

# Energy Transformation: future challenges and opportunities

**FFU 30<sup>th</sup> Birthday Conference**  
**catherine.mitchell@exeter.ac.uk**



New Thinking For Energy



# Overview

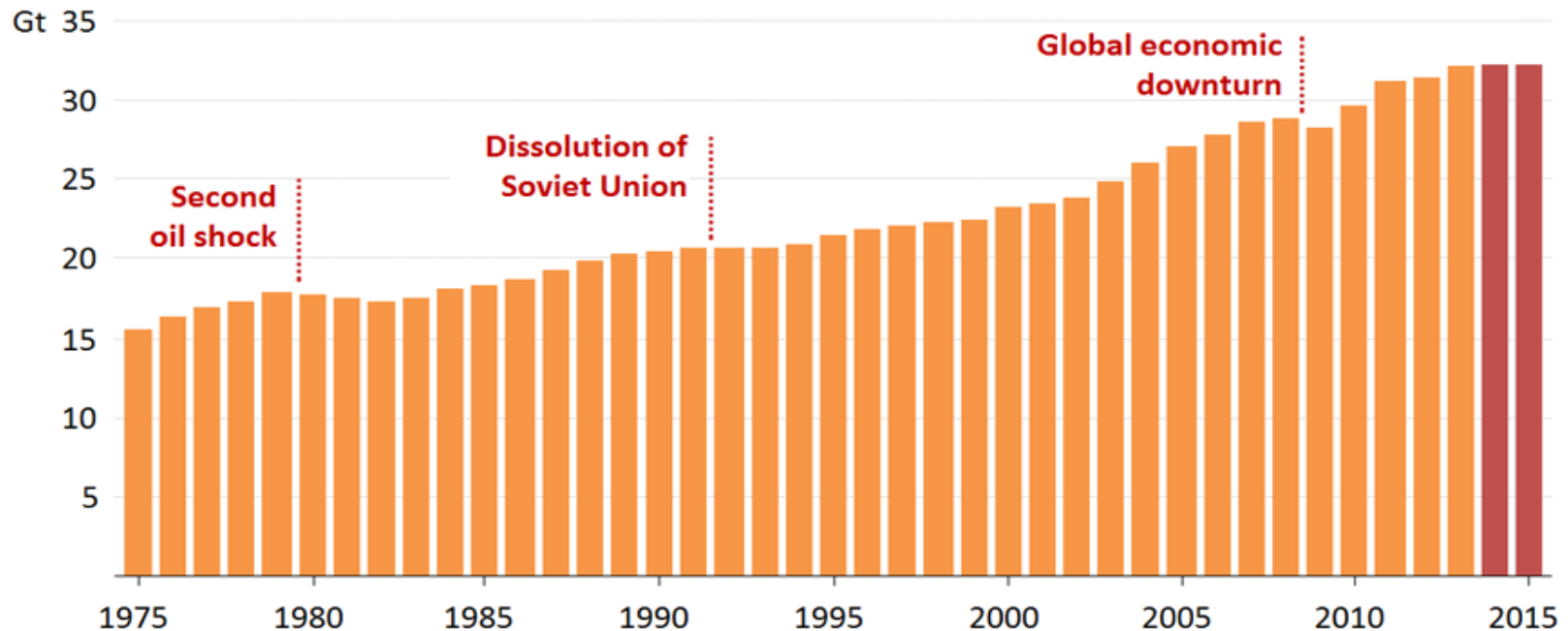
- Global CO2 may have flattened; now need to reduce it
- There are considerable energy system challenges BUT opportunities as well
- There has been lots of change in some countries but needs to spread those changes to more countries, and at a quicker rate
- Need more transformational innovation
  - BAU not good enough
- Very few transformational innovation mechanisms in last 30 years and probably would not have been ‘economic’

**Governance = policies, institutions, rules and incentives (‘the rules of the game’)**

# CO2 remained flat for 2 years which is good, now we have to increase the rate of reduction

(preliminary) <https://www.iea.org/newsroomandevents/pressreleases/2016/march/decoupling-of-global-emissions-and-economic-growth-confirmed.html>

## Global energy-related CO<sub>2</sub> emissions

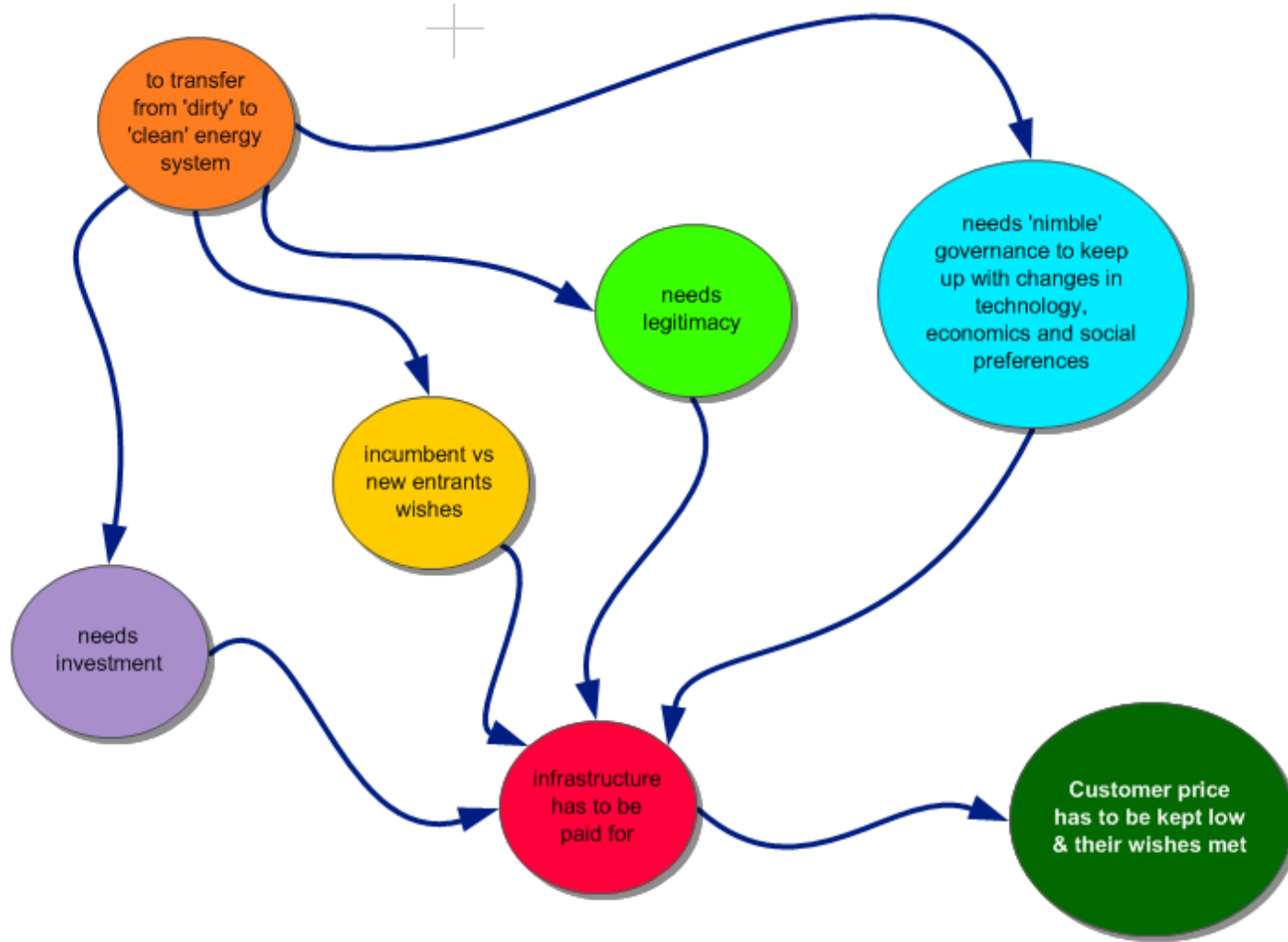


*IEA analysis for 2015 shows renewables surged, led by wind, and improvements in energy efficiency were key to keeping emissions flat for a second year in a row*

# Energy System Challenges to be met

- To transfer from current energy system to a decarbonised one
  - **Requires 'new' energy system – implies new roles (institutions, utilities, customers, providers, intermediaries , business models, etc), new governance and regulatory environment, new value propositions**
- Infrastructure has to be upgraded, and paid for – currently via per unit charge, and raises issues in a falling demand environment
- Need to keep prices as low as possible for customers, and their wishes met
- Must not lag technological and economic change and social preferences
- Policy making has to be 'legitimate'
- Incumbent v new entrant wishes to be navigated

# Energy System Challenges

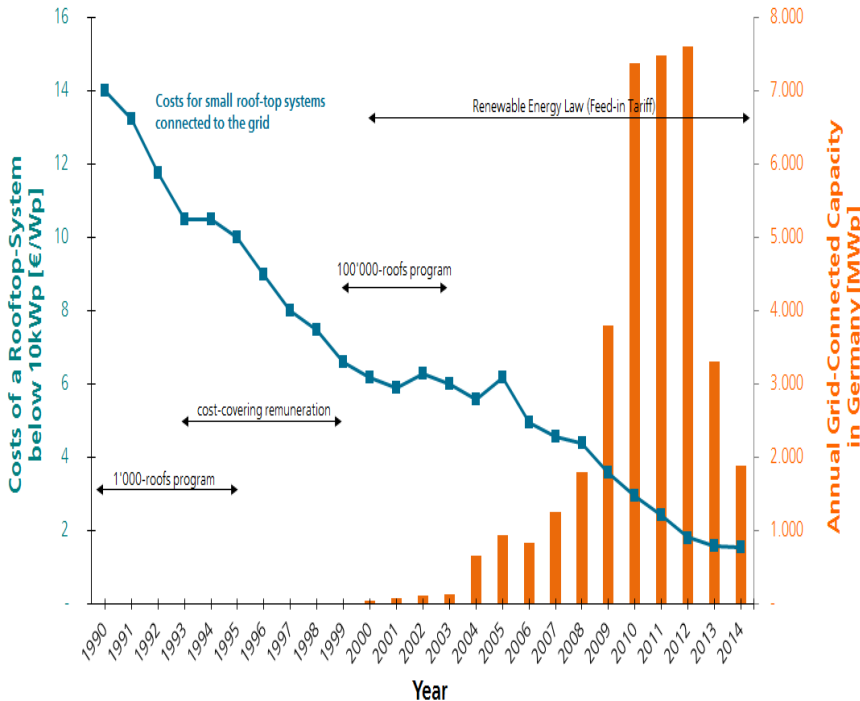
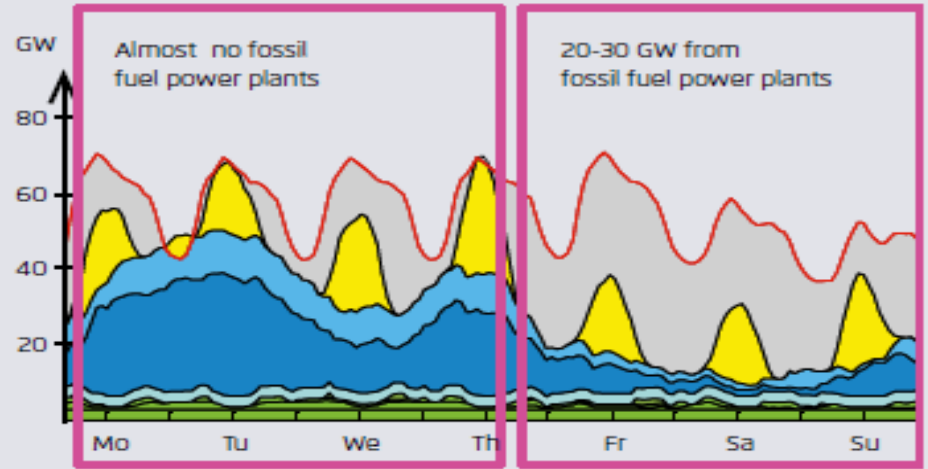


# **BUT many opportunities of change to be captured which help deal with challenges**

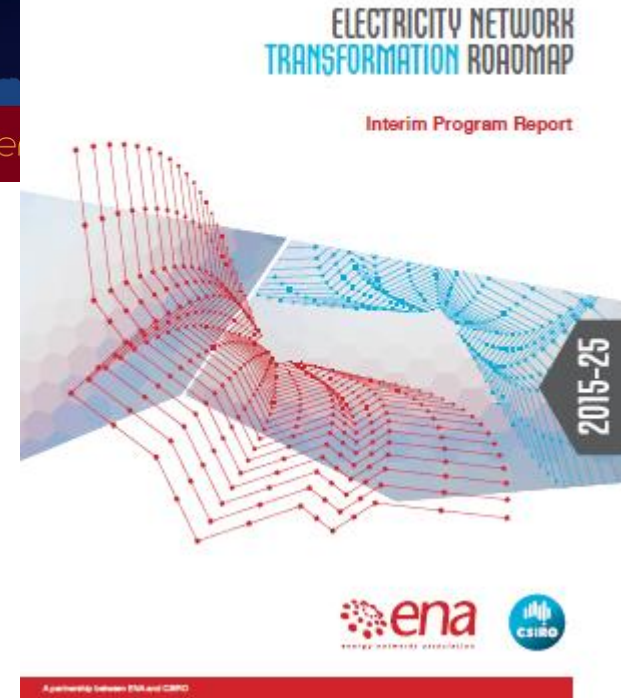
- Ability to utilise infrastructure assets more fully; reduce total infrastructure needs; increase system efficiency through coordination and new ICT technologies; and reduce costs
  - Ability to meet customer wishes, allowing new entrants with new ideas, and developing new business models
  - New examples of institutional frameworks to enable more nimble, flexible, resilient governance which can keep up with / does not lag change
- **Capturing of opportunities needs appropriate governance**

# Germany is an example of change & where opportunities have been captured - but still only in a few countries

Demand for Fossil Fuel Power Plants in 2022: Example of a Week in August



**Governance in most countries is altering but not necessarily transformative and often insufficient to meet emission reduction targets**





# Achieving transformative governance is another major challenge

- There has (arguably) been very few transformative energy policies / governance since 1970's:
  - RE and CHP policies in Denmark in response to oil crises in 1970s
  - PURPA Act in CA in 1970's
  - FITs in Germany in 1990/1
  - NEM and / or DSR in some US States?
- Leading to structural, dynamic change which better meets policy goals and society's preferences

# What characterises transformative governance?

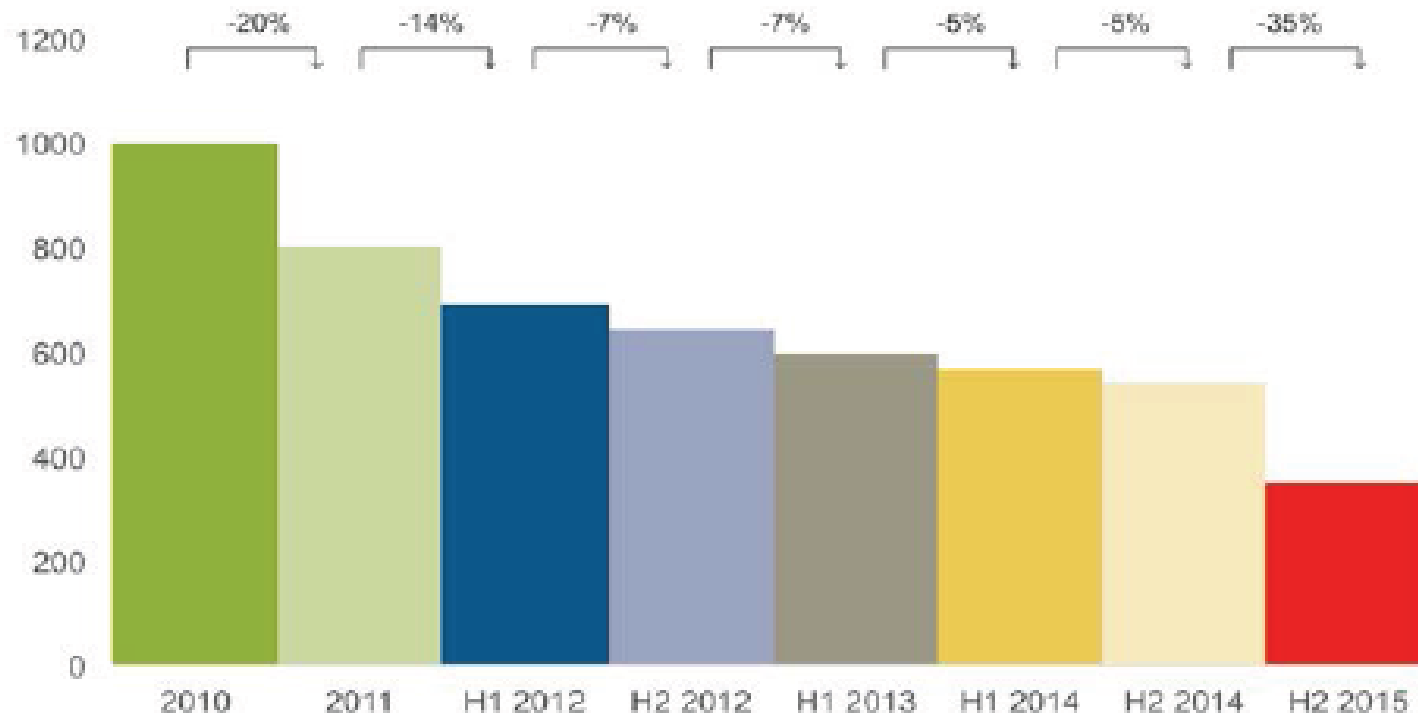
- The decision-makers understood the energy system challenges they were dealing with at the time, then
  - Knowingly dealt with the current challenges and enabled the means to capture the new opportunities
  - Enabled more choice for customers (all types) / new entrants , and thereby gave them more influence
  - Overcoming inertia
  - Kept up with technological and social change and preferences
- **Third Challenge: Probably would not have been 'economic' under traditional methods of analysis**

# Would supporting storage be transformative?

[http://fs-unep-](http://fs-unep-centre.org/sites/default/files/publications/globaltrendsinrenewableenergyinvestment2016lowres_0.pdf)

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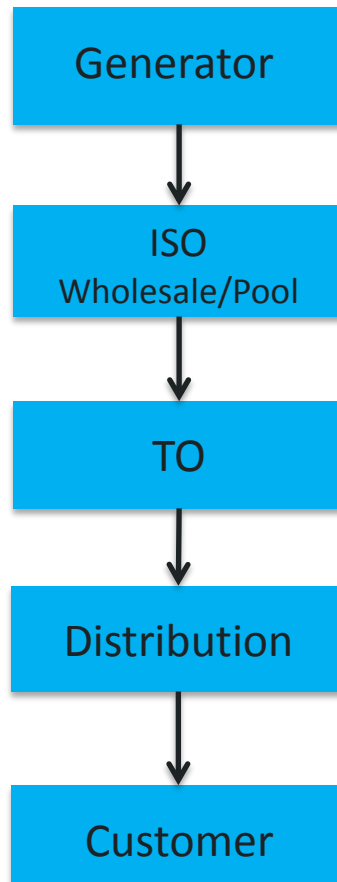
FIGURE 28. AVERAGE EV BATTERY COSTS, \$ PER KWH AND PERCENTAGE CHANGE BETWEEN PERIODS, 2010 TO H2 2015



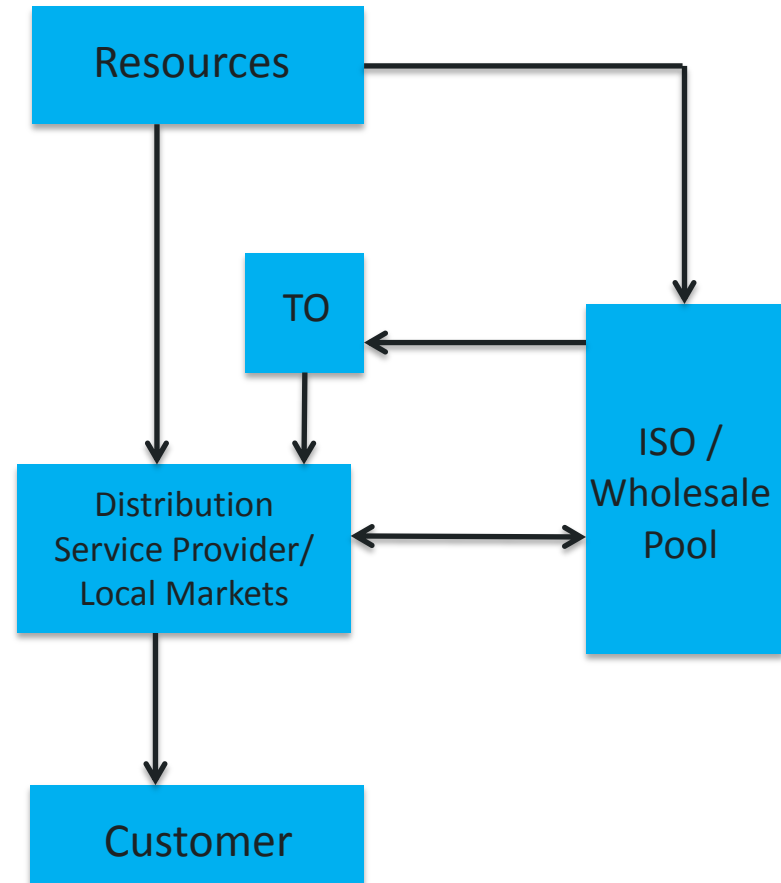
Source: Bloomberg New Energy Finance

# NY State as an Example of Transformative Governance? Too early to say?

## Traditional



## NY REV



# How is Germany in relation to meeting challenges and capturing opportunities?

- Germany is ahead of most other countries
  - FIT was a driving transformative mechanism, not just for Germany but globally
- Is Germany still so transformative?
  - Who recognises within Germany how transformative it was, and its value?
    - Is being transformative still thought to be important?

# Conclusion

- We need to understand transformative governance more, and
- Transformative governance has to be the goal of policy

# THANKYOU

[http://projects.exeter.  
ac.uk/igov/](http://projects.exeter.ac.uk/igov/)