

Geosci. Model Dev. Discuss., referee comment RC1  
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## Comment on gmd-2021-359

James Price (Referee)

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Referee comment on "TIM: modelling pathways to meet Ireland's long-term energy system challenges with the TIMES-Ireland Model (v1.0)" by Olexandr Balyk et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-359-RC1>, 2022

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This paper describes a new, state-of-the-art energy systems optimisation model for Ireland which has been developed following best practice guidelines. The objective of the model is to support evidenced based policy making as Ireland seeks to reach net-zero by 2050.

In general I think the paper, and the model it describes, are of a high quality and will certainly warrant publication once a few minor points below are clarified and amended. My comments are as follows:

Interesting choice not to include technology specific discount rates – is there any further discussion/rationale you could give on this issue? That is, I understand there is a tension here given that the model takes a social planner perspective but I am wondering about this choice since technology specific discount rates are typically used to, in part, acknowledge that the real world generally relies on private finance (at least as of now).

I'm a little unclear if land-use emissions are modelled in TIM based on "Another limitation of TIM is the sole focus on energy and process emissions". My impression is they are but in a static, exogenous manner? Even though there is mention of the agricultural sector being taken from Irish TIMES, it would be useful to clarify, with a few sentences, what is exogenous and endogenous here.

Line 20 – I think this should be updated to "did" fail its 2020 decarbonisation objective, as it is now 2022.

Line 36 – make improving efficiencies challenging (previously "make improve..")

Line 37 – is that average annual renewable electricity generation (36.5%?) And again, is 86% average from wind. It will vary between years.

Line 76 – the model respects whatever tech, environ, economic, social and policy constraints are included – some may be missed (and likely are).

Line 78 – how are feasible uptake rates derived?

Line 92 – what is an “internal transfer”?

Figure 1 – I’m going to assume it can but from the diagram it isn’t totally clear that electricity can be used to produce H<sub>2</sub>, for instance. And is there any CCU?

Line 143 – what is a “spacial spatio-temporal approach”?

Line 260 – can interconnectors be reinforced/new ones built?

Line 272 – I think the sentence should be something like “...in the future, disaggregated as (or into) centralised and decentralised electrolysis options”

Line 316 – 100% VRE share over the year? And is this the case even with an hourly resolution?

Line 485 – regrading -> regarding

Line 544 – agricultural sector energy service demands don’t change from 2018, how reasonable is this assumption?