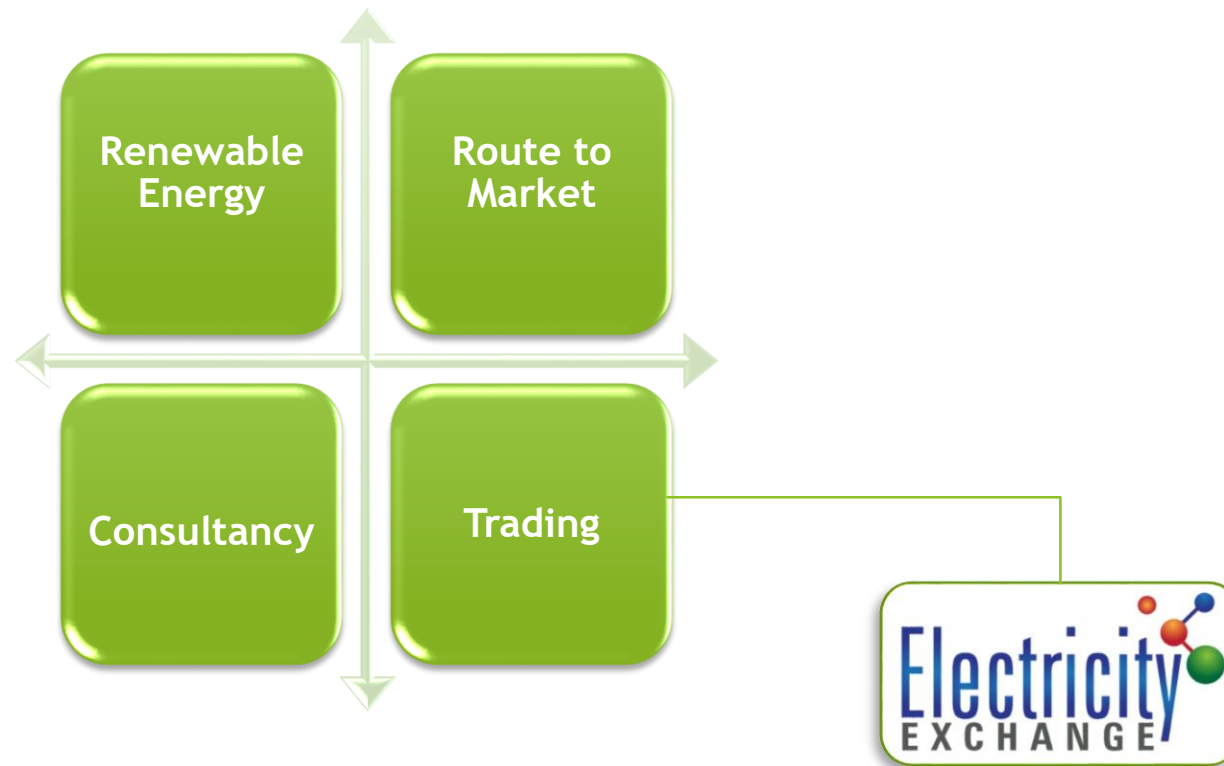
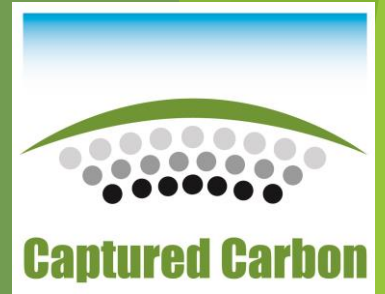
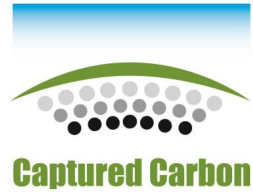


12 months of I-SEM: A DSU Perspective



02/10/2019

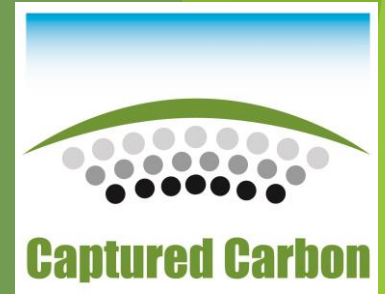
Company breakdown



- ▶ Energy Trading
 - ▶ Wind, small supplier, DSU
 - ▶ Front office 365 trading
 - ▶ Back office analysis and settlement
- ▶ Regulatory Support/consultancy
 - ▶ Support Electricity Exchange in analysing market rules, consultations, modifications etc.
- ▶ Focus on energy markets
 - ▶ Ex-ante and balancing market



- ▶ DSU operation
 - ▶ 24/7 dispatch of demand sites
- ▶ Technology development
 - ▶ Allow for monitoring and performance of demand side
- ▶ Focus on non-energy markets:
 - ▶ Capacity market reliability options
 - ▶ DS3 system service payments

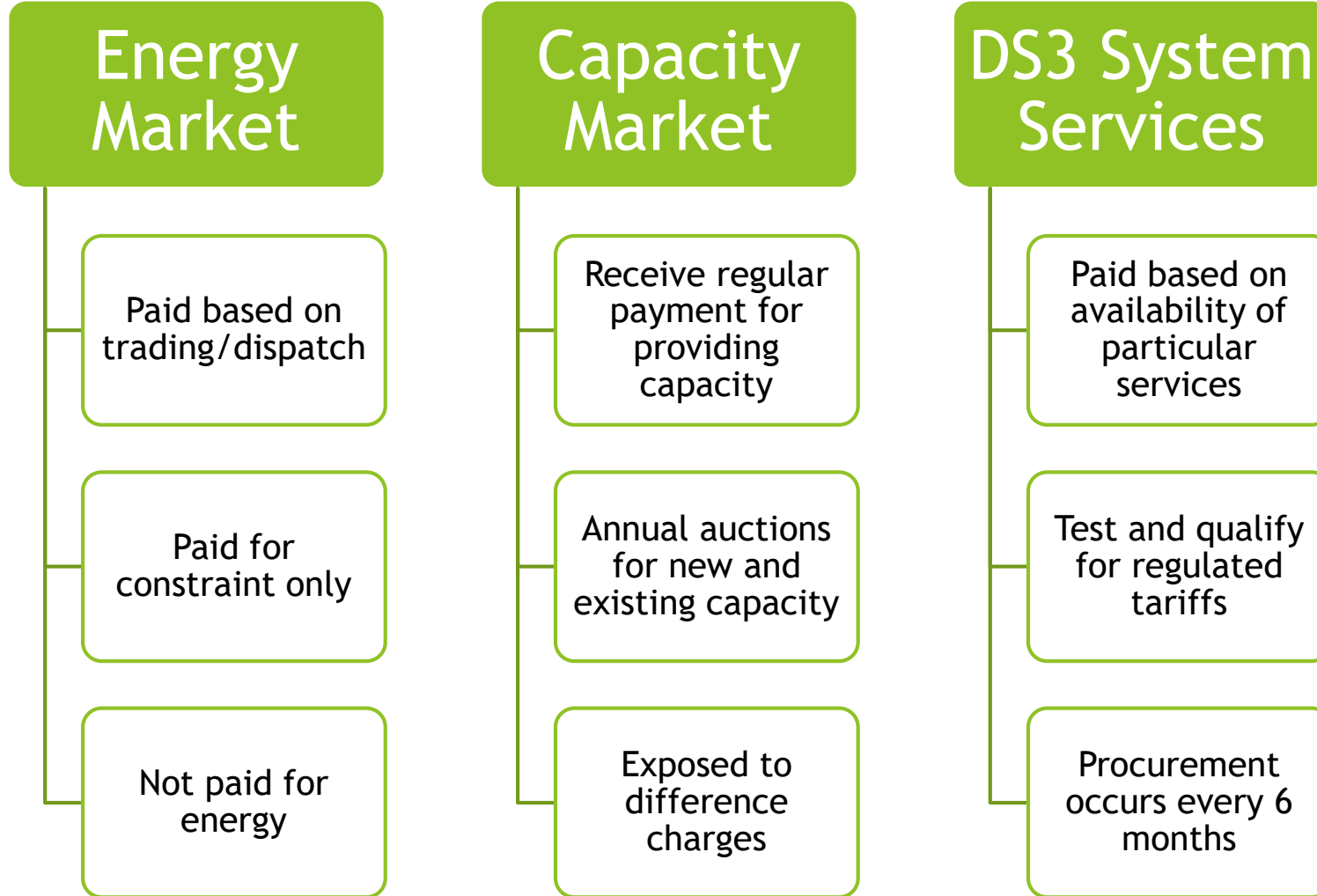


DSU: A Virtual Power Plant

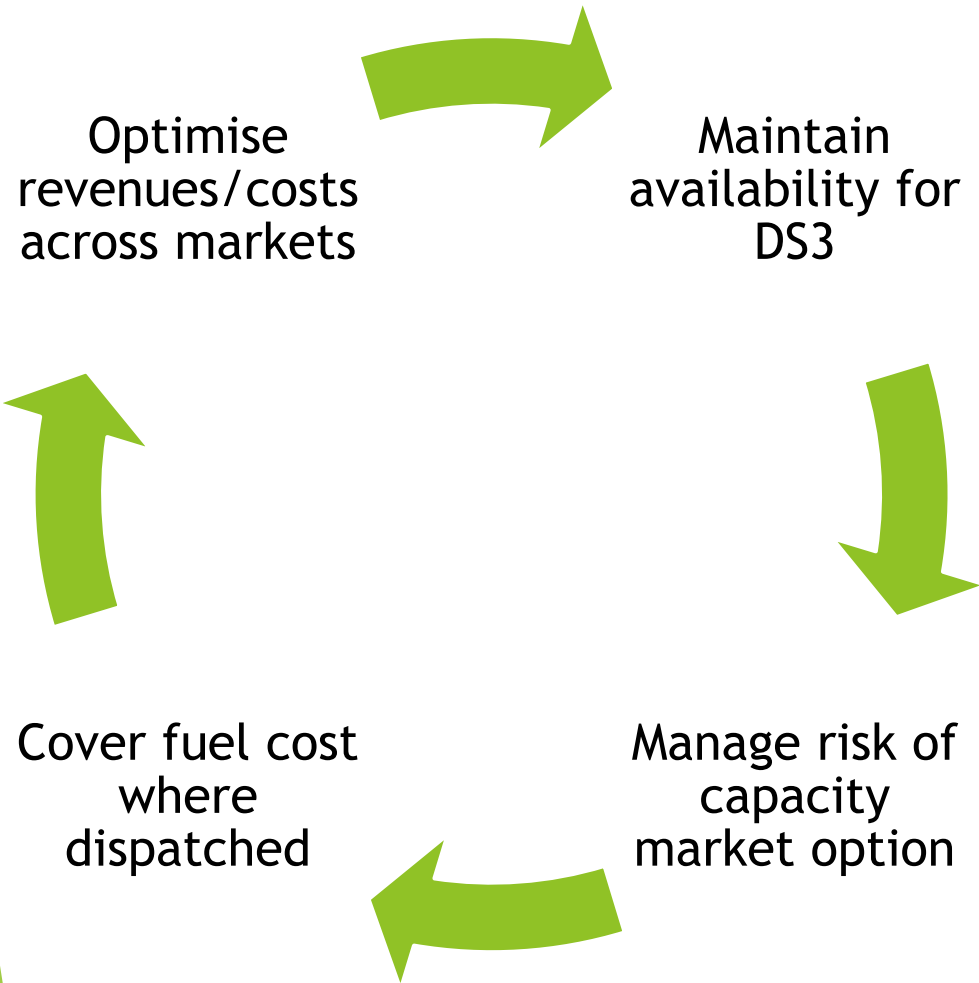


- ▶ Demand reduction as replacement for generation
- ▶ Use technology to control existing demand sites as virtual power plant
- ▶ Increase controllability of the existing grid
- ▶ Able to facilitate renewable energy and flexible grid management

DSU Revenue Streams under I-SEM



Trading - A juggling Act



- ▶ Three markets have different incentives
 - ▶ Optimise dispatch for energy
 - ▶ Always dispatch in price event for capacity
 - ▶ Optimise availability of services for DS3
- ▶ DSU is typically energy limited
 - ▶ Plant can only be shutdown for so long
- ▶ Trading requires a management of this availability across markets

DSU Traits Comparison

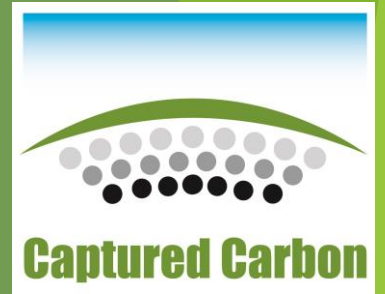
Long-run DSU

- ▶ Typically onsite CHP units
- ▶ High availability over longer periods of dispatch
- ▶ Lower short-run cost (dispatch down payback cost)
- ▶ Typically dispatched down from a baseline generation
 - ▶ Cost recovery per MWh crucial
 - ▶ Start costs highly relevant where de-synced

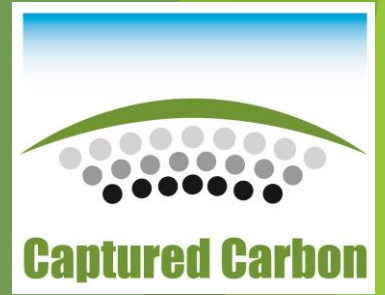
Short-run DSU

- ▶ Typically demand reduction or onsite diesel generation
- ▶ High availability but for short term dispatch
- ▶ Higher short-run marginal cost
- ▶ Typically dispatched up from zero
 - ▶ Start cost recovery is key trading concern

Demand Side Unit (DSU) Versus Traditional Generator Unit



- ▶ No energy payments made to DSU
 - ▶ Not paid for generating the way generators are
 - ▶ Working capital not built up regularly in the market
 - ▶ Has implications on cash flow and increased impact of capacity difference charges
- ▶ Aggregated unit versus single unit
 - ▶ DSU is an aggregation of individual sites with differing characteristics
 - ▶ This provides challenges in co-optimising setup for capacity and DS3
- ▶ Individual demand sites are able to change operator
 - ▶ Happens quicker than build out of generation plant
 - ▶ Provides challenges in capacity registration (rigid timeline and qualification)



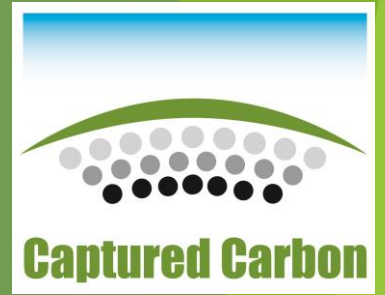
I-SEM - Key Outcomes from Year 1

- ▶ Balancing market prices more volatile than expected
 - ▶ Higher level of negative prices than originally anticipated
- ▶ Multiple breaches of the capacity strike price in the balancing market
 - ▶ Prices exceeded 500 in cases where market was long
 - ▶ Hard to predict and prepare for these events

Trade Date	PIMB 30 Minute
03/10/2018 19:30	€ 549.92
03/10/2018 20:00	€ 684.05
09/10/2018 16:30	€1,453.09
09/10/2018 17:00	€ 610.16
23/11/2018 00:00	€ 514.01
24/01/2019 11:30	€1,331.37
24/01/2019 12:30	€ 980.56
24/01/2019 13:00	€3,773.69
24/01/2019 13:30	€1,909.45

Regulatory Changes and Risk

- ▶ Significant level of consultation and rules changes since go-live:
 - ▶ Imbalance pricing (simple NIV tagging, effect of north-south tieline etc.)
 - ▶ Capacity (de-rating factor for DSU units)
 - ▶ Leads to a moving target with trading as rules have bedded down
- ▶ Push for changes for DSU to deliver appropriate/fair market rules:
 - ▶ Modifications committee (credit cover, application of system services)
 - ▶ Work on increased governance of modification
 - ▶ Response to public consultations (e.g. application of rules for state aid)
- ▶ A need for strong regulation has increased with higher commercial exposures



Conclusion

- ▶ While similar to other units, DSUs have had unique challenges in I-SEM
- ▶ The first year of I-SEM has come with unexpected challenges/changes
- ▶ Some progress has been made on aligning the rules with DSU specifics
- ▶ Key changes are still forthcoming for DSU
 - ▶ State aid related changes to capacity settlement
 - ▶ Secondary trading for the capacity market
 - ▶ It will be vital for DSUs to interact with these changes to ensure the market delivers appropriate measures for our needs