



NETWORKS

Renewable Generation - REFIT and Grid Connection

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- Introduction
- ESB Networks Overview
- Application Process
- Typical MV connection assets
- Capacity Availability
- Second Connection Point
- Power Purchase Agreements

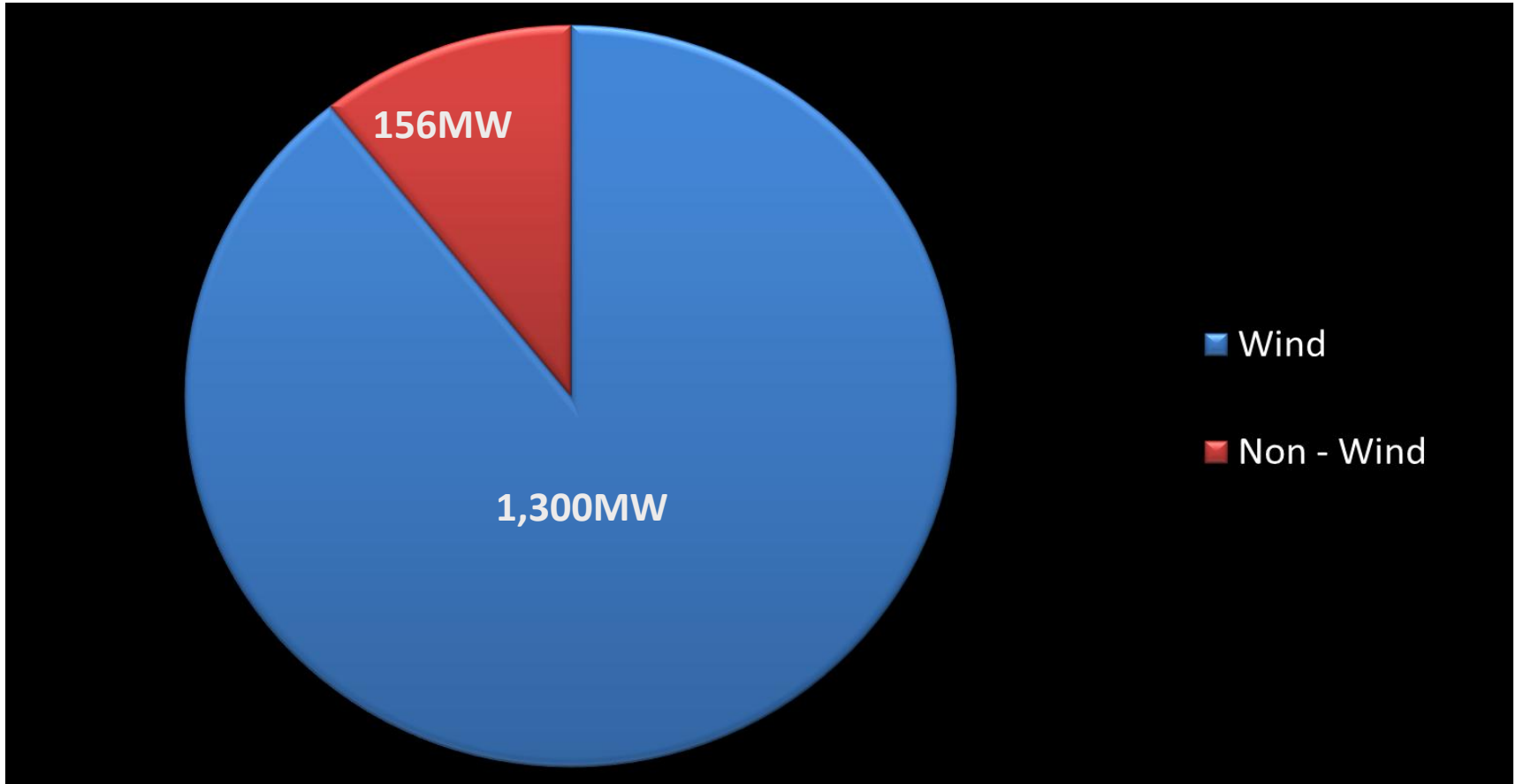
- Licensed Distribution System Operator and Transmission and Distribution Asset Owner in Ireland

Plan, maintain and operate the following networks:

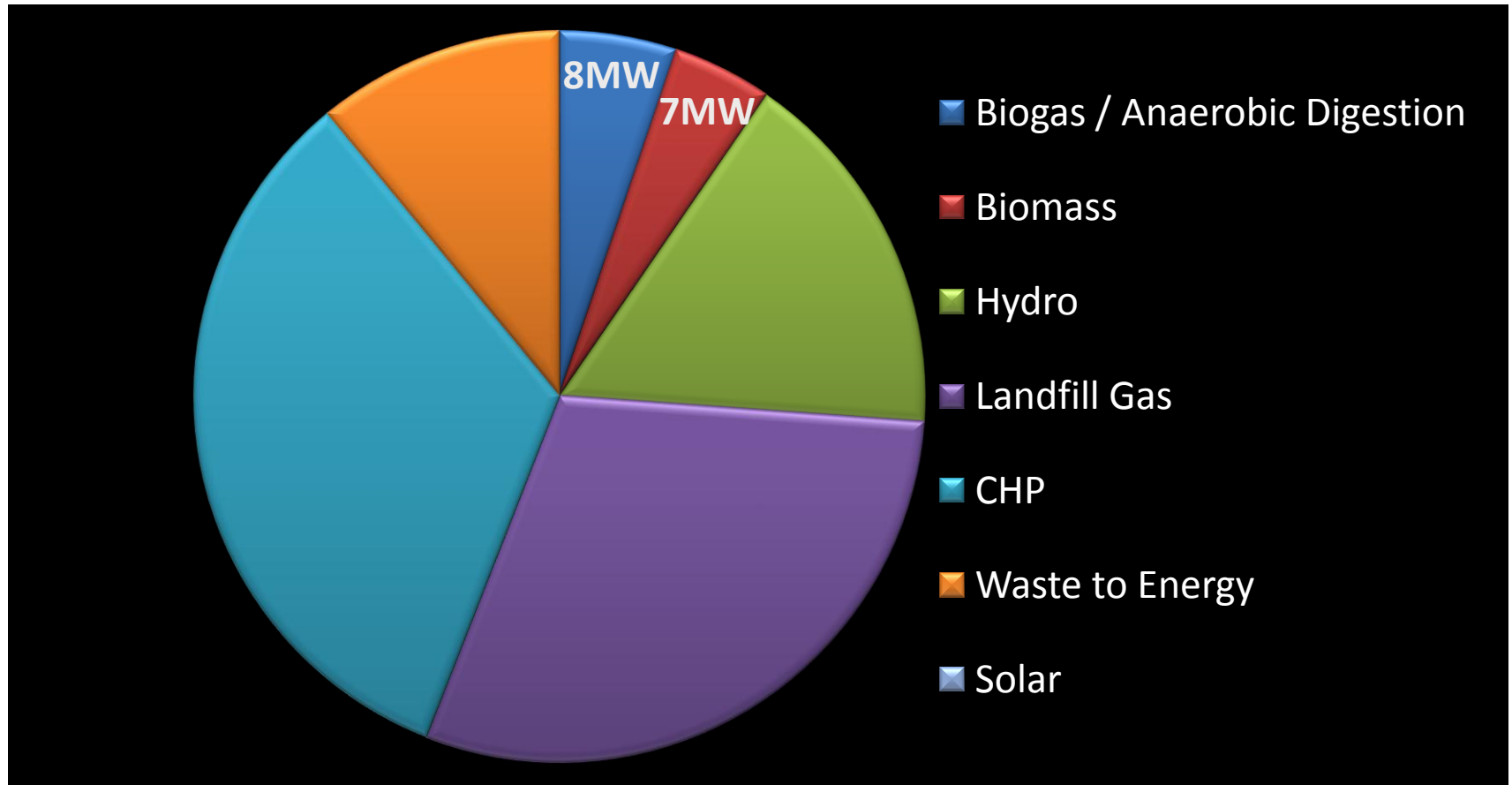
- 110kV network in Greater Dublin
- 38kV sub-transmission nationally
- Medium Voltage (10/20kV) nationally
- Low Voltage (400/230V) nationally

- Responsible for issuance of connection offers to the above networks.

RENEWABLE GENERATION CONNECTIONS



RENEWABLE NON-WIND GENERATION



- There is a further 100MW (approximately) contracted Biomass, Biogas & Anaerobic Digestion projects.
- These projects are at varying stages in the process and are expected to connect over the next few years
- These include a number of larger projects (>10MW)

- Irish Government's 2020 RES-E target – 40% of energy consumed to come from renewable sources.
- All renewable generation connections, wind and non wind, will contribute to the achievement of this RES-E target.

CATEGORIES OF APPLICATIONS

- There are three broad categories of generation application to ESB Networks

Category	Application Process
Micro-Generation - 6kW / 11kW	'Inform & Fit' Approach
Wind applications >500kW	Group Processing Approach (GPA)
Wind <500kW and Non-Wind Renewable	Non-GPA

General rule for Non GPA eligibility:

- < 500kW Wind
- Non-Wind, subject to interaction with queue applicants
- Autoproducer Sites

High numbers of Non-wind applications typically from:

- Anaerobic Digestors
- Biomass
- CHP (HE) – either Biogas or Natural Gas Landfill Gas
- Solar
- Wave & Tidal

- Apply with completed NC5 form and application fee to ESB Networks

<u>MEC</u>	<u>Fee</u>
- No export	€0
- Up to 50kW	€765
- Up to 500kW	€1,559
- Up to 4,000kW	€8,850

[Full detail at www.esb.ie]

- Following receipt of completed NC5 form and full fee, the project enters a 90 day technical study and offer preparation process (assuming eligibility for non-GPA applies)

- CER approved 'Standard Pricing Approach for Generators' will apply
- A Connection Offer issues with 3 month validity
- Acceptance requires:
 - **Contract signature and return**
 - **First stage payment to be made**
- Design and construction work is then scheduled

- Since mid-2009, generation developers can opt to build certain connection assets themselves.
 - Equipment functional specifications will be provided
 - Developer must procure the equipment to these specifications
 - Developer must construct the required infrastructure for the connection
 - ESB Networks will complete the final connection
- The Connection Offer will include an oversight charge

- Capacity to connect generation is finite, even for lower MEC generators.
- Technical study as part of application process will determine availability of capacity:
 - **Line uprate may be required**
 - **New network, or other network reinforcements may be required**
 - **Station transformer uprates may be required**
- The associated charges are borne in full by the connecting generator(s)
- Refunds apply if the asset is subsequently used by another generator

TYPICAL MV CONNECTION ASSETS

Typical MV Overhead Line



Repc

TYPICAL MV CONNECTION ASSETS

MV Cable / Overhead line
interface pole



TYPICAL MV CONNECTION ASSETS

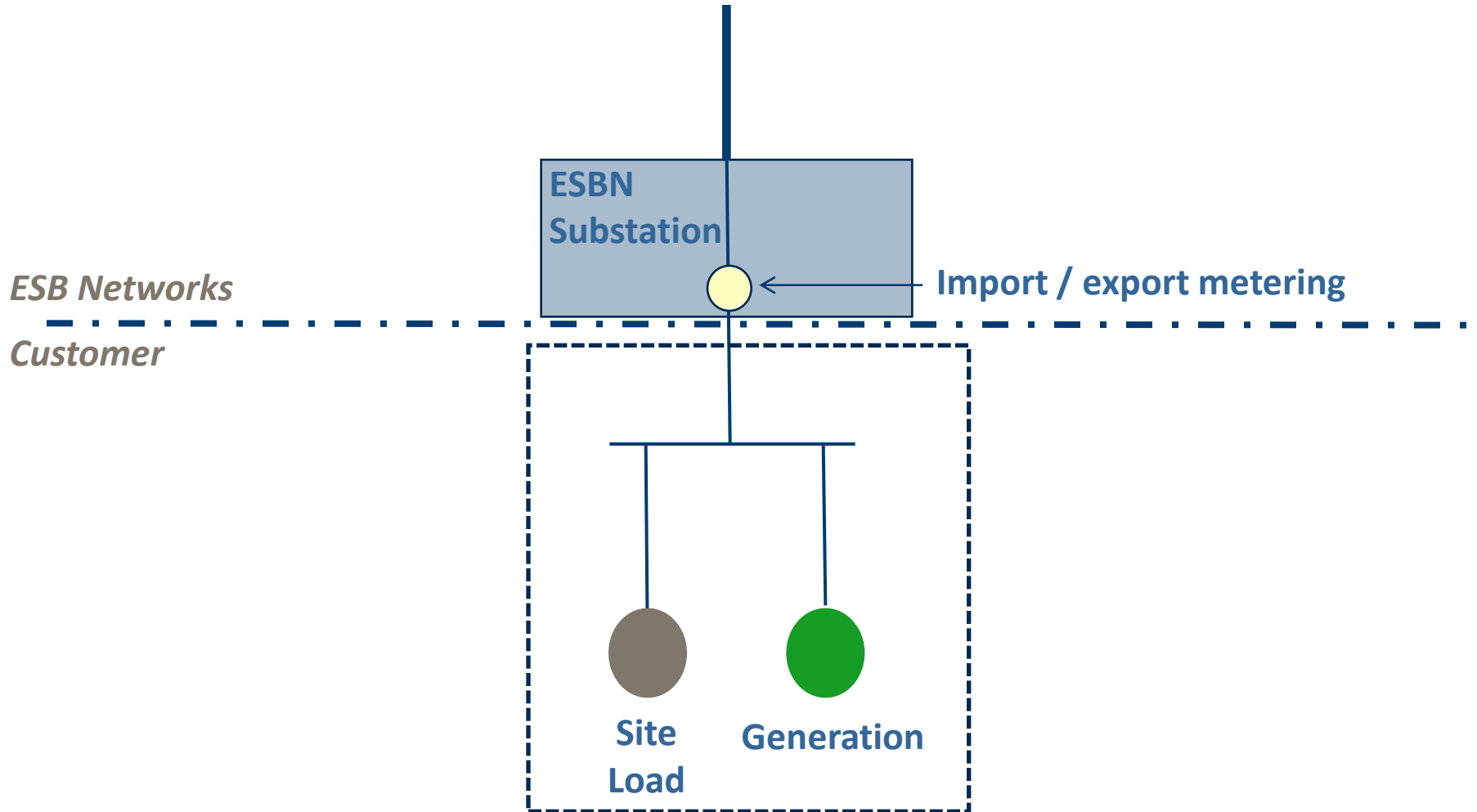
MV Substation building – typically required for connections >200kW



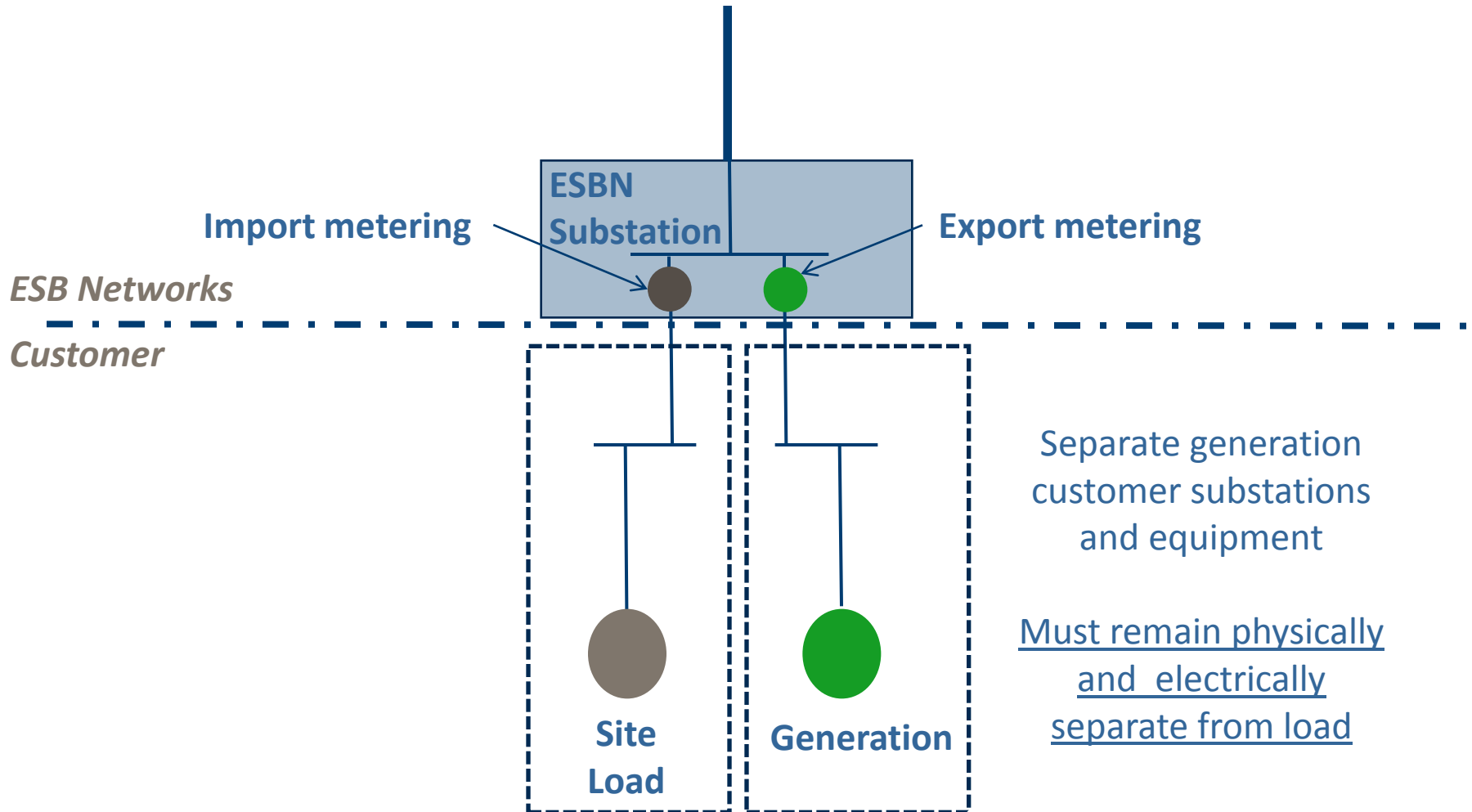
- Autoproducer Connection v Separate Load and Generation Connections
- An autoproducer site has both on-site load and generation, and primarily generates electricity for their own consumption.
- There is only one connection point, with electricity either imported or exported and metered at that point.

- Autoproducer Connection v Separate Load and Generation Connections
- Customer can request a second connection point for the generation, such that all electricity generated can be exported, and separately metered.
- This requires two connections, and therefore cannot be classified as an autoproducer site.

SINGLE CONNECTION POINT

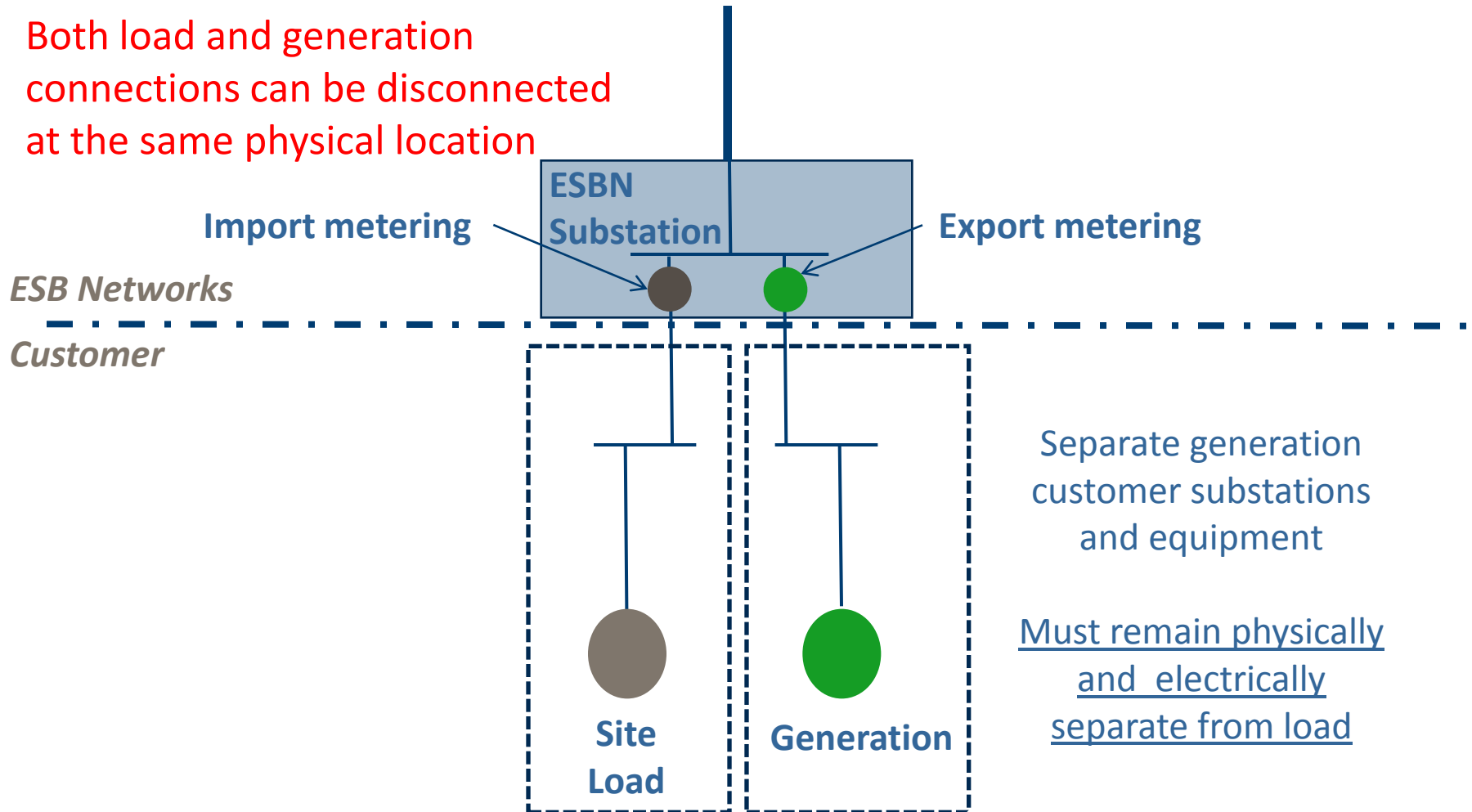


SEPARATE CONNECTION POINT



SEPARATE CONNECTION POINT

Both load and generation connections can be disconnected at the same physical location



Separate generation customer substations and equipment

Must remain physically and electrically separate from load

- This process is independent of ESB Networks
- Payment for the electrical power exported from the site.
- Developer may have an AER / REFIT contract arrangement
- Otherwise, will need to arrange a PPA contract with a registered Electricity Supplier

THANK YOU

