



Embedded Generation Grid-
Connection Standards Scoping Study
Appendices

Prepared by ENERGEIA for the
Clean Energy Council

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Appendix A – Survey Questions.....3
Appendix B – Stakeholders Engaged.....30

Appendix A – Survey Questions

The survey questions were customised to various groups:

- EG Proponents
 - Operating in a single network area
 - Operating in multiple network areas
- DNSP's
- General (Manufacturers, Industry Bodies and Government Office)

EG Proponents

1. In the last two years, approximately how many EG grid-connections, or installs, of 30KW to 5MW has your organisation undertaken?

- None
- 1-3
- 3-10
- 10-20
- More than 20

2. a) Which type(s) of EG technology do you typically connect?

- Solar PV
- Wind
- Diesel
- Gas
- Other:

2. b) Which ranges of EG capacity do you typically connect?

- 30kW - 100kW
- 100kW - 1MW
- 1MW - 5MW

2. c) Which type of EG do you typically connect in terms of export capability?

- Mostly exporting

- A mix
- Mostly non-exporting

3. a) Would it be appropriate to have a single specific set of requirements covering all EG connections from 30kW to 5MW?

- Yes, a single set would be okay
- No, there would need to be a different set of requirements for each EG type

3. b) If not, what subcategories of (e.g. size or technology) would be important to differentiate (e.g. via separate schedules) and why?

Insert your response here

4. How many networks do you usually operate in? If you operate in...

- ... one network
- ... more than one network

EG Proponent Operating in One Network

5. Which network do you mostly operate in?

6. How much do you estimate it costs per year for your organisation to keep up to date with changes in relevant networks' EG connection requirements?

- Less than \$500
- \$500 - \$2,000
- \$2,000 - \$10,000
- \$10,000 - \$30,000
- More than \$30,000

7. Application for Connection

7. a) What aspects, if any, of preparing an application for connection (including supporting documentation) as per the network's requirements, do you believe are unnecessarily difficult to comply with?

7. b) Why are they difficult?

Insert your response here

A
clear

standard will: be easy to understand, complete and non-contradictory; have easy to find information; and use definite language (no use of 'may be required').

- Overly onerous
- Unclear
- Other:

7. c) Please add any additional details.

Insert your response here

7. d) On average, how much does it cost your business to prepare the application for connection (including supporting documentation) to submit to the DNSP for approval?

- Less than \$1,000
- \$1,000 - \$5,000
- \$5,000 - \$10,000
- \$10,000 - \$30,000
- \$30,000 - \$60,000
- More than \$60,000

8. Time Frames

8. a) Once the application for connection has been submitted, how long does it typically take to achieve DNSP approval?

- Less than 2 weeks
- 2 - 4 weeks
- 4 - 8 weeks
- 8 - 16 weeks
- More than 16 weeks

8. b) On average, how many times do you need to re-submit or submit additional information to a DNSP?

- Usually no resubmission
- Once
- Twice
- 3 - 4 times
- More than 4 times

8. c) What is the typical source of any delays?

Insert your response here

9.

Commissioning and Ongoing Maintenance

9. a) What aspect(s) of the network's commissioning and ongoing maintenance requirements, if any, do you believe are unnecessarily difficult?

Insert your response here

9. b) Why are they difficult?

A clear standard will: be easy to understand, complete and non-contradictory; have easy to find information; and use definite language (no use of 'may be required').

- Overly onerous
- Unclear
- Other:

9. c) Please provide any further detail.

Insert your response here

10.

Technical Requirements

10. a) What technical aspects the network's requirements, if any, do you believe are overly onerous?

- Primary protection requirements
- Backup protection requirements
- SCADA/comms requirements
- Power quality requirements
- Design documentation/drawing requirements
- Network Technical Assessment Requirements
- Site access/layout requirements
- Other:

10. b) How are they overly onerous?

Insert your response here

10. c) What technical aspects the network's requirements, if any, do you believe are unclear?

A clear standard will: be easy to understand, complete and non-contradictory; have easy to find information; and use definite language (no use of 'may be required').

- Primary protection requirements
- Backup protection requirements
- SCADA/comms requirements
- Power quality requirements
- Design documentation/drawing requirements
- Network Technical Assessment Requirements
- Site access/layout requirements
- Other:

10. d) How are they unclear?

Insert your response here

10. e) Has the reasoning for these technical requirements been given and made clear? Would understanding the reasoning be useful?

- Yes. Reasoning is given and clear.
- No. However, understanding the reasoning would be useful.
- No. Understanding the reasoning is not needed.

11. Do you have any other concerns, issues or suggestions related to current or future EG connection requirements that have not been addressed in any of the preceding questions?

Insert your response here

EG Proponents Operating in more than one Network

5. Which networks do you operate in?

- ActewAGL
- Ausgrid
- AusNet Services
- CitiPower
- Endeavour Energy
- Energex
- Ergon Energy
- Essential Energy
- Horizon Power
- Jemena
- Power and Water Corporation
- Powercor
- SA Power Networks
- United Energy
- Western Power
- TasNetworks

6. How much do you estimate it costs per year for you or your organisation to keep up to date with changes in relevant networks' EG connection requirements?

- Less than \$500
- \$500 - \$2,000
- \$2,000 - \$10,000
- \$10,000 - \$30,000
- More than \$30,000

7. Application for Connection: Difficult Networks

7. a) Which networks' requirements are most difficult to comply with in terms of preparing the application for connection and supporting documentation?

- ActewAGL
- Ausgrid
- AusNet Services
- CitiPower
- Endeavour Energy
- Energex
- Ergon Energy
- Essential Energy
- Horizon Power
- Jemena
- Power and Water Corporation
- Powercor
- SA Power Networks
- United Energy
- Western Power
- TasNetworks

7. b) Why are they difficult?

A clear standard will: be easy to understand, complete and non-contradictory; have easy to find information; and use definite language (no use of 'may be required').

- Overly onerous
- Unclear
- Other:

7. c) Please provide details on any particular aspects that are difficult.

Insert your response here

7. d) For the most difficult network, on average, how much does it cost your business to prepare the application for connection (including supporting documentation) to submit to the DNSP for approval?

- Less than \$1,000
- \$1,000 - \$5,000
- \$5,000 - \$10,000
- \$10,000 - \$30,000
- \$30,000 - \$60,000
- More than \$60,000

8. Timeframes: Difficult Networks

8. a) For the most difficult network, once the initial application for connection is submitted, how long does it typically take to achieve DNSP approval?

- Less than 2 weeks
- 2 - 4 weeks
- 4 - 8 weeks
- 8 - 16 weeks
- More than 16 weeks

8. b) How many times do you typically need to re-submit or submit additional information to a DNSP?

- Usually no resubmission
- Once
- Twice
- 3 - 4 times



More than 4 times

8. c) What is the typical source of any delays?

Insert your response here

9. Commissioning and Ongoing Maintenance: Difficult Networks

9. a) Which networks are most difficult from a commissioning and ongoing maintenance perspective?

- ActewAGL
- Ausgrid
- AusNet Services
- CitiPower
- Endeavour Energy
- Energex
- Ergon Energy
- Essential Energy
- Horizon Power
- Jemena
- Power and Water Corporation
- Powercor
- SA Power Networks
- United Energy
- Western Power
- TasNetworks

9. b) Why are they difficult?

A clear standard will: be easy to understand, complete and non-contradictory; have easy to find information; and use definite language (no use of 'may be required').

- Overly onerous
- Unclear
- Other:

9. c) Please provide details on any particular aspects that are difficult.

Insert your response here

10. Technical Requirements: Difficult Networks

10. a) Which networks' requirements are most difficult from a technical perspective?

- ActewAGL
- Ausgrid
- AusNet Services
- CitiPower
- Endeavour Energy
- Energex
- Ergon Energy
- Essential Energy
- Horizon Power
- Jemena
- Power and Water Corporation
- Powercor
- SA Power Networks
- United Energy

- Western Power
- TasNetworks

10. b) Please nominate which technical aspects are most difficult and why (either overly onerous or unclear).

A clear standard will be easy to understand, complete, easy to find information, be non-contradictory, and use definite language (no use of 'may be required').

	Overly onerous	Unclear	Both Onerous and Unclear	Other
Primary protection requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Backup protection requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SCADA/comms requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Power quality requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Design documentation/drawing requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Network Technical Assessment Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Site layout/access requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other requirements (provide detail below)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. c) Please justify your responses to part b.

Insert your response here

10. d) Has the reasoning for these technical requirements been given and made clear? Would understanding the reasoning be useful?

- Yes. Reasoning is given and clear.
- No. However, understanding the reasoning would be useful.
- No. Understanding the reasoning is not needed.

11. Application for Connection: Easiest Networks

11. a) Which networks' requirements are easiest to comply with in terms of preparing the application for connection and supporting documentation?

- ActewAGL
- Ausgrid
- AusNet Services
- CitiPower
- Endeavour Energy
- Energex
- Ergon Energy
- Essential Energy
- Horizon Power
- Jemena
- Power and Water Corporation
- Powercor
- SA Power Networks
- United Energy
- Western Power
- TasNetworks

11. b) Why are they easy?

Insert your response here

11. c) For the easiest network, on average, how much does it cost your business to prepare the application for connection (including supporting documentation) to submit to the DNSP for approval?

- Less than \$1,000

- \$1,000 - \$5,000
- \$5,000 - \$10,000
- \$10,000 - \$30,000
- \$30,000 - \$60,000
- More than \$60,000

12. Application for Connection: Easiest Networks

12. a) For the easiest network, once the initial application for connection is submitted, typically how long does it take to achieve DNSP approval?

- Less than 2 weeks
- 2 - 4 weeks
- 4 - 8 weeks
- 8 - 16 weeks
- More than 16 weeks

12. b) How many times do you typically need to re-submit or submit additional information to a DNSP?

- Usually no resubmission
- Once
- Twice
- 3 - 4 times
- More than 4 times

12. c) What is the typical source of any delays?

Insert your response here

13.

Commissioning and Ongoing Maintenance: Easiest Networks

13. a) Which networks' requirements are easiest to comply with from a commissioning and ongoing maintenance perspective?

- ActewAGL
- Ausgrid
- AusNet Services
- CitiPower
- Endeavour Energy
- Energex
- Ergon Energy
- Essential Energy
- Horizon Power
- Jemena
- Power and Water Corporation
- Powercor
- SA Power Networks
- United Energy
- Western Power
- TasNetworks
- TasNetworks

13. b) Why are they easy?

Insert your response here

14.

Technical Requirements: Easiest Network

14. a) Which networks' requirements are easiest to comply with from a technical perspective?

- ActewAGL
- Ausgrid
- AusNet Services
- CitiPower
- Endeavour Energy
- Energex
- Ergon Energy
- Essential Energy
- Horizon Power
- Jemena
- Power and Water Corporation
- Powercor
- SA Power Networks
- United Energy
- Western Power
- TasNetworks

14. b) Why are they easy?

Insert your response here

15. Do you have any other concerns, issues or suggestions related to current or future EG connection requirements that have not been addressed in any of the preceding questions?

Insert your response here

DNSPs

1. How supportive are you of a nationally consistent set of EG connection requirements for small-medium (30kW - 5MW) generators?

- Would support a mandatory standard
- Would support a voluntary standard
- Not supportive

2. a) What would be your biggest concern(s) with a mandated national standard for EG connection requirements for small-medium (30kW - 5MW) generators?

Insert your response here

2. b) Why?

Insert your response here

3. a) Would it be appropriate to have a single specific set of requirements covering all EG connections from 30kW to 5MW?

- Yes, a single set would be okay
- No, there would need to be a different set of requirements for each EG type

3. b) If not, what subcategories of (e.g. size or technology) would be important to differentiate (e.g. via separate schedules) and why?

Insert your response here

4. What are the unique characteristics of your network which would need to be acknowledged by a standard (e.g. via an additional schedule)?

Insert your response here

5. a) How do you rate the level of technical clarity in your existing EG connection requirements?

A clear standard will: be easy to understand, complete and non-contradictory; have easy to find information; and use definite language (no use of 'may be required').

1 2 3 4 5

Unclear Clear

5. b) Please justify your answer to part a.

Insert your response here

6. a) How do you rate your current EG connection requirements in terms of adequately balancing the need to reduce the network's risk exposure with the need to provide an efficient connection process?

1 2 3 4 5

Unbalanced Balanced

6. b) Please justify your answer to part a.

Insert your response here

7. a) How well do you believe your current requirements adequately address emerging technologies, including energy storage in particular?

1 2 3 4 5

No Coverage Good Coverage

7. b) Please justify your answer to part a.

Insert your response here

8. a) How many FTE days per year are involved in the development and maintenance of your EG connection requirements?

- 0-1
- 1-3
- 3-7
- 7-12
- >12

8. b) Do you think this is efficient?

- Yes

No

8. c) Why/why not?

Insert your response here

9. a) How many FTE days are required on average in the negotiation and management of the process of EG connections between 30kW and 5MW?

- 0 - 0.5
- 1 - 3
- 4 - 7
- 7 - 12
- > 12

9. b) Do you think this is efficient?

- Yes
- No

9. c) Why/why not?

Insert your response here

10. a) How consistent are EG proponents in the quality and completeness of applications for connection, including supporting documentation, submitted for approval?

- Very inconsistent
- Somewhat inconsistent
- Largely consistent with some outliers

Very consistent

10. b) What is the main source of any inconsistency?

Insert your response here

11. a) Once an application has been submitted, how long does it typically take to process the application and negotiate a connection approval?

	Less than 2 weeks	2 - 4 weeks	4 - 8 weeks	8 - 16 weeks	Over 16 weeks
30kW - 100kW	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
100kW - 1MW	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1MW - 5MW	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. b) Do you think these time-frames are efficient?

Yes
 No

11. c) Why/why not?

Insert your response here

12. And finally, do you have any other concerns, issues or suggestions related to current or future EG connection requirements that have not been addressed in any of the preceding questions?

Insert your response here

General (Industry Bodies)

1. How supportive are you of a nationally consistent set of EG connection requirements for small-medium (30kW - 5MW) generators?

- Would support a mandatory standard
- Would support a voluntary standard
- Not supportive

2. a) What would be your biggest concern(s) with a mandated national standard for EG connection requirements for small-medium (30kW - 5MW) generators?

Insert your response here

2. b) Why?

Insert your response here

3. a) Would it be appropriate to have a single specific set of requirements covering all EG connections from 30kW to 5MW?

- Yes, a single set would be okay
- No, there would need to be a different set of requirements for each EG type

3. b) If not, what subcategories of (e.g. size or technology) would be important to differentiate (e.g. via separate schedules) and why?

Insert your response here

4. How do you rate the level of technical clarity in existing EG connection requirements?

A clear standard will: be easy to understand, complete and non-contradictory; have easy to find information; and use definite language (no use of 'may be required').

1 2 3 4 5

Unclear Clear

5. a) Are there any networks that stand out as having particularly clear EG connection requirements?

A clear standard will: be easy to understand, complete and non-contradictory; have easy to find information; and use definite language (no use of 'may be required').

- ActewAGL
- Ausgrid
- AusNet Services
- CitiPower
- Endeavour Energy
- Energex
- Ergon Energy
- Essential Energy
- Horizon Power
- Jemena
- Power and Water Corporation
- Powercor
- SA Power Networks
- United Energy
- Western Power
- TasNetworks

5. b) How are they particularly clear?

Insert your response here

6. a) Are there any networks that stand out as having particularly unclear or ambiguous EG connection requirements?

A clear standard will: be easy to understand, complete and non-contradictory; have easy to find information; and use definite language (no use of 'may be required').

- ActewAGL
- Ausgrid
- AusNet Services
- CitiPower
- Endeavour Energy
- Energex
- Ergon Energy
- Essential Energy
- Horizon Power
- Jemena
- Power and Water Corporation
- Powercor
- SA Power Networks
- United Energy
- Western Power
- TasNetworks

- Western Power
- TasNetworks

8. b) How do you feel they have achieved this?

Insert your response here

9. a) Are there any networks that stand out as having a particular imbalance towards reducing network risk exposure over the need to provide an efficient connection process?

- ActewAGL
- Aurora Energy
- Ausgrid
- AusNet Services
- CitiPower
- Endeavour Energy
- Energex
- Ergon Energy
- Essential Energy
- Horizon Power
- Jemena
- Power and Water Corporation
- Powercor
- SA Power Networks
- United Energy
- Western Power
- TasNetworks

9. b) How do you feel they have achieved this?

Insert your response here

10. And finally, do you have any other concerns, issues or suggestions that have not been addressed in any of the preceding questions?

Insert your response here

Appendix B – Stakeholders Engaged

Survey

Type	Organisation
DNSP	Ergon Energy
DNSP	Endeavour Energy
DNSP	Ausnet Services
DNSP	Jemena
DNSP	SA Power Network
DNSP	Powercor & CitiPower
EG Proponent	ABB Australia
EG Proponent	Advanced Power System Services Pty Ltd
EG Proponent	AGL Energy Ltd
EG Proponent	Clean Technology Partners
EG Proponent	CSR Bradford
EG Proponent	New England Solar Power
EG Proponent	Rainey Elect
EG Proponent	ReneSola
EG Proponent	RoofJuice
EG Proponent	SF Suntech
EG Proponent	SMA Australia Pty Ltd
Industry Body	ACT Government
Industry Body	Ener-G Mgt Group
Industry Body	Enphase Energy
Industry Body	Rudds Consulting Engineers
Industry Body	Tasmania Government

Workshops

Organisation	Workshop
AusGrid	Sydney
First Solar	Sydney
AECOM Australia Pty Ltd	Sydney
Eaton Cooper Power Systems	Sydney
AGL Energy Ltd	Sydney
Mark Group	Sydney
TransGrid	Sydney
Biofuels Association of Australia	Sydney
AusGrid	Sydney
Standards Australia	Sydney
Power-One Italy S.p.A	Sydney
AEMC	Sydney
Endeavour Energy	Sydney
ARENA	Sydney
Dianenergy	Sydney
Yingli Green Energy Australia Pty Ltd	Sydney
Biofuels Association of Australia	Sydney
Australian Energy Storage Alliance	Sydney
Clean Energy Council	Sydney
Southern Cross Venture Partners	Sydney
AusGrid	Sydney
Individual	Sydney
SMA Australia Pty Ltd	Sydney
Helioenergy Pty Ltd	Sydney
Endeavour Energy	Sydney
Union Fenosa Wind Australia	Sydney
Enphase Energy	Sydney
Eaton Corporation	Sydney
Clean Energy Council	Sydney
First Solar	Sydney
SunPower Corporation Australia	Melbourne
AGL Energy Ltd	Melbourne

Organisation	Workshop
SunTrix	Melbourne
DEDJTR	Melbourne
Department of Economic Development (Vic)	Melbourne
Jemena	Melbourne
AGL Energy Ltd	Melbourne
Clean Energy Council	Melbourne
Australian Energy Market Operator (AEMO)	Melbourne
AusNet Services	Melbourne
SunEdison	Melbourne
Senvion Australia Pty Ltd	Melbourne
Department of Economic Development, Jobs, Transport and Resources	Melbourne
Enphase Energy	Melbourne
Department of Economic Development Jobs Transport and Resources	Melbourne
Alive Information	Melbourne
Senvion Australia Pty Ltd	Melbourne
Clean Energy Council	Melbourne
Canadian Solar (Australia) Inc.	Melbourne