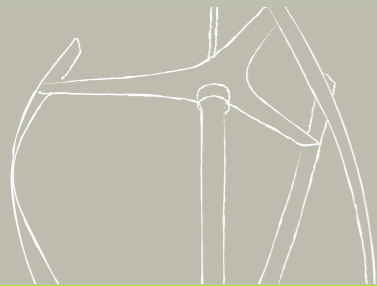


Small-Scale Decentralised Wind Energy



quietrevolution

Smart Grids & Cleanpower Conference

24/25 June, 2010 <http://bit.ly/cleanpower>

Tamás Bertényi

Innovation and Research Director



Quiet Revolution Ltd.

- Spun-out from XCO2 in September 2006
- ~50 full-time employees
- HQ located in Clerkenwell, London
- Manufacturing facility located in Wales
- A Technology Company
- August 2008, first institutional round investment by RWE Innogy



The QR5 Wind Turbine



- Small Scale: $<50\text{kW}$ and $<200\text{m}^2$
 - QR5: 7.5kW peak aerodynamic, 13.6m^2
- Decentralised Energy Production
- Integrated with society
- Cost: £25,000 + installation
- Design Life: 25 years





ECHO Arena, Kings Dock, Liverpool



London Road, Croydon



quietrevolution

- **130+ Commercial Turbines Installed**
- **Rate of 5 turbines per month**
- **UK primary market, with pilot projects in Netherlands, Germany and Australia**



London Road, Croydon



Network Rail



RWE Essen



Sainsbury's



ANZ Bank



The QR5 Wind Turbine - Technology



- World-Class Aerodynamics
- Low noise, no vibration design
- Patented active “Gust Tracking” control
- Composite material primary structure
- Direct-drive generator and active power electronics
- Tilt-down mast for maintenance
- Remote monitoring and pre-emptive maintenance





**“Any feasible path to a 80%
reduction of CO2 emissions by
2050 will require the almost
total decarbonisation of
electricity generation by 2030”**
(Climate Change Committee *Building a
Low Carbon Economy* 2008)

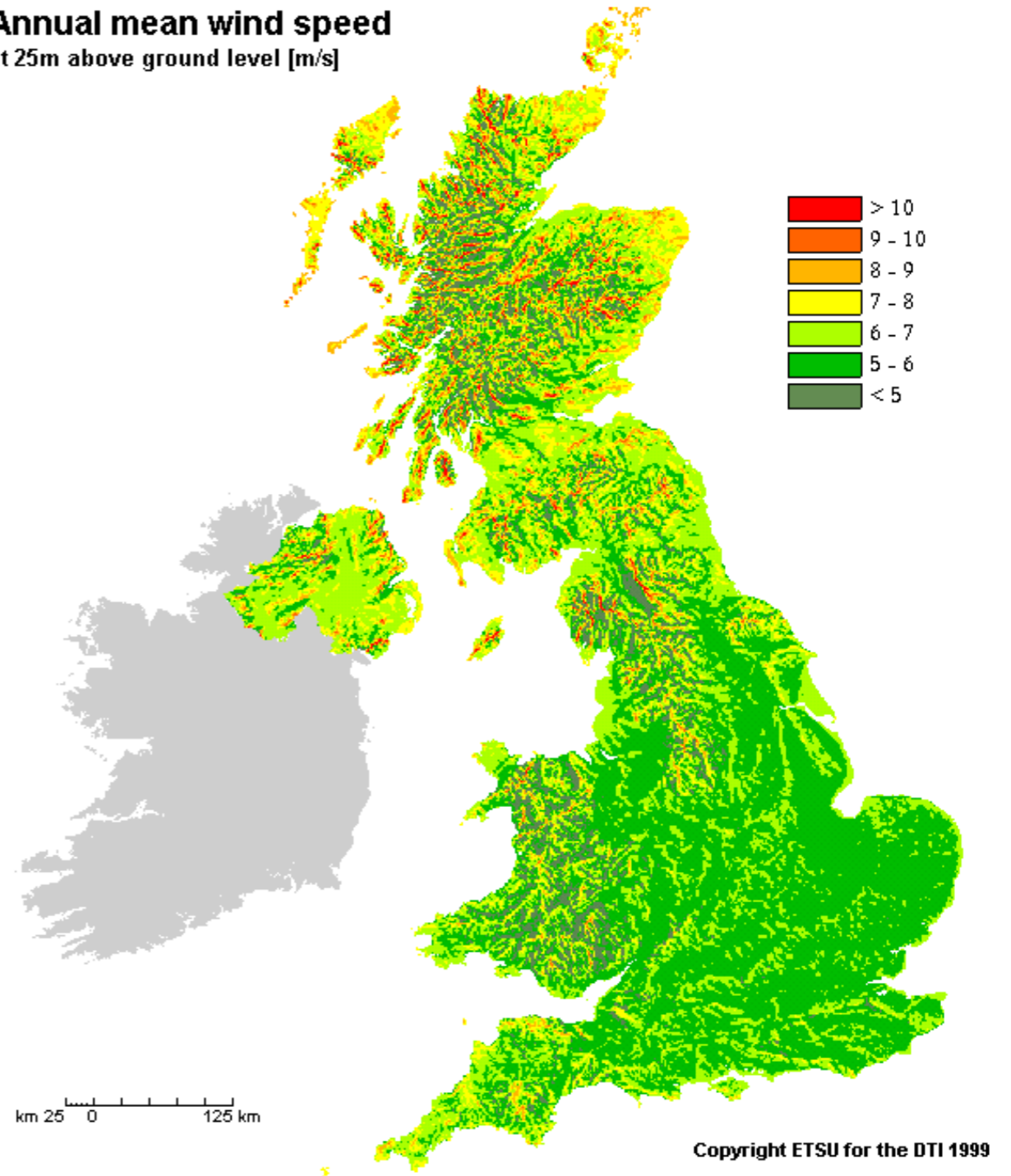


Positive Drivers

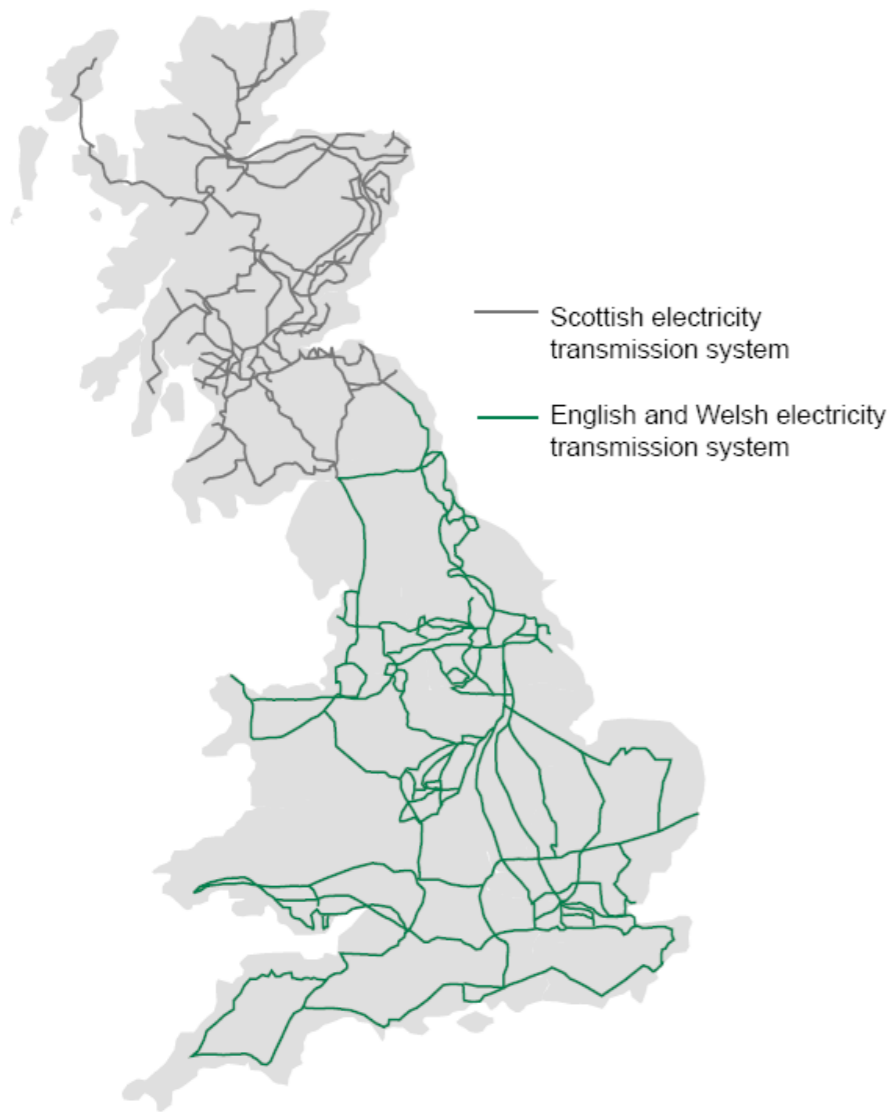
- **New Feed In Tariffs (FIT) from April 2010 UK**
- Good FIT tariffs available in **Portugal, Italy, Greece and Ireland**. Other countries in EU and the USA implementing similar incentives in the near term
- **High Wind FIT** markets provide the initial market demand
 - Coastal developments
 - Infrastructure (rail, road, bridges)
 - Roof top

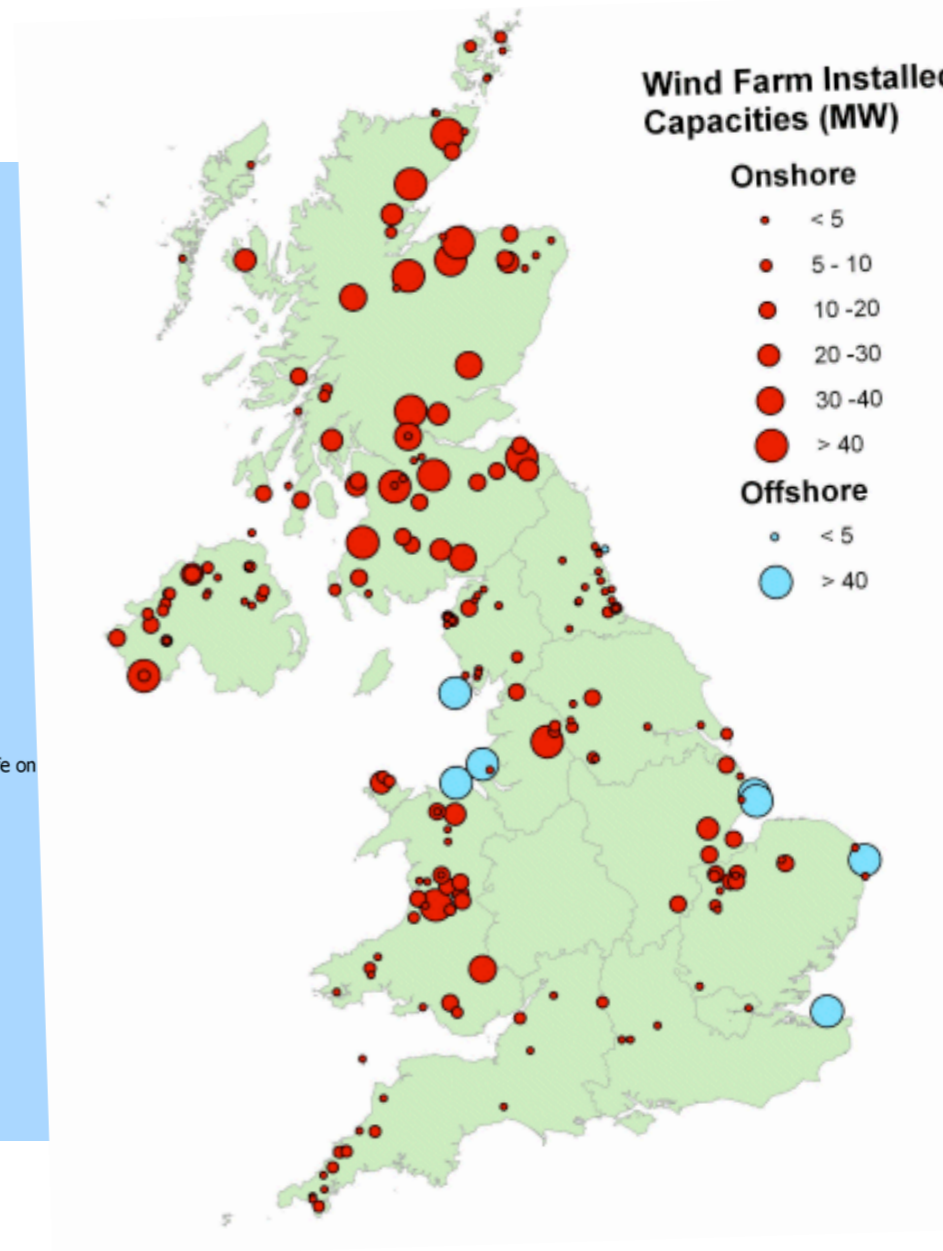
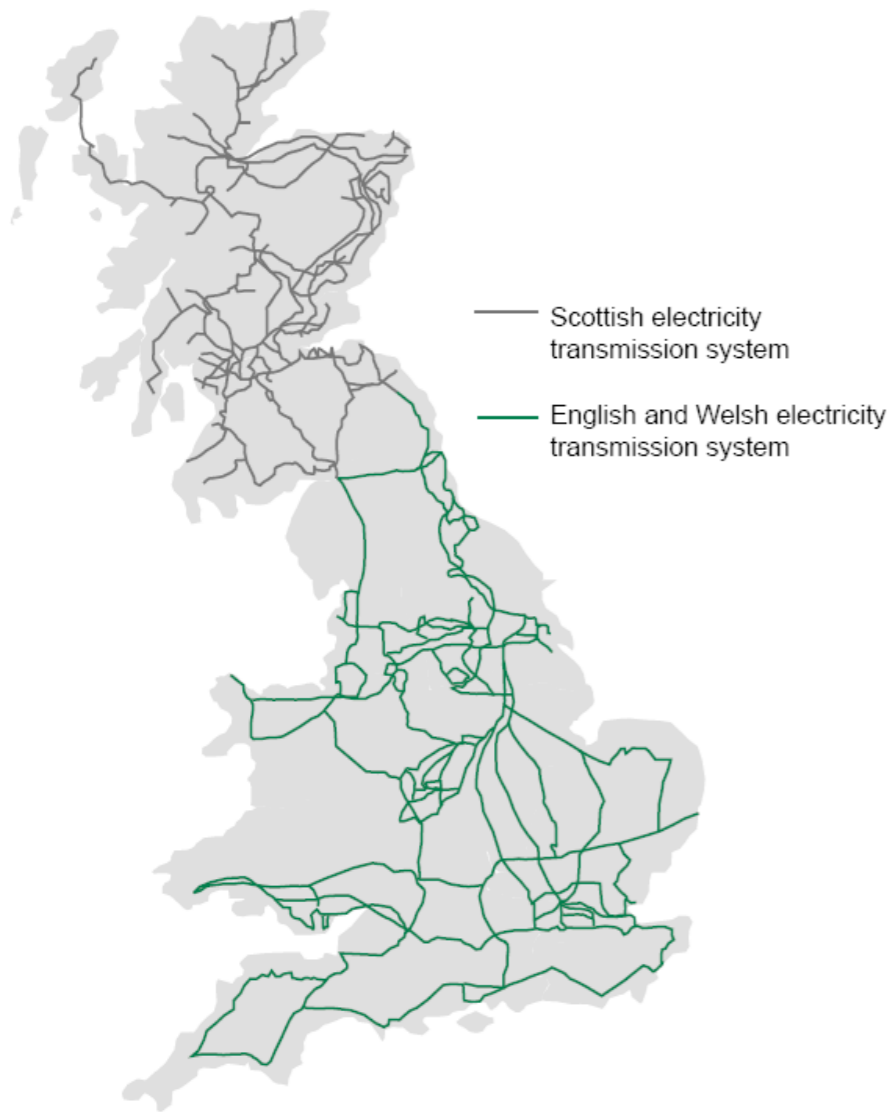
Conclusion: Timing of **FIT** is very favourable for quietrevolution given its lead position

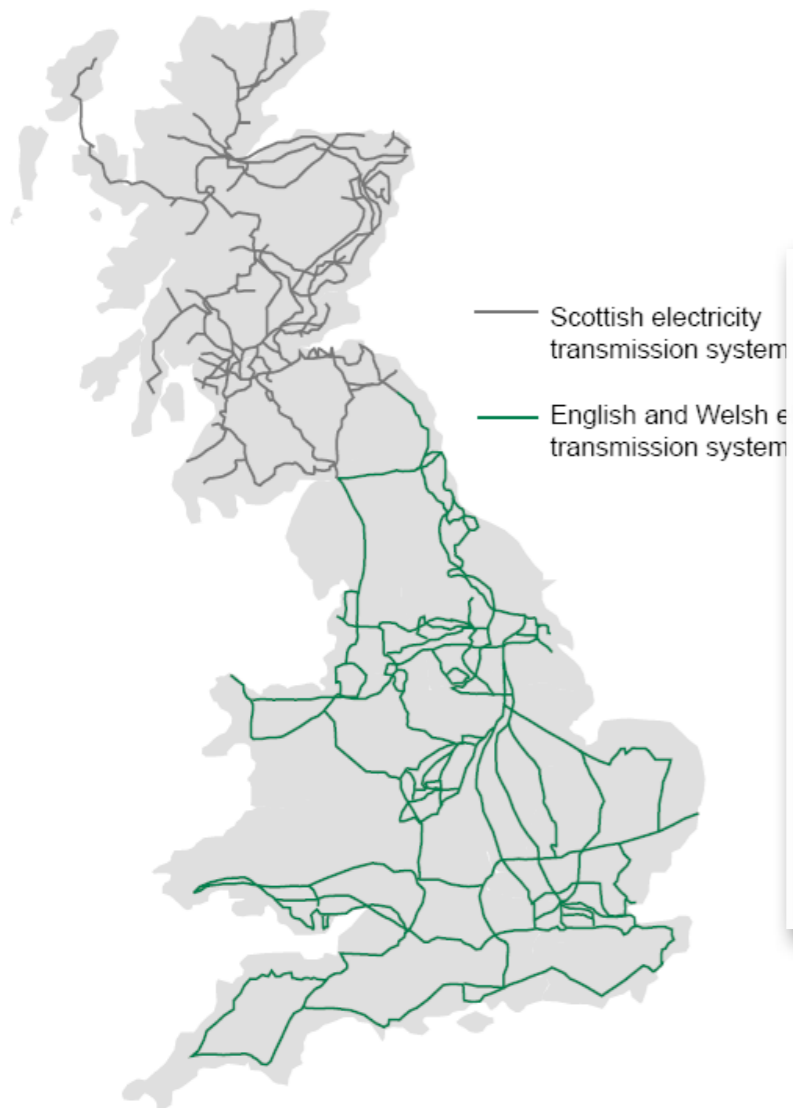
Annual mean wind speed
at 25m above ground level [m/s]



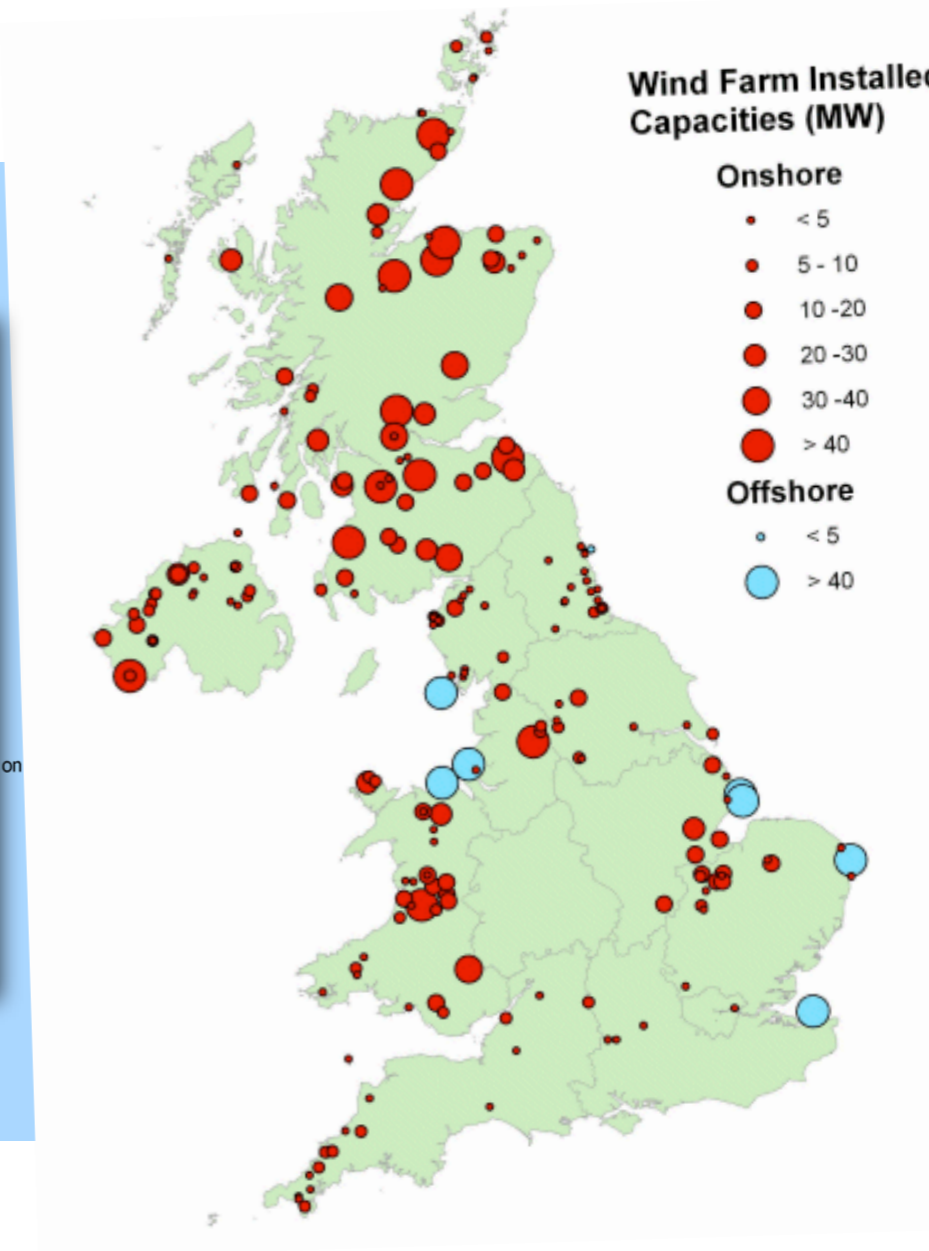








The single biggest issue for large wind is building transmission



Emerging challenges for Large Wind

- Available wind sites in a small island
- Cost of transmission
- Capacity Credit and Adequacy



Small Scale Decentralised Wind

- Harvest wind resource not accessible to traditional large wind
- Eliminate losses associated with distribution
- Can actually work to support a weak grid
- Nascent sector poised for growth; UK alone could be a £10B market over next 25 years



Quiet Revolution the future...





- Distributed generation small wind parks
 - ▶ 24 large multi-MW HAWTs or 1000 small VAWTs
- Typical sites: Retail, transport infrastructure, coastal promenades, ports/marinas, leisure, government buildings, hospital, schools etc.
- Planning process: ability to scale “distributed windfarm” installation
- Efficiency of clusters



Smart Grid Integration



Smart Grid Integration

Energy "Neighbourhood"

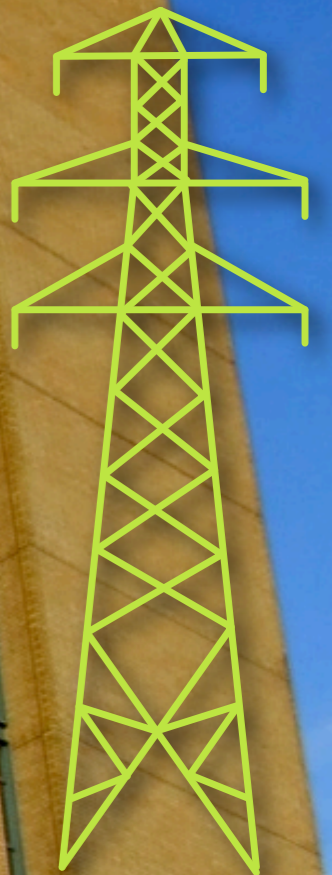


Smart Grid Integration

Energy "Neighbourhood"



The Grid

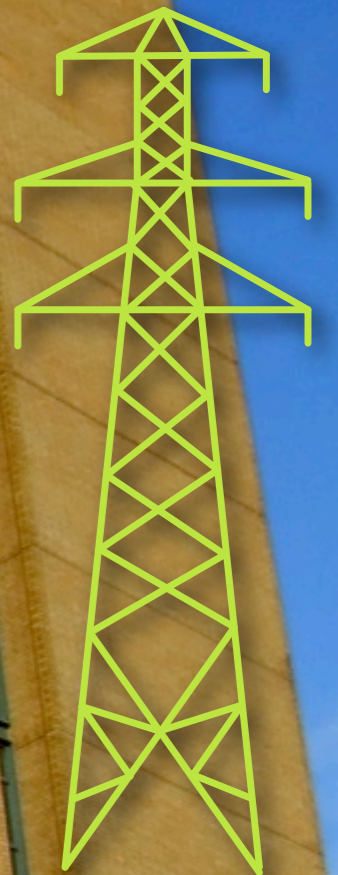


Smart Grid Integration

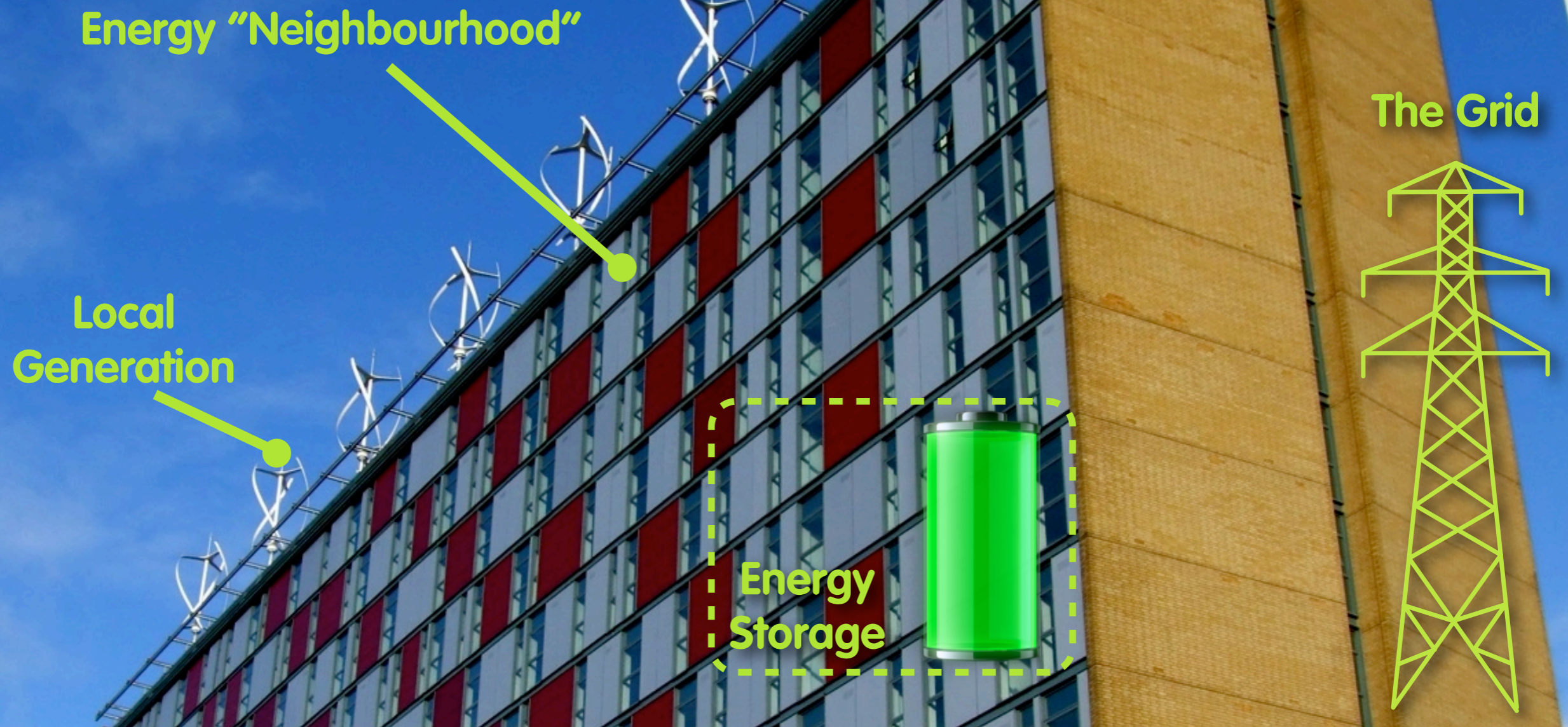
Energy "Neighbourhood"

Local
Generation

The Grid



Smart Grid Integration

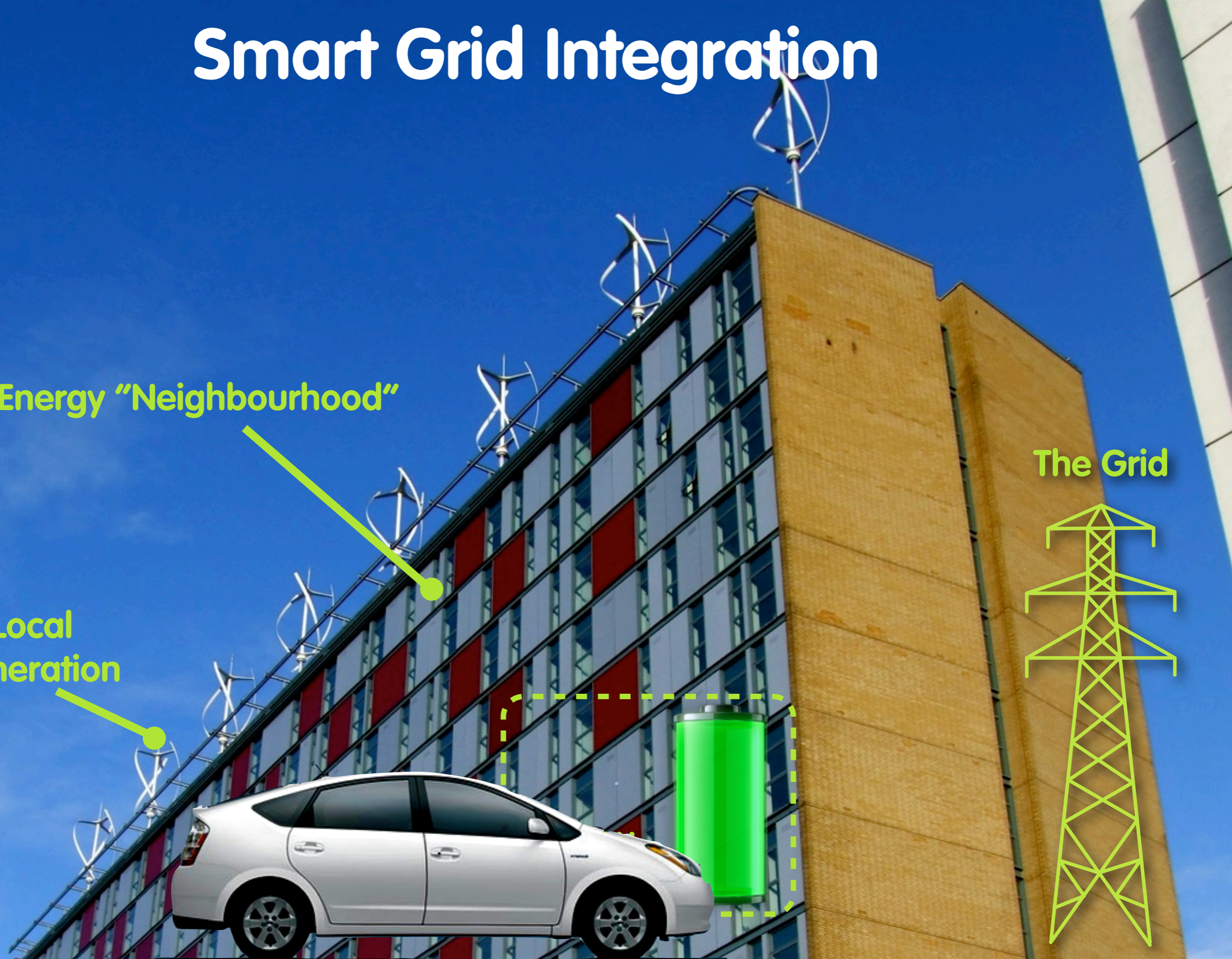


Smart Grid Integration

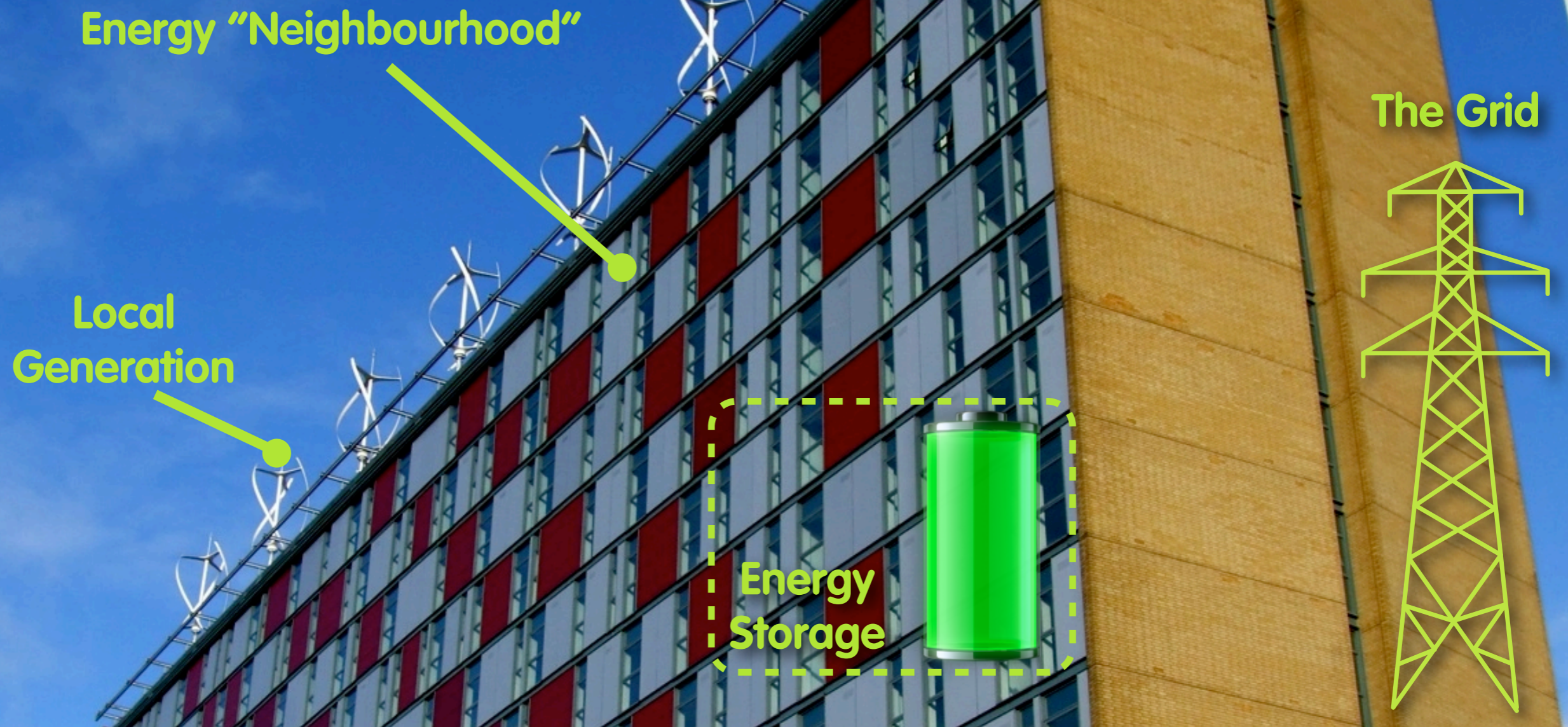
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Smart Grid Integration



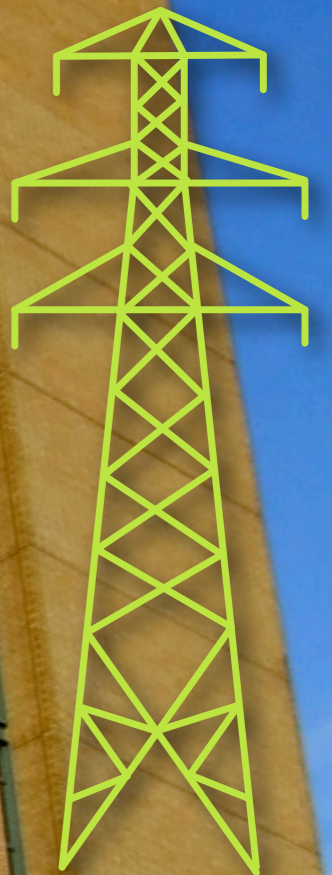
Smart Grid Integration

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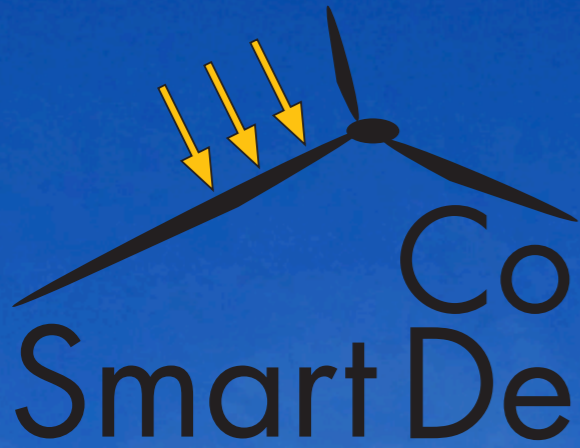
Local
Generation

The Grid

Energy
Storage



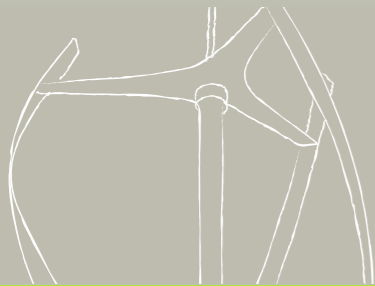
Smart Grid Integration



Smart Control of Demand for
Consumption and Supply
to enable balanced, energy-positive
buildings and neighbourhoods



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