2050 PATHWAYS CALCULATOR

NCCRP Stakeholder Consultation Workshop

Kopanong Hotel and Conference Centre, Benoni , 20 June 2013

Overview

- Introduction
- What will be the Approach
- Stakeholder engagement process.
- Project timeframes and key mile stones.
- Technical aspects (ERC): Examples

- Data requirements and sourcing.

Introduction

- Partnership between South Africa (DEA), UK Department of Energy and Climate Change (DECC) & British High Commission to develop the South African version of the 2050 Emission Pathways Calculator

- The Calculator is an interactive user-friendly tool that allows non-experts to develop their own combination of levels of change in different technologies and sectors of the economy to explore different energy and emissions scenarios out to 2050

Why the SA Calculator?

- To answer the fundamental questions of how far the country can reduce emissions and meet energy needs
- To engage technicians, policy makers and the public on how a country's emissions could change overtime
- No intention of using this tool to develop policies or strategies – but it can help to start discussions around these

What will be the Approach

- Building on the work currently underway on the Mitigation Potential analysis study.
- Alignment with the IEP, IRP, NDP and other government policies and studies.
- Learn from UK and China experiences.

The UK 2050 Calculator is been adapted and improved

Published:

UK | Belgium | China | South Korea

Started:

South Africa | Bangladesh

Planned:

Brazil | India | Indonesia

In discussion:

Mexico | Algeria | Malaysia | Thailand | Vietnam | Philippines

Japan | Russia | France | Hungary | Taiwan

What will be approach, cont….

- The Calculator will cover key sectors of the economy- aligned to the mitigation potential.

- Supply side – Energy production.
- Demand sector - Industry , residential commercial , transport, AFOLU.
- Sector leads within DEA will lead the work:
  - Energy – Mac Makwarela
  - Transport – Mac Makwarela
  - Industry – Andrew Motha
  - AFOLU – Barney Kgope

What will be approach

- Four trajectories for each of these, ranging

LEVEL 1

Little or no effort to reduce GHG emissions

LEVEL 2

Effort achievable without constraints

LEVEL 3

Effort needing **significant change** – hard but deliverable

LEVEL4

extremely ambitious changes that push towards the physical or technical limits of what can be achieved

What will be the Approach, cont…

- DEA sector leads will develop summary scenarios (1-pagers/levels storylines).
- ERC has been contracted to provide technical support.
  - Particularly on the modelling elements of the project.
  - Development of the data-sheets and web-tool.
  - Data sourcing.
  - Development and maintenance of the Website.
  - Online comments and submission of data.
- Sector experts will be appointed to review the data sheet and summary scenarios.

Stakeholder engagement process

- Most inputs will be sourced online (webpage)
- Sectoral workshops (July to August)
- Broader stakeholder Workshop (October)

Project milestones and timeframes

Project milestone	Deadline
Set-up a functional website Most consultation process will be online	June/July
Appointment of Experts	June/July
Draft 1 pager (story lines for level 1 to 4),	Mid May (inputs from ERC & line Depts)
Unload draft list of indicators and 1 pagers	June/July
Sector experts review 1 pagers and data sheets	July/August
Stakeholder session (sectoral workshops)	July/ August
Development of a web-tool	September/October
Stakeholder workshop	October/November
Launch	November 2013
My 2050 Calculator	After the Launch

Offshore Wind

In 2007 the UK had around 0.4 GW of offshore wind capacity, and at the end of 2010, 1.3 GW. All of these were fixed to the seabed by solid foundations, with no floating offshore turbines yet present in the UK.

Level 1

Level 1 assumes that only the current turbines and those already advanced in the planning process are built. Offshore wind capacity initially rises from 1 GW to 8 GW in 2025 then reduces to zero by 2045 as decommissioned sites are not replanted. 8 GW is equivalent to around 1400-5.8 MW turbines (although in reality turbines would have different capacities) and generates around 29 TWh/y at 2025.

Level 2

Level 2 assumes that capacity increases to 60 GW by 2040 and is then maintained. This means building and maintaining about 10 000 of the 5.8-MW turbines in total. In this scenario the sea area occupied by wind farms is about 10 800 km^2, about half the area of Wales. It requires maintaining the same build rate that Germany achieved for onshore turbines from 2000 to 2010 over a 20-year period in the UK and in an offshore environment. 60 GW of offshore wind turbines generates around 237 TWh/y in 2050.

Level 3

Level 3 assumes that capacity rises to 45 GW by 2025, and to 100 GW by 2050, which is equivalent to around 17 000 5.8-MW turbines. The sustained installation rate is 5 GW per year. Installing 5 GW per year might require roughly 30 jack-up barges and means building offshore wind turbines at a rate never before achieved in any country. The sea area occupied by wind farms is 18 000 km^2, close to the area of Wales. The combined weight of steel and concrete in these turbines is roughly 0.4 tonnes for every Briton. 60 GW of offshore wind turbines generates around 395 TWh/y in 2050.

Level 4

Level 4 assumes that capacity rises to 68 GW by 2025, and to 236 GW by 2050 – a 180-fold increase from 2010. The sustained installation rate required is 6 GW per year of fixed turbines (which requires roughly 30 jack-up barges) plus 6 GW/y of floating turbines. In total, this is equivalent to about 40 000 5.8-MW turbines being built by 2050. The costs of offshore wind installation and maintenance increase with the distance from shore and water depth. For level 4, the sea area occupied by wind farms is over 42 000 km^2, roughly twice the area of Wales, including both fixed and floating turbines. If 236 GW of the 5.8 MW turbines were arranged uniformly along 3400 km of coastline, there would be 12 of them per kilometre, generating around 929 TWh/y in 2050. The combined weight of steel and concrete in these turbines is 0.9 tonnes for every Briton.

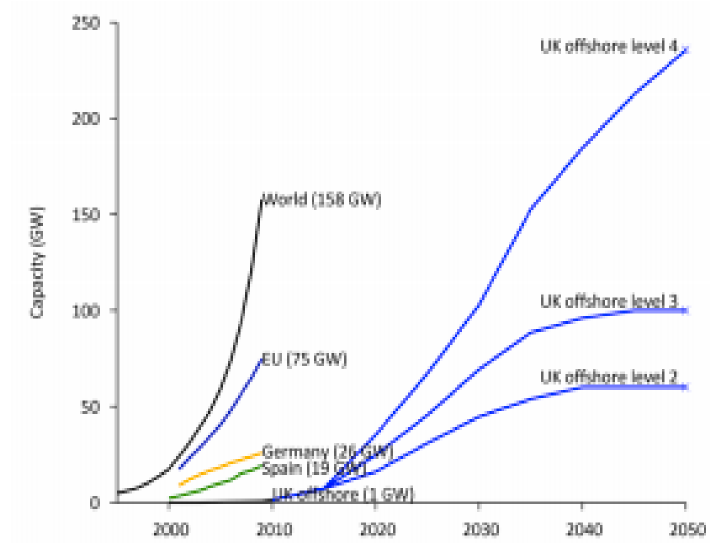
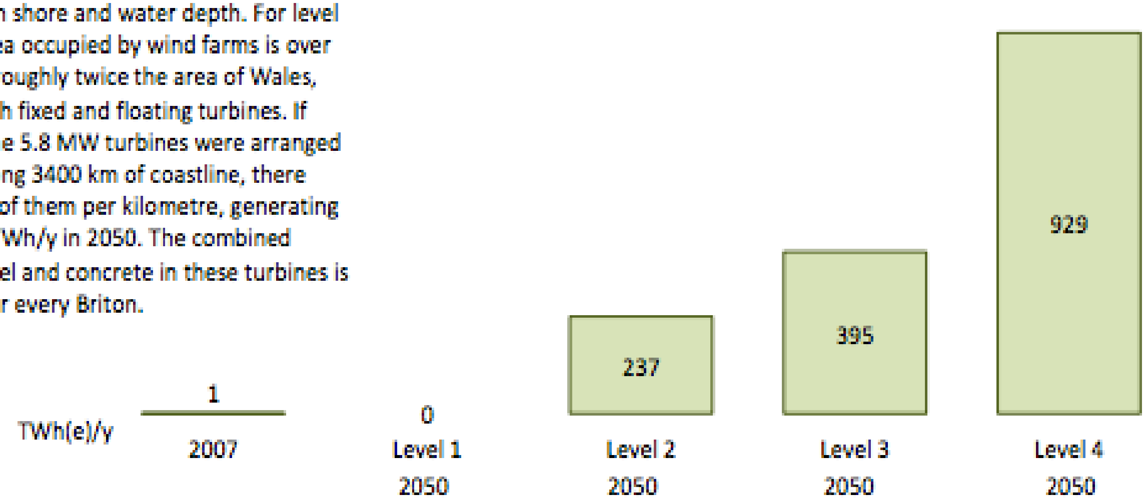


Figure 1. UK offshore wind capacity versus time, historic (to 2010) and assumptions (from 2010 onwards), compared with onshore wind in Spain, Germany, EU, and world totals.



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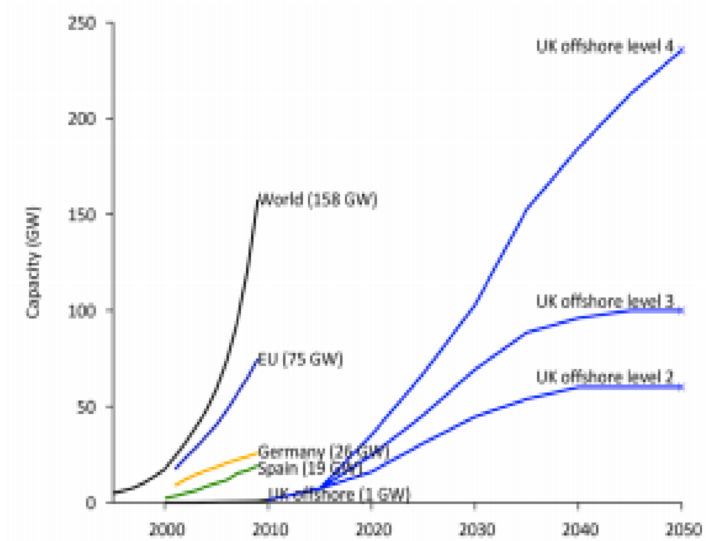

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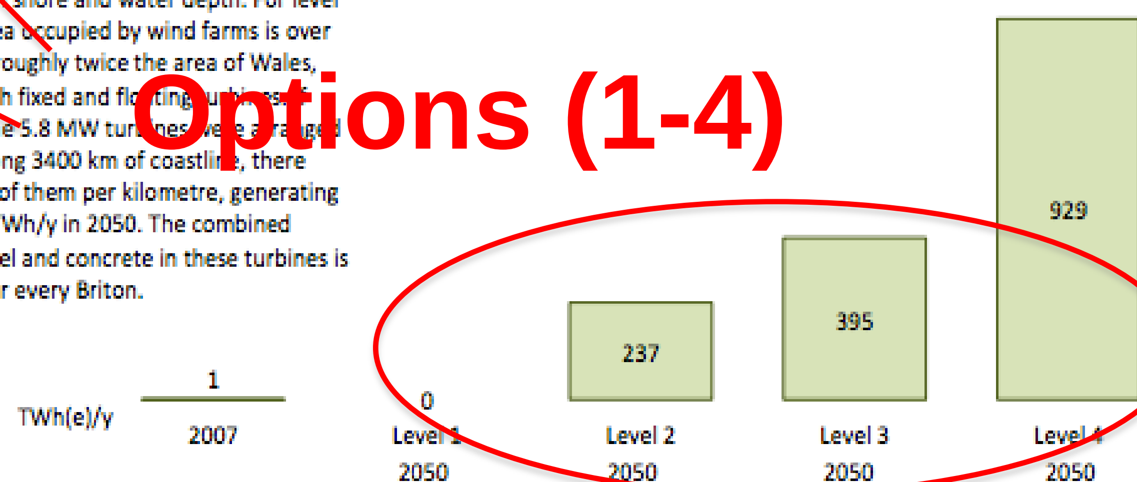

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Context and precedents

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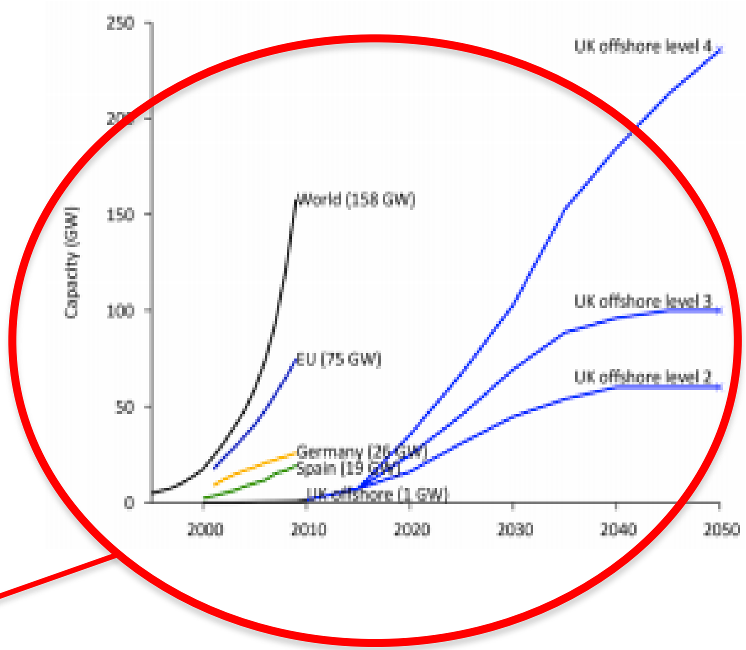

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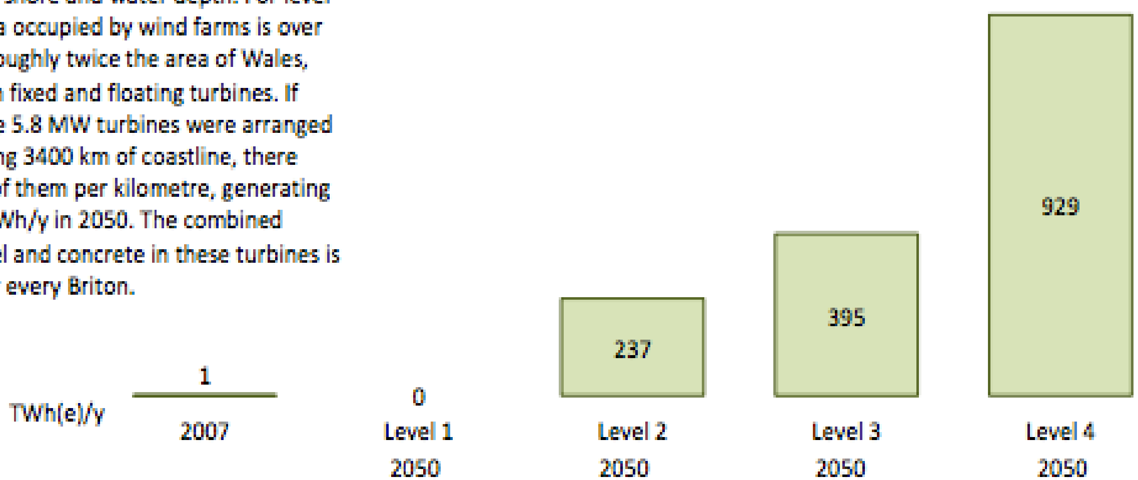

Where are we now?

- **Base year data:**
  - Current emissions
  - Current energy use
  - Other relevant data – activity data, etc

Underlying information – e.g. wind power:

- What is the wind resource in South Africa?
- What is the maximum potential for wind power?
- How much will this cost?
- How fast can we build wind turbines?
- How will wind power affect the rest of the electricity system?
- What are the implications for water use?
- Etc etc

Basic drivers:

- Population growth
- GDP growth, per sector

How are we going to get there?

- The DEA/ERC team will compile information and scenario sheets for everything which goes into the calculator, comprising clear and well-presented data.
- These will be independently reviewed, and put on the calculator website, where anyone will be able to comment on these, either directly on the www or via email. Anyone interested will be welcome to comment on either the data, or on the feasibility and appropriateness of the choice of scenarios.
- In July 2013, there will also be a series of workshops.
- Users will be able to sign up for email updates – these will be regular bulletins on what has been added to the www, meetings and any other connected news.

THANK YOU