ENERGY AND CLIMATE PLANNING TO 2050

Phase 4 Framework

Future Climate – Engineering Solutions

in partnership with

AGENDA FOR TODAY'S CALL

Future Climate
Engineering Solutions

- Introduction to speakers
- History of Future Climate – Engineering Solutions project
- Introducing Phase 4
- Joining FC-ES and producing an Energy and Climate Plan
- Best practice principles from 2008 to 2018
- Timeline for Phase 4
- Question & Answers
- Close out and next steps

Andy Webster

Co-chair of Future Climate Engineering Solutions

Fellow of Institution of Mechanical Engineers

Beatriz Fernandez

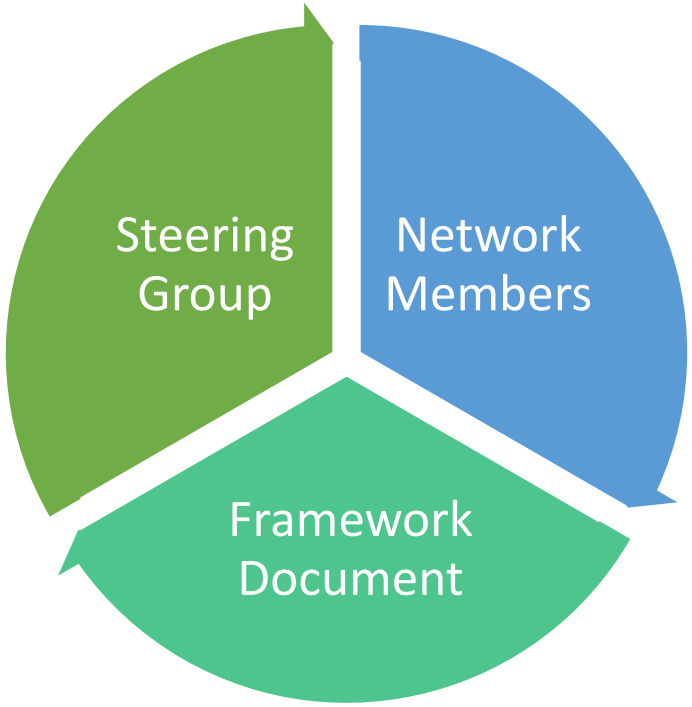
Member of FC-ES steering committee

Consultant for United Nations Environment

HISTORY OF FUTURE CLIMATE – ENGINEERING SOLUTIONS

Future Climate Engineering Solutions

- 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 **whole system energy** thinking
  - **Reduce GHG emissions** and **support countries** in achieving **NDCs**



HISTORY OF FUTURE CLIMATE – ENGINEERING SOLUTIONS

Future Climate Engineering Solutions

Phase 4 - Present

Framework published TODAY
Symposium will be held **in 2018** for FC-ES **participating countries** to **update National Energy and Climate plans**

Phase 3 – 2011 - 2014

Leadership by Cambridge University Engineering Department and the Global Association for Transition Engineering in the UK.
Participated engineering associations representing 29 countries

Phase 2 – 2009-2011

Leadership by Institution of Mechanical Engineers (IMechE) in the UK.
Produced eleven (11) National Energy and Climate plans

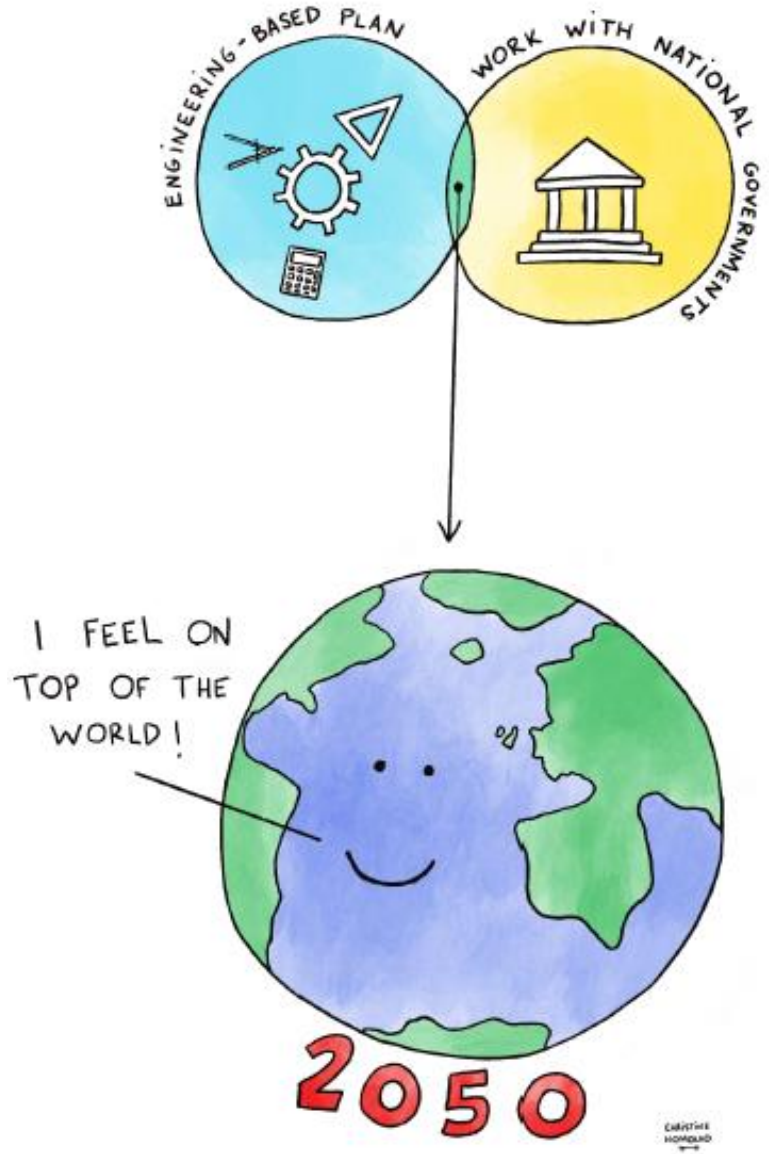
Phase 1 – 2008 - 2009

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

INTRODUCING PHASE 4

Co Chairs for Phase 4:

- Dr Alexandra Howe, MSc, BSc, MRSB, Future Climate-Engineering Solutions
- Andy Webster, CEng, Fellow Institution of Mechanical Engineers



PHASE 4 STEERING GROUP

Future Climate Engineering Solutions

- Dr Alison Cooke, CEng, Fellow Institution of Mechanical Engineers
- Beatriz Fernandez, Consultant, United Nations Environment Programme
- Daniel Kenning, CEng, CEnv, FIMechE, MGATE, MEI, Chair Global Association for Transition Engineering
- Gerald Sekti, BIct, Future Climate-Engineering Solutions
- Jacob Ohrvik-Stott, MEng, Member Institution of Chemical Engineers
- Dr Jean Venables, CBE, FREng, CEng, Fellow Institution of Civil Engineers / WFEO
- Dr Jenifer Baxter, CSci, MEI, CEng, Member Institution of Mechanical Engineers
- Lee Billingham, BEng, MSc, CEng, Fellow Institution of Mechanical Engineers
- Mark Apsey, MEng, CEng, Member Institution of Chemical Engineers
- Pernille Hagedorn-Rasmussen, MSc, The Danish Society of Engineers
- Phil Cohen, MEng, Department for Business Energy and Industrial Strategy
- Rob Curd, BA, PG Dip, Institution of Civil Engineers

BASIC NATIONAL ENERGY AND CLIMATE PLANS

Future Climate Engineering Solutions

A. A short description of the work conducted by the association, including how the plan was developed, who contributed, etc.

B. A qualitative and quantitative description of the energy system and the sources of GHG emissions, e.g. the BEIS 2050 Global Calculator. If a country has official national goals for energy and climate, these must clearly be stated.

C. Description of the most important technologies and solutions proposed for implementation towards the year 2050; characterisations of the technologies, the development status and the present and prospective diffusion within the country. This includes quantitative data regarding the diffusion of the technology, annual GHG reductions, and associated costs. Data should be provided for 2030 and 2050, as well as for baseline years.

ADVANCED NATIONAL ENERGY AND CLIMATE PLANS

Future Climate Engineering Solutions

A. A short description of the work conducted by the association, including how the plan was developed, and who contributed.

B. A qualitative and quantitative description of the whole energy system including demand and supply side cost and cost savings, and the sources of GHG emissions. If a country has official national goals for energy and climate, these must clearly be stated.

C. Description of the most important technologies and non-technological solutions proposed for implementation towards the year 2050, for demand and supply; characterisations of the technologies, the development status and the present and prospective diffusion within the country. This includes quantitative data regarding the diffusion of the technology, annual GHG reductions, and associated costs. This data could be presented in a SWOT table to aid others in understanding relative strengths and weaknesses of solutions. Data should be provided for 2015, 2030 and 2050, as well as for the baseline years.

ADVANCED NATIONAL ENERGY AND CLIMATE PLANS

Future Climate Engineering Solutions

D. A qualitative and quantitative description of the total climate plan based on the technology solutions proposed. Quantitative data for 2015, 2030 and 2050, as well as the baseline year, for the energy system, need to be compiled.

E. A description of the measures that are required to support the development and diffusion of the technologies. This could include R&D; incentives which promote innovation; technology transfer incentives; Joint Implementations (JI) and Clean Development Mechanisms (CDM), subsidies, regulations, etc.

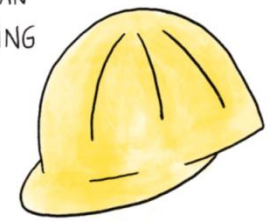
F. The scenarios of the plan need to include economic analyses and estimates of the costs of specific technologies as well as the economic viability of the climate plan proposed.

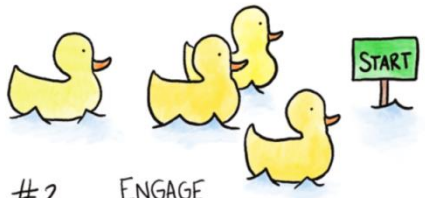
G. Security of supply issues need to be addressed in the report. The sustainable climate scenario needs to be developed based on available energy resources and without risk to sustainable food production.

H. Associations are encouraged to include a description of the national innovation, business and job creation potential of their climate plan.

TEN BEST PRACTICE PRINCIPLES

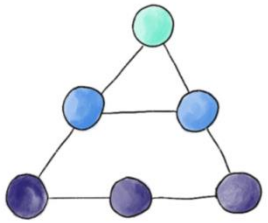
#1 HAVE AN ENGINEERING BASIS





#2 ENGAGE STAKEHOLDERS FROM THE START

#3 HAVE A CLEAR WORKPLAN



#4 USE THE ENERGY HIERARCHY

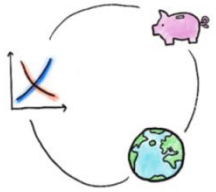
#5 BE REALISTIC

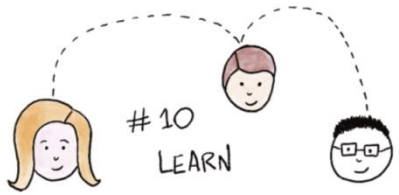
#6 USE GOOD DATA

#7 BE ACTION FOCUSED

#8 IDENTIFY WHO WILL OWN THE PROJECT

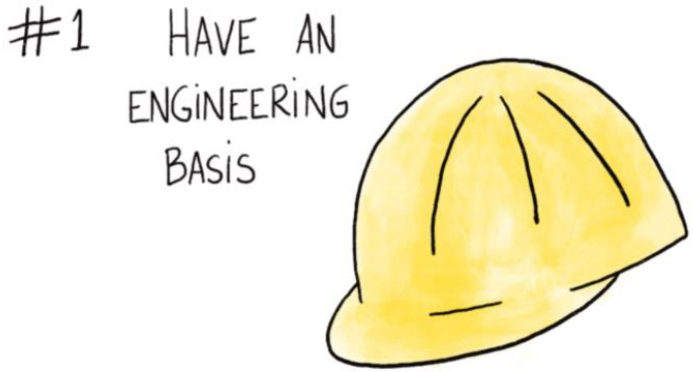
#9 CONSIDER AN ENERGY CYCLE





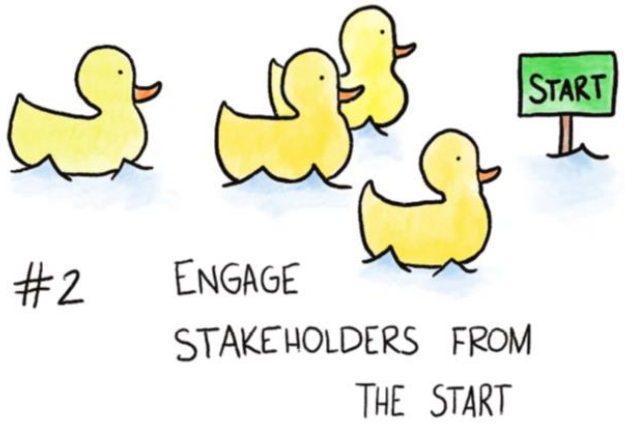
#10 LEARN FROM OTHERS

TEN BEST PRACTICE PRINCIPLES



National energy and climate plans need to draw on sound engineering expertise rather than those based only on political goals, short-term expedience, or a particular technology.

TEN BEST PRACTICE PRINCIPLES



Engagement should begin early in the project. Be clear about who the stakeholders are before embarking on the creation of a plan. Identify the key stakeholders whose input is desired, who will help put the plan together, will own it, promote it once it is complete, and help disseminate it.

TEN BEST PRACTICE PRINCIPLES

Develop a strategy for how the plan will be created; how much time will be required and what budget may be needed.

TEN BEST PRACTICE PRINCIPLES

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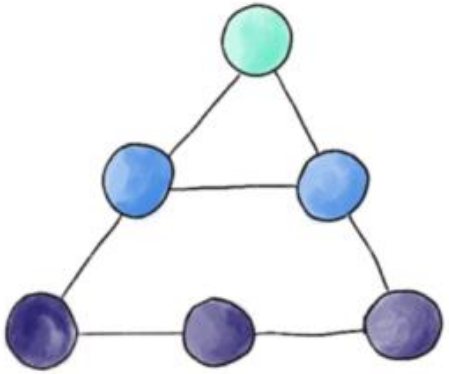
Use the energy hierarchy as a framework for making design decisions about the energy system proposals, from the bullet points below in order of priority:

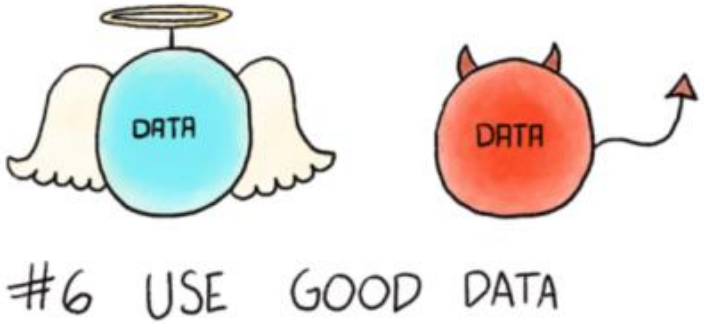


- Minimise demand for energy including non-technological change such as behaviour change, policy, and spatial planning;
- Increase energy efficiency and consider energy conversion technologies;
- Source energy from sustainable renewable resources;
- Having maximised the above points, use other energy supplies with associated technologies that minimise greenhouse gas emissions.

TEN BEST PRACTICE PRINCIPLES

Develop a plan with achievable timescales. Consider what actions are needed, by whom and by when to meet the identified targets and climate change goals.

TEN BEST PRACTICE PRINCIPLES



The energy and climate plans need to be based on data from peer-reviewed sources, describing historical trends in supply and demand in supply. A part of the plan would be the creation of mechanisms to generate high-integrity data where they do not currently exist.

TEN BEST PRACTICE PRINCIPLES

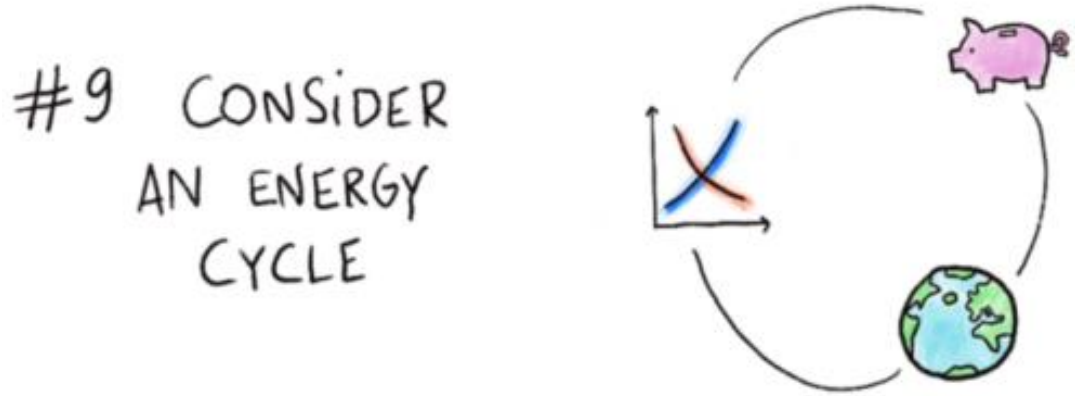
Ensure the plan strikes an appropriate balance between the focused actions needed and the background information that underpins those identified actions.

TEN BEST PRACTICE PRINCIPLES

Consider how the energy plan will be sustained beyond its completion and dissemination. Who will monitor its use, accuracy, success and compliance and ultimately take responsibility for revising the plan with what timeline?

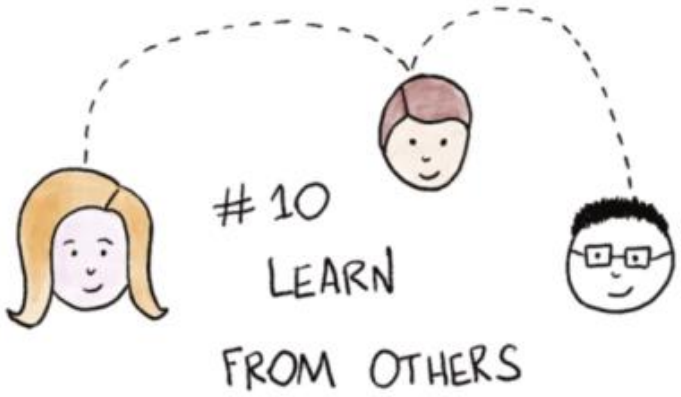
TEN BEST PRACTICE PRINCIPLES

A sustainable plan must not only minimise damage, but must aim to meet societal and environmental objectives, which need to be stated. These objectives will include:



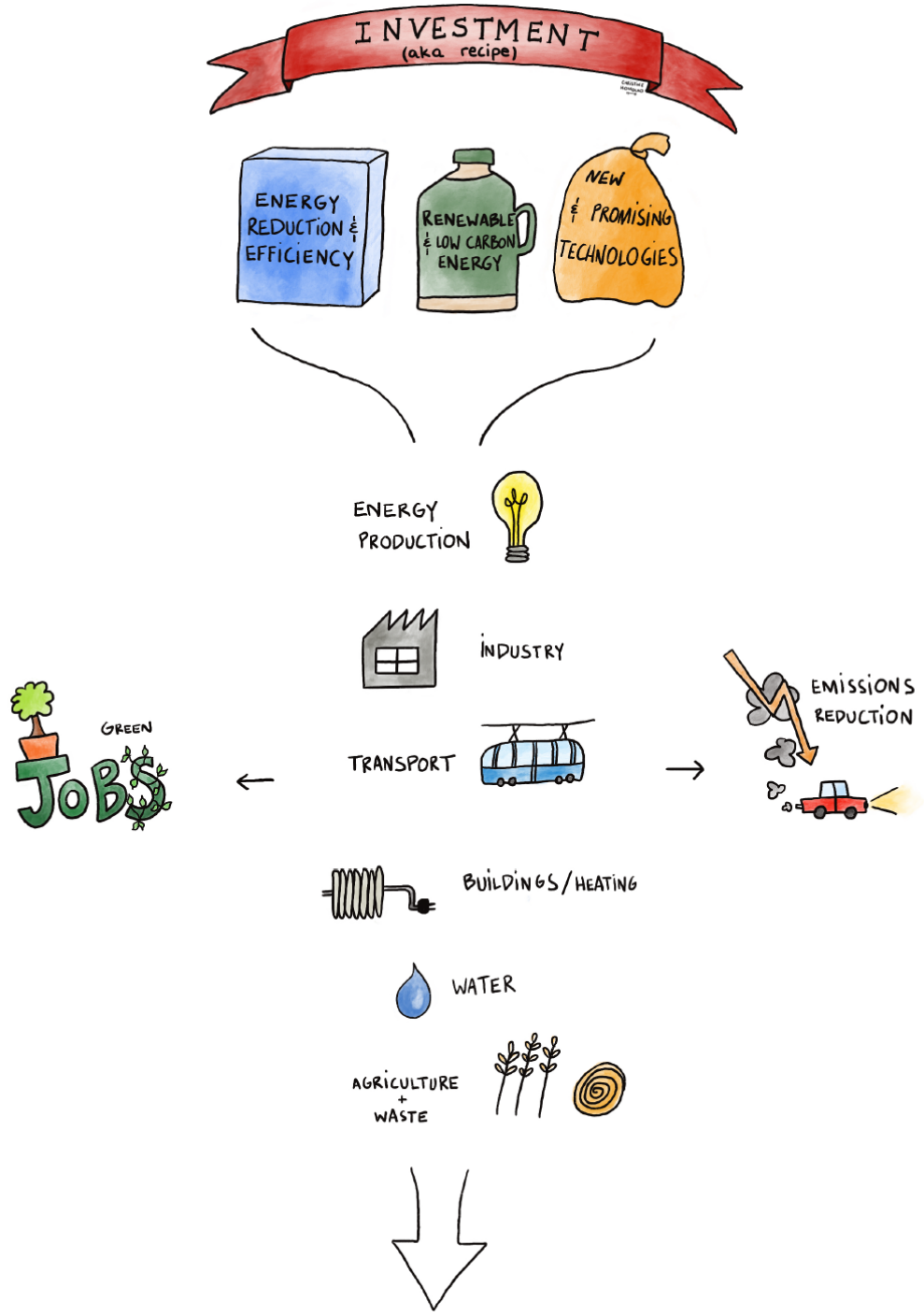
- Environmental sustainability – each plan should demonstrate how to mitigate the climate change and wider environmental impacts through demand and supply side efficiencies, and supply from renewable and low carbon sources;
- Social equity – plans should consider accessible and affordable energy solutions;
- Economic security – plans should look at satisfying the supply-demand balance with an acceptably low risk of disruption. Focussing on energy demand systems allows for flexibility, diversity, and overall demand reduction.

TEN BEST PRACTICE PRINCIPLES



The FC-ES project is as much about “how” a national energy and climate plan is created as it is about “what” goes into that plan. To ensure the optimum process of continual improvement, participants are encouraged to collaborate with and learn lessons from other organisations.

ENERGY & CLIMATE PLAN STRUCTURE



PHASE 4 TIMELINE

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Date	Action for Steering Group	Action for Report Writers
February 2018	Publish Energy and Climate Planning to 2050 - Phase 4 Framework	Read Phase 4 Framework
February 2018	All-Network Kick-Off event: Webinar to introduce Phase 4: Open to all Engineering Associations network members / new members introduced via WFEO	Join Webinar
February 2018	Support work on development of Energy and Climate Plans	Develop plan and recruit team to create Energy and Climate Plan
May 2018	Mid-Term Review and Report: Review first data and summary of main aspects provided by participating countries.	Start work on collecting data to support Energy and Climate Plan. Submit first data and summary of main aspects of Plan.
May - September 2018	Feedback and comments on the mid-term report	Continued work by participating engineering associations
September 2018	Review draft Energy and Climate Plans.	Submit draft Energy and Climate plans including a final data sheet
October 2018	Provide feedback and comments on draft Plans.	Review comments and update Plan.
October 2018	Global Engineering Congress Panel Session on Phase 4 project.	Attend Global Engineering Congress
December 2018	Collate National Energy and Climate Plans and develop summary.	Submission of final Energy and Climate Plan
December 2018	Presentation of Energy and Climate Plans at COP24	Share Energy and Climate Plan with national stakeholders.

QUESTION & ANSWER

WHATS NEXT?

Future Climate Engineering Solutions

- Review the Phase 4 report on www.fc-es.net
- Gain commitment from the engineering organisation in your country to join the Phase 4 project.
- Email Andy & Alex to confirm your participation. (andy.t.webster@outlook.com / alexandrajanehowe@gmail.com)
- We will set up a ‘community’ to meet, share ideas, and get support.

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