

NSW Electricity Infrastructure Roadmap Market Briefing Note

Proposed methodology for generator contributions to network infrastructure connecting projects to energy hubs (H2P network) in CWO REZ

December 2022



Purpose

This market briefing note provides information to projects seeking CWO REZ access rights in Tender Round 2, expected to be held in Q2 2023. It explains the proposed methodology for calculating generator contributions towards Renewable Energy Zone (REZ) network infrastructure (RNI).

This RNI is referred to as the network between the identified substation hubs and projects' gates ('hubs to project gate' or H2P).

The H2P generator contributions apply where infrastructure is built by the REZ Network Operator in the initial REZ development, as shared network between the backbone of the REZ and one or more projects.

EnergyCo as the Infrastructure Planner and AEMO Services as the NSW Consumer Trustee, will conduct targeted engagement with potential proponents and other stakeholders to test the proposed methodology. The final decision on matters contained within this document will rest with the Infrastructure Planner and/or the Consumer Trustee as appropriate.

Briefing context

Projects seeking access rights must make certain contributions to the REZ costs either via access fees or other payments. These contributions fall into four broad categories:



A community and employment component. This component was previously outlined in draft by AEMO Services in its [Tender 1 Guidelines](#).¹



A system strength component. The proposed methodology for calculating this component is outlined in a separate [briefing note](#).



Scheme administration component. This is an amount to recover the costs incurred by EnergyCo in administering the access scheme for the REZ. This component of the access fee was previously outlined in draft by AEMO Services in its [Tender 1 Guidelines](#).



A H2P network capital component. This briefing note sets out the proposed methodology for calculating a generator's capital contribution to shared network assets from identified substation hubs to project gates. The methodology applies benchmark costs for the generator's avoided connection asset.

1. t1_aemo_services_tender_guidelines_september_2022.pdf (aemoservices.com.au)

Background to the H2P network capital component

Traditionally in the national electricity market (NEM) projects have paid the costs of connecting to the existing shared network and the costs of augmentations to the shared network necessary to enable the projects to connect.

In REZs, EnergyCo is seeking to reduce costs and minimise environmental and community impacts by coordinating the planning, construction, and operation of RNI.

During the initial development of the REZ, this will involve EnergyCo providing or procuring easements, planning approvals, design, construction, and operation of shared network for both the backbone RNI network and the H2P network (near high quality renewable energy resources and major planned projects).

It is expected that this network will be shared by multiple projects, and whilst parts of this network may initially connect one project, will remain available for use by future projects that receive access rights.

For the initial projects, engaging with EnergyCo on REZ design, the H2P network will provide connection points at or near “project gates”. The location of these connection points is expected to reduce or eliminate the need for projects to construct and fund their own dedicated connection assets.

The H2P arrangement has been designed to support the initial development of the CWO REZ in a manner consistent with policy objectives, including social licence and delivery timeframes. The same arrangement may not be available, or may apply differently, to later projects joining the CWO REZ.

Each generator’s H2P network capital component is allocated based on the generators’ equivalent avoided costs of delivering a dedicated connection asset to the identified benchmark RNI connection point (referred to as Benchmark Hub Connection Point below). This briefing note sets out the proposed cost allocation methodology.

Proposed methodology for H2P network capital component

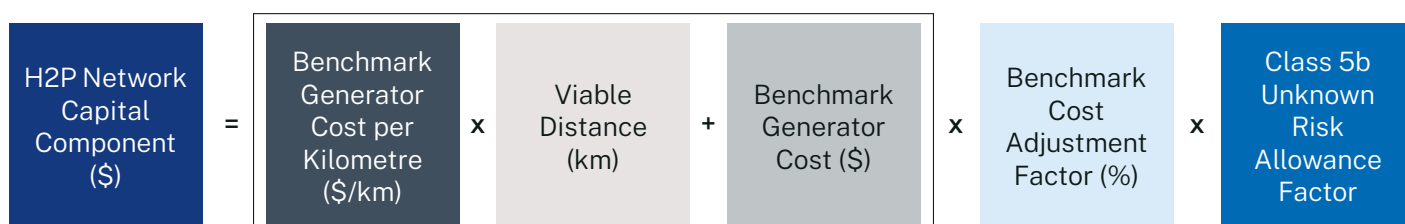
The methodology proposes that each generator contributes an amount equal to *the benchmark cost of a dedicated connection asset (DCA) from the generator to the RNI, sized for the generator*. The methodology for this component focuses on capital costs and it is anticipated this component will be amortised over the economic life of the assets starting from the commercial operating date.

The benchmark cost of a DCA for a generator will be derived by using the *H2P capital component calculator (Calculator)*. The Calculator undertakes the calculation shown in Figure 1 to determine the H2P Network Capital Component.

The Calculator applies AEMO’s transmission cost database for a 400MVA project connecting into Central West NSW (N3) using a 330 kV network.³ Further work is being undertaken by AEMO Services and EnergyCo to ensure the appropriateness of these capital cost estimates ahead of the CWO REZ, access fee final determination.

All the variables applied in the Calculator are set out in Table 1 – Variables for H2P network capital component below. The Viable Distance and the Benchmark Cost Adjustment Factor are variables specific to each generator while the Benchmark Generator Cost per kilometre and Benchmark Other Generator Cost are set according to AEMO’s transmission connection database as explained above. A case study to demonstrate how the calculation is applied to a project is provided in Attachment 1 – case study – H2P network capital component calculator.

Figure 1. H2P network capital component calculation



3. AEMO Transmission Cost Database output files, aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/isp/2021/transmission-cost-database-output-files.zip?la=en

Table 1. Variables for H2P network capital component

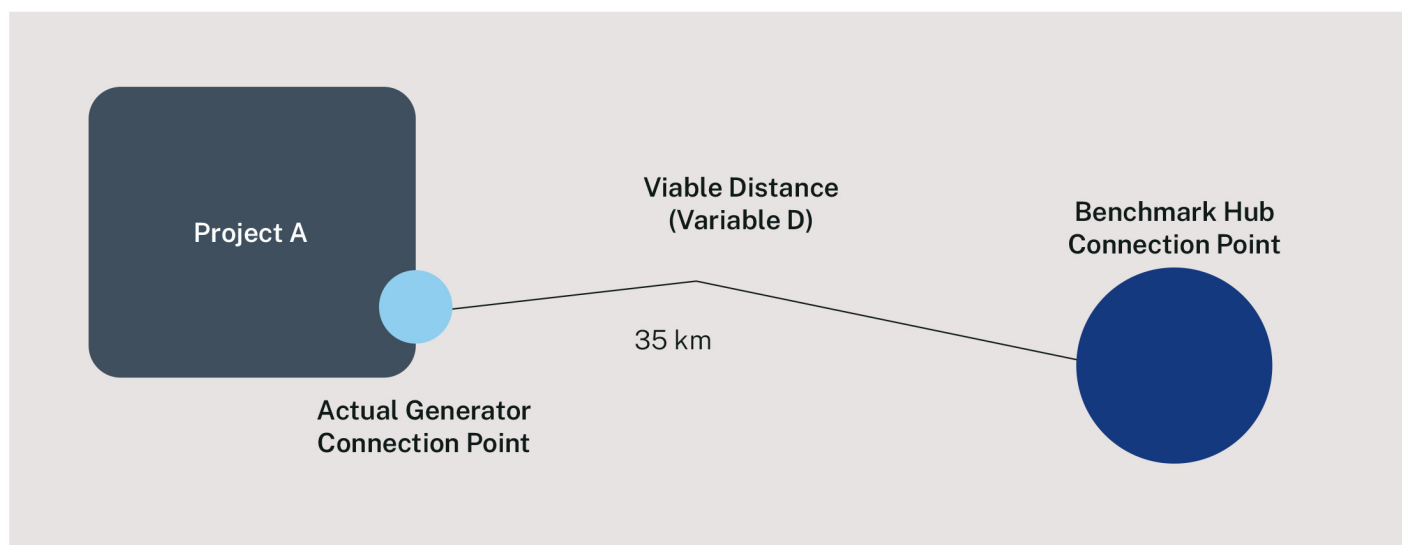
Variable	Name	Description
A	Benchmark Generator Cost per Kilometre (\$/km)	The Generator Cost per Kilometre is the Class 5 transmission cost outlined in the most recent AEMO Transmission Cost report (currently the 2021 AEMO Transmission Cost Report). ⁴
B	Benchmark Other Generator Cost (\$)	The Other Generator Cost is the Class 5b other transmission costs outlined in N3 330kV outputs from the most recent AEMO Transmission Cost report (currently the 2021 AEMO Transmission Cost Report).
C	Benchmark Cost Adjustment Factor (%)	The Benchmark Cost Adjustment Factor recognises the Benchmark Costs from AEMO are for a 400MVA generator and need to be adjusted to reflect the relative size for the generator. This is done by taking the proportion of the generator's nameplate capacity in MVA divided by 400MVA (being the amount of the AEMO benchmark connection prescribed in AEMO's N3 connection asset). This means for projects over 400 MVA, multiple H2P assets will be assumed.
D	Viable Distance (km)	<p>The Viable Distance is the distance from the Actual Generator Connection Point to the Benchmark Hub Connection Point via the shortest viable transmission route, where:</p> <ul style="list-style-type: none"> • The actual generator connection point is the point identified by EnergyCo where the generator will connect to the CWO REZ. • The Benchmark REZ Connection Point is any point specified by EnergyCo as a Benchmark Hub Connection point for the CWO REZ. <p>The Benchmark REZ Connection points specified by EnergyCo will be based on locations published on 8 April 2022. This means for the western side of REZ the Benchmark Connection Points are locations near Elong Elong and Merotherie Energy Hubs and on the eastern side the location near former Uarbry energy hub, which will no longer be constructed.</p> <p>The viable transmission route is a route that is physically and technically capable of hosting the prescribed network.</p>
E	Class 5b Unknown Risk Allowance Factor	The Class 5b Unknown Risk Allowance (+/-50%) is included post calculation to increase the total costs to the relevant cost estimate class. This means that the expected project costs are increased by the relevant Class 5B factor to appropriately reflect the potential unforeseen risk individual component cost figures used from AEMO's Transmission Cost Database.

4. AEMO | Transmission costs for the 2022 Integrated System Plan as outlined in the 2021 Transmission Cost Report

Attachment 1 – case study – H2P network capital component calculator

A 300 MVA solar project (Project A) is planning to connect into a CWO REZ Benchmark Energy Hub. This is shown below in Figure 2.

Figure 2. Stylised map for case study



EnergyCo will procure RNI to be built as shared network to the “Actual Generator Connection Point” that is identified by EnergyCo.

The distance between the Benchmark Hub Connection Point and Project A’s Actual Generator Connection Point is the Viable Distance.

This Viable Distance connection path follows the shortest viable transmission route from the Actual Generator Connection Point to the Benchmark Hub Connection Point and has a total distance of 35km. The Viable Distance is marginally longer than a direct measurement from the Actual Generator Connection Point to the Benchmark Hub Connection.

The Calculator requires two inputs identified by EnergyCo in consultation with projects to calculate the component amount:

- the Viable Distance in kms, being the distance from the Actual Generator Connection Point to the Benchmark Hub Connection Point; and
- the Benchmark Cost Adjustment Factor, which is the nameplate capacity of the generator as a proportion of the AEMO benchmark 400 MVA connection to 330 kV network prescribed in AEMO’s N3 connection asset, utilised by the project. This means for projects over 400 MVA, multiple H2P assets will be assumed.

Project A is a 300 MVA project and as such has a Benchmark Cost Adjustment Factor of 75% as it is three quarters of the nameplate capacity of the generic project AEMO has model in its N3 transmission connection database of 400 MVA.

For Project A the relevant project details are summarised in the table below. Variables C and D in bold are specific to this case study, while variables A, B and E are non-project specific.

Table 2. Variables for H2P network capital component calculator

Variable	Name	Value
A	Benchmark Generator Feeder Cost per Kilometre	\$1.9M/km
B	Benchmark Other Generator Cost	\$27.74M
C	Benchmark Cost Adjustment Factor	75%
D	Viable Distance	35 km
E	Class 5b Unknown Risk Allowance Factor	(x 1.3 ÷ 1.15)

These variables then provide a H2P network capital component of \$79.84 million, calculated as shown below.

Further, *Table 3. output from H2P network capital component calculator*, shows how the calculator can support projects deriving the capital contribution.

HSP network capital component

$$\begin{aligned}
 &= [(A \times D) + B] \times C \times E \\
 &= [(\$1.9\text{M}/\text{km} \times 35 \text{ km}) + \$27.74\text{M}] \times 75\% \times (1.3 \div 1.15) \\
 &= \$70.63\text{M} \times (1.3 \div 1.15) \\
 &= \mathbf{\$79.84\text{M}}
 \end{aligned}$$

Table 3. Output from H2P network capital component calculator

Variable	Name	Value	Utilisation	Contribution
	Distance of AEMO N3 benchmark connection Project (km)	10		
A	Benchmark Generator Cost per km (\$m)	\$1.90		
B	Benchmark Other Generator Cost (\$m)	\$27.74	75%	\$20.80
C	Benchmark Cost Adjustment Factor (%)	75%		
D	Viable Distance (km)	35.0		
A x D	Benchmark Generator Cost (\$m)	\$66.43	75%	\$49.82
	Class 5b Unknown Risk Allowance (+/-50%)			\$9.21
Total HSP network capital component (\$m)				\$79.84

In summary

- The H2P capital component enables Project A to contribute to the capital costs of providing shared network RNI to the Actual Generator Connection Point. In doing so it replicates what Project A would have paid in “DCA” costs whilst optimising the opportunity REZs provide to plan and build shared network directly to renewable resources.
- The location of the Actual Generator Connection Point significantly reduces the DCA required for Project A.
- The Viable Distance may or may not reflect the actual route alignment of the CWO REZ RNI.

Question and Answers

Question 1: How will the H2P network capital component methodology be applied to individual projects?

EnergyCo will work with individual proponents to apply the methodology to each project. This work will be conducted through EnergyCo's ongoing Candidate Foundational Generator engagement, or by projects contacting EnergyCo directly using the email address below.

Following identification of the H2P network capital component for a project, EnergyCo will provide this information to the Consumer Trustee (AEMO Services) to support the Consumer Trustee's determination of an access fee applicable to the project.

Proponents will be notified of the access fee applicable to their projects ahead of participation in the tender.

Projects seeking to bid for a CWO access right in an upcoming tender who are not participating in the Candidate Foundational Generator process are invited to contact EnergyCo at contact@energyco.nsw.gov.au

Question 2: What considerations will impact the identification of a viable distance?

EnergyCo will work with individual proponents to identify the Viable Distance (Variable G) for use in the Calculator. The route identification will consider expected land availability, and social and environmental constraints, to reflect a reasonable potential alignment between the project's Actual Generator Connection Point and the Benchmark Hub Connection Point.

Question 3: How will the capital contribution be converted into a periodic payment?

The structure of the payment will be of critical importance to projects. Once this consultation has been completed, further consultation will be undertaken on converting the H2P network capital component into a periodic payment. This will consider:

- operating and maintenance cost allocations
- capital return considerations
- amortisation periods for the connection asset
- escalation/indexation
- other matters emerging through the consultation of the capital contribution.

Question 4: What costs are included in or excluded from the H2P capital contribution calculator?

The Calculator follows the methodology included in the AEMO transmission cost database and a detailed list of the included costs can be found in the Calculator spreadsheet. This includes substation costs, as well as allowances for indirect costs including: project development, works delivery, land and environment, stakeholder and community engagement, procurement and insurance. The Calculator does not include financing costs attributable to a connection asset.

Question 5: Will all the Benchmark Hub Connection Points be built?

No. EnergyCo as the Infrastructure Planner may alter actual position of an energy hub as part of the detailed design process for reasons such as future proofing of lines, or for technical optimisation including innovation or in response to community feedback and social license.



About CWO REZ

The NSW Government is in the development phase for the State's first Renewable Energy Zone (REZ) in the Central-West Orana region. The Central-West Orana REZ is approximately 20,000 square kilometres centred by Dubbo and Dunedoo, on the land of the Wiradjuri, Wailwan and Kamilaroi people.

EnergyCo is delivering the Central-West Orana REZ to provide a clean, affordable and reliable power supply for energy consumers across NSW. The REZ will initially unlock at least three GW of new transmission capacity from solar, wind and storage projects within the next decade, which is enough to power 1.4 million homes.

For more information on the CWO REZ

For more information about the Central-West Orana REZ, you can visit the EnergyCo [website](#), contact EnergyCo on contact@energyco.nsw.gov.au or phone 1800 032 101 (9am to 5pm, Monday to Friday).

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