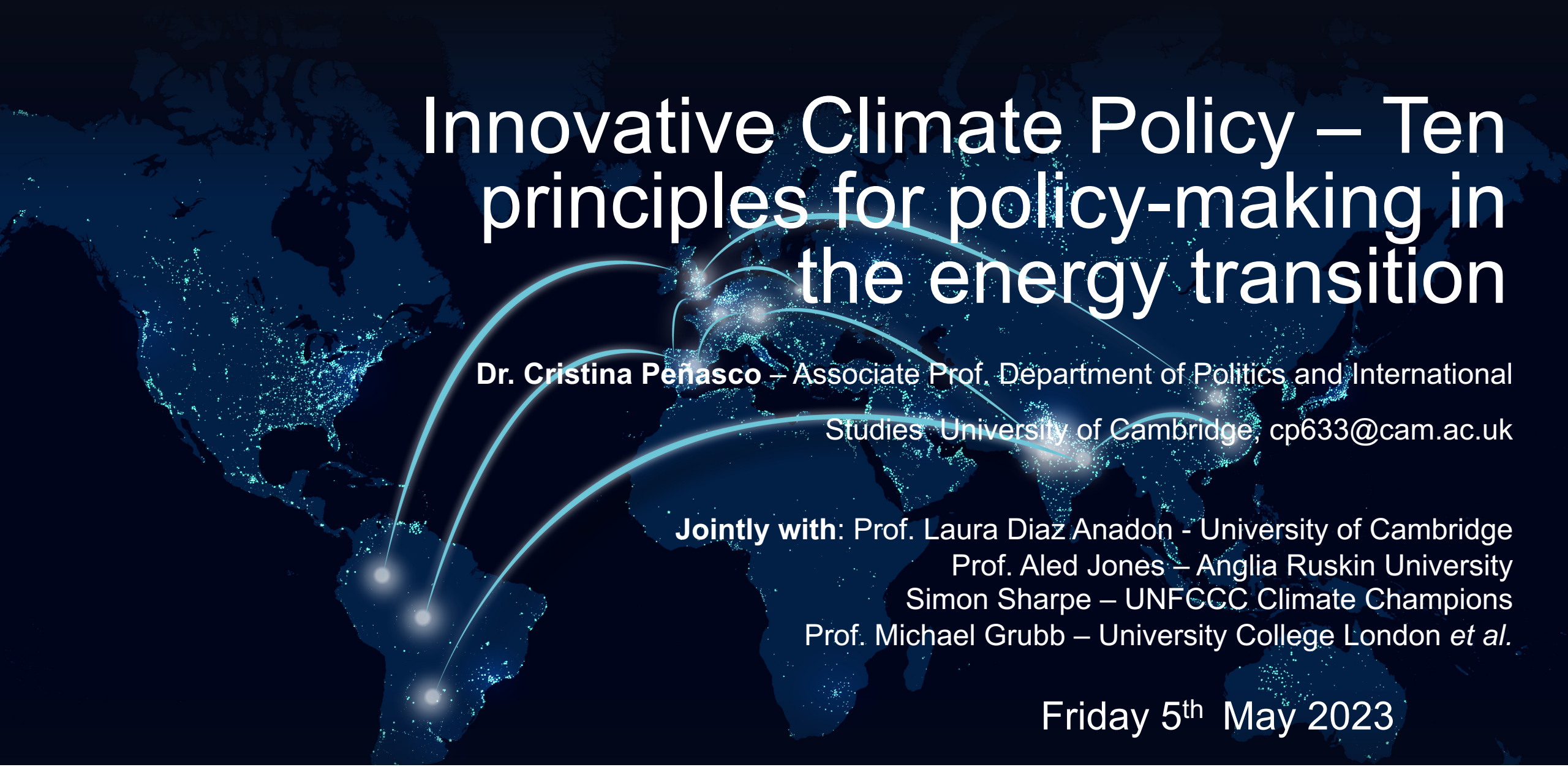

Innovative Climate Policy – Ten principles for policy-making in the energy transition

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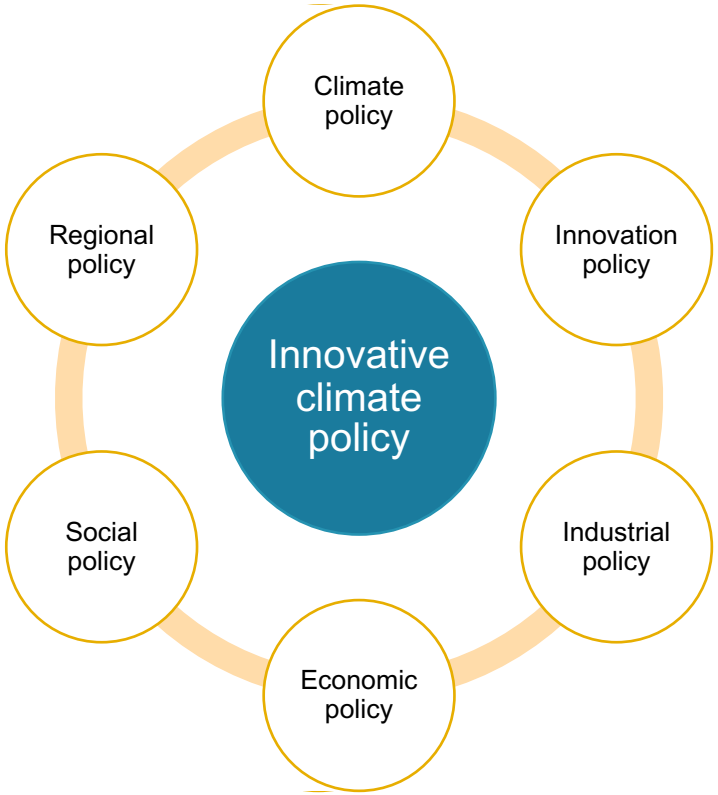
Friday 5th May 2023

Funded by UK Government
Department for Business, Energy & Industrial Strategy
CIFF CHILDREN'S INVESTMENT FUND FOUNDATION
ECONOMICS OF ENERGY INNOVATION AND SYSTEM TRANSITION
UNIVERSITY OF CAMBRIDGE

Overview

1. What is innovative climate policy?
2. A paradigm shift?
3. Why is that?
4. Ten principles for policy making in the energy transition
5. Conclusion

What is innovative climate policy?



Regulatory instruments			
Codes / standards / mandates			Obligation schemes / quotas
Building codes and standards	Product standards	Vehicle-fuel economy and emission standards	Renewable Energy obligations (RPS)*

Economic and Financial instruments										
Direct investment		Fiscal / Financial incentives						Market-based instruments		
Government Procurement	R&D funding	Feed-in tariffs / premiums	Auction	Taxes and tax exemptions	Grants, subsidies and other tax allowances	Loans and soft loans	User charges	GHG emissions allowance trading schemes	Green certificates	White certificates

Soft instruments					
Performance labels		Information campaigns	Voluntary approaches		
Comparison Labels	Endorsement labels	(by energy agencies, energy suppliers, etc...)	Negotiated agreements (Public-private sectors)	Public voluntary schemes	Unilateral commitments (private sector) /Environmental Management Systems (EMSs)

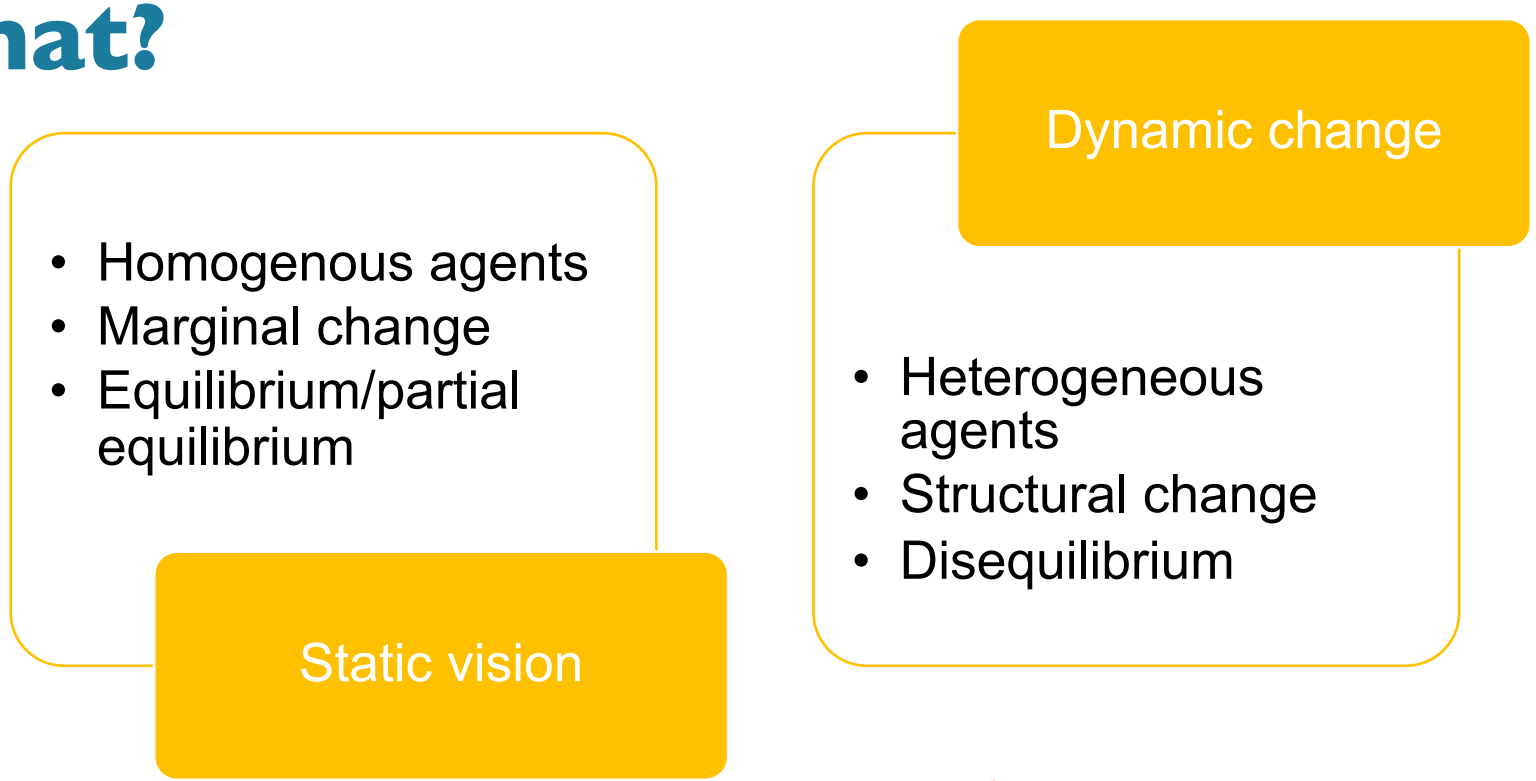
Source: Peñasco et al 2021, *Nature Climate Change.*

Innovative climate policy means using ‘new’ policy instruments and ‘combine’ them in an innovative way with the ultimate goal of mitigating the impacts of climate change and build a more sustainable future for all

A paradigm shift?

Policies critical to the most outstanding successes so far in low carbon transitions in China, India, Brazil, the UK and EU were generally implemented **'despite, not because of, the predominant economic analysis and advice.'**

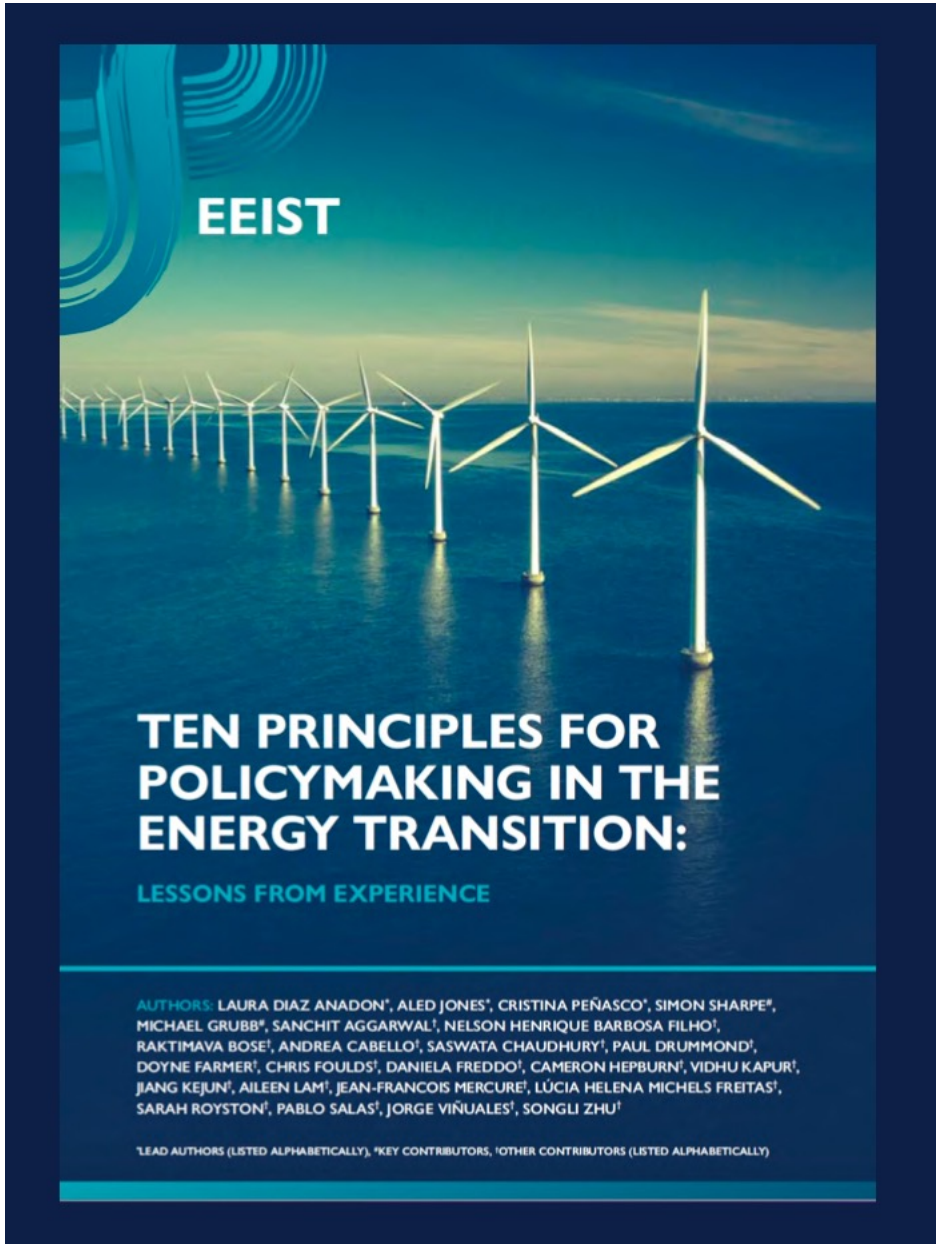
Why is that?



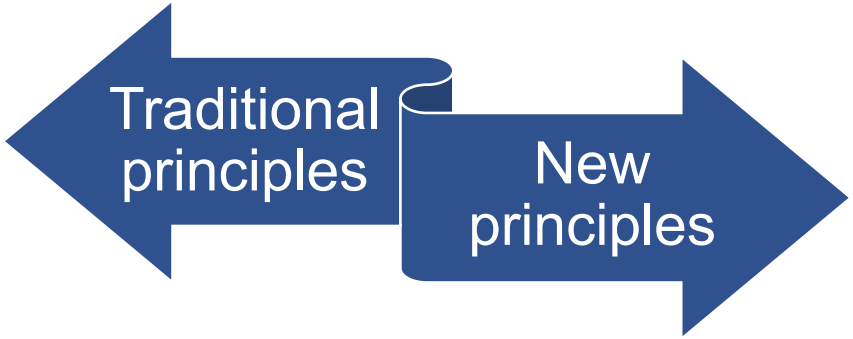
1. In this context, we do not only need new and innovative modelling tools that help identify policies that will drive cost-effective decarbonisation.

2. We also need an innovative way of understanding and doing climate policy a.k.a. a change in paradigm in policy making for the transition to low carbon economies.

Source: Barbrook-Johnson et al. 2023; Anadon et al. 2022



In the context of dynamic processes and structural change like the energy transition, **new general principles for policymaking are needed.**



This New Principles are built on a wealth of **experience and analysis gathered over the last three decades** where policy has induced rapid innovation and growth in clean energy technologies.

	Traditional principle	Principle for the transition
1	*Policy should be 'technology neutral'*	Technology choices need to be made
2	*Government interventions raise costs*	Invest and regulate to bring down costs
3	*Markets on their own optimally manage risks*	Actively manage risks to crowd-in investment
4	*Simply price carbon at a level that internalises the damages of climate change*	Target tipping points
5	*Consider policies individually based upon distinct 'market failures'*	Combine policies for better outcomes
6	*Policy should be optimal*	Policy should be adaptive
7	*Act as long as total benefits outweigh the costs*	Put distributional issues at the centre
8	*Link carbon markets to minimise current costs*	Coordinate internationally to grow clean technology markets
9	*Assess aggregate costs and benefits*	Assess opportunities and risks
10	*Policy models and assessment are neutral*	Know your biases

Technology choices need to be made

Traditional principle: Policy should be 'technology neutral'

- In a context of innovation and structural change, policies will almost always advantage some technologies. It is better to choose deliberately rather than accidentally, supporting innovation in low-carbon directions.

Figure 2. Development of offshore wind prices and costs in the UK. 'Strike prices' (in 2012 prices) are the lowest values awarded to offshore wind under CfD FIDER round (pre-defined prices, awarded in 2013), Auction Round 1 (held in 2015), Auction Round 2 (held in 2017) and Auction Round 3 (held in 2019). ROC (Renewable Obligation Certificate) is the estimated value of the subsidy under the RO mechanism. (Source: [35])

Case Study: UK offshore wind power

Invest and regulate to bring down costs

Traditional principle: Government interventions raise costs

- Well-designed investment and regulation policies can bring down the cost of clean technologies, by creating a 'demand pull' for innovation.

Case Study: Wind turbines in Brazil

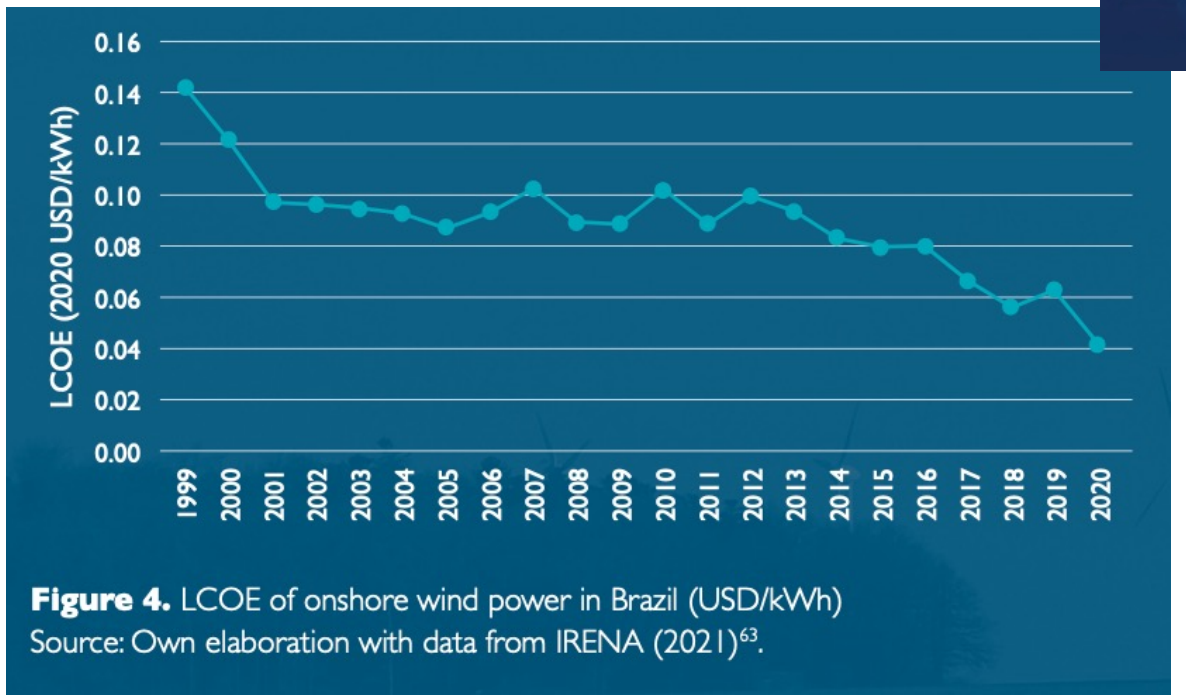


Figure 4. LCOE of onshore wind power in Brazil (USD/kWh)
Source: Own elaboration with data from IRENA (2021)[63].

Actively manage risks to crowd-in investment

Traditional principle: Markets on their own optimally manage risks

- Efforts to reduce the risks of private investment in clean technologies, including public finance acting as a lead investor, can reduce technology risk and financing costs and greatly increase investment and deployment.

Figure 5. Internal Rate of Return of small hydropower plants in the GET FiT programme with counterfactual Internal Rate of Return (IRR) based on KfW data. The y-axis represents the project-level Internal Rate of Return in % and each of the bars in the x-axis represents individual projects awarded the Global Energy Transfer (GET) Feed-in Tariff (GET FiT) in the respective rounds. There were nine projects in Round 1 (in 2013) and Round 2 (in 2014) combined and five projects in Round 3 (in 2015). Between 2013 and 2015 the IRR required for investors went down, indicating that investment risks went down significantly. The counterfactual internal rate of return (IRR) was calculated using projects that did not get funding, but went ahead with the project even without GET FiT funding. This counterfactual data exists as firms needed to hand in detailed financial data to apply for KfW funding. In addition, these rejected firms were unlikely to change their construction design or other factors later in the process, as environmental and other permits were tied to a specific design. Source:[98]

Case Study: Feed-in tariffs & internationally funded top-ups for small hydropower in Uganda

Target tipping points

Traditional principle: Simply price carbon at a level that internalizes the damages of climate change

- Well targeted interventions can activate tipping points where a small input leads to a large change. This can inform the targeting and level of subsidies and taxes, as well as the stringency of regulations.

Case Study: Triggering the electricity transition with Electricity Market Reform and a carbon price floor

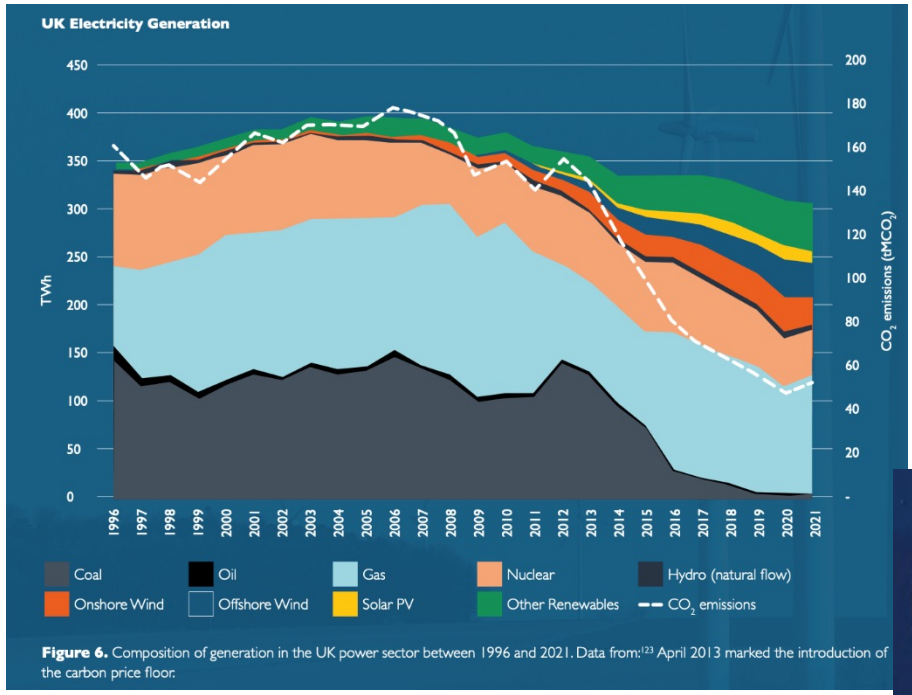


Figure 6. Composition of generation in the UK power sector between 1996 and 2021. Data from:[123] April 2013 marked the introduction of the carbon price floor.

Combine policies for better outcomes

Traditional principle: consider policies individually based upon distinct 'market failures'

- A combination of policies will be needed to drive each low-carbon transition. Assessing policies as a package can identify those that are mutually reinforcing, generating outcomes 'greater than the sum of the parts'.

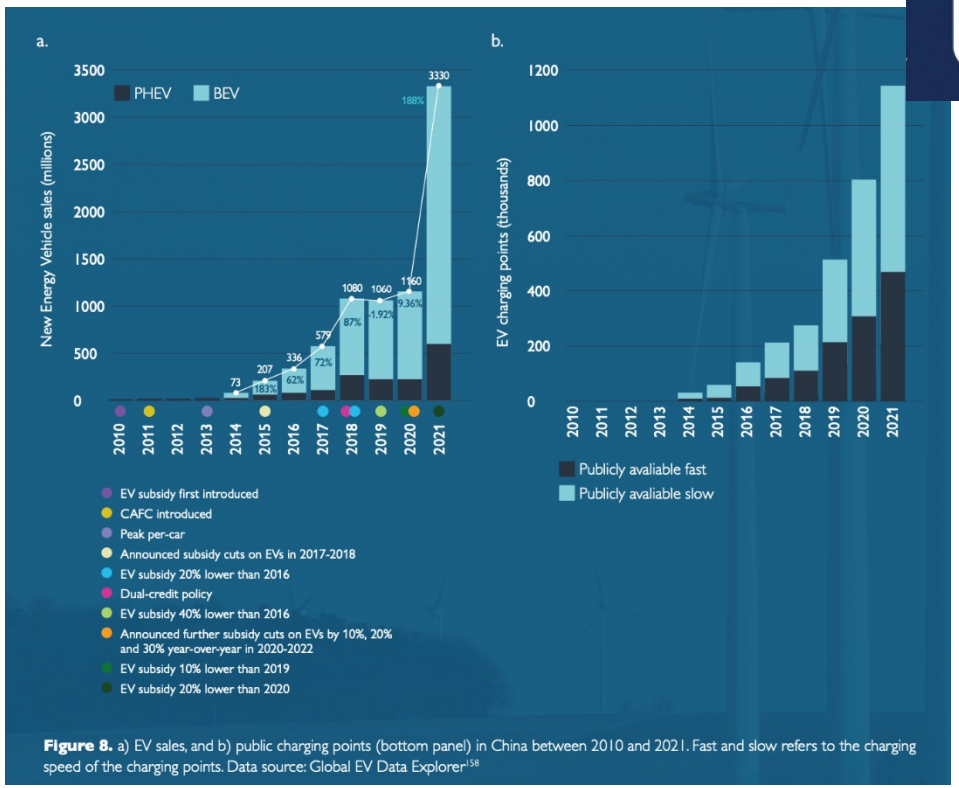


Figure 8. a) EV sales, and b) public charging points (bottom panel) in China between 2010 and 2021. Fast and slow refers to the charging speed of the charging points. Data source: Global EV Data Explorer[158]

Case Study: Policies supporting China's electric vehicle development

Policy should be adaptive

Traditional principle: policy should be optimal

Case Study: Expansion of solar PV in Brazil

- Policy should be designed to be adaptive, so that it can more easily respond to unforeseen changes, exploit opportunities and manage risks.

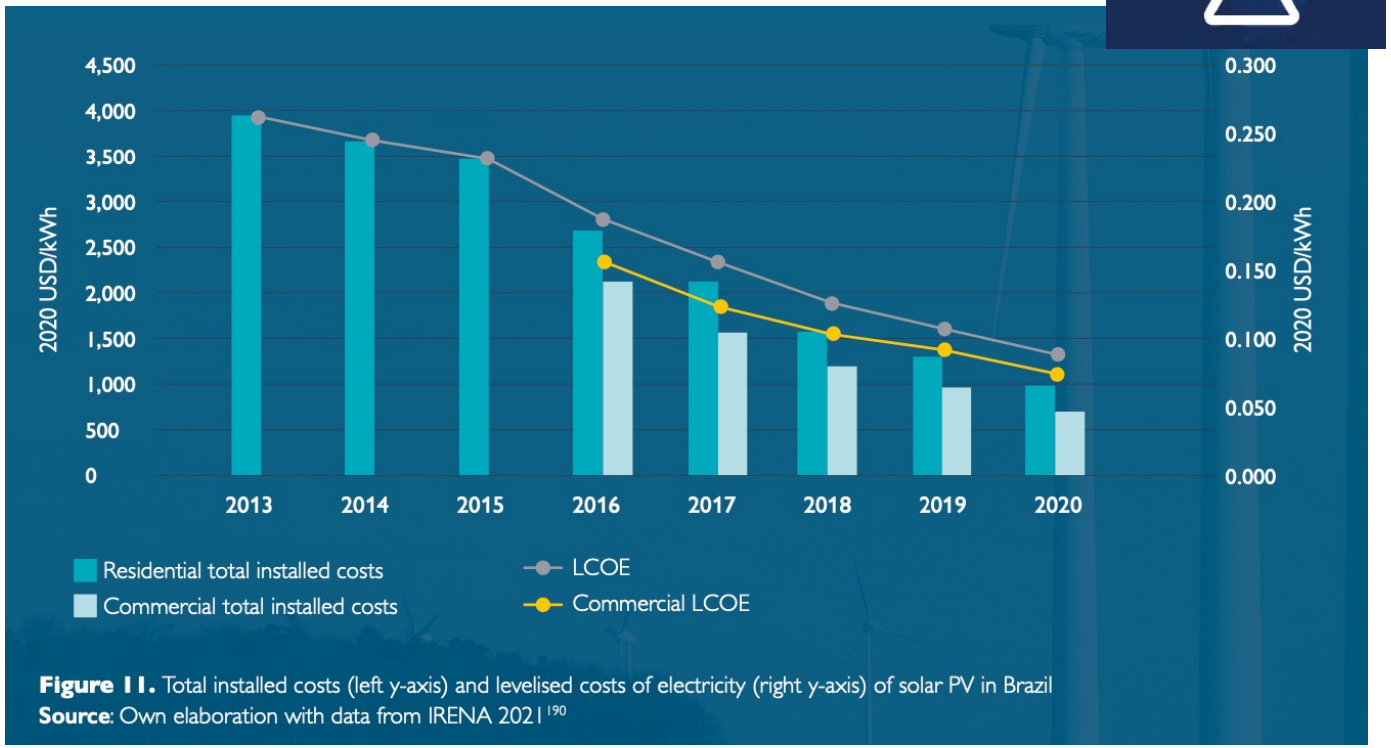


Figure 11. Total installed costs (left y-axis) and levelised costs of electricity (right y-axis) of solar PV in Brazil
Source: Own elaboration with data from IRENA 2021 [190]

Put distributional issues at the centre

Traditional principle: Act as long as total benefits outweigh the costs

- Distributional issues should be central to policy analysis, since they are important for environmental, economic and social goals, and are likely to have a strong bearing on social support for the transition.

Case Study: Carbon road fuel taxes and the 'Gilets Jaunes' movement in France

Coordinate internationally to grow clean technology markets

Traditional principle: Link carbon markets to minimise current costs

- Coordinate internationally to grow clean technology markets can lead to faster innovation and larger economies of scale, accelerating the cost reduction of clean technologies, with benefits for all countries.

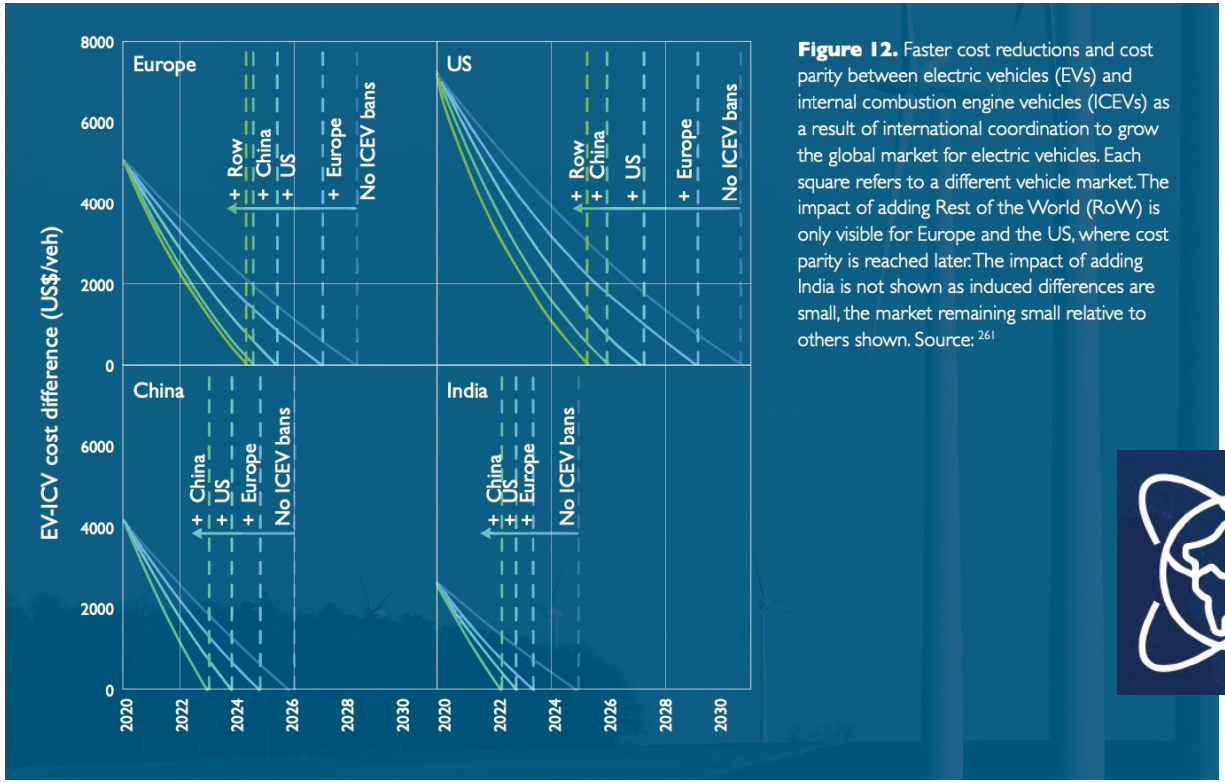


Figure 12. Faster cost reductions and cost parity between electric vehicles (EVs) and internal combustion engine vehicles (ICEVs) as a result of international coordination to grow the global market for electric vehicles. Each square refers to a different vehicle market. The impact of adding Rest of the World (RoW) is only visible for Europe and the US, where cost parity is reached later. The impact of adding India is not shown as induced differences are small, the market remaining small relative to others shown. Source: [261]

Case Study: International cooperation on zero-emission vehicles

Assess opportunities and risks

Traditional principle: Assess aggregate costs and benefits

- Where the aim is transformational change, appraisal should consider the effects of policies on processes of change in the economy, alongside their expected outcomes.

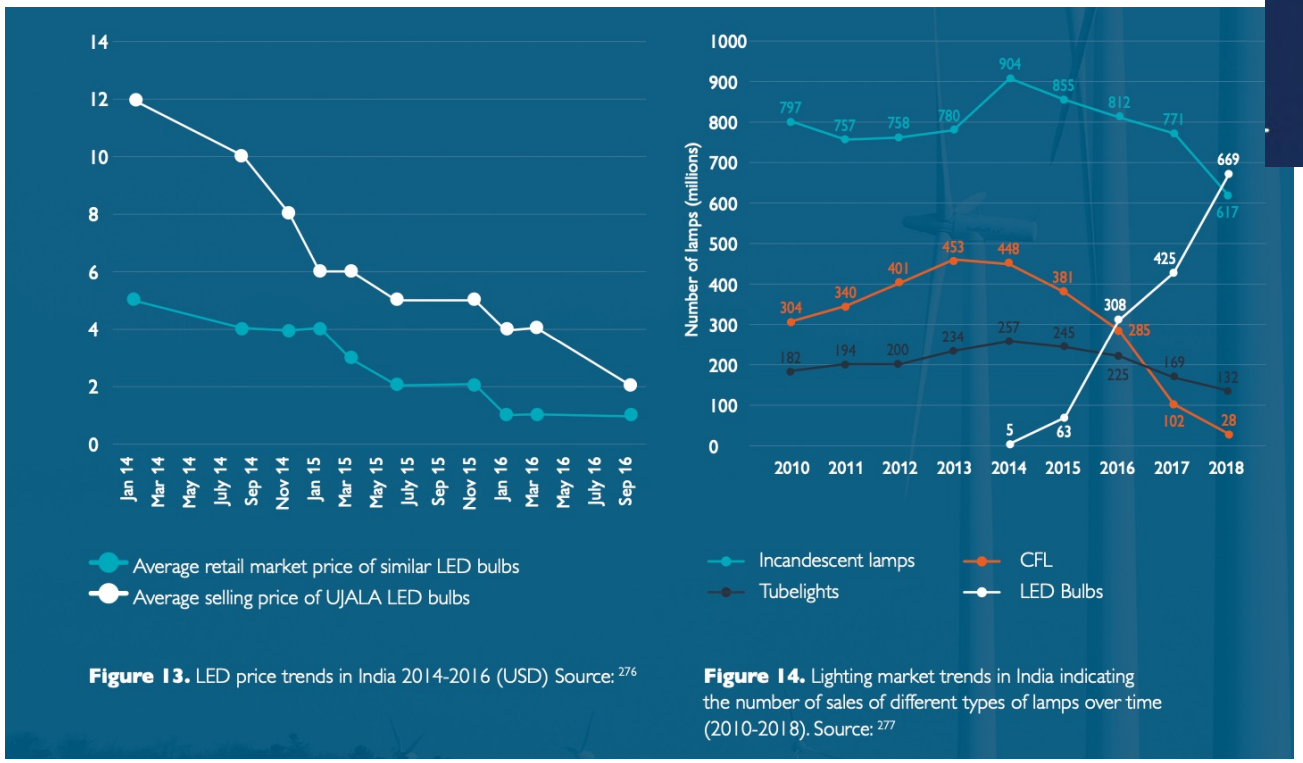


Figure 13. LED price trends in India 2014-2016 (USD) Source: [276]

Figure 14. Lighting market trends in India indicating the number of sales of different types of lamps over time (2010-2018). Source: [277]

Case Study: India's transformation of LED demand aggregation through procurement

Know your biases

Policy models and assessment are neutral

- The construction of economic models unavoidably involves many choices that will influence their outputs, in which there are no 'correct' answers.

Case Study: European 2030 renewable energy targets

Conclusions

- ✓ Within a complex system, a structural change requires transformational climate policy, underpinned by appropriate policy processes and informed by a set of organising principles
- ✓ Acknowledge the limitations of the traditional principles in a changing context and complement the 'assumed' knowledge with analytic frameworks considering structural change beyond equilibrium theory.
- ✓ Where the traditional principles aim to achieve an efficient allocation of existing economic resources, our principles aim to guide the process of economic change in an effective and fair way
- ✓ Useful for governments wishing to achieve fast enough transitions to avoid dangerous and irreversible climate change impacts while minimising costs and maximizing opportunities for economic development.

Thanks so much – Q&A

@EeistP @chrispenasco

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