10 MW, such a schedule will, however, be accepted. Depending on whether errors are found or not, a positive or negative receipt acknowledgement will be generated, which is subsequently requested by the party.

2B. Send receipt acknowledgement

Depending on whether errors are found or not, a positive or negative receipt acknowledgement will be generated, which is then sent to the party.

2C. Send aggregated operational schedule

If a schedule is approved, Energinet will send the confirmed operational schedule in a separate message, which is acknowledged by the BRP after receipt.

3.4 Business rules

All values must be indicated with a positive sign.

3.4.1 Adjustment of schedules

If adjustments are made to an operational schedule, the entire schedule must be re-submitted, including any changes.

3.4.2 Description of parties

Each participant in the electricity market is responsible for its balance between production and consumption of electricity as well as trade in electricity. A participant is identified by a unique ID, regardless of the number of roles the participant may have. An approved BRP is a participant approved to handle balance responsibility for a given production unit, consumption, or trade towards Energinet. In this document, a balance responsible party is a BRP for consumption or production which is responsible for the physical trades of one or more electricity-consuming or electricity-generating units.

3.4.3 Dependencies with PlannedRessourceSchedule_MarketDocument

The Planned Resource Schedule market document is used to submit operational schedules.
The table below describes the values in the fields.

	XSD requirements	
PlannedResourceSchedule_MarketDocument		
mRID	Mandatory	Senders Unique Identification
RevisionNumber	Mandatory	The revision number of the document
Type	Mandatory	A14 = Resource Provider Resource Schedule
process.processType	Mandatory	A17 = Schedule day
sender_MarketParticipant.mRID	Mandatory	The coding scheme is the Energy Identification Coding Scheme (EIC), maintained by ENTSO-E. EIC for Energinet = 10X1001A1001A248 A01=EIC GLN for Energinet = 5790000432752 A10 = EAN/GLN
sender_MarketParticipant.marketRole.type	Mandatory	A06 = Production responsible party
receiver_MarketParticipant.mRID	Mandatory	The coding scheme is the Energy Identification Coding Scheme (EIC), maintained by ENTSO-E. A01=EIC A10 = EAN/GLN
receiver_MarketParticipant.marketRole.type	Mandatory	A04 = System operator
createdDateTime	Mandatory	Creation date/time of the document (in ISO 8601 UTC format) YYYY-MM-DDTHH:MM:00Z

schedule_Period.timeInterval	Mandatory	Period covered (in ISO 8601 UTC format) <period.timeInterval> <start>2013-07-31T22:00Z</start> <end>2013-08-31T22:00Z</end> </period.timeInterval> This should cover the complete period In relation to a CET time zone: In winter, the time spread is from 23:00 UTC to 23:00 UTC The change from winter to summer time spread is from 23:00 UTC to 22:00 UTC The summer time spread is from 22:00 UTC to 22:00 UTC The change from summer to winter time spread is from 22:00 UTC to 23:00 UTC
domain.mRID	Conditional	Not used
subject_MarketParticipant.mRID	Conditional	Not used
subject_MarketParticipant.marketRole.type	Conditional	Not used

Table 1 PlannedResourceSchedule_MarketDocument

PlannedResource_TimeSeries		
mRID	Mandatory	Unique identification of time series within the document
businessType	Mandatory	A01 = Production dispatchable
		A04 = Consumption dispatchable
		A60 = Minimum possible. The time series provides a schedule of minimum possible values for a Resource Object.
		A61 = Maximum available. The time series provides a schedule of maximum available values for a Resource Object.
		C11 = A time series providing the volume of production reduced by an energy provider / producer / supplier.
flowDirection.direction	Conditional	Not used
product	Mandatory	8716867000016 = Active power
connecting_Domain.mRID	Mandatory	DK1 = 10YDK-1--------W (EIC)
		DK2 = 10YDK-2--------M (EIC)
registeredResource.mRID	Conditional	GRSN for production/consumption unit >= 10 MW A10 = GS1, the coding scheme for the preceding attribute.
mktPSRType.psrType	Conditional	Main fuel type when submitting sum for production/consumption units < 10MW. A03 = Mixed production and consumption unit. Used for e.g. batteries.
		A05 = Load (Decentral Consumption: decentralised consumption)
		B01 = Biomass
		B04 = Fossil Gas: A production unit using refinery gas, natural gas, LPG
		B05 = Fossil Hard coal: A production unit using hard coal, furnace coal, coke
		B06 = Fossil Oil: A production unit using diesel, fuel oil, gas oil
		B11 = Hydro Run-of-river and poundage: A production unit using hydropower
		B15 = Other renewable: Other renewable energy types such as biogas waste gasification, biogas landfill gas, biogas liquid manure, biogas water treatment plant, wave power
		B17 = Waste: Waste
resourceProvider_MarketParticipant.mRID	Mandatory	A01=EIC
		The coding scheme is the Energy Identification Coding Scheme (EIC), maintained by ENTSO-E.
		A10 = EAN/GLN
Acquiring_Domain.mRID	Conditional	Not used
marketAgreement.type	Conditional	Not used Conditional

marketAgreement.mRID	Conditional	Not used
measurement_Unit.name	Mandatory	MAW = Megawatt
objectAggregation	Conditional	A06 = Resource Object. Production/consumption unit >= 10 MW A08 = Resource type. Production/consumption < 10MW

Table 2 PlannedResource_TimeSeries

UnavailableReserve_TimeSeries (associated with Original_MarketDocument)	**Conditional**	**Not used**

Table 3 UnavailableReserve_TimeSeries (associated with Original_MarketDocument)

Series_Period		
timeinterval	Mandatory	The start and end time of the period. <period.timeInterval> <start>2018-05-30T22:00Z</start> <end>2018-05-31T22:00Z</end> </period.timeInterval>
resolution	Mandatory	PT05M = 5 minutes

Table 4 Series_Period

Point		
Position	Mandatory	Position within the time interval
Quantity	Mandatory	The actual production/consumption (only zero/positive values are reported) Precision is 0.1

Table 5 Point

Reason	**Conditional**	**Not used**

Table 6 Reason

3.4.4 Dependencies with ConfirmedRessourceSchedule_MarketDocument

The Confirmed Resource Schedule market document is used to confirm the submitted operational schedule. The table below describes the values in the fields.

	XSD requirements	
ResourceSchedule_MarketDocument		
mRID	Mandatory	Senders Unique Identification
Type	Mandatory	A14 = Resource Provider Resource Schedule
sender_MarketParticipant.mRID	Mandatory	A01=EIC The coding scheme is the Energy Identification Coding Scheme (EIC), maintained by ENTSO-E. A10 = EAN/GLN
sender_MarketParticipant.marketRole.type	Mandatory	A06 = Production responsible party
receiver_MarketParticipant.mRID	Mandatory	A01=EIC The coding scheme is the Energy Identification Coding Scheme (EIC), maintained by ENTSO-E.

		EIC for Energinet = 10X1001A1001A248 A10 = EAN/GLN GLN for Energinet = 5790000432752
receiver_MarketParticipant.marketRole.type	Mandatory	A04 = System operator
createdDateTime	Mandatory	Creation date/time of the document (in ISO 8601 UTC format) YYYY-MM-DDTHH:MM:00Z
schedule_Period.timeInterval	Mandatory	Period covered (in ISO 8601 UTC format) <period.timeInterval> <start>2013-07-31T22:00Z</start> <end>2013-08-31T22:00Z</end> </period.timeInterval> This should cover the complete period In relation to a CET time zone: In winter, the time spread is from 23:00 UTC to 23:00 UTC The change from winter to summer time spread is from 23:00 UTC to 22:00 UTC The summer time spread is from 22:00 UTC to 22:00 UTC The change from summer to winter time spread is from 22:00 UTC to 23:00 UTC

Table 7 ResourceSchedule_MarketDocument

Original_MarketDocument (associated with header)		
mRID	Mandatory	Reference to original mRID
RevisionNumber	Mandatory	Reference to original revision number
domain.mRID	Mandatory	A01=EIC The coding scheme is the Energy Identification Coding Scheme (EIC), maintained by ENTSO-E. DK1 = 10YDK-1--------W (EIC) DK2 = 10YDK-2--------M" (EIC)
subject_MarketParticipant.mRID	Conditional	
subject_MarketParticipant.marketRole.type	Conditional	
Process.processType	Mandatory	A17 = Schedule day

Table 8 Original_MarketDocument

PlannedResource_TimeSeries		
		Value from, PlannedResourceSchedules timeseries.

Table 9 PlannedResource_TimeSeries

UnavailableReserve_TimeSeries (associated with Original_MarketDocument)	**Conditional**	**Not used**

Table 10 UnavailableReserve_TimeSeries (associated with Original_MarketDocument)

Series_Period		
timeinterval	Mandatory	The start and end time of the period. <period.timeInterval> <start>2018-05-30T22:00Z</start> <end>2018-05-31T22:00Z</end> </period.timeInterval>
resolution	Mandatory	PT05M = 5 minutes

Table 11 Series_Period

Point		
Position	Mandatory	Position within the time interval
Quantity	Mandatory	The actual production/consumption (only zero/positive values are reported) Precision is 0.1

Table 12 Point

Reason	Conditional	Not used

Table 13 Reason

4. Assembly Model's references

IEC 62325-451-7 – Planned Resource Schedule
IEC 62325-451-7 – Resource Schedule Confirmation
iec62325-451-1-acknowledgement_v8_1.xsd