

2024 ISP Market Model Instructions

June 2024

A guide to using the published
2024 ISP PLEXOS model





Important notice

Purpose

AEMO has prepared this document to assist stakeholders in interpreting and using input data produced for the purposes of modelling the National Electricity Market (NEM) for the 2024 Integrated System Plan (ISP).

AEMO's dataset covered by this guide is configured for use in the PLEXOS Integrated Energy Model software; the PLEXOS database itself containing the market models underpinning the 2024 ISP is also published as part of this data package.

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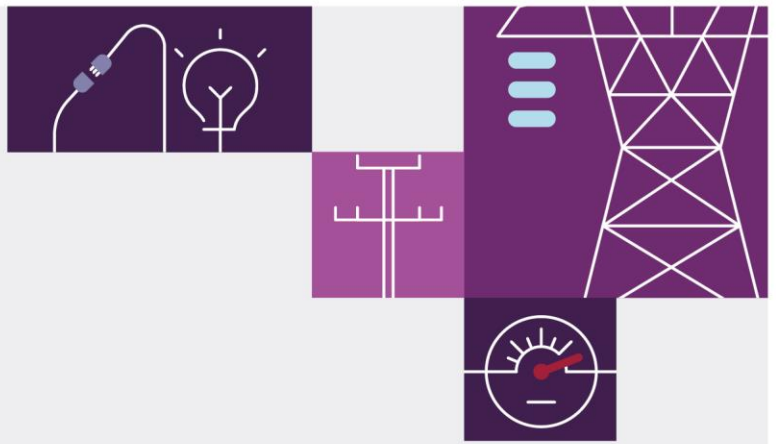
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Version control

Version	Release date	Changes
1.0	26/06/2024	Initial release



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1 2024 ISP DLT Model

This document outlines how to setup the Detailed Long Term (DLT) model and its input assumptions that AEMO makes publicly available to stakeholders.

The capacity outlook process uses two interacting models to address different aspects of long-term optimisation. The Single-Stage Long-Term Model (SSLT) and DLT.

The DLT model determines outcomes for generation expansion and retirement, transmission expansion, storage, and dispatch options. The DLT model takes some outputs from the SSLT and incorporates them as inputs to the optimisation.

The DLT allows a chronological optimisation of each day and ensures a more detailed representation of demand and VRE variability than the SSLT. Detailed information about the DLT and the other models used within the 2024 ISP can be found in the “2023 ISP Methodology” report¹.

1.1 Market model and data package content

The publication of the 2024 ISP DLT Model comprises:

- One PLEXOS database in .xml format for each scenario below, with data which corresponds to the optimal development path and input assumptions for each scenario:
 - *Step Change*
 - *Progressive Change*
 - *Green Energy Exports*
- Demand, renewable generation, timeslice specifications, and load subtracter traces in PLEXOS format.

1.1.1 Supporting data: Trace Files

AEMO optimises expansion decisions across multiple historical weather years known as “reference years” to account for short- and medium-term weather diversity. AEMO uses a “rolling reference years” approach to capture weather diversity in the capacity outlook models.

Consistent with the rolling reference years approach, these traces were obtained by combining time series of 14 historical weather years. The reference years were matched to the SSLT and DLT planning horizon in the following sequence described in Table 1 with the 14-year sequence repeating in the same order until the end of the outlook period.

¹2023 ISP Methodology Report available at: https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/isp-methodology-2023/isp-methodology_june-2023.pdf?a=en

Table 1 Rolling reference years sequence in capacity outlook models

Planning Year	Reference Year	Hydrological Reference Year	Variable Renewable Energy (VRE) Reference Year
2023-24	2017-18	2017-18	2017-18
2024-25	2018-19	2018-19	2018-19
2025-26	2019-20	2019-20	2019-20
2026-27	2020-21	2020-21	2020-21
2027-28	2021-22	2021-22	2021-22
2028-29	2022-23	2022-23	2022-23
2029-30	2014-15 ²	2006-07 (Dry year)	2014-15
2030-31	2010-11	2010-11	2010-11
2031-32	2011-12	2011-12	2011-12
2032-33	2012-13	2012-13	2012-13
2033-34	2013-14	2013-14	2013-14
2034-35	2014-15	2014-15	2014-15
2035-36	2015-16	2015-16	2015-16
2036-37	2016-17	2016-17	2016-17

2 Configuring the 2024 ISP Model

The following section outlines the steps needed to set up the 2024 ISP DLT PLEXOS market model, including the configuration of the input data package. The PLEXOS version used for simulating the 2024 ISP DLT is the PLEXOS 9.2 Release 6 (R06)³.

The step-by-step guide is documented below:

1. Download the 2024 ISP Model zip file from AEMO's 2024 ISP webpage⁴.
2. Unzip the file 2024 ISP Model. This will generate the 2024 ISP Model folder.
3. Open the 2024 ISP Model folder. There will be one folder for each of the three scenarios.
4. Download and unzip the three other folders, i.e., 2024 ISP Wind traces, 2024 ISP Solar traces, and 2024 ISP Timeslice traces. Those contain wind, solar, and timeslice traces that are the same for all scenarios.
5. Copy the three unzipped folders (wind, solar, and timeslice) and paste them into the Traces folder within the scenario of interest. The Traces folder must contain six folders with the names exactly as shown in Figure 1.

² The dry year traces (2006-07) were replaced with 2014-15 traces for renewable and demand as they were most similar in profile to the 2006-07 year.

³ The ISP model may be able to be used in other versions of PLEXOS but these have not been tested by AEMO.

⁴ See <https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp>

Figure 1 Content of Traces folder

- Name ^
- demand
 - hydro
 - load_subtractor
 - solar
 - timeslice
 - wind

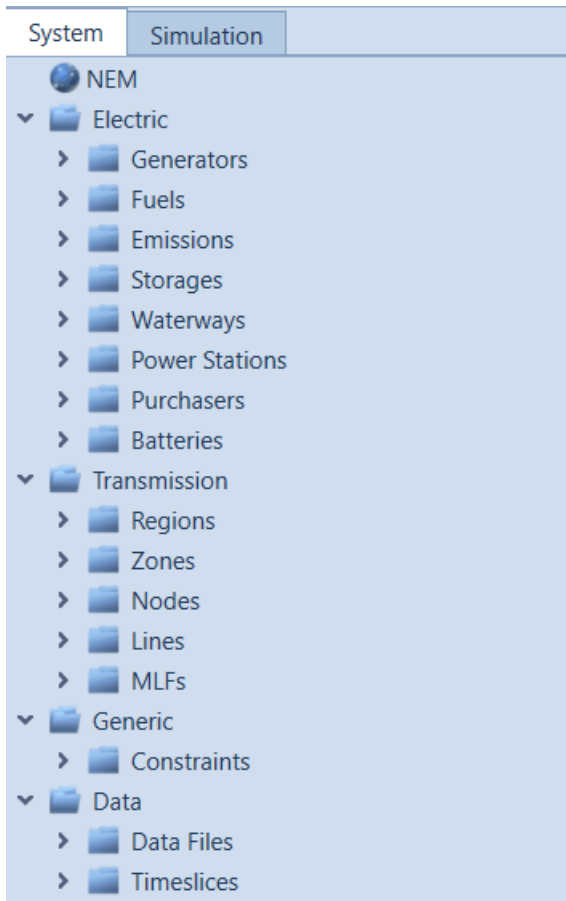
6. The list and respective content of files is presented in the Table 2 for *Step Change*.

Table 2 Zip files for 2024 ISP Step Change

File	Description	File location
2024 ISP Step Change Model	Contains the .xml model for <i>Step Change</i>	Placed in the 2024 ISP Step Change folder
PLEXOS_Solverparam	Contains .xml file	Placed in the 2024 ISP Step Change folder
Traces	Contains six folders with traces for demand, hydro, load subtractor, solar, wind and timeslice.	Placed in the 2024 ISP Step Change folder
<i>Demand</i>	Contains half-hourly sub-regional demand traces for operational demand	Placed in the 2024 ISP Step Change\Traces\demand' folder
<i>Hydro</i>	Contains Hydro daily inflows traces.	Placed in the 2024 ISP Step Change \Traces\hydro' folder
<i>Load_subtractor</i>	Contains half-hour load subtractor traces used to improve the accuracy of the approximation of load and VRE output.	Placed in the 2024 ISP Step Change\Traces\load_subtractor' folder
<i>Solar</i>	Constrains half-hourly generation traces for solar	Placed in the 2024 ISP Step Change \Traces\solar' folder
<i>Timeslice</i>	Contains timeslices traces.	Placed in the 2024 ISP Step Change \Traces\timeslices' folder
<i>Wind</i>	Constrains half-holy generation traces for wind	Placed in the 2024 ISP Step Change\ 'Traces\wind' folder

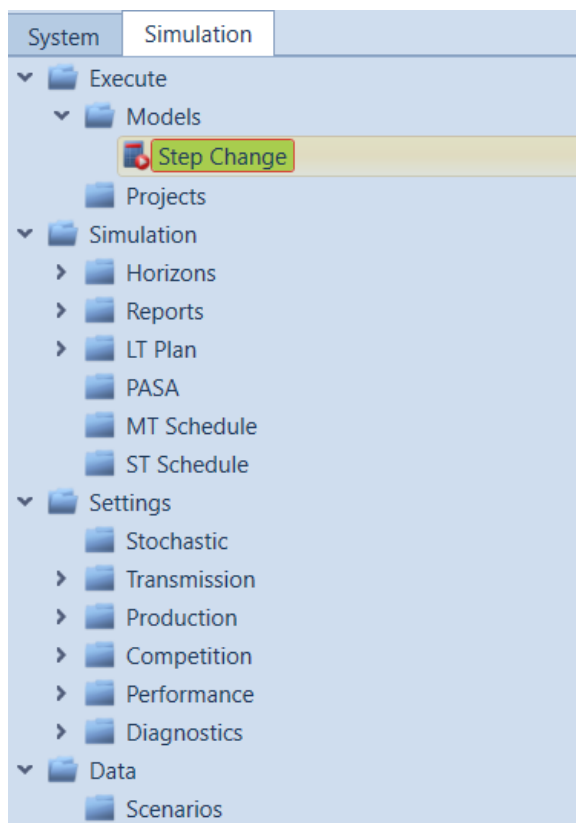
- Open the .xml file in PLEXOS. The model consists of System and Simulation tabs, as shown in Figure 2. The PLEXOS System tab comprises all objects, as well as their memberships and properties. The PLEXOS Simulation tab contains the model object and all the settings used in the simulation.

Figure 2 System tab of the .xml file



- Execute the highlighted model in the Simulation tab, corresponding to *Step Change* CDP14 as shown in Figure 3.

Figure 3 Simulation tab of the 2024 Step Change ISP Model.xml file



2.1 Further modelling details

The size of the problem and the length of the planning horizon require some simplifications in the assumptions, trading off some model accuracy for computational manageability. These simplifications include:

- Aggregating half-hour demand across the 28-year planning horizon into a representative number of load blocks.
- Dividing the optimisation horizon into smaller steps (four steps of seven years).
- Using notional transfer limits between sub-regions to simplify network representation.
- Preliminary screening of new entrant generation candidates by optimising the DLT model for a selection of snapshot years to determine if a technology is part of the most economically efficient solution at any time across the planning horizon.

Further information can be found in AEMO's ISP Methodology⁵.

⁵ ISP Methodology available at https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/isp-methodology-2023/isp-methodology_june-2023.pdf?la=en.