

Business Process

BP_SO_4.2 Demand Forecasting for Scheduling & Dispatch

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1 ASSUMPTIONS

Assumptions made during the design of this process include:

- This is an all-island business process, meaning the same process will be used across both jurisdictions on the island, Ireland and Northern Ireland. It can be conducted by the relevant team in either Dublin or Belfast;
- The following business processes addresses all requirements, including roles, tools, and activities that will enable the TSOs to achieve scheduling objectives; and
- All required systems, including MMS and EDIL are in place. They offer all required functionalities to support business needs.

2 PROCESS REFERENCES

2.1 RELATED RULES REFERENCES

The following table provides references to the documents that govern the design of this business process.

Document Title	Relevant Section	Description
SONI Grid Code	OC1 Demand Forecasting	The SONI Grid Code details the requirements on the TSO to produce demand forecasts for various time horizons to ensure there is always sufficient generation to meet demand.
EirGrid Grid Code	OC1 Demand Forecasts	The EirGrid Grid Code details the requirements on the TSO to produce demand forecasts for various time horizons to ensure there is always sufficient generation to meet demand.
SEM-15-065	System Operation in the I-SEM	Sets out high level guidance related to the scheduling and dispatch process.
Trading and Settlement Code	Agreed procedure 06	The T&SC and associated Agreed Procedures outlines the requirements on the TSO to submit forecast data to the market for publication.

2.2 RELATED DOCUMENTS

The following table provides a list of documents that are related to this business process.

Document Title	Relationship	Description
Balancing Market Principles Statement	Information	A Guide to Scheduling and Dispatch under the Revised Single Electricity Market Arrangements.
MMS User Guide	System guide	ABB MMS OUI User Guide.
BP_SO_10.1 Perform Long Term and Short Term Scheduling	Associated process	The 'Demand Forecasting for Scheduling & Dispatch' process will provide jurisdictional load forecasts to be used in the scheduling runs.

3 PROCESS CONTEXT

3.1 BUSINESS MODEL RELATIONSHIP

The 'Demand Forecasting for Scheduling & Dispatch' process sits within the 'Forecasting' process group which covers both demand and wind forecasting within the System Operator processes. The TSOs are required to forecast demand to ensure there is sufficient generation to match demand in real time. Historical demand information and other factors such as the current and historic weather conditions, growth rates, embedded generation, major events known in advance and transmission system losses are accounted for to predict future demand. Forecasting is conducted across different time horizons, and depending on time horizon different data will be used in the process.

The primary purpose of this group of processes is to provide key inputs to the scheduling and dispatch processes. Forecasts are also published to the Market for Market Participants to access and analyse.

3.2 BACKGROUND AND SCOPE

Background

The 'Demand Forecasting for Scheduling & Dispatch' process develops shorter term load forecasts for use in the scheduling process. Demand Forecasting in the Programming and Control Phase is managed jurisdictionally. Previously all Demand Forecasting was performed using the Energy Management System (EMS) Load Forecast Application, which forecasts system demand for 14 days ahead for each half hour period. This will continue to be done and will be retrieved by the Market Management System (MMS) Load Predictor (LPRED) function for use in the Security Constrained Unit Commitment (SCUC) / Security Constrained Economic Dispatch (SCED) scheduling runs. LPRED retrieves long-term load forecasts for each jurisdiction from the EMS Load Forecast function for 5 days for use in the Long-Term Scheduling (LTS). LPRED also produces short-term system load forecasts at one-minute resolution from the current time (real-time rounded to next one-minute boundary) to four hours ahead for each jurisdiction and total system. The short-term load forecasts are used by Real-Time Commitment (RTC) and Real-Time Dispatch (RTD) scheduling applications.

Scope

This process covers Demand Forecasting in the Programming and Control Phases used for scheduling and dispatch in both jurisdictions, generating a 5 day forecast for use in the Long-Term Scheduling run and load forecasts from the current time to four hours ahead for use in the RTC and RTD scheduling runs.

It does not cover the generation of long term forecasts in the Operational Planning Phase (annually up to monthly); these are covered within the 'Long Term Demand Forecasting' process (BP_SO_4.1_Long Term Demand Forecasting). It covers the sending of forecasts to the Market Operator in accordance with the Trading and Settlement Code requirements. It does not cover forecasting for wind which is covered by the 'Wind Forecasting' process.

4 PROCESS OBJECTIVE

The objective of this Business Process is to meet the following obligations, namely:

- EirGrid Grid Code OC1 Demand Forecasts; and
- SONI Grid Code OC1 Demand Forecasting.

5.1.1 REAL TIME

The following table provides a summary of the obligations of Real Time relating to 'Demand Forecasting for Scheduling & Dispatch':

Team Name	Responsibility in relation to process	Timeline Associated
Real Time (Process Owner)	<ul style="list-style-type: none"> • Prepare day load forecast in EMS • Ensure data is retrieved into MMS (LPRED) from EMS for forecasting • Ensure all load shape is correct for LPRED • Update and assurance of the LPRED parameters. 	<ul style="list-style-type: none"> • Process will be performed daily for use in the scheduling runs in MMS throughout that day • Ad hoc/ As required

5.1.2 MARKET OPERATOR

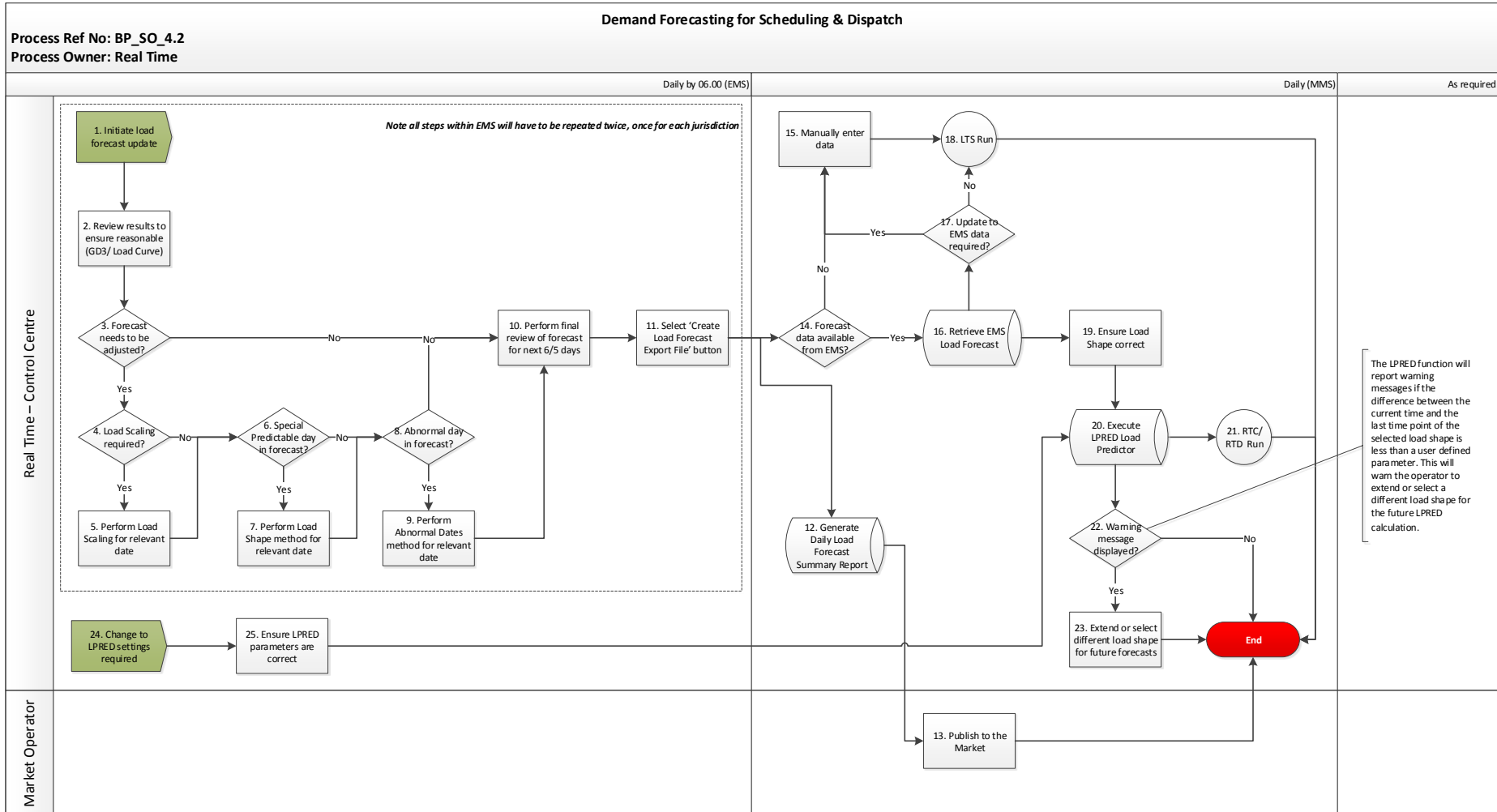
The following table provides a summary of the obligations of Market Operator relating to 'Demand Forecasting for Scheduling & Dispatch':

Team Name	Responsibility in relation to process	Timeline Associated
Market Operator	<ul style="list-style-type: none"> • Ensuring reports are published to the market. This will largely be automated and will only require action if there is an issue with the report generating. 	<ul style="list-style-type: none"> • Daily

6 PROCESS DESCRIPTION

6.1 LEVEL 3 PROCESS

6.1.1 PROCESS MAP



6.1.2 PROCESS STEPS

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/Frequency	System
1	Trigger: Initiate load forecast update	The trigger for this process will be Real Time User initiating the process as part of SI and no later than 06.00. Note that EMS and MMS will generate forecasts per jurisdiction (ROI and NI) thus the steps in this process will have to be performed separately for each jurisdiction.	Real Time User	14 Day Load Forecast	Daily, no later than 06:00	Demand Forecasting Tool (EMS)
2	Review results to ensure reasonable (GD3/ Load Curve)	User should review the forecast automatically generated to ensure that it is reasonable. The GD3 (ROI) and Load Curve (NI) can provide historical loads for each jurisdiction to compare the forecast with.	Real Time User	N/A	Daily, no later than 06:00	Demand Forecasting Tool (EMS)
3	Forecast needs to be adjusted?	If the forecast does not seem reasonable following comparison with historical load data, then an alternative method must be used to generate the forecast. If yes, go to step 4. If no, go to step 10.	Real Time User	N/A	Daily, no later than 06:00	Demand Forecasting Tool (EMS)
4	Load Scaling required?	Is load scaling required to adjust the forecast? If yes, go to step 5. If no, go to step 6.	Real Time User	N/A	Daily, no later than 06:00	Demand Forecasting Tool (EMS)
5	Perform Load Scaling for relevant date	Perform Load Scaling for relevant date.	Real Time User	Load scaling complete	Daily, no later than 06:00	Demand Forecasting Tool (EMS)
6	Special Predictable day in	Where there special predictable day/s in the	Real Time User	N/A	Daily, no later than	Demand



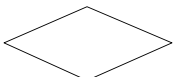




#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/ Frequency	System
	forecast?	forecast period, e.g. Christmas Day? If yes, go to step 7. If no, go to step 8.			06:00	Forecasting Tool (EMS)
7	Perform Load Shape method for relevant date	Perform Load Shape method for relevant date.	Real Time User	Load Shape method complete	Daily, no later than 06:00	Demand Forecasting Tool (EMS)
8	Abnormal day in forecast?	Where there abnormal day/s in the forecast period? Abnormal dates are special days that are similar to other days in term of shape, e.g. the Tuesday after a Bank Holiday is often similar in shape to the Monday of the previous week. If yes, go to step 9. If no, go to step 10.	Real Time User	N/A	Daily, no later than 06:00	Demand Forecasting Tool (EMS)
9	Perform Abnormal Dates method for relevant date	Perform Abnormal Dates method for relevant date.	Real Time User	Abnormal dates method complete	Daily, no later than 06:00	Demand Forecasting Tool (EMS)
10	Perform final review of forecast for next 6/5 days	Perform a final review and ensure a reasonable forecast is available for next 6 days.	Real Time User	N/A	Daily, no later than 06:00	Demand Forecasting Tool (EMS)
11	Select 'Create Load Forecast Export File' button	When satisfied with forecast, select the 'Create Load Forecast Export File' button, which will generate an export file for MMS.	Real Time User	Export file	Daily, no later than 06:00	Demand Forecasting Tool (EMS)
Note: Steps 1-11 will have to be repeated twice, for each jurisdiction						
12	Generate Daily Load Forecast Summary Report	Systems will generate a Daily Load Forecast Summary Report which will be made available to Market Participants.	N/A - System step	Daily Load Forecast Summary Report	Daily	MMS

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/ Frequency	System
13	Publish to the Market	The Daily Load Forecast Summary Report will be published to the market on a daily basis via the Market Operator.	Market Operator	Report published	Daily	MI
14	Forecast data available from EMS?	The forecast data from EMS should be automatically retrieved into MMS for both jurisdictions, if for some reason it is not it may need to be manually entered. If it is available, the process will proceed as normal to step 16. If it is not available, go to step 15.	Real Time User	N/A	Daily	LPRED (MMS)
15	Manually enter data	Manually enter the EMS load forecast data into LPRED or make manual update to EMS data that has been loaded into LPRED (to amend it before it is used in LTS). LPRED produces 1-minute load forecasts for RTC/RTD.	Real Time User	EMS load forecast in MMS	Daily	LPRED (MMS)
16	Review Shape.	Once EMS Load Forecast data has been loaded into LPRED the user should review the forecast data to ensure it is still correct and that no amendments are required before it is used in the LTS run and the blending for the RTC and RTD runs. If an update is required go to step 17, for a manual update go to step 15 and if no update is required go to step 19.	Real Time User	EMS load forecast in MMS	Daily	LPRED (MMS)
17	Load Shape Management	Options in terms of management include: 1. Complete re-editing of shape. 2. Like & Accept proposed shape	Real Time User	EMS load forecast amended	Daily	LPRED (MMS)

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/Frequency	System
		3. Amend in LPRED. Ramp/Scale etc. Go to step 19 when amendments are complete.				
18	LTS run	Once the data is available from EMS, LPRED will use this data for each jurisdiction from the EMS Load Forecast function for Long-Term Scheduling (LTS).	Real Time User	Advisory instructions	Every 4 Hours (minimum)	Scheduling Application (MMS)
19	Finalise Load Shape	The user can select historical load, adjust historical load, or generate load shape to be used in LPRED. Once the User finalises the load shape, LPRED uses the calculated system load and load shapes to produce 1-minute load forecasts.	Real Time User	N/A	Daily	LPRED (MMS)
20	Execute LPRED Load Predictor	The system may be automatically set-up to execute LPRED, if not the user can trigger the process.	N/A – Systems step	Short-term system load forecast	Daily	LPRED (MMS)
21	RTC/ RTD Run	Once the LPRED has been executed the short-term system load forecasts at one-minute resolution from the current time to four hours ahead for each jurisdiction and total system will be available for the RTC and RTD runs.	N/A – Systems step	Advisory Instructions	Every 15 mins (RTC) / every 5 mins (RTD)	Scheduling Application (MMS)
22	Warning message displayed?	User should check to see if there are any warning messages being displayed following LPRED execution. The LPRED function will report warning messages if the difference between the current time and the last time point of the selected load shape is less than a user defined parameter. This will warn the operator to extend or select a different load shape for the future	N/A – Systems step	N/A	As required	LPRED (MMS)

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/Frequency	System
		<p>LPRED calculation.</p> <p>If there have been warning messages, go to step 23.</p> <p>If there have been no messages, process ends.</p>				
23	Extend or select different load shape for future forecasts	<p>The LPRED function will report warning messages if the difference between the current time and the last time point of the selected load shape is less than a certain parameter.</p> <p>If there has been a warning the User should extend or select a different load shape for the future LPRED calculation.</p>	Real Time User	N/A	As required	LPRED (MMS)
24	Change to LPRED settings required	If there is a change to LPRED settings this will be managed by Real Time.	Real Time User	N/A	As required	N/A
25	Ensure LPRED parameters are correct	<p>Ensure all parameters for LPRED function are correct, this includes:</p> <ul style="list-style-type: none"> • Blending parameters • Load adjustment • Ramp options 	Real Time User	N/A	As required	LPRED (MMS)

7.1 PROCESS FLOWCHART KEY

FLOWCHART KEY	
	Trigger
	Process step
	Process decision / question
	Reference to another process
	Another business process to be implemented following current step (current step is a trigger for another process)
	Process end
	System (automatic step)