energy technologies institute

www.eti.co.uk

Priorities For Energy Security In The UK

Westminster Energy, Environment & Transport Forum – 9th March 2017

Ensuring the UK meets supply criteria; mix diversity, infrastructure investment and decarbonising the system – the role for nuclear

Mike Middleton – Strategy Manager For Nuclear

ETI10 TEN YEARS OF INNOVATION 2007 – 2017

Introduction to the ETI organisation

- The ETI is a public-private partnership between global energy and engineering companies and the UK Government.
- Targeted development, demonstration and de-risking of new technologies for affordable and secure energy
- Shared risk

ETI members

bp

CATERPILLAR®

EDF ENERGY

Rolls-Royce

Department for Business, Energy & Industrial Strategy

EPSRC Pioneering research and skills

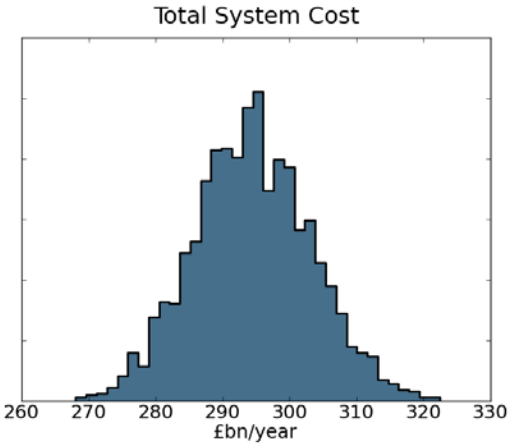
Innovate UK Technology Strategy Board

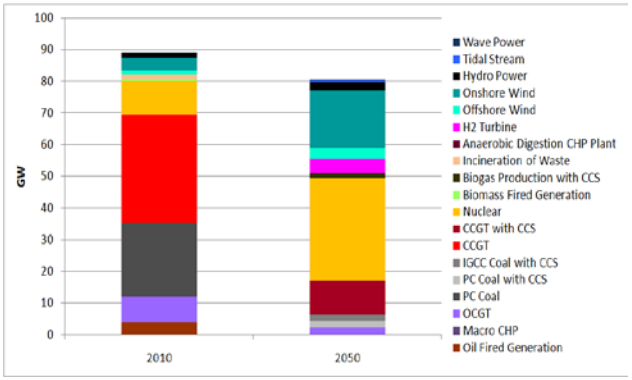
ETI programme associate

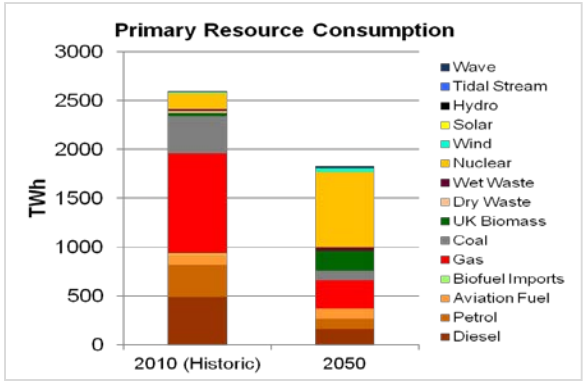
HITACHI Inspire the Next

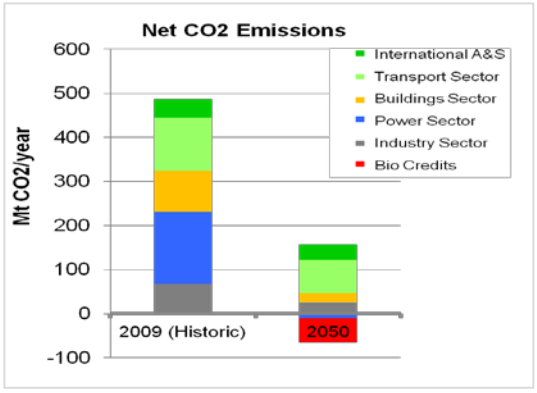
ESME – The ETI's system design tool

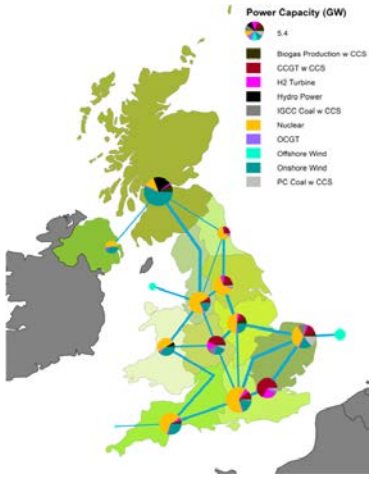
Integrating power, heat, transport and infrastructure providing national / regional system designs

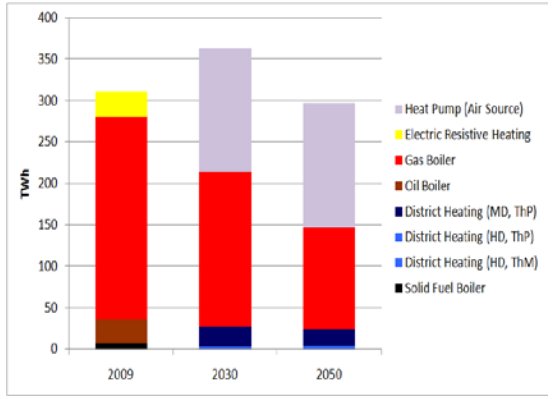










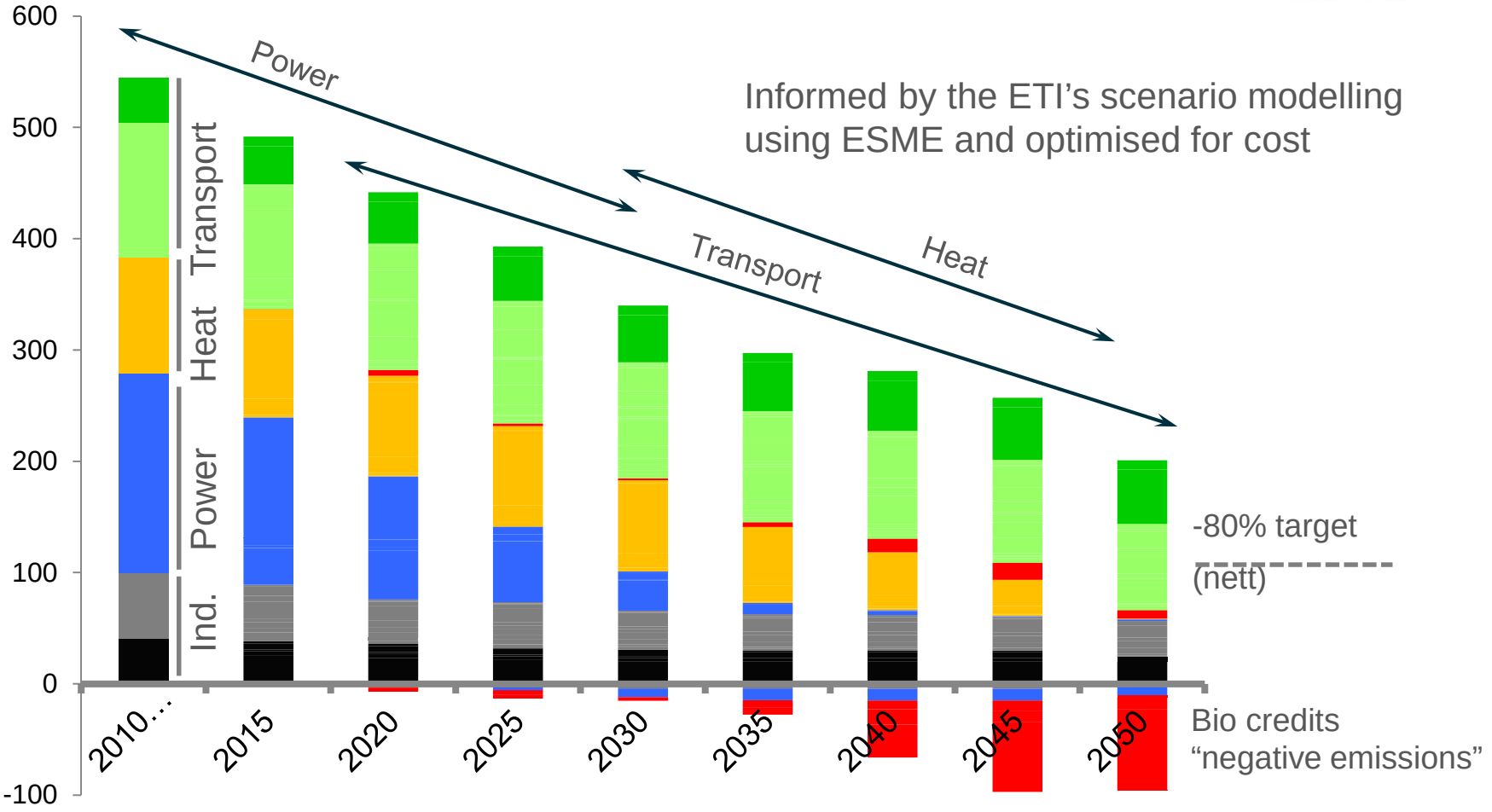


ESME example outputs

A UK emissions reduction plan

Power now, heat next, transport gradual – cost optimal

MT CO2



ETI's Nuclear Insights - Key Messages

10 YEARS TO PREPARE for a low carbon transition

New nuclear plants can form a major part of an affordable low carbon transition

with potential roles for both large nuclear and small modular reactors (SMRs)

Large reactors are best suited for baseload electricity production

analysis indicates an **upper capacity limit** in England & Wales to 2050 from site availability of

35 GWe

Actual deployment will be influenced by a number of factors and could be lower. Alongside large nuclear, SMRs may be less cost effective for baseload electricity production

SMR's could fulfil an additional role in a UK low carbon energy system by delivering combined heat and power

a major contribution to the decarbonisation of energy use in buildings

but deployment depends on availability of district heating infrastructure

SMR's offer more flexibility with deployment locations that could deliver heat into cities via hot water pipelines up to

30 km in length

Assessed deployment capacity of at least **21 GWe** limit could be higher

Total nuclear contribution in the 2050 energy mix could be around 50 GWe; SMRs contributing nuclear capacity above 40 GWe will require flexibility in power delivery to aid balancing of the grid

Future nuclear technologies will only be deployed if there is a market need

and these technologies provide the most cost effective solution

A decision is required now

10 years

whether to begin 10 years of enabling activities leading to a final investment decision for a first commercially operated UK SMR

earliest operational date around **2030**

A strategic approach to reactor siting together with public consultation

will be important in determining the extent of deployment of both large nuclear and SMR's

Conclusions

- Nuclear is a proven source of secure low carbon generation
- Deployed in almost all transition scenarios examined by the ETI
- Deployed within a mix of low carbon technologies including renewables and combustion plant with carbon capture and storage
- Bio with CCS is a key technology combination - “negative” emissions
- Potentially complementary roles of proven large nuclear power plants and Small Modular Reactors
- 18 GWe of new nuclear capacity currently planned by developers –
    - actual deployment by 2050 will depend on a range of factors

More information:
UK scenarios for a low carbon energy system
http://www.eti.co.uk/insights/options-choices-actions-uk-scenarios-for-a-low-carbon-energy-system
The role for nuclear in the UK transition to a low carbon energy system
http://www.eti.co.uk/insights/the-role-for-nuclear-within-a-low-carbon-energy-system
Preparing for the UK deployment of a small modular reactor by 2030
http://www.eti.co.uk/insights/preparing-for-deployment-of-a-uk-small-modular-reactor-by-2030

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The ETI can also be followed on Twitter @the_ETI

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