

Storage & Networks

Day 2 - 4th LV workshop &
TVCC seminar



Nigel Bessant
2nd March 2017



Scottish & Southern
Electricity Networks

Scottish and Southern Electricity Networks

- Scottish and Southern Electricity Networks is a Distribution Network Operator (DNO)
- SSEN operates:
 - Scottish Hydro Electric Power Distribution SHEPD
 - Southern Electric Power Distribution SEPD
 - Scottish Hydro Electric Transmission SHET
- Delivering electricity to 3.7m homes, offices and businesses
- 106,000 substations
- 130,000 km of overhead line and cable





The question(s)

Energy storage solutions for electrical Distribution networks...

what are they...

what is working...

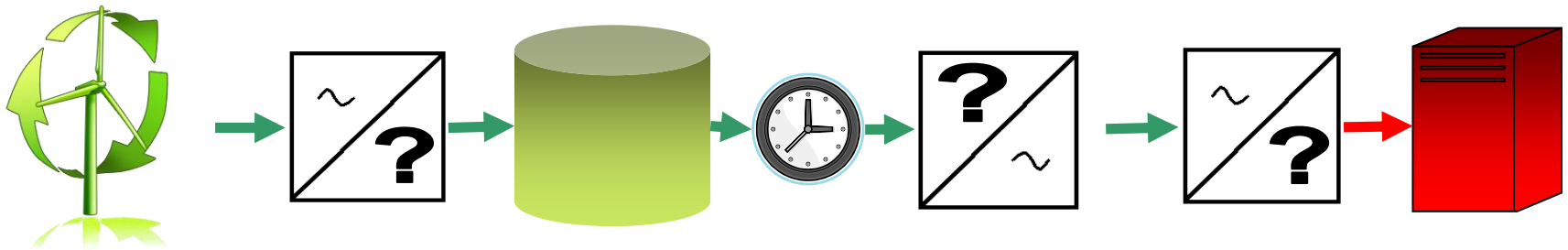
what is not working...

what is needed to make them work?

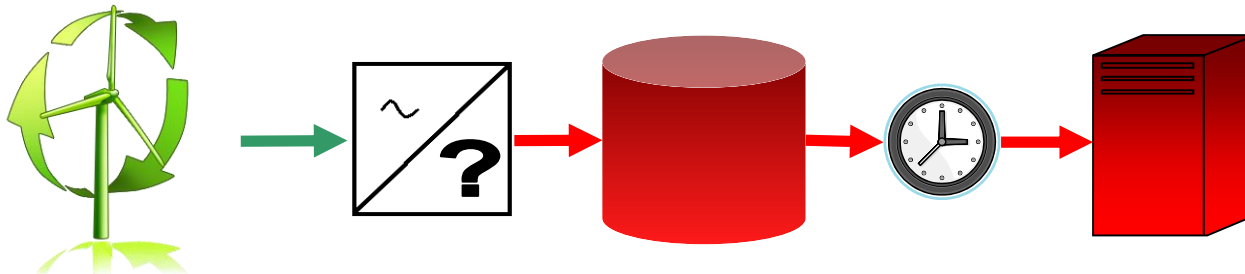


What is Storage?

A means of separating the time of Generation and time of energy Consumption.



Energy Storage Device



Energy Storage (Demand Side Management)

Energy storage continuum



Domestic
Commercial
Industrial
New entries (cars).....

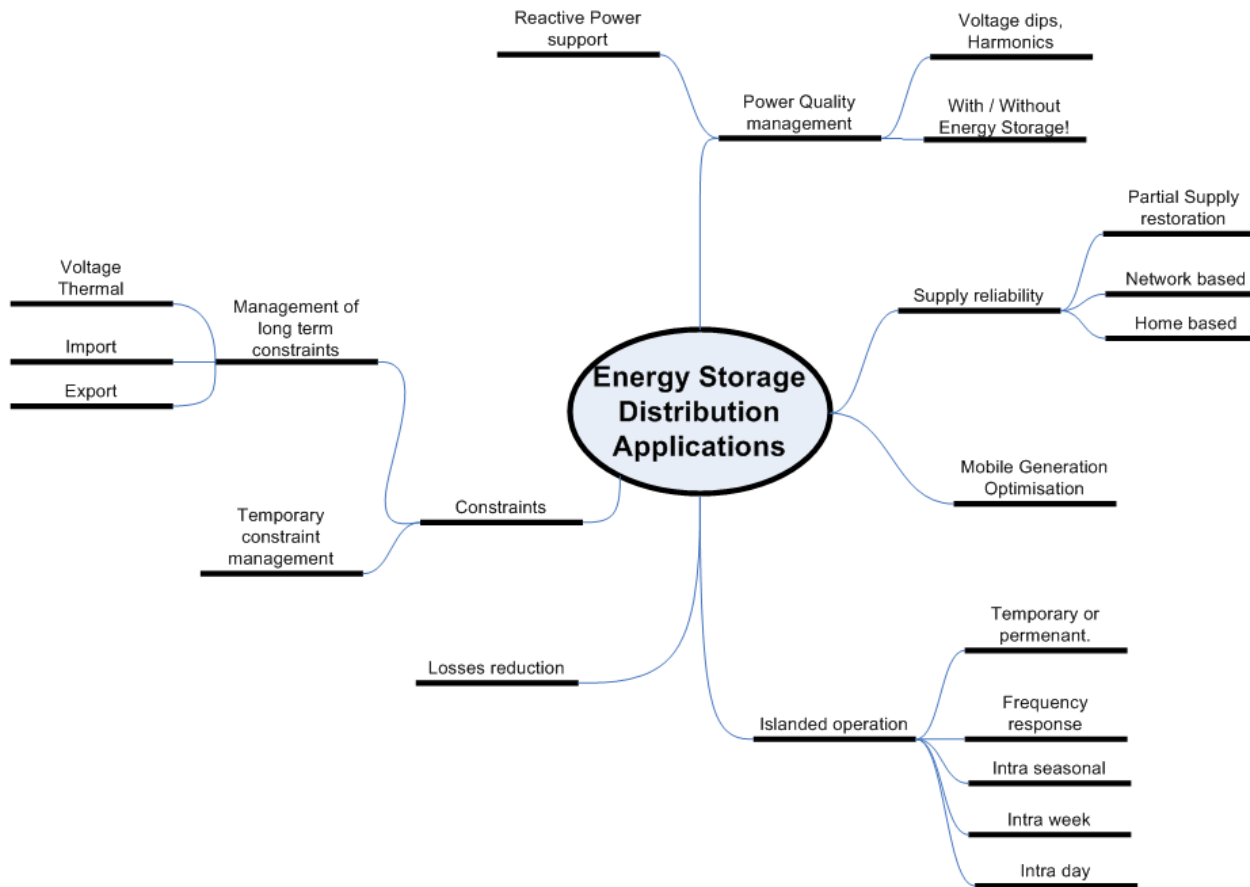
Small scale thermal Mass
Manufacture process management
District Heating.....

Batteries
Flow Batteries
Thermal conversion
Pump storage
Flywheels.....

Sabatier process (Methane)
Electrolysis (Hydrogen)
Haber Process (Ammonia)
Inter sector energy exchange...

Short Time Constant.....Long Time Constant

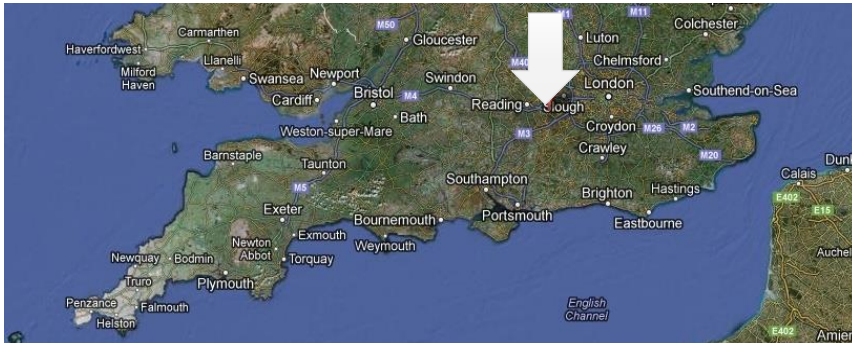
What can energy storage provide?



NTVV Project metrics

Focused on the LV Network

Bracknell and the surrounding Thames Valley area



Honeywell



Understand

Anticipate

Support

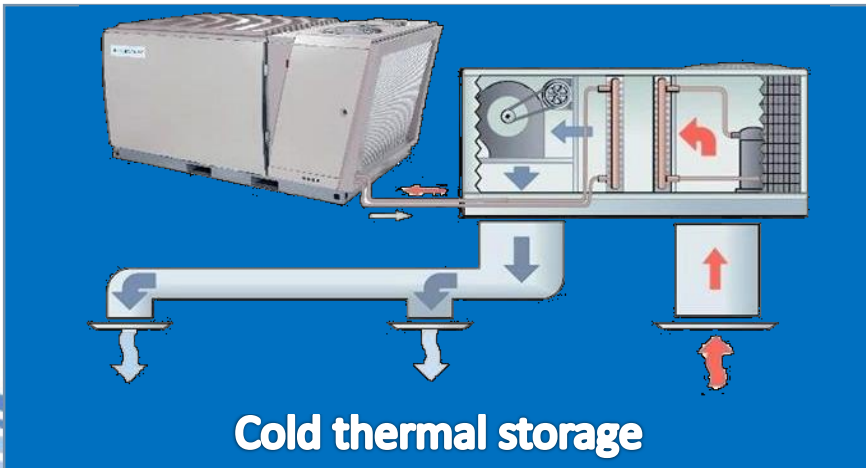
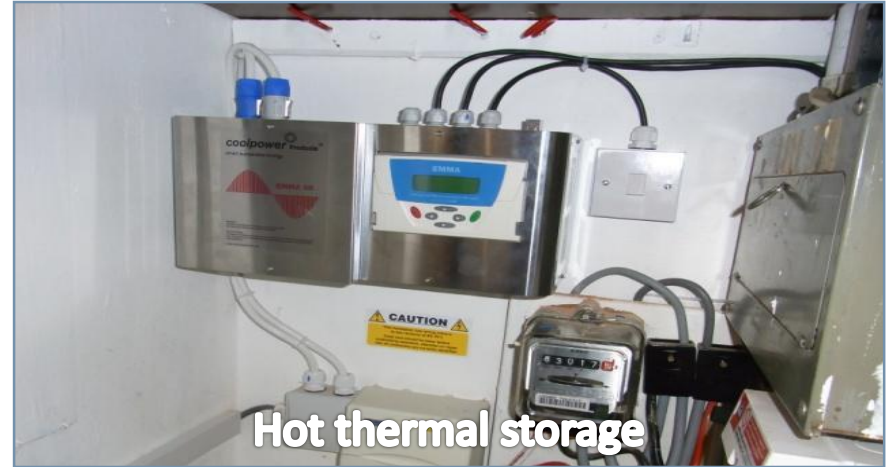
Monitor

Model

Manage

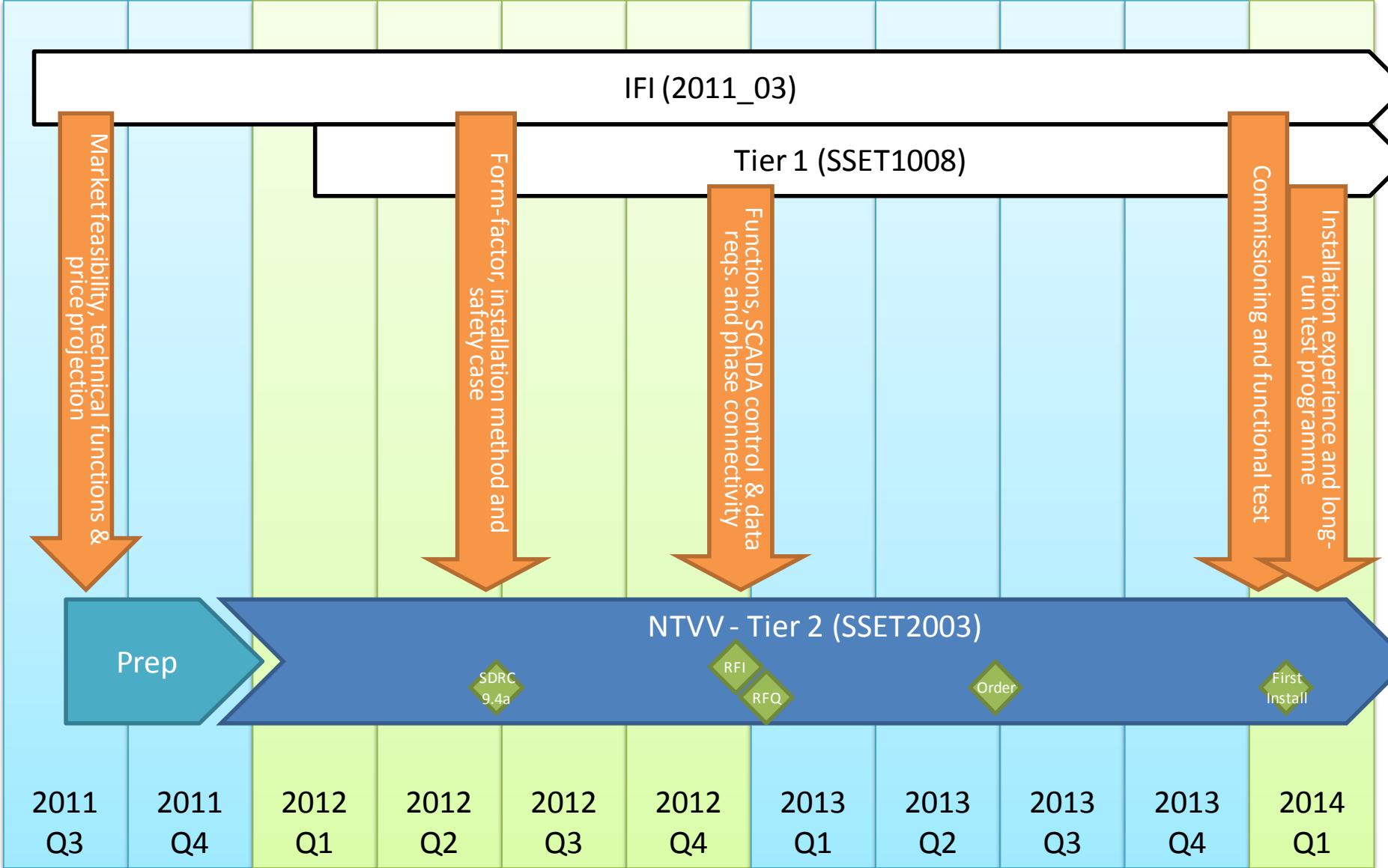


Locally relevant storage alternatives



Energy storage projects timeline relevant to NTVV ESMUs

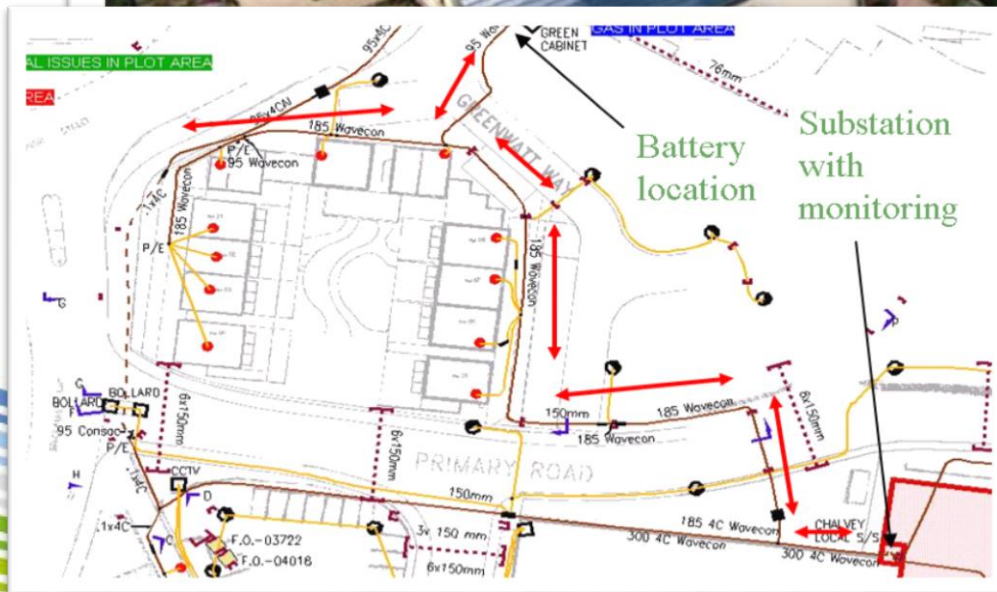
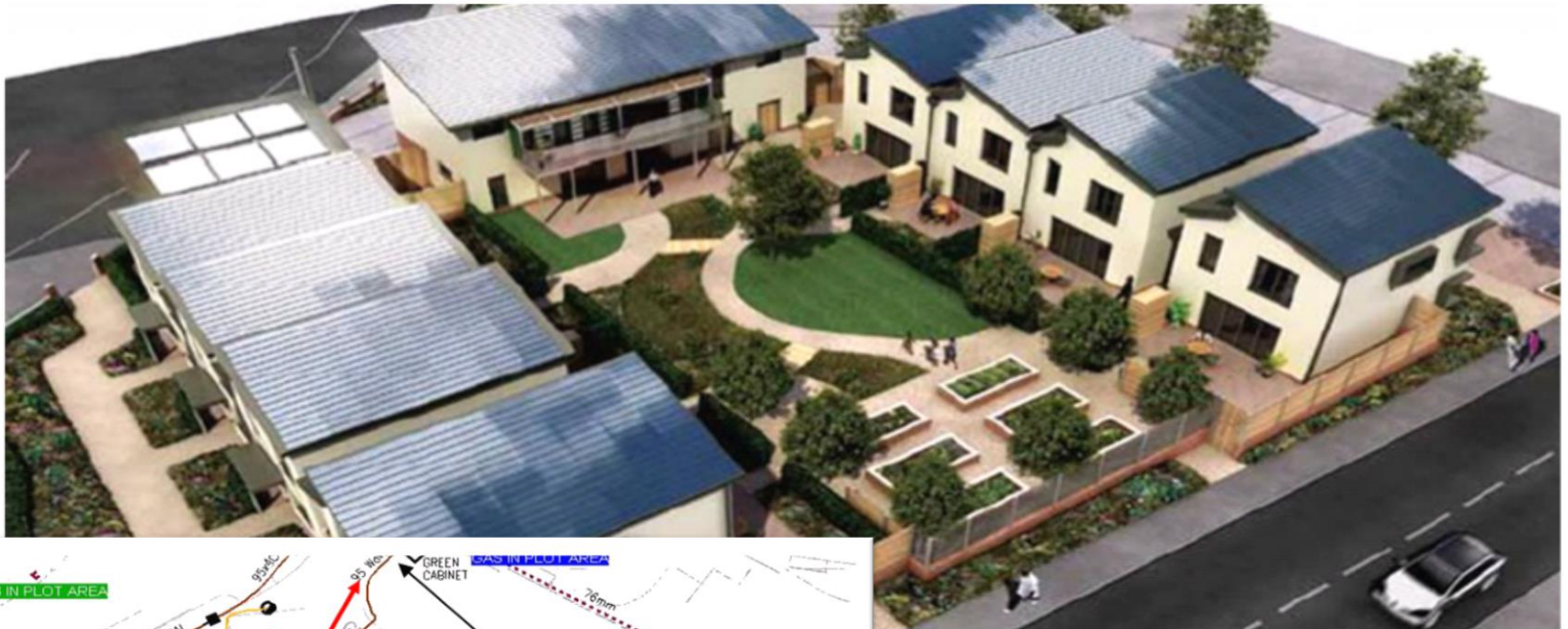
Note: orange arrows show information transfer from IFI & Tier 1 to NTVV indicating when information is used in NTTV, not when it was generated



3 x 1ph 25kVA



Greenwatt Way, Chalvey, Slough



Lessons learnt: Many functions/simple footprint

Hypothesis “use of forecasted demand ... [to] provide a coordinated response to address ... voltage and thermal performance in the most efficient manner possible.”

	Voltage				Thermal		Efficiency		CI/CML and Emergency response
	Regulation	Harmonic Distortion	Balance	Flicker	Phase	Neutral	Utilisation	Losses	
Balancing load between phases (without storage)	M		M		H	H	M	M	
Storage to balance peaks and troughs	M				H	H	H	H	
Balancing load between phases (with storage)	M		M		H	H	H	H	
Reactive voltage support (without storage)	H		H					M	
Reactive voltage support (with storage)	H		H					M	
Improve power quality & harmonics		H		H					
Demand reduction									H
Frequency response									H

- 3ph Inverter
- Modular Design for scalability
- Rapid installation (3 days)
- Minor civil works



Scottish & Southern
Electricity Networks