

PARIS  
REINFORCE



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REINFORCE

Winter 2020 semi-annual ETSAP meeting

**Supporting transition towards the Paris Agreement using TIMES  
Insights from preliminary analyses of the Paris Reinforce project**

Alessandro Chiodi (*E4SMA*)



[www.paris-reinforce.eu](http://www.paris-reinforce.eu)

**Title:**

Delivering on the Paris Agreement: A demand-driven, integrated assessment modelling approach (PARIS REINFORCE)

**Funding:**

European Union's Horizon 2020 Research and Innovation Programme (H2020)

**Lifetime:**

June 2019 - May 2022 (36 months)

**Coordination:**

NTUA, Energy Policy Unit, National Technical University of Athens

**Participants:**

13 European partners; 5 international partners

**Call/Grant:**

H2020-LC-CLA-01-2018/820846



The PARIS REINFORCE project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 820846.

**NTUA** - National Technical University of Athens GR

**BC3** - Basque Centre for Climate Change ES

**Bruegel** - Bruegel AISBL BE

**Cambridge** - University of Cambridge UK

**CICERO** - Cicero Senter Klimaforskning Stiftelse NO

**CMCC** - Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici IT

**E4SMA** - Energy, Engineering, Economic and Environment Systems Modelling Analysis IT

**EPFL** - École polytechnique fédérale de Lausanne CH

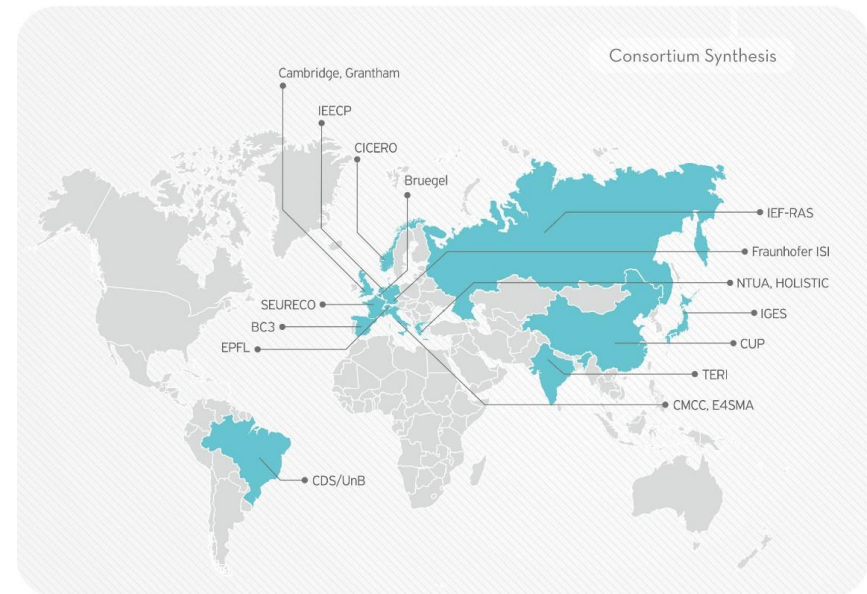
**Fraunhofer ISI** - Fraunhofer Institute for Systems and Innovation Research DE

**Grantham** - Imperial College of Science Technology and Medicine - Grantham Institute UK

**HOLISTIC** - Holistic P. C. GR

**IEECP** - Institute for European Energy and Climate Policy Stichting NL

**SEURECO** - Société Européenne d'Économie SARL FR



**CDS/UnB** - Centre for Sustainable Development of the University of Brasilia BR

**CUP** - China University of Petroleum-Beijing CN

**IEF-RAS** - Institute of Economic Forecasting – Russian Academy of Sciences RU

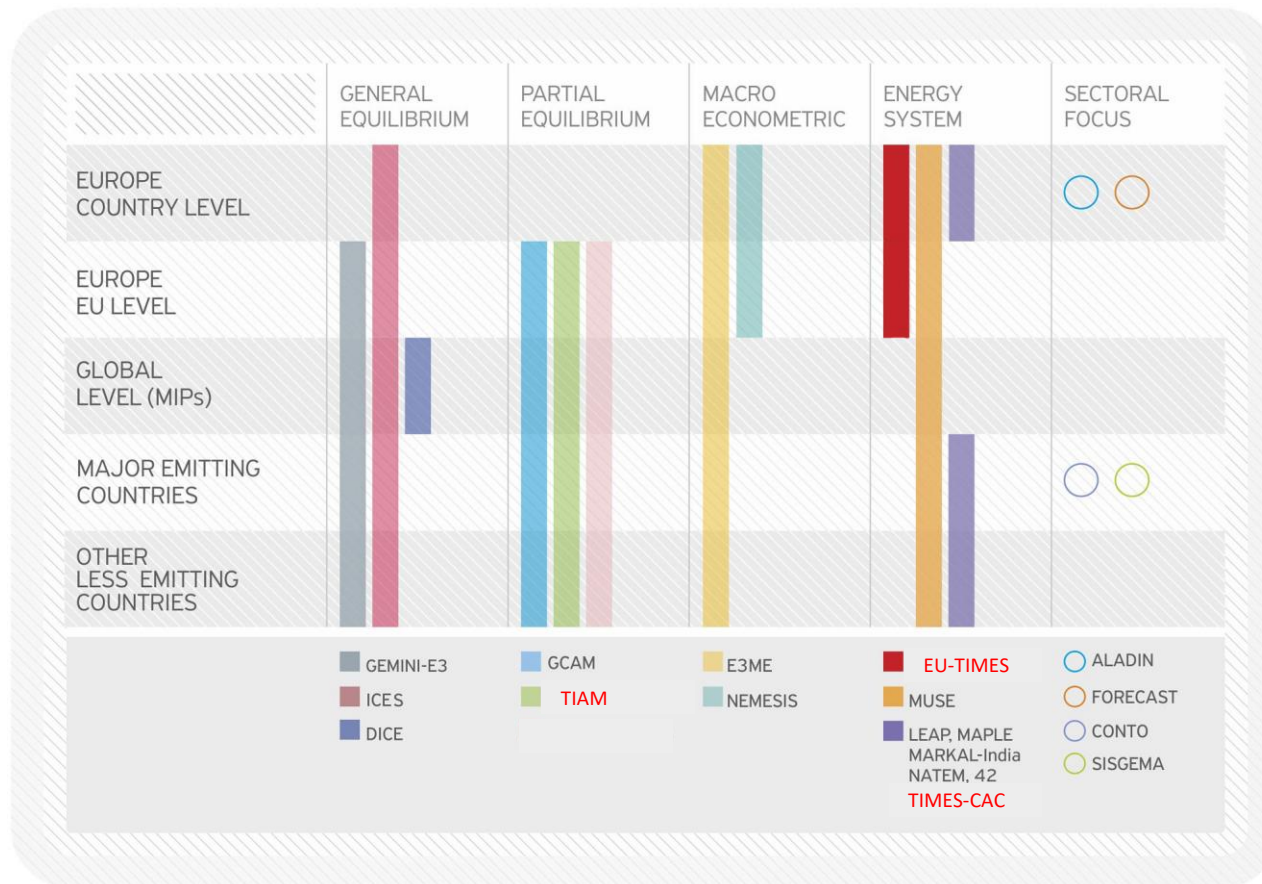
**IGES** - Institute for Global Environmental Strategies JP

**TERI** - The Energy and Resources Institute IN

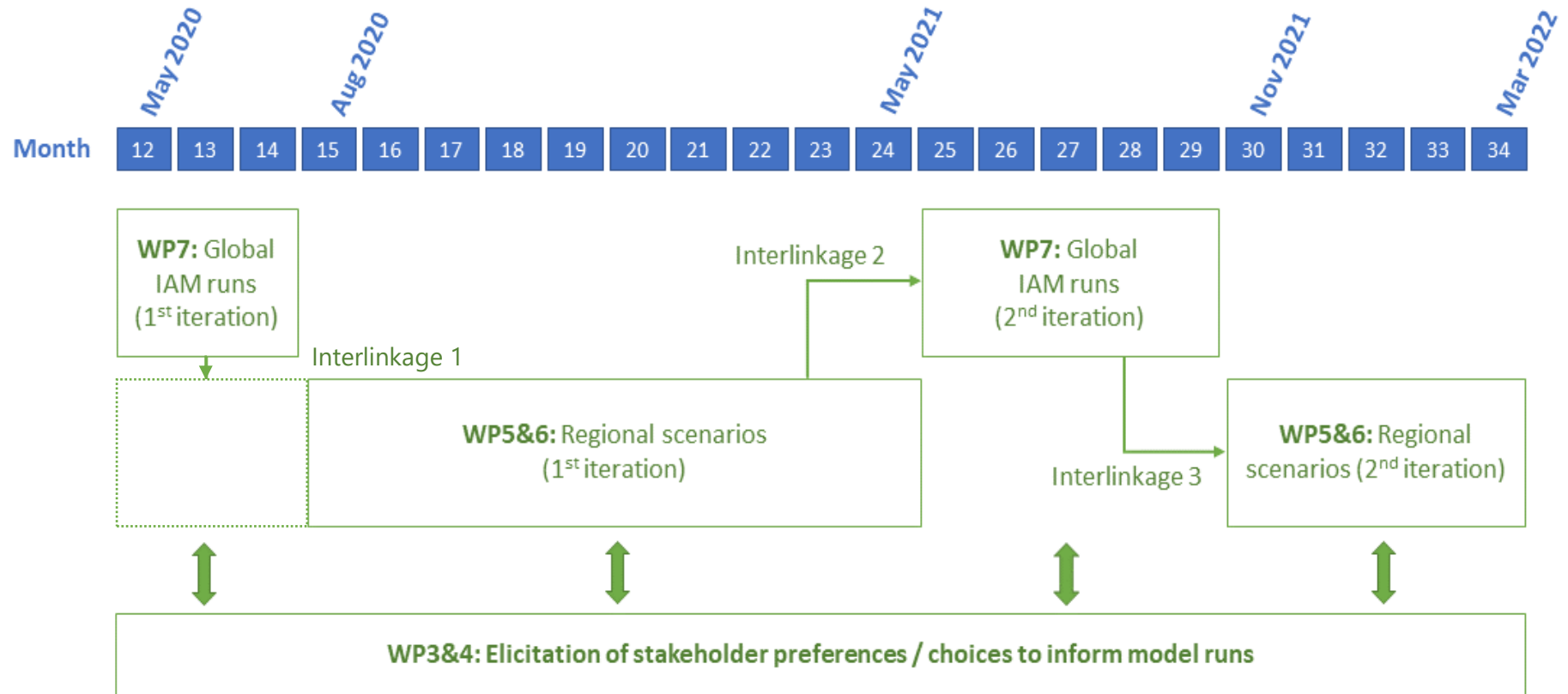


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A set of **complementary**-in terms of mathematical structure, geographical, sectoral and focus coverage-**integrated assessment, energy system** and **sectoral models**



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**Creating a common ground:**  
harmonisation of  
exogenous variables  
between models

**Design of common  
scenario protocol:**  
“Where are we  
heading” scenarios  
to allow the  
interlinkage and  
comparison

### Modelling armory

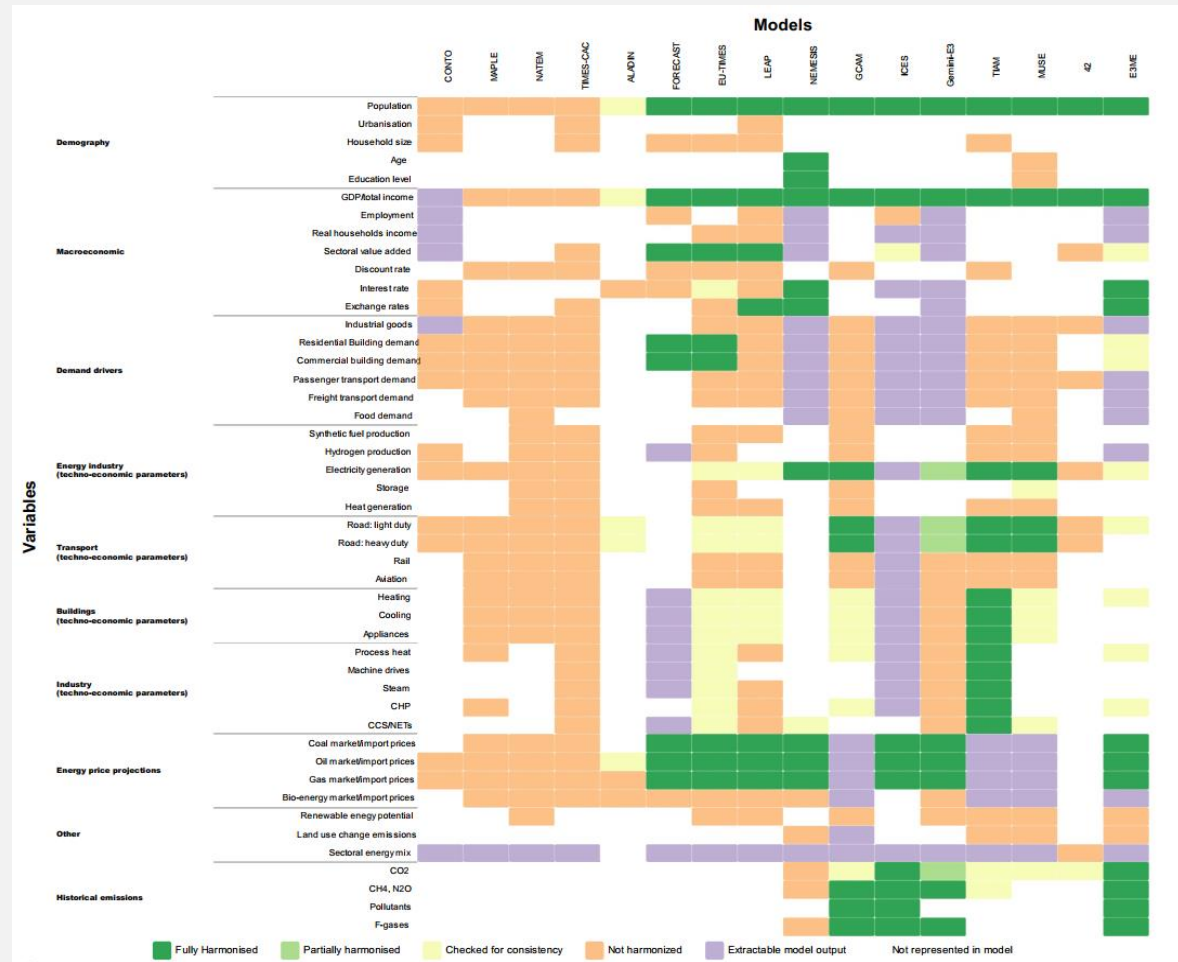
4Z	DICE	ESME	GCAM	GEMINI-E3	ICES	MUSE	TIAM
CONTO	MAPLE	MARKAL-India	NATEM	SIGGEMA	TIMES-CAC	ALADIN	FORECAST
EU-TIMES	LEAP	NEMESIS					



**Outputs  
intercomparison:**  
common findings  
and robustification  
(ongoing)



Creating a common ground:  
harmonisation of  
exogenous variables  
between models



Source:

[http://paris-reinforce.epu.ntua.gr/pr\\_wwh/harmonisation\\_table#harm\\_heatmap](http://paris-reinforce.epu.ntua.gr/pr_wwh/harmonisation_table#harm_heatmap)



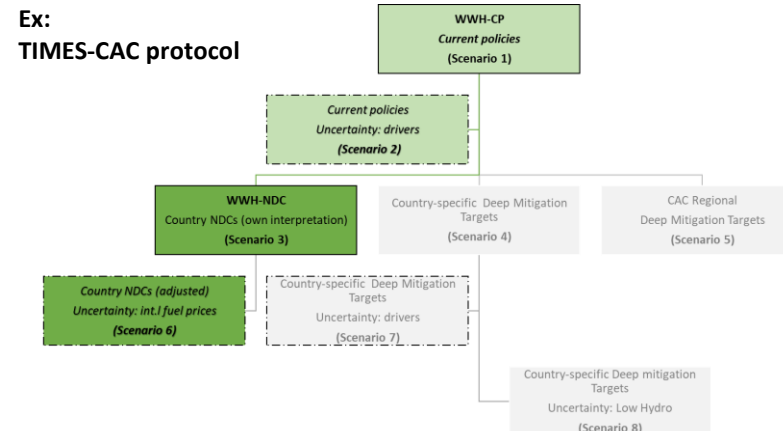
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### Common *Where are we heading (WWH)* scenario protocol:

- All model's **Reference scenarios** reflect current levels of climate policy ambition in different world regions.
- Will include
  - a scenario reflecting the implementation of **current policies** at a national or regional level (WWH - Current Policy)
  - a distinct reference scenario including the implementation of **Nationally Determined Contributions** (WWH - NDC).
- **Variants** to this framework can be established to capture specificness of geographical scope, policy ambition and uncertainties

**Design of common scenario protocol:**  
 “Where are we heading” scenarios to allow the interlinkage and comparison

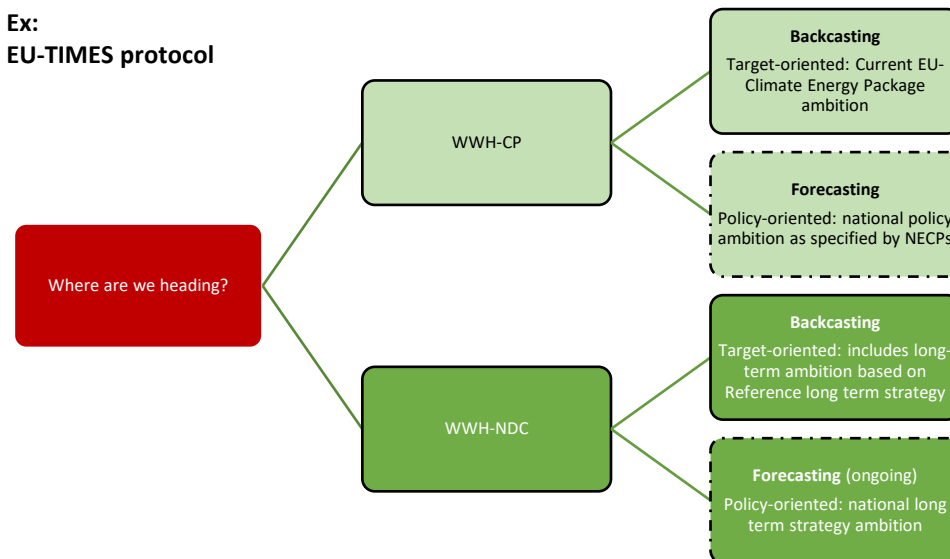




### Common *Where are we heading (WWH)* scenario protocol:

- To the European context, models will take advantage of the high-level of ambition in climate mitigation in the EU and of the well-established set of existing policies.
- Scenarios includes variants comparing a target-oriented, or “forecasting”, approach; with a policy-oriented (“backcasting”) approach.

Ex:  
EU-TIMES protocol



**Design of common scenario protocol:**  
“Where are we heading” scenarios to allow the interlinkage and comparison



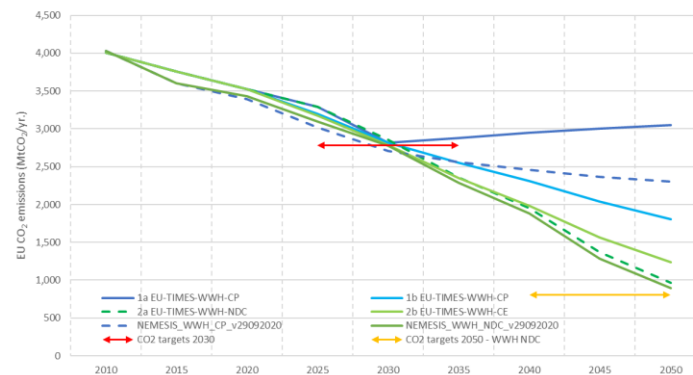


## Objectives:

- Models fine-tuning/debugging
- Improve robustness
- Expand results scope:
  - Single modeling tool cannot address all aspects of the transition in great detail and greater insights
  - Highlighting strengths of multiple modeling tools

This task is meant to primarily inform models with similar geographical scope, but also provide feedback to other geographical scales (e.g. EU models to inform global modelling, etc.)

**This task is currently ongoing**



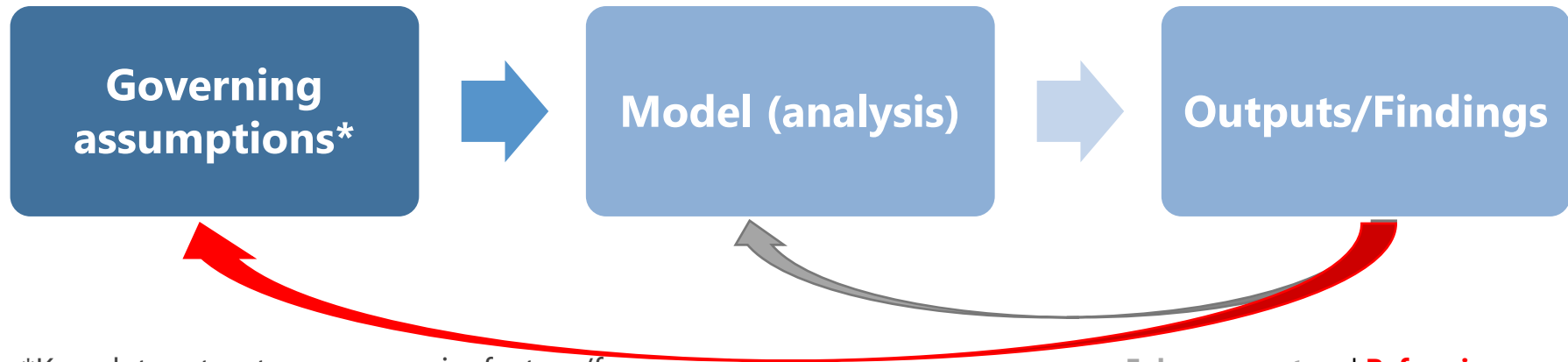
**Outputs**  
**intercomparison:**  
 common findings  
 and robustification  
 (ongoing)



Scenarios  
(virtual)

“What can the model deliver” VS “What do decision makers would like to know”

Decisions  
(real)



\*Key data, structures, scenario factors/forces, and their combinations into storylines

(examples: technologies, socio-economic phenomena, energy/climate statistics, reserves&potentials, policies and measures, etc.)



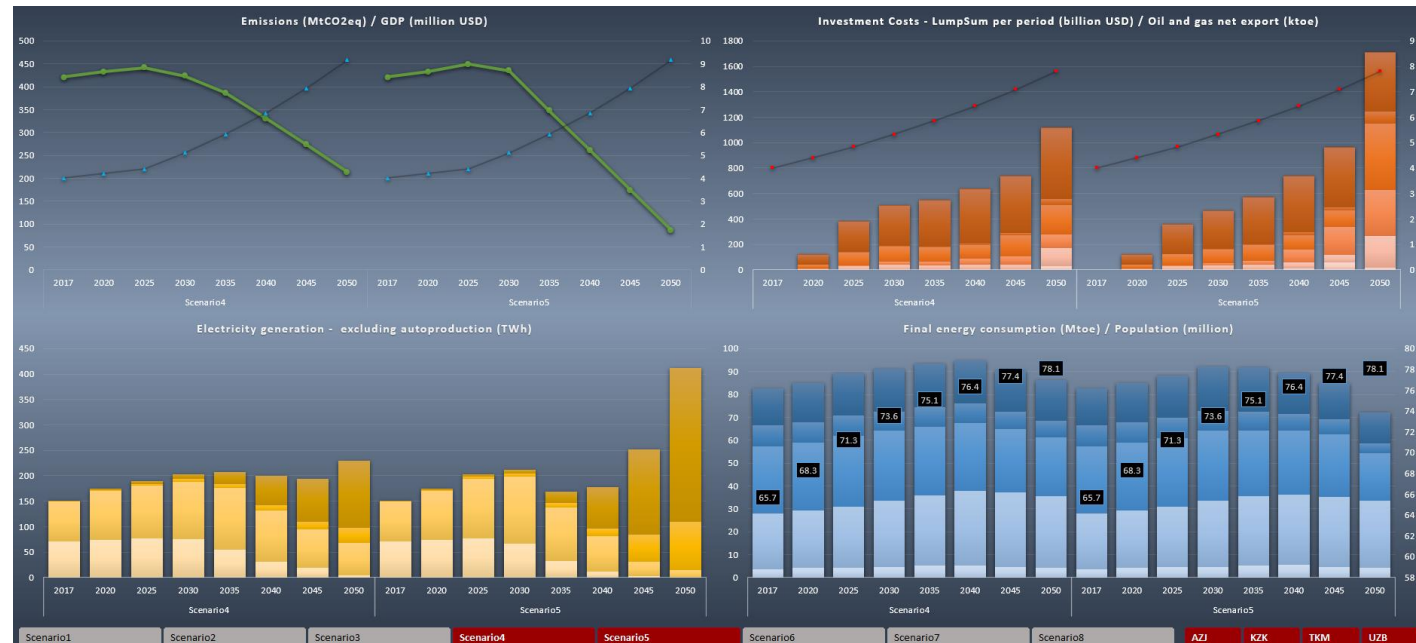
Next round of EU national workshops will be host on Q1-Q2 2121 in Italy, UK, Greece, etc.



Dashboard is a visualisation interface which organizes, stores and displays views of key performance indicators (KPIs) relevant to a particular system.

- Offline tool (front-end + back-end)
- Created specifically to facilitate the dialogue between modellers and local stakeholders
- Pre-defined KPIs (limited number)
- Comprehensiveness - Non-redundancy – Scenario-sensitivity
- National vs Regional

“to establish an (initial) common ground for an effective scenario development and results analysis through a participative approach”.



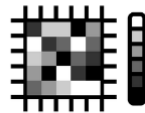
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The **I<sup>2</sup>AM PARIS** Platform, an open-access portal:

- **Open to other models**
- Repository of inputs, assumptions and datasets
- Dedicated sections to various stakeholders
- Results visualization tool (ongoing)

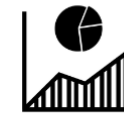


<http://paris-reinforce.epu.ntua.gr/main>



### Variable Harmonisation Heatmap

A heatmap that indicates how different variables are handled across the models within the Paris Reinforce consortium. The rows present the different socio and techno economic variables. The columns indicate the 16 PR models. Variables are either considered as outputs from models, inputs to models or are not represented by the models as any explicit output or input.



### Where are we headed? (Advanced Scientific Module)

These are the results produced by the analysis made using the models of the Paris Reinforce project used in scientific research and this service provides tools to explore the available data.



### Cool... what does that mean?

This section presents the outcome of the analysis process along with meaningful conclusions about it and other insightful information.



### Virtual Library

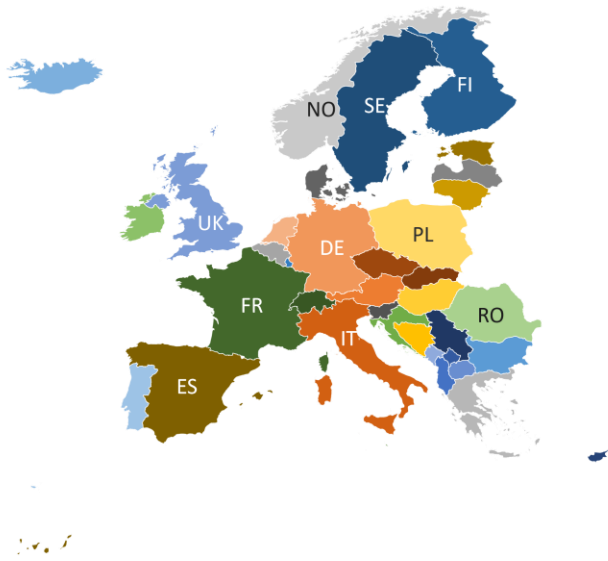
This section essentially includes scientific publications, policy briefs, databases (probably direct download links, input data sources information i.e. IEA WorldBank EDGAR etc.) relevant to Paris Reinforce workspace run.



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## EU-TIMES

(EU-27, UK, Norway, Switzerland, Iceland)



### Key model features:

- Originates from the open source JRC-EU-TIMES model
- Horizon: 2010- 2060 (up to 2075)
- (Intra-annual) timeslots: 12 slices (4 seasons \* 3 intraday slots)
- Sectors coverage: supply; electricity generation, demand sectors (residential, commercial, industry, agriculture, transport)
- High level of technology/activity explicitness (supply and demand side)
- Trades within EU and with RoW
- Emissions coverage: CO<sub>2</sub> (Combustion & Process)

### Latest developments:

- Migration to the Veda 2.0 platform
- Enforcement of a results database and dynamic dashboard to efficiently check and analyse results (online tool under development)
- Update of scenario drivers, harmonized with H2020 Paris Reinforce project partners
- Review of fossil fuel price projections, harmonized with project partners (WEO 2019)
- Review of nuclear retirement and outlook profiles
- Review of CCS potentials
- Addition of latest national policy targets (i.e. NECP)
- Review of ETS policy trajectory + inclusion of Aviation within the sector
- General debugging



## Development of WWH scenarios:

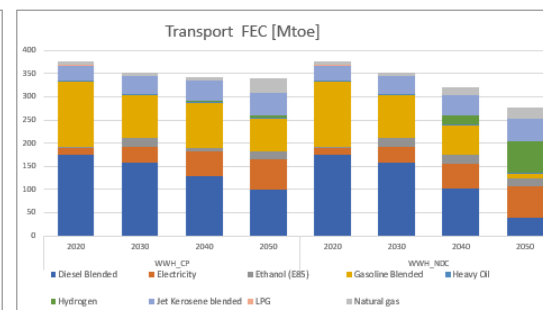
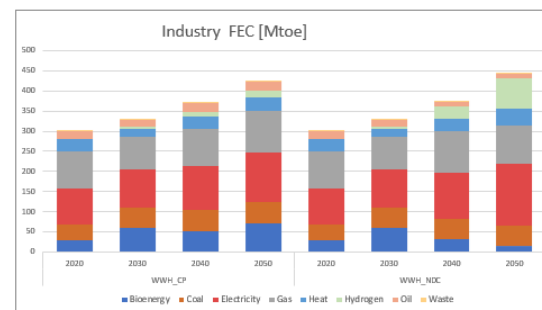
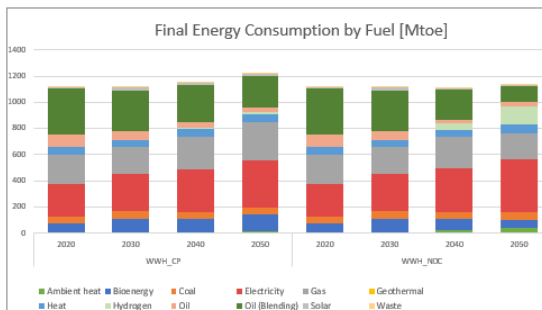
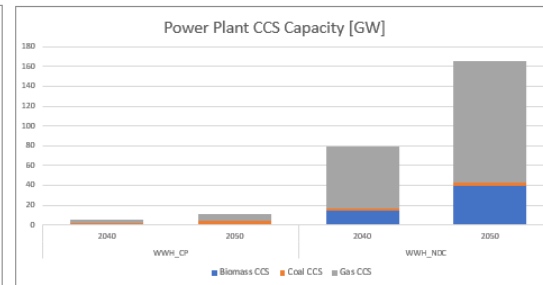
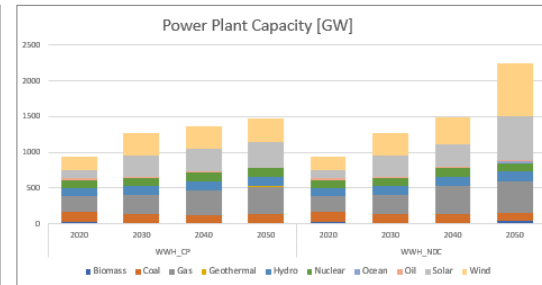
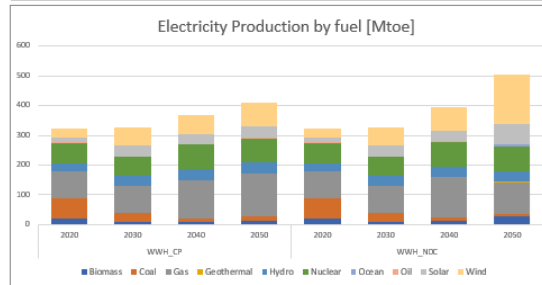
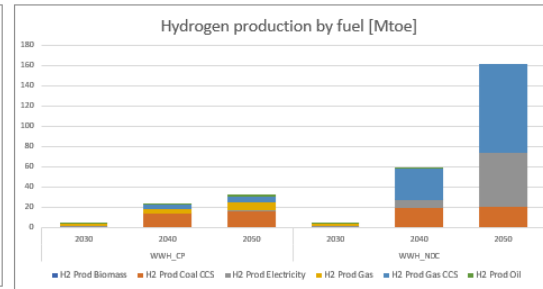
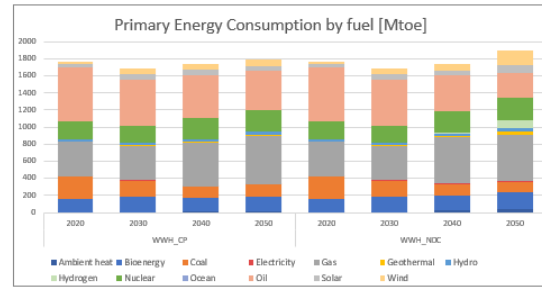
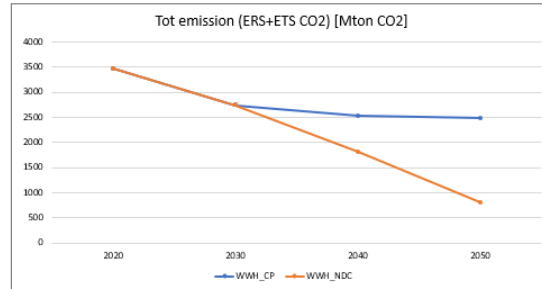
- Two backcasting (harmonized) scenarios + 2 forecasting variants
- Benchmark analysis performed over:
  - key EU projections (e.g. EU Reference 2016, EUCO 3232.5, etc.)
  - technology roadmaps (e.g. CCS, hydrogen, etc.)
  - other EU tools (e.g. NEMESIS)

**Region**  
 AT  
BE  
BG  
CY  
CZ  
DE  
DK  
EE

**Region group**  
 EU27+UK  
Extra-EU

**Year Slicer**  
 2036  
2037  
2038  
2039  
2041  
2042  
2043  
2044

**Scenario**  
 WWH\_NDC  
WWH\_CP



## Next steps (Q1-Q2 2020):

- Proposal of a set policy-relevant **Paris Reinforce** scenarios, including top priority EU challenges:
  - Assessment of impacts of COVID-19
  - Increasing the ambition towards the Green new deal
- Moving towards country-specific focal analyses
- Make use of the upcoming national EU events to **inform AND get informed** by key stakeholder
  - Co-design process
- Contribute to the IPCC AR6





Thank you!

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