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Topic A smart flexible energy system a call for evidence with data from Enstore -Q4

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Issued to BEIS and Ofgem with no restrictions on the use of the data

Signed by *E A Lewis* and *P M Lewis* Company directors

Anacronyms

- EFR. Enhanced Frequency response.
- ESS. Energy storage system.
- Fast Fault current. The provision of AC current in to an AC fault for a defined time period.
- SBSPM. Second by second performance monitoring.
- SM1 & 2. Meters for recording the SBSPM.
- PM1 & 2. Meters for recording instantaneous and average AC grid power.
- PWM. Pulse Width Modulation
- VSM. Virtual Synchronous Machine implemented in a control system

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To understand this data, you need a copy of my data for Questions 1, 2 and 3.2

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4. Removing policy and regulatory barriers Enabling Storage

Do you agree with our assessment that network operators could use storage to support their networks?

Yes.

Are there sufficient existing safeguards to enable the development of a competitive market for storage?

Yes.

Are there any circumstances in which network companies should own storage?

Yes.

Please provide evidence to support your views.

The Enstore vision is that the AC grid should be able to develop in a way that provides energy storage distributed across the network, as shown on Figure 4.1, to achieve the lowest possible overall cost by fully rewarding energy storage for the full set of **Savings** that it provides.

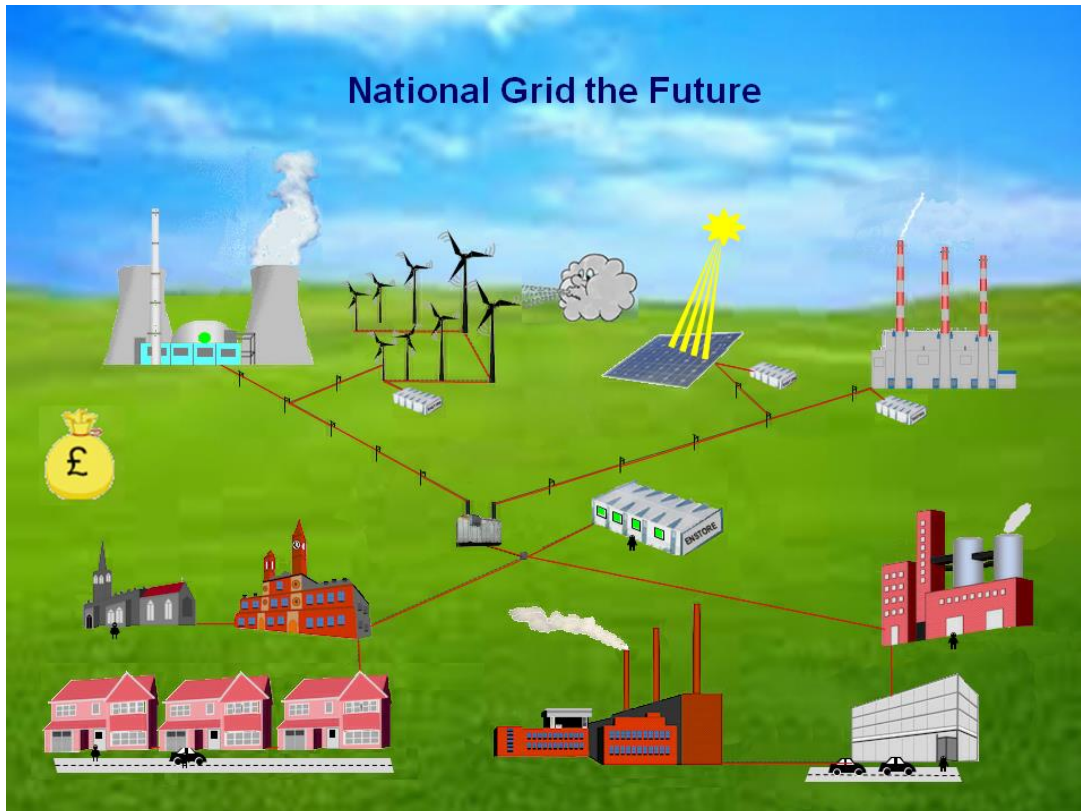


Figure 4.1. An animated version is available.

The potential savings are:

- **Saving 1.** Can have a high penetration of renewable energy generation without any curtailed production.
- **Saving 2.** Can smooth the intermittent renewable energy generation to minimise the power flow variations.
- **Saving 3.** To minimise the associated transmission infra structure costs.
- **Saving 4.** To have essentially steady generator power demands to optimise their performance.
- **Saving 5.** Can have the minimum of rotary generators operating in real time with no reserve power margins.
- **Saving 6.** Will have time to start up rotary generators when extra units are needed.
- **Saving 7.** Will not need rotary generators operating below optimum efficiency to have spare capacity.
- **Saving 8.** Can operate the rotary generator at their optimal efficiency.
- **Saving 9.** Will need fewer rotary generator saving significant investment costs.
- **Saving 10.** Will have lower fossil fuel burn to reduce the CO₂ produced.
- **Saving 11.** Will not have abnormal system transients even with trips of a nuclear power station.
- **Saving 12.** To store the renewable energy for significant time periods to stabilise pool prices.

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The network companies should own storage if the market is failing to provide systems to provide the Benefits listed in Section 1.

The network companies should also own storage if it is not possible to implement market systems that provide the important listed Savings.