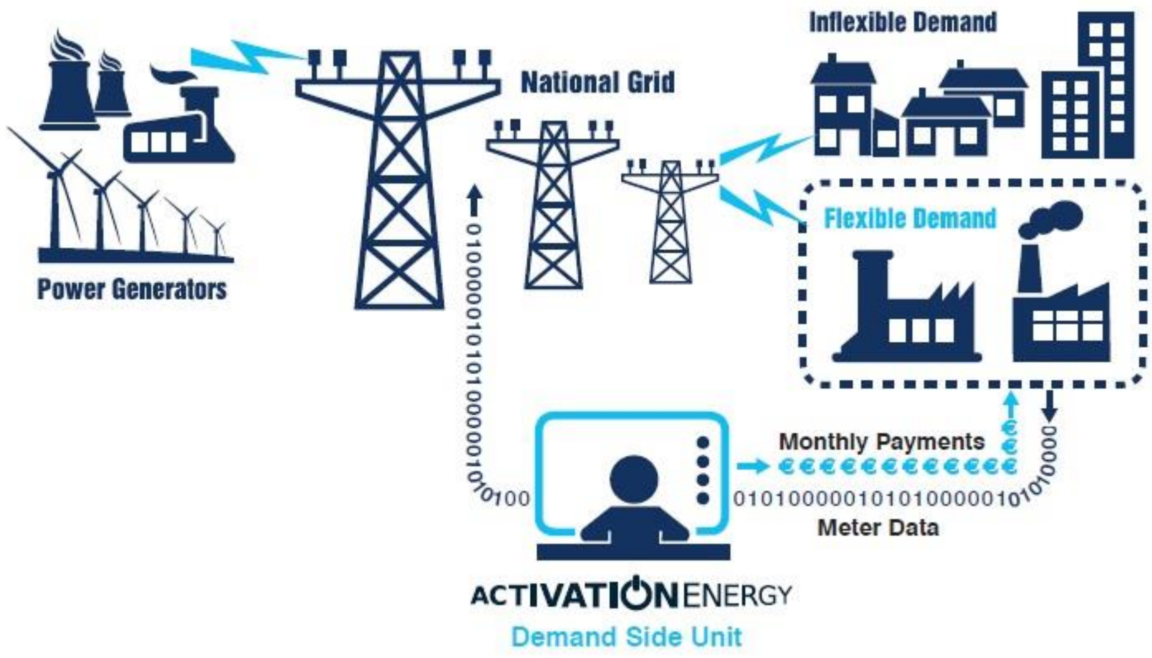
Integrated Single Electricity Market – Energy Trading Arrangements for DSUs

Dear Sir/Madam,

Activation Energy and EnerNOC are pleased to have the opportunity to provide some thoughts on how Demand Side Units (DSUs) can best participate in the ISEM trading arrangements. Activation Energy plays a leading role in the development of Demand Response and the Smart Grid in Ireland. Its parent company EnerNOC Inc (Nasdaq:ENOC) is a world leading Energy Intelligence Software provider with businesses across 4 continents.

Demand response refers to changes in electric usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time, or to incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardised.

Demand response makes energy markets more cost-effective for consumers and reduces stress on the electric grid. With the proper planning, demand response resources can meet a variety of needs on the grid, including providing capacity, energy, and ancillary services. Demand response also allows customers to reduce their electricity bills through peak load management, and other facility management tools.



Background

Benefits of Demand Response and the Smart Grid

Demand Response can provide many services to the electricity system and provides many benefits. Among these benefits are the following

- Provision of capacity
- Reduction of energy costs for all
- Increasing flexibility on the electricity system
- Facilitation of renewables
- Improvement of system security
- Diversification of energy sources
- Improvement of energy efficiency on users sites
- Returning of funds to energy users

Provision of capacity

Capacity is required in an electrical system to adequately meet the maximum demand of the system. Demand response offers the ability to reduce this maximum in a way that provides the same net result but without having to build and support peaker power plants. Furthermore, as demand response is lower in cost than peakers, it has been shown to reduce capacity costs in many markets where the service has matured.

Reduction of energy costs

By reducing the need for costly peakers to run in the electricity system, the cost of generation can be lowered for all. These savings can then be passed on to all consumers, not just those who provide demand response.

Increasing flexibility on the electricity system

Some electricity systems can struggle with the rapid ramp rates required by quickly changing loads or changes in generation. Demand response is generally fast-acting and so can better facilitate these changes than larger, slower traditional generators. Further flexibility can be provided by the geographically diverse nature of demand response resources, which can allow local area schemes to manage system constraints and local grid loading problems.

Facilitation of Renewables

Intermittent energy resources can be challenging for system operators to manage because the natural demand curve of the system may not match the availability of generation. Demand response and the Smart Grid offer fast responding resources to system operators to adjust this load curve and so allow for increased integration of renewables.

Improvement of system security

As demand response can be faster-acting than traditional generation, it can improve the resilience of the system significantly. Furthermore, the dispersed nature of the service means that there is a lower risk of an interruption of its availability. Finally, due to the diverse range of the fuel provision (from diesel to simply switching off loads), the risk to the resource's availability is greatly reduced.

Diversification of energy sources

Demand response is provided by a range of provider types. Some providers simply switch off non-essential equipment such as pumps, chillers, or process equipment. Others use local energy resources such as backup diesel generators. These diverse sources demonstrate the diversity provided by demand response and the resulting improvement it provides to security of supply.

Improvement of energy efficiency on users sites

As consumers focus attention on their energy usage through their participation in demand response, it has been shown that they also tend to carry out energy reducing projects onsite. This reduces Ireland's energy demand generally, reduces greenhouse gas emissions and reduces energy imports.

Returning of funds to energy users

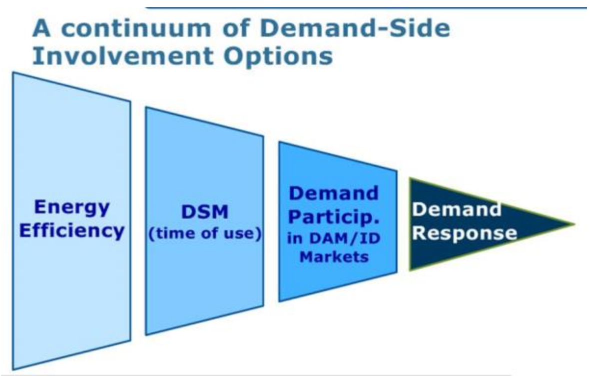
Demand Response is provided to the Grid by the users themselves. This means that industrial and commercial users who are struggling with high energy prices can offset these costs against the payments they receive from the grid. This can mean the difference between increasing demand in a jurisdiction (and the associated jobs) or moving to a lower cost economy.

European Recognition of Demand Response Internationally

The benefits listed above play a significant part in ACER's view that demand response that can be controlled and dispatched by the system operator represents the most valuable benefit the Smart Grid can provide to the system, as demonstrated in the slides below[1].

Demand Response (DR)

- The most valuable service Demand can provide
- Demand capabilities compete only with storage and selected generation technologies (reservoir hydro, …)
- Requires:
  - Demand "being there"
  - A business model with clear roles (aggregators)
  - A clear regulatory framework
  - Consumers' buy-in



Internationally, demand response has provided significant savings to markets where it provides a large proportion of the capacity, notably in parts of USA and Australia. In PJM for example demand response is credited with saving the market in excess of $11 million dollars annually.

[1] Alberto Pototschnig - Types and Profiles of Demand Response: the Vision of ACER - 6 November 2013

I-SEM Energy Trading Arrangements

EnerNOC and Activation Energy believe that at a high level the proposed trading arrangements could work well for demand-side participation. We do believe however that as the detail is progressed the following issues must be considered.

Price Responsive Demand (PRD)

The creation of a day-ahead market with reliable pricing may be very useful to those who wish to a) expose themselves to market volatility, and b) move their load in response to price signals. While a subset of customers may be interested in this approach, in our experience most commercial and industrial electricity customers seek out retail arrangements with suppliers that shield them from market volatility and mitigate such risk.

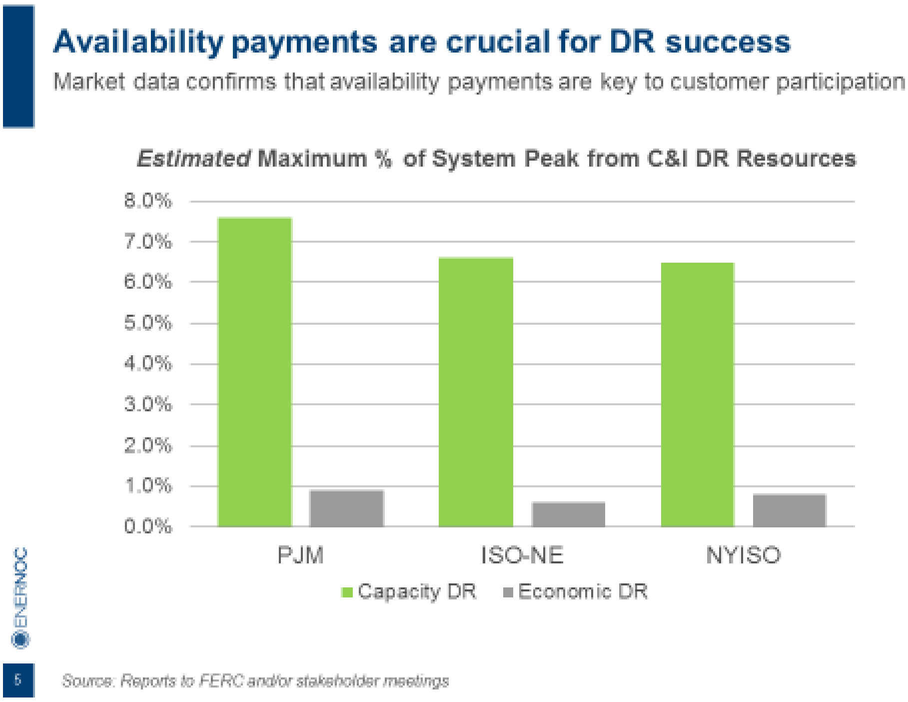
That said, the most flexible and energy-savvy customers may indeed seek supply arrangements that enable them to maximise their economic benefit through well-planned modifications of their consumption patterns. This could be in the form of freezing, pumping, charging and other processes which only need to run for part of the day. For this to succeed, however:

- The variance of price between the high point and the low point of the market must be significant.
- The portion of the final price of electricity that the ISEM (or other variable) price makes up must be significant.
- Suppliers must be incentivised to offer this pass-through product and not have other factors which mean it is costly to them (such as unnecessarily burdensome collateral costs etc.)

It is important to note that, while the participation of demand-side resources in this manner may help contribute to reductions in wholesale energy prices, such energy-based paradigms, by virtue of being purely autonomous voluntary, cannot necessarily be counted on to contribute to system reliability. This contrasts with demand acting as a dedicated reliability resource in a capacity market.

Demand Response (DR)

While some customers will be happy to manage the uncertainty that comes with pass-through tariffs of the day-ahead market, others will wish to stay with the current system of allowing a supplier to manage this variability. These customers can still engage with the wholesale electricity market in a different manner through participation in a capacity or availability mechanism or market. Empirical data demonstrates that capacity-based schemes are the most successful in encouraging demand response[2], and for a clear reason. They allow customers to contribute to system security while enjoying the budgetary certainty in regards to electricity costs they are used to. Such approaches provide customers with a known revenue stream in return for their firm commitment to be available when called upon. The figure below compares capacity vs economic DR in several US markets that allow both types to participate.



Furthermore, demand response is a service that can provide fast- acting capacity to the system at times of high wind penetration. Even at times when other generators are not synchronised or hot, demand remains on the system and available to reduce if required.

Demand response schemes struggle in markets where no capacity or standby payment exists, primarily due to a lack of certainty about the benefits of participation. Without a clear understanding of the economic benefit of participating in demand response, it is often difficult to achieve consensus within an organisation that time and resources should be invested in load curtailment strategies. The same challenge exists for aggregators, who are the primary vehicle through which commercial and industrial demand participates in electricity markets. Revenue certainty in the form of capacity

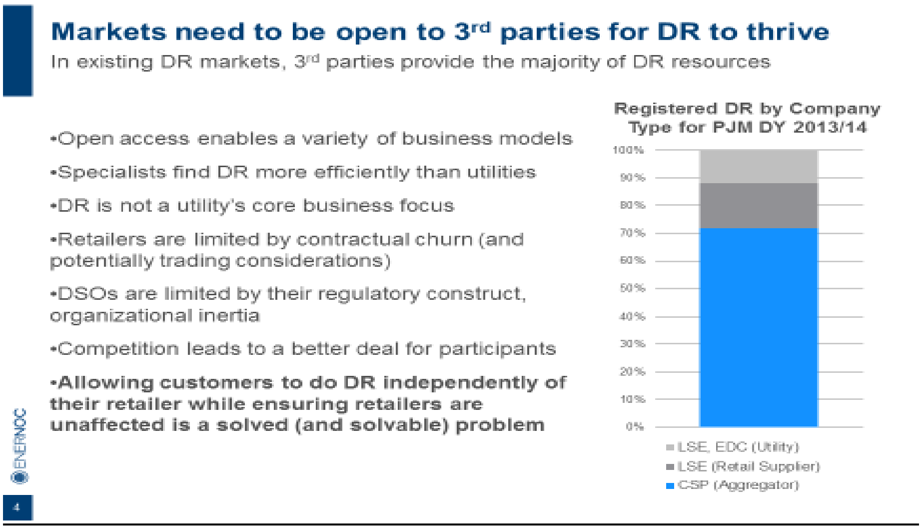
[2] EnerNOC Experiences of Availability Based Market Mechanisms for Demand Response Programmes

payments allows aggregators to invest in recruiting customers for demand response participation, and in building and maintaining technology platforms which support metering and load curtailment.

In short, a capacity or standby price mechanism of some sort is required to facilitate any significant amount of demand response to participate in the market, as is the case with the current CRM.

Specialist Aggregation Providers

When the SEM was designed, rules were implemented which prevented independent DSU aggregators from entering the market. This resulted in a barrier to new entrants and so a halt on innovation which was only removed when the rules were changed. It is critically important that no such barriers are replicated in the ISEM and that new entrants are allowed to continue to progress the market.



Balancing Responsible Party

A final area which we believe will be critical to the success of Demand Response and aggregators is the "Balancing Responsible Party" (BRP). In other jurisdictions the relationships between aggregators (who may resell customer flexibility into a market) and the customers BRP (who is responsible for that customers demand position) has been problematic. We feel that it is critical that this be designed appropriately.

DSU Participation in Markets and Relationships with the Balancing Responsible Party and Supplier

As a starting point, we propose that the DSU may participate in the Day-Ahead Market (DAM,) Intra Day Trading (IDT) and Balancing markets by way of bidding a price-quantity (PQ) pair. In the event of the bid being in merit, the DSU may then be dispatched by the TSO in the normal way. The DSU aggregator will then request its member customers to reduce demand, resulting in reduced consumption of energy.

- It is likely that the customers Supplier will have taken a position on behalf of the customer in the DAM or the IDT markets. If dispatched the customer consumes less energy, and so the the Supplier will be in a long position.
- As the DSU will have been dispatched, provided energy, and so it will also be in a long position.
- Finally the reason for the dispatch occuring is that some other participant is in a short position.

The above description sets out the need for a solution to settle the market as two partipants are in a long position while only one is in a short position. This problem existed in the SEM and is a natural problem in all markets which faciliate third party aggregators and DR participation in the energy market. In considering this problem it is important to consider the following issues.

- A DSU is generally made up of customers who have supply agreements with different suppliers from each other
- It would be unworkable for the DSU to enter into bilateral arrangements with each supplier. This must be handled by the NEMO
- DSUs generally bid a high energy price. Payment of an Energy Payment is the primary incentive for them to reduce this bid.
- Where possible, the long retailer should be protected from being at a loss due to the participation of their customers
- No Supplier should have the option of reducing their customers rights to participate in a third party DSU scheme.

The market must not depend on the aggregator securing bilateral agreements with the suppliers and/or BRPs of their customers. Suppliers could, and in many European jurisdictions, do, simply refuse to enter such an agreement, or simply refuse to allow aggregators to work with "their" customers, even though the customers may wish to do business with the aggregator. This would result in incumbent suppliers being the only practical participants to provide aggregation (a solution which was tried and failed in the SEM). Indeed it should be a licence requirement of all BRPs to allow customers to take part in DSM schemes without the need for bilateral agreements between aggregators and the BRPs. Instead this relationship must be managed by NEMO and we feel that it is critical that this be designed appropriately.

Two options for faciliation of this challenge within ISEM are set out below. The first more closely resembles the methodology which exists in the SEM, while the second is based on a more progressive model used in many European markets.

Option 1 - No Energy Payments Option

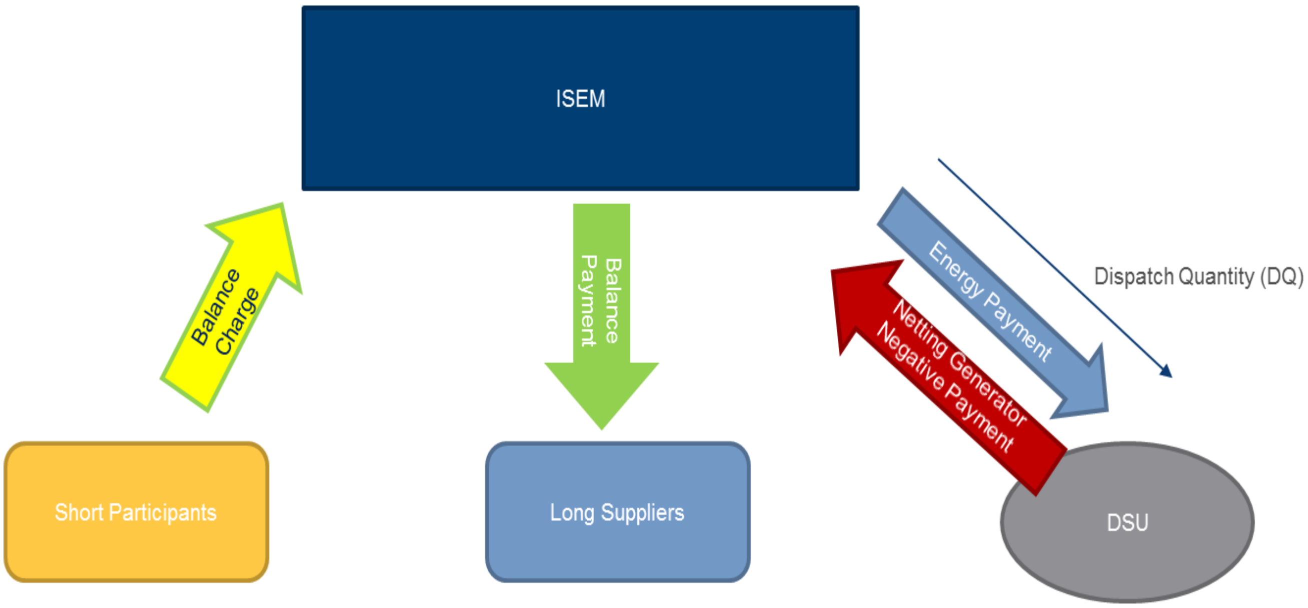
This option most closely resembles the solution used in the SEM. In this option, the following steps are taken to make the market whole:

When registration of a DSU is completed, a notional "Netting Generator" is also created. In the event of a dispatch, the DSU is credited with an energy payment equivalent to the "Dispatch Quantity" it has been requested to fulfill. At the same time the Netting Generator is credited with a number which is the negitive of the DSU energy payment.

This results in the DSU returning to a balanced position. It also means it recieves no energy payment.

This option leaves the "long" supplier with their long position. This will result in them being paid for their long position in the balancing market.

The payment to the long retailer is paid for by the "short" participant



The benefits of this option are as follows:

- It is relatively simple to implement.
- The long supplier is likely kept whole.

The negatives of this option are:

- No incentive to bid a low energy price is created for the DSU as they recieve no energy payment.
- Less alignment with European target.
- In the event of a DSU being asked to pay a "reliability option", they recieve NO energy payment to fund the clawback. This is discrimatory and would be unworkable.

Option 2 - Energy Payments Option

This option provides the DSU with an energy payment and so an incentive to bid low prices and run. It most closely resembles the solution advocated by SEDC as the best option around Europe.

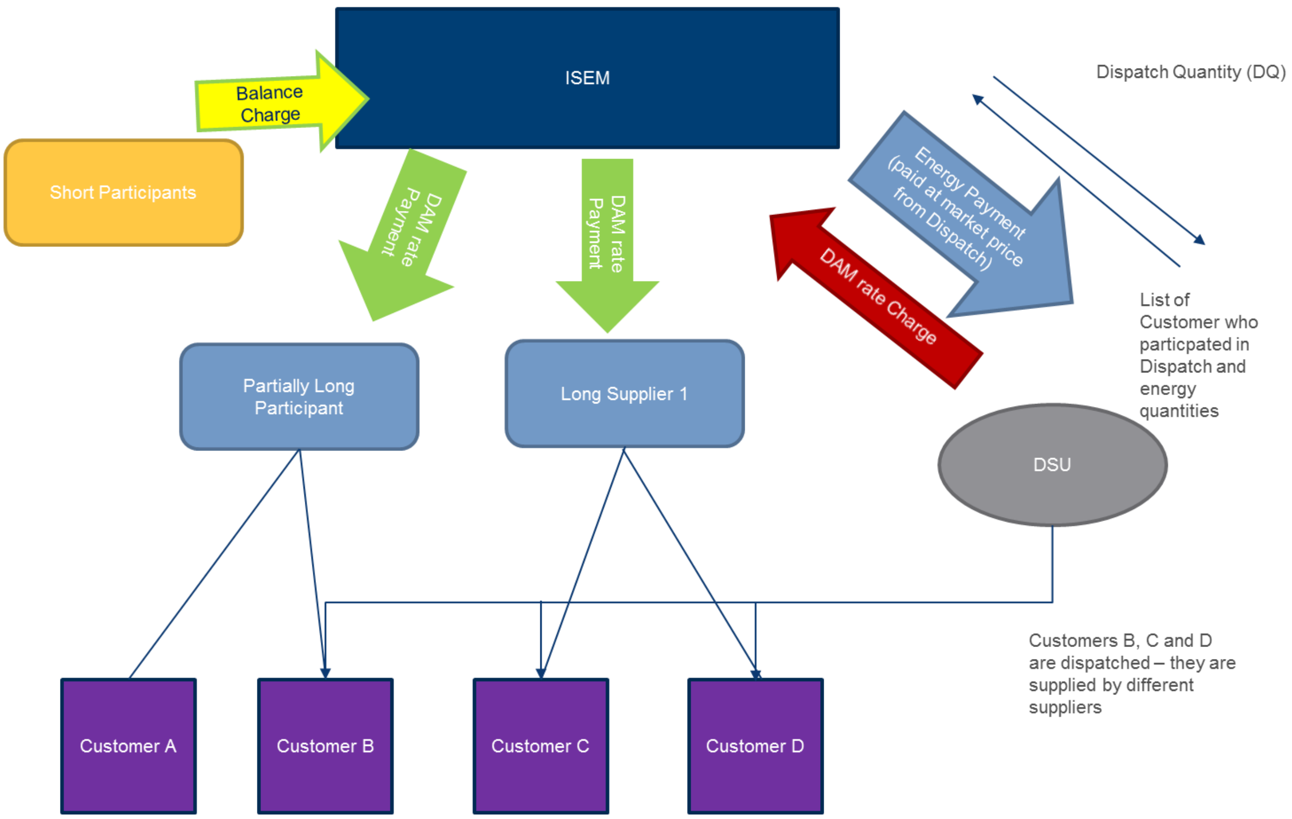
In the event of a dispatch, the DSU is credited with an energy payment equivalent to the rate settled for that market.

Within an agreed period, the DSU must submit to the NEMO a list of customers (MPRNs) who particpated in the dispatch and the quanities of energy which they reduced by for the purposes of the dispatch. The sum of these quanitities and the DQ should be equal.

The NEMO would then charge the DSU for this energy at the DAM rate. The payment which the DSU ultimately recieves would therefore be the difference between the energy payment they recieve for the market they participated in and the energy charge they pay at the DAM rate.

NEMO would then credit the suppliers whose customers particiapted in the dispatch with an energy payment covering the energy their customers provided to the dispatch at the DAM rate. In this way the supplier is not at a loss for the dispatch.

The "short" participant will pay for the energy at the rate of the market where the DSU was dispatched.



The benefit of this option are as follows:

- Since the DSU recieves an Energy Payment, it is incentivised to bid a low price and run.
- The long supplier is likely to be kept whole.
- More alignment with European target.

The negatives of this option are:

- More complicated to administer.
- In the event of a DSU being asked to pay a “reliability option”, they will only recieve an energy payment which is the difference between the DAM rate and the rate of the market in which they are dispatched. This is a lower rate than generators and so if asked to pay the clawback they would be at a disadvantage. This is discriminatory.