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What will the future grid system look like?

Guy Nicholson CEO Econnect

All Energy 2008

Econnect's Business

Contracting Consultancy Technology

UK & Ireland

Worldwide

Offices in UK, Ireland,
Australia & New Zealand

Energising Renewables on Stand A22

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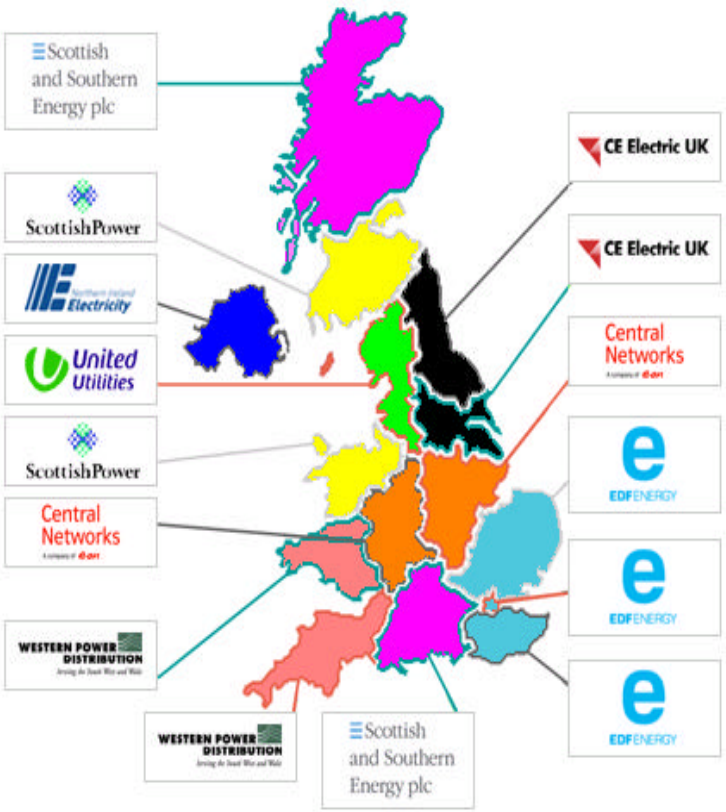
GB Grid



One GB electricity market

One GB System Operator (SO) NGET

Three GB Transmission Owners (TO)

S&S

SP

NGET

14 Distribution Network Owners (DNO) in 7 companies

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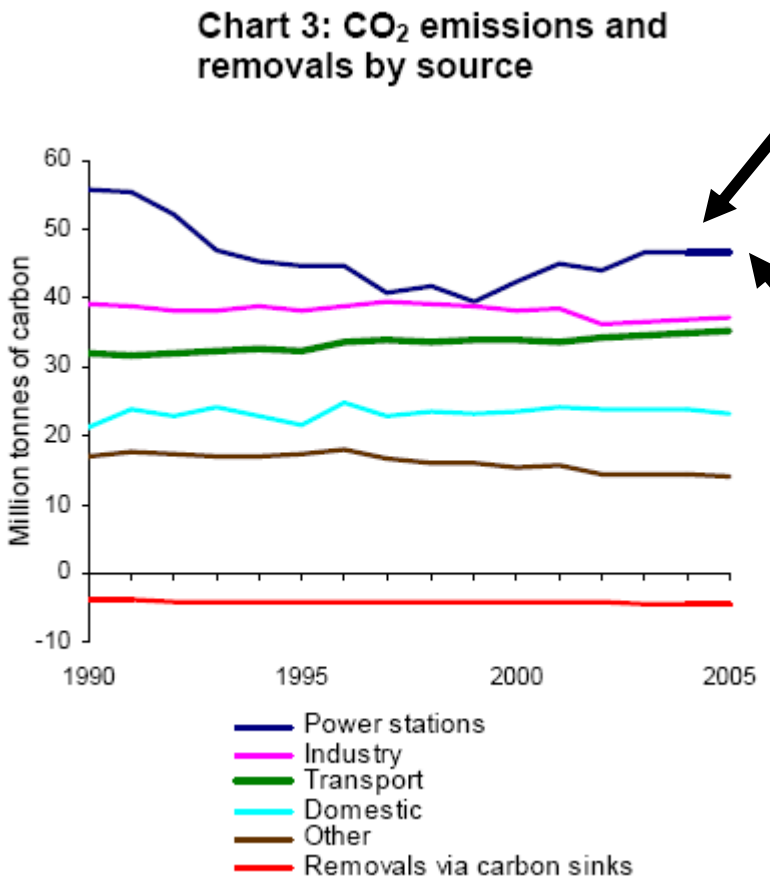
Grid's role in CO2 emissions



- Largest UK emitters are power stations
  - Rising since 1999
- Power stations emit ~45MTCO2 per annum
- Grid enables power stations to emit carbon @£38/tonne =£1.7bn/annum

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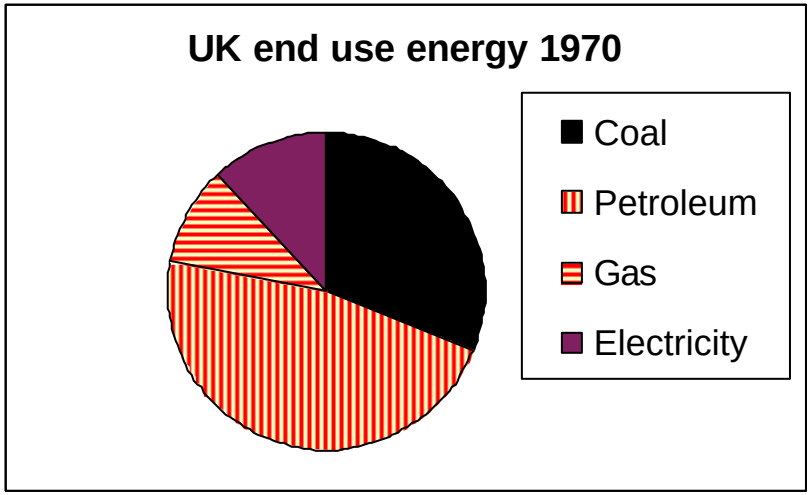
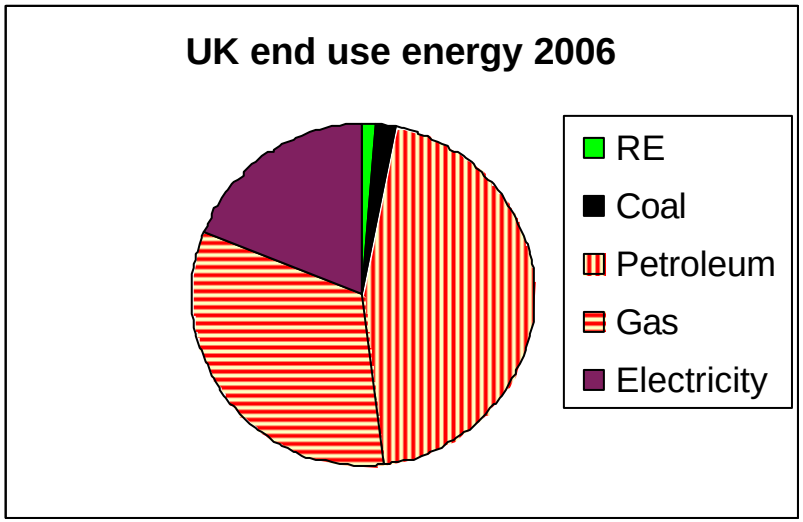
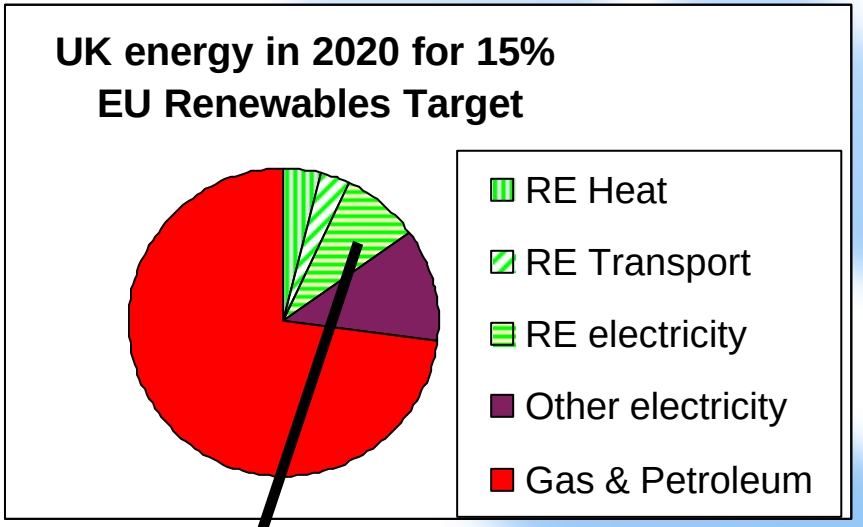
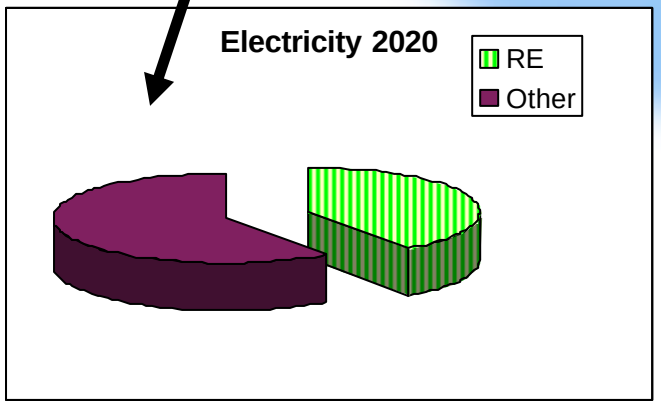
UK energy – evolution









RE electricity ~40%

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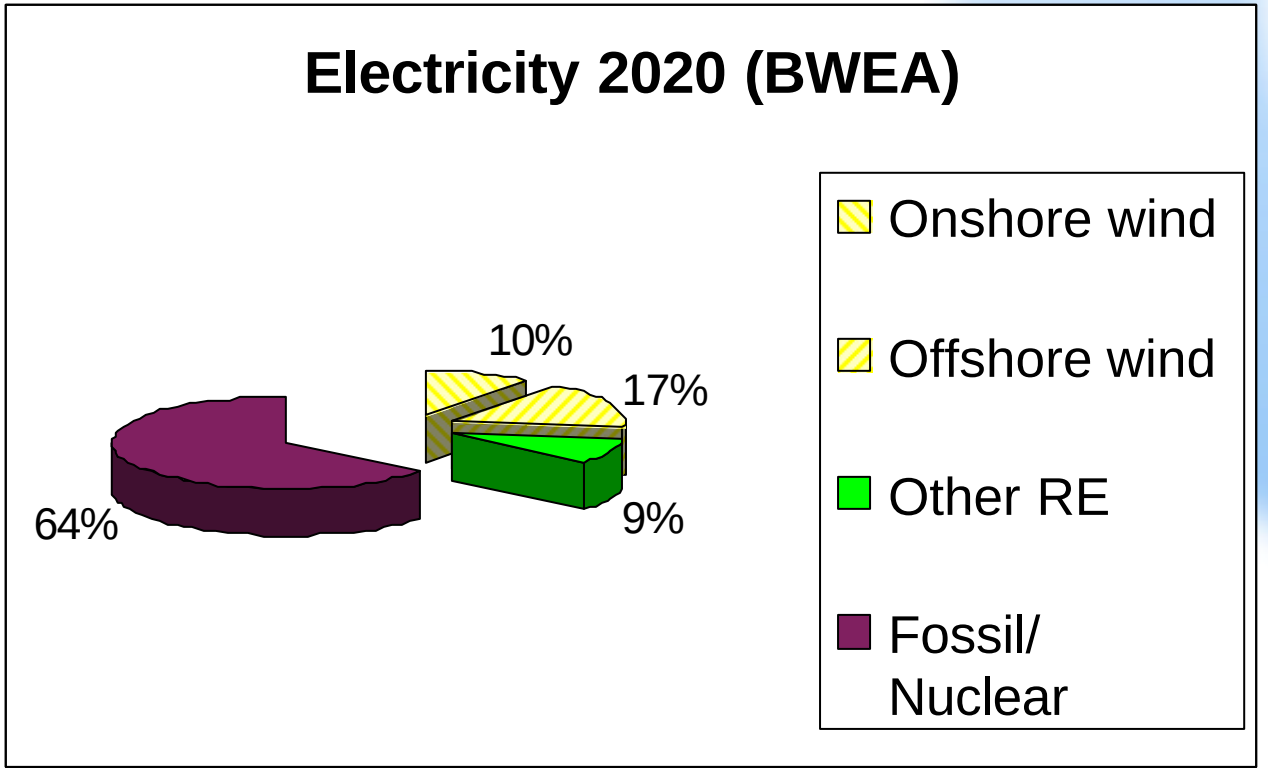
2020 Electricity from RE



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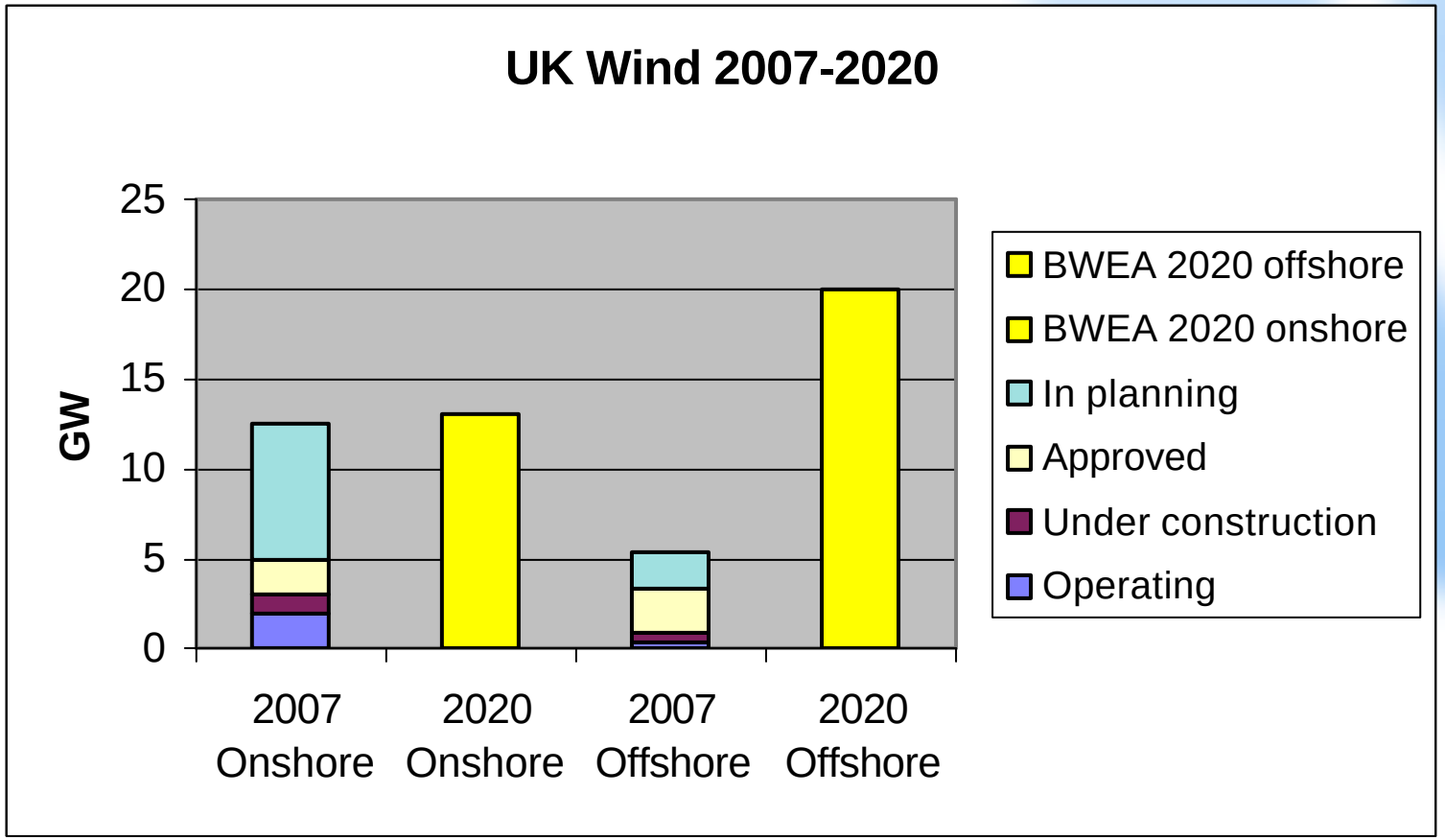
2020 Wind Power



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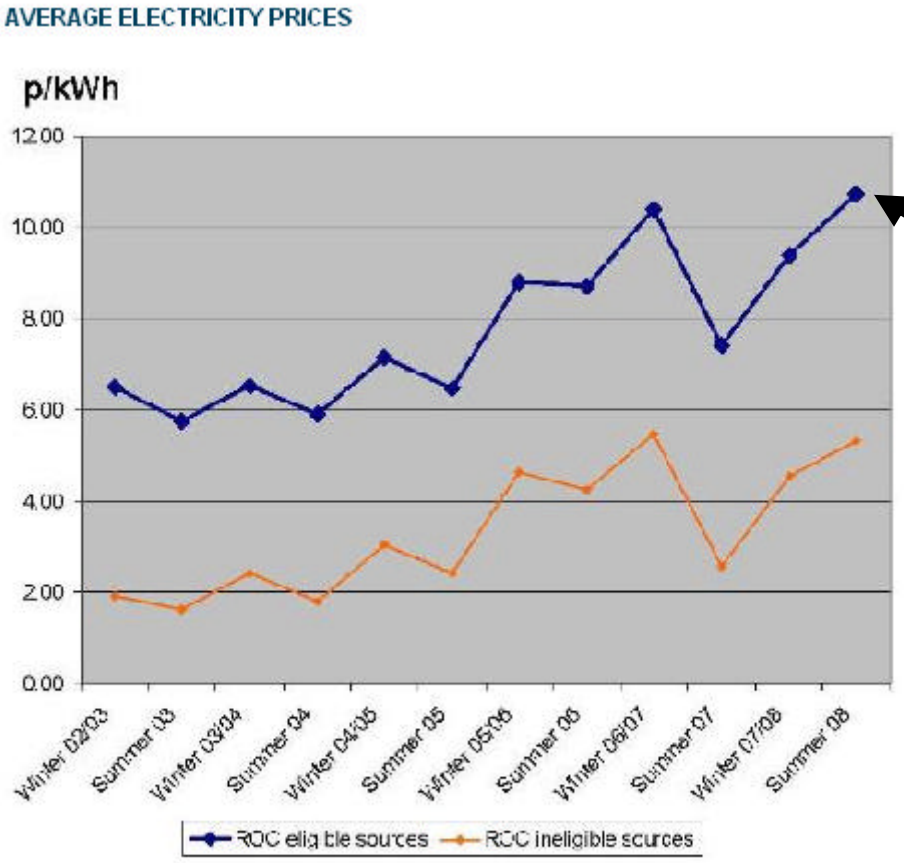
Market drivers – power and RO



These are the average prices we have obtained for electricity sold through our on-line auctions since 2002.

Prices with ROCs

~11p/kWh

~£110/MWh

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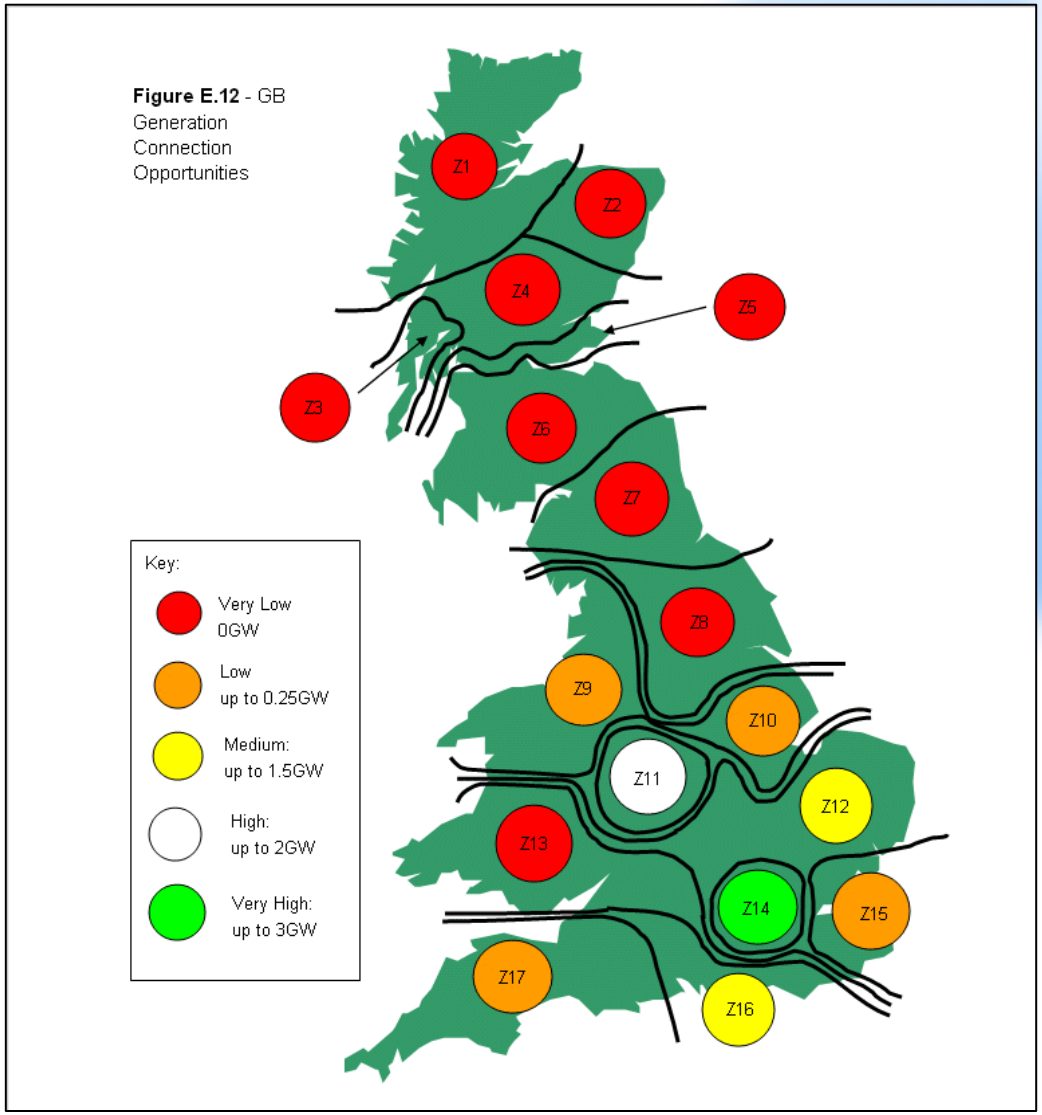
Grid bottlenecks



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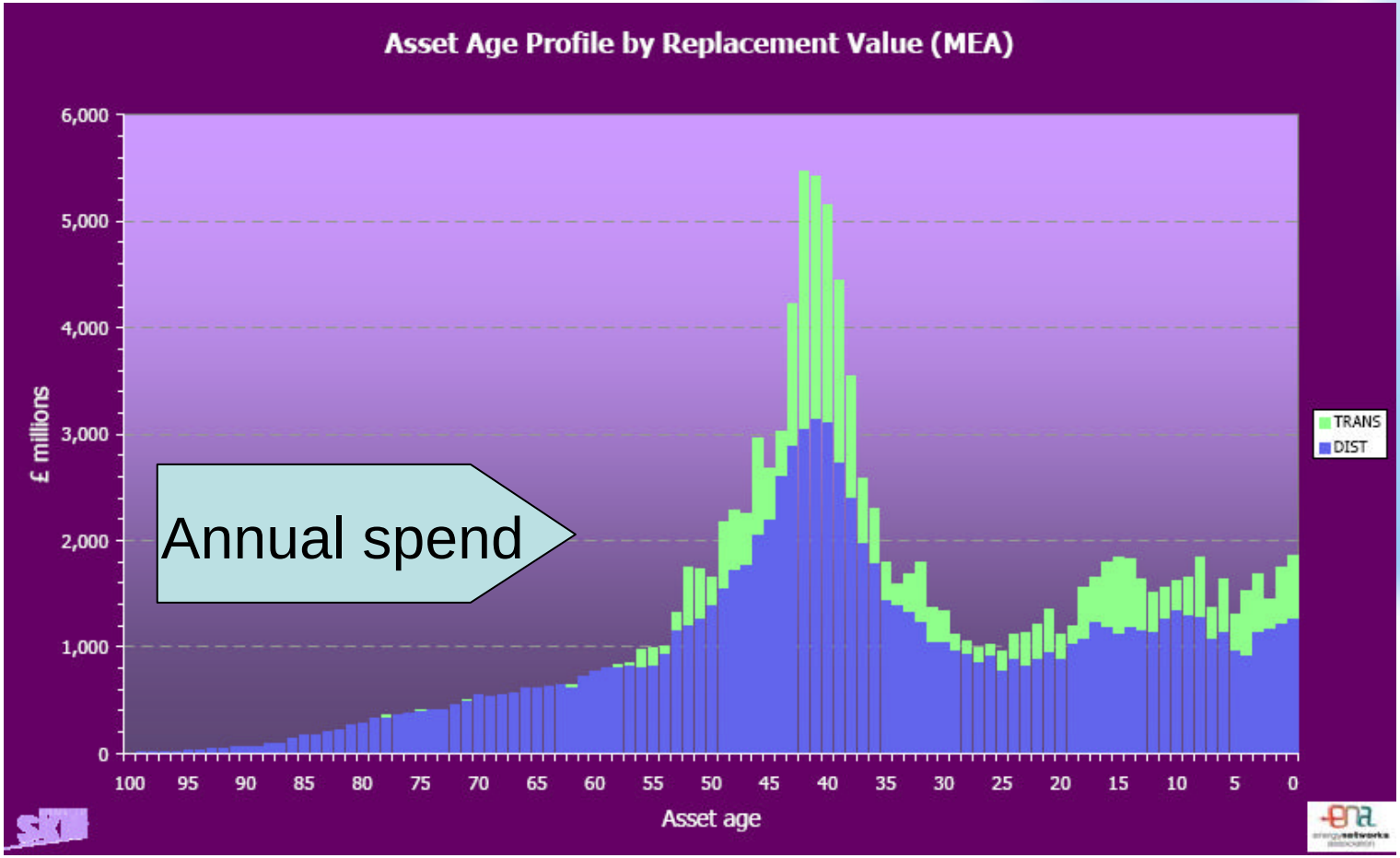
GB Grid - age and value



At current spend rates > 60 years to replace

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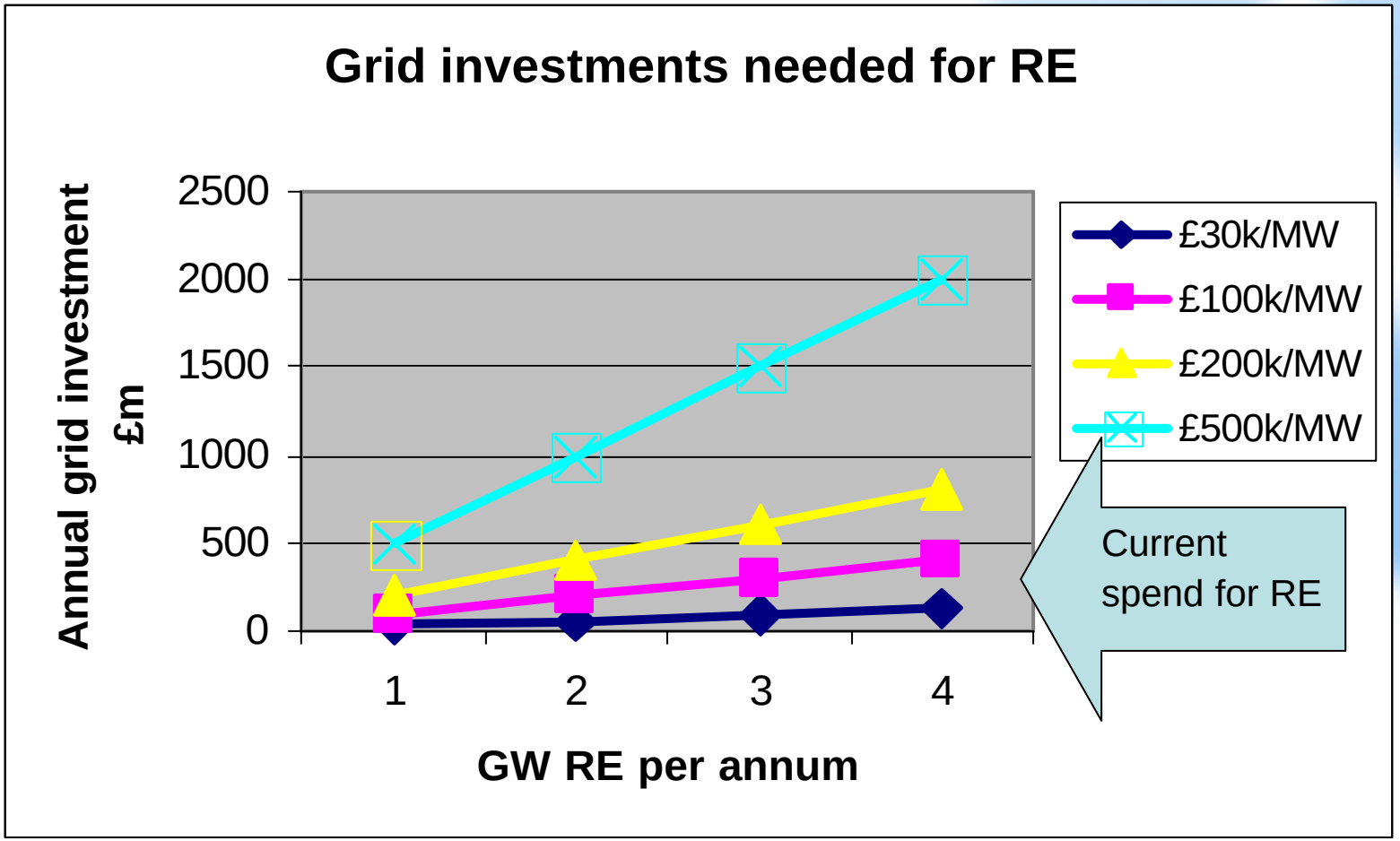
Grid spend needed for RE



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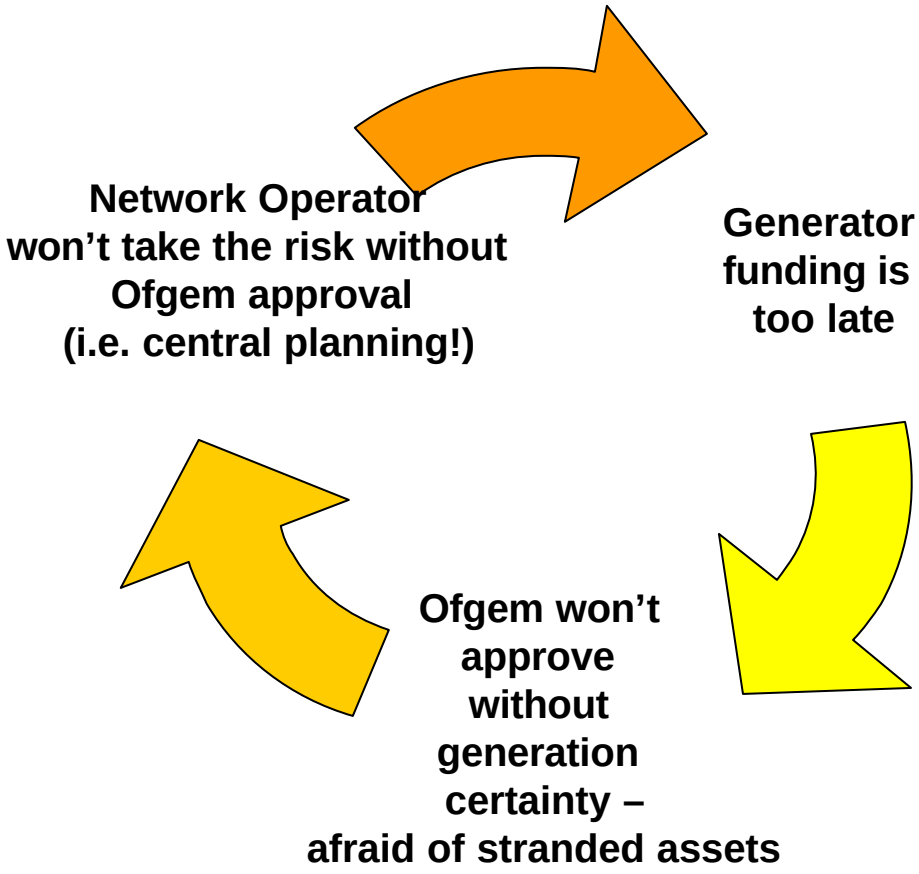
Investment Catch 22

Network Investment probably required – but some risk because Generation is not 100% certain



How do we unlock Risk investment in Networks?

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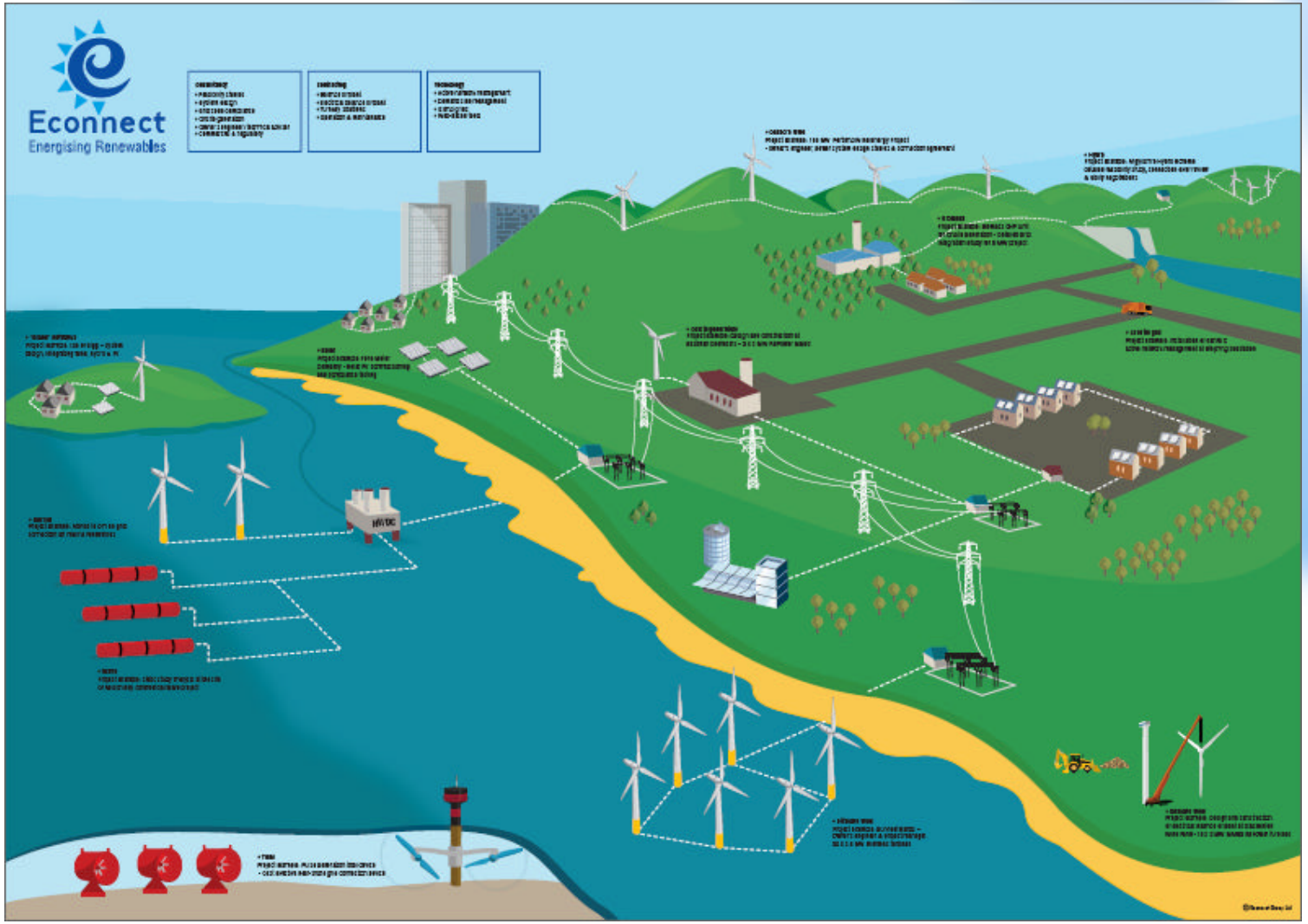
Smartgrids



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E.g. Connect and Manage

Zone / System Spur

Zonal capacities	MW
Hydro capacity	380
Min demand	75
Max Demand	350

SINTEF study:
30 years of data.
Connected 670MW wind with only 5% constraint costs

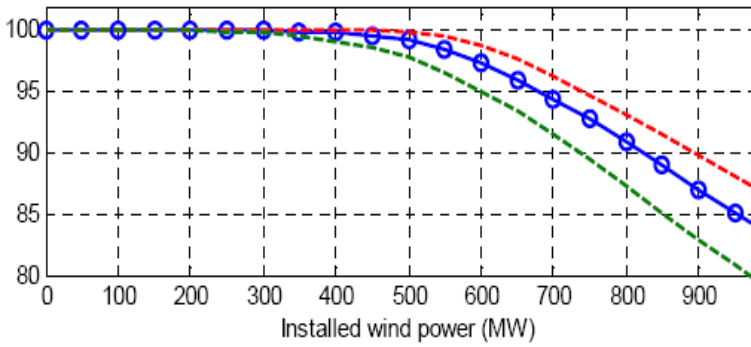
Ability to connect wind
420 – 380 +75 = 115MW

Interconnect

Export capacity (average) = 420MW

Main Grid System

Wind capacity vs. generation value



Active Network Management

E.g. GenAVC™ Solution

- For microgeneration and DG <10MW.
- Active network management - sits in primary substation.
- Allows use of existing assets.
- Reduces losses.
- Avoids digging up the roads for more cables.
- Saves, resources, CO2, disruption, landfill, aggregates, electrical losses and money.
- Connects three times as much generation to the network.

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Islands networks lead the way

- **Innovation incubators:**
- Energy Storage – Foula.
- DSM at individual appliance level – Rum.
- Centralised DSM desalination – Ascension.
- RE electric heating and power – Fair Isle.
- Microgeneration integration – Eigg.

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Incentives on GB Grid Operators

Regulatory Incentive	**Result**
Control constraint costs	Invest before connect
Reduce losses	Resist more generation in north
Reduce Opex and Capex	Resist change & complexity
DG incentive	Not big enough to drive change

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Summary

- Networks carry CO2 costing £1.7bn per annum
- Networks need to respond to EU RE directive and market demand for RE.
- Investment needs to increase an order of magnitudue to ~£2bn/annum for RE alone (£4bn in total).
- SO,TNO, DNOs have incentives that work against RE.
- GB Grid Operators need strong incentives to invest and take risks.

Future GB Grid

- Physically, will only change incrementally.
- *But with incentives on operators*
- Could quickly be operated and managed very differently to connect and transport renewable energy to help meet EU 2020 targets.

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