# Storage: What are your options?

Fast moving industry and I will try to cover:

- Progress with batteries
- Applying the technology
- Related products and services
- Ray Noble APSE Advisor



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#### Storage is a complete game changer

let me explain

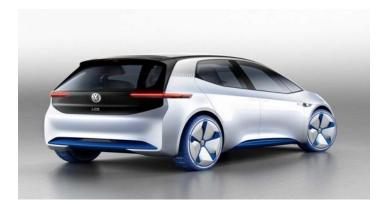


### Progress with Batteries

- Battery technology developed by the electronic industry – Phones, Laptops
- Expansion of Battery Development now being driven by Motor Industry with enormous investment in manufacturing
- Lithium Ion is the choice of most and will be for at least 5 years with a further price reduction of 50% by 2020
- Solid State Batteries in development, Porsche, Toyota & Dyson, which can handle a 5 minute superfast charge
- China is the largest market for EV's and battery manufacturing in the World
- This growth based around control of pollution and CO2 reduction – What strategy are you putting in place?









#### EV's are a solution to City Pollution

- Deaths from pollution now published
- Ranges of 200 to 350miles are now possible (range anxiety will be dead!)
- 500mile range being a target
- Fast charging of EV's, now 30mins, puts stress on the grid - 5min charge time is target - how can the grid cope!
- Some Cities putting a ban in place on old diesels
- Some talking of the end of new fossil fuel cars sales by as soon as 2025
- New diesel car sales already suffering a drop of 30%
- Other clean city transport coming to the market – taxi's, delivery vans







### "Clean" delivery Vehicles

- No Diesel in Cities soon to reduce pollution – When are you going to impose constraints?
- All sizes of Electric delivery vehicles are being developed, many on pre sale test prior to mass production – No excuses not to plan for a change to electric vehicles - available soon!











#### Public Transport

- Options available Battery electric and Hydrogen Fuel Cell
- Both need a clean source of fuel, renewable electric or renewable hydrogen
- Industry gearing up fast.
- Price will be a driver What's your policy? Have you made a decision?
   Do you have a "clean" charging strategy?







#### Are you EV ready?

- Most EV's will be charged at home
- Overnight Charging adequate to cover most journeys
- Long Journeys Motorway / A road Charging Stations
- On Street Parkers will charge EV at a local "Charging Stations" – Do you have a strategy?
- Individual chargers will not satisfy the market – difficult to find, not maintained, always blocked – Will be totally unacceptable? Do not waste money?
- Business case difficult to provide a charging network, ahead of the market but they are coming fast – Will you be ready?

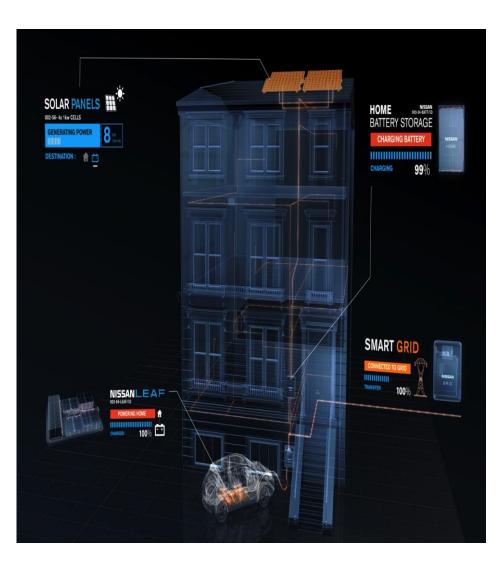






#### Home Storage and Vehicle to Grid

- These predicted low cost batteries will impact building energy supply
- Nissan / Audi / Mercedes, etc offer a home storage system that also talks to the EV
- With car battery capacities of 100kWh (300miles+ range, but average daily mileage is 20miles, these vehicle batteries can talk to the house / grid
- Time of use metering for domestics on the horizon
- Putting clean Solar energy into battery storage during daytime is a no brainer – Do you have a strategy?





#### **New Housing**

- Government wants us to ween ourselves off gas by 2030 – Do you have a policy?
- For new housing all electric is the only answer but requires much greater levels of energy efficiency of the building fabric – What's your policy?
- Solar PV a must along with Storage, Smart controls and EV charging provision – What do you ask for?
- Strategies need to follow Zero
   Carbon and apply the "Merton Rule"
   What do you require?
- 1 million additional homes required

   we cannot go on with present strategies





### Future energy provision

- Distributed generation / Smart Grids will be key to a successful future energy supply – Have you a policy?
- Can you be a generator Have you looked at your own land for local generation? How are you powering your own buildings and houses?
- New Smart Homes and Buildings are a must – What is your policy?
- Existing Homes and Buildings need to be made more energy efficient – what happens when we run short of gas – Do you have a strategy?
- Car Parks Do you plan for them to be energy generators?







#### Potential Services with Storage

- At present Battery Storage prices have not fallen enough to be economic in market applications – Global mass production drives down prices
- Presently Storage is providing Ancillary Services to National Grid where payments for these services are high.
- However as Storage becomes deployed at scale these Ancillary Services payments will diminish
- Pilot projects using battery storage are beginning now with market, linked to rate of price reduction, expected to develop at scale 2019 / 2020
- Multiple small scale Storage installations will be interlinked to provide both benefits for the owners with potential earnings from other services supporting the smart grid
- The market will move fast and the impact on grid / distribution system will constantly change, particularly around EV uptake together with the massive potential of vehicle to grid.



#### Storage Provides Opportunities

- Home systems allow time of use tariffs to be deployed
- Fuel Poor / Social Housing will need systems
- EV's need at network of Charging Centre's with Storage to support the grid
- More clean electricity, Wind and Solar, will be required
- Building Standards will have to dictate
- Planning Permission will have to dictate
- Carbon targets will come under greater pressure
- Storage will transform Transport, Buildings & Energy



### The message is "Be Ready"

Thank You

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