Occam Lecture

From High Carbon Baby to Low Carbon Boardroom

Juliet Davenport
Good Energy

Michaelmas 2016

“Saving our planet, lifting people out of poverty, advancing economic growth... these are one and the same fight.

We must connect the dots between climate change, water scarcity, energy shortages, global health, food security and women's empowerment. Solutions to one problem must be solutions for all”

Ban Ki-moon. UN Secretary General

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Following the Thread

- Studied Physics at Merton (1986) with Atmospheric Physics as speciality

MERTON COLLEGE OXFORD

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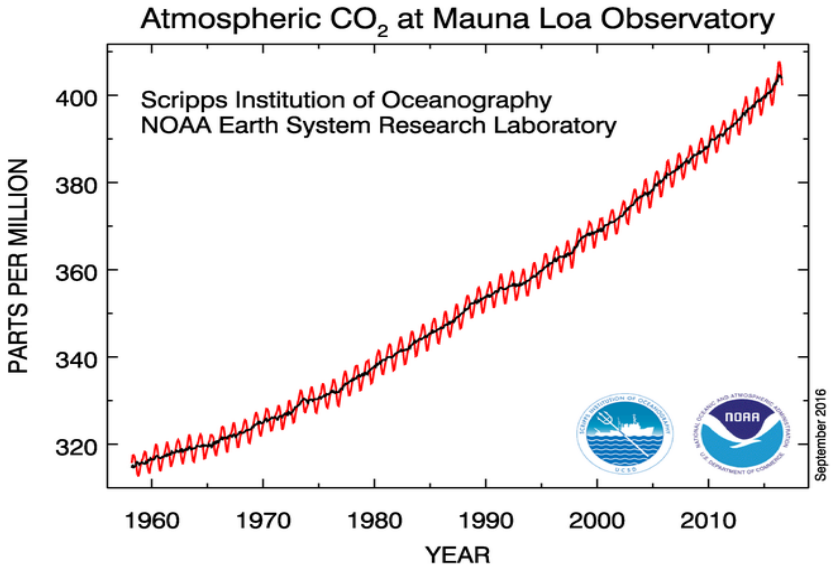
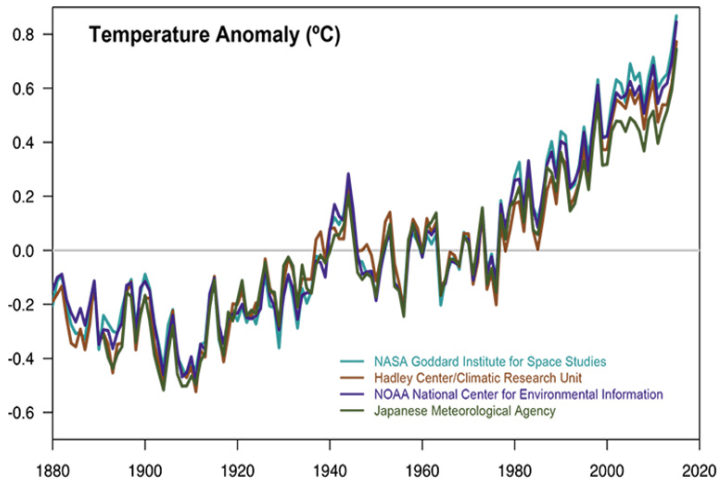
Facts and Changing Attitudes





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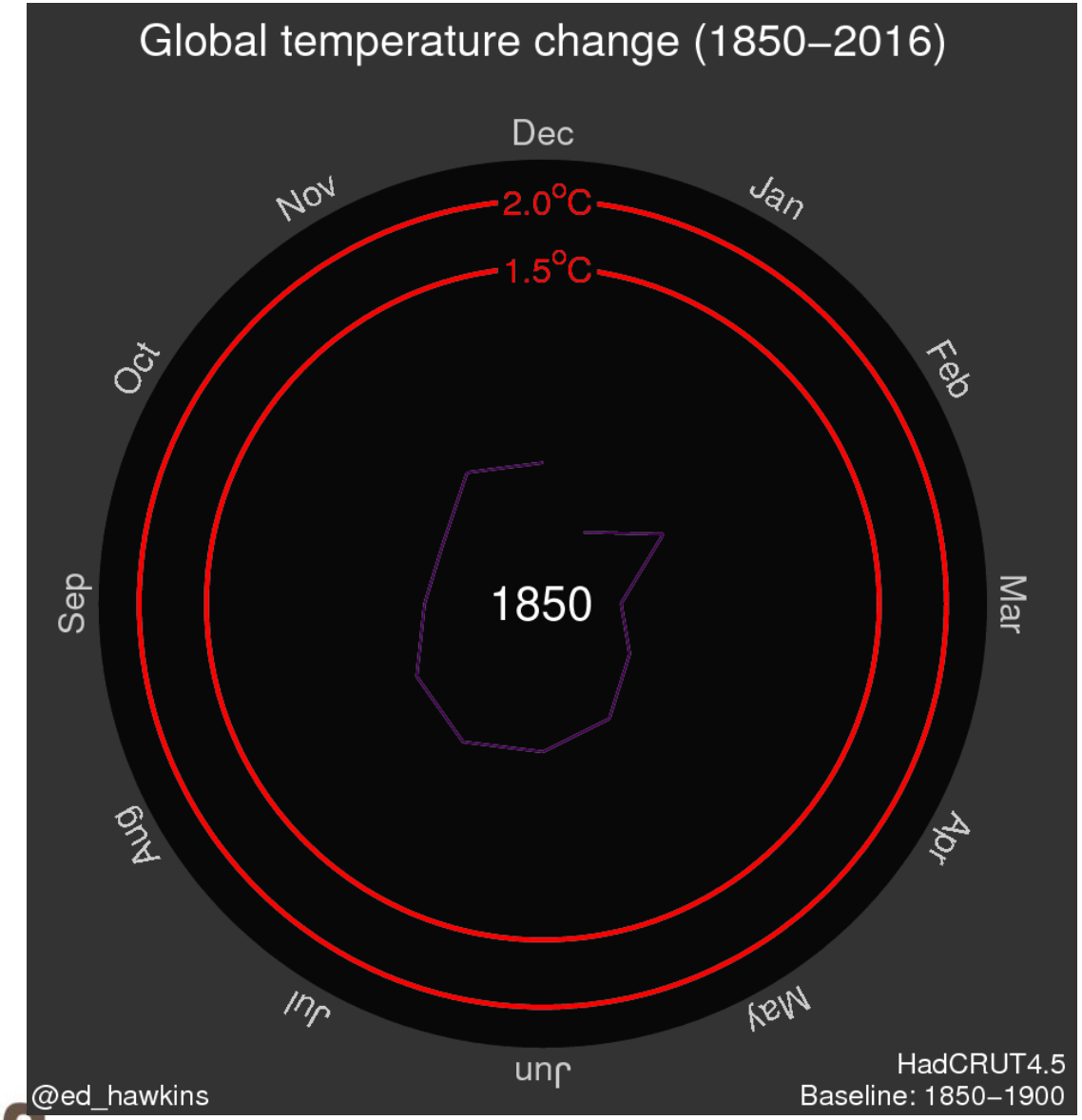

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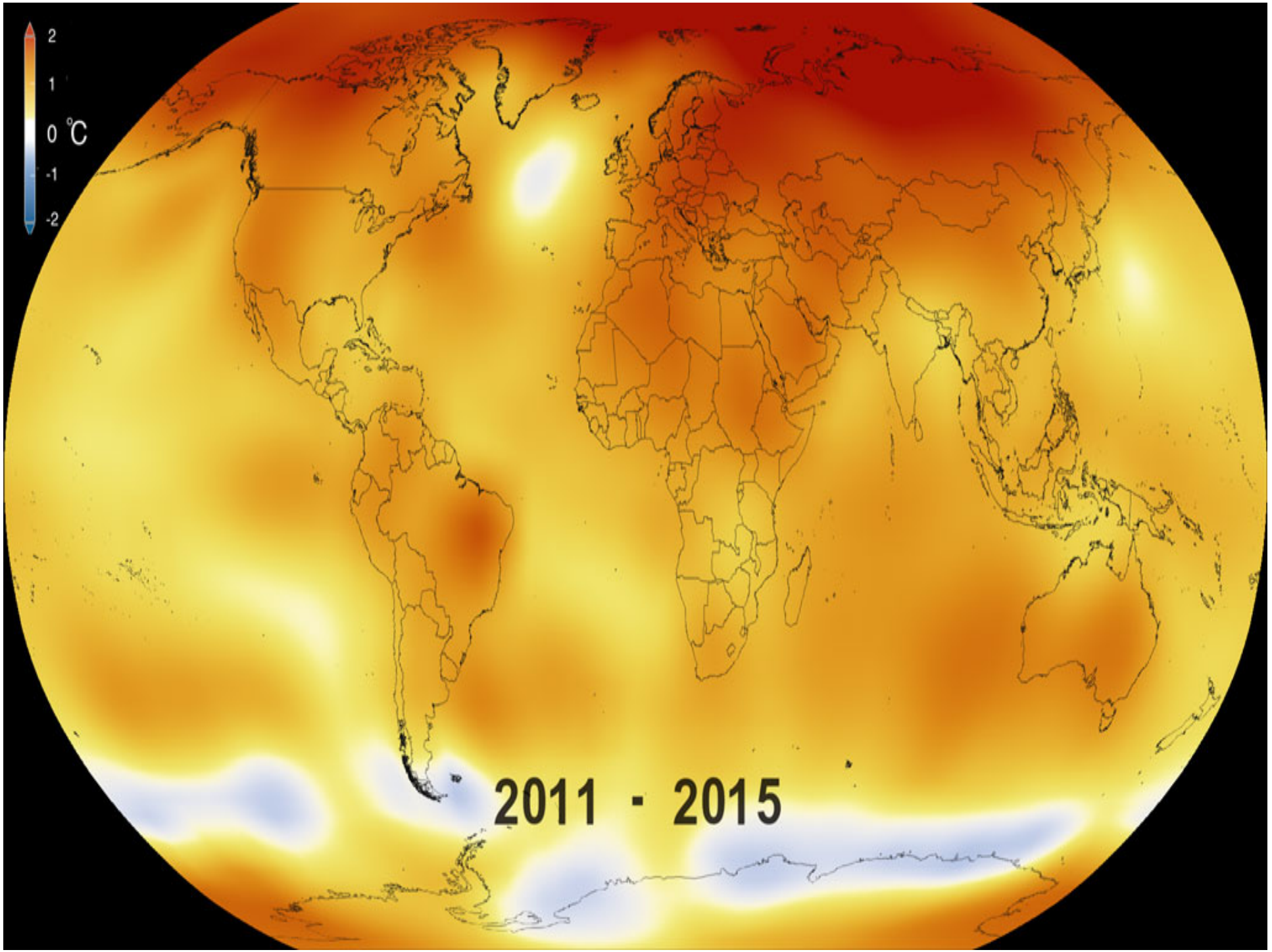
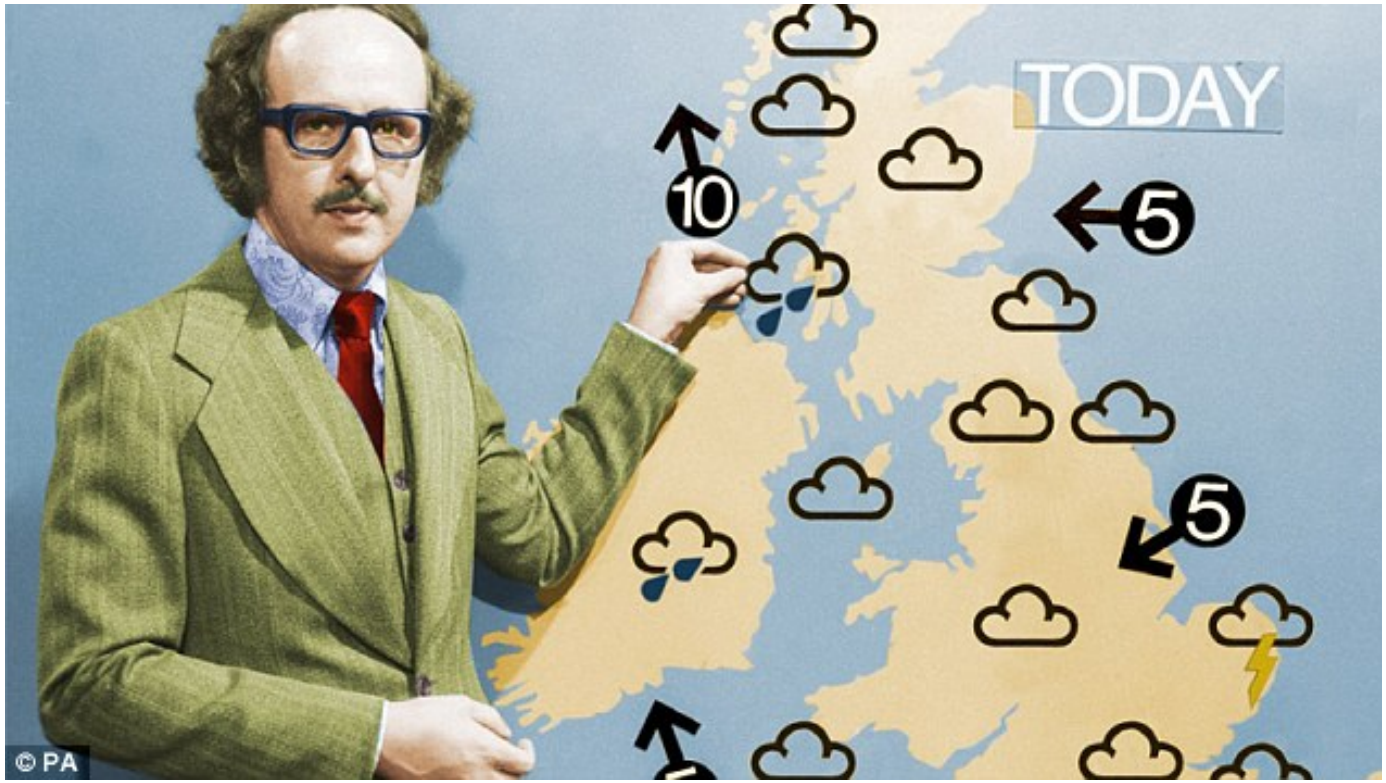

2
1
0 °C
-1
-2
2011 - 2015



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And the thread continues on….

- Economics Masters at Birkbeck College, London
- Internship in European Commission and the European Parliament on carbon taxation

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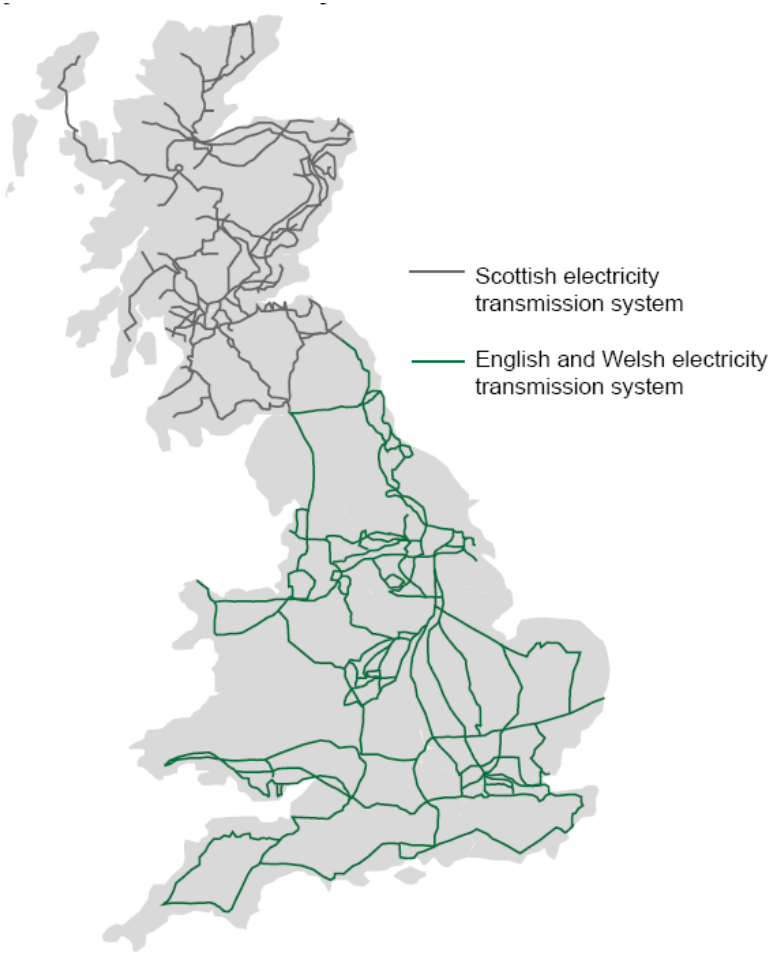
Grid Infrastructure Bias



- Built in mid 20th Century with few improvements since
- Interconnectors – a useful flexibility option that requires transmission
- National Grid maintain 50Hz frequency across the grid

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National Grid

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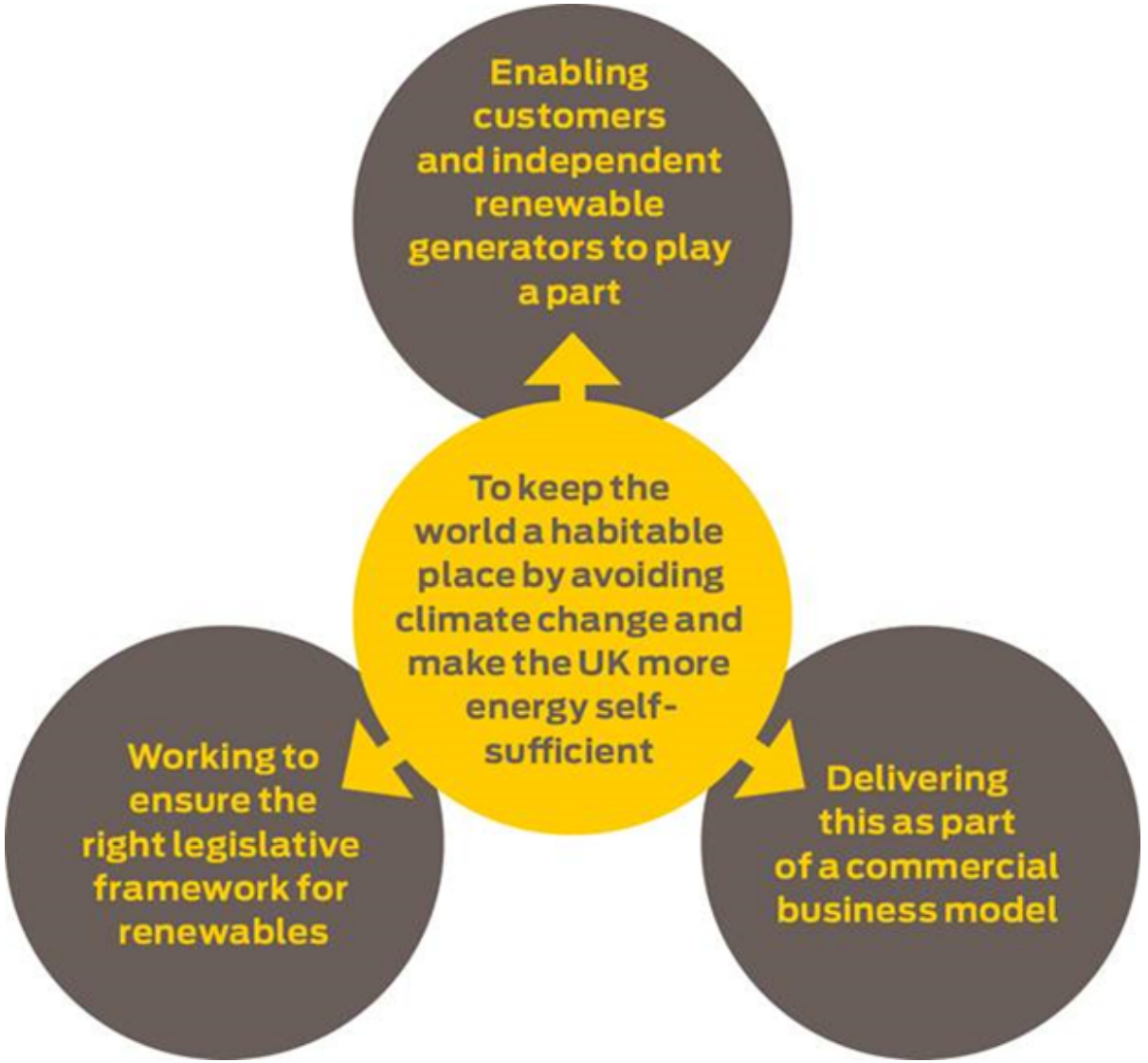
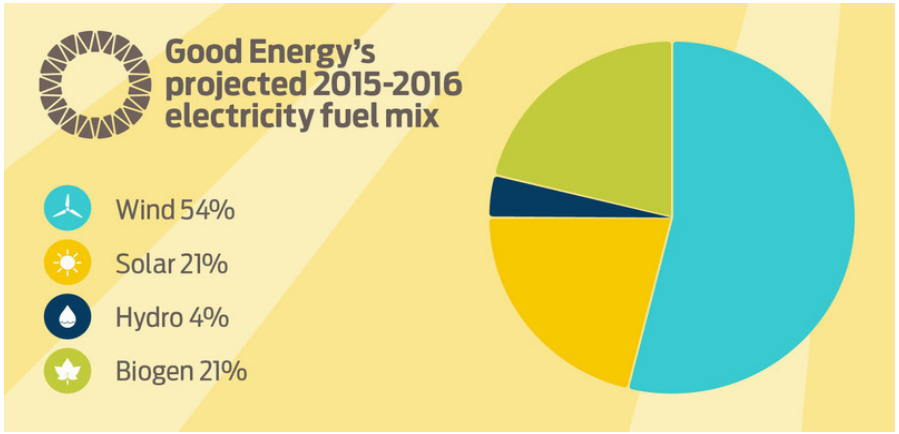
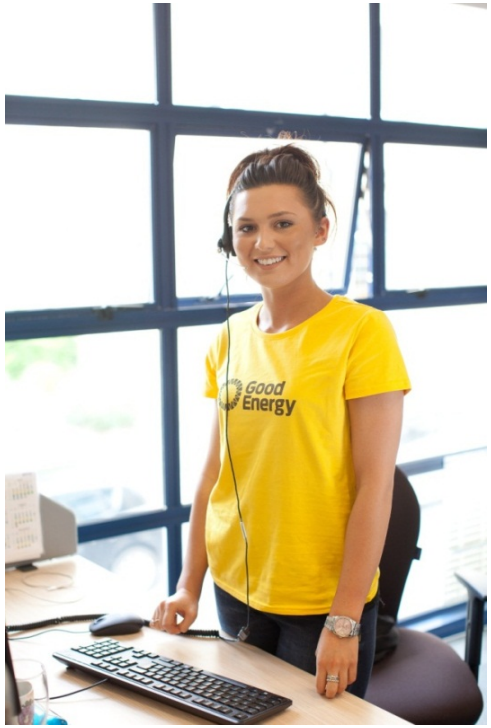
Who is Good Energy?

What is our Purpose?



What do we do?


Good Energy's projected 2015-2016 electricity fuel mix
Wind 54%
Solar 21%
Hydro 4%
Biogen 21%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Good Energy's Story

- I wanted to work with people - its all about the customers
- Created the "blueprint" for a low carbon economy
- We were radical and very entrepreneurial
- No-one in the city believed that a concept like Good Energy would work
- So we turned it on its head and asked our customers if they would invest

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How do we influence

- Natural Environment Research Council (NERC)
  - Award judging panel
- Energy UK Board
  - Small supplier voice
- Ofgem steering groups
  - Influence energy policy
- Founding supporter of POWERful Women
  - Influence business and inspire others

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NERC Research

- First **Impact Awards 2015** recognised and rewarded the contribution of NERC science in four research areas fundamental to policy or business:

  - **Economic Impact:** Water and gas monitoring instruments and job creation
  -
  - **Societal Impact:** Butterfly conservation in a changing climate
  - **Early-Career Impact:** extreme weather warnings
  - **International Impact:** Ozone layer protection and

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Climate Change: Science and Policy

- **Climate Science and Technology**
  - Accepted among the scientific community: IPCC Working Group 1
  - Sensitivities difficult to determine accurately (eg CO_2)
  - Innovation and research always improving (eg Solar PV)

- **Political Challenges and Messaging**
  - Short-termism and underlying principles
  - Paris Agreement and compromises – Finance flows
  - Global problem with distributed local impacts
  - Difficult to translate global risk into local reality into personal action

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PARIS2015
CONFÉRENCE DES NATIONS UNIES SUR LES CHANGEMENTS CLIMATIQUES
COP21·CMP11

MARRAKECH COP22|CMP12
UN CLIMATE CHANGE CONFERENCE 2016
مؤتمر الأمم المتحدة لتغير المناخ

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Energy Evolution

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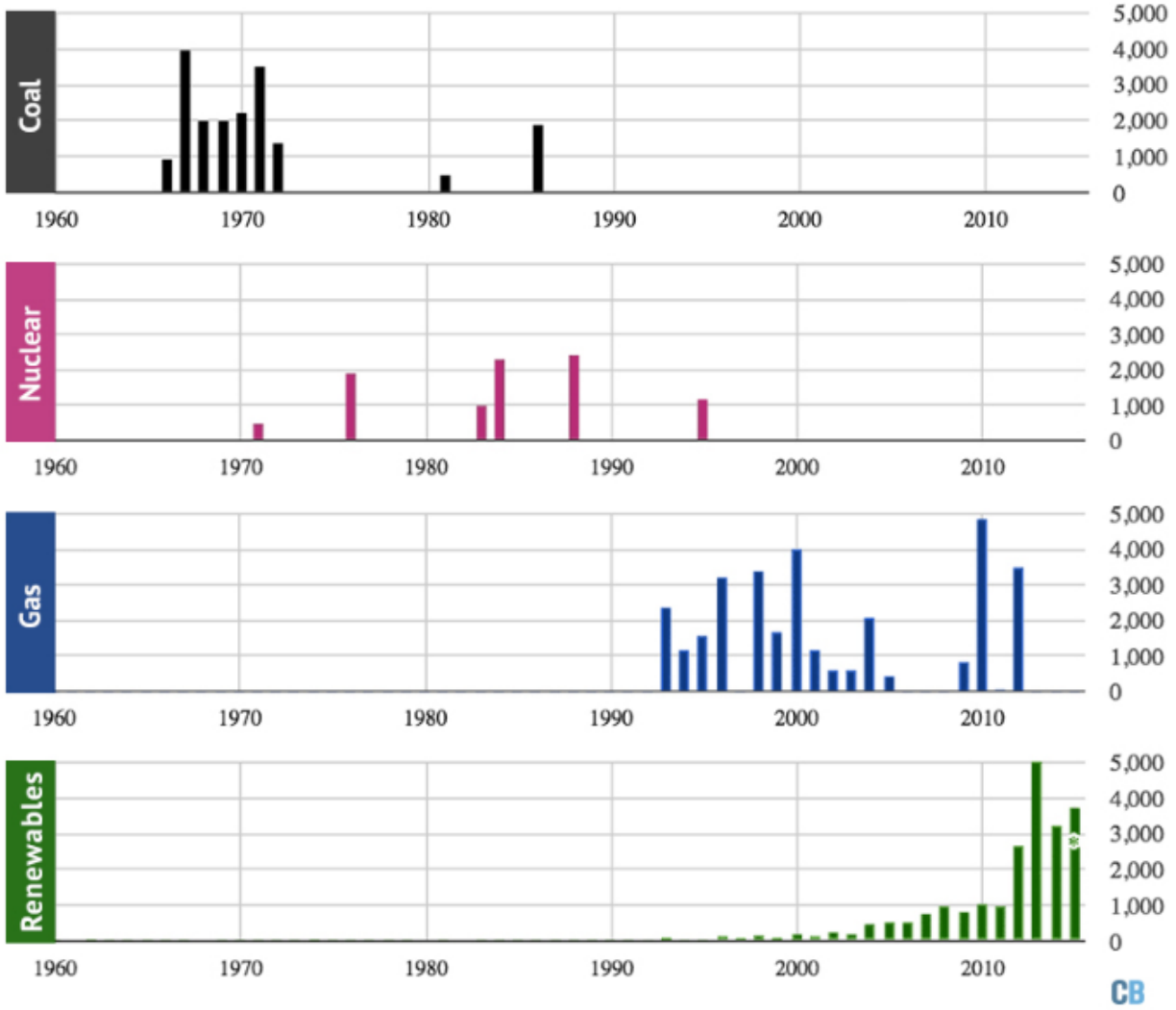
UK Annual Capacity Additions, 1960-2015



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Carbon Brief

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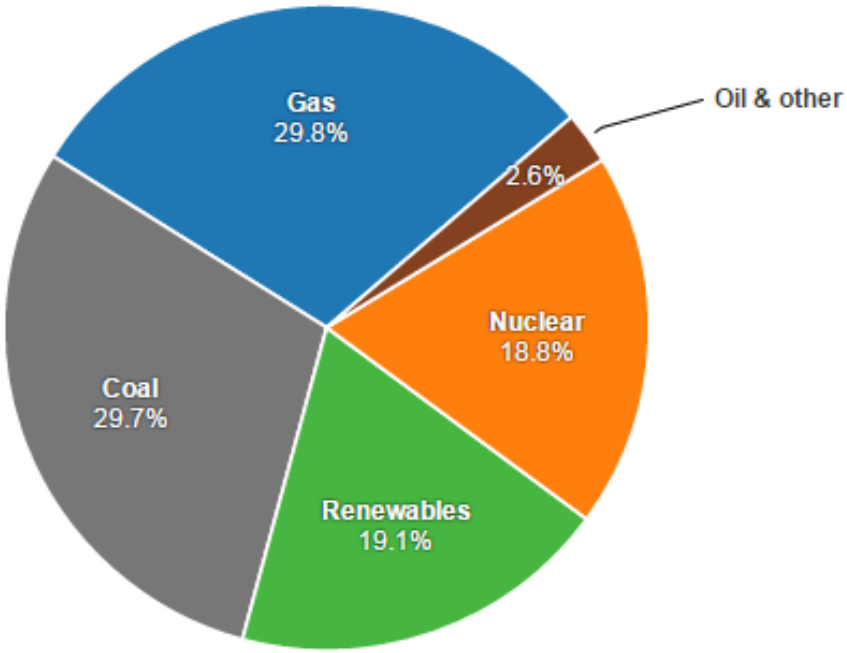
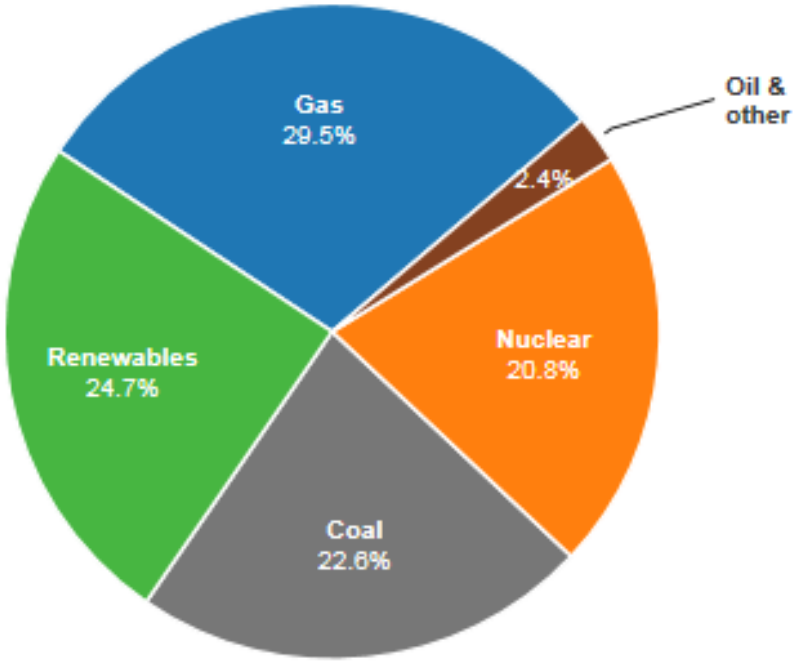
UK Generation mix

2014



2015



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Edie

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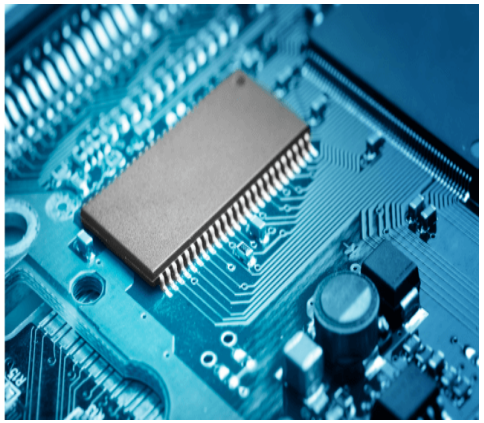
Energy Revolution: Digitisation and Decentralisation

Software

Sensors



Semiconductors

Solar

Storage

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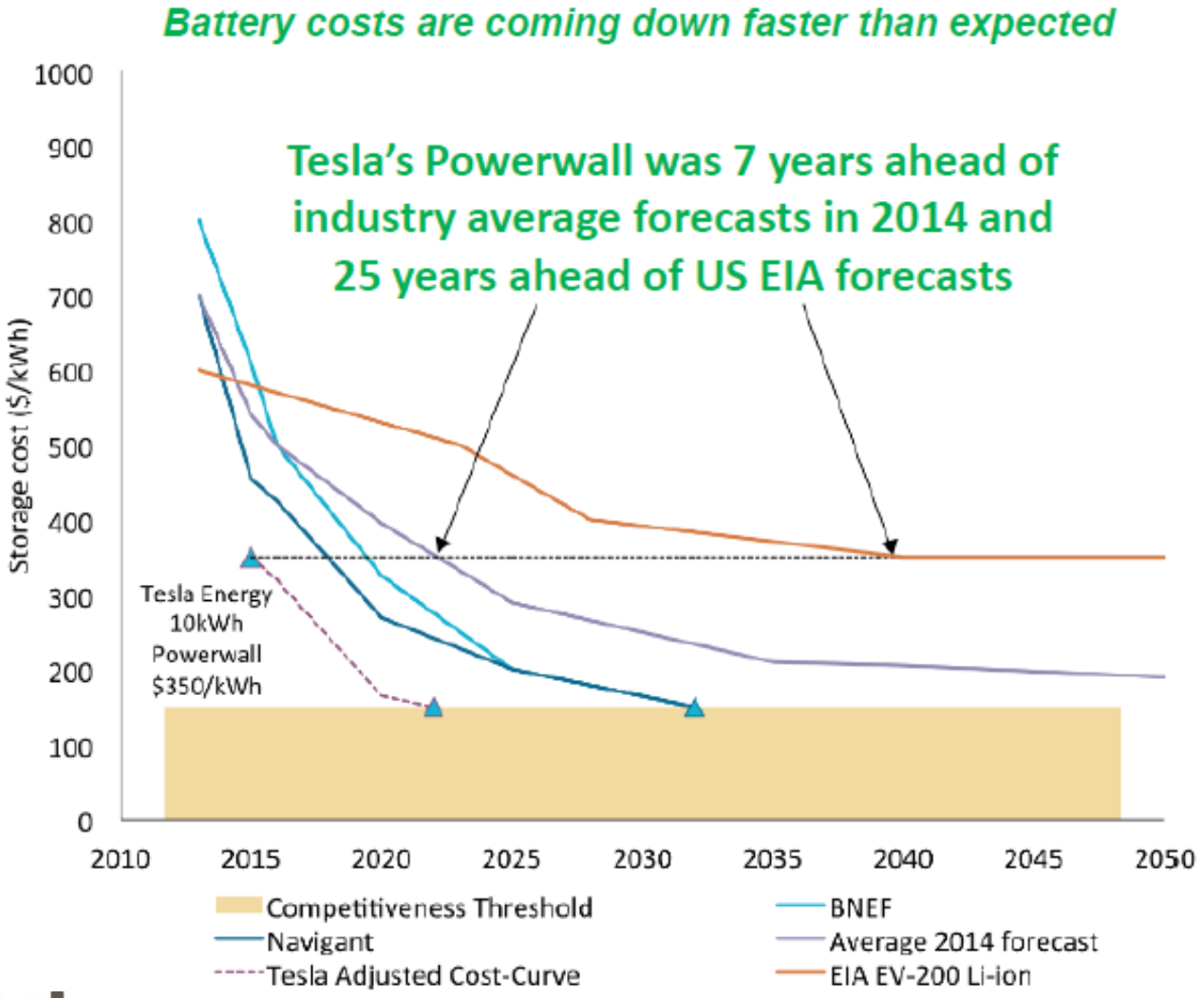
Battery Cost Projections



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Carbon Tracker

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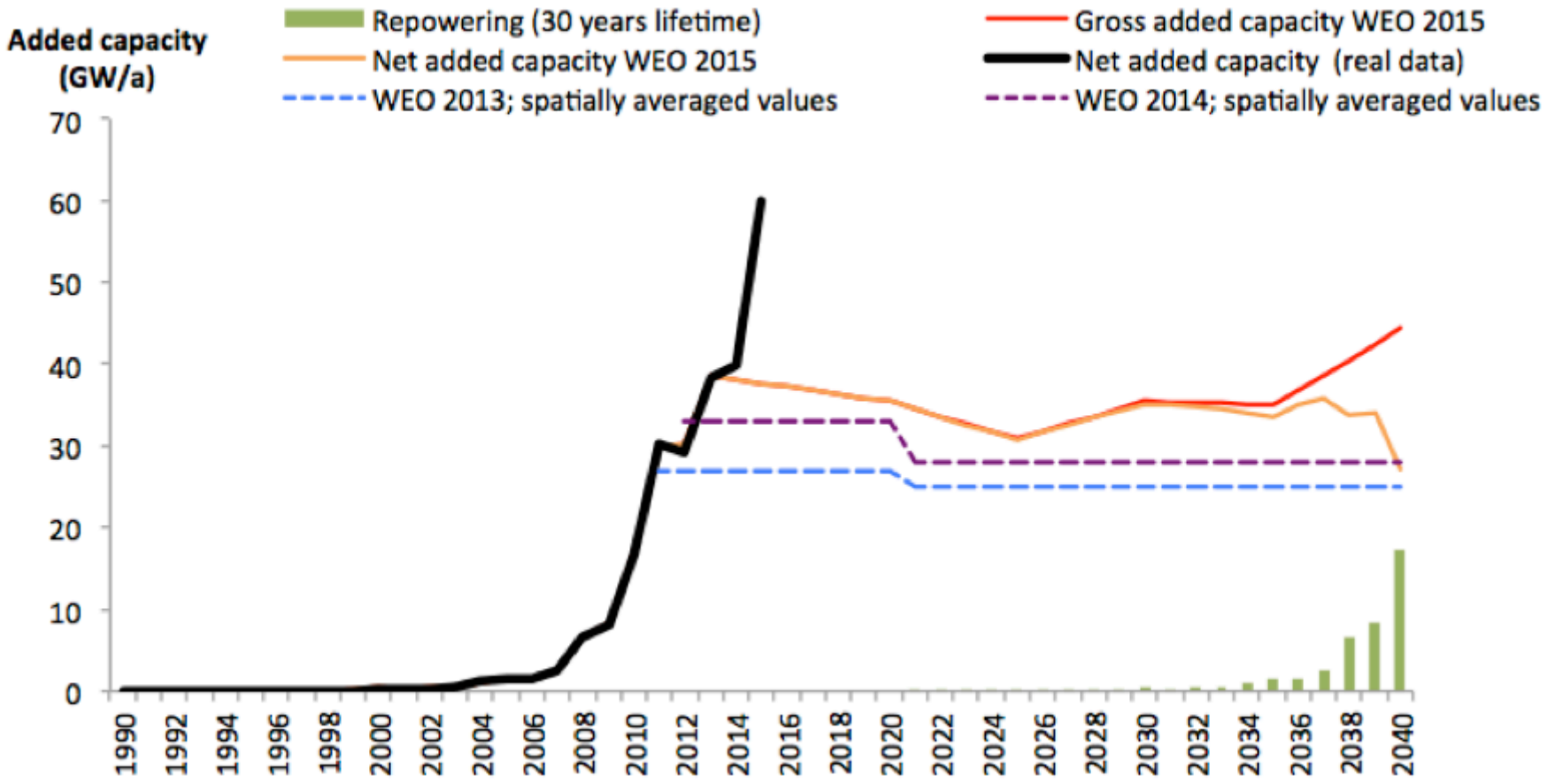
Solar Deployment Projections



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Energy Watch Group

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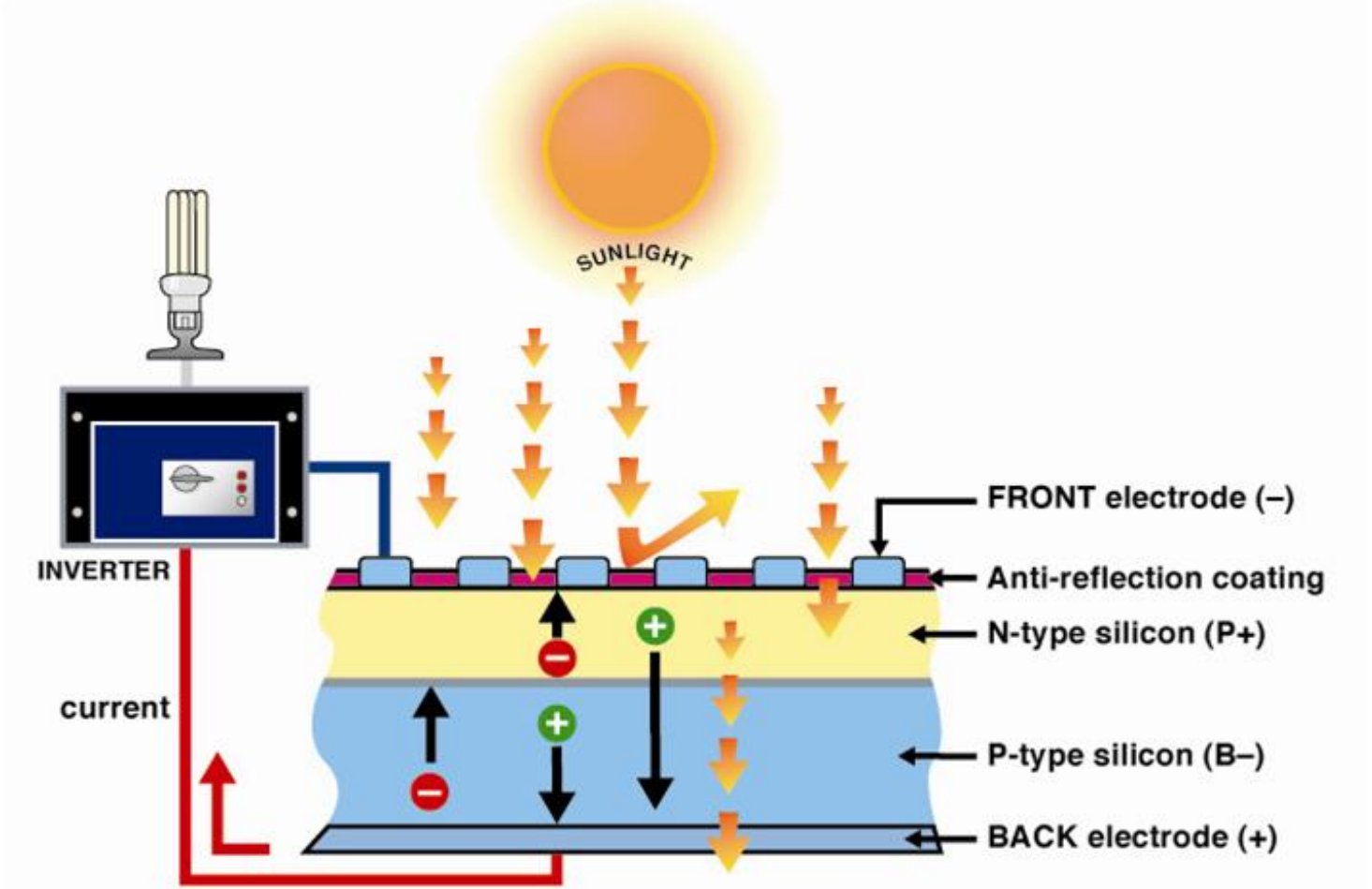
Solar Photovoltaics - Concept



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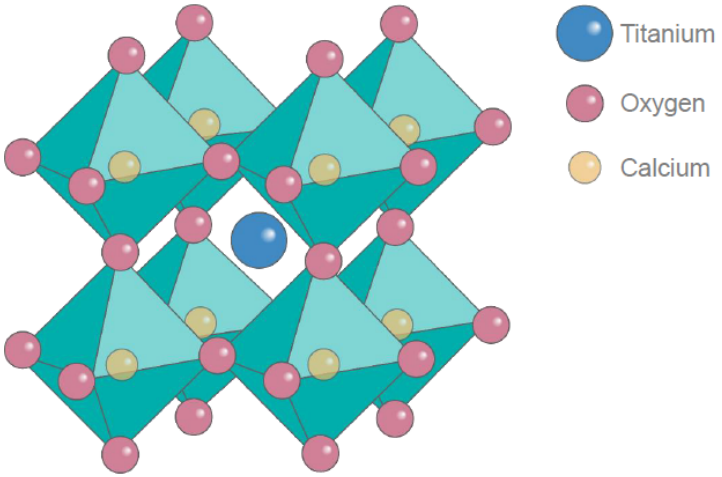
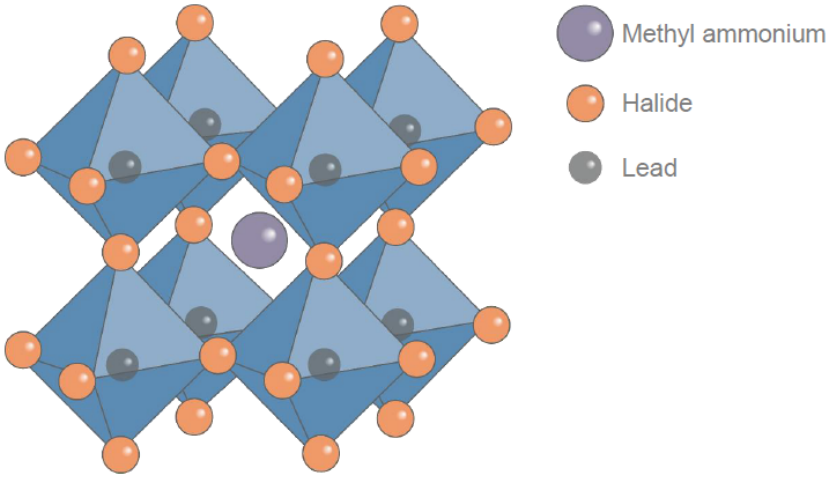
Solar Photovoltaics - Perovskite

The mineral perovskite

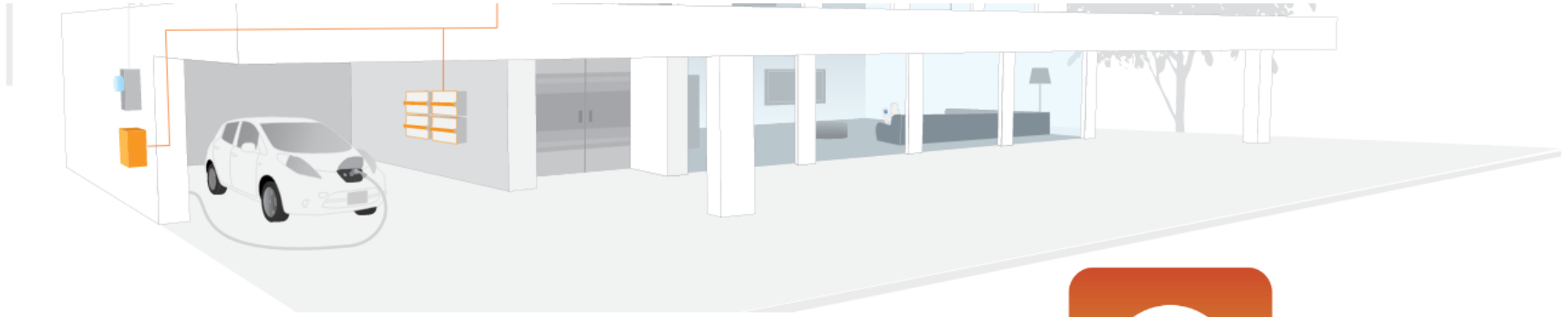


Typical perovskite solar absorber



- Theoretical Limits on Si efficiency reached c.25%
- Oxford PV: Perovskite structure – tuneable energy gap and low cost
- Double-layered increases theoretical efficiency to >30%

Low carbon world looks pretty different



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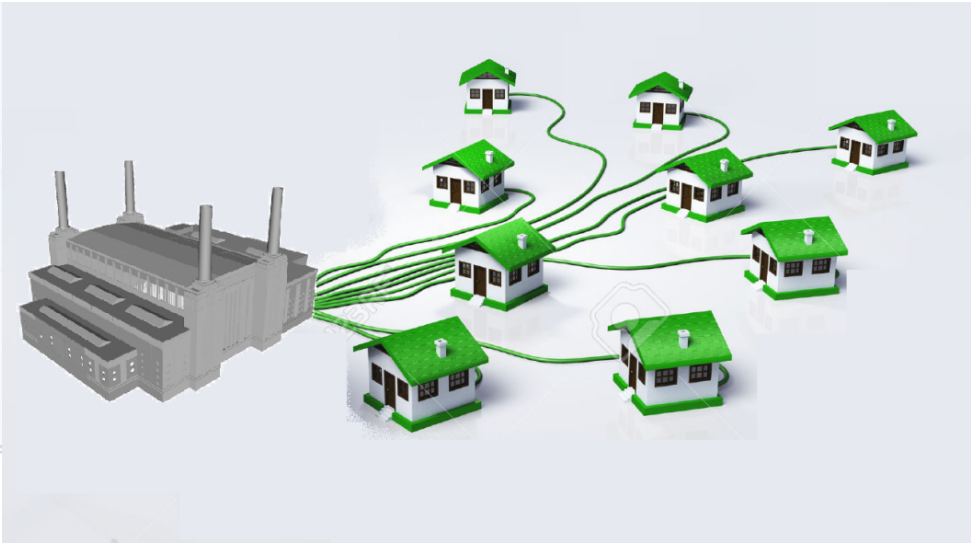
moixa



Selectricity – a vision of future power generation

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Thank you for listening.

Questions?