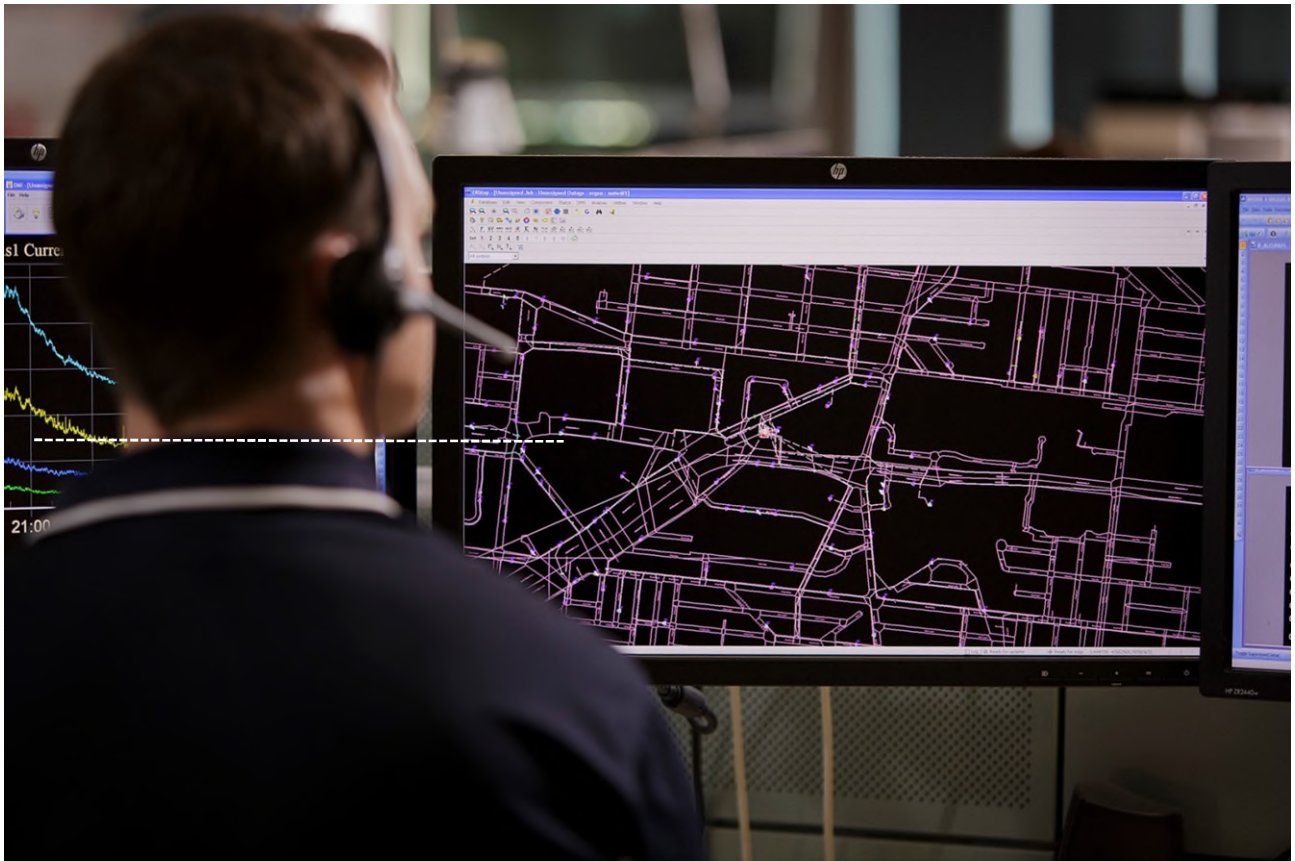


**Ergon Energy Network  
Register of completed  
Embedded Generation Projects > 200 kW  
1 July 2019 to 30 June 2024**

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## 1 Introduction

Ergon Energy has a dedicated Major Customer group who are here to guide and assist you through your connection project. This register of completed embedded generation projects has been developed to improve the level of technical information available, on projects that have been successfully connected to Ergon Energy's distribution network.



## 2 Purpose of this Register

Under Chapters 5 and 5A of the National Electricity Rules, Ergon Energy is required to publish a register of completed embedded generation projects:

- includes details of all embedded generation projects (i.e. for systems with a generation capacity of 200 kW or greater) completed within the preceding five year period; and
- Update annually for all completed projects in the 5 year period preceding the review date.

## 3 Details to be included in the register

A register of the plant of completed embedded generation projects includes, but is not limited to:

- technology of generating unit (e.g. synchronous generating unit, induction generator, photovoltaic array, etc) and it's make and model;
- maximum power generation capacity of all embedded generating units comprised in the relevant generating system;
- contribution to fault levels;
- the size and rating of the relevant transformer;
- a single line diagram of the connection arrangement;
- protection systems and communication systems;
- voltage control and reactive power capability; and
- details specific to the location of a facility connected to the network that are relevant to any of the details in the bullet points above.

## 4 More Information

For more information about the Major Customer Group and embedded generation, please contact us;

### **Major Customers Manager**

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## 5 Project Register

Year Completed = Connected	Location	Technology of generating unit (e.g. synchronous generating unit, induction generator, photovoltaic array, etc)	Network Connection Voltage (kV)	Generator Unit details (Make and Model)	Generator Voltage Level (kV)	Maximum power generation capacity of all embedded generating units comprised in the relevant generating system (kw)	Contribution to fault levels (kA) at connection point	The size and rating of the relevant transformer (Voltages & kVA)	A single line diagram of the connection arrangement	Protection systems and communication systems	Voltage control, power factor control and/or reactive power capability	Details specific to the location of a facility connected to the network, that are relevant to any of the details.
2019/20	Kalkie	Solar PV	LV	SolarEdge 2xSE82.8K, 2x SE27.6K, 2xSE17K	LV	364	0.63	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Hughenden	Solar PV	33kV	6 x 2.75MW	0.55kV	16500	0.35	6x 33/0.55kV	As per Figure 5	As per Figure 7	Voltage control of 66kV	Full Export
2019/20	Hughenden	Wind	33kV	12 x 3.6MW	0.65kV	40320	0.85	12x 33/0.65kV	As per Figure 5	As per Figure 7	Voltage control of 66kV	Full Export
2019/20	West Gladstone	Solar PV and Battery	LV	10 x Fronius ECO and SYMO models	LV	340	0.59	315kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Westcourt	Solar PV	LV	Fronius ECO 27.0-3-S X 6 + Symo 15.0-3-M X 4	LV	222	0.38	1000kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Yarranlea	Solar PV	110kV	44 x SMA SC2750-EV	0.6	103000	0.775	130MVA 110/33kV	As per Figure 5	As per Figure 6	Voltage Control	Full Export
2019/20	Idalia	Solar PV	LV	ABB PVS-100-TL X2 + TRIO-TM-50-400 + 2x SMA STP25000TL-30	LV	300	0.52	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Manoora	Solar PV	LV	11 x SolarEdge SE27.6K	LV	303.6	0.53	1000kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Middlemount	Solar PV	66kV	12 x SMA Sunny Central 2500-EV	0.55kV	30000	0.31	32MVA 66/33kV	As per Figure 5	As per Figure 7	Voltage control of 66kV	Full Export
2019/20	Gladstone	Solar PV	LV	8 x Solar Edge SE 82.8K	LV	662	1.15	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Bucasia	Solar PV	LV	4 x SUN2000-50KTL-M0 x 4	LV	220	0.38	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Currajong	Solar PV	LV	PVS-100-TL x1 + TRIO-TM-50.0-400 x 1	LV	250	0.43	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Pialba	Solar PV	LV	4 x Huawei SUN2000-50KTL + SUN2000-20KTL	LV	220	0.38	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Darling Heights	Solar PV and Battery	LV	Sungrow Hybrid 5H5K + LG Shem RESU6.5	LV	295	0.02	315kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Non-Export
2019/20	Townsville	Synchronous EG	11kV	Caterpillar C32 Diesel Generator	LV	1100	11.11	1000kVA 11/0.433kV	As per Figure 1	As per Figure 8	Fixed power factor	Non-Export
2019/20	Bohle Plains	Battery	11kV	4 x Tesla Powerpack 2.5	LV	4992	0.32	5000kVA 11/0.44kV	As per Figure 1	As per Figure 8	Voltage control	Full Export
2019/20	Yarranlea	Solar PV	33kV	12 x SMA SC 2750	0.6	33000	0.72	2 x 32 MVA 110/33 kV	As per Figure 5	As per Figure 6	Voltage control	Full Export

Year Completed = Connected	Location	Technology of generating unit (e.g. synchronous generating unit, induction generator, photovoltaic array, etc)	Network Connection Voltage (kV)	Generator Unit details (Make and Model)	Generator Voltage Level (kV)	Maximum power generation capacity of all embedded generating units comprised in the relevant generating system (kw)	Contribution to fault levels (kA) at connection point	The size and rating of the relevant transformer (Voltages & kVA)	A single line diagram of the connection arrangement	Protection systems and communication systems	Voltage control, power factor control and/or reactive power capability	Details specific to the location of a facility connected to the network, that are relevant to any of the details.
2019/20	Westcourt	Solar PV	LV	8 x Fronius ECO 27.0-3-S	LV	216	0.37	1000kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Emerald	Solar PV and Battery	LV	Fronius SYMO 10.0-3-M + SYMO 20.0-3-M + SYMO 15.0-3-M	LV	349.2	0.60	500kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Full Export
2019/20	Ashfield	Solar PV and Battery	LV	5 x ABB TRIO 27.6-TL-OUTD, 5 x ABB TRIO 20.0-TL-OUTD, 2 x Selectronic SP PRO SPL1202	LV	298	0.52	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Full Export
2019/20	Cairns	Synchronous EG	LV	Caterpillar AA339	LV	1100	11.11	2 x 1000kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Non-Export
2019/20	Westcourt	Solar PV	LV	4 x FRONIUS SYMO 20.3-3-M, 13 x older inverters	LV	431	0.75	1000kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Woree	Solar PV	LV	10 x Fronius ECO 27.0-3-S	LV	270	0.47	500kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Wallumbilla	Synchronous EG	LV	Capstone C1000 Microturbine	LV	1000	10.10	1500kVA 33/0.433kV	As per Figure 6	As per Figure 7	Fixed power factor	Partial Export
2019/20	Pimlico	Solar PV	11kV	5 x SolarEdge SE27.6K	LV	356	0.62	1000kVA 11/0.415kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2019/20	Sladevale	Solar PV	33kV	24 x Ingeteam 1640TL B630	0.63kV	32000	0.67	8 x 4.92MVA 33/0.63kV	As per Figure 5	As per Figure 7	Voltage control of 33kV	Full Export
2019/20	Dirranbandi	Solar PV	33kV	1 x SMA Sunny Central 2500-EV	33kV	2500	0.05	N/A	As per Figure 6	As per Figure 7	Voltage control	Non-Export
2019/20	Harristown	Solar PV	LV	12 x SMA STP25000TL	LV	300	0.52	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Non-Export
2019/20	Toowoomba	Solar PV	LV	12 x SMA STP25000TL	LV	300	0.52	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Non-Export
2019/20	Allentown	Solar PV and Battery	LV	Fronius Eco 25.0-3-S, SYMO 20.0-3-M, SYMO 15.0-3-M	LV	541	0.94	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Full Export
2019/20	Sladevale	Solar PV	33kV	24 x Ingeteam 1640TL B630	0.63kV	32000	0.67	8 x 4.92MVA 33/0.63kV	As per Figure 6	As per Figure 7	Voltage control of 33kV	Full Export
2019/20	Chinchilla	Solar PV	LV	12 x HUAWEI 29.9KTL	LV	358	0.62	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Fixed power factor	Full Export
2019/20	Bakers Creek	Solar PV	LV	4 x Huawei SK6612PHV	LV	220	0.38	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2020/21	West Gladstone	Solar PV	LV	ECO 27.0-3-S, ECO 25.0-3-S, SYMO 20.0-3-M, SYMO 17.0-3-M	LV	224	0.39	315kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Partial Export
2020/21	Earlville	Solar PV	LV	3 x SolarEdge SE82.8kW	LV	248.4	0.43	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var	Non-Export
2020/21	Cannonvale	Solar PV	LV	2 x Sungrow SG110CX	LV	220	0.38	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export

Year Completed = Connected	Location	Technology of generating unit (e.g. synchronous generating unit, induction generator, photovoltaic array, etc)	Network Connection Voltage (kV)	Generator Unit details (Make and Model)	Generator Voltage Level (kV)	Maximum power generation capacity of all embedded generating units comprised in the relevant generating system (kW)	Contribution to fault levels (kA) at connection point	The size and rating of the relevant transformer (Voltages & kVA)	A single line diagram of the connection arrangement	Protection systems and communication systems	Voltage control, power factor control and/or reactive power capability	Details specific to the location of a facility connected to the network, that are relevant to any of the details.
2020/21	Bayview Heights	Solar PV	LV	2 x Huawei SUN2000-50KTL-Mo	LV	210	0.36	500kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2020/21	Kingaroy	Solar PV	LV	5 x SMA Sunny Tripower Core 1 STP 50-40	LV	250	0.43	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2020/21	Smithfield	Solar PV	LV	SMA STP 25000TL, SMA STP 15000TL x 2, SMA STP 20000TL, SMA STP 10000TL	LV	333	0.58	1000kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2020/21	Edmonton	Solar PV	LV	Solar Edge 27.6K Inverters	LV	303	0.52	1000kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2020/21	Garbutt	Solar PV	LV	9 x SE27.6K	LV	248	0.43	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2020/21	Bundaberg	Solar PV and Battery	LV	26 x Fronius ECO 25.0-3-S, Tesla Powerpack 2.5	LV	940	1.63	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2020/21	Mackay	Solar PV	LV	Sungrow Power Supply SG110CX x 2	LV	220	0.38	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2020/21	Thuringowa	Solar PV	11kV	ABB PVS-50-TL – S x 5	LV	650	0.04	1MVA + 1.5MVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Non-Export
2020/21	Woree	Solar PV	22kV	SMA STP 15000TL, SMA STP 25000TL x 2, SMA STP 10000TL, SolarEdge SE82.8kW x 4	LV	496	0.02	2x 1.5MVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2020/21	Rockhampton	Solar PV	LV	Sungrow SG110CX x 3 & SG50CX	LV	380	0.66	1500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2020/21	Kingaroy	Synchronous EG	LV	Perkins 4012-46TAG0A with Stamford P1734F	LV	1250	12.63	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Fixed power factor	Non-Export
2020/21	Edmonton	Solar PV	LV	SolarEdge 2 x SE82.2K, 1x SE50K	LV	225	0.39	1000kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2020/21	Garbutt	Solar PV	LV	15 x SolarEdge SE27.6K	LV	414	0.72	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2020/21	Parkhurst	Solar PV	LV	4 x SMA SHP75-10	LV	300	0.52	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2020/21	Highfields	Solar PV	LV	3 x SMA SHP5-10	LV	225	0.39	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2020/21	Railway Estate	Solar PV	LV	2 x Sungrow SG110CX	LV	220	0.38	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Non-Export
2020/21	Bowen	Solar PV	LV	4 x SMA SHP75-10	LV	300	0.52	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2020/21	Maryborough	Solar PV	LV	2x SolarEdge SE82.8K + 2x SMA STP20000TL-30	LV	205	0.36	315kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2021/22	Townsville	Solar PV	LV	SolarEdge SE50K x 1 + SE25K x 1 + SE8K x 2	LV	291	0.46	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export

Year Completed = Connected	Location	Technology of generating unit (e.g. synchronous generating unit, induction generator, photovoltaic array, etc)	Network Connection Voltage (kV)	Generator Unit details (Make and Model)	Generator Voltage Level (kV)	Maximum power generation capacity of all embedded generating units comprised in the relevant generating system (kw)	Contribution to fault levels (kA) at connection point	The size and rating of the relevant transformer (Voltages & kVA)	A single line diagram of the connection arrangement	Protection systems and communication systems	Voltage control, power factor control and/or reactive power capability	Details specific to the location of a facility connected to the network, that are relevant to any of the details.
2021/22	Maryborough	Solar PV	LV	2x SMA STP 110-60	LV	220	0.35	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Non-Export
2021/22	Heatley	Solar PV	LV	3x SolarEdge 82.8kVA Inverter	LV	248	0.39	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2021/22	Bentley Park	Solar PV	LV	SolarEdge SE82.8K-AU0P0BNU4, SE50K-AU0P0BNU4, SE30K-AU00IBNV4	LV	378	0.60	500kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2021/22	Gunyarra	Solar PV	LV	4x SolarEdge SE82.8K	LV	331	0.53	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2021/22	Manunda	Solar PV	LV	SolarEdge SE82.8K-AU0P0BNU4, SE50K-AU0P0BNU4, SE27.6KAU000BNU4, SE17K-AU0T0BNU4	LV	487	0.77	1000kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2021/22	Proserpine	Solar PV	LV	Fronius Aust + SolarEdge Tech + Selectronic Aust Model: ECO 27.0-3-S x 4 + SE50K x 1 + SPMC482-AU x 3, ABB Trio 27.6-TL x 3 + PVI-12.5-TL x 1	LV	253	0.40	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2021/22	Chinchilla	Synchronous Machine	LV	Cummins C275 D5	LV	220	2.22	315kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Non-Export
2021/22	Annandale	Battery	LV	Tesla Powerpack	LV	232	0.37	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Non-Export
2021/22	Annandale	Solar PV	LV	SMA STP15000TL-30 x 2 + STP20000TL-30 x 2 + STP25000TL-30 x 1, STP20000TL-30 x 11 + STP25000TL-30 x 8	LV	515	0.82	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2021/22	Bohle	Solar PV	LV	SMA Sunny Tripower Core2 x 6, Sunny Tripower Core2 x 3	LV	990	1.57	2 x 750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2021/22	Annandale	Solar PV	LV	Sungrow Power SG50CX x 4 + SG30CX x 5 + SG5K-D x 5	LV	374	0.59	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2021/22	West Mackay	Solar PV	LV	Huawei Technologies SUN2000-50KTL-M0 x 4	LV	220	0.35	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2021/22	Cairns	Solar PV	LV	SolarEdge SE82.8K-AU0P0BNU4 x4	LV	391	0.62	1000kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2021/22	Alloway	Solar PV	LV	ABB TRIO-20.0 x2 + TRIO-27.6 x8, (ABB) Power-One PVS-100-TL x2	LV	460	0.73	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2021/22	Gladstone	Solar PV	LV	SolarEdge SE82.8K-AU0P0BNU4 x2	LV	248	0.39	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2021/22	Deeragun	Solar PV and Battery	LV	SMA STP15000TL-30 x 11 + STP20000TL-30 x 4 + STP25000TL-30 x 3, STP50-60 x 1, Tesla Powerpack	LV	544	0.86	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2021/22	Kirwan	Solar PV	LV	SMA STP25000TL-30 x 6 + STP2000TL-30 x 5 + STP15000TL-30 x 5 + STP 50-40 x 6, Tesla Power Pack	LV	973	1.54	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2021/22	Chinchilla	Solar PV	LV	Sungrow SG110CX x 2	LV	220	0.35	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2021/22	Redlynch	Solar PV	LV	SolarEdge SE82.8K-AU00IBNV4 x4	LV	348	0.55	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export



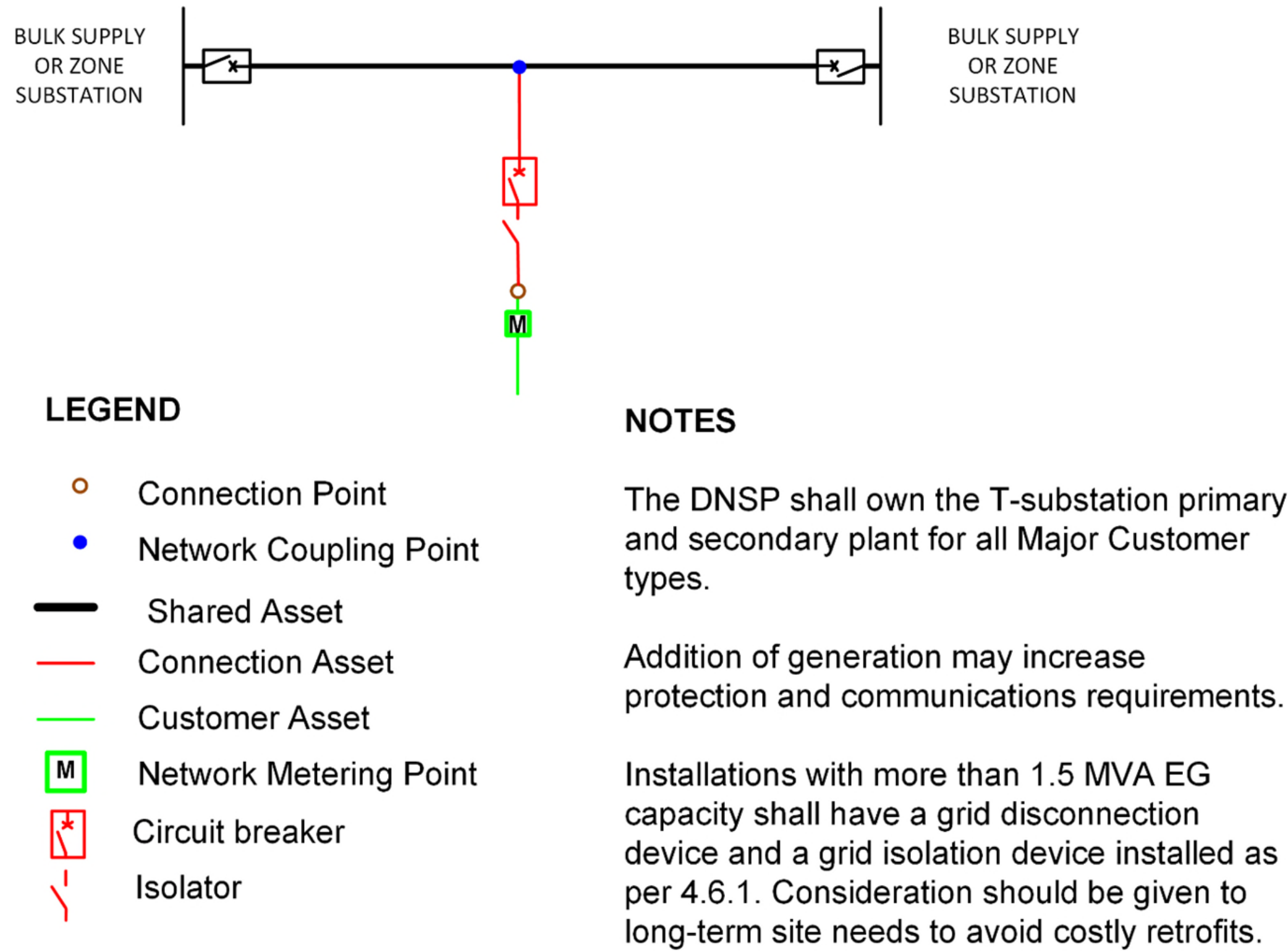
Year Completed = Connected	Location	Technology of generating unit (e.g. synchronous generating unit, induction generator, photovoltaic array, etc)	Network Connection Voltage (kV)	Generator Unit details (Make and Model)	Generator Voltage Level (kV)	Maximum power generation capacity of all embedded generating units comprised in the relevant generating system (kw)	Contribution to fault levels (kA) at connection point	The size and rating of the relevant transformer (Voltages & kVA)	A single line diagram of the connection arrangement	Protection systems and communication systems	Voltage control, power factor control and/or reactive power capability	Details specific to the location of a facility connected to the network, that are relevant to any of the details.
2021/22	Yeppoon	Solar PV	LV	Sungrow SG50CX x 5	LV	250	0.40	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Non-Export
2021/22	Yeppoon	Battery	LV	Sungrow SC50HV x 5	LV	250	0.40	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Non-Export
2021/22	Yeppoon	Solar PV and Battery	LV	Sungrow Power SC50HV x 3, SG110CX x 2	LV	370	0.59	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	Yeppoon	Solar PV	LV	SolarEdge SE82.8K, 2xSE66.6K	LV	216	0.31	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2022/23	Burnett Heads	Solar PV	LV	ABB UNO-DM-5.0TL Plus x 100	LV	500	0.72	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	Deeragun	Solar PV and Battery	LV	SMA STP15000TL30x4, STP20000TLx4, STP25000TLx5, Tesla Powerpack	LV	265	0.38	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	Cranbrook	Solar PV and Battery	LV	SMA STP20000TL30x7, STP15000TL30x2, STP25000TL30x7, Tesla Powerpack	LV	345	0.50	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	Burdell	Solar PV and Battery	LV	Various SMA and ABB, Tesla Powerpack	LV	431	0.62	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	Hyde Park	Solar PV and Battery	LV	SMA STP15000TL30x2, STP20000TLx5, STP25000TLx4, Tesla Powerpack	LV	230	0.33	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2022/23	Martyville	Solar PV	LV	Sungrow SG110CXx3	LV	330	0.48	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	Innisfail	Solar PV	LV	SolarEdge82.8K, SE25K	LV	381	0.55	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2022/23	Mundubbera	Solar PV	LV	Sungrow SG110CX x2	LV	220	0.32	315kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	Currajong	Solar PV	LV	ABB PVS100TL, ABB TRIO50.0TL, Sungrow SG110CXx2	LV	370	0.53	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	North Rockhampton	Solar PV	LV	SolarEdge SE82.8K, SE66K	LV	232	0.33	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2022/23	Ayr	Solar PV and Battery	LV	Various SMA inverters, Tesla Powerpack	LV	225	0.32	315kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	Mackay	Solar PV	LV	Solar Edge 66.6K, SE82.8K	LV	232	0.33	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2022/23	Urangan	Solar PV	LV	Sungrow SG110CX x 2	LV	220	0.32	315kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	Tully	Synchronous Machine	22kV	SIEMENS, 1DU2049-8AE0	11	18000	3.31	12.5MVA 22/11kV	As per Figure 3	As per Figure 5	Reactive power control	Non-Export
2022/23	Tully	Synchronous Machine	22kV	Leroy Somer, SR4BHV	6.6	1600	0.29	2MVA 11/6.6kV	As per Figure 3	As per Figure 5	Reactive power control	Non-Export

Year Completed = Connected	Location	Technology of generating unit (e.g. synchronous generating unit, induction generator, photovoltaic array, etc)	Network Connection Voltage (kV)	Generator Unit details (Make and Model)	Generator Voltage Level (kV)	Maximum power generation capacity of all embedded generating units comprised in the relevant generating system (kw)	Contribution to fault levels (kA) at connection point	The size and rating of the relevant transformer (Voltages & kVA)	A single line diagram of the connection arrangement	Protection systems and communication systems	Voltage control, power factor control and/or reactive power capability	Details specific to the location of a facility connected to the network, that are relevant to any of the details.
2022/23	Bargara	Solar PV	LV	SMA STP110-60x2, Sungrow SG50CX	LV	270	0.39	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	Dulacca	Wind	132kV	Vestas Wind turbine, V150	33kV	173000	1	2x 132/33kV 125MVA	As per Figure 2	As per Figure 5	Voltage control	Full Export
2022/23	Rockhampton	Solar PV	LV	SMA STP110-60 x2	LV	220	0.32	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	Tinana	Solar PV	LV	Sungrow SG110CX x2	LV	220	0.32	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2022/23	Rasmussen	Solar PV	LV	Sungrow SG110CX x3	LV	330	0.48	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2022/23	Pialba	Solar PV	LV	Sungow SG110CX x4	LV	440	0.64	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2023/24	Gordonvale	Solar PV	LV	Sungrow SC 110CX	LV	220	0.32	1000kVA 22/0.433kV	As per Figure 6	As per figure 7	Volt-var and volt-watt	Full Export
2023/24	Kearney Springs	Solar PV	LV	Fronius Australia Eco 25.0-3-S, Fronius Australia Eco 27.0-3-S	LV	208	0.30	1000kVA 11/0.433kV	As per Figure 6	As per figure 7	Volt-var and volt-watt	Full Export
2023/24	Pialba	Solar PV	LV	Sungrow SG110CX	LV	220	0.32	1000kVA 11/0.433kV	As per Figure 6	As per figure 7	Volt-var and volt-watt	Full Export
2023/24	Ayr	Synchronous Machine	LV	Caterpilla C13 DE400E0	LV	400	0.58	500kVA 11/0.433kV	As per Figure 6	As per figure 7	Fixed power factor	Non-Export
2023/24	Yeppoon	Solar	LV	Sungrow SG110CX	LV	220	0.32	750kVA 11/0.433kV	As per Figure 6	As per figure 7	Volt-var and volt-watt	Full Export
2023/24	Annandale	Solar	LV	Sungrow SG110CX	LV	550	0.79	1500kVA 11/0.433kV	As per Figure 6	As per figure 7	Volt-var and volt-watt	Partial Export
2023/24	Charters Towers	Solar PV and Battery	LV	Fronius Australia Eco 100-3-P, Fronius Australia Symo 15.0.3.M, Sungrow SC50HV, SMA Australia STP 25000TL, SMA Australia STO 20000TL	LV	550	0.79	500kVA 11/0.433kV	As per Figure 6	As per figure 7	Volt-var and volt-watt	Partial Export
2023/24	Mareeba	Solar	LV	Fronius Australia Eco 100-3-D, Fronius Australia Symo 15 0-3-M	LV	215	0.31	1000kVA 11/0.433kV	As per Figure 6	As per figure 7	Volt-var and volt-watt	Full Export
2023/24	Ayr	Solar	LV	Sungrow SG110CX	LV	220	0.32	1000kVA 11/0.433kV	As per Figure 6	As per figure 7	Volt-var and volt-watt	Full Export
2023/24	Garbutt	Solar	LV	Sungrow SG110CX, Sungrow SG50CX	LV	210	0.30	1000kVA 11/0.433kV	As per Figure 6	As per figure 7	Volt-var and volt-watt	Full Export
2023/24	ARRIGA	Synchronous Machine	66kV	Shinko 7MW unit	11	31000	44.74	20000kVA66/11kV	As per Figure 3	As per figure 5	Voltage Control	Partial Export
2023/24	ARRIGA	Synchronous Machine	66kV	Perkins 4016-61TRG3	11	2000	2.89	20000kVA66/11kV	As per Figure 3	As per figure 5	Fixed power factor	Partial Export
2023/24	Toowoomba	Solar	11kV	SungrowCG110CX	LV	1430	2.06	2x1500kVA 11/0.433kV	As per Figure 3	As per Figure 5	Volt-var and volt-watt	Full Export

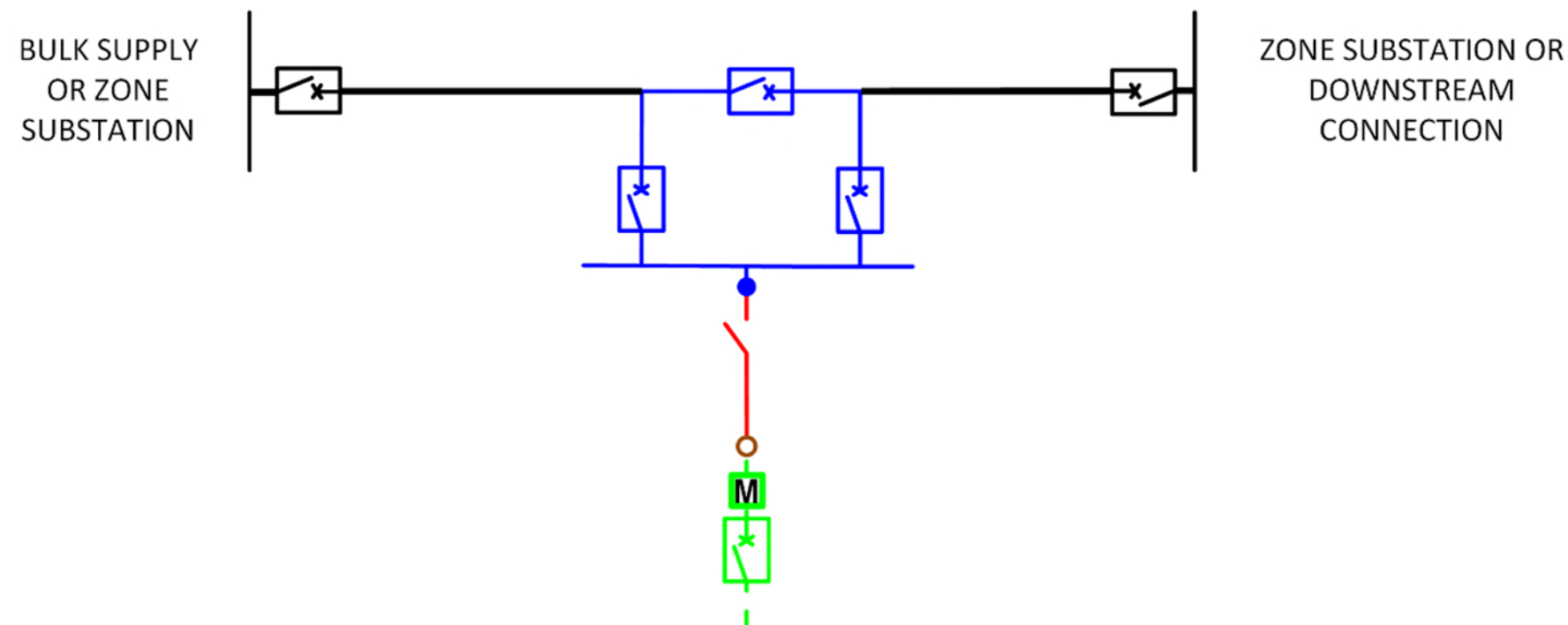
Year Completed = Connected	Location	Technology of generating unit (e.g. synchronous generating unit, induction generator, photovoltaic array, etc)	Network Connection Voltage (kV)	Generator Unit details (Make and Model)	Generator Voltage Level (kV)	Maximum power generation capacity of all embedded generating units comprised in the relevant generating system (kw)	Contribution to fault levels (kA) at connection point	The size and rating of the relevant transformer (Voltages & kVA)	A single line diagram of the connection arrangement	Protection systems and communication systems	Voltage control, power factor control and/or reactive power capability	Details specific to the location of a facility connected to the network, that are relevant to any of the details.
2023/24	Paget	Solar	LV	Solaredge Technologies SE82.8K	LV	82.8	0.12	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2023/24	Mount Louisa	Solar	LV	Fronius Symo 20.0-3-M	LV	80	0.12	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2023/24	Smithfield	Solar	LV	Solar edge ( SE27.6K, SE25K, SE10K-AUS), Sungrow SG110CX, Delta Electronics PCS100HV	LV	300.2	0.43	1000kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2023/24	Mossman	Solar	LV	Sungrow SG110CX	LV	330	0.48	1000kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2023/24	Hewitt	Solar	LV	Sungrow SG110CX	LV	220	0.32	315kVA 22/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2023/24	Yarwun	Solar	LV	Solaredge Technologies SE82.8K	LV	331.2	0.48	1500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Non-Export
2023/24	Parkhurst	Solar	LV	Sungrow SG110CX, Sungrow SG50CX	LV	270	0.39	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2023/24	Svensson Heights	Solar	LV	Solaredge SE30K, Sungrow CG110CX, Sungrow CG50CX	LV	250	0.36	500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2023/24	ACACIA RIDGE	Solar	LV	Sungrow CG110CX	LV	330	0.48	1500kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2023/24	ANNANDALE	Solar	LV	ABB Trio-27.6-TL, SMA Australia STP 110-60	LV	275.2	0.40	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export
2023/24	ELI WATERS	Solar	LV	Sungrow CG110CX	LV	220	0.32	1000kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Full Export
2023/24	Bundaberg	Solar	LV	Sungrow SG110CX	LV	440	0.64	750kVA 11/0.433kV	As per Figure 6	As per Figure 7	Volt-var and volt-watt	Partial Export

## 6 Single Line Diagram Types

**Figure 1 HV Generation Connected to Subtransmission via T-Off Connection**



**Figure 2 HV Generation Connected to Subtransmission via Switching Station**



**LEGEND**

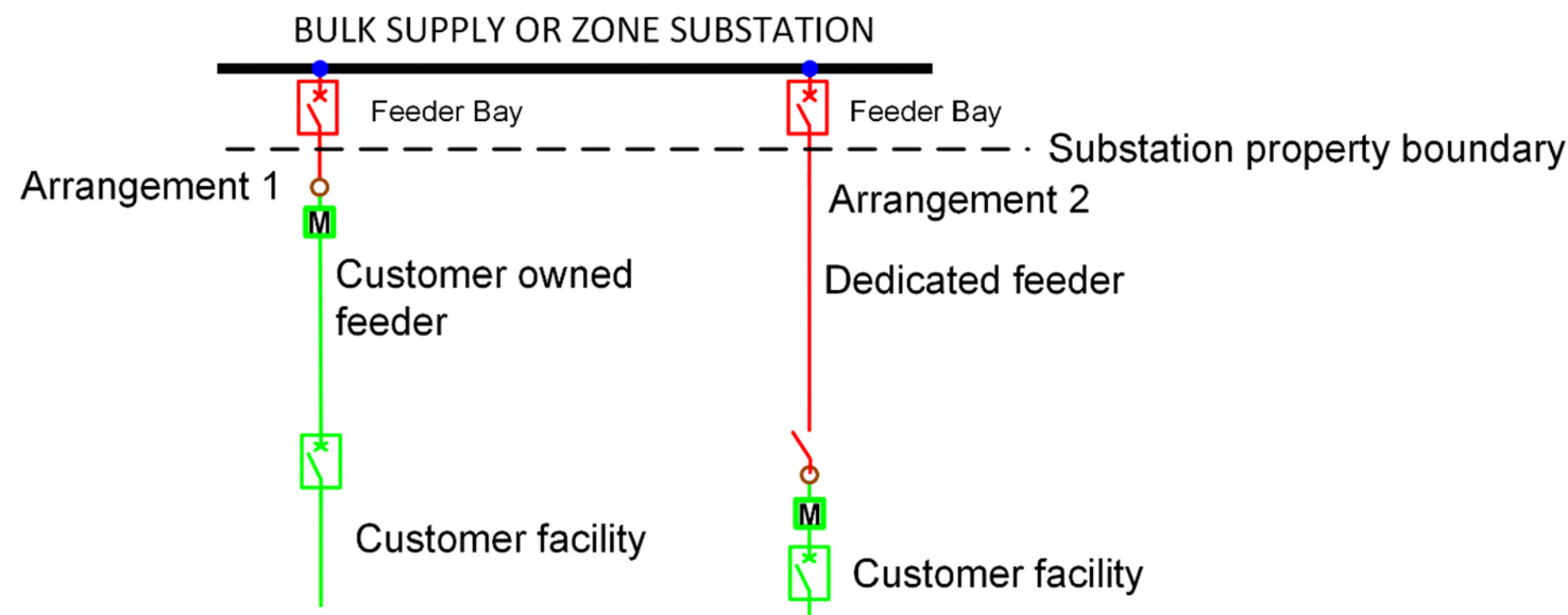
- Connection Point
- Network Coupling Point
- Shared Asset
- Augmented Shared Asset
- Customer Asset
- Connection Asset
- Circuit breaker
- Metering Point
- ⋈ Isolator

**NOTES**

The DNSP shall own the switching substation. This arrangement is used to cut into radial lines where power flows are uni-directional. This arrangement would be required based on the Major Customers need for high reliability (compared to T-substation or 3 bay tee), etc.



Figure 3 HV Connected Generation Via Direct Feed From Substation



LEGEND

- Connection Point
- Network Coupling Point
- Shared Asset
- Connection Asset
- Customer Asset
- Metering Point
- Circuit breaker
- Isolator

NOTES

Arrangement 1 shows a Major Customer owned feeder. Protection scheme elements at customers end can be either Major Customer or DNSP owned.

Arrangement 2 shows an DNSP owned feeder. Secondary protection scheme elements (protection relays and associated communications equipment) at Major Customers end shall be owned by the DNSP. Other elements of the Protection Scheme (circuit breakers, CT, VT, DC supplies, etc.) can be either Major Customer or DNSP.

Figure 4 HV Generation Connected via T-Off from Distribution Feeder

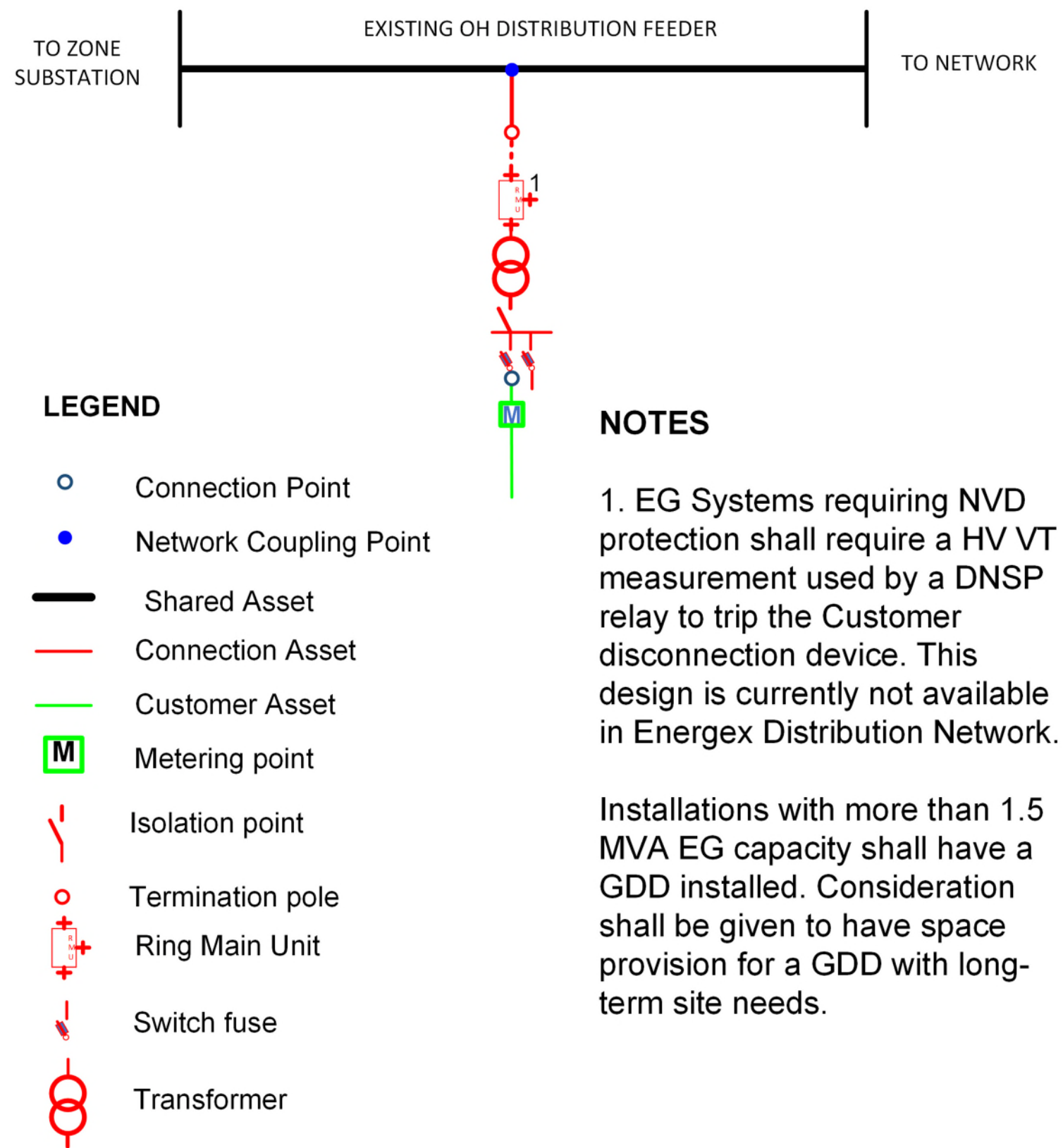
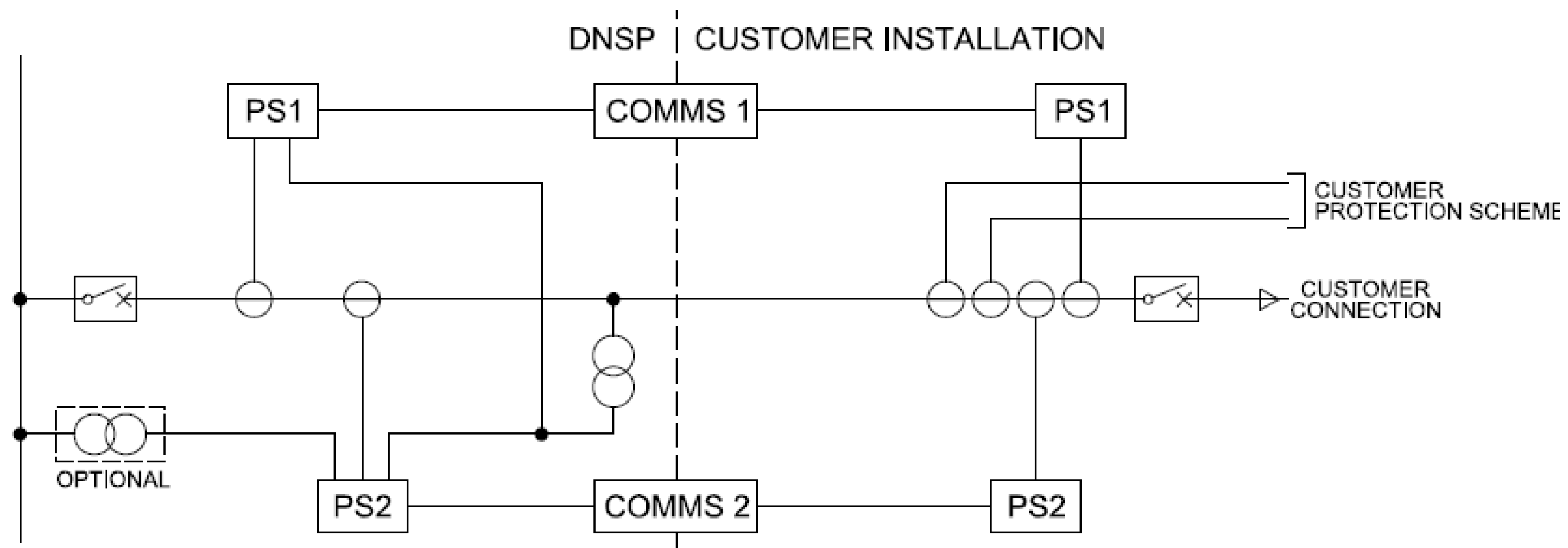
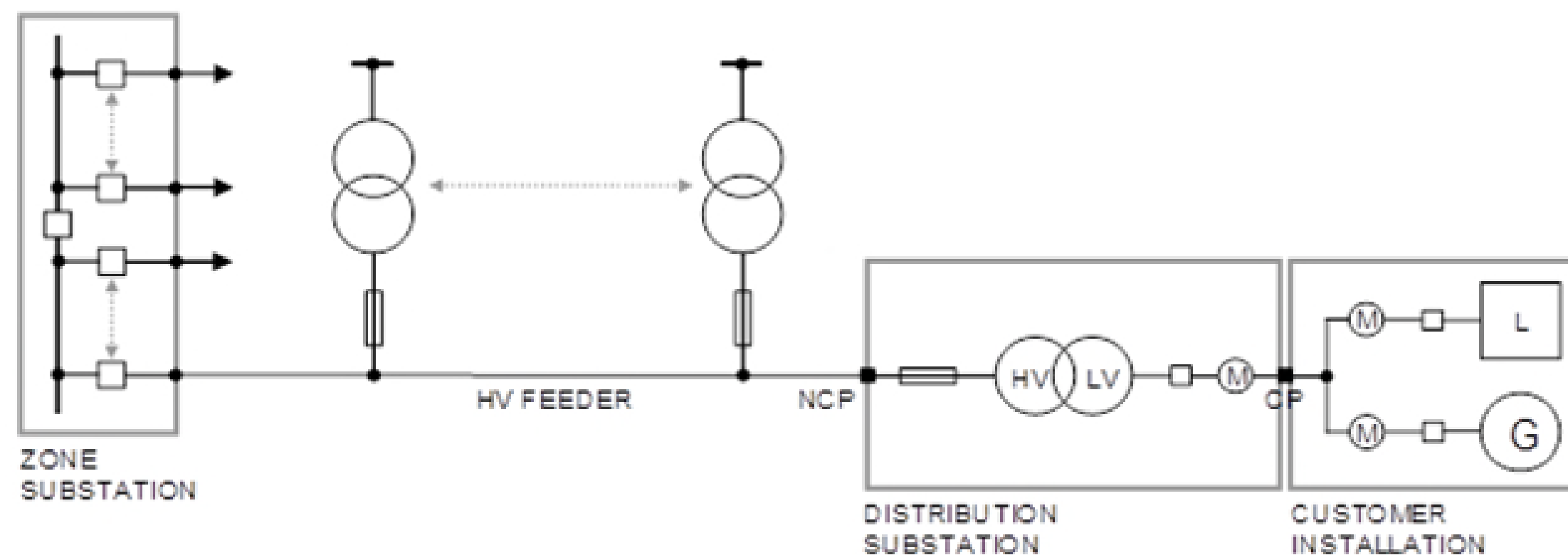




Figure 5 Dual Communications for Generation Systems >5MW



**Figure 6 Single Line – LV Connection Generation**



**LEGEND**

CP	Connection Point
L	Internal load for embedded generation Customer
M	Metering – may be Nett or Import/Export type
NCP	Network Coupling Point
	HV or LV fuse
	Circuit breaker, protection or switching device

## LOW VOLTAGE GENERATION AND DEDICATED LOW VOLTAGE CONNECTION

Generation at low voltage with parallel low voltage load - Dedicated low voltage connection - Shared HV feeder

**Figure 7 Protection Requirements for LV Connected Generation**

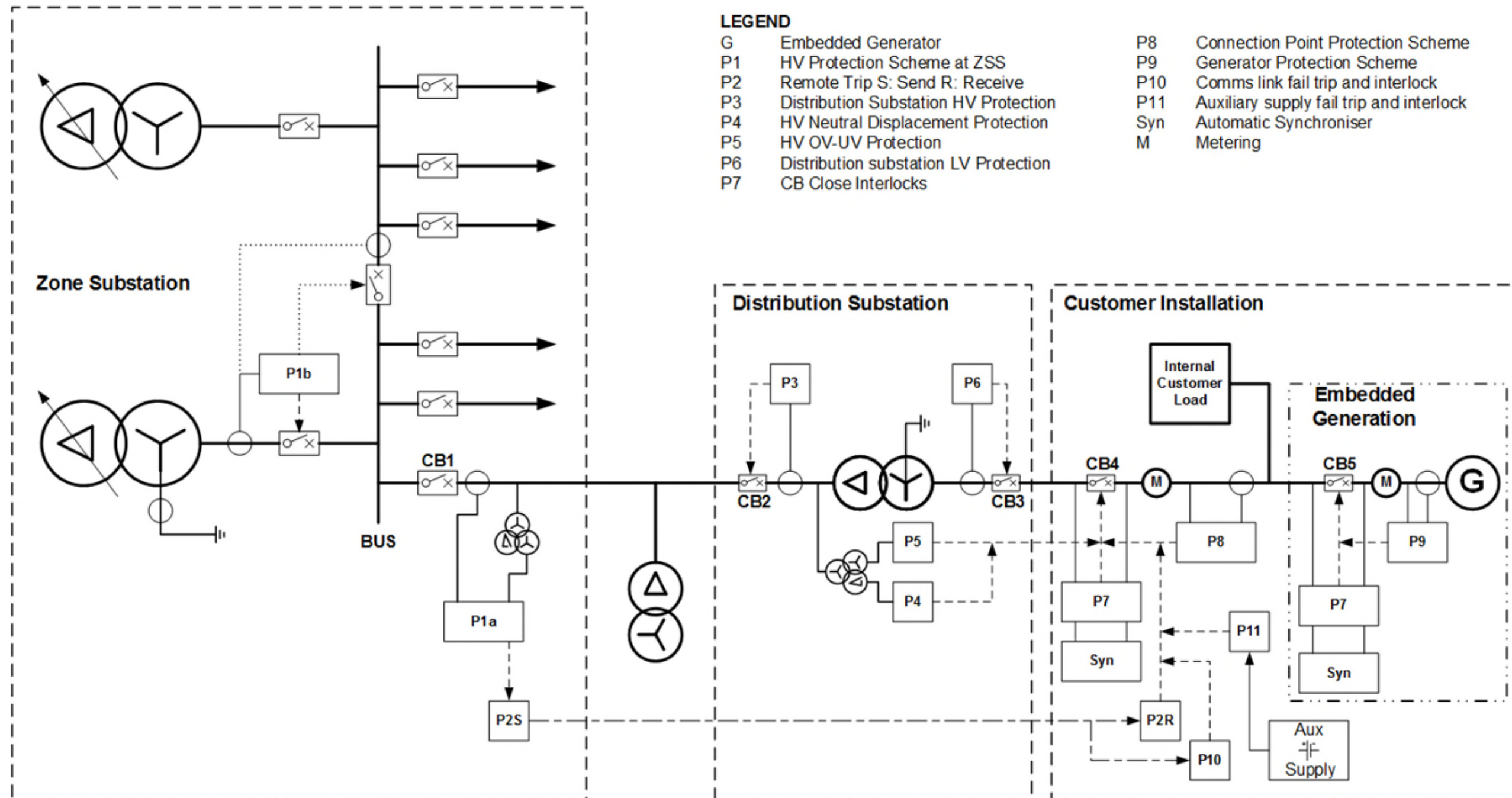
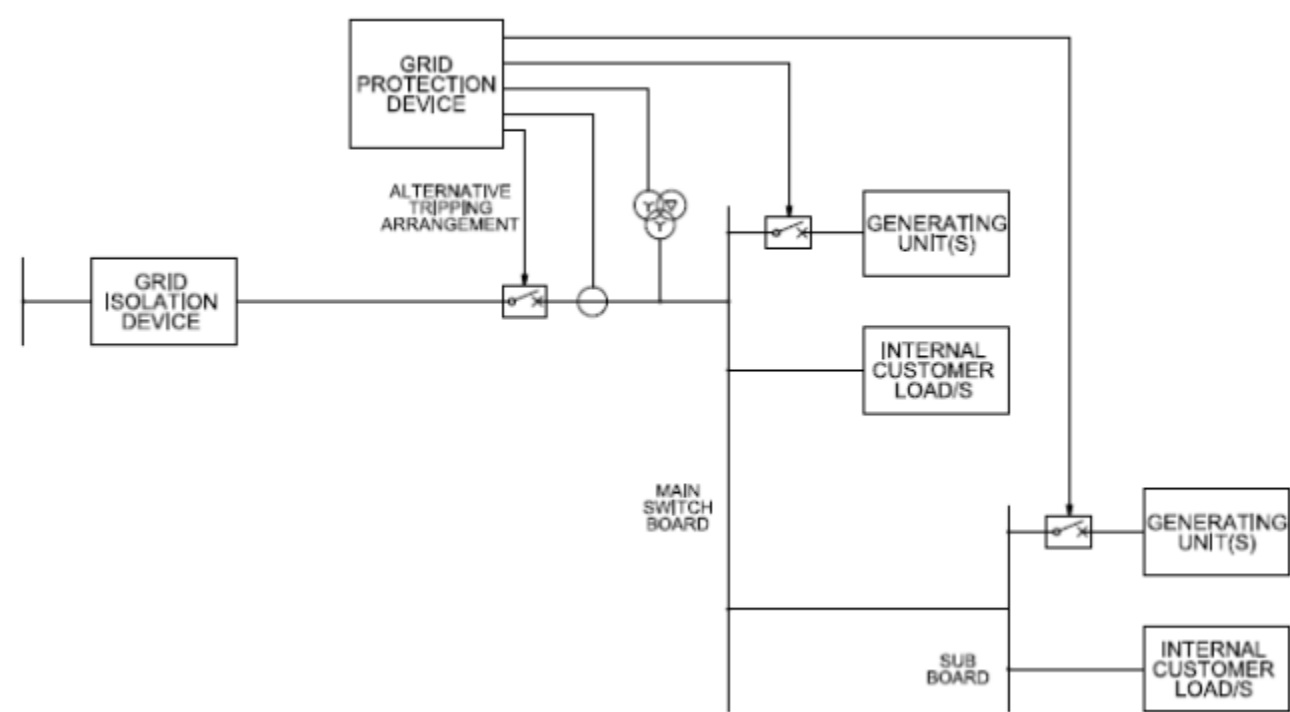




Figure 8 Protection for HV Systems <5MVA



## 7 Protection Schemes and Requirements

### Level 1 Backup Protection

- Over and under voltage
- Over and under frequency
- Voltage vector shift and
- Rate of change of frequency
- Reverse Power

### Level 2 Backup Protection

- Neutral voltage detection/unbalance, or
- Direct intertrip from network circuit breaker (for systems above 200kW).

Protection Function	Shared LV Circuit	Dedicated LV Circuit	Dedicated Transformer Up to 200kW		Dedicated Transformer 200<x<1000 kW		Dedicated Transformer(s) Greater than 1000 kW
	Nil-Export	Nil-Export	Nil Export	Export	Nil-Export	Export	Export/Nil export
Over/under voltage	✓	✓	✓	✓	✓	✓	✓
Over/under frequency	✓	✓	✓	✓	✓	✓	✓
Voltage vector shift	✓	✓	✓	✓	✓	✓	✓
Rate of change of frequency	✓	✓	✓	✓	✓	✓	✓
Reverse Power	✓	✓	✓	✓	✓	✓	✓
Neutral voltage displacement <sup>2</sup>					✓	✓	✓
Direct Intertrip							✓
SCADA link							✓

## 8 PQ Voltage and Power Factor Control

For low voltage customers, pursuant to clause 36(2)(d) of the Electricity Regulation, Ergon Energy requires the Customer to ensure that the power factor of the IES is for low voltage supply to the Customer, as per the volt-var requirements of STNW1174 or STNW3511. This standard can be found on the Ergon Energy website, via Network > Connections > Major Business > Large Generation.

For high voltage customers, the power factor is to reflect the agreed voltage or power factor control arrangement. Please note connections must comply with the requirements set out in STNW1175, which can be found on the Ergon Energy website, via Network > Connections > Major Business > Large Generation.

## 9 Fault Level Contribution Factor

Indicative fault level contribution from generating systems:

Generator Type	Fault level contribution factor
Synchronous Generator unit	7 X Rating
Solar/Inverter Generator unit	1.2 X Rating

Note: It is assumed that bumpless systems do not contribute to fault levels.