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The Decarbonisation Policy Evaluation Tool (DPET)

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INNOPATHS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730403.

Abstract: The complexity of environmental problems, combined with several other economic and socio-political challenges such as ensuring fairness and promoting competitiveness, have put great pressure on building a well-rounded and stronger understanding of how to design effective solutions to tackle climate change. This is even more true given the COVID-19 pandemic we are currently facing. Within the framework of the H2020 project Innovation Pathways, Strategies and Policies for the Low Carbon Transition in Europe (INNOPATHS), I led the team in charge of designing the Decarbonisation Policy Evaluation Tool (DPET). **The DPET is a one-of-a-kind open-access interactive tool designed as a helpful reference for policy makers, academics and general users as it allows them to explore the possible trade-offs or co-benefits of policies to support the net zero-carbon transition with a novel methodological approach** (Fig. 1).

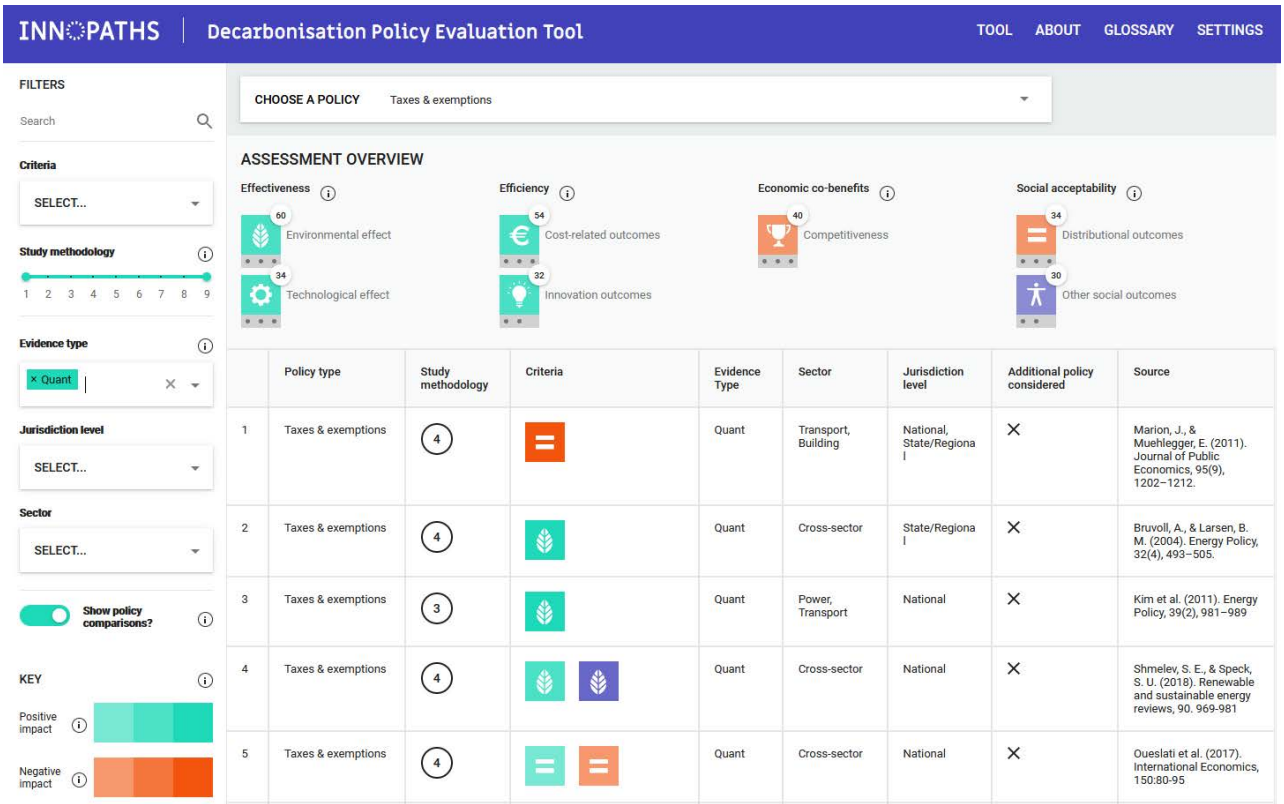

Fig 1. Snapshot of the DPET

Source: https://dpet.innopaths.eu/#/

The need

Policy makers at different governmental levels around the world are considering taking more aggressive steps towards facilitating a net-zero carbon future, consistent with the goals of the Paris Agreement. However, governments typically have multiple societal goals they are trying to advance beyond improving environmental outcomes, which may include reducing costs, increasing competitiveness and innovation, ensuring fair distributional effects, and securing political support, among others. One of the main challenges faced by policy makers in the field is that the current evidence available to help decision-making is fragmented, i.e. information about the various impacts of a particular policy is scattered and there is inconsistent evidence regarding the impact of a wider range of low-carbon policy instruments on a variety of outcomes. Indeed, the heterogeneity in academic evidence translates into uncertainty for policy makers regarding what instruments to choose when pursuing different or multiple goals. Within the EU research arena, the need for more clarity on these matters has been explicit for a while.

The innovation

To cover this gap, and after more than four years of co-design with the interaction and participation of policy makers and academics from countries like Belgium, Germany, Poland, the United Kingdom, Greece and Italy among many others, in the context of the INNOPATHS project, the DPET is up and running. The DPET was envisaged as a framework for the systematic analysis of the impact of the most relevant energy and climate policy options on the many important outcomes for decision makers and for decarbonisation scenarios development. The current framework systematically analyses the evidence on building codes and standards, renewable energy obligations, government procurement, public R&D funding, feed-in tariffs or premiums, energy auctions, energy taxes and tax exemptions, GHG emissions allowance trading schemes, tradable green certificates, and white certificates. The seven categories of outcomes analysed are environmental, technological, cost-related, innovation, competitiveness, distributional and other social outcomes. The DPET is designed to be an alive open-access interactive tool and it is now being expanded to include other instruments like product standards, vehicle fuel economy standards or other grants, subsidies and tax allowances. Additionally, the DPET also summarizes the strength of the evidence and its context to help interpret its possible applicability elsewhere.

The overreaching objective of the DPET is to provide academics and policy makers with an integrating tool analysing and synthesizing what we know about the policy instruments that can be used to support the transition to a net zero carbon system. The innovative interactive tool contains the systematic review of 211 peer-reviewed articles and high-level reports with a total of more than 700 evaluations. The DPET presents the evidence in the papers resulting from the systematic literature review according to the type of policy instruments and outcome. It also indicates the extent to which each paper concludes that there is a positive, negative, or lack of impact on each outcome. The DPET specifies the level of agreement across papers evaluating similar policies too. It presents the research methods used, the contextual factors relevant to the evaluated policy -including time period and location- and the key design elements in each policy associated with apparent differences in outcomes. The DPET represents a systematic framework that can be applied by others interested in these types of evaluations and assessments. This is important since the available academic and non-academic evidence is growing fast. Furthermore, the COVID-19 pandemic has increased the challenge of addressing climate-related concerns in a swift manner. The Systematic review of the outcomes and trade-offs of ten types of decarbonization policy instruments, of which I am first and corresponding author, has been published in Nature Climate Change. The article uses the evidence in the DPET to explore whether we can pursue decarbonisation while also effectively promoting other important societal goals.

The contribution

But, why do we need a Decarbonisation Policy Evaluation Tool? To reach the goal of a net zero carbon economy by 2050, policy instruments are essential to shape the technologies that get developed and deployed, as well as the incentives shaping behaviour at the individual and organisational levels, therefore, additional policies are needed. Taking the next steps requires a prior analysis of what policies have been working adequately in the last few years and in what terms they have done so. Then, **what is the optimal policy combination of 'technology pull' (e.g. CO2 prices)**

and technology push' (e.g. feed-in tariffs) strategies to bring societies towards a renewable energy system? ("Renewables" Question 68.) The Systematic review and the results synthesized in the DPET confirm that there is no one-size-fits-all solution and policy makers should, for example, deploy incentives for innovation, such as targeted R&D funding, while also adapting tariffs and quotas to benefit those across income distributions. **By which criteria should we evaluate the effectiveness of policies, as well as policy mixes [...] in bringing about transformational change across renewable energy sources?** ("Renewables" Question 72.) We have designed a typology of outcomes that takes into consideration not only environmental effectiveness but technological effectiveness, cost-related impacts, innovation impacts, competitiveness, distributional and other social-outcomes. This is because, unless low-carbon policies are fair, affordable and economically competitive, they will struggle to secure public support – and further delays in decarbonisation could be disastrous for the planet. **What are the policy trade-offs, from a social perspective, in transitioning to a fully renewable energy system; and how can these be managed and/or mitigated?** ("Renewables" Question 73.) We show in a consistent fashion that some policy instruments were able to advance certain societal goals (e.g., environmental and technological), but that in some cases they had negative impacts on others (i.e. distributional and competitiveness). Our research concludes that policy design can help reduce the trade-offs. Our paper in Nature Climate Change provides specific examples on how to design energy taxes, subsidies for renewable energy support and R&D funding to minimize trade-offs. Importantly, the DPET offers a systematic mapping not only of the things we know, but also of the most important under-researched instruments, times or geographies. This, we hope, may provide inspiration to others.

Acknowledgements

This was a collaborative effort of the team formed by Prof. Laura Diaz Anadon (Department of Land Economy- University of Cambridge, Prof. Elena Verdolini (Euromediterranean Center for Climate Change and University of Brescia) and myself and that I had the privilege to lead.