Good practice in climate and energy planning: Engineering solutions for implementing NDCs

Future Climate – Engineering Solutions

in partnership with the

Institution of Chemical Engineers – Energy Centre

Future Climate
Engineering Solutions

IChemE
Energy Centre

Department for
Business, Energy
& Industrial Strategy

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Agenda

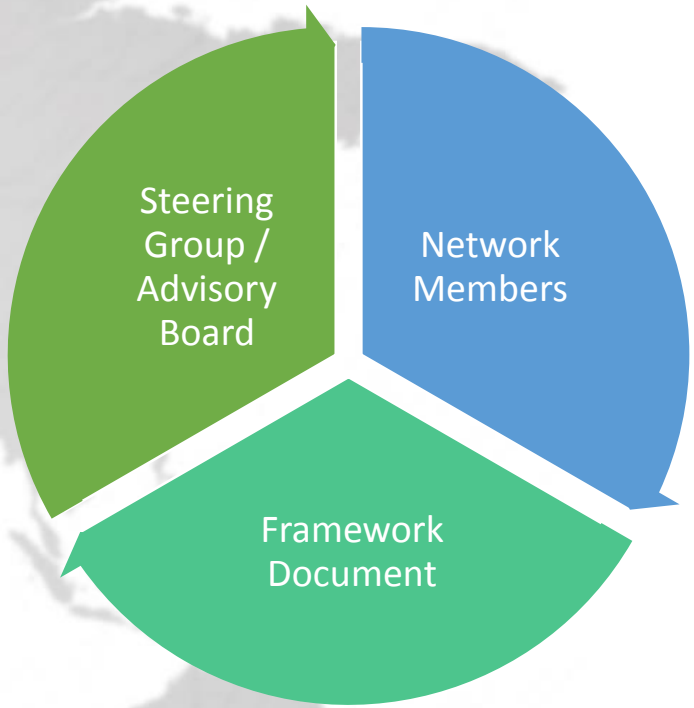
1. FC-ES journey from COP 15 to COP 23 and latest good practice
2. IChemE Energy Centre good practice – System thinking
3. UK Government good practice – Energy calculator
4. Audience questions

2. FC-ES journey from COP 15 to COP 23 and latest good practice

Beatriz Fernandez

Future Climate - Engineering Solutions - A Global Engineering Alliance

- A **global network** of **engineering associations** with activity in past 10 years across 23 countries
- We develop and share good practice in **national energy and climate plans**:
  - Aligned to **IPCC's scenario** of keeping global average temperature increase below 2°C
  - **Promoting renewable energies** and **independence** from **fossil fuels**
  - **Reduce GHG emissions** and **support countries** in achieving **NDCs**



FC-ES website: [fc-es.net](fc-es.net)

Climate Change and role of FC-ES

IPCC Fifth Assessment Report (2013)

Increase of carbon dioxide concentrations by 40% since pre-industrial times

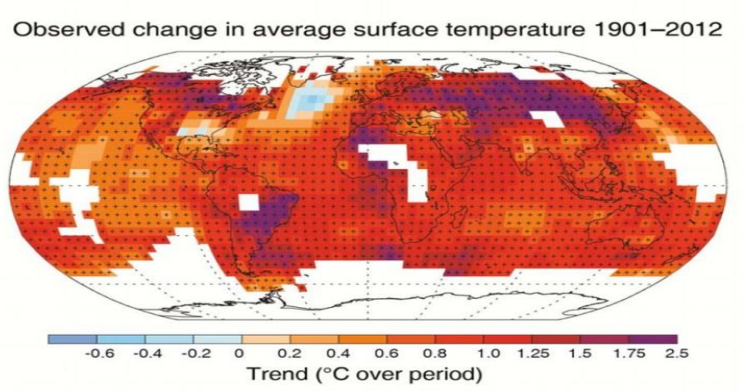
UNFCCC 23rd Conference of Parties (COP23)

Advance in the implementation of the Paris Agreement

Sustainable Development Goal 13:

Addressing Climate Change

Climate Change Agenda



Source: UN IPCC, White blocks indicate insufficient data
Bloomberg, 2013

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Engineering expertise to develop data and science-based national energy and climate plan to reduce greenhouse gas emissions

Participation from COP15 to COP23

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COP 23, Bonn, Germany

Partner with UK Governements side event highlighting FC-ES as broker

COP 21, Paris, France

Side event emphasizing the active role of engineers to assist governments in accomplishing NDCs

COP 19, Warsaw, Poland

COP 18, Doha , Qatar

Conference fringe event

COP 17, Durban, South Africa

FC-ES links with WFEO

COP 16, Cancun, Mexico

Christiana Figueres, former UNFCCC Secretary to FC-ES Engineers: *"You must keep pushing us along with your knowledge and keep on – don't give up!"*

COP 15, Copenhagen, Denmark

Official invitation from UNFCCC

FC-ES Approach and the Framework Document

- National plans must be based on sound engineering expertise
- Engage right stakeholders from the start
- Set realistic milestones for implementation
- The energy trilemma:
  1) affordability
  2) supply security
  3) climate change

Phase 4 - Present

Framework under development to be published in 2017
Symposium will be held **in 2018** for FC-ES **participating countries** to **update National energy and climate plans**

Phase 3 – 2011 - 2014

Under leadership of Institution of Civil Engineers (ICE) and IMechE in UK
Participated engineering associations representing 24 countries

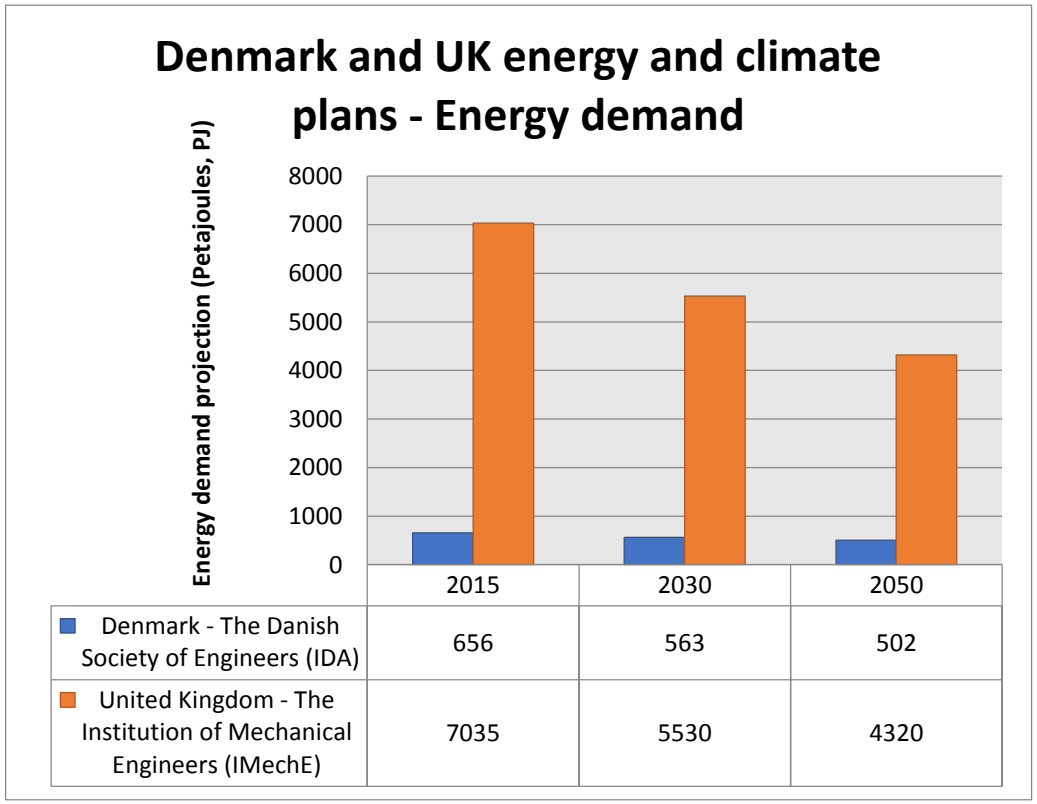
Phase 2 – 2009-2011

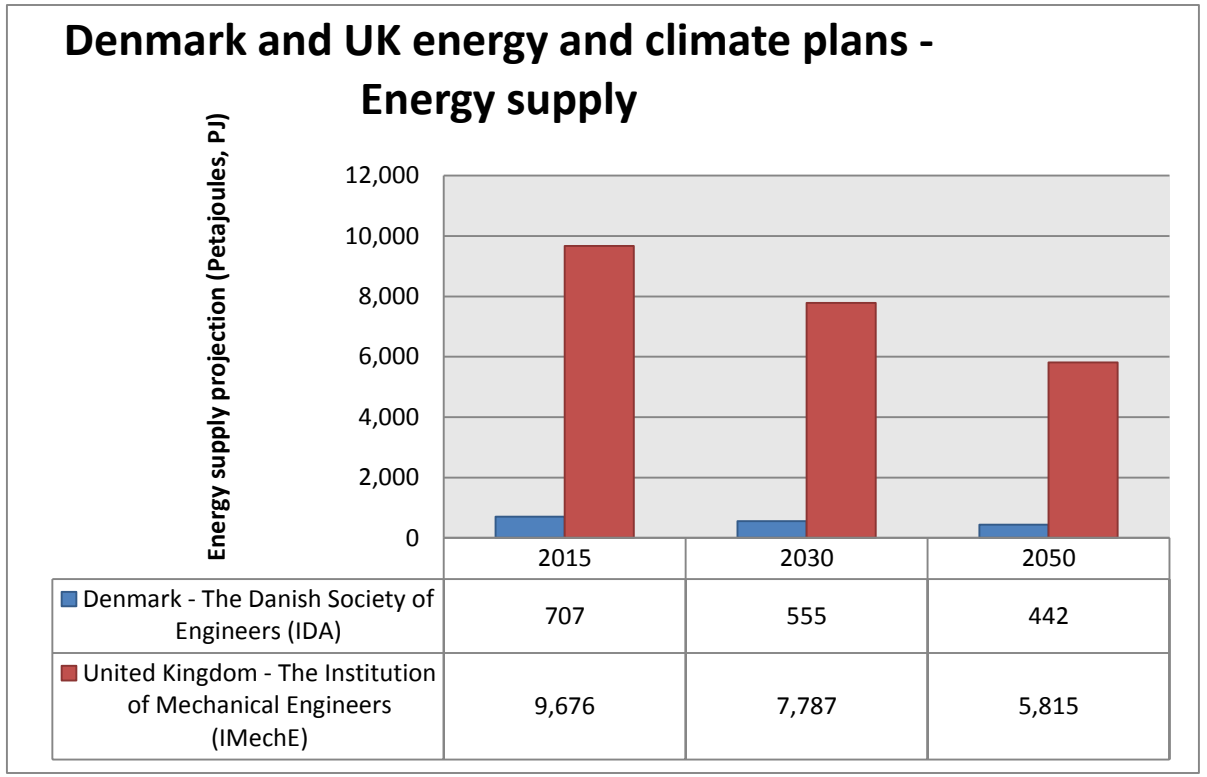
Leadership by Institution of Mechanical Engineers (IMechE) in the UK and IDA in Denmark
Produced eleven (11) National energy plans

Phase 1 – 2008 - 2009

Led by the Danish Society of Engineers (IDA) with engineering associations from 13 countries
Ten (10) National energy plans produced

National climate and energy plans – UK and Denmark





Denmark

- Lower energy demand based on energy savings,

United Kingdom

- energy efficiency strategies in buildings, transport and industry

Denmark

- Decentralized and distributed energy production based solely on renewable sources

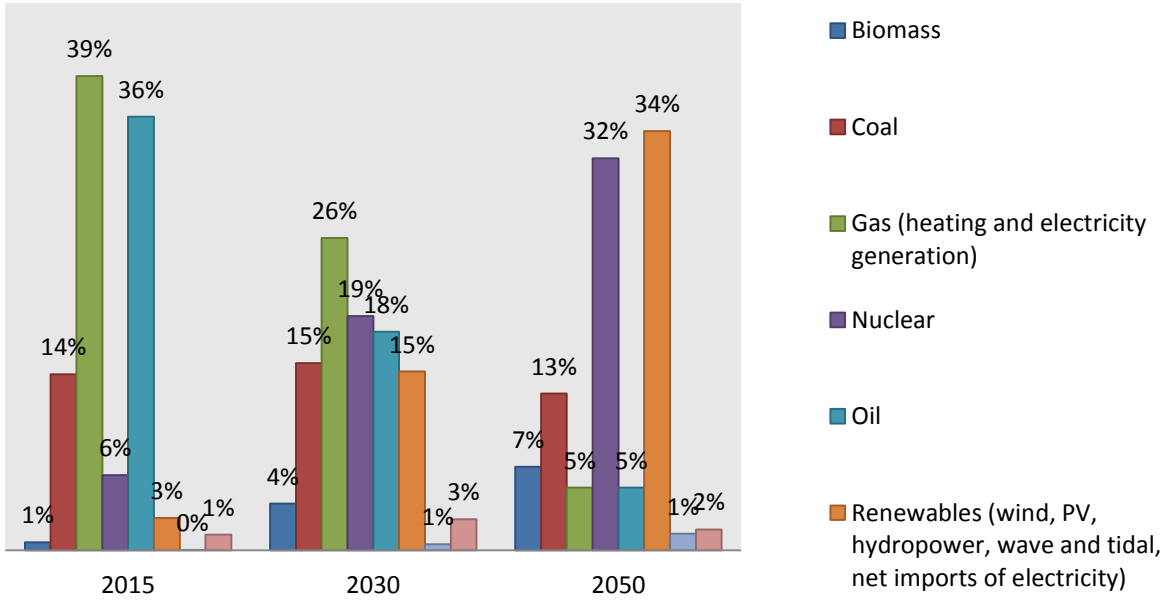
United Kingdom

- GHG emissions reduction target of 80% by 2050 by reducing energy supply by 48% by 2050

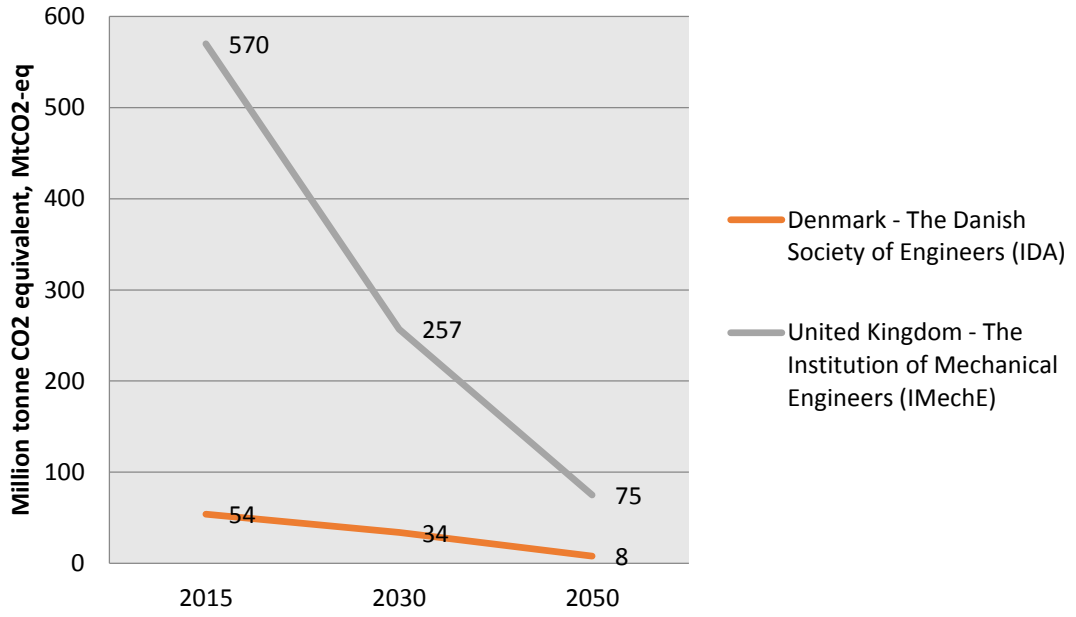
National climate and energy plan – UK

Future Climate Engineering Solutions

United Kingdom energy and climate plan by IMechE - Energy supply share by sources



Greenhouse gas emissions target (Million tonne CO2 equivalent, MtCO2-eq)



3. IChemE Energy Centre good practice – System thinking

Mark Apsey

IChemE Energy Centre – System Thinking

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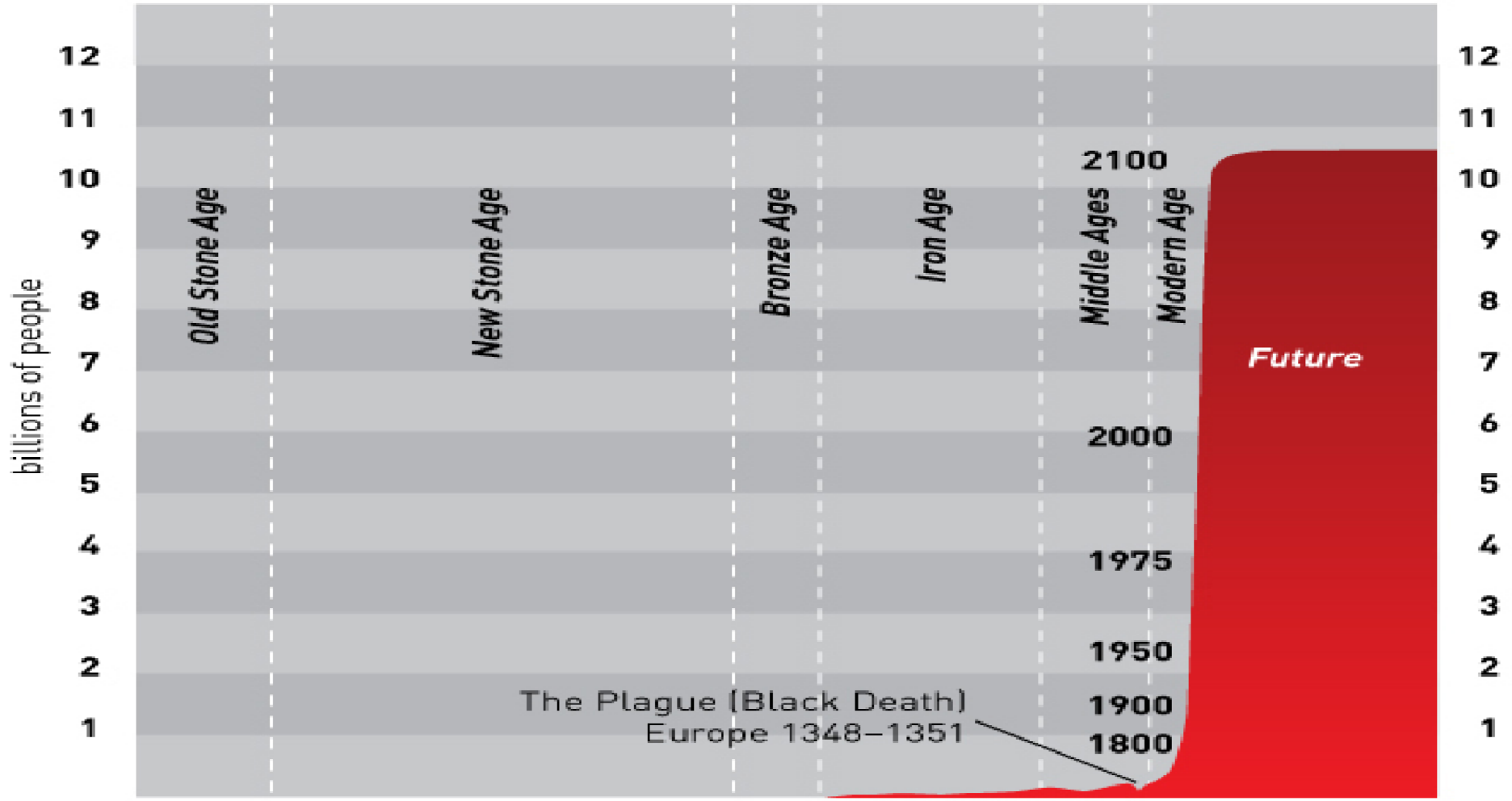
The Challenge



Source: Royal Geographical Society

The Challenge

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The world needs more...

Today 2030

40% ↑

Today 2030

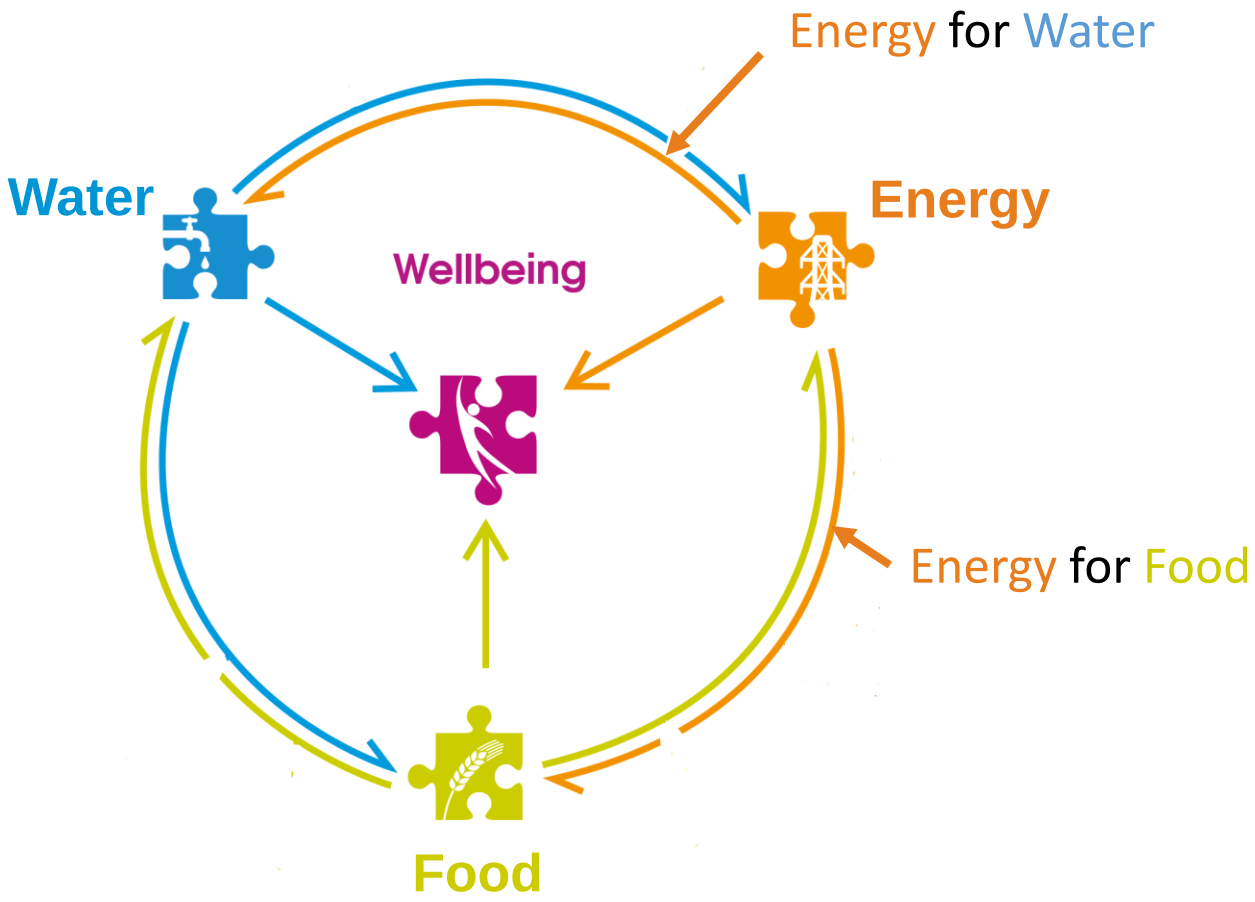
50% ↑

Today 2030

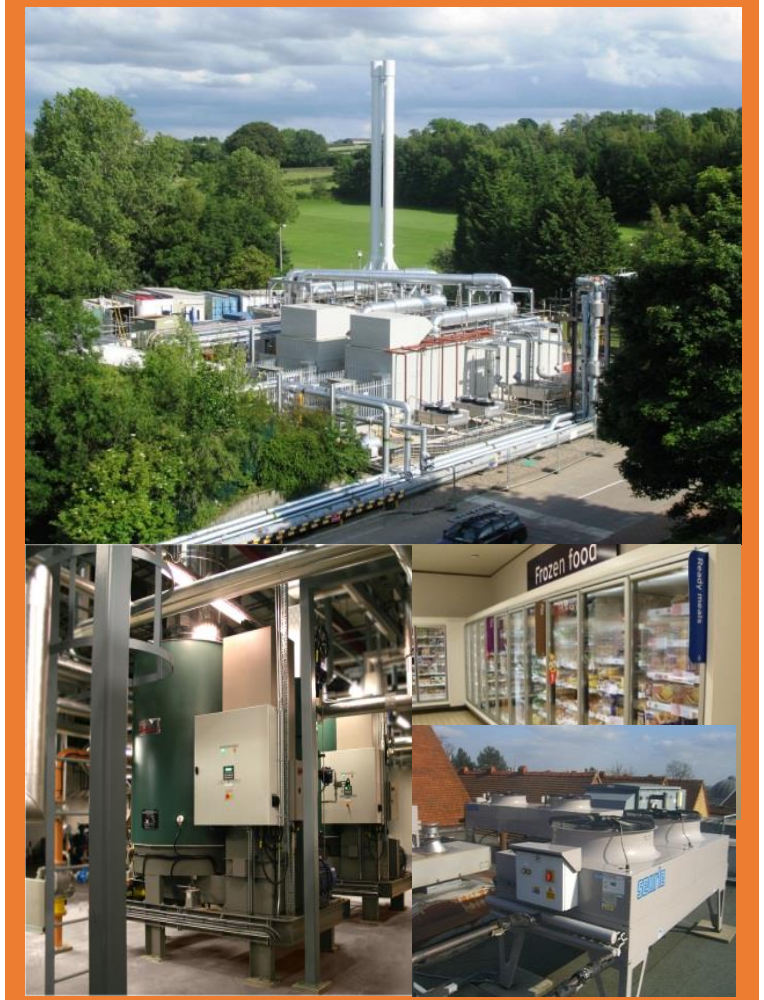
50% ↑

IChemE Energy Centre

Systems Thinking



Energy Efficiency



The work of the IChemE Energy Centre - Energy Vista

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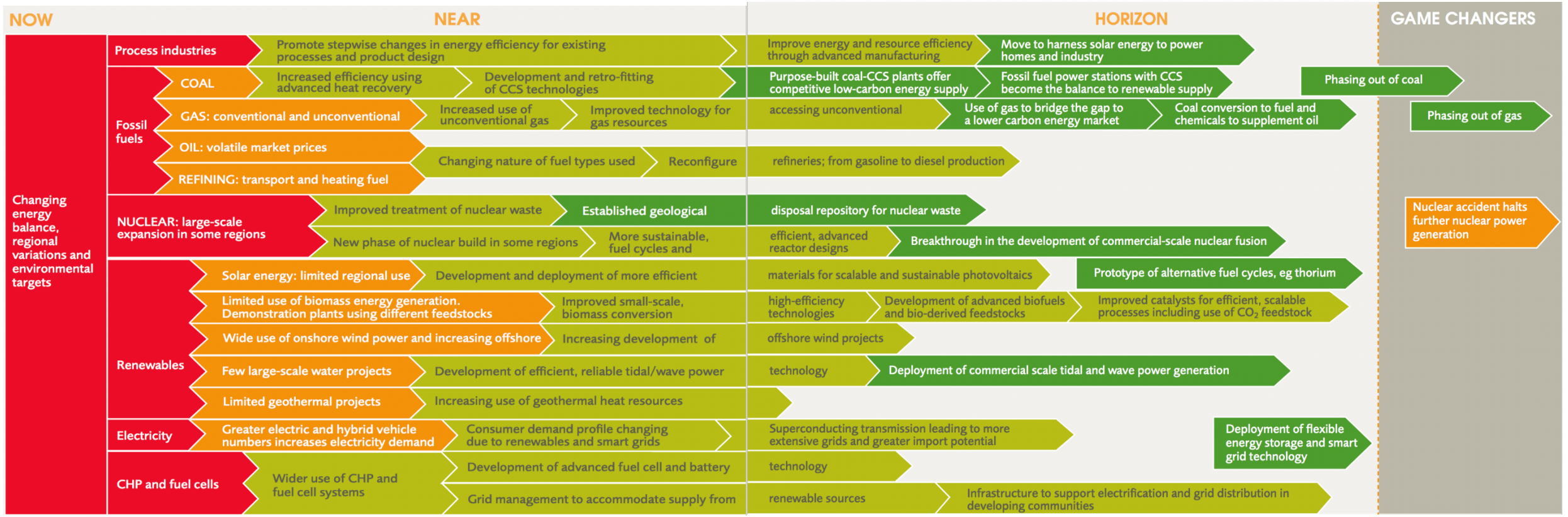

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Unblocking Action

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Project Steps

- Origination
  - Opportunity Assessment
  - Feasibility Study
- Full Business Case
  - Investment Grade Audit
  - Detailed Design and Engineering
- Project Delivery and Operation
  - Construction and Commissioning
  - Operations and Maintenance

Blocks

- Low energy costs relative to operating costs; not looking
- Not financially attractive; better use of capital
- Fear of disruption to operations; hassle
- Concerns over savings; will measures work; will incentives change
- No executive sponsorship; not core business
- Short termism; no pressure to act

IChemE Energy Centre

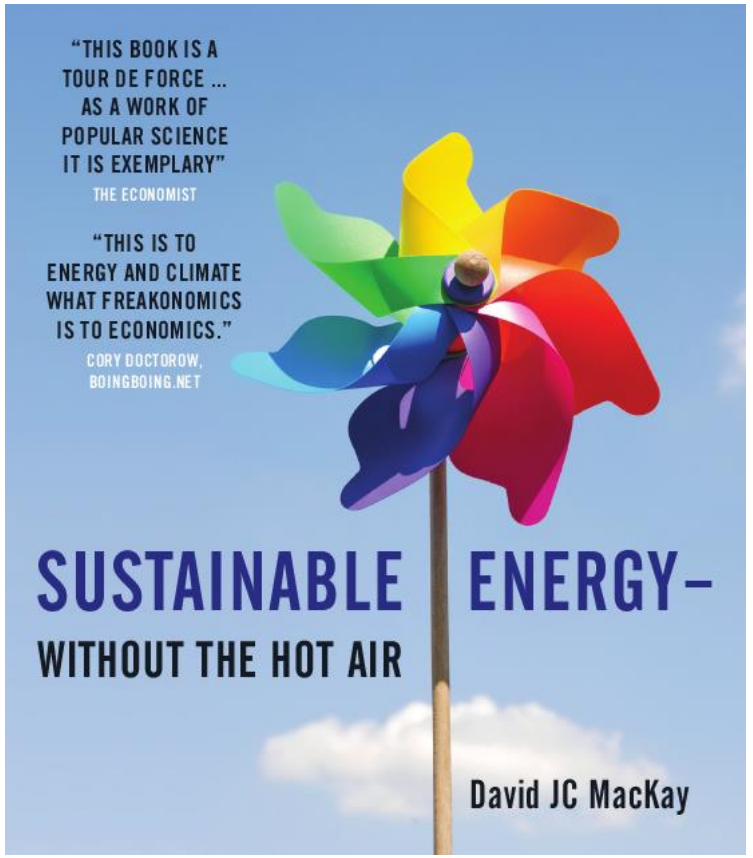
4. UK Government good practice – Energy calculator

Andy Webster

Evidence based climate solutions began in 2010

Future Climate Engineering Solutions

- The UK Climate Change Act 2008 brought in an ambitious target: 80% reduction of CO2e emissions by 2050.
- Department for Energy and Climate Change was put in charge of creating a cross-Government strategy for meeting this.
- But there was an ill-informed debate around what was possible.
- David MacKay's book advocated for a rational, numbers-based approach.



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Numbers based approach resulted in a global calculator

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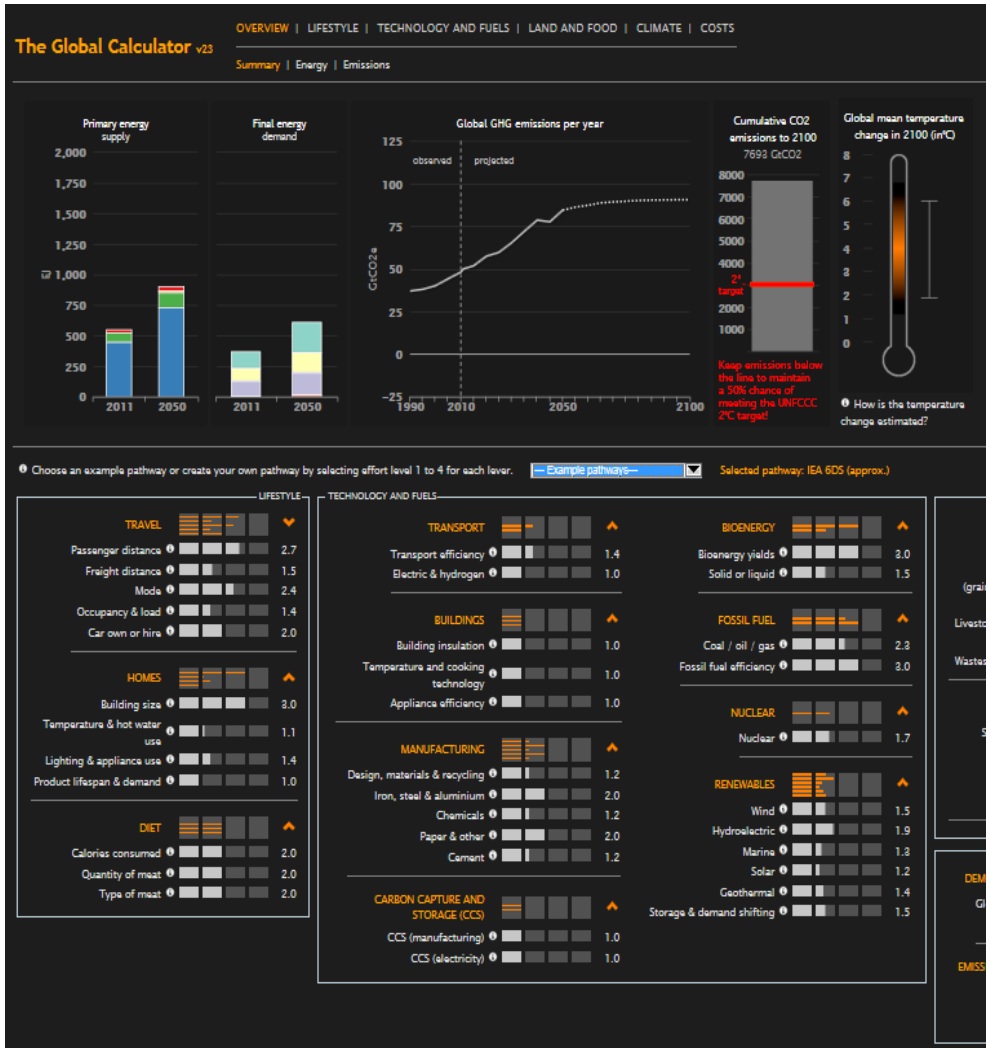

- A free and interactive tool that helps understand the link between lifestyles choices, energy use, and the consequences for the climate.
- Enable businesses, NGOs and governments to become increasingly informed and engaged in debating them in an evidence-based way.
- Encourage businesses and NGOs to use the tool so that they will:
  - Consider their own long-term strategies
  - Lobby governments for a global deal and actions that have the biggest impact on emissions

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Three principles behind the tool

Future Climate Engineering Solutions

1. **Openness** – an Excel-based tool which is fully published and available free online

2. **Collaboration** – built by a global team with input from hundreds of experts

3. **Simplicity** – modelling the world as simply as possible, while still including all energy, emissions and a full range of future scenarios

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How does it work? A demonstration

Available at www.globalcalculator.org

My2050 - 20,000 pathways submitted by the public

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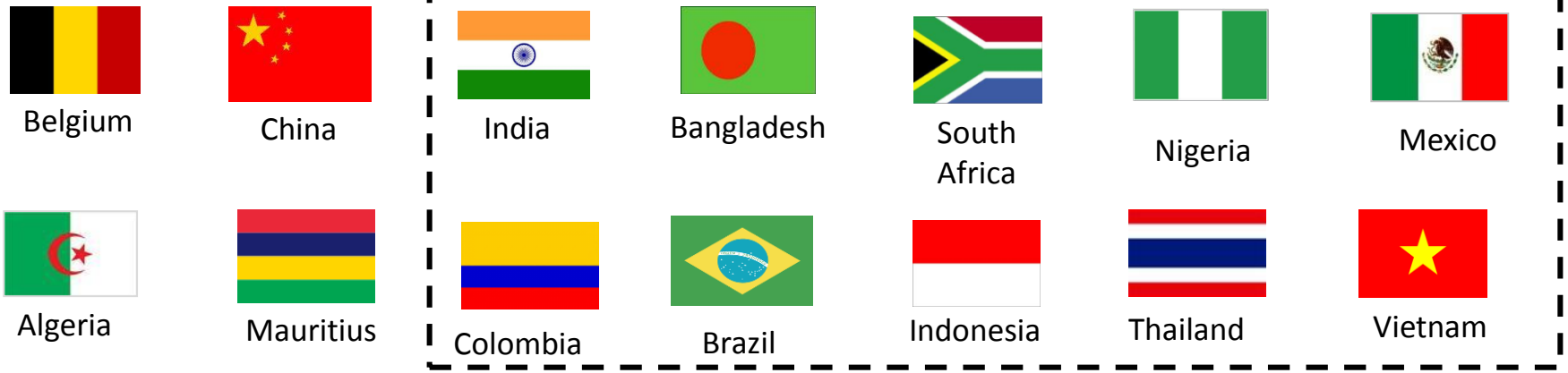
Development of calculators around the world

Future Climate Engineering Solutions

Supported by the International Climate Fund



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Since the launch of the Global Calculator

Future Climate Engineering Solutions

- Over 22,000+ users of the webtool and 77,000 users of the website
- Events held in the US, India, Japan, Brazil and South Korea among others
- Pathways provided by:

WORLD NUCLEAR ASSOCIATION

friends of the earth see things differently

iea International Energy Agency

WORLD ENERGY COUNCIL CONSEIL MONDIAL DE L'ENERGIE

The Vegan Society One world. Many lives. Our choice.

Mott MacDonald

- Used in classes at a number of universities

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It’s useful but it’s not the complete answer

Future Climate Engineering Solutions

What’s good about it?

- It allows exploration, rather than finding one “right” answer
- Works very well as an educational tool
- Covers all energy and emissions in one place
- Really highlights the importance of non-energy sectors, e.g. land use
- Can be used to provide a “common language” for discussion

What does it not do?

- Doesn’t divide up the world into countries
- Costs and climate impact sections could be improved to show costs avoided by stopping climate change

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5. Audience questions

More information:

www.icheme.org/energycentre , energycentre@icheme.org

www.fc-es.net

Key takeaways

1. The engineering voice and skill set is being used in many countries to ensure that what's possible is well understood.

   - Welcome sign up from national engineering organisations here today

2. In 2018 Future Climate - Engineering Solutions will be inviting countries to participate in evidence based Energy & climate plans

3. Good practice from 10 years of experience include using system thinking and energy calculators.

5. Audience questions

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