Data files supporting the Marinus Link Project Assessment Draft Report

TasNetworks has provided ten data files which provide additional detailed information relating to the modelling of net market benefits presented in the Marinus Link Project Assessment Draft Report (***PADR*)**. The following paragraphs provide an explanation of these data files.

Description of data files

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| **File** | **Description** |
| Marinus Link PADR modelling assumptions workbook 2019\_12\_19a.xlsx | Lists the assumptions used by Ernst & Young (**EY**) in undertaking the market expansion modelling, as discussed in section 5.2 of the *PADR* and Attachment 1 to the *PADR*.  The format of this workbook closely follows the format used by the Australian Energy Market Operator in its Integrated System Plan Inputs and Assumptions workbooks. |
| Economic Evaluation Marinus Link.xlsx | Provides the detailed derivation of net market benefits presented in Tables 8 to 12 of the *PADR*.  This worksheet collates the results from EY’s market benefits modelling, GHD’s frequency control ancillary services benefits modelling, and TasNetworks’ estimates of annualised costs of Marinus Link, to determine the net market benefits for each combination of Marinus Link option, timing and scenario presented in *PADR* Tables 8 to 12. |
| 8 files, with the name format,  EY results workbook - <scenario> - Marinus 1500MW <years>.xlsx | These files provide greater detail about the market outcomes forecast by EY’s market expansion model. All files present modelling outcomes of the preferred option, being 1500 MW Marinus Link commissioned in two 750 MW stages.  Two groups of files are provided, indicated by the <years> field in the filename:  <years> = “2028 and 2032”: the first stage of Marinus Link is commissioned in 2028 and the second stage is commissioned in 2032. This is the option with the greatest net market benefit identified in the *PADR*.  <years> = “2027 and 2028” is the alternative timing proposed in section 6.3 of the *PADR*, with the first stage commissioned in 2027 and the second stage in 2028.  For each of the two <years> options, four different files are provided, corresponding to the scenario being modelled. |

Contents of the *EY results workbook* files

The eight files providing detailed results from EY’s market expansion model each contain 26 individual worksheets. The worksheets’ tabs are colour coded.

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| **Tab colour** | **Worksheet names** | **Description** |
| Yellow | Cover, Release notice, Version notes | EY quality assurance information |
| Orange | --- Compare options ---- | Presents the differences in market costs, installed generation capacity, and generated energy between the with- and without-Marinus Link market expansion simulations.  The results are presented for each year of the study.  The difference in market costs between a with- and without-Marinus Link simulation will be the gross market benefit due to Marinus Link. |
| Dark green | StatusQuo\_BaseCase\_CF, StatusQuo\_BaseCase\_Capacity, StatusQuo\_BaseCase\_Generation | Presents model outputs for the no-Marinus Link simulation run (i.e., the base case) relating to non-cost outputs: capacity factor, installed capacity, and generated energy. |
| Light green | StatusQuo\_BaseCase\_VOM Cost, StatusQuo\_BaseCase\_FOM Cost, StatusQuo\_BaseCase\_Fuel Cost, StatusQuo\_BaseCase\_Build Cost, StatusQuo\_BaseCase\_REHAB Cost, StatusQuo\_BaseCase\_REZ Tx Cost, StatusQuo\_BaseCase\_USE+DSP Cost, StatusQuo\_BaseCase\_SyncCon Cost | Presents the costs associated with the various categories of market benefits assessed, in the no-Marinus Link simulation run. These worksheets are discussed in more detail below. |
| Dark purple | StatusQuo\_<year>\_CF, StatusQuo\_<year>\_Capacity, StatusQuo\_<year>\_Generation | Presents model outputs for the simulation run in which Marinus Link is commissioned relating to non-cost outputs: capacity factor, installed capacity, and generated energy.  <year> will be either “M27\_28” or “M28\_32”, corresponding to the years in which the stages of Marinus Link are commissioned. Each file corresponds to one <year> option. |
| Light purple | StatusQuo\_<year>\_VOM Cost, StatusQuo\_<year>\_FOM Cost, StatusQuo\_<year>\_Fuel Cost, StatusQuo\_<year>\_Build Cost, StatusQuo\_<year>\_REHAB Cost, StatusQuo\_<year>\_REZ Tx Cost, StatusQuo\_<year>\_USE+DSP Cost, StatusQuo\_<year>\_SyncCon Cost | Presents the costs associated with the various categories of market benefits assessed, in the simulation run in which Marinus Link is commissioned. These worksheets are discussed in more detail below.  <year> will be either “M27\_28” or “M28\_32”, corresponding to the years in which the stages of Marinus Link are commissioned. Each file corresponds to one <year> option. |

Each “costs” worksheet provides the costs associated with a particular element:

VOM = variable operating and maintenance costs (i.e. costs per unit of energy generated)

FOM = fixed operating and maintenance costs (i.e. costs per unit of installed generating capacity)

Fuel = fuel costs (coal or gas costs; zero for hydro, wind and solar generation)

Build = capital costs to build new generating or storage plant, annualised over the life of the plant.

REHAB = cost to decommission generating plant (rehabilitation cost). Generating plant will be decommissioned either when it reaches its forecast end of life, or if the model elects to retire the plant early on the basis that this will yield a lower overall cost to the NEM.

REZ Tx = cost to expand transmission to connect a renewable energy zone hub.

USE+DSP = cost of curtailed load, either involuntary unserved energy (USE) or voluntary demand side reduction (DSP).

SyncCon = the cost to run generators as synchronous condensers to provide inertia support, in order to meet the minimum inertia constraints implemented in the market expansion model.

The cost categories VOM, FOM, Fuel, Build, and REHAB are broken down into NEM regions, then further broken down by generating and storage technology types. REZ Tx and USE+DSP are broken down by NEM region only, as these are not associated with particular generating and storage technologies.

Synchronous condenser costs apply to Tasmania only, as this is the only region in which the inertia constraint has a material impact.

All costs are discounted to the year 2025, using a 5.9% discount rate.[[1]](#footnote-2)

The sum of all eight cost components will be the forecast total cost to supply the NEM over the modelling period. The light green tabs represent these cost categories in a market expansion simulation without Marinus Link installed. Summing the costs from the eight light-green tabs is therefore the forecast cost of supply without Marinus Link. Similarly, summing the costs from the eight light purple tabs (i.e. the simulation run when Marinus Link is installed) will yield the forecast total cost to supply the NEM if Marinus Link is present. The difference between these two totals is the gross market benefit of Marinus Link.

1. Costs are discounted to 2025 because this was the approach used in our Initial Feasibility Report which examined the possibility of Marinus Link being commissioned in 2025. The spreadsheet *Economic Evaluation Marinus Link.xlsx* converts EY’s 2025 base year discounting to a 2019 base year. [↑](#footnote-ref-2)