



Short-term validation of scenarios

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***piamValidation**: systematic validation for IAM climate mitigation scenarios*

An open-source R package for benchmarking IAM output against historical data, near-term technology trends & cross-model consistency

Motivation

Provide a systematic validation framework for Integrated Assessment Model (IAM) pathways

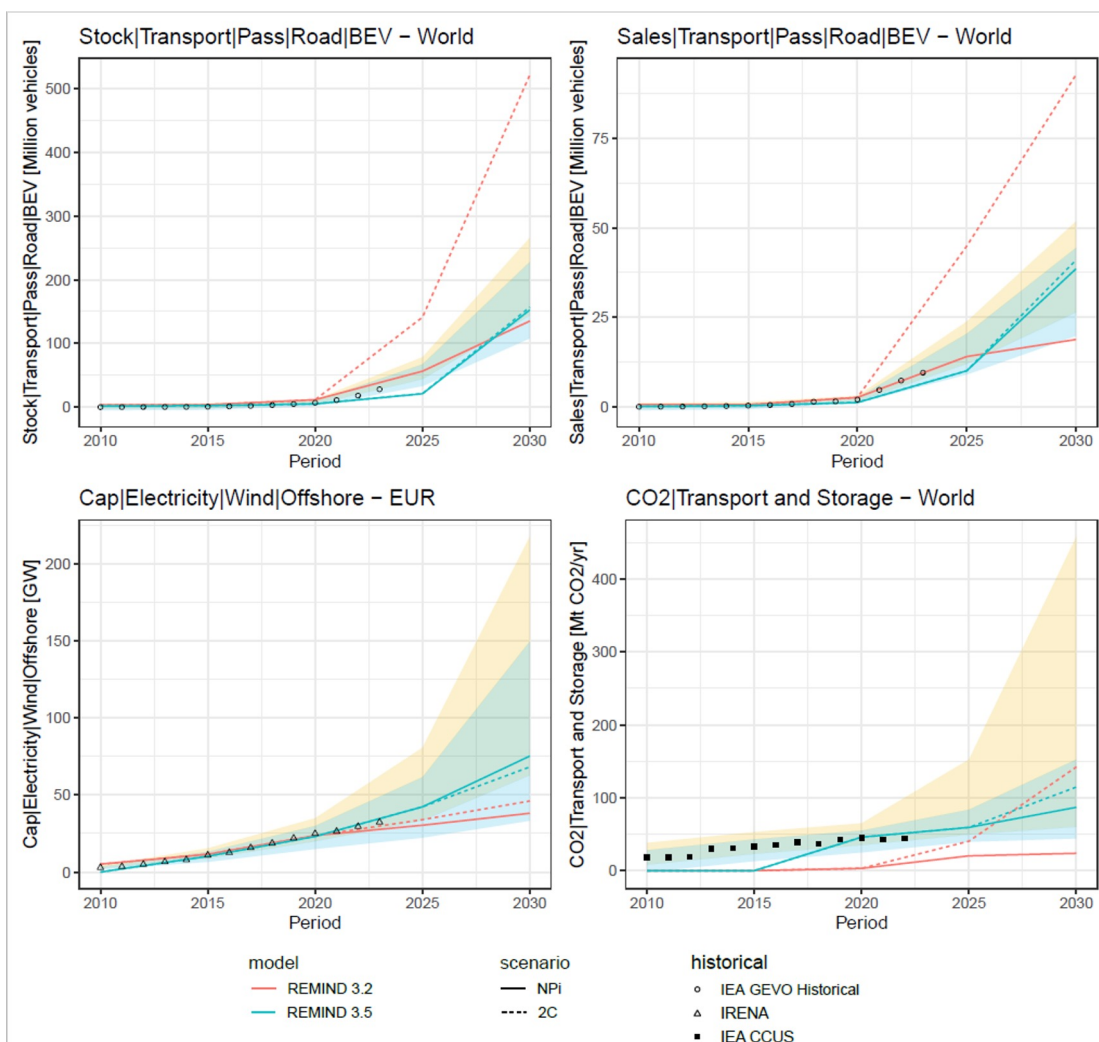
What the tool does

- **Historical consistency**: compares IAM variables against observations & feasibility bounds
- **Near-term technology trends**: validates vs. IEA, IRENA & GWEC outlook data
- **Model intercomparison**: checks consistency across IAMs & scenarios
- **Automated reporting**: interactive heatmap HTML report, single command

Usability

- **Researchers**: quality assurance & transparency in model development
- **Policymakers**: assessment of large scenario ensemble (IPCC)
- **Investors**: robustness of NGFS-based climate risk assessments
- **Energy industry**: flag implausible technology deployment pathways





Historical reference data

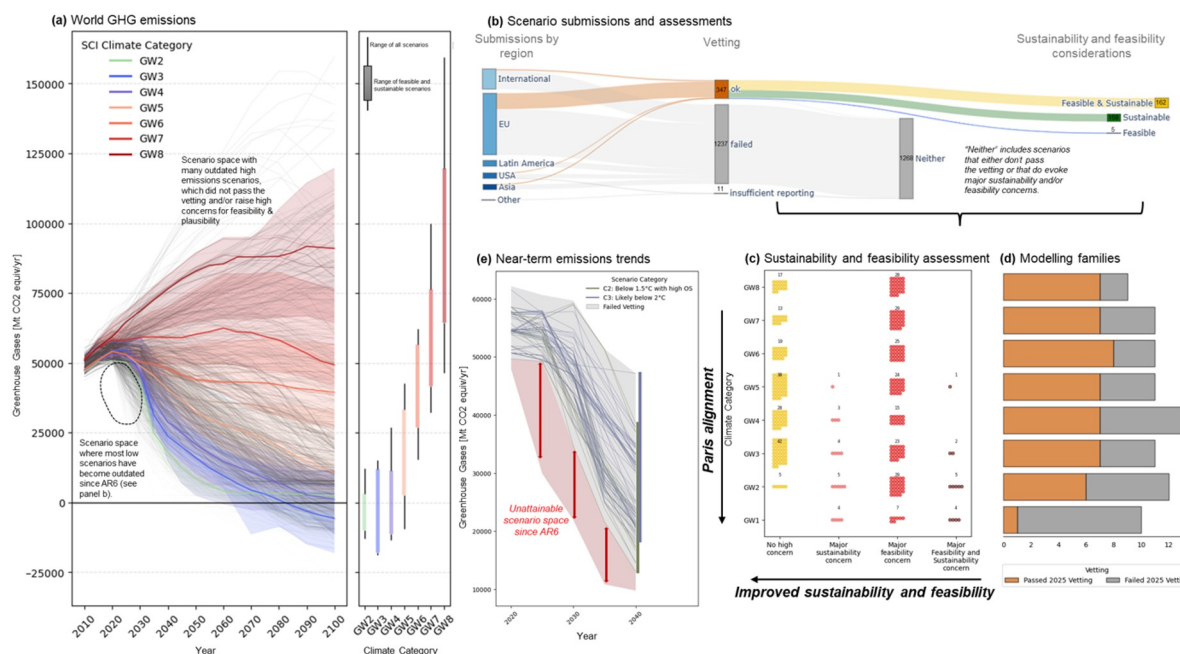
- BEV stock & sales: **IEA Global EV Outlook (GEVO)** - historical
- Offshore wind capacity (Europe): **IRENA installed capacity** data
- CO₂ transport & storage: **IEA CCUS Projects Database** incl. status of project

Outlook & benchmark scenarios

- IEA GEVO Announced Pledges Scenario (APS) and Stated Policies Scenario (STEPS) for EV trajectories
- GWEC global wind energy projections for offshore capacity

Weigmann, Pascal, et al. "Validation of Climate Mitigation Pathways." *Geoscientific Model Development*, vol. 18, no. 23, 2025, pp. 9897–9912, <https://doi.org/10.5194/gmd-18-9897-2025>

Scenario Compass Initiative



- Over **1,500 IAM scenarios** collected and vetted against real-world trends since AR6
- Only **162 pass** feasibility, plausibility and sustainability checks
- 1.5°C with low or no overshoot is no longer feasible, but returning warming to 1.5°C this century (after overshooting to about 1.7°C) remains possible

Riahi, Keywan, et al. *Mitigation Benchmarks from the 2025 Community Update of Global Emissions Pathways*.

Version 1, Research Square, 2026, <https://doi.org/10.21203/rs.3.rs-8891091/v1>



Validate – Share – Improve

Key Takeaways

- Systematic validation improves *transparency* and *near-term realism* of IAM scenarios
- *piamValidation* is a community tool, config files are a shared knowledge resource
- The validation approach is now carried forward by the **Scenario Compass Initiative**: a community-driven framework for continuous scenario collection and vetting

Get involved / Stay in touch

- Available on GitHub:
<https://github.com/pik-piam/piamValidation>
License: LGPL-3
- Install piamValidation in R:
`install.packages("piamValidation", repos = "https://rse.pik-potsdam.de/r/packages")`
- Issues & contributions:
<https://github.com/pik-piam/piamValidation/issues>
- Contact:
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Thank you for your
attention



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