

The Big Energy Summit



- **Storage – get ready now**
- **Ray Noble – APSE Associate**

Drivers of Storage

- Electronics Industry lead development for Phones and Computers developing smaller but more powerful batteries
- Motor Industry now developing the same technology to power Electric Vehicles
- This same technology is now entering the power industry at all levels of requirement
- All based around Lithium Ion battery technology



Electric powered transport

- The milk float was quiet, produced no emissions, but was slow and with a limited range
- The Nissan Leaf took many car manufacturers by surprise bringing the Leaf to the market, initially, with a 85 mile range on a charge
- Although most cars only average 20 mile per day, users of EV's wanted to charge up every time they parked, this created the term "Range Anxiety"



EV technology is developing fast

- Tesla changed EV perception with a 280mile range and also being the fastest accelerating car on the road (0 to 60 in 2.5secs)
- All car manufacturers are now introducing a full range of EV's from 2017 to 2020 with ranges in of 200 to 350miles
- Talk of a ban on diesels (city pollution) or even a UK scrappage scheme and with some Countries talking of the end of fossil fueled cars by 2025 / 2030



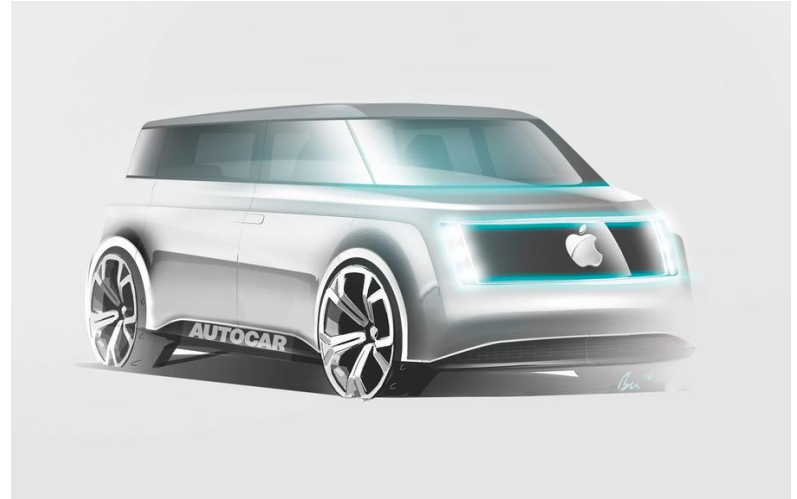
Latest developments

- Most EV's heading for a 350mile range and the charge is no longer 8 hours but now 30 minutes
- Some manufacturers talking of a 700mile range and a 5 minute superfast charge by 2021
- Of course to be "clean" EV's need to be charged with clean electricity – Solar and Wind will be in big demand – 7,800 charging stations
- Grid support Storage needed to operate multiple fast EV chargers
- The start of Storage in Power Supply



Motor Industry concerns!

- Rumor's that Apple and Google are going to make cars
- Apple tried to buy McLaren EV technology
- Rumor's Apple will buy a car manufacturer
- Or will Apple, Google or even Amazon do an Intel and supply the drive system, battery and software to a number of car manufacturers – Powered by __ __ !
- Dieselgate has completely changed VW car strategy!



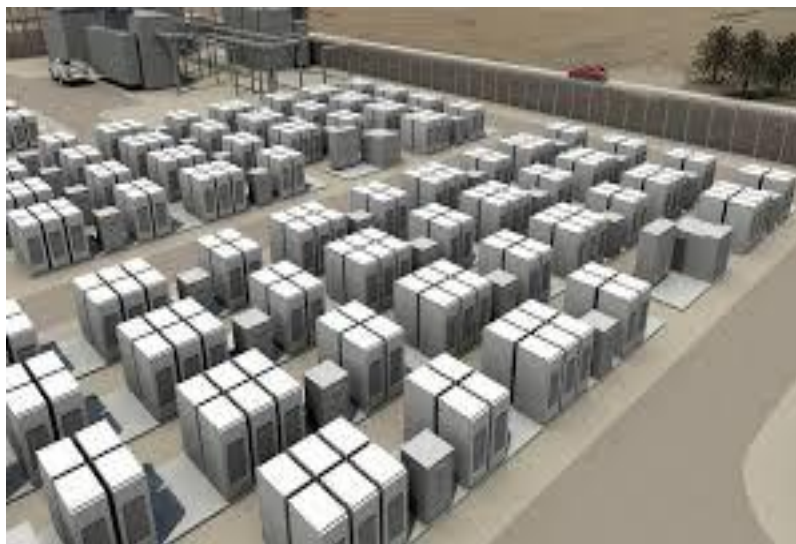
EV not restricted to cars

- Full range of electric “non polluting” delivery vans hitting the road
- 10,000 miles per year requires 3,300kWh, the equivalent used by the average house
- Single deck electric buses already operating successfully, but double deck buses were thought to be impossible – not now!
- This demonstrates how fast battery technology is developing with packing density increasing and at the same time cost reducing



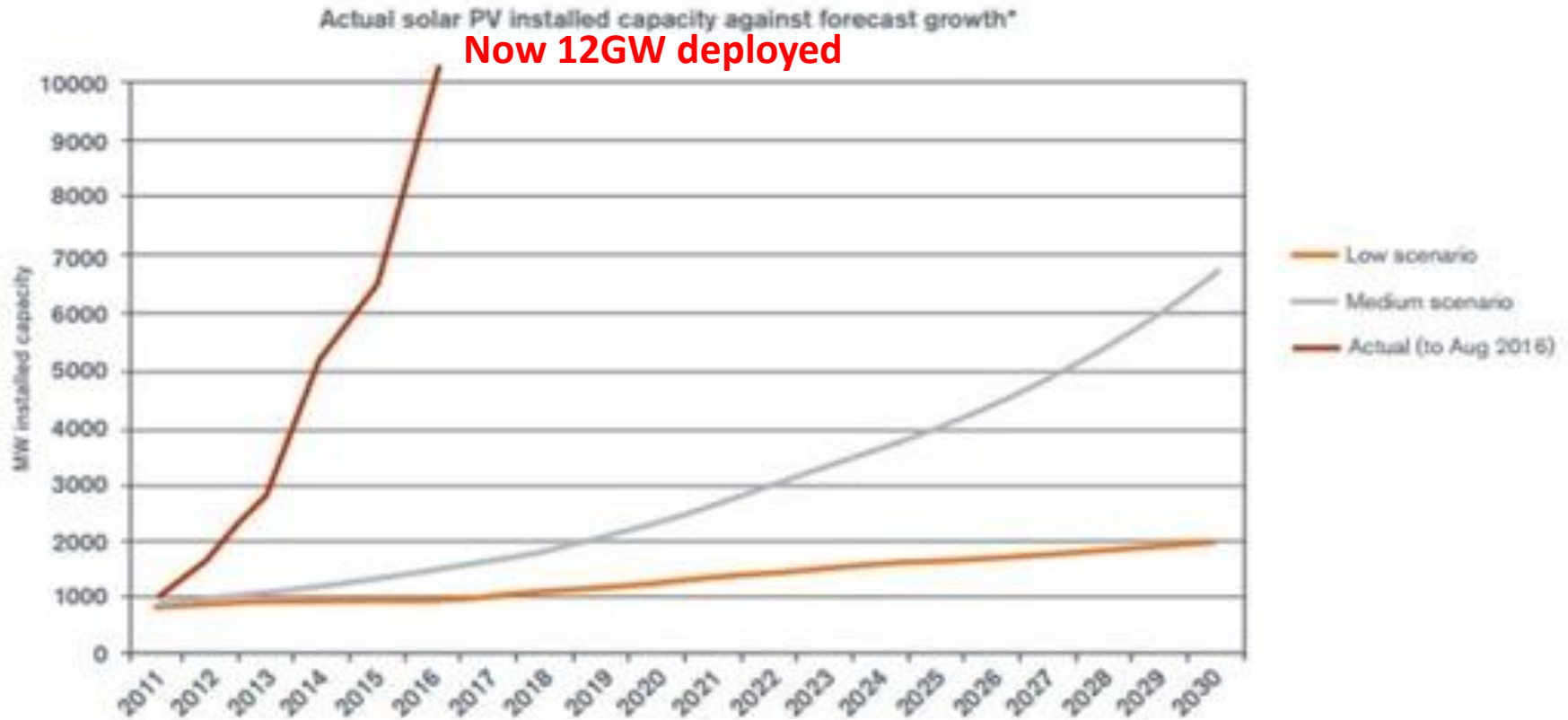
Battery Technology driving Grid Storage

- Government was advised that Storage of electricity was thought to 10 to 20 years away
- With many of the Technologies under development this prediction is probably correct
- The density capacity of lithium ion batteries has changed all thinking
- What was battery demonstrations has overnight become a market and a solution to grid problems.



Learn from Solar growth

Global mass production drove down cost rapidly

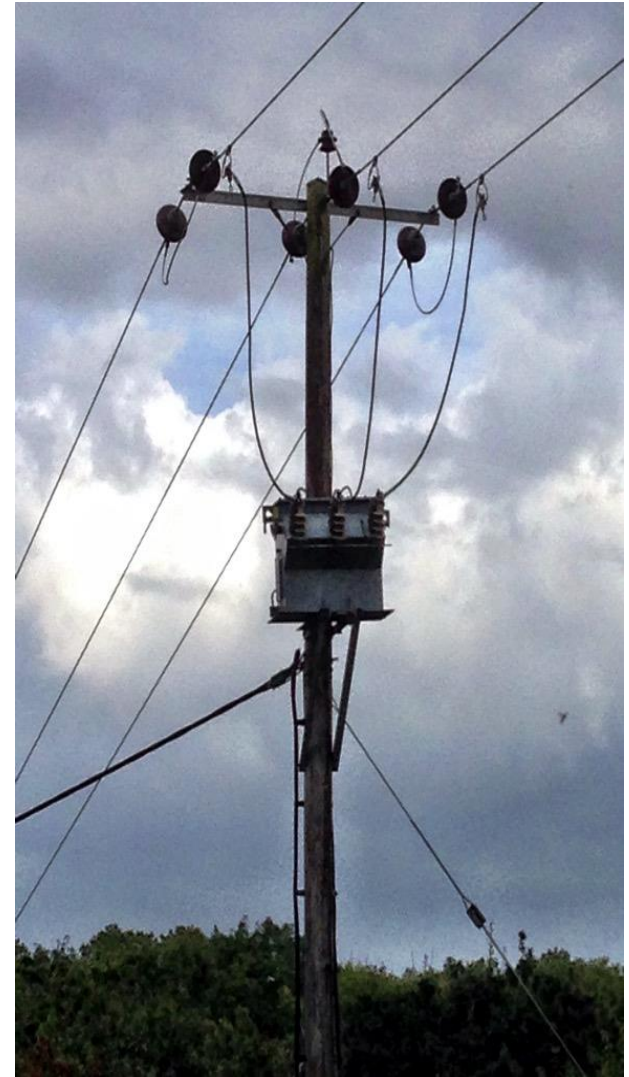


* Low and Medium Scenarios come from the EA Technology 2012 report "Assessing the Impact of Low Carbon Technologies on Great Britain's Power Distribution Networks". Actual installed capacity is from DECC solar photovoltaics deployment data.

Storage is also a Global market – prices are dropping rapidly and it's a larger market

Storage also provides benefits to the Grid

- Storage of electricity provides many complimentary benefits to the grid not only controlling intermittent renewables (Wind & Solar)
- Fast Frequency Response, Fast Demand Response, Voltage Control, Peak Capacity provision can help both National Grid & Distribution Network Operators manage their Grid and can avoid some costly upgrades
- Smart technology allows large and small storage installations to be operated remotely to supplement the grid.



Smart Transport and Housing



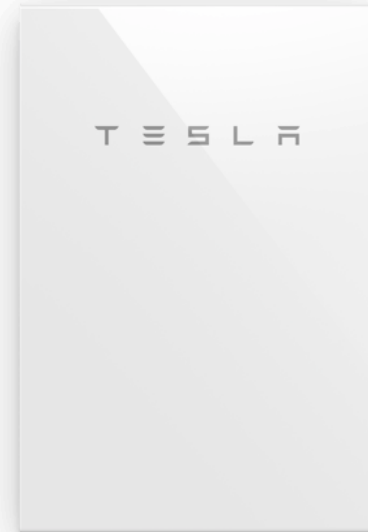
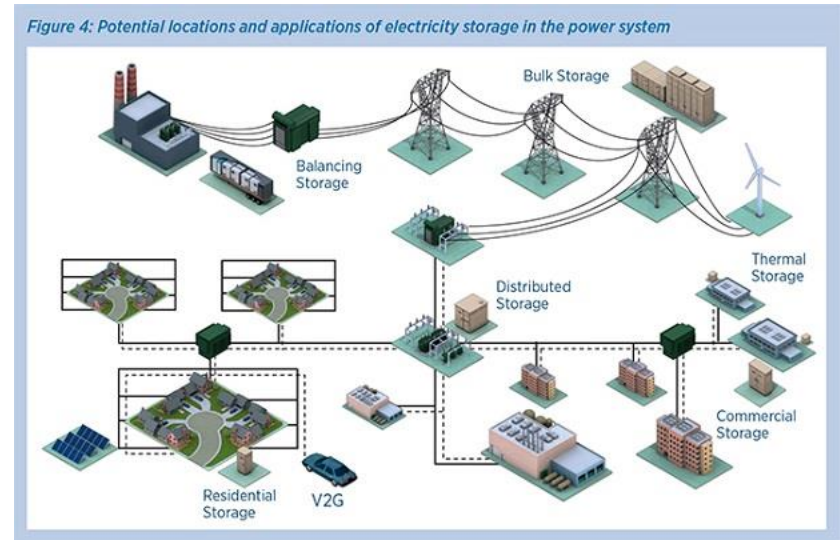
Solar / Storage for business

- Most Solar and Wind farms will connect in Storage to unlock their full potential and move electricity sales to peak times
- To a commercial / LA customer moving electricity around using storage can help avoid the “Red Zone” prices
- Housing with Solar can also benefit avoid buying back of your exported electricity on an evening but still claim the FIT export.



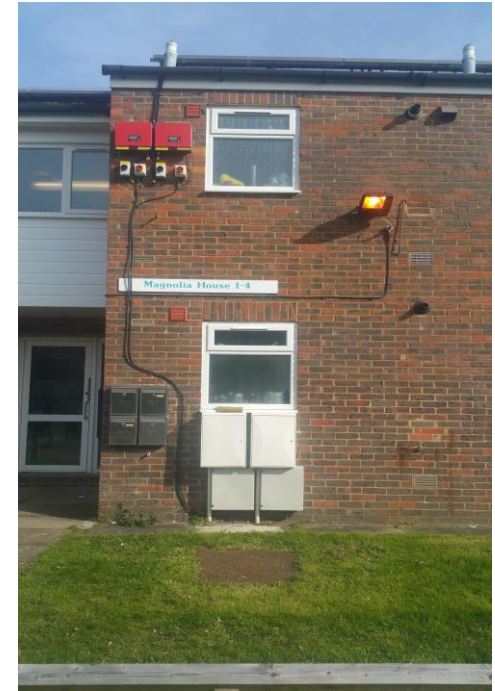
Storage offers

- Behind the meter installations, why tell anyone?
- Ensure if you have Solar they are installed after the FIT meter
- Some battery systems create a noise – position them correctly
- Buy fully guaranteed systems, with smart controls, not just a battery
- Some systems are “free” but that means someone else is making the big money!
- Take advice!



Check Solar systems before adding Storage

- Many Solar systems are not performing correctly
- Bad design, dodgy product, poor installation are generally the problem
- Can you access to check?
- Flat roof systems are easy to forget!
- Flat roof systems that moved in the wind, some held on roof by wiring, some end up on the ground



Now is the time to develop a strategy

- New Housing – apply the Merton rule
- EV charging needs to be planned, most will be charged at home or service areas
- Solar, Wind and Storage and linked to EV's can provide much of the power and reduce impact on the overstressed grid
- Energy companies in problems, 15% increase in price shows what is around the corner



Start working out the opportunities

Cornwall's energy future

We will create an energy future that is cleaner and more affordable, retaining the social and economic benefits in Cornwall.



CORNWALL & ISLES OF SCILLY
LOCAL ENTERPRISE PARTNERSHIP



Cornwall has a wealth of renewable energy resources

Best wind resource in Western Europe

Best solar resource in mainland UK

Best geothermal resource in the UK

Huge potential for offshore renewables

32% of our electricity demand met by renewables in 2016

We will exploit this unique opportunity to...

Tackle energy inequalities

Making our homes, businesses and transport greener and more affordable.



Take local control of our energy

Generating, owning and using our energy locally to reduce bills.



Become a world-leading green economy

Retaining benefits in our communities and securing year round jobs.



We will create an energy future that is cleaner and more affordable, retaining benefits in Cornwall

2030 outcomes

- Reduce fuel poverty to 5%**
- 100% electricity demand met by renewables**
- 30% of energy spend retained in the Cornish economy**
- 50% locally owned generation**
- 20% reduction in fuel bills**
- 4000 green jobs**

but Cornwall is not benefiting and we currently spend £1bn a year on our energy

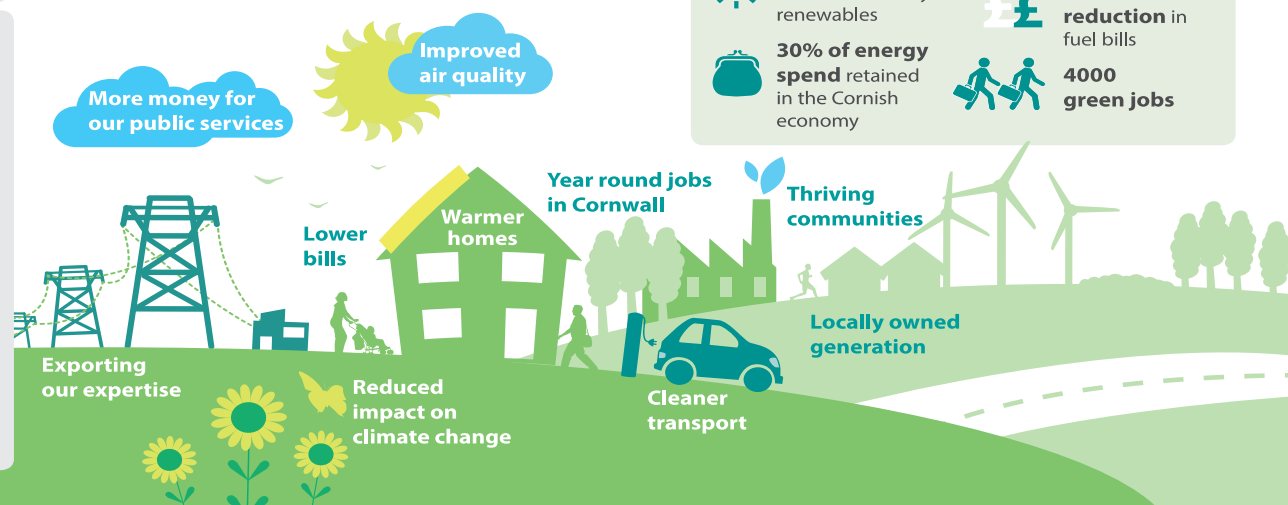
98% of our energy spend leaves the local economy

People are struggling to heat their homes

Public sector budgets and funding are reducing

Our economy is under performing

Our infrastructure is outdated



Storage is going to happen fast and like Solar - nothing will stop it!!

Thank You

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