Economics and policy, politics and Europe

Presentation to BIEE Policy Conference,

Getting Serious about Net Zero

London, 24 Sept 2019

Michael Grubb,

Professor of Energy and Climate Change, UCL

Former Senior Advisor, Ofgem & Chair, UK Panel of Technical Experts on EMR

- Where we've been – key points
- Where we could go
- A way to think about the policy economics
- …. And some resulting politics and international dimensions

"… Because something is happening,
but you don't know what it is.
Do you, Mr Jones?"

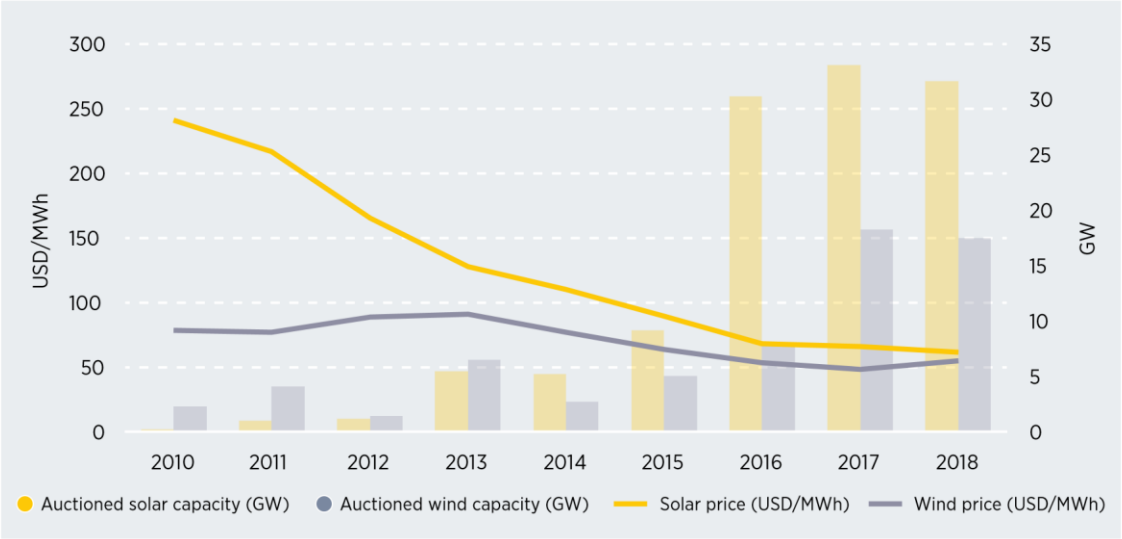
- Bob Dylan, *Ballad of a Thin Man*

- School Strikes - *Millions*
- Solar Revolution
- Proliferating *Net Zero* commitments
- EC Vice-President for Green New Deal (Timmermans) & Greening ECB (Lagard)
- Google ++ renewable energy
- EV Revolution, Offshore wind auctions

- Brexit
- Drone attacks halve Saudi oil output
- Trump
- Bolsonaro & Amazon
- Australian election & Adani Mine
- US-China trade war, Saudi-Iran hot war??

Solar PV growth & transforming power of PV auctions

Global ***average*** prices resulting from auctions, 2010-18



Source: IRENA (2019), Renewable Energy Auctions: Status and Trends Beyond Price

Auctions in summer 2019 broke three times the world record of cheapest solar PV tariff:

Los Angeles, USA - $20/MWh
Brazil - $17.5/MWh
Portugal - $16/MWh

Portugal's July 2019 world's cheapest PV.

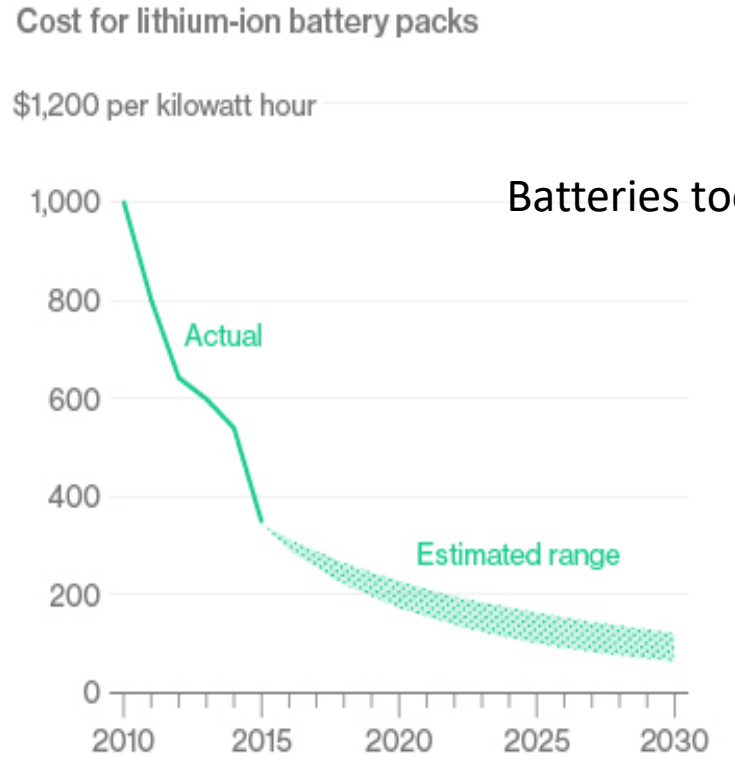
Ethiopia Sept 2019, Africa's cheaper PV to date @ $25/MWh

"Solar power is by far the most expensive way of reducing carbon emissions

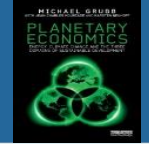
- *The Economist,* **2014.**

Actually, emerging as the cheapest widespread high-grade energy source in human history

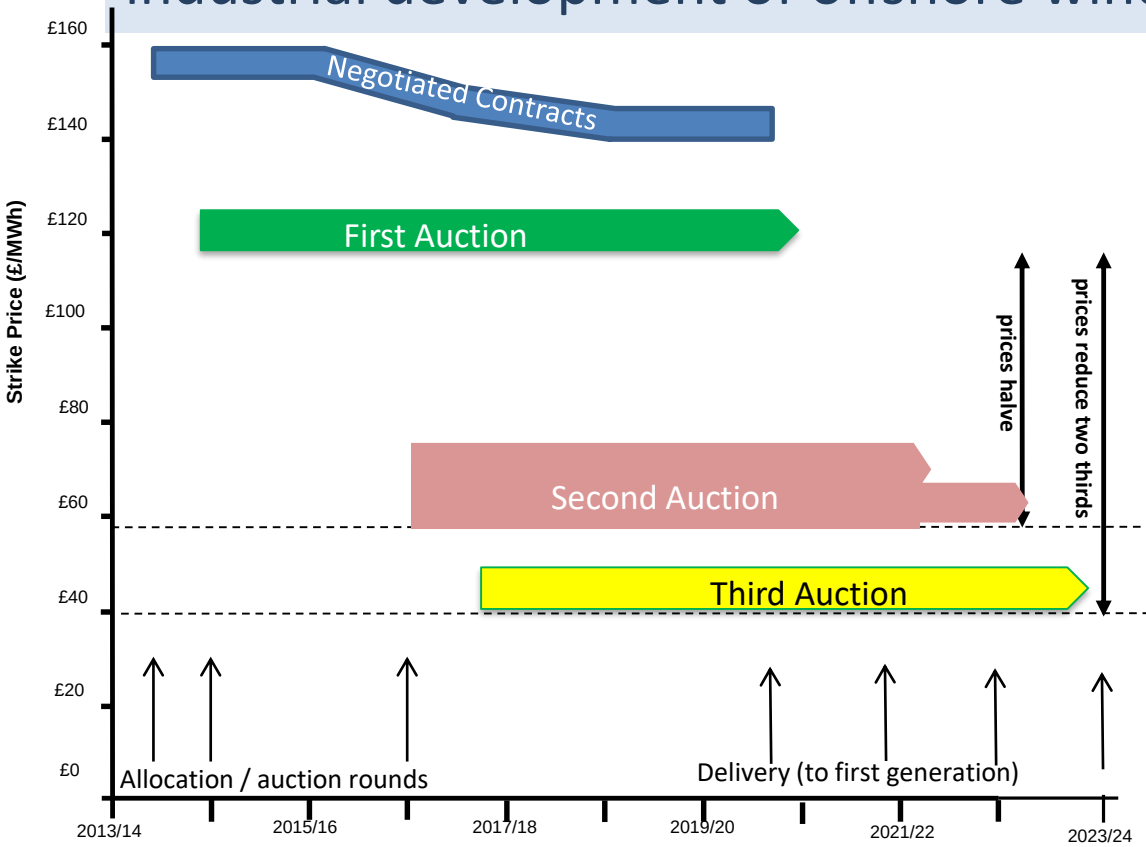
Batteries too



The UK's biggest energy resource discovery..

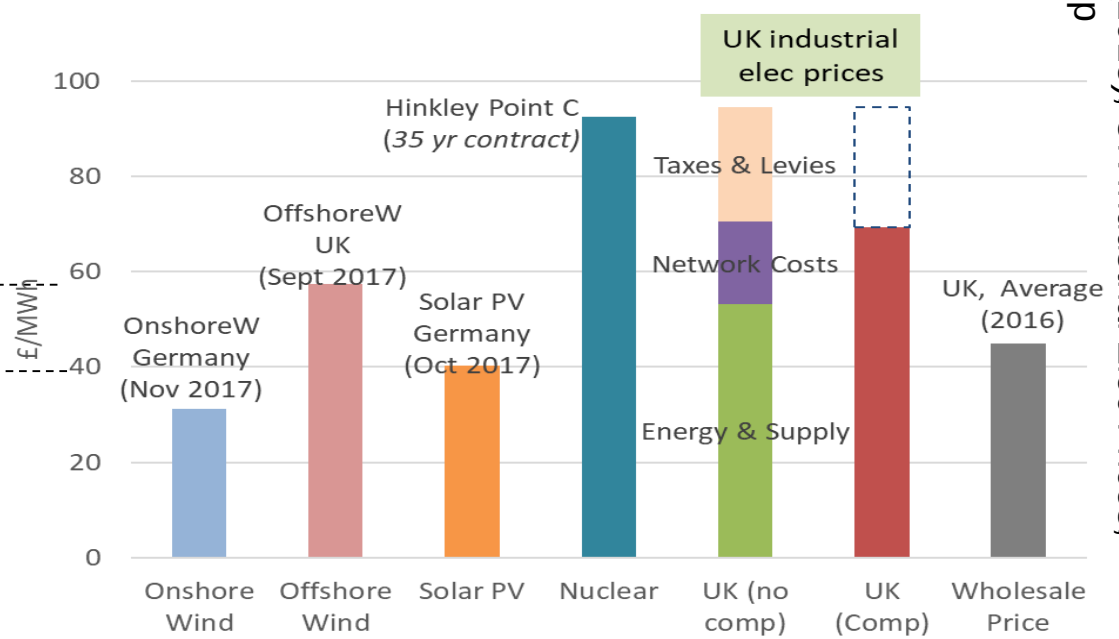


Economic scepticism followed by huge gains from auctions & pan-European industrial development of offshore wind



Sources: M.Grubb and D.Newbery (2018), 'UK Electricity Market Reform and the Energy Transition: Emerging Lessons', MIT-CEEPR working paper; Updated

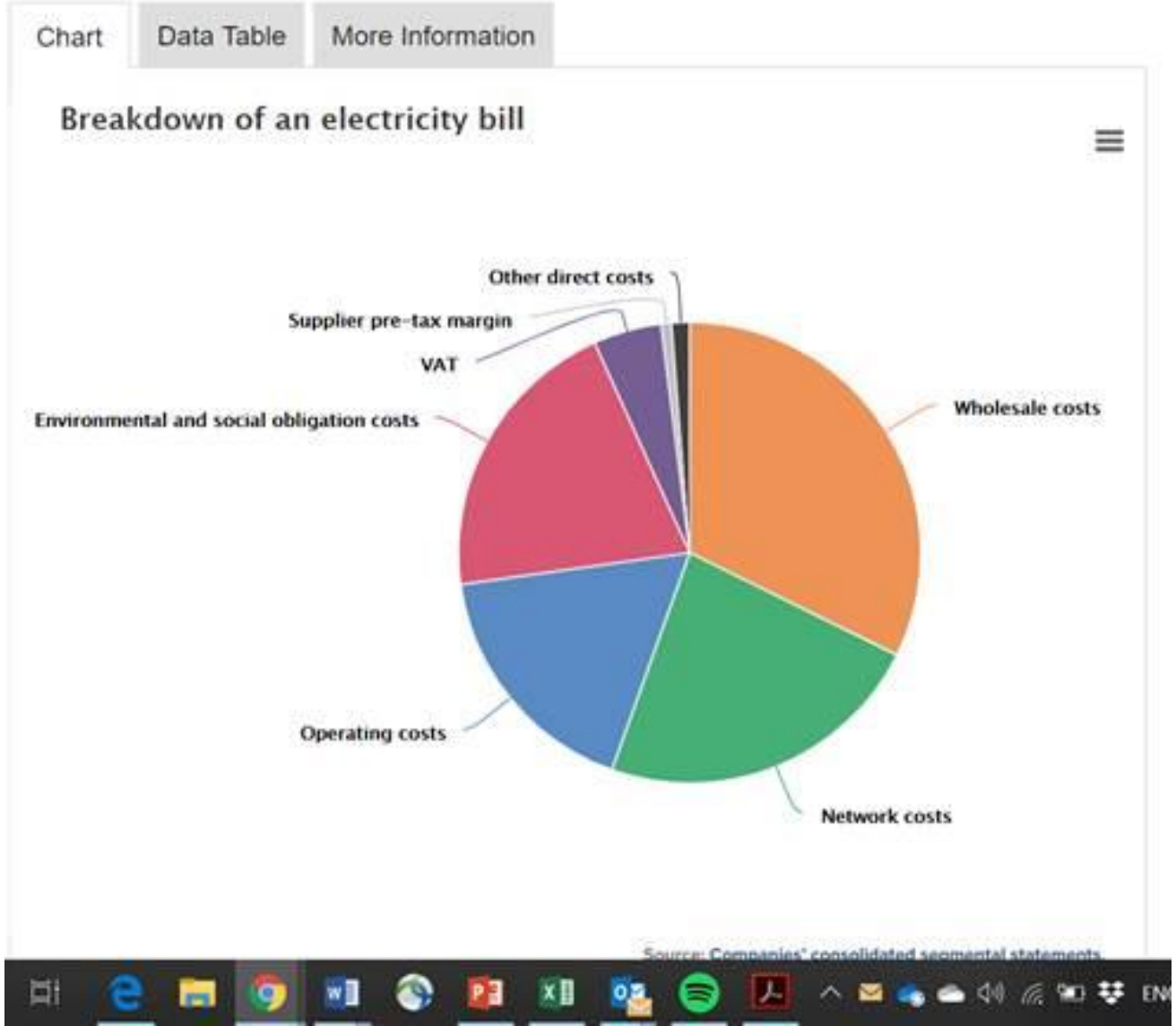
… now < half industrial elec prices and below recent wholesale price



Grubb & Drummond (2018), UK Industrial Elec Prices, UCL/Aldersgate Group

#2 Emerging as a UK and North European resource as large and valuable as North Sea Gas

An aside – we (Ofgem?) *really* need to sort out accounting systems …



"Environmental and social obligation costs" include the full cost of renewable energy contracts

… even though the generation directly displaces "wholesale costs" so is not additive (and with new wind contract prices, may actually net repay the system)

#1. Renewable energy contracts must be separately accounted

Economics and policy, politics and Europe

Presentation to BIEE Policy Conference,

Getting Serious about Net Zero

London, 24 Sept 2019

Michael Grubb,

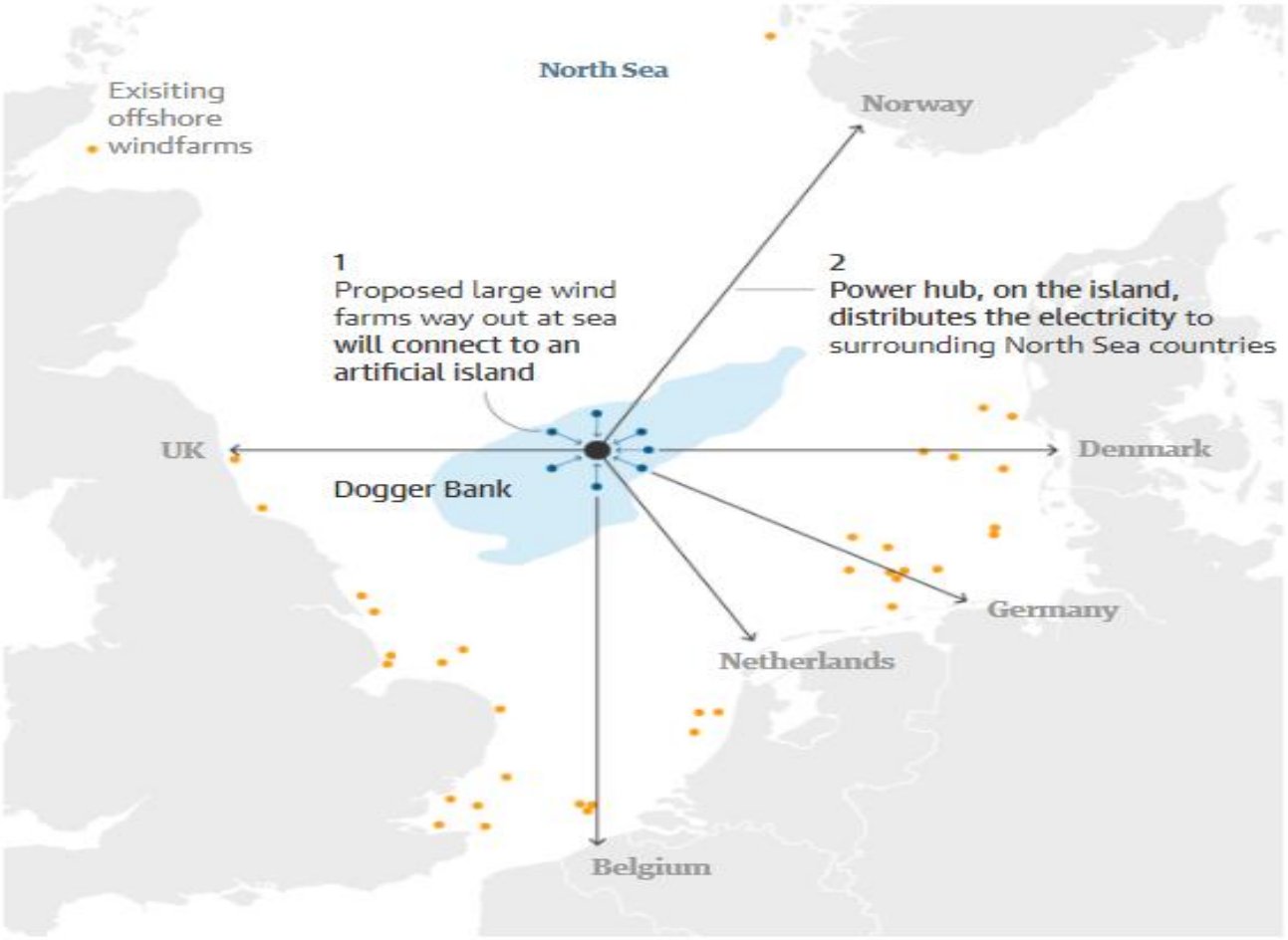
Professor of Energy and Climate Change, UCL

Former Senior Advisor, Ofgem & Chair, UK Panel of Technical Experts on EMR

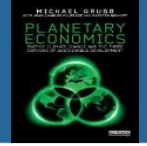
- Where we've been – key points
- **Where we could go?**
- A way to think about the policy economics
- …. And some resulting politics and international dimensions

The Prize: a new North Sea Energy Renaissance

… with proposal for offshore wind based on reef in North Sea
- a scale, value & strategic significance on a par with North Sea gas



Source: Guardian/Tennet



CCC Report (Dec 2008) placed elec decarbonisation at the centre of the intermediate and long-term strategy

Reducing power sector emissions:

Renewables (Wind, solar, tidal and marine, biomass), nuclear, CCS

Application of power to transport and heat

Reducing transport emissions:

- Fuel efficiency
- **Electric**/plug-in hybrids

  Bio fuels

Reducing heat emissions:

- Energy efficiency
- Lifestyle change
- **Electric heat** (e.g. heat pumps, storage heating)
- Biomass boilers
- CCS in industry

Economic Implications:

Economics of transition:

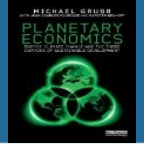
- Not necessarily long-term burden, but not a free lunch
- A dynamic process of shifting to fundamentally new systems

Economic advice has been:

- Deeply misleading regarding *what to do* (marginal costs)
- Very valuable regarding *how to do it* (at least in terms of driving demand with competition)

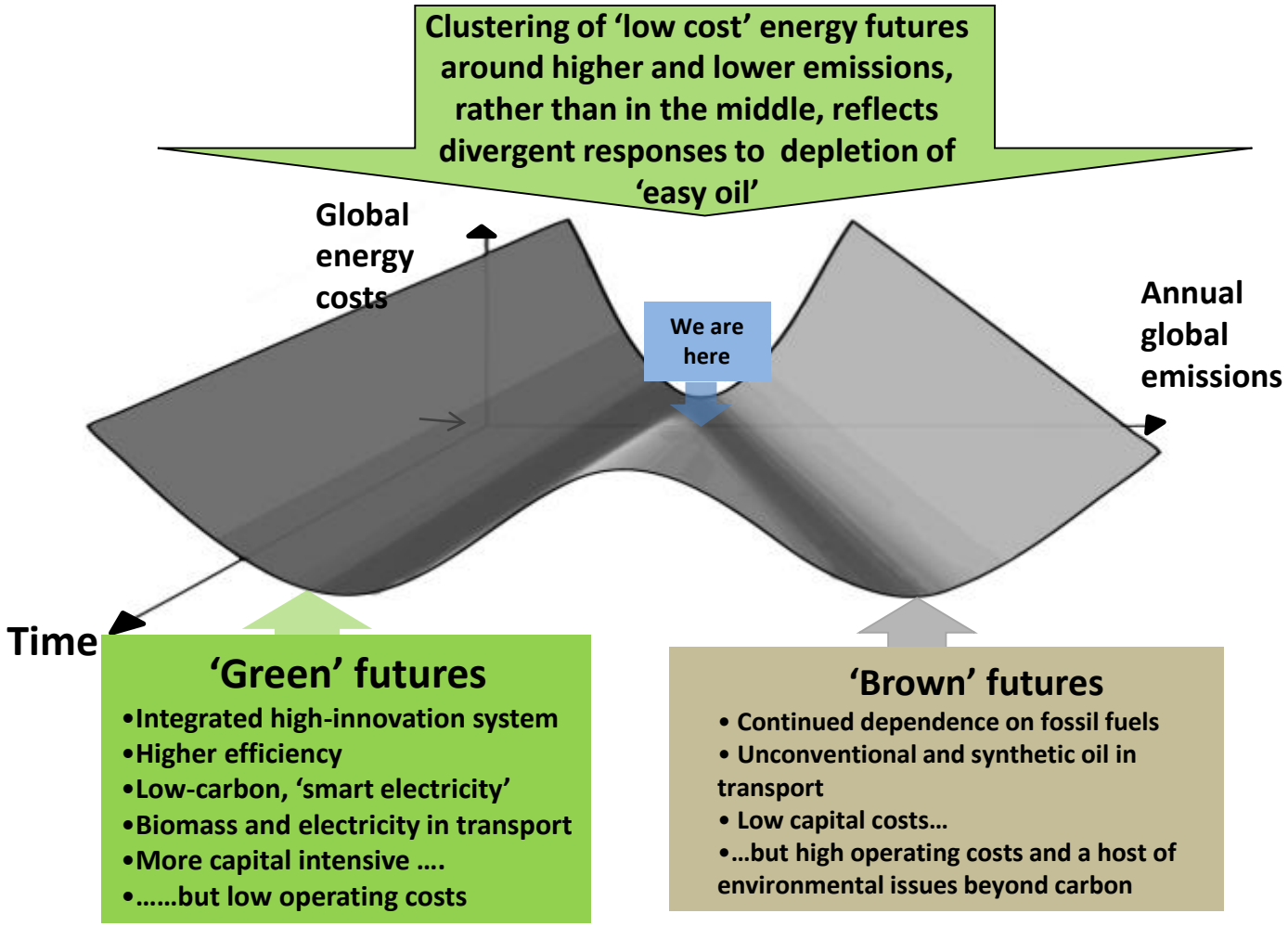
#2 We badly need integrated, evidence-based theories of low-carbon transformation

UCL Econ Policy and Practice lecture 5th Dec .. – mathematical theory of induced innovation



‘Ignoranti quem portum petat nullus suus ventus est’ - Lucius Annaeus Seneca

No wind is favourable to those who don't know where they are going



Planetary Economics, Figure 10-6: Two kinds of energy future – the carbon divide
Source: Upper panel: Gritsevskyi and Nakićenović (2000); lower panel: authors

Breaking out of the current dominant fossil-fuel valley *fast enough* requires *strong and international* public action

Who?

- Government ?
- Voters ?
- Consumers ?
- Corporate and finance ?
- Law breakers ?

Economics and policy, politics and Europe

Presentation to BIEE Policy Conference,

Getting Serious about Net Zero

London, 24 Sept 2019

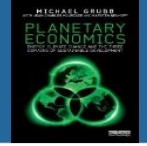
Michael Grubb,

Professor of Energy and Climate Change, UCL

Former Senior Advisor, Ofgem & Chair, UK Panel of Technical Experts on EMR

- Where we've been – key points
- Where we could go?
- **A way to think about the policy economics**
- …. And some resulting politics and international dimensions

Three Domains of decision-processes



with different characteristics and theoretical foundations, apply at different scales

DOMAIN	Characteristics	Theoretical foundations
1. Satisficing	Habits, myopia, inattention to incidental / intangible costs; endemic 'contractual' & principal-agent failures, risk aversion *- But also values, diversity & experimentation*	**Behavioural and organisational economics**
2. Optimising	Economic optimisation based on relative prices, 'representative agents' with 'rational expectations', stable preferences and tech trends *- But also rapid new entry*	**Neoclassical and welfare economics**
3. Transform-ing	Structural, technological, institutional and behavioural change, typically from strategising, innovation, infrastructure investment *- Including interrelated social, political & institutional change*	**Evolutionary and institutional economics**

SOCIAL SCALE

TIME HORIZON

Improved efficiency and service

New markets, vs Incumbents

New technology waves

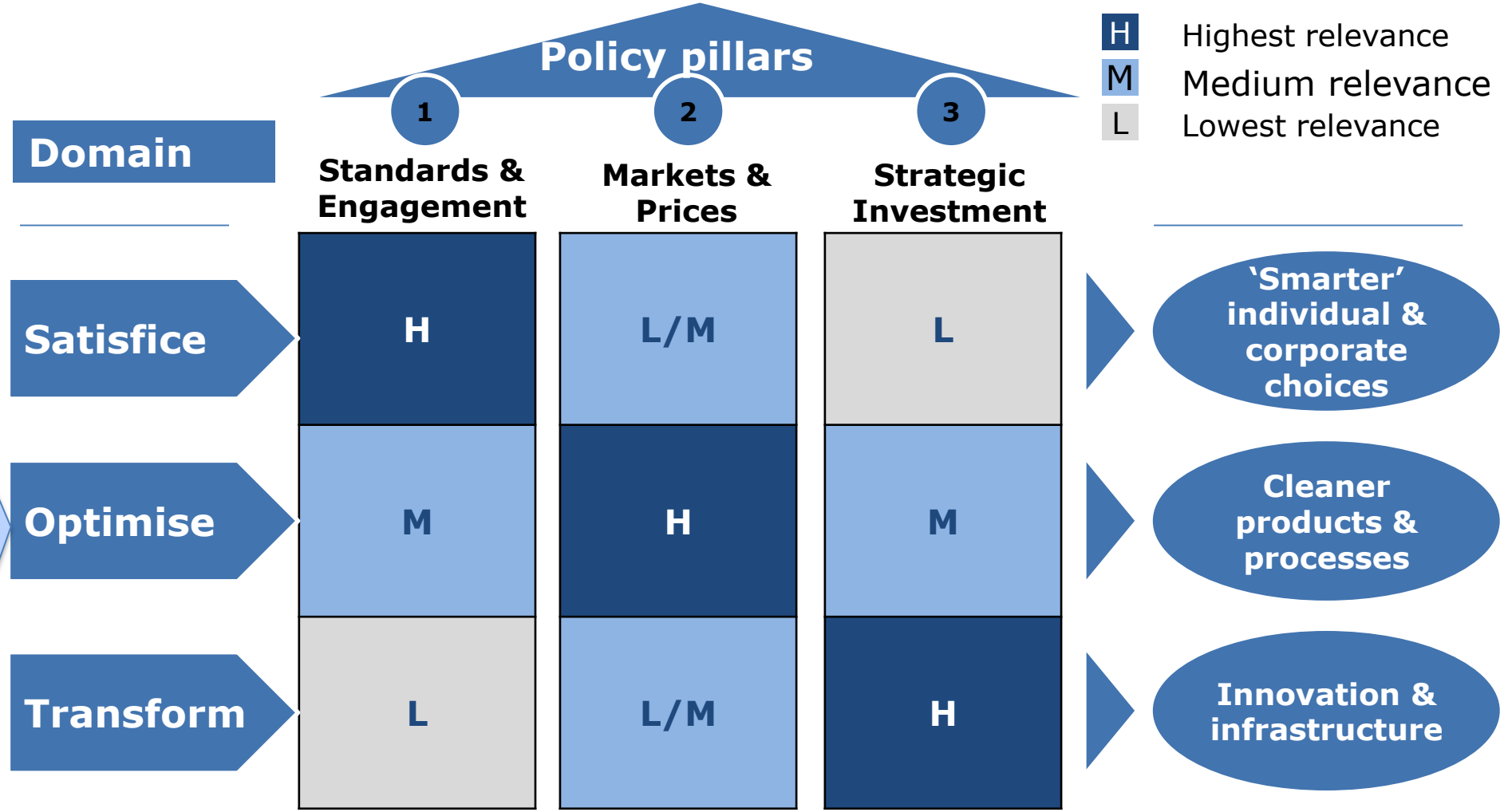
Three Domains perspective supports a package approach

"The EU 3-targets approach is madness.. "

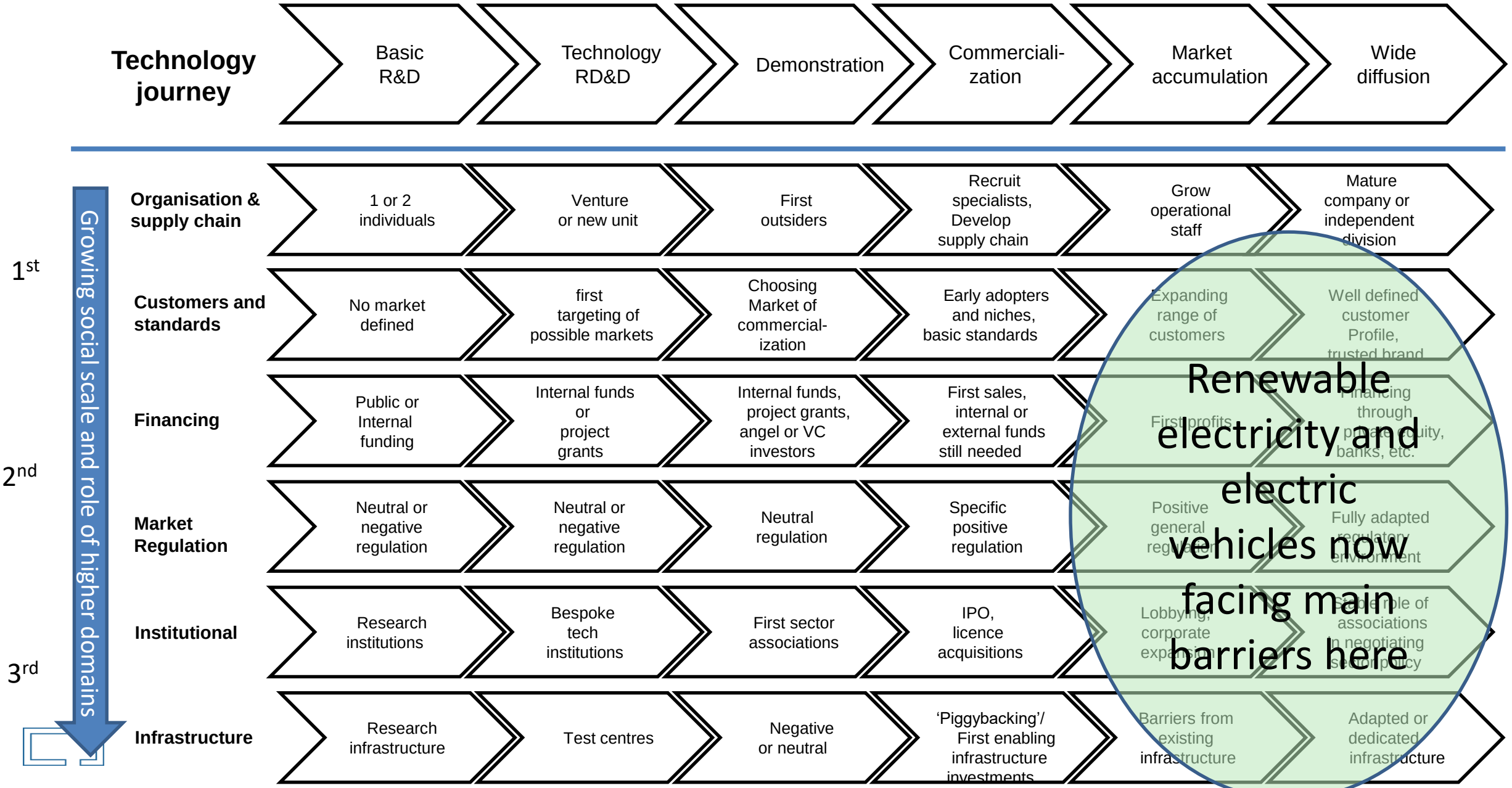
"Other policies such as feed-in tariffs, industry regulation and subsidies, are far less economically preferable than carbon pricing to reduce emissions… " (OECD, 2013)

I beg to differ …

#5 Key is to have goals for each economic domain and match the best instrument to the respective domain

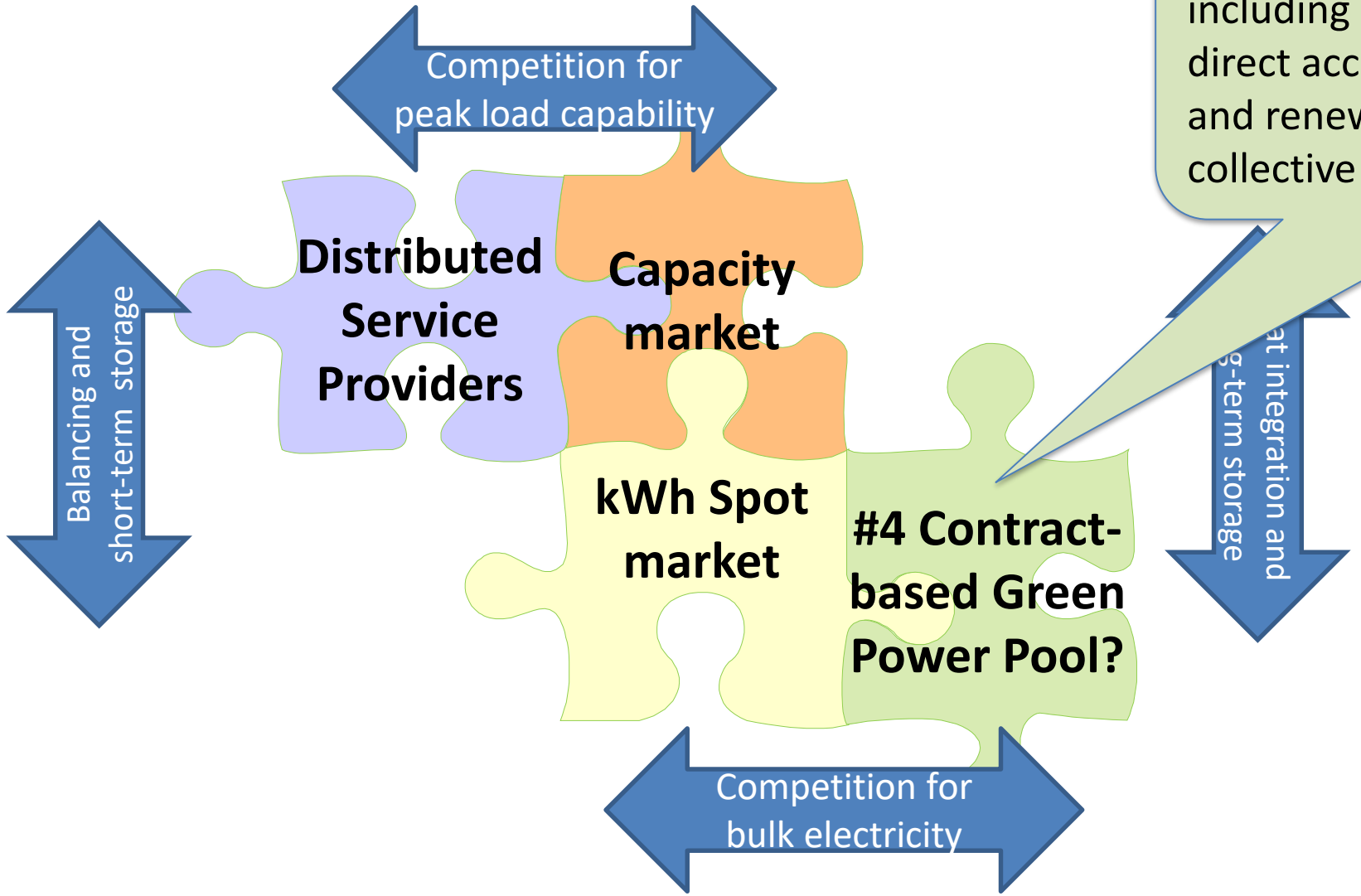


Successful innovation must span a complex multi-domain journey



Source: Grubb, McDowell and Drummond (2017), On order and complexity in innovations systems, Energy Research & Social Science; derived from Fig.9.8 in Grubb et al (2014) *Planetary Economics*

Future system could involve multiple markets (- *with managed competition between them?)*



Entering a world in which consumers – including many businesses - need direct access to bulk renewables, and renewables need to bear efficient collective balancing costs

Economics and policy, politics and Europe

Presentation to BIEE Policy Conference,

Getting Serious about Net Zero

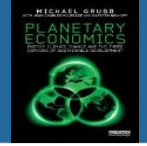
London, 24 Sept 2019

Michael Grubb,

Professor of Energy and Climate Change, UCL

Former Senior Advisor, Ofgem & Chair, UK Panel of Technical Experts on EMR

- Where we've been – key points
- Where we could go?
- A way to think about the policy economics
- **…. And some resulting politics and international dimensions**



Politics will remain a problem – even if its hard to understand why some 'broadsheets' find need to print pure fantasy on the front pages

Report claims that this (privately financed) offshore windfarm may

- lose £150m/yr (assuming the author knows more about the project finances than those investing > £3bn)
- that the UK government would then bail them out (rather than letting the assets be transferred & refinanced)
- To do this, add up to 35% to retail electricity prices – raising over £16bn
- on the assumption that the developers will then break contract to benefit from higher electricity prices.

ie, complete fantasy. As with climate science, seems climate economics now needs to grapple with 'post truth' age

2020

- -20% Greenhouse Gas Emissions
- 20% Renewable Energy (national targets)
- 20% Energy Efficiency
- 10% Interconnection

"The EU should focus on reducing greenhouse gases as the unique climate objective after 2020, and allow the market to identify the most cost efficient way to deliver this target.– *Former Shell upstream executive director, Malcolm Brinded.*

2030

- ≤ -40% Greenhouse Gas Emissions
- ≥ 32% Renewable Energy
- ≥ 32.5%* Energy Efficiency
- 15% Interconnection

EU policy process reflected important things that classical econ recommendations often overlook

New Governance System and Indicators

The European Disjuncture

Central achievement of European Union energy to date, the liberalisation and integration brought together in the Third Package

- A valuable achievement, but only addresses one domain of the needs in the sector
- *Applied to clearly 3rd Domain areas like DG-Climate – hence central focus on EU ETS with very mixed results and many policy tensions*

A microcosm: focus on market & liberalisation is no accident

- *The main legitimacy of most European institutions, and also most national regulatory agencies, is founded on the principles of Second Domain economics*
- Aside from explicitly non-economic institutions (like Foreign policy & security) the main EU institutions with some clear "Third Domain" remits are European Investment Bank and R&D programmes
- Biggest investment-impacting EU lever is State Aids – the negative side of the coin

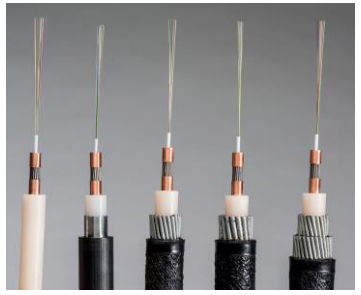
Can climate change help to rebalance the European project?

Can it (and should it) give Europe a renewed legitimacy?

“It’s Sovereignty, Stupid”*

“If God wanted us to be part of Europe, he wouldn’t have made us an island”

- A dialogue of the deaf (and a mini tale)
- On Sovereignty and Virginity
- On Pipes, wires and Power Cables



https://1xtechnologies.com/submarine-cable/

- **Facing reality:** an interconnected world on a finite planet
- A struggle of **geopolitical powers**, with old energy interests vs the new
- Outcome determined by the internationalized, interconnected youth of today?
- A new ‘Institutional SuperCycle’?

*https://www.huffingtonpost.co.uk/entry/brexit-sovereignty_uk_5cb047e1e4b098b9a2d1a844

Economics and policy, politics and Europe

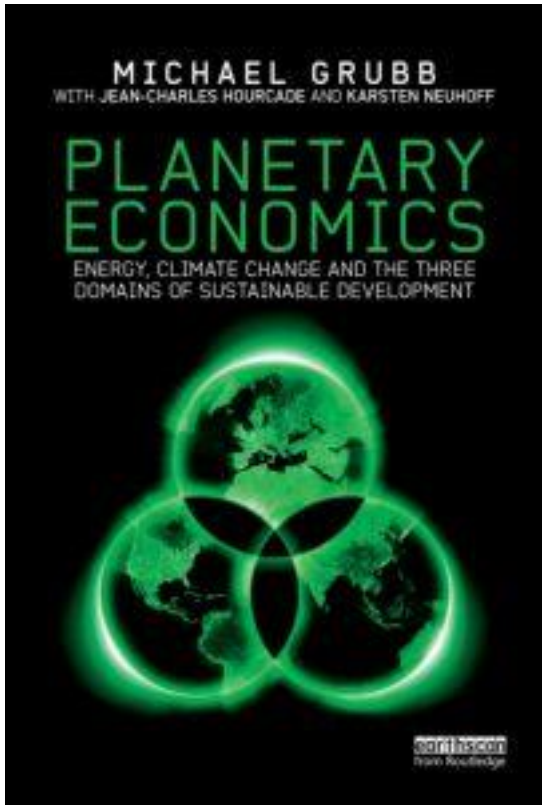
Presentation to BIEE Policy Conference,

Getting Serious about Net Zero

Michael Grubb, Professor of Energy and Climate Change, UCL

Former Senior Advisor, Ofgem & Chair, UK Panel of Technical Experts on EMR

- Where we've been
- Where we could go
- A way to think about the policy economics
- …. And the resulting politics and international dimensions

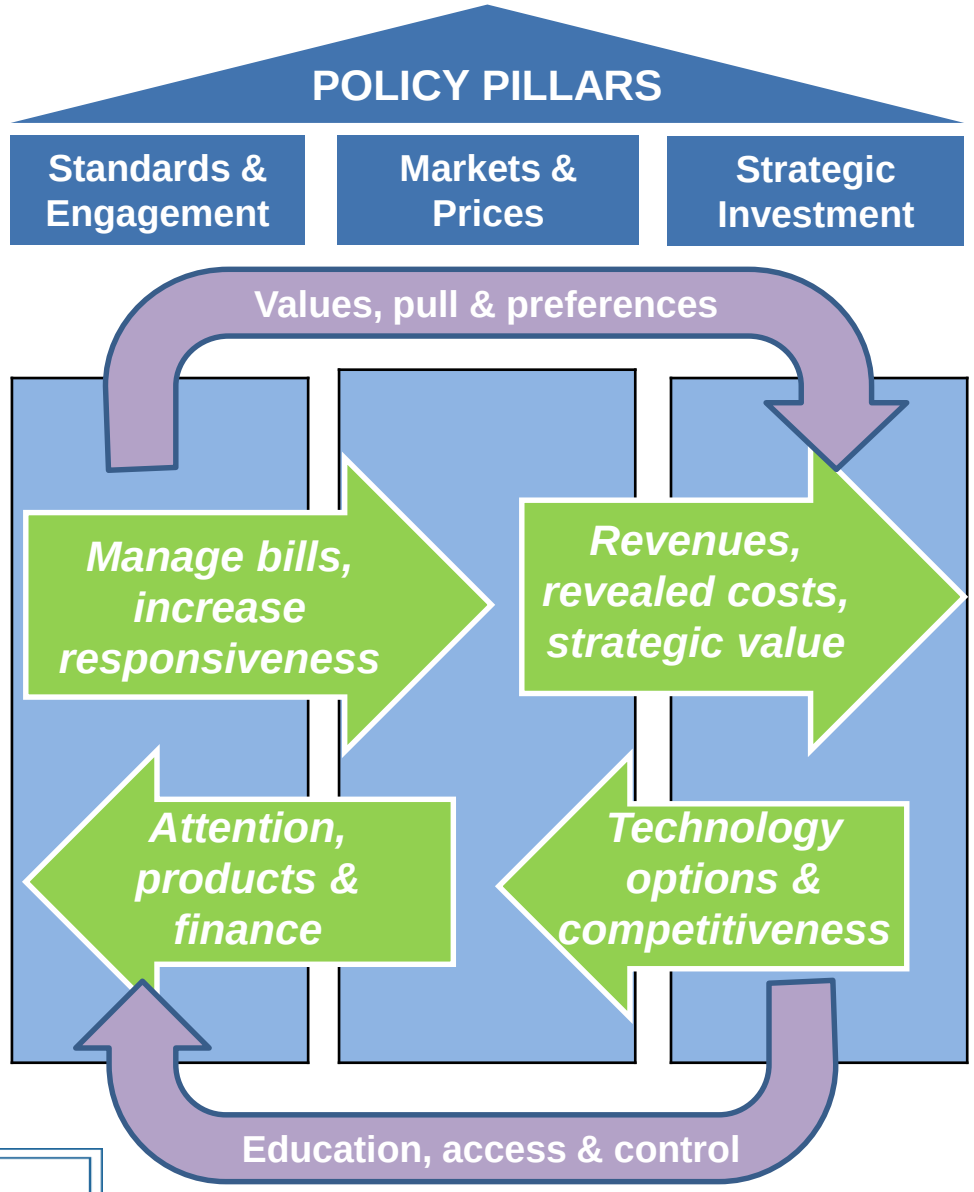


Energy, Climate Change and the Three Domains of Sustainable Development

Conclusions – Economics and Policy

- *#1. Renewable energy contracts must be separately accounted*
- *#2 Offshore wind emerging as a UK and North European resource as large and valuable as North Sea Gas*
- *#3 We badly need integrated, evidence-based theories of low-carbon transformation*
- *#4 Key is to have goals for each economic domain of each sectoral transformation, and match the best instrument to the respective economic domain*
- #5 Breaking out of the current dominant fossil-fuel valley *fast enough* requires *strong and international* public action
- *#6 Consumers need direct access to bulk renewable electricity, and renewables need to bear efficient collective balancing costs => Green Power Pool?*
- *…. And many other sector-specific developments*

“Only Connect”



Conclusions:

- 21st Century energy systems will be radically different from 20th Century
- Transition is already under way, so far driven far more by the non-pure-market policies
- Need the Three Domains & associated Pillars of Policy designed as a mutually reinforcing package
- Harnessed for *industrial / development* strategy
- Including fresh consideration of carbon pricing:
  - Stability and direction?
  - Use of revenues for energy innovation and infrastructure?
  - Direct consumer access to zero-carbon energy
- Clear policy direction with all three pillars can shift risk, lower finance costs, and increase the economic gains from innovation and infrastructure