

A common nomenclature for assessing low-carbon transition pathways in Europe and tools supporting an integrated modelling platform

Daniel Huppmann, Sandrine Charousset, Erik Francisco Álvarez Quispe,
Sebastian Zwickl-Bernhard, Thorsten Burandt, Volker Krey,
and the openENTRANCE consortium

Video-Poster at the Energy Modelling Platform for Europe (EMP-E) 2020



This project has received funding from the European Union's Horizon 2020
research and innovation programme under grant agreement No. 835896

This presentation and the recording are licensed under
a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

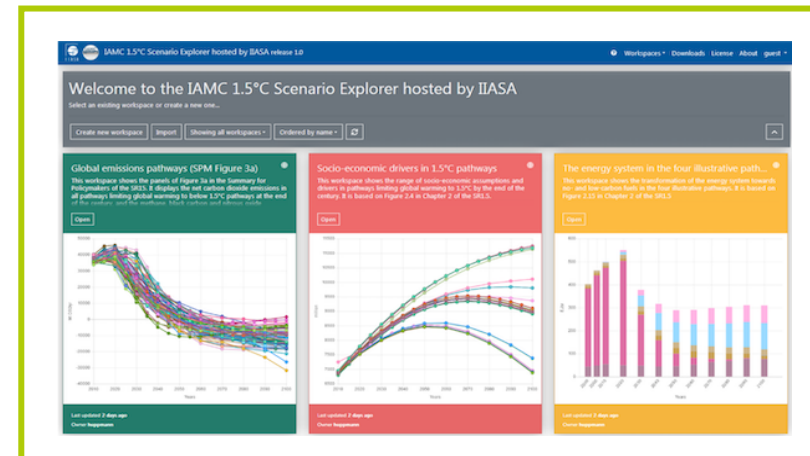


Aim: a modelling platform for the European energy transition

- The openENTRANCE project aims at developing a **transparent & integrated modelling platform** for assessing low-carbon transition pathways in Europe.
- The project links **macro-economic & energy system models**, and provides **economic & human behavioural data** relevant for understanding the energy transition.
- The **IIASA Scenario Explorer** infrastructure serves as a central data hub to integrate models across spatial & sectoral scales.

The **IIASA Scenario Explorer** was developed to provide access to the quantitative data supporting the IPCC *Special Report on Global Warming of 1.5 °C*. It is now further expanded into a versatile hub for model integration and data comparison.

software.ene.iiasa.ac.at/ixmp-server/



The key components for model integration (1/3)

Three ingredients to connect models via a central data hub:



1. A common data format

- We adapt the format developed by the **Integrated Assessment Modeling Consortium (IAMC)** used by the IPCC WG III and numerous Horizon 2020 & other projects.

	A	B	C	D	E	F	G	H
1	Model	Scenario	Region	Variable	Unit	2015	2020	2025
2	GENeSYS-MOD	Societal Commitment	Europe	Primary Energy	EJ/y	69.9	65.7	...

- In **openENTRANCE**, we extend the format to work with subannual time resolution.



The key components for model integration (2/3)

2. A common nomenclature (naming conventions, definitions, list of regions)

- We need a **common understanding** across all modelling teams on the naming of key variables, regional (dis)aggregation and temporal resolution
- We started a **collaborative process** on GitHub to facilitate an open discussion and a clear history of changes.
- The nomenclature is implemented as **yaml-format dictionary files** to strike a balance between (human) readability vs. (machine) processability.



Final Energy:

description: Total final energy consumption by all end-use sectors and all fuels, excluding transmission/distribution losses

unit: EJ/yr

- Link to the Github repo: github.com/openENTRANCE/nomenclature



The key components for model integration (3/3)

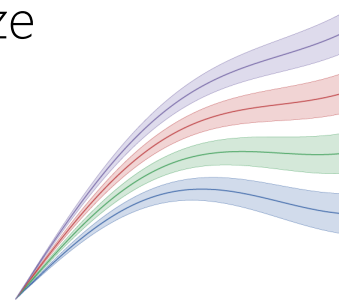
3. Shared workflow scripts, processing tools, and analysis/visualization packages

- The nomenclature comes with a simple, installable Python package providing **validation tools and utility functions** for conforming to the common data format and definitions



- The openENTRANCE data format can fully utilize the open-source Python package *pyam* for scenario processing, analysis & visualization

- More information: pyam-iamc.readthedocs.io



pyam: analysis and visualization of integrated assessment scenarios

License Apache 2.0  passing docs passing coverage 85%

DOI 10.5281/zenodo.1470400 JOSS 10.21105/joss.01095

Repository hosted on Community supported by Documentation hosted by



pyam-iamc.readthedocs.io

Note: the Python packages are intended as a useful resource for modelling teams, but it is **not mandatory** that they are used in the openENTRANCE project!



Related event at EMP-E



Join the EMP-E 2020 Focus Group 5 on infrastructure for model integration and open science (Thursday Oct 8) co-organized with our partner projects



Dr. Daniel Huppmann
Research Scholar – IIASA Energy Program
www.iiasa.ac.at/staff/huppmann | huppmann@iiasa.ac.at

 [@daniel_huppmann](https://twitter.com/daniel_huppmann)



This presentation is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

