Commercial Review

New Thames Valley Vision

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Understand

- Substation Monitoring
- End point monitoring

Anticipate

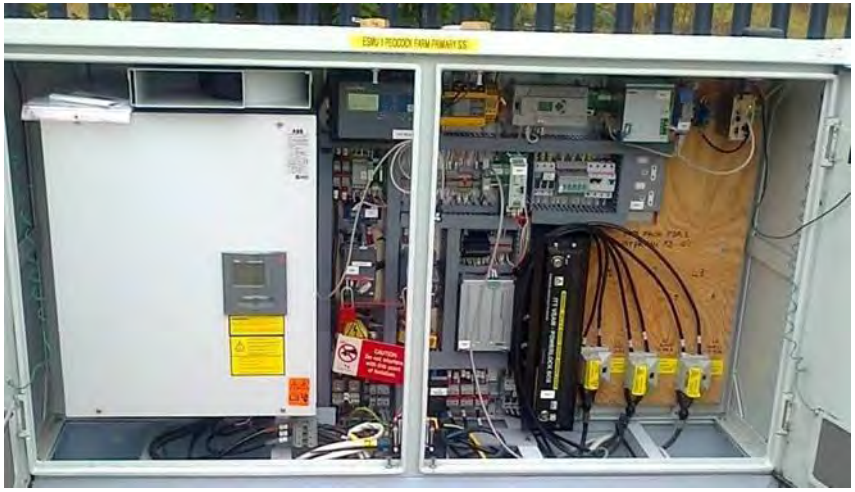
- Combined Network Modelling and Distribution system management Environment

Support

- Energy Storage and Management Units (ESMU)
- Hot thermal storage – Energy and Micro Generation Management Application (EMMA)
- Cold Thermal Storage (Ice Bears)
- Automated Demand Response (ADR)

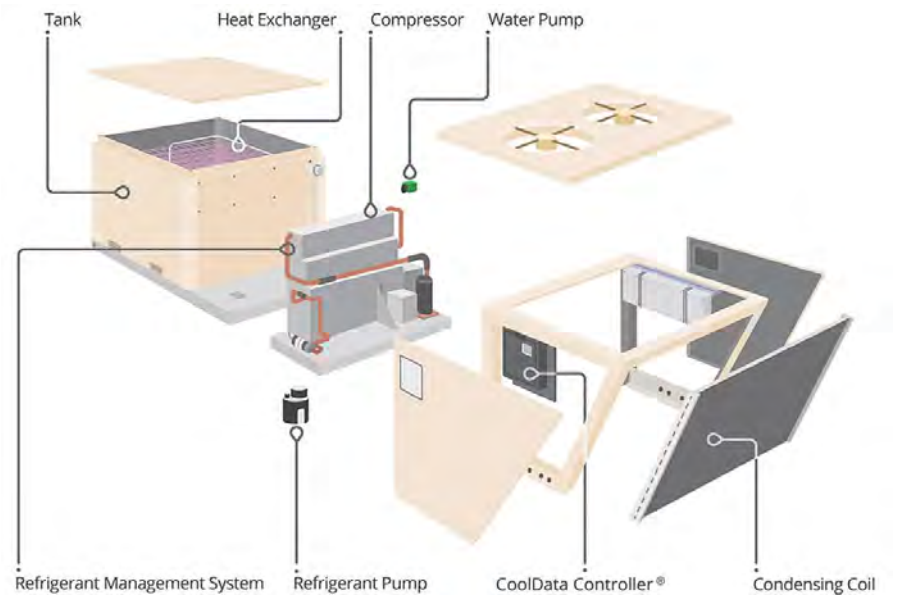
ESMU

- 36 kW/12.5 kWh battery storage unit
- Power electronics were also shown to provide significant additional benefits
- Unmetered connections (For trial purposes only)
- Expected to remain outside of DNO/DSO ownership in future models
- CDCM provides cost signals, but may be insufficiently strong to justify ESMU investment on their own



Ice Bear

- Cold Thermal store
- Overnight Freezing Cycle reduces A/C demand during day
- Allows load to be shifted from day to night
- Also has a dispatchable load capability
- Existing CDCM signals provide a marginal cost benefit to the consumer
- Potential to avoid reinforcement costs



EMMA

- Domestic technology
  - Installed in houses with Hot water tank and PV generation only
- Controls the immersion heater to absorb the PV production
- Mitigates voltage rise on LV feeders
- Smart meters are a pre-requisite
- Existing DNO cost signals swamped by FIT tariff and cost of energy signals

Automated Demand Response (ADR)

Building Management Systems (BMS) is used to control building services

ADR interfaces with BMS to allows demand to be shed upon instruction

ADR capability varies with building usage cycles

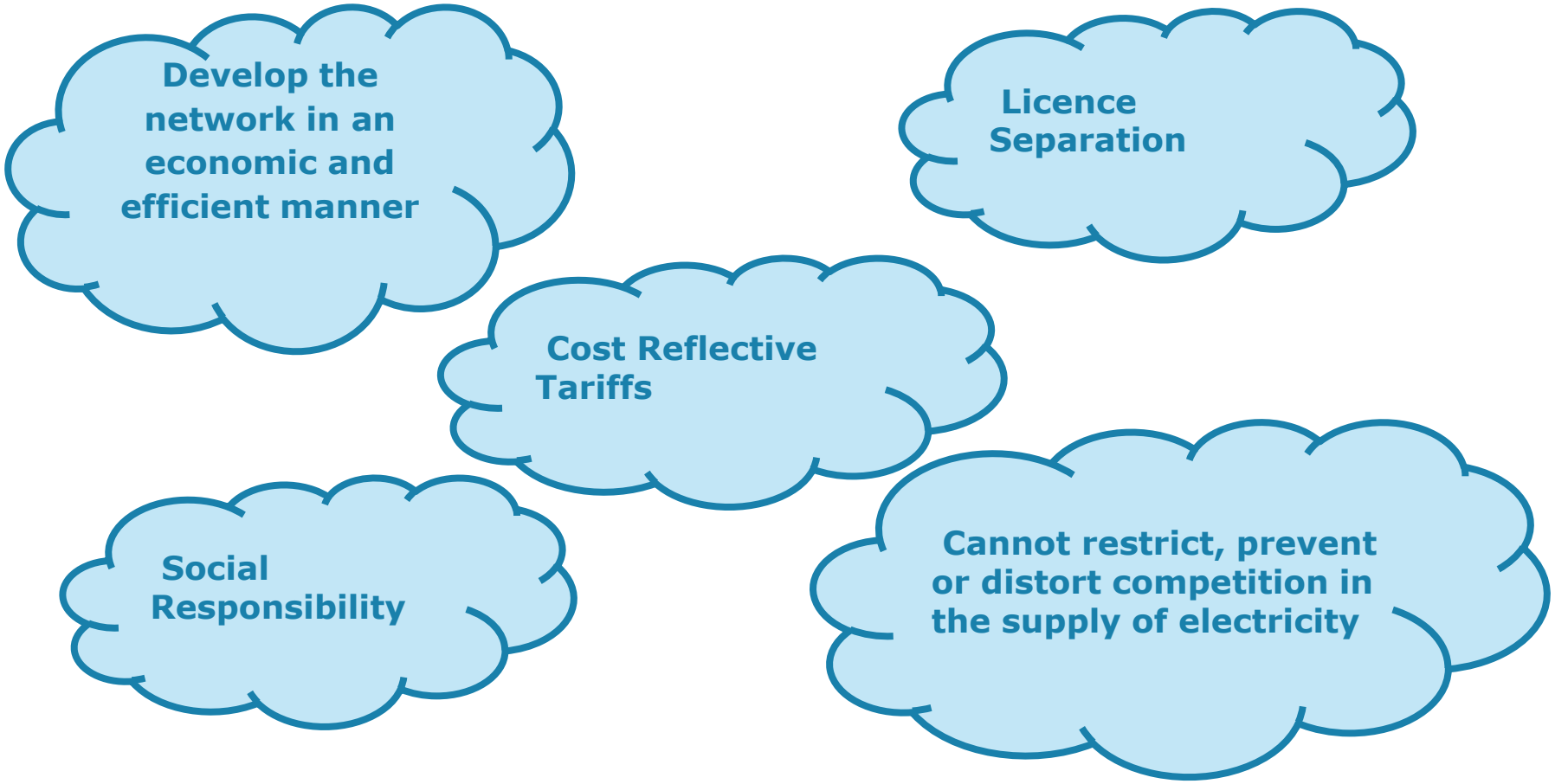
Courtesy of Honeywell

Potential use includes:

- constraint management,
- national energy balancing & frequency response

National ADR resource estimated to between 2.5%-10% of winter weekday power demand

The Distribution Licence



DNO tariffs

Use of System tariffs recover DNO's allowed revenue

There are two sets of Tariffs

EDCM	CDCM
Used for connections > 22 kV	All other MPANs
Tariff's rates tailored to each user	77 standardised Tariffs (inc LDNO)
Applies to **12,367** MPANs in GB	Applies to **30,657,000** MPANs in GB

Tariffs can be used to give cost signals

Both Tariffs are indifferent to capability to dispatch demand

Requirement for DCUSA change?

The DCUSA facilitates flexible demand users

- Daily time of use tariffs
- DCP179 facilitates Time of use Tariffs for domestics users

It does not facilitate dispatchable demand

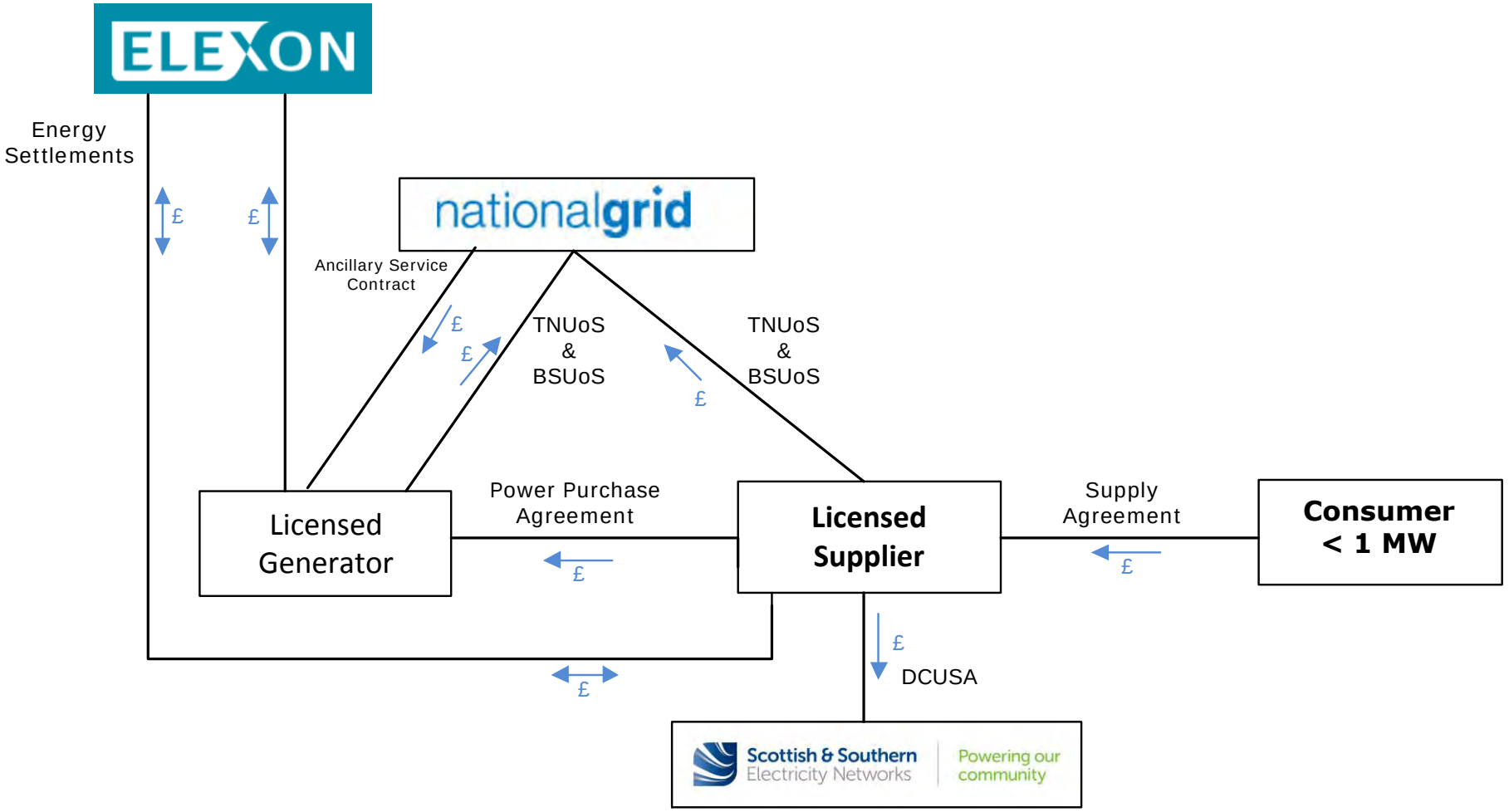
- Common frameworks?
- How to expose CDCM dispatchable demand to EHV locational benefit signals?

BUT!

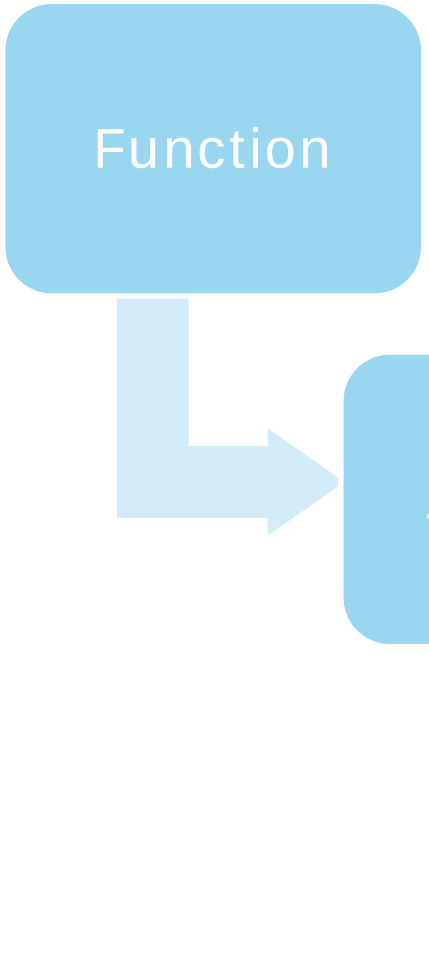
Is the DCUSA even the right place to start?

TSO and Energy suppliers would benefit from dispatchable demand too!

Business as usual



Future Structures

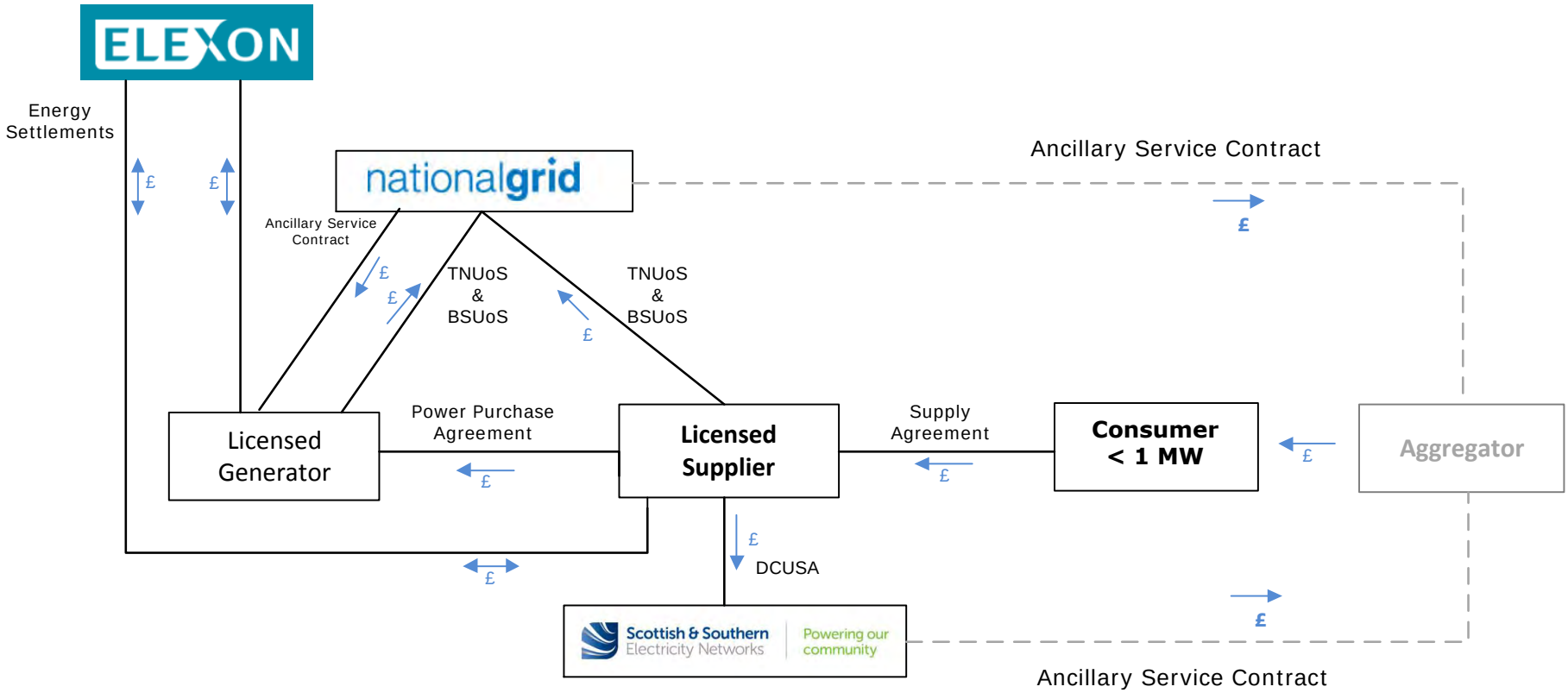


Dispatchable demand has major potential as a network management tool

But it is only useful if it is located in the right location in sufficient volume

The existing UoS signals do not make a strong proposition

Near future industry structure



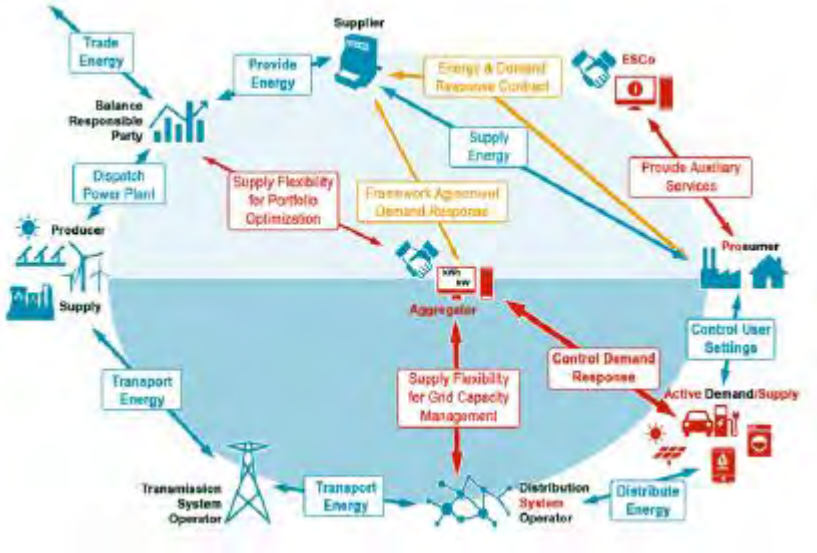
Other approaches

- DNOs are not bound to provide cost/benefit signals only through UoS methodology

Other solutions do exist…….

- SSE have already demonstrated constrained management zones

- Alliander is trialling "flexibility markets"
  - Run alongside the standard wholesale rules
  - Stacks cost benefit signals from suppliers, TSOs and DSO



Summary

- Dispatchable demand has potential to offer major industry benefit
- Existing UoS methodology does not facilitate dispatchable demand
- Existing UoS cost signals tend to get swamped by other signals
- Should the DNO interaction with dispatchable demand be via DUoS?
- Would it be more effective to offer benefit signals via tenders?

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