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Network Asset Management:

What and how much new investment do we need?

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Topics to discuss

- q **Situation (what & why)**
- q **Problem to deal with**
- q **Solutions**
 - Key deliverables
 - Enablers
 - Measures of success



Situation / Tasks

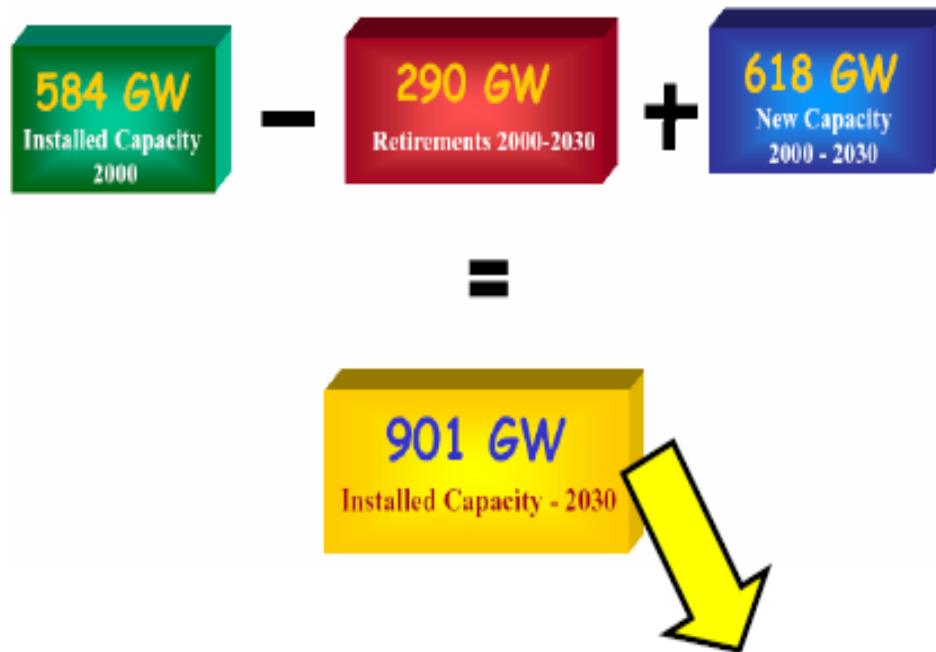
- q **Aging asset base**
- q **Changes in demand and generation patterns**
- q **Drive for lower environmental impact (RES, microgeneration, more efficient use of heat energy) and increasing generation investment**
- q **New network technologies (automation, ANM, DSM & smart metering...)**

Synergetic development across the spectrum of opportunity

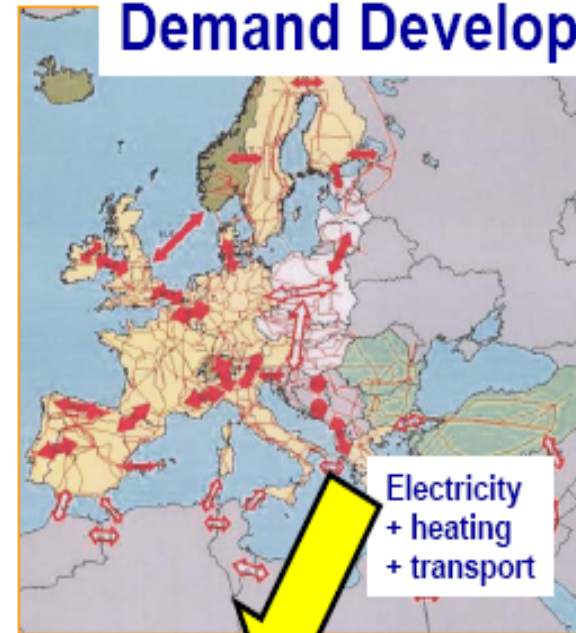


Situation / Tasks

Ageing assets



Demand Development

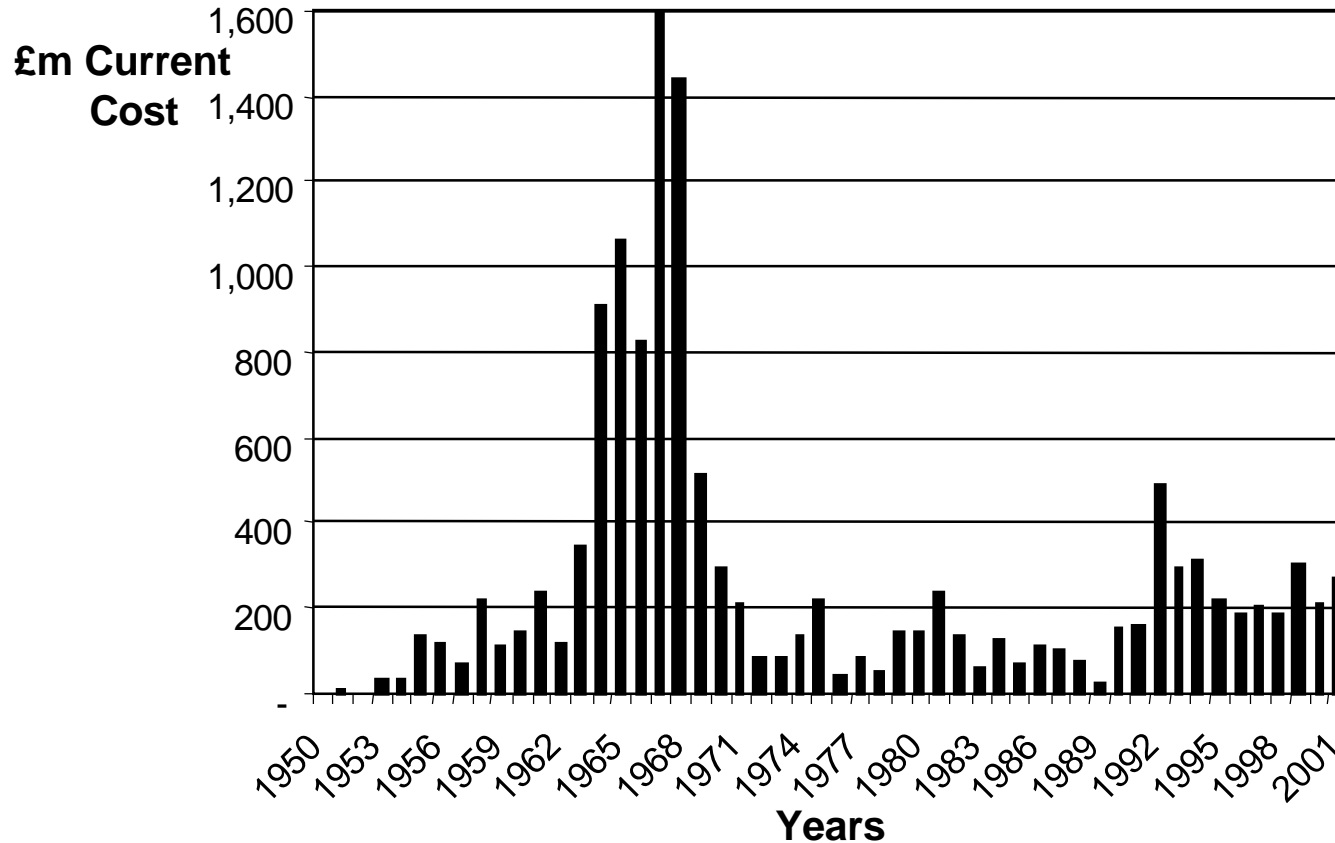


Comprehensive strategy is required
for energy supply + power system



The Asset Challenge - transmission

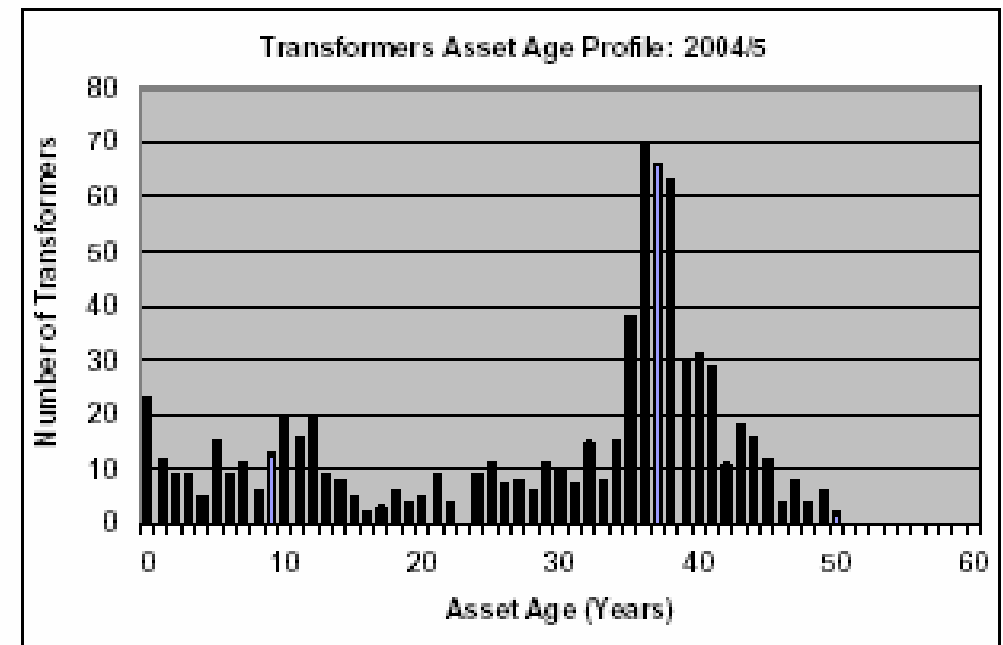
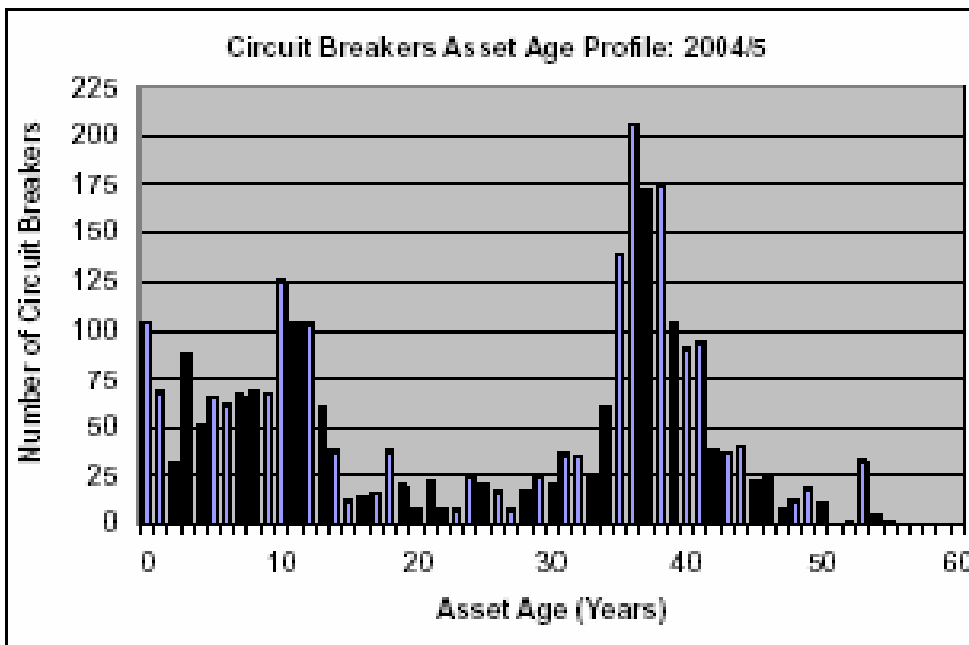
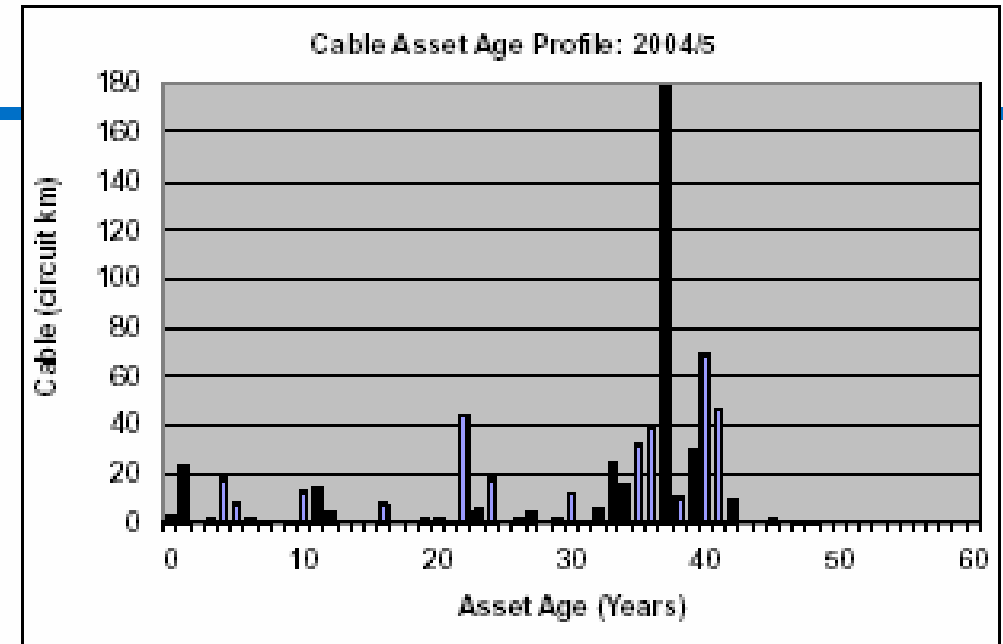
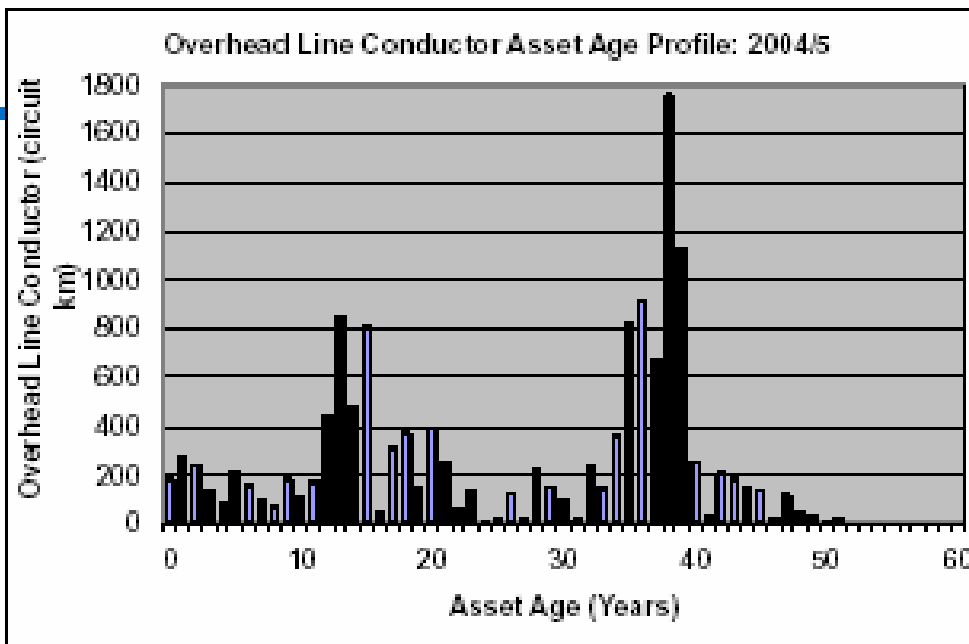
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Source: National Grid 2004

Bulk of existing electricity transmission system was installed from early 1960's. Main plant asset lives are typically 45 - 50 years.

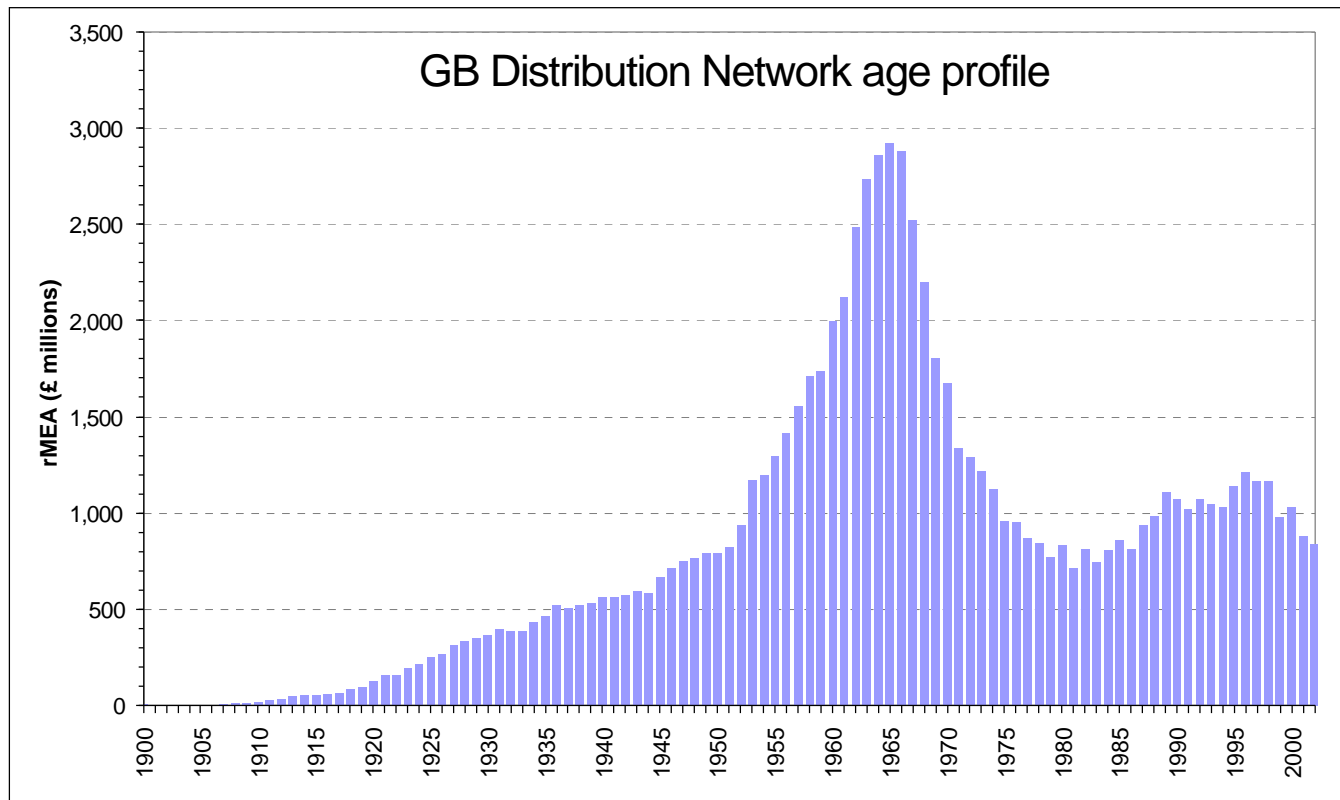
Concentration of assets 35-40 years old – large volume, similar duty, reaching the end of technical asset life at the same time





The Asset Challenge - distribution

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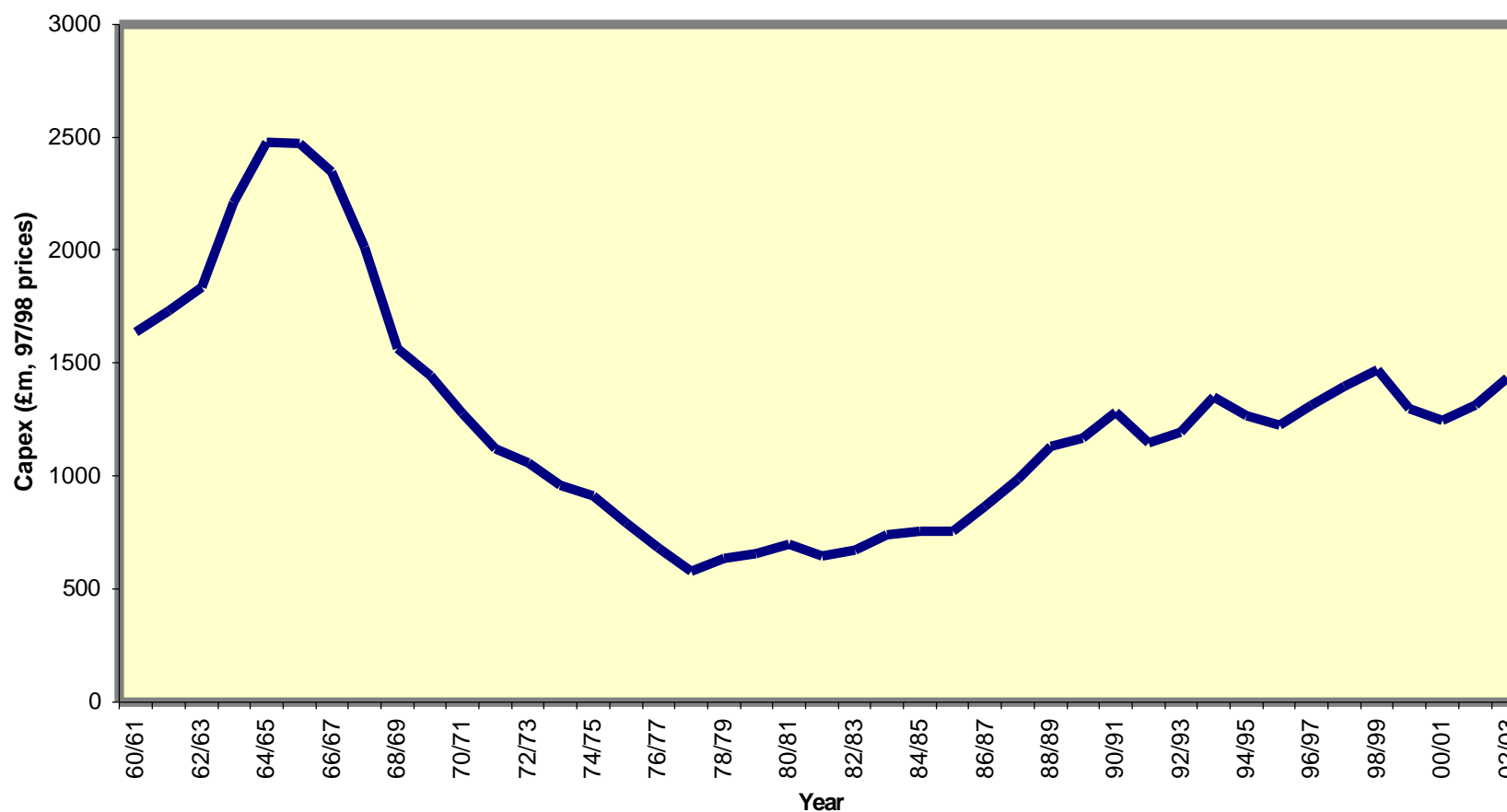




The Asset Challenge – distribution

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Capital investment in the UK electricity distribution network





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Situation / Tasks

- q **Replace / reinforce or a more strategic approach?**
 - `Design-in' for greater network capability and functionality so as to allow for managing uncertainties and future changes
 - New and different (low carbon) designs as apposed to conventional network designs?
- q **Managing risks and ensuring return on investment**
 - good “knowledge” of the natural life cycles of networks and their existing components.
 - the life-expectancies of future installed / refurbished assets – and the functional performance expectations (eg reliability, security, availability, accessibility, flexibility, adaptability, safety, environmental /aesthetic impact, operational impact, efficiency, and whole-life cost) from asset installation to disposal
- q **Resources / skilled staff** (incl whole supply chain)



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Problems to deal with

- q To examine and assess the generic age and load-related asset renewal profiles and the potential scope for synergetic refurbishment and replacement with new and innovative plant and equipment so as to bring out the most socio-economic and environmental benefit in the short, medium and long term.**



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Problems to deal with

- q **To identify both synergies and incremental costs of new assets and designs. This will allow for a more reliable measure of the costs of introducing new plant and equipment as opposed to like-to-like renewal and therefore inform the business cases for future asset management.**
 - Modelling of investment options to ascertain the potential scale of synergies in conventional network investment
 - Studies to ascertain the levels of incremental cost and benefit associated with alternative/new network designs and technologies to facilitate RES and DG,



Solution – Key deliverables

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- q **Advanced methods/models/tools for asset condition monitoring and diagnostics so as to examine and assess equipment residual life including the natural asset renewal profiles, timescales due to asset condition, utilisation and quality of supply improvement drivers.**
- q **New tools for risk and socio-economic based asset management so as to account for the present day possibilities of decentralised generation for grid-support, reliability and power quality enhancement at the connection point.**
- q **Applications to demonstrate ability of improved methods/tools to deliver better ‘knowledge’ and management of network assets**
- q **A generic business case for introducing new plant and equipment as opposed to like-to-like renewal, and hence the likely migration path and take-up of appropriate technologies**
- q **Demonstration projects using existing network infrastructure combined with existing and new asset management tools and technologies and delivered onto appropriate platforms to demonstrate both their technical feasibility and the business case for each of the identified stakeholders arising from widespread adoption in a liberalised market led industry**



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Solution

Enablers:

- q New plant and equipment technologies, new types of networks (eg Paris)
- q The inadequacy and potential higher cost of traditional like-for-like renewal approaches combined with the need to gain greater capability and functionality (flexibility, adaptability and accessibility) from the existing infrastructure while delivering socio-economic and environmental benefits.

Measures of success:

- q Effective sharing of knowledge and experience on aging assets (materials / components) and new technology and equipment.
- q Customer satisfaction measured through ever increasing reliability and quality of supply at an acceptable price and in coordination and understanding with the policy makers, regulators, network operators and customers.