



How do we successfully transform energy analysis into Government policy?

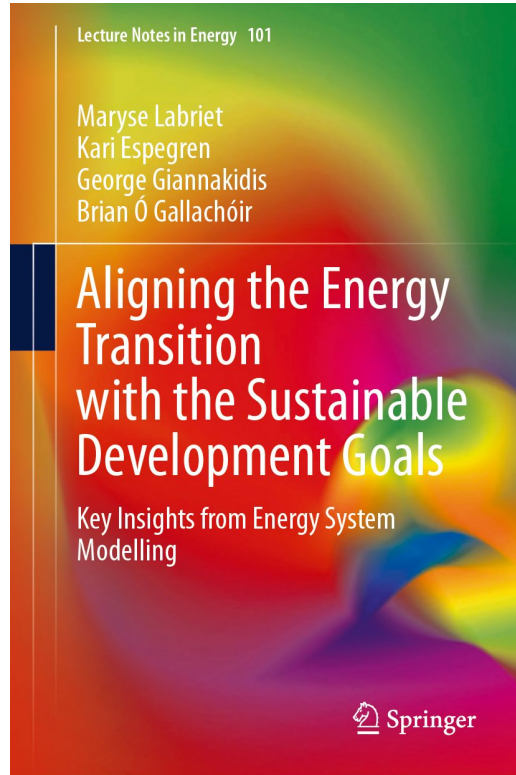
Fionn Rogan, Paul Deane and Brian Ó Gallachóir

International Energy Workshop, June 27th 2024

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Presentation drawn from ...



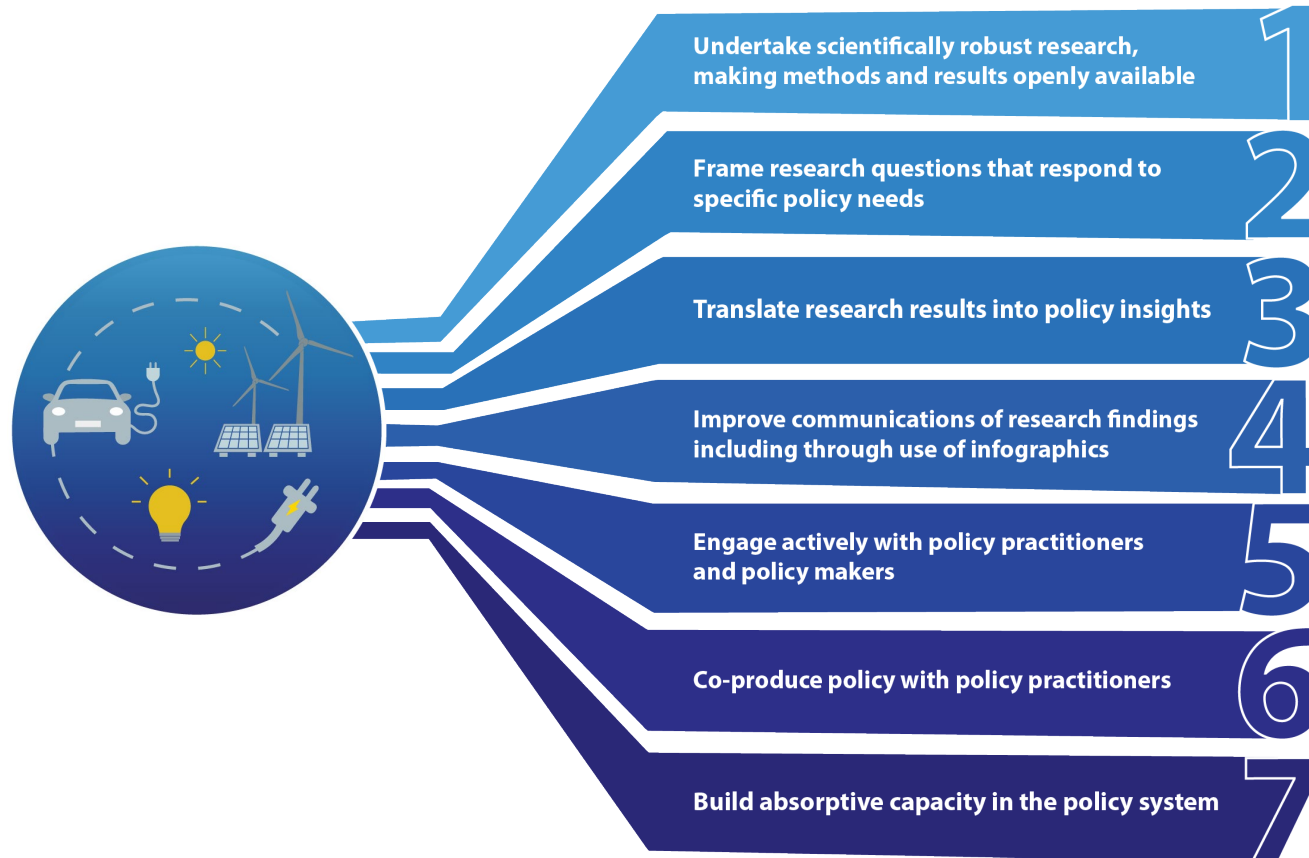
Ó Gallachóir B., Deane P. and Rogan F. 2024
*Translating Research Results into Policy
Insights to Underpin Climate Action in
Ireland.*

In: Labriet M., Espegren K., Giannakidis G.
and Ó Gallachóir B. (eds) *Aligning the Energy
Transition with the Sustainable Development
Goals: Key Insights from Energy Systems
Modelling*. Lecture Notes in Energy, Vol 101.
Springer.

Available from

[https://link.springer.com/book/97830315889
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Analysis -> Policy in Seven Stages



Stage 1: Undertake robust, open research

Energy Policy 53 (2013) 169–189

Contents lists available at ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

Modelling the impacts of challenging 2050 European climate mitigation targets on Ireland's energy system

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^d Royal Military College Saint-Jean, National Defence, Garrison St-Jean C.P. 100 Succ. Bureau Chef, St-Jean-sur-Richelieu (Québec), Canada J0Y 1R0

Energy 296 (2024) 131110

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Is District Heating a cost-effective solution to decarbonise Irish buildings?

Jason Mc Guire^{a,b,c}, Stefan N. Petrović^c, Hannah Daly^{a,b}, Fionn Rogan^{a,b}, Andrew Smith^{a,b}, Olexandr Balyk^{a,b,d}

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^d Center for Global Energy Policy, School of International and Public Affairs, Columbia University, 630 Amsterdam Avenue, NY 10027, USA

Product Solutions Open Source Enterprise Pricing

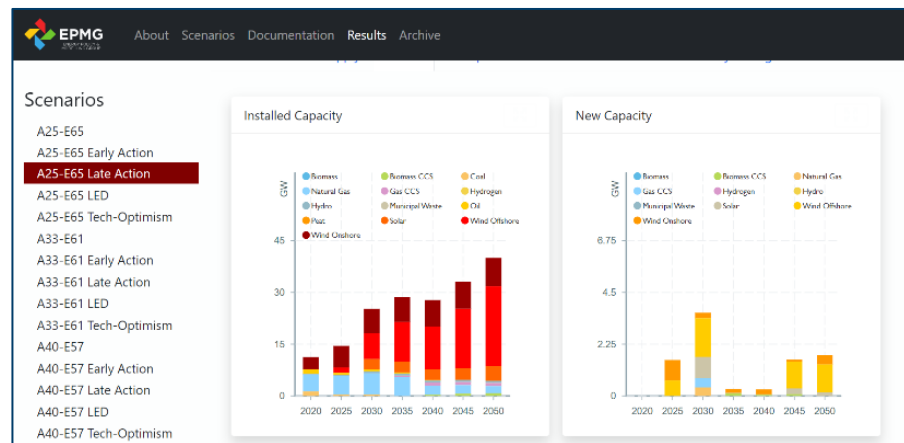
MaREI-EPMG / times-ireland-model Public

Code Issues 23 Pull requests Actions Projects 3 Security Insights

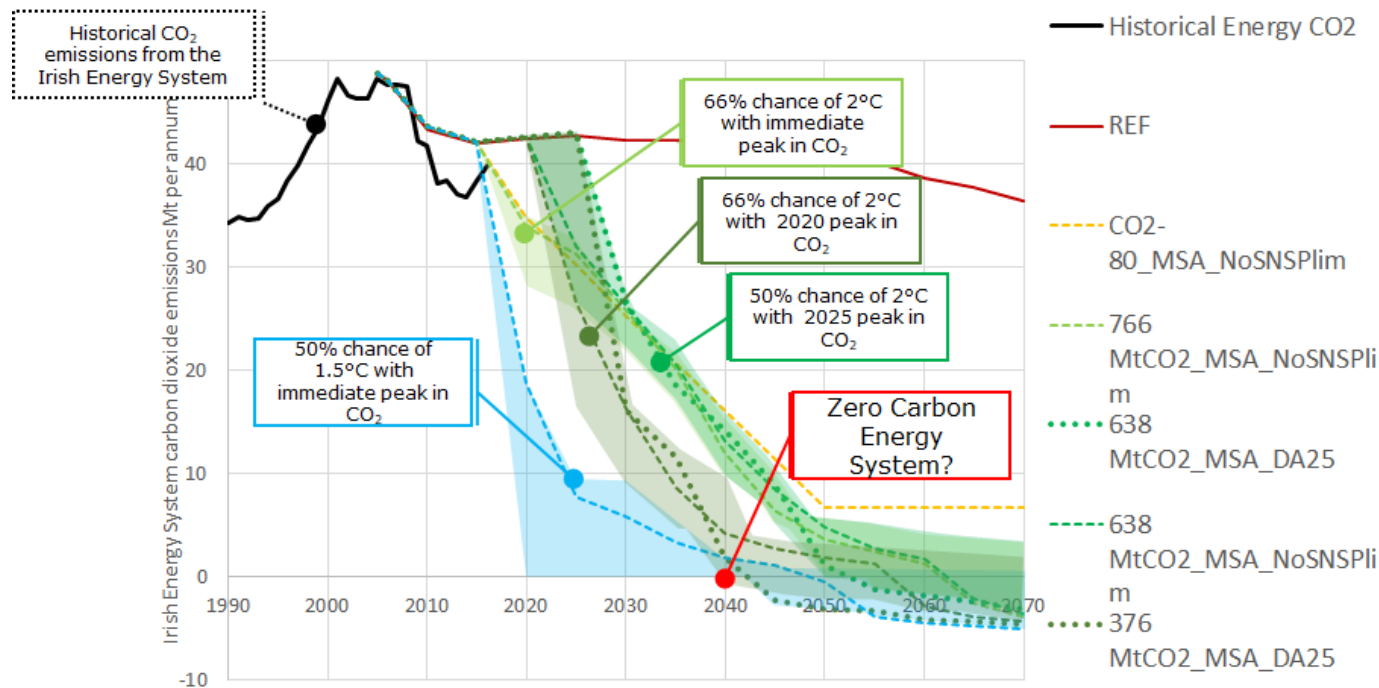
main 14 branches 4 tags

BalykzhanSuleimenov Carbon budgets for 1.5 degree (#67)

- github Update CODEOWNERS
- AppData Carbon budgets for 1.5 degree (#67)
- SubRFS_TMP Carbon budgets for 1.5 degree (#67)
- SuppXLS Carbon budgets for 1.5 degree (#67)
- github Carbon budgets for 1.5 degree (#67)
- zenodo.json Add metadata for zenodo
- ACKNOWLEDGEMENT.md Add TIMES-Ireland Model
- BY Trans.xlsx Add TIMES-Ireland Model
- UCLES.txt Add TIMES-Ireland Model
- README.md Update scenario description in README.md



Stage 2: Frame research to policy needs



Glynn, J., Gargiulo, M., Chiodi, A., Deane, P., Rogan F., Ó Gallachóir, B., 2019. *Zero carbon energy system pathways for Ireland consistent with the Paris Agreement*. **Climate Policy** 19:1, 30-42. Available from [here](#)

Stage 3: Translate results into insights

Policy Brief

Identifying
technology
opportunities in
the low carbon
energy transition

Our 2050

This is one of a series of policy briefs to summarize ongoing findings related to the research project, 'Our 2050 – Opportunities for Ireland in a Low Carbon Economy', which is on the economic and societal opportunities arising from the transition to a low carbon economy and the policies needed to achieve this transition

Deriving MACCs from energy systems model

Using the Irish TIMES model, the MACC is derived by imposing increasingly more stringent mitigation targets and run the model multiple times. The MACC contains over 100 scenarios, from the REF scenario where no climate policy is imposed to 100% with a 1% step change in 2050 emission level (relative to 1990 level). Intermediate climate targets in 2020, 2030 and 2040 are linearly interpolated.

Key Policy Insights MACC

The system-wide MACC (Fig. 1) demonstrates the tradeoff between decarbonization ambitions and economic feasibility. The upward shape of the MACC reflects the increased marginal efforts when aiming for more ambitious carbon mitigation targets. Compared to the MACC, the total system cost does not increase tremendously. The impact of 80% reduction target on the total energy system cost represents less than 1% of total GDP in 2050.

Tipping points can be identified on the MACC.

At cost levels with steady and low rate of increase, the model is able to deploy and expand the capacities of many cost-effective mitigation options. As these cheaper sets of technologies reach their maximum potential, more expensive options need to be deployed. This causes tipping points where marginal abatement cost increase drastically.

Certain technologies have limited mitigation options in the model (such as passenger trains and cement production) and some mitigation technologies (such as plug-in hybrid vehicles and gas CCS) are not completely carbon free. It is impossible to reach carbon neutrality without negative emission technologies such as BECCS

Energy Systems

Analysis on the scenario ensembles that form the MACC shows the sectoral energy system patterns in response to the change in decarbonization ambitions. Each sector requires different levels of economic efforts for mitigation and may not decarbonize at the same rate with increased emission stringency. For example, the first half of CO₂ in power sector (Fig. 2) can be mitigated by switching from coal/peat to gas with low cost. The rest of CO₂ decarbonization requires CCS and biomass technologies.

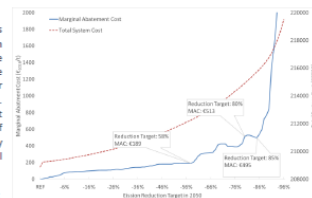


Figure 1. Marginal abatement cost in 2050 and overall total system cost. Tipping points can be identified at 58% and 85% CO₂ reduction levels

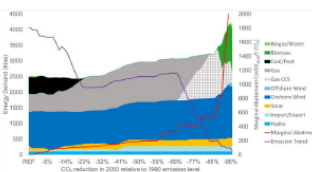
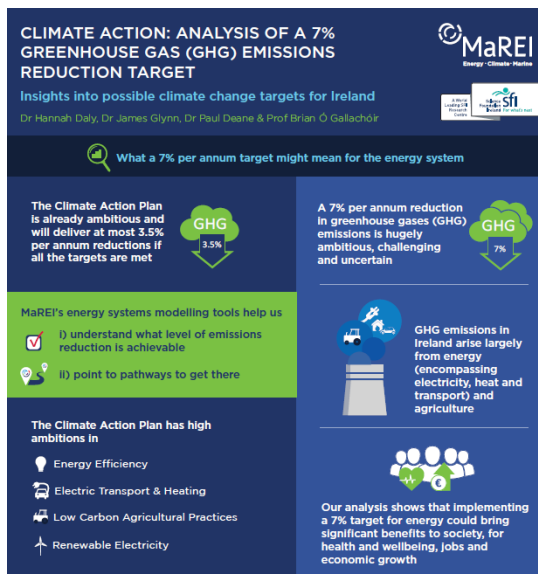
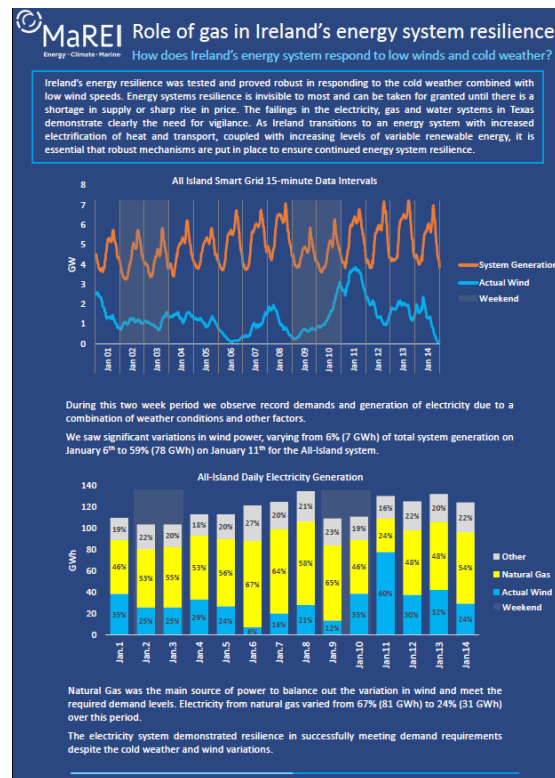


Figure 2. Electricity generation energy demand, emission trends and system-wide MACC in 2050.

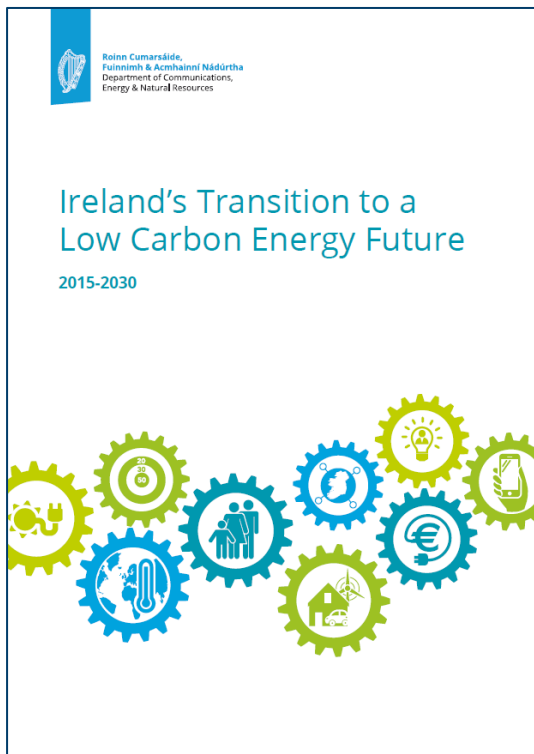
Stage 4: Improve comms (infographics)



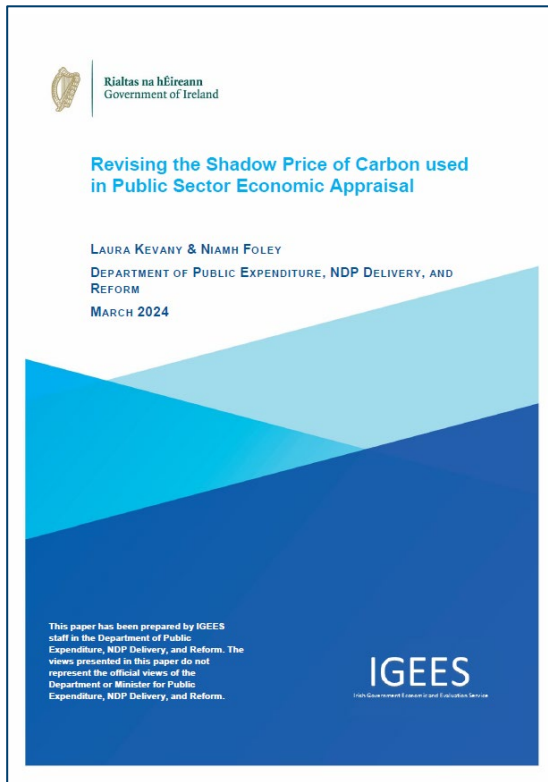
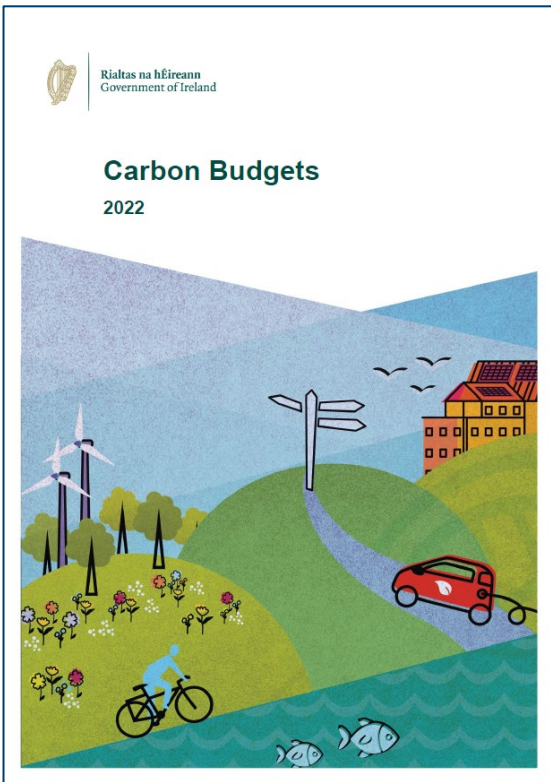
MaREI analysis indicates we would also need significant increases in ambition beyond the Climate Action Plan in the following areas



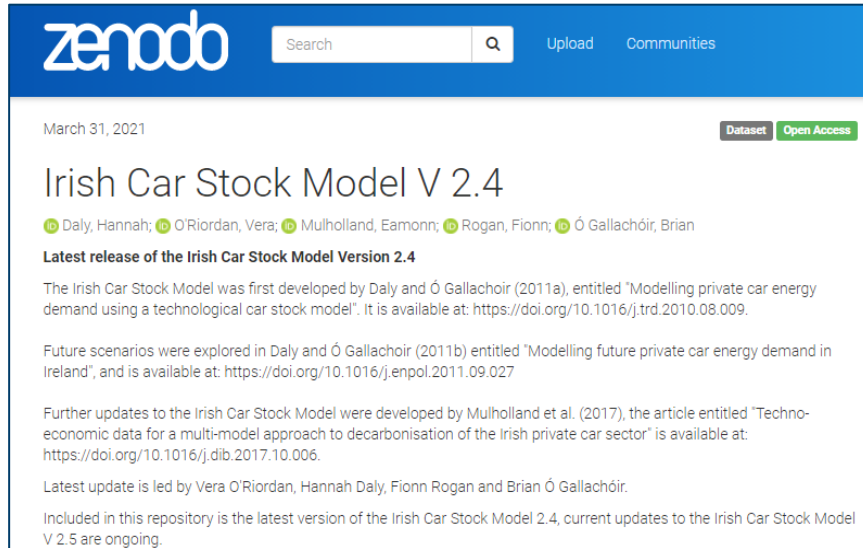
Stage 5: Engage with policy makers



Stage 6: Co-produce Policy



Stage 7: Build absorptive capacity



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Irish Car Stock Model V 2.4

Daly, Hannah; O'Riordan, Vera; Mulholland, Eamonn; Rogan, Fionn; Ó Gallachóir, Brian

Latest release of the Irish Car Stock Model Version 2.4

The Irish Car Stock Model was first developed by Daly and Ó Gallachóir (2011a), entitled "Modelling private car energy demand using a technological car stock model". It is available at: <https://doi.org/10.1016/j.trd.2010.08.009>.

Future scenarios were explored in Daly and Ó Gallachóir (2011b) entitled "Modelling future private car energy demand in Ireland", and is available at: <https://doi.org/10.1016/j.enpol.2011.09.027>.

Further updates to the Irish Car Stock Model were developed by Mulholland et al. (2017), the article entitled "Techno-economic data for a multi-model approach to decarbonisation of the Irish private car sector" is available at: <https://doi.org/10.1016/j.dib.2017.10.006>.

Latest update is led by Vera O'Riordan, Hannah Daly, Fionn Rogan and Brian Ó Gallachóir.

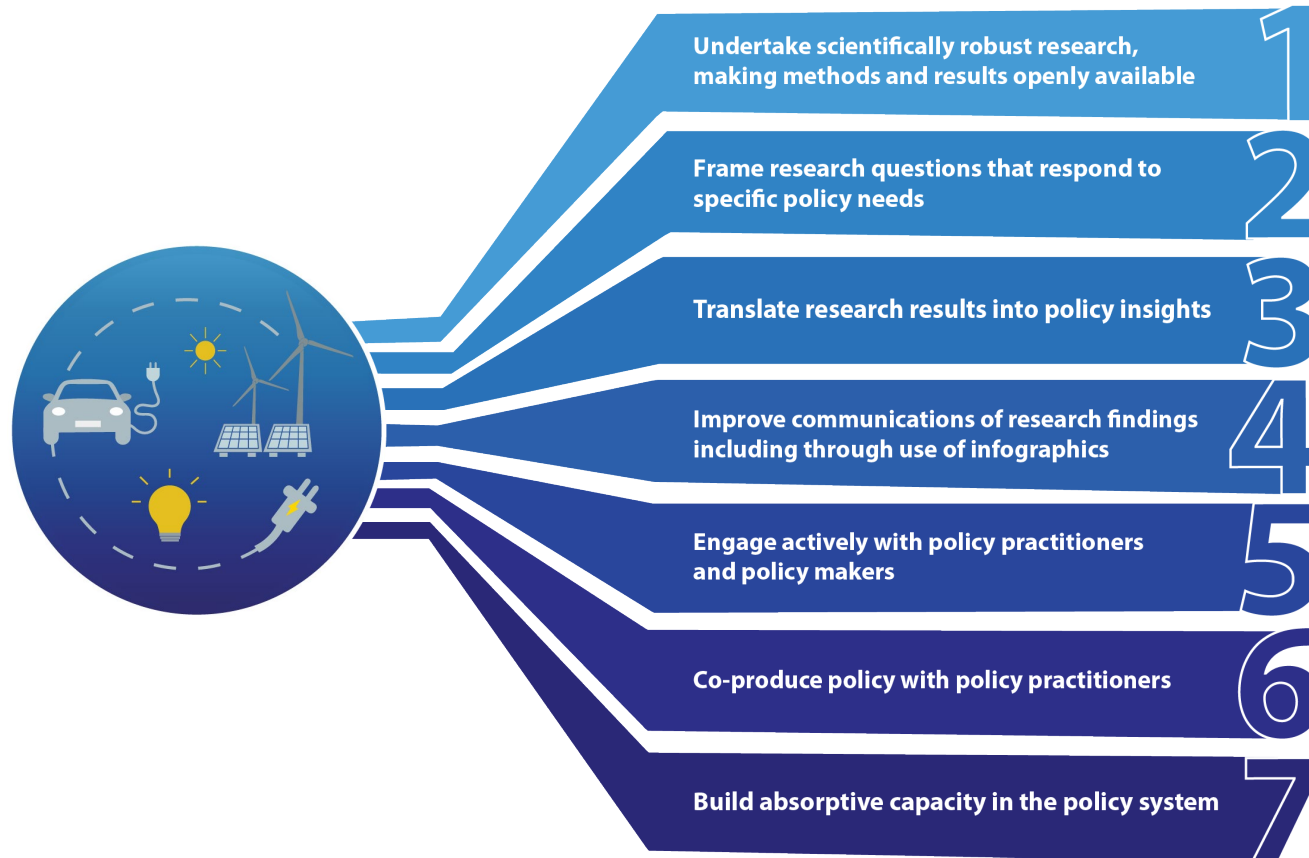
Included in this repository is the latest version of the Irish Car Stock Model 2.4, current updates to the Irish Car Stock Model V 2.5 are ongoing.



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Sustainability and Human Development

Translating Imagination into
Action for Transformative
Change

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