

Demand Side Units

LIEN / AEE Seminar
10th September 2013



Introduction



- EirGrid plans and operates the Transmission System in Ireland
- SONI operates the Transmission System in Northern Ireland and NIE plans the Transmission network in conjunction with SONI
- Single Electricity Market Operator (SEMO) is a joint-venture between SONI and EirGrid



Background



- Provision for DSU in the SEM since 2007
- Demand Side Vision for 2020:
 - “the Regulatory Authorities (RAs) in the Republic of Ireland (RoI) and Northern Ireland recognise the potential which demand side management has to deliver significant economic and environmental benefits to the All-Island market.”
- Demand Side Management Initiative
 - Promote Demand Side participation in the SEM
 - Remove any barriers to market entry



What is a Demand Side Unit?

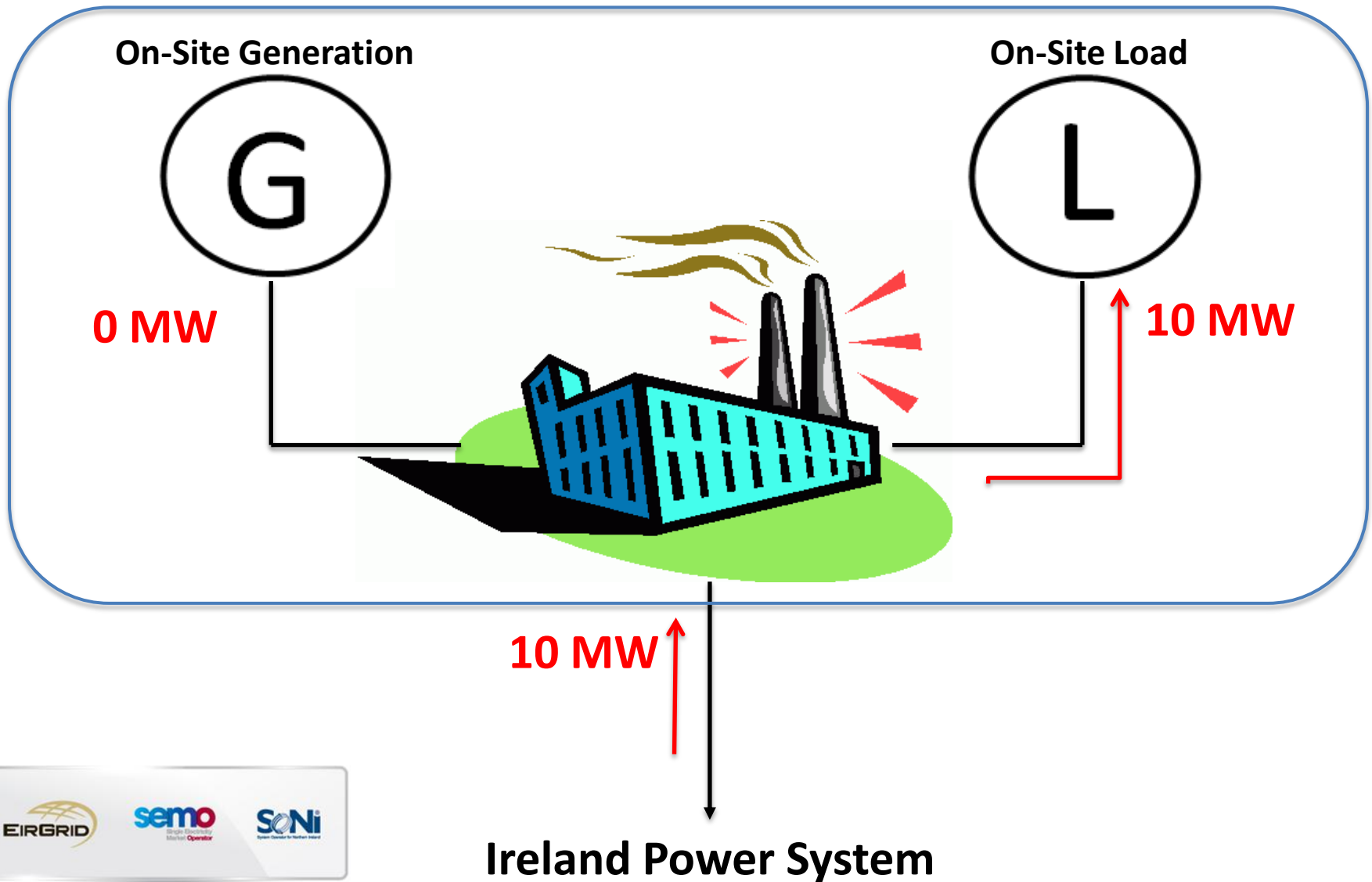


- A Demand Side Unit (DSU) is one or more demand sites that deliver a demand reduction when requested by the EirGrid or SONI Control Centre
 - Requests for a demand reduction are called Dispatch Instructions
- It is registered in the Single Electricity Market (SEM) and bids its demand reduction into the pool
- A demand site can become a DSU by itself (Individual Demand Site) or sign up with an aggregator (Aggregated Demand Site)



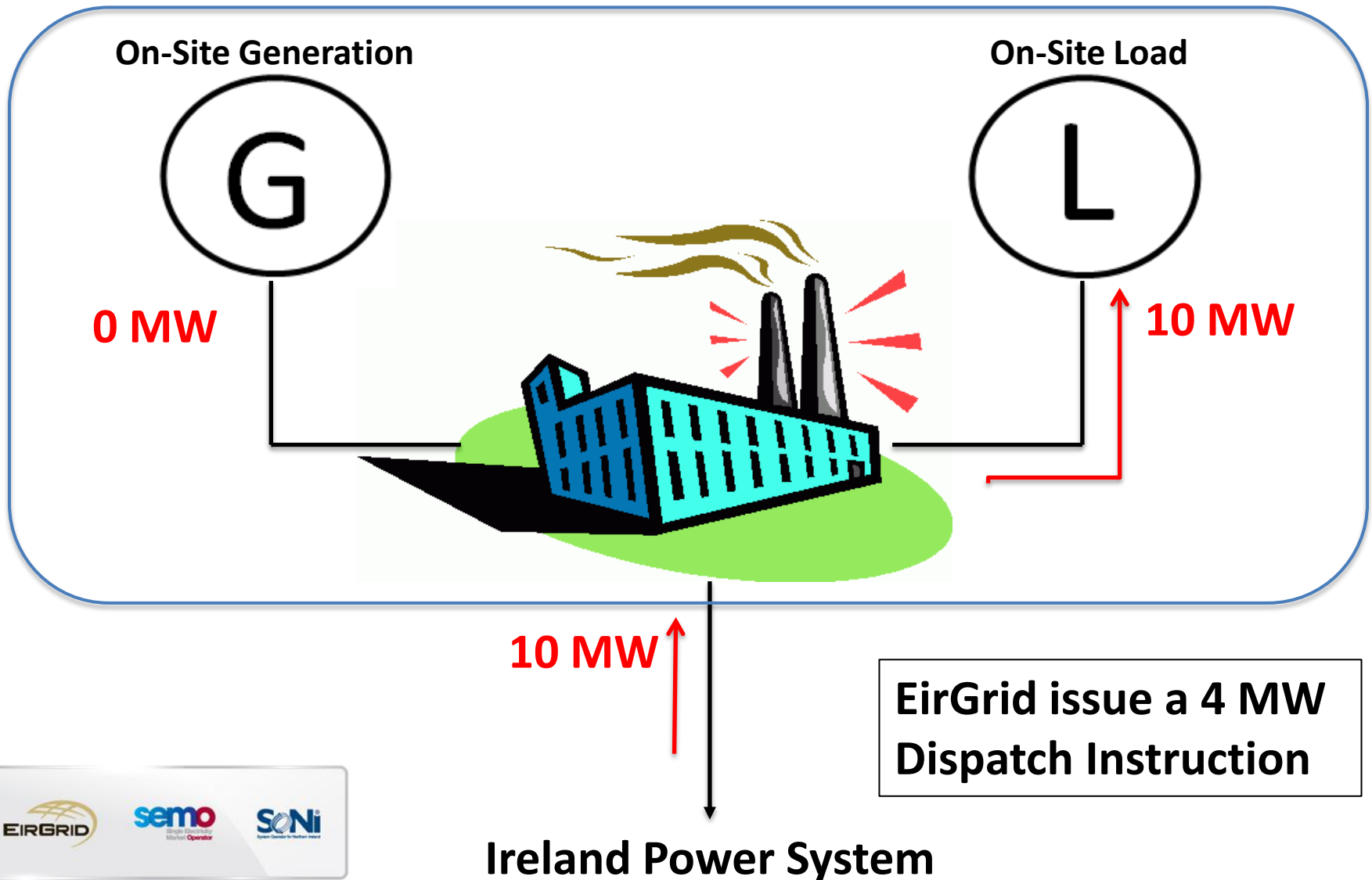
Individual Demand Site

Example 1



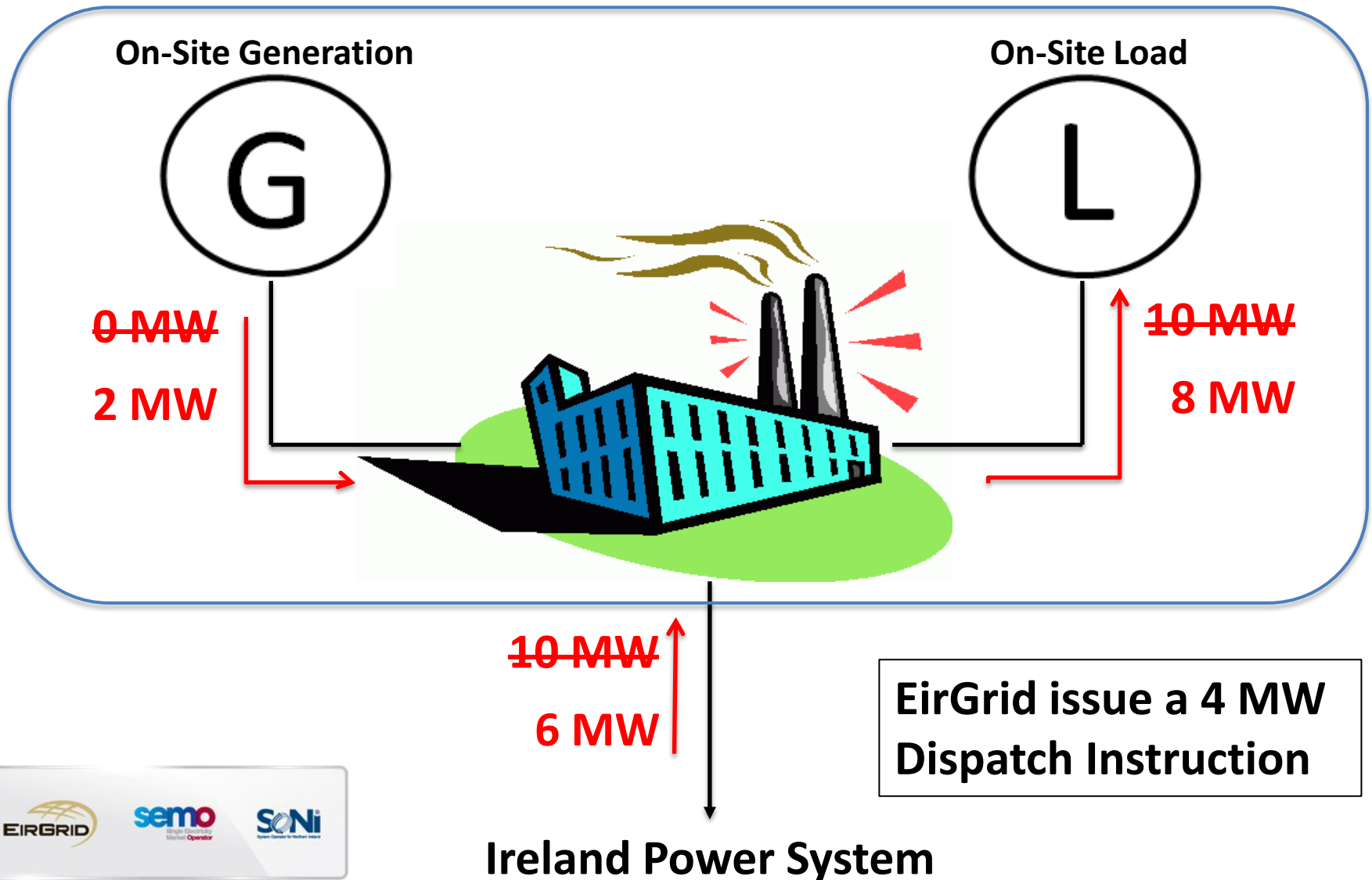
Individual Demand Site

Example 1



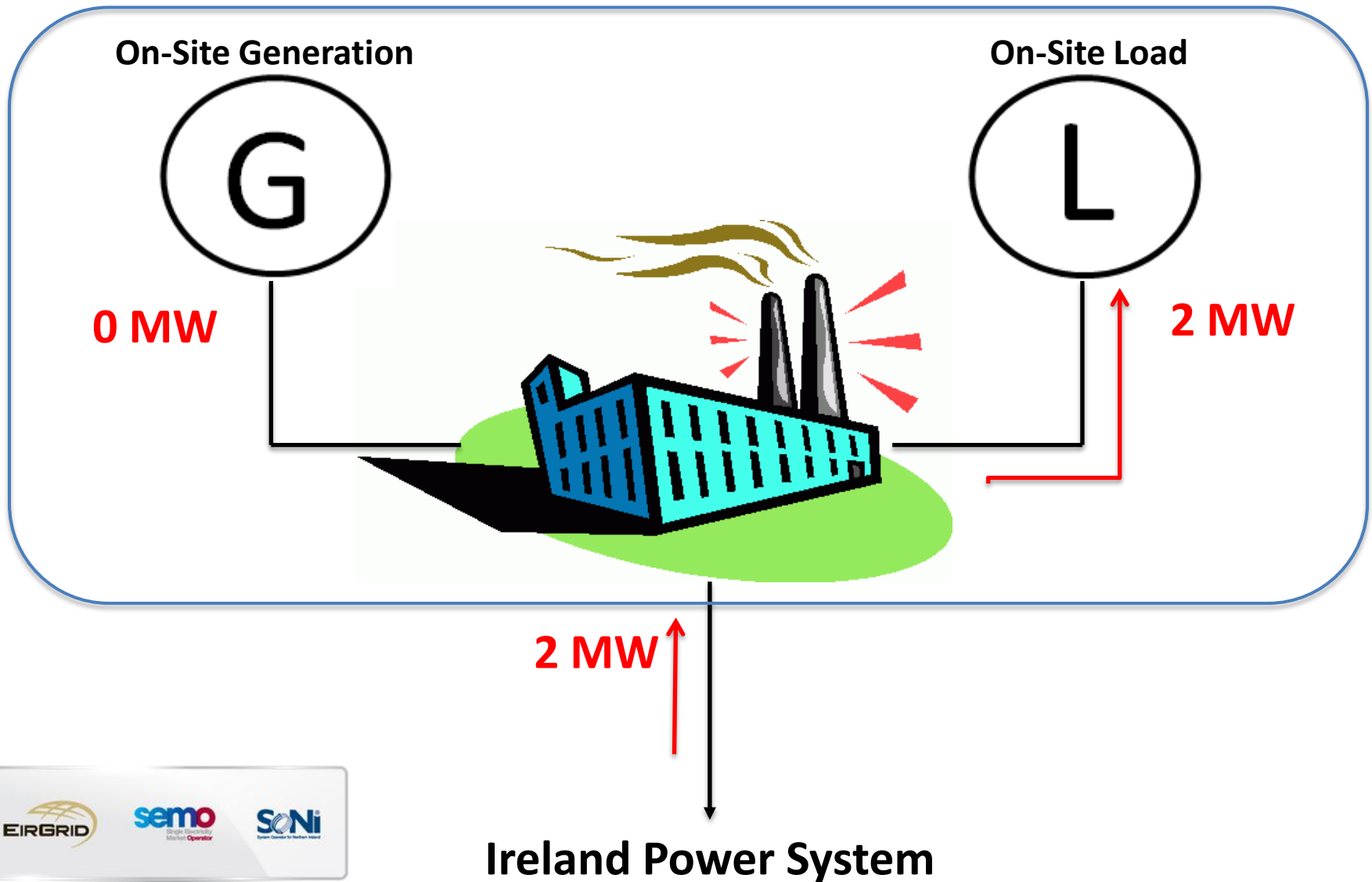
Individual Demand Site

Example 1



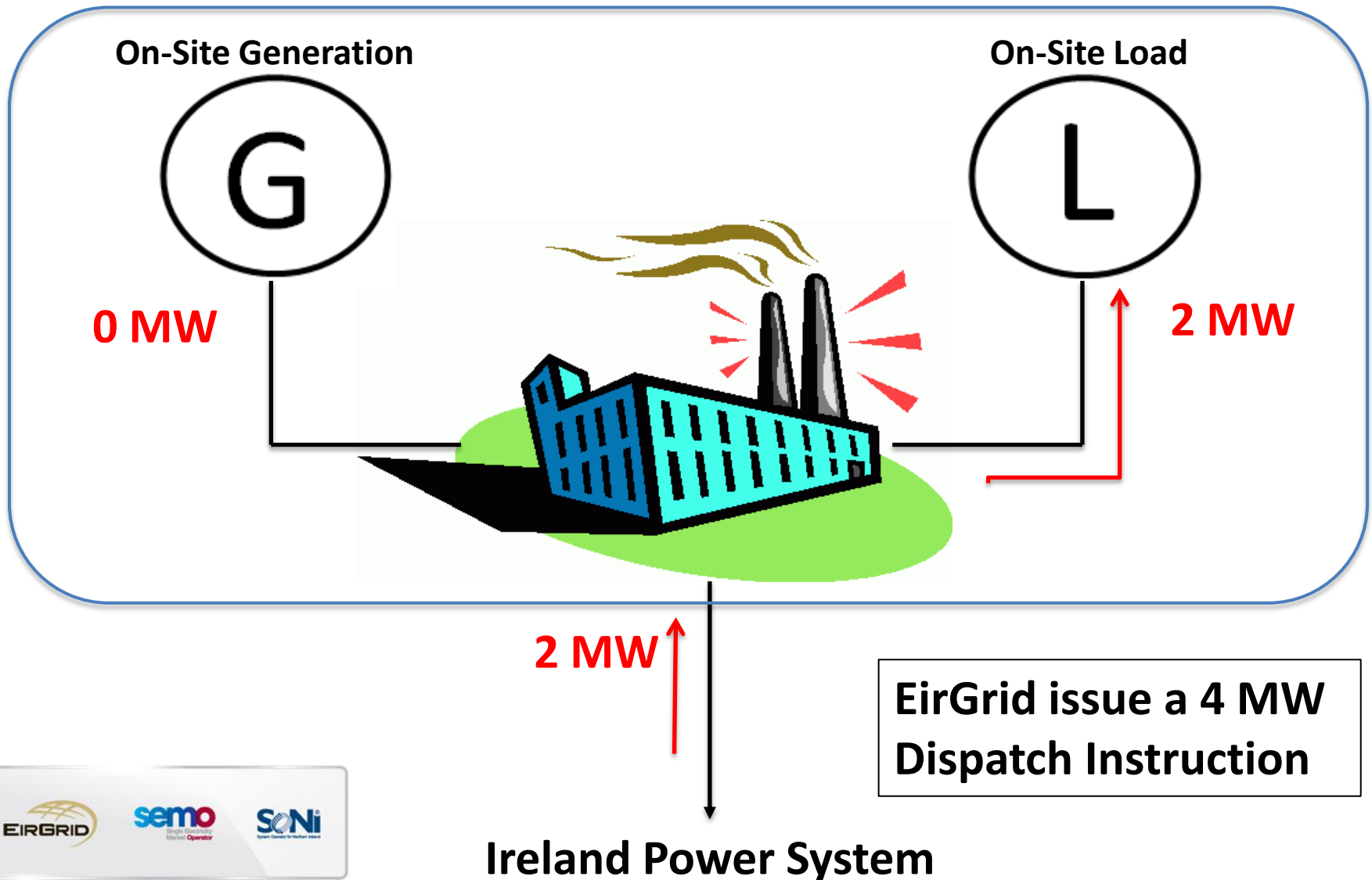
Individual Demand Site

Example 2



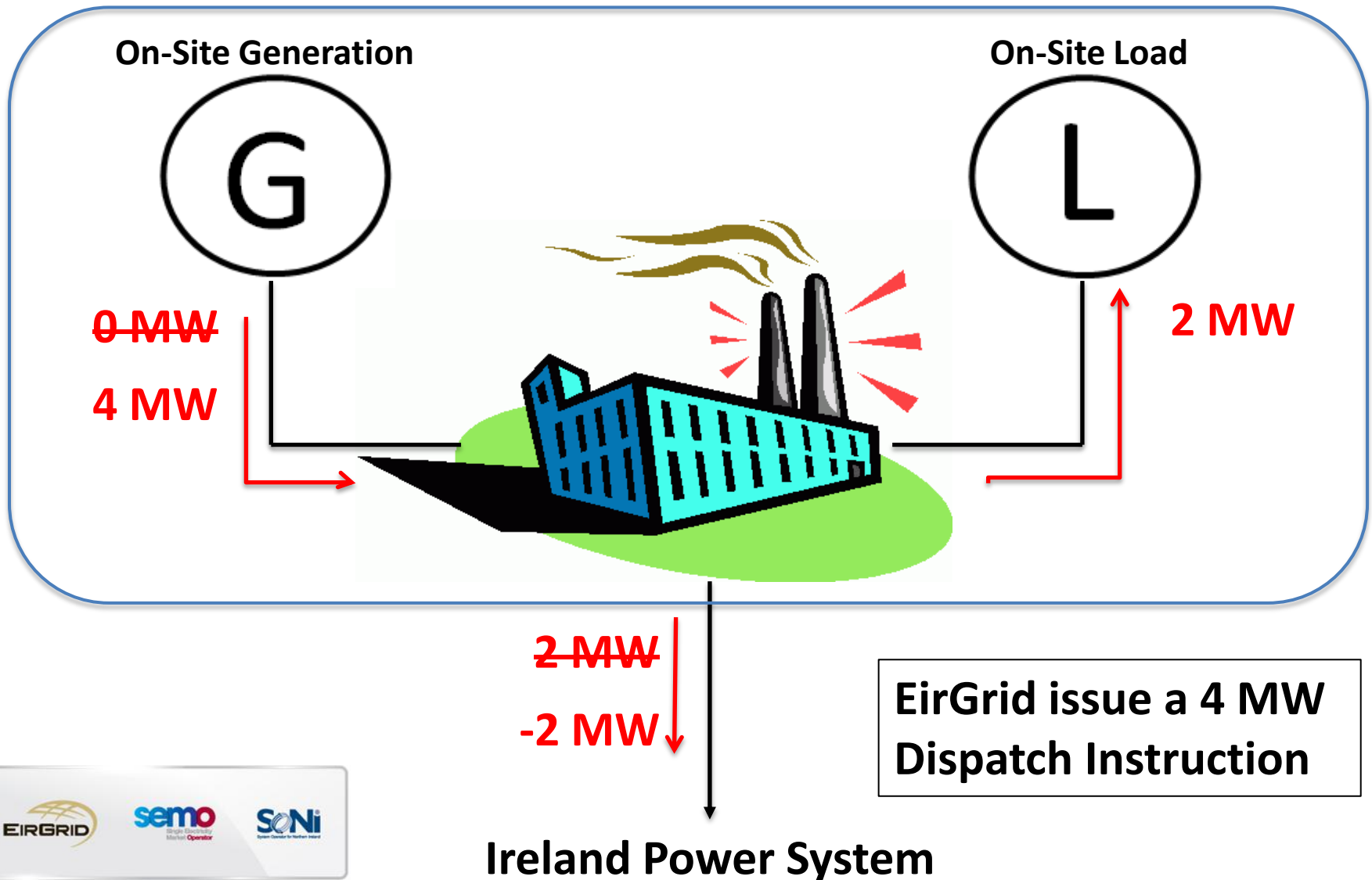
Individual Demand Site

Example 2

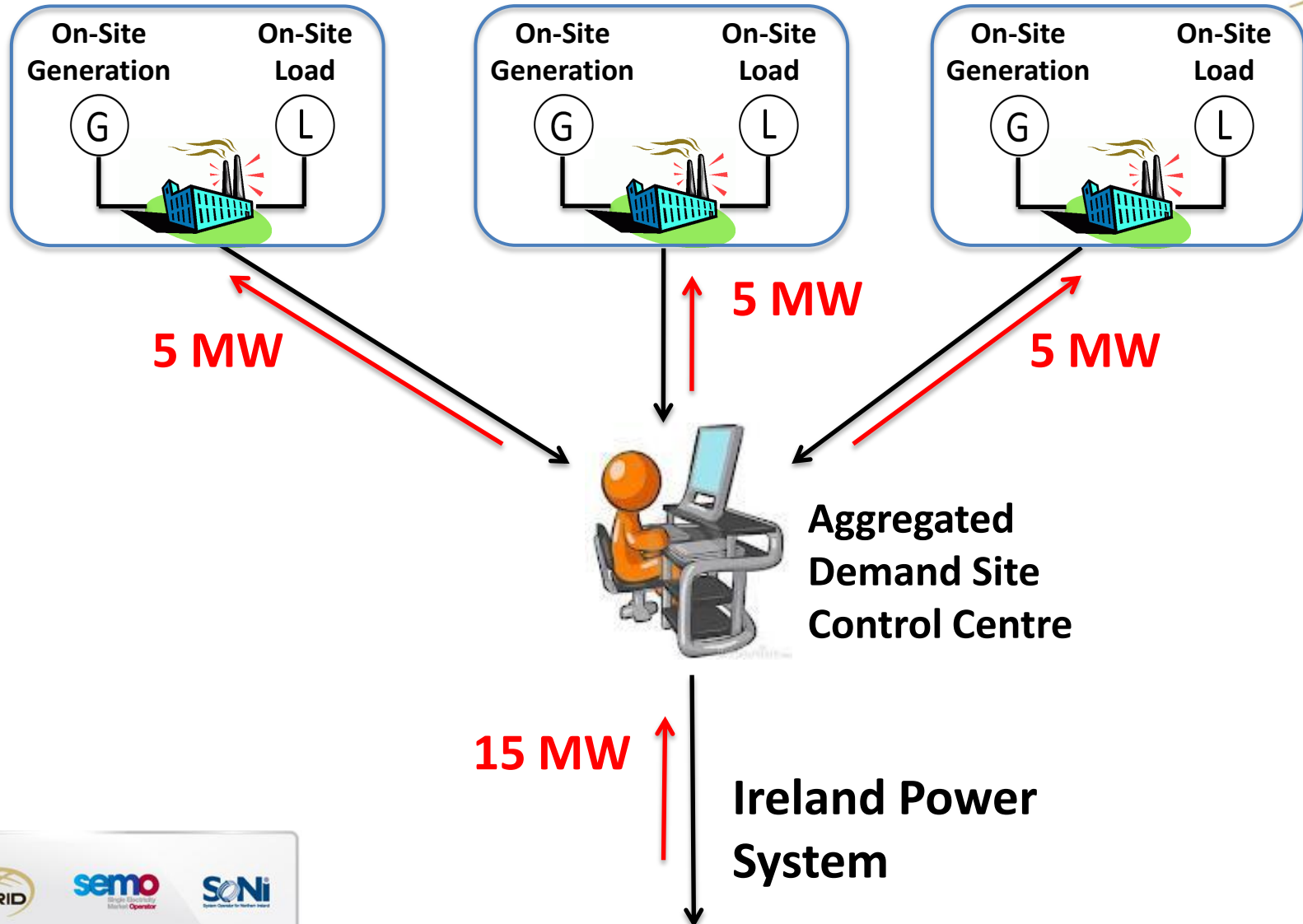


Individual Demand Site

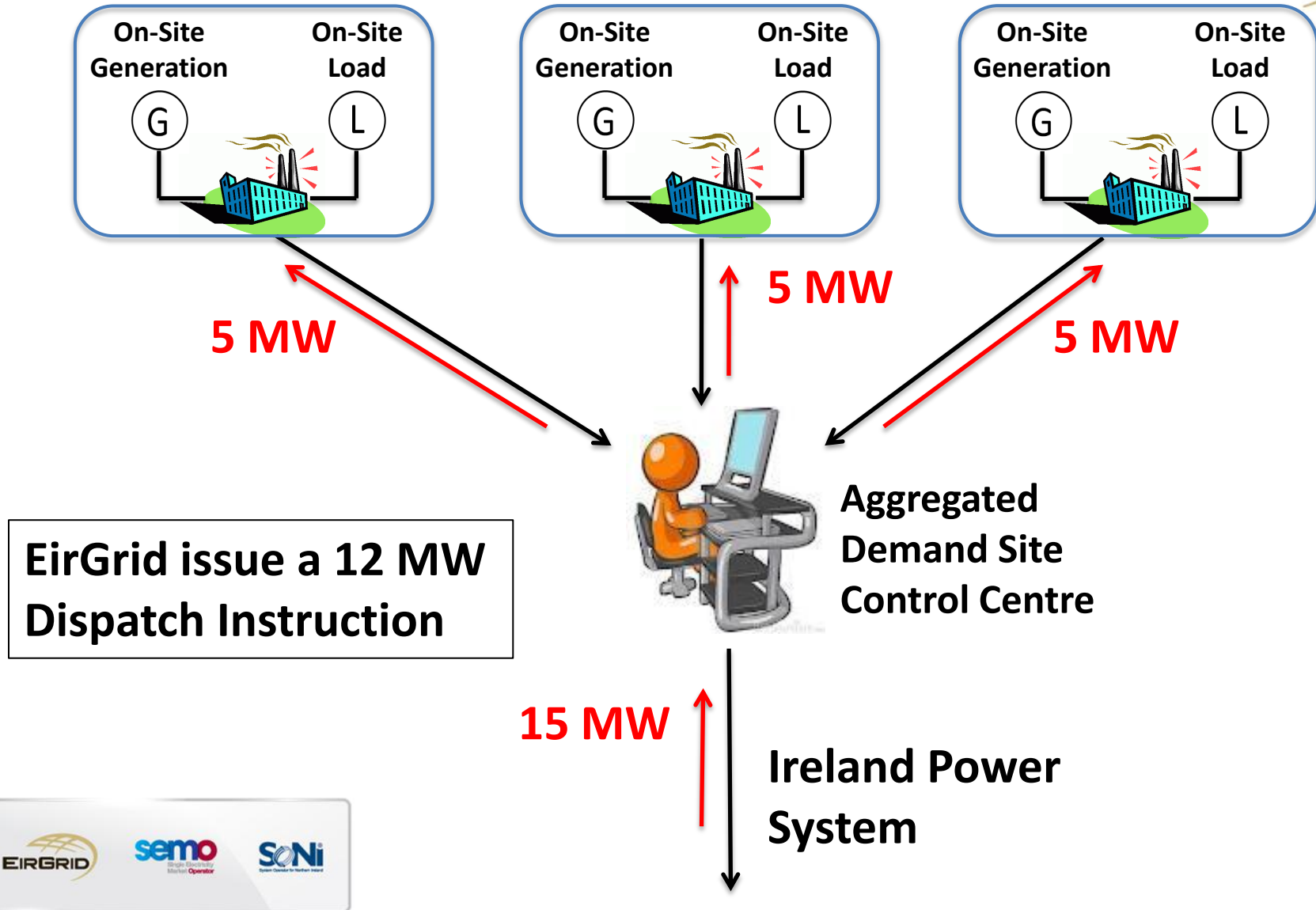
Example 2



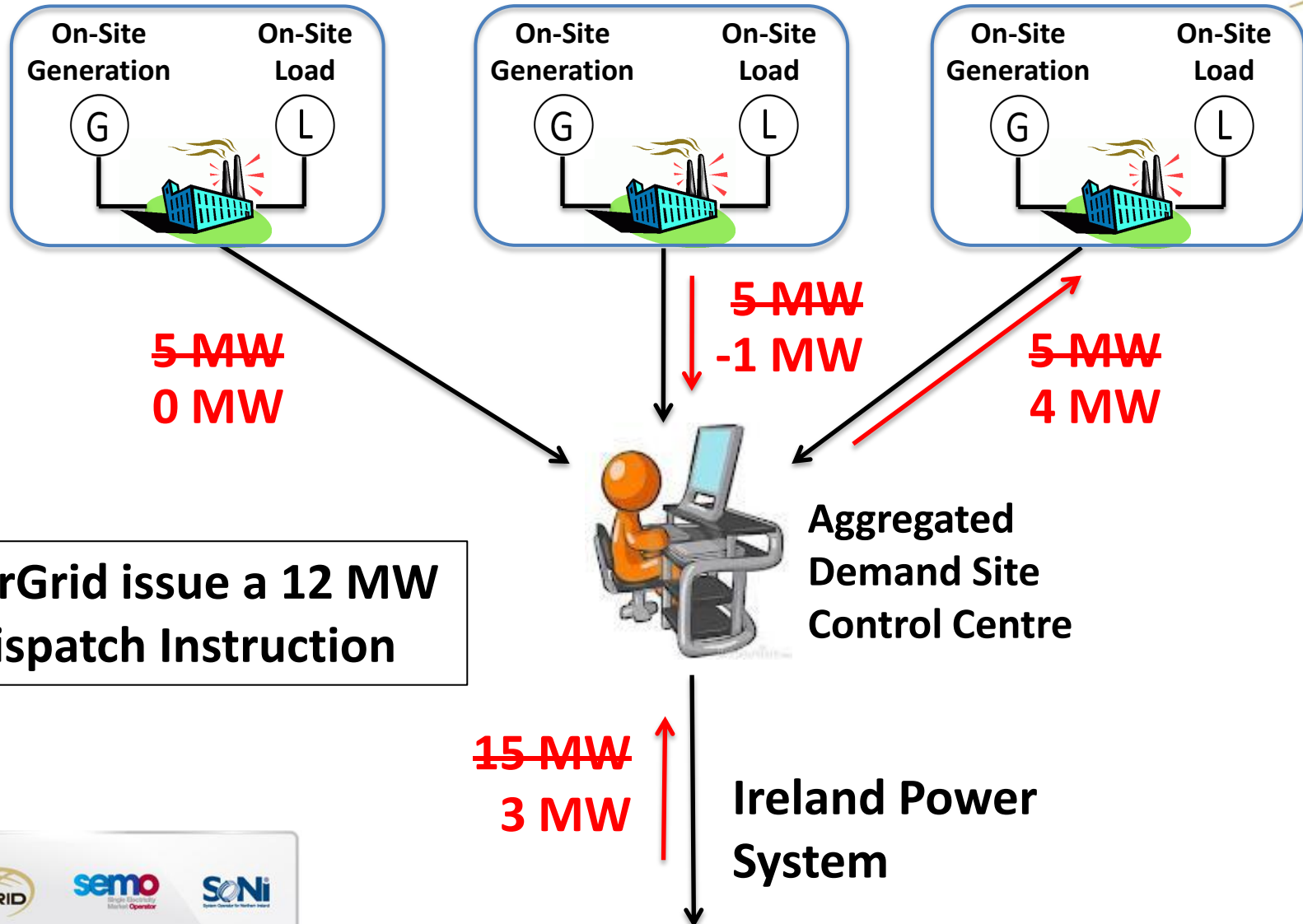
Aggregated Demand Site Example



Aggregated Demand Site Example



Aggregated Demand Site Example



EirGrid issue a 12 MW
Dispatch Instruction







~~15 MW~~
3 MW

Ireland Power
System



Individual or Aggregated



Individual Demand Side Unit MW Capacity	Individual	Part of an Aggregator
< 4 MW		
≥ 4 MW and < 10 MW		
≥ 10 MW		

An Aggregated Demand Side Unit is not limited to size (all members of the aggregator must be less than 10MW)

Communications

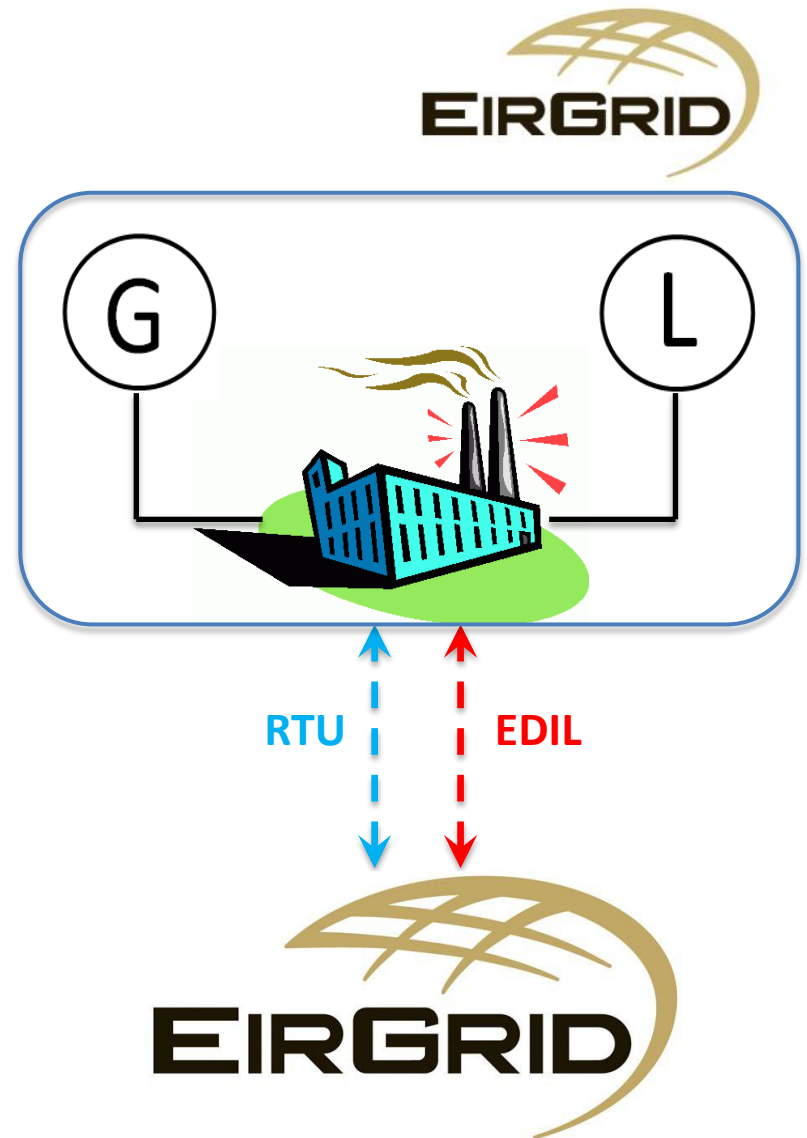
Individual Demand Site

Remote Terminal Unit (RTU)

- 2-way communications link
- DSU will send signals to EirGrid as specified in EirGrid Signals List

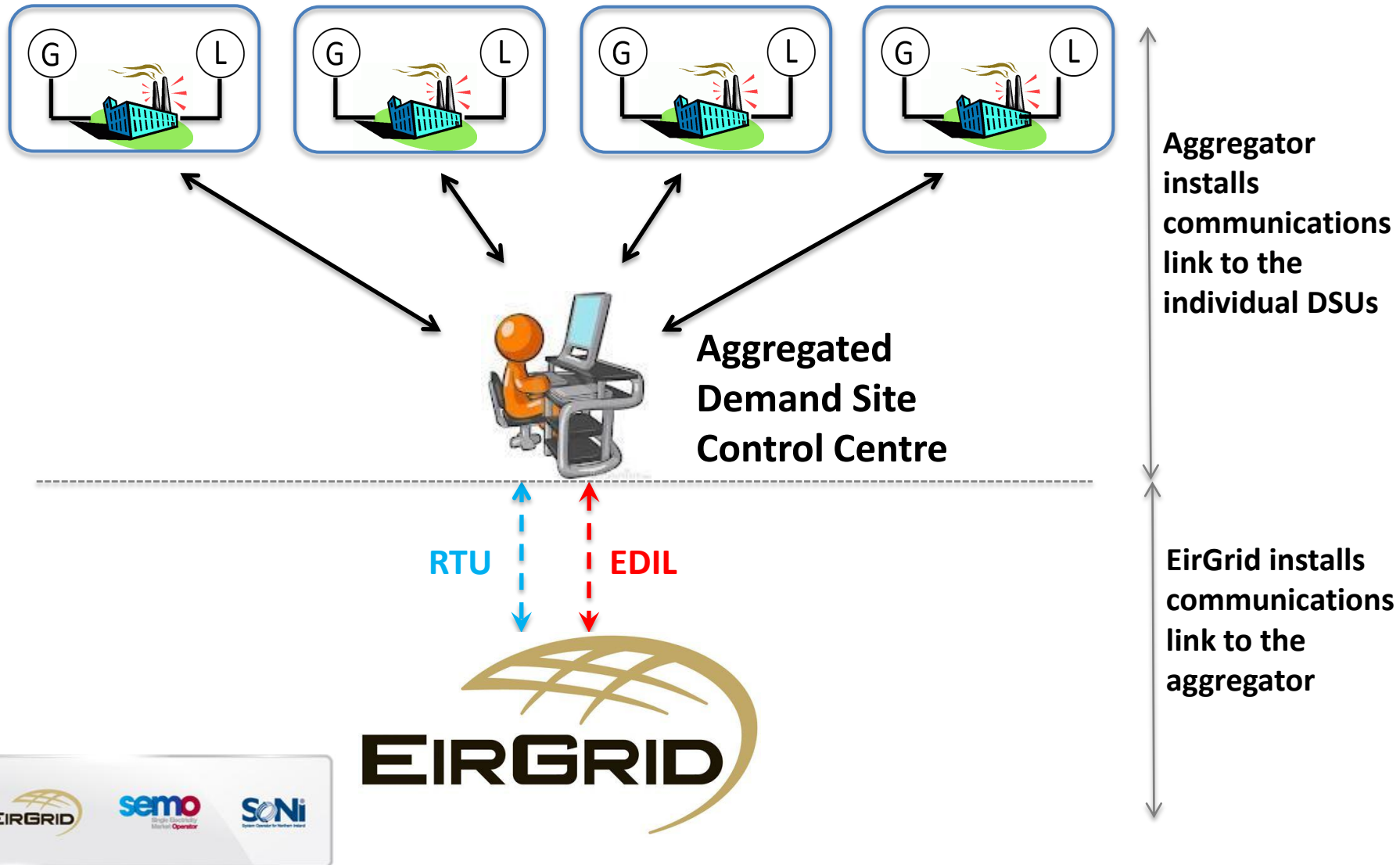
Electronic Dispatch Instruction Logger (EDIL)

- 2-way communications link
- EirGrid send dispatch instructions to DSU via EDIL
- DSU will make declarations to EirGrid via EDIL



Communications

Aggregated Demand Site



DSU Interaction with EirGrid



- Application
- Real-time communication links
- Grid Code Testing
- Demand reduction availability declarations
- Indicative Dispatch schedules
- Dispatch Instruction
- Once the DSU is operational it will be subject to on-going performance monitoring



Requirements for a DSU



- Must comply with:
 - Grid Code
 - Trading and Settlement Code
 - Bidding Code of Practice
- 24/7 Manned Control Centre
- Supply License required from the Regulator
- Evidence of a Connection Agreement with ESBN (inc. MEC if applicable)



Demand Side Units – SEMO Role

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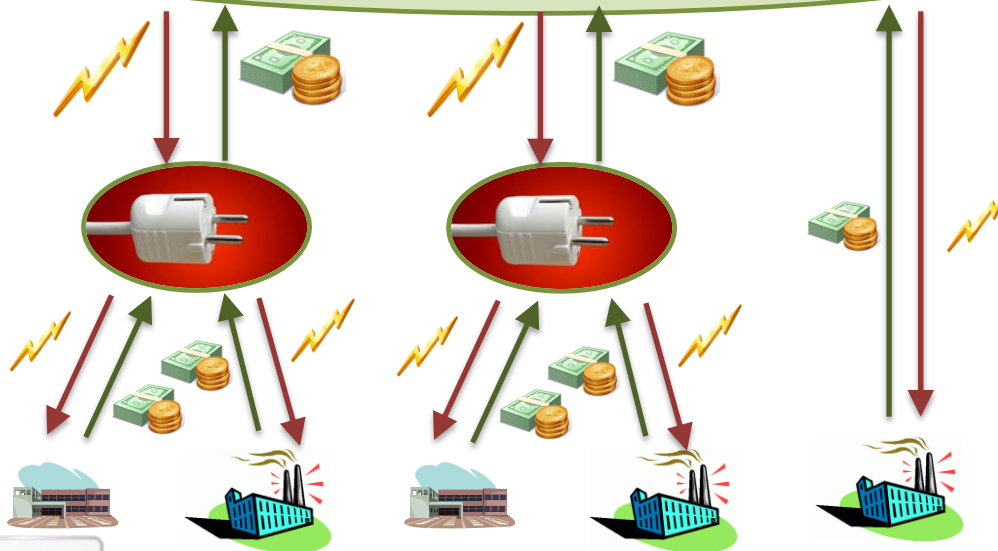
The SEM



Generators



Supply Companies



Supply Customers

Independent Demand Site



DSU History in SEM

- In Ireland there are currently two DSUs live in the SEM
- One DSU registered in Northern Ireland but later switched to an Aggregated Generator Unit

DSU Interaction with SEMO



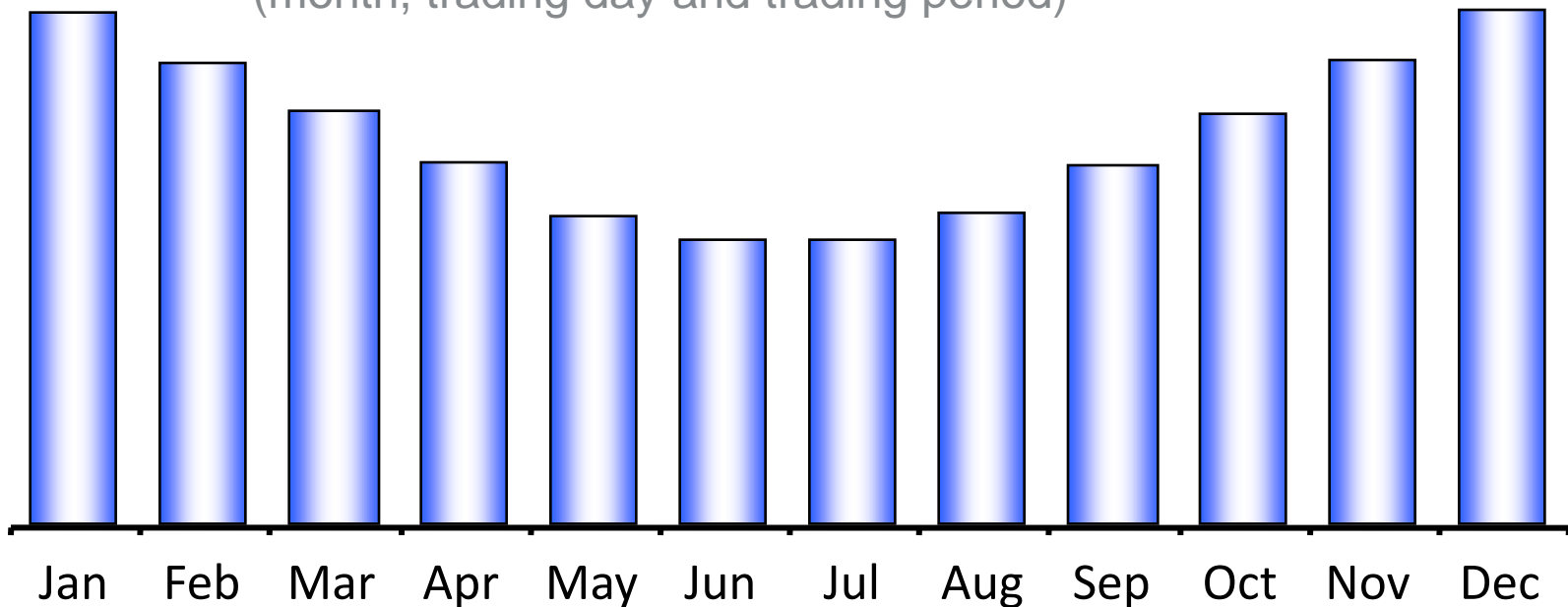
- DSUs must be registered in the SEM
 - Registration Fees ~ € 4800
 - Credit Cover - ~ € 7000
- Commercial Offer and Technical Offer data submitted on a daily basis
- Settlement
 - Payments for capacity and constraints are processed through the SEM
 - Check and reconcile settlement with bids, demand reduction and availability



Capacity Payments



- Paid on availability, not utilisation
- Annual Pot of ~€500m - ~€62k/MW in 2012
- Payments based on 'value' of capacity
 - (month, trading day and trading period)



Charge Reduction



- Avoided market charges when providing demand reduction
 - System Marginal Price - Mean €63/MWh, Max €676 /MWh^{#1}
 - Capacity Charge ~ €14.50/MWh ^{#2}
 - Imperfections Charge €4.71/MWh ^{#3}
 - Variable MO Charge €0.698/MWh ^{#3}

#1 2012 actual figures

#2 Illustrative values only, based on approximate averages

#3 Based on 2012/2013 Regulatory Authorities approved tariffs



Constraint Payments



- Ensures DSU is not disadvantaged when scheduled in the market but not dispatched or vice-versa
- Similar mechanism to all other generators in the SEM
- Should not be considered an incentive for participation, just made to ensure DSU is not disadvantaged

DSU - Aggregated Demand Site

Scenario	Scheduled in Market	Dispatched by TSO
B1	✓	✓
B2	✓	✗
B3	✗	✗
B4	✗	✓

DSU Revenue	Demand Site Avoided Costs
✓ Cap & (SMP – Bid Price)	✓
✓ Cap & (SMP – Bid Price)	✗
✓ Cap	✗
✓ Cap & (Bid Price – SMP)	✓

Example: Scenario B3

DSU Bids

Bid Price	€ 200	/MWh
Demand Reduction Quantity	5	MW

Market Outcomes

Scheduled Quantity for DSU	0	MW
Dispatched Quantity by TSO for DSU	0	MW
SMP	€ 50	/MWh
Related Supplier Charges (Cap, VMOC, Imperfections etc.)	€ 20	/MWh
Demand Site Load	20	MW
Capacity Payment Price	€ 7.50	/MWh

* Prices and Quantities are for illustrative purposes only

* Values are based on one half hour trading period only

* Supplier Demand Site Charges assumed to be pass through charges for this example

Demand Site Charges (Payable to Supplier) € 700

= (SMP + Related Charges) x Demand Site Load x 1/2 hour trading period

DSU Payments (Paid by SEM) € 18.75

= Capacity Payment x DSU Reduction x 1/2 hour trading period

Overall Savings (for 1/2 hour trading period) € 18.75

Contact Details



- EirGrid may be contacted on:
 - dsu@eirgrid.com
- SONI may be contacted on:
 - connections@soni.ltd.uk
- SEMO may be contacted on:
 - markethelpdesk@sem-o.com
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