



PARIS
REINFORCE



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D8.8 DATA MANAGEMENT PLAN – UPDATE 2

WP8 – Communication, Dissemination & Exploitation

Version: 1.00

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EC Summary Requirements

1. Changes with respect to the DoA

No changes with respect to the work described in the DoA.

2. Dissemination and uptake

This deliverable constitutes the final update of the Data Management Plan, analysing the procedures for data collection, processing, production, and storage within the H2020 PARIS REINFORCE project, as put together and submitted in November 2022. The report also documents all efforts taken by the project team to ensure that project data are Findable, Accessible, Interoperable, and Reusable (FAIR). Moreover, it may be used by any other party interested in data management within the Open Data Research Pilot of the Horizon 2020 (and Horizon Europe) programme.

3. Short summary of results (<250 words)

This report is the last update to the PARIS REINFORCE Data Management Plan (DMP). It outlines the procedures applied regarding the collection, processing, production, and storage of research data within the project. More specifically, the DMP includes information regarding the following questions: (i) how research data were handled during the project, and how they will be handled after the end of the project; (ii) what data were collected, processed and/or generated; (iii) which methodology and standards were applied; (iv) whether data were shared/made open access; and (v) how data were curated and preserved (including after the end of the project). The most notable changes/updates to the previous version of the DMP relate to the documentation of 36 datasets and 85 publications produced and uploaded onto the project's Zenodo community page by November 2022 (i.e., during the project lifetime).



















4. Evidence of accomplishment

This report and the project's Zenodo community page ([link](#)).



Preface

PARIS REINFORCE will develop a novel, demand-driven, IAM-oriented assessment framework for effectively supporting the design and assessment of climate policies in the European Union as well as in other major emitters and selected less emitting countries, in respect to the Paris Agreement. By engaging policymakers and scientists/modellers, PARIS REINFORCE will create the open-access and transparent data exchange platform ¹PARIS, in order to support the effective implementation of Nationally Determined Contributions, the preparation of future action pledges, the development of 2050 decarbonisation strategies, and the reinforcement of the 2023 Global Stocktake. Finally, PARIS REINFORCE will introduce innovative integrative processes, in which IAMs are further coupled with well-established methodological frameworks, in order to improve the robustness of modelling outcomes against different types of uncertainties.

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 Environment Systems Modeling and 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'Economie 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	



Executive Summary

This report is the last update to the PARIS REINFORCE Data Management Plan (DMP). It outlines the procedures applied regarding the collection, processing, production, and storage of research data within the project. More specifically, the DMP includes information regarding the following questions: (i) how research data were handled during the project, and how they will be handled after the end of the project; (ii) what data were collected, processed and/or generated; (iii) which methodology and standards were applied; (iv) whether data were shared/made open access; and (v) how data were curated and preserved (including after the end of the project). The most notable changes/updates to the previous version of the DMP relate to the documentation of 36 datasets and 85 publications produced and uploaded onto the project's Zenodo community page by November 2022 (i.e., during the project lifetime).



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1 Introduction

This report is the last version of the PARIS REINFORCE Data Management Plan (DMP). It outlines the procedures applied regarding the collection, processing, production, and storage of research data within the project. Specifically, the DMP provides detailed answers on the following questions: (i) how research data were handled during the project, and how they may be handled after its end; (ii) what data were collected, processed and/or generated; (iii) which methodology and standards were applied; (iv) whether data were shared/made open access; and (v) how data were curated and preserved (including after the end of the project).

In order to be up to date, the DMP was considered as a “living document” during the project. Thus, the DMP was revised over the course of the project whenever significant changes arise, such as: new data (publications and datasets produced) as well as changes to consortium policies (e.g., new innovation potential, decision to file for a patent, etc.) or to consortium composition and external factors (e.g., new consortium members joining or old members leaving), although the latter were eventually not observed during the project.

The ultimate purpose of the DMP was to ensure that the research data produced by PARIS REINFORCE as well as the data on which the project’s results are based on are Findable, Accessible, Interoperable, and Reusable (FAIR). Moreover, that these data are comprehensively and transparently stored and shared among the modelling community, as well as comprehensibly disseminated across and exploited by policymakers and other stakeholders.

Sections 2-6 remain as were in the original DMP, with modifications where necessary. A new section (Section 7) was added in the first update, reflecting the datasets and publications produced and provided access to, via the Zenodo repository, and is considerably expanded in this second update due to new data in the Zenodo repository.



2 Data Summary

2.1 Purpose of the data collection/generation and its relation to the objectives of the project

The main objective of PARIS REINFORCE was to support evidence-based climate policy formulation for low-carbon transitions in the context of the Paris Agreement. Such approach resulted in a lot of research data being collected, processed, and stored during the various stages of the project.

PARIS REINFORCE has been developing a novel, demand-driven, IAM-oriented assessment framework for effectively supporting the design and assessment of climate policies in the European Union as well as in other major emitters and selected less emitting countries, in respect to the Paris Agreement. This assessment framework was supported through the development of the I²AM PARIS platform, which is an open-access and transparent data exchange platform supporting the modelling work towards effective update and subsequent implementation of Nationally Determined Contributions, preparation of future action pledges, development of 2050 decarbonisation strategies, and reinforcement of the 2023 Global Stocktake. These activities generated vast amounts of data that required a logically structured, transparently accessible data management system.

2.2 Types and formats of data to be generated/collected

As previously described, within PARIS REINFORCE several data was gathered in order to (i) develop an IAM-based assessment framework; (ii) co-create the I²AM PARIS platform; and (iii) co-produce climate policies supporting the achievement of the goals of the Paris Agreement. Towards the implementation of these outcomes, three main types of data were gathered/generated. First, the data collected via stakeholder engagement; second, the already available data that has been extracted from appropriate databases; and, third, the data that has been generated using the models and by post-processing model results. The data is available in one or more of the following formats: .pdf, .docx, .xlsx, .csv, .txt, .mp3, .mp4.

The following sections present the models used in the project, the data required by the models, and the policy options analysed and assessed.

2.2.1 Data Processing Tools (Models & Methodologies) used within PARIS REINFORCE

Within PARIS REINFORCE, a total of twenty-two models were used in the production of climate policies. In particular, five national/regional models were applied for analyses in European countries and Europe (or the EU) as a whole; nine national or regional models were used to analyse selected countries outside Europe; and eight global models were applied to identify policy-related implications at the global level (but also used for national and regional analyses in countries of interest, for which they feature the required geographic granularity).

Since the first version of the DMP, some modifications of the modelling ensemble have taken place in PARIS REINFORCE, reflecting new knowledge as well as emerging availability of the modelling tools. In particular, and as discussed in deliverables D5.2, D6.2, and D7.2, (a) the JRC-EU-TIMES model has now been renamed to EU-TIMES, after discussions with the JRC team behind it, following their stated interest in submitting modelling scenarios for the IPCC AR6 cycle; (b) and two models, namely TIMES-India for India and MUSE-Brazil for Brazil, have been added to the modelling ensemble of WP6, so as to both reinforce the WP6 modelling analyses and make up for the possibility of not using the MARKAL-India (India) and SISGEMA (Brazil) models in said analyses. In this update, we also add AIM_CGE-India and OSeMOSYS, which were used for the purposes of D6.6 (India case study) and D4.4 (Greece case study).



The models that have been used in the processing of the data, in order to develop decarbonisation policies, are presented in the following table (Table 1).

Table 1: Models used in PARIS REINFORCE

Global Models ¹	National/Regional Models (Europe) ²	National/Regional Models (outside Europe) ³
GCAM https://github.com/JGCRI/gcam-core	ALADIN https://www.aladin-model.eu/	CONTO
TIAM http://bit.ly/2JziuFe	NEMESIS https://frama.link/r_Upbulb	MARKAL-India
MUSE http://bit.ly/2NpY42F	FORECAST http://www.forecast-model.eu/	MAPLE
42	LEAP https://frama.link/rTynpKFy	GCAM-China
GEMINI-E3 https://www.epfl.ch/labs/gemini-e3/	EU-TIMES https://frama.link/hunjKQmf	GCAM-SOUSEI
ICES https://www.icesmodel.org/	OSeMOSYS http://www.osemosys.org/	GCAM-USA https://jgcri.github.io/gcam-doc/gcam-usa.html
E3ME https://www.e3me.com/		NATEM
DICE http://bit.ly/2MWL8Ca		SIGGEMA
		TIMES-CAC
		MUSE-Brazil
		TIMES-India
		AIM_CGE-India

Apart from the models outlined above, a series of robustification techniques and tools have hitherto been to understand, assess, and reduce associated uncertainties that may be present in the developed policy recommendations.

2.2.2 Data used as input for the models & the robustification toolbox

The development of climate policies is being based on accurate data that may be divided in three categories: (i) stakeholder-generated data; (ii) already available datasets; and (iii) real-life policy/impact observations. The former was collected via the stakeholder consultation process, which consists among others of bilateral interviews, focus groups, workshops, etc., as described in the PARIS REINFORCE report “D3.1 Stakeholder engagement plan”. The second category was populated by exploiting existing databases. These are shown in more detail in the relevant section of this report “2.3 Re-use of existing data”. The final category was obtained from literature review and monitoring of current affairs. All data in the aforementioned three categories was used in the assessment

¹ As described in PARIS REINFORCE report D7.2 “Interlinkages of global IAMs with the I²AM PARIS platform”

² As described in PARIS REINFORCE report D5.2 “Interlinkages of national/regional level models for Europe with the I²AM PARIS platform”

³ As described in PARIS REINFORCE report “D6.2 Interlinkages of national/regional level models for countries outside Europe with I²AM PARIS”



and/or validation of policies.

Table 2 presents the main data types that tend to be used (non-exhaustive list) as inputs to the models comprising the entire PARIS REINFORCE modelling ensemble.

Table 2: Input Data to Models and Robustification Methodologies (non-exhaustive list)

Input Data to Models		
Socio-economic related data		
GDP	Public debt	Number of households
Private consumption or households' disposable income	Population	Households size
Demand in transports services (passenger-kms, tonne-kms)	Population by age groups and educational attainment level	Interest rates
Gross value added	Energy markets in physical units	Sectoral economic activity growth (agriculture, etc.)
Sectoral production growth	Physical production growth in the industrial sectors	Indirect taxation
Labour participation and productivity	International sectoral statistics	Detailed social accounting matrices
Government expenditures	International transactions among governments and transactions/flows between government and private households	Number of employees in service sectors and industry
Square meter per employee in service sector		
Energy technology data		
Fossil fuel proven/possible reserves (mainly oil and gas) and expected production rates	Information about under construction/planned/possible energy projects/infrastructures	Policies (emissions constraints, renewable portfolio standards, regional emissions reduction goals, etc.)
Energy efficiency improvements rates	Fuel efficiency for electricity and heat plants	Transport infrastructures (charging)
Structure of electricity and heat production	Exchanges rates	Fuel efficiency for cars and trucks
Sectoral energy intensities	Industrial production for energy-intensive industry sectors	Technology characterisation
Power generation technology specification	Degree to which energy demand and demand for other goods and services resulting in GHG emissions change over the time horizon	Agricultural technology crop yields, costs, carbon contents, water requirements, fertiliser requirements



Input Data to Models		
Resources (fossil fuels, wind, solar, uranium and groundwater)	Overall savings rate for physical capital	Vehicle fleet and structure
Driver profiles (including trips purpose, length of route, departure and arrival time, etc.);		
Price data		
Cost of drive technologies (battery electric vehicles -BEV, range-extended vehicles - REEV, plug-in hybrids - PHEV, etc.)	Energy efficiency improvements costs/limits (from the supply side to the demand side)	Fuel prices
Biomass prices	Fossil fuels prices	Fossil energy prices
End-consumer energy prices (electricity, coal, oil, natural gas, biomass, district heating)	Renewable energy and CCS costs/potentials	Economic flows related to fuel-specific energy production and consumption
Technology availability and costs	Energy technology costs, performance, water requirements	

2.2.3 Created Data and Policy Recommendations

The policies recommended by PARIS REINFORCE were formulated from data derived from the models after the consideration of several policy options that were explored, and the application of robustification methodologies. The following table presents an indicative list of policy options that were considered in the project, as these were tied to the co-defined research priorities and capacity needed from the stakeholder engagement process (cf. Deliverable D7.3 “Report on stakeholder needs and research capacity needed”).

Table 3: Considered Policy Options (non-exhaustive)

Policy Options considered in PARIS REINFORCE modelling activities		
The emissions targets or constraints consistent with different regions’ contributions to different long-term, Paris-compliant temperature goals (i.e. well below 2°C, 1.5°C);	Emissions financial supports;	Carbon border supports on exports;
The mix of policies that can be implemented to aim to achieve these emissions targets;	Energy tax;	Trade regulations policies;



Policy Options considered in PARIS REINFORCE modelling activities

The interactions of different resulting mitigation pathways with other policy goals, in particular the sustainable development goals (SDGs) and adaptation goals;	Energy subsidies;	Standards (building, fuel economy, etc.)
Emissions tax (carbon tax / carbon price);	Energy mix target;	Investment in the construction of cross-national new pipelines;
Emissions target / quota (annual);	Energy efficiency target;	Maintenance of free exchange in the energy sector across the region;
Emissions target / quota (cumulative);	Energy & Energy efficiency regulations;	Creation of regional joint CO ₂ emission permit systems;
Synthetic fuel production	Carbon sink pricing;	Land use change emissions tax;
Behavioural changes	Emissions regulations;	Afforestation targets;
Building technologies	Hydrogen production	Carbon border tax on imports;
Financial supports	Coal and biomass to liquids production	Carbon capture and storage/sequestration (CCS)

For a better elaborated overview of what types of policies PARIS REINFORCE modelling tools can be used for, the reader is referred to Deliverable D3.2 “Policy Briefing on What can ‘our models’ deliver”⁴, the respective policy brief⁵, as well as the interactive, dynamic documentation of each model in the I²AM PARIS platform⁶

2.3 Re-use of existing data

In order to increase research efficiency and avoid waste of resources, data from already existing and reliable sources were exploited. In particular, reputable databases such as the World Bank’s Databank⁷, EUROSTAT’s database⁸, etc. were used among others.

The following table concentrates on the existing data sources that the PARIS REINFORCE models have used.

Table 4: Existing data sources used in the PARIS REINFORCE models

Data Sources used in Models	Purpose / Data	Publicly Accessible (P) or Restricted Access/Subscription Fee (SF)	Model(s) using the Source
REM2030-Fahrprofile	Driving profiles of vehicles		ALADIN
Mobility Panel	Driving profiles of vehicles		ALADIN

⁴ [https://paris-reinforce.eu/sites/default/files/2020-03/D3.2 PARIS REINFORCE Policy Briefing.pdf](https://paris-reinforce.eu/sites/default/files/2020-03/D3.2%20PARIS%20REINFORCE%20Policy%20Briefing.pdf)

⁵ [https://paris-reinforce.eu/sites/default/files/2019-11/PARIS REINFORCE Policy Brief What our models can do.pdf](https://paris-reinforce.eu/sites/default/files/2019-11/PARIS%20REINFORCE%20Policy%20Brief%20What%20our%20models%20can%20do.pdf)

⁶ http://i2am-paris.eu/dynamic_doc/

⁷ <https://databank.worldbank.org/home.aspx>

⁸ <https://ec.europa.eu/eurostat/data/database>



Data Sources used in Models	Purpose / Data	Publicly Accessible (P) or Restricted Access/Subscription Fee (SF)	Model(s) using the Source
KiD 2010 vehicle survey for Germany	Driving date for medium and heavy-duty vehicles		ALADIN
EUROSTAT	Vehicles transport performance and annual mileage data; socioeconomic data: National accounts (GDP, private consumption, GFCF, production, value added, etc...), interest rates, exchange rates, population, population projection (EUROPOP), labour force survey, energy quantities and prices, etc.		ALADIN, JRC-EU-TIMES, NEMESIS
National Statistical Authorities databases (Russian Federal State Statistics Service, China's energy statistical yearbook 2006-2011, national Chinese data sources, etc.)	Same as EUROSTAT		CONTO, CHINA-MAPLE
UN's System of National Accounts	Same as EUROSTAT		CONTO
United Nations (United Nations 2018)	ASDI indicators for ICES base year (2007)		ICES
United Nations (United Nations 2019)	Population growth in GEMINI-E3	P	GEMINI-E3
World Income Inequality Database (WIID3.4), United Nations 2017	ASDI indicators for ICES base year (2007)		ICES
Buildings Performance Institute Europe (BPIE)	Technology-related data not available in EUROSTAT		FORECAST
TABULA IEE project	Technology-related data not available in EUROSTAT		FORECAST
IEA Building Energy Efficiency Policies (BEEP)	Technology-related data not available in EUROSTAT		FORECAST
IEA Energy Balances (1990-2016)	Energy production and consumption; ICES: ASDI indicators for base year (2007) and historical calibration in the baseline; Calibration of 42 (depending on the country/region)		JRC-EU-TIMES, TIMES-CAC, TIAM, ICES, 42
IEA world energy statistics (year 2005)	Calibration of TIAM		TIAM



Data Sources used in Models	Purpose / Data	Publicly Accessible (P) or Restricted Access/Subscription Fee (SF)	Model(s) using the Source
IEA world energy statistics (year 2010)	Calibration of MUSE		MUSE
IEA world energy statistics (year 2012)	Calibration of TIAM (projections for energy, installed technology capacity and emissions)		GCAM-CHINA, GCAM-SOUSEI, GCAM-USA, GCAM, TIAM
IEA world energy statistics (year 2015)	Calibration of TIAM (potentially); Calibration of MUSE (projections for energy, installed technology capacity and emissions); Calibration of NEMESIS (prices and taxes)		NEMESIS, TIMES-CAC, TIAM,
IEA World Energy Outlook (2018)	Economic growth and international energy prices in GEMINI-E3; Calibration of TIAM to post-2015	SF	TIMES-CAC, TIAM, GEMINI-E3
GTAP 8 database	Energy volumes, CO2 and non-CO2 emissions, fluorinated gases, and National social accounting matrices for behavioural equations in ICES	P	ICES
GTAP-Power database	Economic flows related to fuel-specific energy production and consumption in ICES	SF	ICES
GTAP-10 database	Calibration of GEMINI-E3	SF	GEMINI-E3
GTAP Non-CO2 GHG emissions (NCGG) dataset	Representation of non-CO2 emissions in GEMINI-E3	SF	GEMINI-E3
EPA abatement curves (EPA 2013)	Calibration of GCAM models		GCAM-CHINA, GCAM-SOUSEI, GCAM-USA, GCAM
EPA abatement curves (EPA 2019)	Computation of abatements by gases in GEMINI-E3	P	GEMINI-E3



Data Sources used in Models	Purpose / Data	Publicly Accessible (P) or Restricted Access/Subscription Fee (SF)	Model(s) using the Source
OECD	Calibration of GEMINI-E3 (specific data i.e. indirect taxation and government expenditures); Calibration of NEMESIS (complementary to Eurostat) and long-term projection of GDP in non-EU countries	P	NEMESIS, GEMINI-E3
International Monetary Fund (IMF)	Calibration of GEMINI-E3 (specific data i.e. indirect taxation and government expenditures); ICES: ASDI indicator on Public Debt (2007); NEMESIS: short-medium term GDP projections for non-EU countries	P	NEMESIS, GEMINI-E3, ICES
World Bank 2012			CHINA-MAPLE
World Development Indicators (World Bank 2016)	Indicators on R&D expenditure over GDP, private and public health expenditure and total education expenditure (for the year 2007)		TIMES-CAC, ICES
World Development Indicators (World Bank 2018)	Population and employment trend for ICES baseline (from 2017 to 2015); ASDI indicators for ICES base year (2007)		ICES
OECD Main Science and Technology Indicators (OECD 2016)	Attributing R&D to the different economic agents in ICES via the indicator "share of R&D financed by Government, Firms, Foreign Investment and Other National"		ICES
EPISCOPE IEE project			FORECAST
ODYSSEE database			FORECAST
Ecodesign Directive preparatory studies			FORECAST
Individual technology studies	Heating and cooling technologies, hydrogen, storage		JRC-EU-TIMES
GfK	Market research data		FORECAST
World Steel Association	Market research data		FORECAST
CEPI	Market research data, NEMESIS: alternative to OECD long-term GDP projections for non-EU countries		FORECAST, NEMESIS



Data Sources used in Models	Purpose / Data	Publicly Accessible (P) or Restricted Access/Subscription Fee (SF)	Model(s) using the Source
Cembureau	Market research data		FORECAST
Eurochlor	Market research data	P	FORECAST, JRC-EU-TIMES
Other industry organisations	Market research data		FORECAST
US Geological Survey		P	JRC-EU-TIMES
UNFCCC			FORECAST
UN commodity production database			FORECAST
PRODCOM			FORECAST
IPPC BREF studies			FORECAST
IPCC Shared Socioeconomic Pathways (SSPs)	NEMESIS for population qualification projections (and potentially in PR for GDP and population)		NEMESIS, GCAM-CHINA, GCAM-SOUSEI, GCAM-USA, GCAM
EU Energy Roadmap 2050 reference scenario	Potential calibration of NEMESIS to nuclear and hydro PG share in electricity mix and exogeneous energy efficiency		NEMESIS
European Environment Agency – EEA 2019			NEMESIS
DG TAXUD 2019			NEMESIS
World Input-Output Database (WIOD) 2016	NEMESIS: to complete EUROSTAT (imports and exports)		NEMESIS
FAOSTAT balances	Food demand, agriculture		GCAM-CHINA, GCAM-SOUSEI, GCAM-USA, GCAM
EIA (2014)	State Energy Data System		GCAM-USA
U.S. Census Bureau			GCAM-USA
Energy Balance Sheet			CHINA-MAPLE
Industrial Statistics Yearbook			CHINA-MAPLE



Data Sources used in Models	Purpose / Data	Publicly Accessible (P) or Restricted Access/Subscription Fee (SF)	Model(s) using the Source
Industrial Statistical Yearbook 2010-2013			CHINA-MAPLE, TIMES-CAC
China Steel Statistics 2011			CHINA-MAPLE
China Chemical Industry Yearbook			CHINA-MAPLE
China Nonferrous Metals Industry Yearbook			CHINA-MAPLE
China Energy Statistical Yearbook 2006-2013			CHINA-MAPLE
China's Medium and Long-Term Development Strategy on Traffic and Transportation			CHINA-MAPLE
Automotive Energy Outlook 2012			CHINA-MAPLE
China Transport Yearbook			CHINA-MAPLE
China Bulletin on Motor Vehicles Pollution Prevention			CHINA-MAPLE
The Annual Development and Research Report on Building Energy Efficiency in China (2008-2013)			CHINA-MAPLE
Energy Supply and Demand Projections to 2040. National Energy Board (NEB) – Canada	Driver projections, energy trade and electricity generation, Canada	P	NATEM
Trottier Energy Futures Project (TEPF, 2016). Trottier Energy Institute.	Model structure and assumptions, Canada	P	NATEM
Annual Energy Outlook Database. Energy Information Administration (EIA) - United States	Drivers and energy projections, electricity generation, technology stocks and techno-economic attributes, various data, USA	P	NATEM



Data Sources used in Models	Purpose / Data	Publicly Accessible (P) or Restricted Access/Subscription Fee (SF)	Model(s) using the Source
Proyecciones de la Población 2010-2050. Consejo Nacional de Poblacion (CONAPO) – Mexico	Driver projections, Mexico	P	NATEM
Prospectiva de Energía Renovable 2014 – 2028. Secretariat de Energia (SENER), Mexico	Renewable energy projections, Mexico	P	NATEM
PRODESEN – Programme de Desarrollo des Sistema Electrico Nacional - Mexico	Energy projections, electricity generation, various data, Mexico	P	NATEM
Report on Energy Supply-Demand in Canada. Statistics Canada	Regional energy balances, Canada	P	NATEM
Numerous technology/sectoral studies			FORECAST
A diverse database included in the LEAP model	GHG emissions of energy and non-energy sectors		LEAP
The Technology and Environmental Database (TED)			LEAP
ENTRANZE Database	Dwelling stock characterisation, Characterisation of retrofit measures	P	JRC-EU-TIMES
JRC-IDEES Database	Disaggregated energy balances by energy service, technology efficiencies, load factors for dispatchable electricity generation	P	JRC-EU-TIMES
EMISIA TRACCS Database	Vehicle stocks, Fuel consumption, Average occupancy/tonnage, Average efficiency in road transport	P	JRC-EU-TIMES
ETRI Database	Energy Technology Reference Indicators	P	JRC-EU-TIMES
ENSPRESO Database	Wind, solar and biomass energy potentials	P	JRC-EU-TIMES
EMHRES (European Meteorological derived High Resolution RES) Database	Parametrisation of variable RES	P	JRC-EU-TIMES
EU Reference scenario 2016	Demand projections	P	JRC-EU-TIMES



Data Sources used in Models	Purpose / Data	Publicly Accessible (P) or Restricted Access/Subscription Fee (SF)	Model(s) using the Source
FAO Aquastat database	Water resources, uses, withdrawals	P	JRC-EU-TIMES, TIMES-CAC
Country-Specific DB (Local - Central Asia)	Economic indicators, technology data, reserves, pipelines, etc.		TIMES-CAC
BP, Statistical Review of World Energy (Central Asia)	Reserves, production, trades		TIMES-CAC
WRI	GHG emissions for ASDI database (2007)		ICES
SSP database (IIASA)	Projections of GDP, population, employed population		ICES
AR5 emission scenario (IIASA)	emission projections		ICES
GMWD SERI/WU Global Material Flows Database	Material flow for ASDI database (2007)		ICES
Comprehensive Energy Use Database. Office of Energy Efficiency, Natural Resources Canada (RNCAN)	Energy consumption data, Canada	P	NATEM
National Inventory Report. Environment and Climate Change Canada (ECCC)	GHG inventory and methodology, Canada	P	NATEM
Global Power Plant Database.	Electricity capacity by plant, Worldwide	P	NATEM
FIGARO (Eurostat, experimental statistics)	Calibration of NEMESIS (potentially)		NEMESIS
The 2018 Ageing Report: Economic and Budgetary Projections for the EU Member States (2016-2070)	Calibration of NEMESIS (potentially - EU GDP and population projections)		NEMESIS
OECD/ITF. ITF Transport Outlook 2017	Transportation data for TIAM		TIAM
Global Energy Assessment - GEA (2012)	Energy end-use in transport and buildings for TIAM V4		TIAM

However, as envisioned and promised in the Grant Agreement, towards leading to meaningful model inter-comparisons where all intra-model differences can be discussed as a reflection of their specificities and theory alone, PARIS REINFORCE modelling exercises undertook a very thorough harmonisation process. For example, for the first 'Where are We Headed?' runs, Table 5 shows the harmonisation of the modelling inputs across all models



involved. This is also documented in the I²AM PARIS platform “Where is the world headed?”⁹ and “Where is the EU headed”¹⁰ workspaces, along with the harmonisation tables for all other multi-model exercises. The platform also offers the possibility for extracting harmonisation tables for selected models on demand¹¹.

Table 5: Model variable harmonisation table for the ‘Where the world is headed?’ model inter-comparison

Population	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
OECD Population Projections (short- and mid-term) (OECD Population Projects, 2020)					✓						✓	✓	✓	✓	✓	✓	✓
Europop (short- and mid-term) (Europop, 2020)						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
UN (short-term) (United Nations 2019)					✓						✓	✓	✓	✓	✓	✓	✓
SSP2 Population (long-term) (KC and Lutz, 2017)					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GDP/total income	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
OECD (Economic Outlook No. 103 and 106) (short- and mid-term) (OECD, 2018) (OECD, 2019)					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ageing Report 2018 (short- and mid-term) (EC, 2017)											✓	✓	✓	✓	✓	✓	✓
IMF (short-term) (IMF, 2019)					✓						✓	✓	✓	✓	✓	✓	✓
SSP2 (long-term) (Dellink et al, 2017)					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sectoral value added	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
Eurostat GDP growth indicator (Eurostat, 2020)							✓	✓	✓			✓					✓
Interest rate	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
OECD Economic Outlook No. 103 (July 2018) (OECD, 2018)								✓		✓							✓
Exchange rates	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
OECD Economic Outlook No. 103 (July 2018) (OECD, 2018)									✓	✓							✓
Electricity generation	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
TIAM (Napp et al., 2019)					✓			✓	✓	✓	✓		✓	✓	✓		✓
NECPs (Mantzios et al., 2017)								✓	✓	✓							
Road: light duty	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
NREL Electric futures report (NREL, 2017)					✓	✓		✓	✓		✓		✓	✓	✓		✓
NECPs (Mantzios et al., 2017)						✓		✓	✓								
TIAM (Napp et al., 2019)						✓		✓	✓								
Road: heavy duty	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
NREL Electric futures report (NREL, 2017)					✓	✓		✓	✓		✓		✓	✓	✓		✓

⁹ https://i2am-paris.eu/pr_wwh/harmonisation_table

¹⁰ https://i2am-paris.eu/eu_wwh/harmonisation_table

¹¹ https://i2am-paris.eu/harmonisation_map_tool/harmonisation_manual



	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
NECPs (Mantzos et al., 2017)								✓	✓								
TIAM (Napp et al., 2019)								✓	✓								
Heating	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
NECPs (Mantzos et al., 2017)								✓	✓		✓			✓	✓		✓
TIAM (Napp et al., 2019)								✓	✓		✓			✓	✓		✓
Cooling	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
NECPs (Mantzos et al., 2017)								✓	✓		✓			✓	✓		✓
TIAM (Napp et al., 2019)								✓	✓		✓			✓	✓		✓
Appliances	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
NECPs (Mantzos et al., 2017)								✓	✓		✓			✓	✓		✓
TIAM (Napp et al., 2019)								✓	✓		✓			✓	✓		✓
Process heat	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
NECPs (Mantzos et al., 2017)								✓			✓			✓	✓		✓
TIAM (Napp et al., 2019)								✓			✓			✓	✓		✓
Machine drives	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
NECPs (Mantzos et al., 2017)								✓			✓			✓	✓		✓
TIAM (Napp et al., 2019)								✓			✓			✓	✓		✓
Steam	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
NECPs (Mantzos et al., 2017)								✓			✓			✓	✓		✓
TIAM (Napp et al., 2019)								✓			✓			✓	✓		✓
CHP	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
NECPs (Mantzos et al., 2017)								✓			✓			✓	✓		✓
TIAM (Napp et al., 2019)								✓			✓			✓	✓		✓
CCS/NETs	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
NECPs (Mantzos et al., 2017)								✓			✓			✓	✓		✓
TIAM (Napp et al., 2019)								✓			✓			✓	✓		✓
Coal market/import prices	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
IEA WEO 2019 (IEA, 2019)							✓	✓	✓	✓		✓	✓				✓
Oil market/import prices	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
IEA WEO 2019 (IEA, 2019)						✓	✓	✓	✓	✓		✓	✓				✓
Gas market/import prices	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
IEA WEO 2019 (IEA, 2019)							✓	✓	✓	✓		✓	✓				✓
CO2	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
CMIP6 (Hoesly et al, 2018) (van Marle et al, 2017)					✓					✓	✓	✓	✓	✓	✓	✓	✓
CH4, N2O	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
CMIP6 for CH4 (Hoesly et al, 2018) (van Marle et al, 2017)										✓	✓	✓	✓	✓	✓	✓	✓
PRIMAP for N2O (Gütschow et al, 2016)										✓	✓	✓	✓	✓			✓
F-gases	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME
NOAA: WMO Ozone Assessment 2018 (NOAA, 2018)										✓	✓	✓	✓				✓
Pollutants	CONTO	MAPLE	NATEM	TIMES-CAC	GCAM-USA	ALADIN	FORECAST	EU-TIMES	LEAP	NEMESIS	GCAM	ICES	Gemini-E3	TIAM	MUSE	42	E3ME



CMIP6 (Hoesly et al, 2018) (van Marle et al, 2017)												✓	✓						✓
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2.4 Origin of the data

The data used in the project was either gathered directly via stakeholder engagement (i.e., experts' opinions, knowledge, insights, question-driven scenarios, etc.) or via existing databases and statistical data as described in the previous section. Stakeholder engagement was carried out via interviews, small meetings and focus groups, online surveys, as well as regional and national workshops.

2.5 Expected size of the data

The data collected, processed, and produced within PARIS REINFORCE is estimated to be less than 250GB. Due to the decentralised nature of data management across project partners, exact numbers for the size of all data related to the project are difficult to calculate. An indication is given by the size of all datasets stored in Zenodo¹², which is no more than 300MB in total. Most other data produced in the project is in the form of pdf files of deliverables and publications, which should not be more than a few MB each.

2.6 Data utility

The produced data is envisaged to be useful to various stakeholder groups, primarily including policymakers and modelling scientists, as also reflected in the main objectives of the project, i.e., to support policy processes regarding the update of NDCs and the informed support of the 2023 Global Stocktake on the one hand, and to inform major scientific assessments (like the IPCC AR6 cycle) on the other. Other potential users of the data are other academics/scientists, industry representatives, NGOs, financial institutions, and civil society.

¹² <https://zenodo.org/communities/paris-reinforce/>



3 FAIR Data

3.1 Making Data Findable

To ensure that data is easily findable in a consistent way, all data is associated with a persistent digital object identifier and described with rich metadata. In the case of scientific publications, DOIs are provided by the publisher, while for other literature (e.g., reports, policy recommendations, etc.) DOIs have been and will be assigned via the repository, in which they will be archived. For the purposes of the PARIS REINFORCE project, the Zenodo repository is being used to share both the publications and the datasets supporting these publications and other research activities¹³.

As described in “D1.1 Quality Management Plan”, a clear naming and versioning system has been established for the identification of the following project documents:

- Deliverables
- Project/WP Meetings agendas and minutes
- Project events agendas
- Official reports to the EC
- Documents, such as mailing lists and internal effort reporting, which are regularly updated
- Documents used for internal project management and monitoring purposes
- Materials/Publications produced by the project, such as commentaries, policy briefs, working documents, presentations, newsletters

Moreover, each document is accompanied with adequate keywords (e.g., Data, Data Management, FAIR Data, Data Processing, etc.) so that potential users are facilitated in searching for and retrieving the document that they are interested in.

3.2 Making Data Openly Accessible

3.2.1 Data envisaged to be distributed in open access

All reports and data that are not confidential are being licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0)¹⁴. Exceptions to this rule may apply if needed (e.g., conflict of IPRs, desire to exploit the project’s results, etc.). Currently the only exceptions are the reports shown in the following table.

Table 6: Confidential data/reports & respective reason

Non-Open access data / report	Reason for exception
D4.2 First portfolio analysis of technological and policy mixes	Scientific publication potential
D4.5 Index decomposition analysis and sectoral benchmarking of IAM scenarios	Scientific publication potential
D4.7 Transformative policy mixes: comparing national case studies	Scientific publication potential
D5.3 Global pathways & EU response: A 1 st European Regional, National and Sectoral assessment	Scientific publication potential

¹³ <https://zenodo.org/communities/paris-reinforce/>

¹⁴ <https://creativecommons.org/licenses/by/4.0/>



D5.4 Study on EU climate policy, SDGs and the EU policy framework	Scientific publication potential
D6.3 First round of nationally modelled low-carbon pathways outputs	Scientific publication potential
D6.4 Ancillary impacts, including SDGs, of national low-carbon pathways outputs	Scientific publication potential
D6.5 Game-changing innovation across the globe	Scientific publication potential
D7.4 1 st Report on Model Inter-Comparisons: Informing scientific assessments and the GST	Scientific publication potential
D9.1 H - POPD - Requirement No. 1	Need for confidentiality in connection with security issues
D9.2 POPD - Requirement No. 3	Need for confidentiality in connection with security issues
D9.3 GEN - Requirement No. 4	Need for confidentiality in connection with security issues
D9.4 GEN - Requirement No. 6	Need for confidentiality in connection with security issues
D9.5 POPD - Requirement No. 5	Need for confidentiality in connection with security issues

These reports will have restricted access; reports with scientific publication potential will be opened in Jan 2023.

3.2.2 Ways to ensure open access

The data produced is provided in open access: they are available via the I²AM PARIS open access exchange platform, and deposited in the PARIS REINFORCE community in the Zenodo repository¹⁵, in order to ensure that it is available to all interested parties. As mentioned before, data is stored in widely used and established formats, namely .pdf, .docx, .xlsx, .csv, .txt, .mp3, .mp4. Several programs capable to open these file formats are distributed freely (e.g., OpenOffice in the case of docx and xlsx formats).

3.3 Making Data Interoperable

Interoperability of provided data is ensured by depositing in the Zenodo repository that uses appropriate data and metadata vocabularies; in particular, Zenodo uses the JSON Schema for internal representation of metadata and offers export to other popular formats, such as Dublin Core or MARCXML.

3.4 Making Data Reusable

All reports and data that are not confidential will be licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0). Most reports are made available as soon as they are accepted by CINEA. In case scientific publications are envisaged to be produced from certain data and/or reports, then an embargo period will be applied until the publication has been accepted. After the publication of data in open access, these will be exploitable by third parties, and it is intended that the data remain re-usable for as long as possible.

¹⁵ <https://zenodo.org/communities/paris-reinforce/>



4 Allocation of Resources

To ensure data accessibility and preservation, the free-of-charge Zenodo repository is used. Thus, the only necessary resources for making data FAIR are the processes of depositing the data in the repository, as well as any fees for publishing in open access (either gold or green). Both these expenditures have already been budgeted in the PARIS REINFORCE Grant Agreement. NTUA was responsible for depositing the data in Zenodo. Ideally, the cost of long-term preservation will be covered by the Zenodo repository. According to the H2020 requirements, open access must be ensured to all peer-reviewed scientific publications within a period of at most six months. The following table presents the available open access options.

Table 7: Open Access Options

Open Access Type	Definition	Options	Access	Fees	License
Gold Open Access	Providing free online access to the published scientific paper for any user.	<ul style="list-style-type: none"> Publish in an open access journal. Publish in a journal that supports open access. 	Free to everyone.	Article Processing Charges (or APCs), ranging range between 130€ and 5,400€	<ul style="list-style-type: none"> CC BY 4.0 CC BY-NC-ND 4.0
Green Open Access	Depositing the published article or the final peer-reviewed manuscript in an online repository	Publishing in an embargo journal.	Free to everyone after an embargo period.	Fees may be required in order to achieve the embargo period of 6 months.	CC BY-NC-ND 4.0
		Self-archiving the final accepted manuscript in an appropriate repository (e.g. arXiv, RePEc, etc.)	Free to everyone immediately.	No fees required.	CC BY-NC-ND 4.0



5 Data Security

Within the project's lifetime, in order to enhance the effective collaboration among partners, data is stored in a project-specific implementation of the Alfresco Community document management system. The employed Alfresco server has full version control and a backup of previous versions (full backups rather than differential), as well as enables retaining a backup copy for every deleted or overwritten piece of content in its repository. This allows instant recovery of documents, through either the Alfresco interface or the administration interface. In addition, certain data produced by the models of the project was stored in or linked to from the I²AM PARIS platform, more information on which is available in "D2.2 – Protocol for model use, scenarios and stakeholder engagement" (Month 7) and "D2.4 – I²AM PARIS platform" (Month 12), "D2.5 – I²AM PARIS platform – Update 1" (Month 24), and "D2.6 – I²AM PARIS platform – Update 2" (Month 42). The structure and technical details of the platform were decided, and good practices of data storage and recovery applied in its design and development. It is envisaged that the platform will be maintained for a period of at least five years after the end of the project, as its lifetime has been extended for as long, being supported and sustained by four other projects: H2020 NDC ASPECTS, H2020 ENCLUDE, HE IAM COMPACT, and HE DIAMOND.

The PARIS REINFORCE implementation of Alfresco is located on a Windows Server 2008 R2 Datacenter Hyper-V Virtual Machine, on a Dell Poweredge R710 Server owned by EPU-NTUA (Project Coordinator) and operated in the EPU-NTUA premises. Data redundancy on a server-wide scale is achieved by the use of four SAS 600GB hard disk drives on a RAID 10 configuration—this ensures that no data is lost if one drive fails. In addition, offsite backups of the server are taken on a weekly basis. More information about Alfresco can be found at the Alfresco website¹⁶.

After the project's end, the collected data will be stored in an appropriate repository to achieve data reservation. It is envisaged that this data will also be archived in the Zenodo PARIS REINFORCE community, which is provided by CERN and has a lifespan of at least 20 more years. Moreover, even in case of closure of Zenodo, best efforts will be made by its staff to integrate all content into suitable alternative institutional and/or subject based repositories. According to Zenodo's policy, the data files are stored in the central server located in CERN Data Centres, Geneva, while two more replicas of a file located on different disk servers, in Budapest, are created. Thus, loss of data is highly improbable to occur. Regarding specific files, other repositories apart from Zenodo may be chosen in case they are more suitable to the file in question.

Finally, the outcomes of PARIS REINFORCE will be maintained in NTUA's servers for a period of at least ten years after the end of the project, thus further increasing data preservation.

¹⁶ <https://www.alfresco.com/solutions/document-management>



6 Ethical Aspects

Regarding the data already available in existing databases (see Section 2.4), there are no ethical aspects, apart from the respect of the licence under which these databases are provided, namely a database with restricted access cannot be available with open access even if PARIS REINFORCE has used it.

Regarding data gathered via stakeholder consultation (e.g., stakeholders' opinions, etc.) several ethical procedures apply in regards with data collection, handling, and further availability to the public. For the collection of the data, as described in "D9.1 H - POPD - REQUIREMENT No. 1", informed consent procedures have been established and appropriate templates have been created. Moreover, in case data gathered via stakeholder consultation is decided to be made public (e.g., if the data is used in an open access scientific publication), then suitable anonymisation techniques will be applied prior to the archiving of data.



7 Datasets and publications produced

7.1 Datasets

Name:	Van de Ven et al._2019_ERL_DATASET
Description:	This dataset contains the underlying data for the following publication: Van de Ven, D. J., Sampedro, J., Johnson, F. X., Bailis, R., Forouli, A., Nikas, A., ... & Doukas, H. (2019). Integrated policy assessment and optimisation over multiple sustainable development goals in Eastern Africa. <i>Environmental Research Letters</i> , 14(9), 094001, https://doi.org/10.1088/1748-9326/ab375d .
Partner(s):	BC3, NTUA
Zenodo DOI:	https://doi.org/10.5281/zenodo.4099722
Zenodo link:	https://zenodo.org/record/4099722
Publication Date:	August 20, 2019
Name:	Song_et_al_2020_ERSS_DATASET
Description:	This dataset contains the underlying data for the following publication: Song, L., Lieu, J., Nikas, A., Arsenopoulos, A., Vasileiou, G., & Doukas, H. (2020). Contested energy futures, conflicted rewards? Examining low-carbon transition risks and governance dynamics in China's built environment. <i>Energy Research & Social Science</i> , 59, 101306., https://doi.org/10.1016/j.erss.2019.101306
Partner(s):	NTUA
Zenodo DOI:	https://doi.org/10.5281/zenodo.4088569
Zenodo link:	https://zenodo.org/record/4088569
Publication Date:	September 23, 2019
Name:	Vielle_2019_EEPS_DATASET
Description:	This dataset contains the underlying data for the following publication: Vielle, M. (2020). Navigating various flexibility mechanisms under European burden-sharing. <i>Environmental Economics and Policy Studies</i> , 22(2), 267-313., 10.1007/s10018-019-00257-3. Full details of methods used to create the dataset and provided within this publication.
Partner(s):	EPFL
Zenodo DOI:	https://doi.org/10.5281/zenodo.4085245
Zenodo link:	https://zenodo.org/record/4085245#.Y1am0HZByUk
Publication Date:	December 19, 2019
Name:	van_vliet_et_al_2020_EIST_DATASET



Description: This dataset contains the underlying data for the following publication: van Vliet, O., Hanger, S., Nikas, A., Spijker, E., Carlsen, H., Doukas, H., & Lieu, J. (2020). The importance of stakeholders in scoping risk assessments—Lessons from low-carbon transitions. *Environmental Innovation and Societal Transitions* 35, 400-413. <https://doi.org/10.1016/j.eist.2020.04.001>.

Partner(s): NTUA

Zenodo DOI: <https://doi.org/10.5281/zenodo.4099682>

Zenodo link: <https://zenodo.org/record/4099682>

Publication Date: May 12, 2020

Name: Nikas_et_al_2020_ORIJ_DATASET

Description: This dataset contains the underlying data for the following publication: Nikas, A., Fountoulakis, A., Forouli, A., & Doukas, H. (2020). A robust augmented ϵ -constraint method (AUGMECON-R) for finding exact solutions of multi-objective linear programming problems. *Operational Research*, in press, 10.1007/s12351-020-00574-6.

Partner(s): NTUA

Zenodo DOI: <https://doi.org/10.5281/zenodo.4099564>

Zenodo link: <https://zenodo.org/record/4099564>

Publication Date: May 24, 2020

Name: Babacan_et_al_NATEN_2020_DATASET

Description: This dataset contains the underlying data for the following publication: Babacan, O., De Causmaecker, S., Gambhir, A., Fajardy, M., Rutherford, A. W., Fantuzzi, A., & Nelson, J. (2020). Assessing the feasibility of carbon dioxide mitigation options in terms of energy usage. *Nature Energy*, 5(9), 720–728. <https://doi.org/10.1038/s41560-020-0646-1>.

Partner(s): Grantham

Zenodo DOI: <https://doi.org/10.5281/zenodo.4104432>

Zenodo link: <https://zenodo.org/record/4104432>

Publication Date: July 6, 2020

Name: Neofytou_et_al_2020_RSER_DATASET

Description: This dataset contains the underlying data for the following publication: Neofytou, H., Nikas, A., & Doukas, H. (2020). Sustainable energy transition readiness: A multicriteria assessment index. *Renewable and Sustainable Energy Reviews*, 131, 109988., 10.1016/j.rser.2020.109988.

Partner(s): NTUA

Zenodo DOI: <https://doi.org/10.5281/zenodo.4084765>

Zenodo link: <https://zenodo.org/record/4084765>

Publication Date: July 6, 2020



Name: Forouli_et_al_2020_ENVSOFT_DATASET

Description: This dataset contains the underlying data for the following publication: Forouli, A., Nikas, A., Van de Ven, D.-J., Sampedro, J. & Doukas, H. (2020). A multiple-uncertainty analysis framework for integrated assessment modelling of several sustainable development goals. *Environmental Modelling & Software*, 131, 104795. <https://doi.org/10.1016/j.envsoft.2020.104795>.

Partner(s): NTUA, BC3

Zenodo DOI: <https://doi.org/10.5281/zenodo.4091763>

Zenodo link: <https://zenodo.org/record/4091763>

Publication Date: July 21, 2020

Name: Labella_et_al_2020_IJCIS_DATASET

Description: This dataset contains the underlying data for the following publication: Labella, Á., Koasidis, K., Nikas, A., Arsenopoulos, A., & Doukas, H. (2020). APOLLO: A Fuzzy Multi-criteria Group Decision-Making Tool in Support of Climate Policy. *International Journal of Computational Intelligence Systems*, 13(1), 1539-1553, <https://doi.org/10.2991/ijcis.d.200924.002>.

Partner(s): NTUA

Zenodo DOI: <https://doi.org/10.5281/zenodo.4084747>

Zenodo link: <https://zenodo.org/record/4084747>

Publication Date: October 1, 2020

Name: Babonneau_et_al_2020_EMA_DATASET

Description: This dataset contains the underlying data for the following publication: Babonneau, F., Bahn, O., Haurie, A. & Vielle, M. (2020). An Oligopoly Game of CDR Strategy Deployment in a Steady-State Net-Zero Emission Climate Regime. *Environmental Modeling & Assessment*, in press, [10.1007/s10666-020-09734-6](https://doi.org/10.1007/s10666-020-09734-6).

Partner(s): Grantham

Zenodo DOI: <https://doi.org/10.5281/zenodo.4120615>

Zenodo link: <https://zenodo.org/record/4120615>

Publication Date: October 22, 2020

Name: Lalas_et_al_2021_Energies_DATASET

Description: This dataset contains the underlying data for the following publication: Lalas, D., Gakis, N., Mirasgedis, S., Georgopoulou, E., Sarafidis, Y., & Doukas, H. (2021). Energy and GHG Emissions Aspects of the COVID Impact in Greece. *Energies*, 14(7), 1955. <https://doi.org/10.3390/en14071955>.

Partner(s): NTUA

Zenodo DOI: <https://doi.org/10.5281/zenodo.5659219>



Zenodo link: <https://zenodo.org/record/5659219#.Y1aoXnZByUk>

Publication Date: April 1, 2021

Name: Giarola_et_al_2021_STOTEN_DATASET

Description: This dataset contains the underlying data for the following publication: Giarola, S., Mittal, S., Vielle, M., Perdana, S., Campagnolo, L., Delpiazzi, E., ... & van de Ven, D. J. (2021). Challenges in the harmonisation of global integrated assessment models: A comprehensive methodology to reduce model response heterogeneity. *Science of the Total Environment*, 783, 146861. <https://doi.org/10.1016/j.scitotenv.2021.146861>.

Partner(s): Imperial, EPFL, CMCC, Cambridge, CICERO, NTUA, BC3

Zenodo DOI: <https://doi.org/10.5281/zenodo.5659438>

Zenodo link: <https://zenodo.org/record/5659438#.Y1ao5nZByUk>

Publication Date: April 7, 2021

Name: Doukas_et_al_2021_TRPD_DATASET

Description: This dataset contains the underlying data for the following publication: Doukas, H., Spiliotis, E., Jafari, M. A., Giarola, S. & Nikas, A. (2021). Low-cost emissions cuts in container shipping: Thinking inside the box. *Transportation Research Part D: Transport and Environment*, 94, 102815, <https://doi.org/10.1016/j.trd.2021.102815>.

Partner(s): NTUA, Imperial

Zenodo DOI: <https://doi.org/10.5281/zenodo.5666360>

Zenodo link: <https://zenodo.org/record/5666360#.Y1arDXZByUk>

Publication Date: April 19, 2021

Name: Yang_et_al_2021_SCS_DATASET

Description: This dataset contains the underlying data for the following publication: Yang, X., Lin, W., Gong, R., Zhu, M., & Springer, C. (2021). Transport decarbonization in big cities: An integrated environmental co-benefit analysis of vehicles purchases quota-limit and new energy vehicles promotion policy in Beijing. *Sustainable Cities and Society*, 71, 102976. <https://doi.org/10.1016/j.scs.2021.102976>. Full details of methods used to create the dataset and provided within this publication.

Partner(s): Tsinghua

Zenodo DOI: <https://doi.org/10.5281/zenodo.5657797>

Zenodo link: <https://zenodo.org/record/5657797#.Y1aum3ZByUk>

Publication Date: April 30, 2021

Name: Confronting mitigation deterrence in low-carbon scenarios: supporting data

Description: Supporting data for manuscript 'Confronting mitigation deterrence in low-carbon scenarios', accessible at <https://iopscience.iop.org/article/10.1088/1748-9326/ac0749>



Partner(s):	Imperial
Zenodo DOI:	https://doi.org/10.5281/zenodo.4740581
Zenodo link:	https://zenodo.org/record/4740581#.Y1au9XZByUk
Publication Date:	June 11, 2021
Name:	Nikas_et_al_2021_STOTEN_DATASET
Description:	This dataset contains the underlying data for the following publication: Nikas, A., Elia, A., Boitier, B., Koasidis, K., Doukas, H., Cassetti, G., ... & Chiodi, A. (2021). Where is the EU headed given its current climate policy? A stakeholder-driven model inter-comparison. <i>Science of The Total Environment</i> , 148549. https://doi.org/10.1016/j.scitotenv.2021.148549
Partner(s):	NTUA, E4SMA, EPFL, Cambridge, CMCC, SEURECO, Imperial, ISI Fraunhofer, Bruegel, BC3, CICERO,
Zenodo DOI:	https://doi.org/10.5281/zenodo.5619308
Zenodo link:	https://zenodo.org/record/5619308#.Y1avJXZByUk
Publication Date:	June 21, 2021
Name:	Li_et_al_2021_MASGC_Dataset
Description:	This dataset contains the underlying data for the following publication: Li, R., Perdana, S., Vielle, M. (2021), Potential integration of Chinese and European emissions trading market: welfare distribution analysis, <i>Mitigation and Adaptation Strategies for Global Change</i> , 26:22 https://doi.org/10.1007/s11027-021-09960-7 .
Partner(s):	EPFL
Zenodo DOI:	https://doi.org/10.5281/zenodo.5676182
Zenodo link:	https://zenodo.org/record/5676182#.Y1axJ3ZByUk
Publication Date:	June 25, 2021
Name:	Koasidis_et_al_2021_TRD_DATASET
Description:	This dataset contains the underlying data (Monte Carlo iterations) for the manuscript Koasidis et al., submitted to <i>Maritime Policy & Management</i> in July 2021.
Partner(s):	NTUA
Zenodo DOI:	https://doi.org/10.5281/zenodo.5120042
Zenodo link:	https://zenodo.org/record/5120042#.Y1axgnZByUk
Publication Date:	July 21, 2021
Name:	Van_de_Ven_et_al_2021_DATASET
Description:	This dataset contains the underlying data for the following publication: Van de Ven, D.J., Westphal, M., Gonzalez-Eguino, M., Gambhir, A., Peters, G., Sognaes, I., McJeon, H., Hultman, N., Kennedy, K., Cyrs, T., & Clarke, L. (2021). The impact of U.S. re-engagement in climate on the Paris targets. <i>Earth's Future</i> , in press



Partner(s): BC3, Imperial, CICERO
Zenodo DOI: <https://doi.org/10.5281/zenodo.5235569>
Zenodo link: <https://zenodo.org/record/5235569#.Y1ax-HZByUk>
Publication Date: August 23, 2021

Name: Sognaes_et_al_2021_NCC_DATASET
Description: This dataset contains the underlying data for the following publication: I. Sognaes, A. Gambhir, D.-J. Van de Ven, A. Nikas, A. Anger-Kraavi, H. Bui, L. Campagnolo, E. Delpiazzi, H. Doukas, S. Giarola, N. Grant, A. Hawkes, A. Koberle, A. Kolpakov, S. Mittal, J. Moreno, S. Perdana, J. Rogelj, M. Vielle, & G.P. Peters. (2021). A multi-model analysis of long-term emissions and warming implications of current mitigation efforts. Nature Climate Change.

Partner(s): CICERO, Imperial, BC3, NTUA, Cambridge, CMCC, EPFL
Zenodo DOI: <https://doi.org/10.5281/zenodo.5562199>
Zenodo link: <https://zenodo.org/record/5562199#.Y1ay2HZByUk>
Publication Date: September 27, 2021

Name: Cost reductions in renewables can substantially erode the value of carbon capture and storage in mitigation pathways: supporting data

Description: This provides supporting data for the paper, Cost reductions in renewables can substantially erode the value of carbon capture and storage in mitigation pathways, published in One Earth. The full paper can be accessed at the following DOI: <https://doi.org/10.1016/j.oneear.2021.10.024>, published on the 19th November 2021.

Partner(s): Imperial
Zenodo DOI: <https://doi.org/10.5281/zenodo.5666988>
Zenodo link: <https://zenodo.org/record/5666988#.Y1az53ZByUk>
Publication Date: November 11, 2021

Name: Gambhir et al.,2022_NCC_DATASET
Description: This dataset contains the underlying data (Modelling input and output regarding fossil fuels) for the journal article by Gambhir et al., 2022 published in Nature Climate Change in December 2021.

Partner(s): Imperial
Zenodo DOI: <https://doi.org/10.5281/zenodo.7274547>
Zenodo link: <https://zenodo.org/record/7274547#.Y2KcfnZByUI>
Publication Date: December 13, 2021

Name: Koasidis et al.,2022_MCDM_SD_DATASET
Description: This dataset contains the underlying data (Stakeholder votes) for the book chapter Koasidis et al., 2022 published in Multiple Criteria Decision Making in January 2022.



Partner(s): NTUA
Zenodo DOI: <https://doi.org/10.5281/zenodo.7229824>
Zenodo link: <https://zenodo.org/record/7229824#.Y1a0dHZByUk>
Publication Date: January 1, 2022

Name: Categorical variables based on cross country household survey on energy consumption
Description: The data used in this file was collected via two large-scale surveys conducted in Italy, Switzerland and the Netherlands. A total of 6,138 responses were recorded, containing information on socio-demographic and socio-psychological characteristics, dwelling and household characteristics, technologies and energy services used, and their metered electricity consumption. There were a large number of missing responses for metered electricity consumption in the Netherlands, leading to an under-representation of data from this country. The survey responses were used to construct newly defined energy efficiency indicators, and energy service indicators. This allows two distinct factors to be separated: service consumption, and energy efficiency relative to the demanded service. Firstly, dwelling characteristics and survey responses related to energy services (e.g. floorspace, ownership of specific appliances and number of lightbulbs), were regressed to the collected metered electricity data. For each household, this allowed us to calculate the expected lighting and appliance electricity demand based on the level service that the household demanded, which is referred to as lighting and appliance service demand indicators. The idea is that a larger house, or a house with more appliances for example is expected to use more electricity. Relative to this expected electricity demand energy efficiency can be calculated. All variables are categorised in categorical variables deduced based on the questions asked in the two surveys. The survey responses were clustered based on the lighting service demand, appliance service demand and the efficiency gap (k-means clustering with Jaccard dissimilarity measure) which is described in Edelenbosch, Miu et al (2022). Translating observed household energy behaviour to agent-based technology choices in an integrated modelling framework. Iscience (accepted).

Partner(s): Imperial
Zenodo DOI: <https://doi.org/10.5281/zenodo.5906624>
Zenodo link: <https://zenodo.org/record/5906624#.Y1a1DHZByUk>
Publication Date: February 6, 2022

Name: Burke and Gambhir, 2022_ECC_DATASET
Description: This dataset contains the Marginal abatement cost curve data for different Greenhouse Gas Removal Options for the journal article Burke and Gambhir, 2022 published in Energy and Climate Change



Partner(s):	Imperial
Zenodo DOI:	https://doi.org/10.5281/zenodo.7199122
Zenodo link:	https://zenodo.org/record/7199122#.Y1a1O3ZByUk
Publication Date:	April 26, 2022
Name:	Koasidis et al., 2022_ESD_DATASET
Description:	This dataset contains the underlying data (Stakeholder votes) for the journal article by Koasidis et al., 2022 published in Energy for Sustainable Development in May 2022.
Partner(s):	NTUA, CMCC, Bruegel, Imperial
Zenodo DOI:	https://doi.org/10.5281/zenodo.7233859
Zenodo link:	https://zenodo.org/record/7233859#.Y1a4knZByUk
Publication Date:	May 17, 2022
Name:	Van de Ven et al._OE_2022_Dataset
Description:	This dataset contains the underlying data (portfolio analysis runs) for the manuscript Van de Ven et al., submitted to One Earth in June 2022.
Partner(s):	BC3, NTUA, Imperial, E4SMA, EPFL, Holistic
Zenodo DOI:	https://doi.org/10.5281/zenodo.6998390
Zenodo link:	https://zenodo.org/record/6998390#.Y1a463ZByUk
Publication Date:	June 22, 2022
Name:	Karamaneas et al., 2022_PSET_DATASET
Description:	This dataset contains the data used and calculations performed for conducting the analysis, including the answers provided by regional stakeholders for the assessment of SDGs for the book chapter Karamaneas et al., 2022 published in Palgrave Handbook of Zero Carbon Energy Systems and Energy Transitions. Palgrave Studies in Energy Transitions.
Partner(s):	NTUA, E4SMA, Bruegel
Zenodo DOI:	https://doi.org/10.5281/zenodo.7199199
Zenodo link:	https://zenodo.org/record/7199199#.Y1a4_nZByUk
Publication Date:	August 30, 2022
Name:	Koasidis et al._SDG FCMs_2022_DATASET
Description:	This dataset contains the underlying data (Monte Carlo Fuzzy Cognitive Mapping inputs, lambda parameters, and outputs) for the manuscript Koasidis et al., submitted to Applied Soft Computing in September 2022.
Partner(s):	NTUA
Zenodo DOI:	https://doi.org/10.5281/zenodo.7071303
Zenodo link:	https://zenodo.org/record/7071303#.Y1a8EnZByUk
Publication Date:	September 12, 2022



Name: Van de Ven et al 2022_Mitigation_DATASET

Description: This dataset contains the underlying scenario protocol, input (socioeconomic assumptions), and output (model results) for the study by Van de Ven et al. on post-Glasgow climate action and feasibility gap

Partner(s): BC3, Imperial, NTUA, EPFL, CICERO

Zenodo DOI: <https://doi.org/10.5281/zenodo.7086557>

Zenodo link: <https://zenodo.org/record/7086557#.Y1bB9XZByUk>

Publication Date: September 16, 2022

Name: Karamaneas et al_RSETR_2022_DATASET

Description: This dataset contains the LEAP and OSeMOSYS output data for the manuscript Karamaneas et al., submitted to Renewable & Sustainable Energy Transition in September 2022.

Partner(s): NTUA

Zenodo DOI: <https://doi.org/10.5281/zenodo.7090607>

Zenodo link: <https://zenodo.org/record/7090607#.Y1bCQnZByUk>

Publication Date: September 18, 2022

Name: Perdana and Vielle, 2022_JEPO_DATASET

Description: This dataset contains the underlying data (Redistribution of CBAM) for the journal article by Perdana and Vielle, 2022 published in Energy Policy in September 2022.

Partner(s): EPFL

Zenodo DOI: <https://doi.org/10.5281/zenodo.7234034>

Zenodo link: <https://zenodo.org/record/7234034#.Y1bCgnZByUk>

Publication Date: September 19, 2022

Name: Cassetti_et_al_2022_EGY_DATASET

Description: This dataset contains the underlying input and output data (model assumptions and results) for the manuscript Cassetti et al. ("The interplay among COVID-19 economic recovery, behavioural changes, and the European Green Deal: an energy-economic modelling perspective"), submitted to Energy in 2022.

Partner(s): E4SMA, SEURECO, NTUA

Zenodo DOI: <https://doi.org/10.5281/zenodo.7194864>

Zenodo link: <https://zenodo.org/record/7194864#.Y1bCtnZByUk>

Publication Date: October 13, 2022

Name: Forouli et al., 2022_SoftwareX_DATASET

Description: This dataset contains the underlying data (Augmecon-Py data) for the journal article by Forouli et al., 2022 published in SoftwareX in October 2022.

Partner(s): NTUA, Holistic



Zenodo DOI: <https://doi.org/10.5281/zenodo.7271747>
Zenodo link: <https://zenodo.org/record/7271747#.Y2FPOHZByUk>
Publication Date: October 17, 2022

Name: Gambhir et al.,2022_NCC_DATASET
Description: This dataset contains the underlying data (Modelling input and output regarding fossil fuels) for the journal article by Gambhir et al., 2022 published in Nature Climate Change in December 2021.
Partner(s): Imperial
Zenodo DOI: <https://doi.org/10.5281/zenodo.7274547>
Zenodo link: <https://zenodo.org/record/7274547#.Y4CkEnZByUk>
Publication Date: December 13, 2021

7.2 Publications

For more information on the scientific publications that have been produced by the PARIS REINFORCE project, please see Deliverable D8.12 "Report on Scientific Publications".

Citation (APA): Van de Ven, D. J., Sampedro, J., Johnson, F. X., Bailis, R., Forouli, A., Nikas, A., ... & Doukas, H. (2019). Integrated policy assessment and optimisation over multiple sustainable development goals in Eastern Africa. *Environmental Research Letters*, 14(9), 094001.
DOI: <https://doi.org/10.1088/1748-9326/ab375d>
Zenodo link: <https://zenodo.org/record/4022245>
Publication Date: August 20, 2019
Access: Gold (Open)

Citation (APA): Song, L., Lieu, J., Nikas, A., Arsenopoulos, A., Vasileiou, G., & Doukas, H. (2020). Contested energy futures, conflicted rewards? Examining low-carbon transition risks and governance dynamics in China's built environment. *Energy Research & Social Science*, 59, 101306.
DOI: <https://doi.org/10.1016/j.erss.2019.101306>
Zenodo link: <https://zenodo.org/record/4061008>
Publication Date: September 23, 2019
Access: Gold (Open)

Citation (APA): Gramkow, C., & Anger-Kraavi, A. (2019). Developing Green: A Case for the Brazilian Manufacturing Industry. *Sustainability*, 11(23), 6783.
DOI: <https://doi.org/10.3390/su11236783>
Zenodo link: <https://zenodo.org/record/4022583>
Publication Date: November 29, 2019
Access: Gold (Open)



Citation (APA): Vielle, M. (2020). Navigating various flexibility mechanisms under European burden-sharing. *Environmental Economics and Policy Studies*, 22(2), 267-313.

DOI: <https://doi.org/10.1007/s10018-019-00257-3>

Zenodo link: <https://zenodo.org/record/4088158>

Publication Date: December 19, 2019

Access: Green (Embargoed until December 19, 2020)

Citation (APA): Hausfather, Z., & Peters, G. P. (2020). Emissions—the ‘business as usual’ story is misleading. *Nature*, 577, 618-620.

DOI: <http://dx.doi.org/10.1038/d41586-020-00177-3>

Zenodo link: <https://zenodo.org/record/4118610>

Publication Date: January 29, 2020

Access: Green (Available in Zenodo)

Citation (APA): van Vliet, O., Hanger, S., Nikas, A., Spijker, E., Carlsen, H., Doukas, H., & Lieu, J. (2020). The importance of stakeholders in scoping risk assessments—Lessons from low-carbon transitions. *Environmental Innovation and Societal Transitions*, 35, 400-413.

DOI: <https://doi.org/10.1016/j.eist.2020.04.001>

Zenodo link: <https://zenodo.org/record/4022683>

Publication Date: May 12, 2020

Access: Gold (Open)

Citation (APA): Le Quéré, C., Jackson, R. B., Jones, M. W., Smith, A. J., Abernethy, S., Andrew, R. M., De-Gol, A., Willis, D. R., Shan, Y., Canadell, J. G., Friedlingstein, P., Creutzig, F., & Peters, G. (2020). Temporary reduction in daily global CO₂ emissions during the COVID-19 forced confinement. *Nature Climate Change*, 10, 647–653.

DOI: <https://doi.org/10.1038/s41558-020-0797-x>

Zenodo link: <https://zenodo.org/record/4118105>

Publication Date: May 19, 2020

Access: Green (Available in Zenodo)

Citation (APA): Nikas, A., Fountoulakis, A., Forouli, A., & Doukas, H. (2020) A robust augmented ϵ -constraint method (AUGMECON-R) for finding exact solutions of multi-objective linear programming problems. *Operational Research*, <https://doi.org/10.1007/s12351-020-00574-6>

DOI: <https://doi.org/10.1007/s12351-020-00574-6>

Zenodo link: <https://zenodo.org/record/4023114>

Publication Date: May 24, 2020

Access: Gold (Open)



- Citation (APA):** Nikas, A., Neofytou, H., Karamaneas, A., Koasidis, K., & Psarras, J. (2020) Sustainable and socially just transition to a post-lignite era in Greece: a multi-level perspective, *Energy Sources, Part B: Economics, Planning, and Policy*, <https://doi.org/10.1080/15567249.2020.1769773>
- DOI:** <https://doi.org/10.1080/15567249.2020.1769773>
- Zenodo link:** <https://zenodo.org/record/4088144>
- Publication Date:** May 27, 2020
- Access:** Green (Available in Zenodo)
- Citation (APA):** Grant, N., Hawkes, A., Napp, T., & Gambhir, A. (2020). The appropriate use of reference scenarios in mitigation analysis. *Nature Climate Change*, 10, 605–610.
- DOI:** <https://doi.org/10.1038/s41558-020-0826-9>
- Zenodo link:** <https://zenodo.org/record/4088256>
- Publication Date:** June 29, 2020
- Access:** Green (Embargoed until December 29, 2020)
- Citation (APA):** Babacan, O., De Causmaecker, S., Gambhir, A., Fajardy, M., Rutherford, A. W., Fantuzzi, A., & Nelson, J. (2020). Assessing the feasibility of carbon dioxide mitigation options in terms of energy usage. *Nature Energy*, 5(9), 720-728.
- DOI:** <https://doi.org/10.1038/s41560-020-0646-1>
- Zenodo link:** <https://zenodo.org/record/4088221>
- Publication Date:** July 6, 2020
- Access:** Green (Available in Zenodo)
- Citation (APA):** Neofytou, H., Nikas, A. & Doukas, H. (2020). Sustainable energy transition readiness: A multicriteria assessment index. *Renewable and Sustainable Energy Reviews*, 131, 109988.
- DOI:** <https://doi.org/10.1016/j.rser.2020.109988>
- Zenodo link:** <https://zenodo.org/record/4088194>
- Publication Date:** July 6, 2020
- Access:** Green (Available in Zenodo)
- Citation (APA):** Koasidis, K., Karamaneas, A., Nikas, A., Neofytou, H., Hermansen, E.A.T., Vaillancourt, K. & Doukas, H. (2020). Many Miles to Paris: A Sectoral Innovation System Analysis of the Transport Sector in Norway and Canada in Light of the Paris Agreement. *Sustainability*, 12, 5832.
- DOI:** <https://doi.org/10.3390/su12145832>
- Zenodo link:** <https://zenodo.org/record/4024636>
- Publication Date:** July 20, 2020
- Access:** Gold (Open)



Citation (APA): Forouli, A., Nikas, A., Van de Ven, D.-J., Sampedro, J. & Doukas, H. (2020). A multiple-uncertainty analysis framework for integrated assessment modelling of several sustainable development goals. *Environmental Modelling & Software*, 131, 104795.

DOI: <https://doi.org/10.1016/j.envsoft.2020.104795>

Zenodo link: <https://zenodo.org/record/4025086>

Publication Date: July 21, 2020

Access: Gold (Open)

Citation (APA): Fuss, S., Canadell, J. G., Ciais, P., Jackson, R. B., Jones, C. D., Lyngfelt, A., ... & Van Vuuren, D. P. (2020). Moving toward Net-Zero Emissions Requires New Alliances for Carbon Dioxide Removal. *One Earth*, 3(2), 145-149.

DOI: <https://doi.org/10.1016/j.oneear.2020.08.002>

Zenodo link: <https://zenodo.org/record/4118120>

Publication Date: August 21, 2020

Access: Green (Available in Zenodo)

Citation (APA): Nikas, A., Lieu, J., Sorman, A., Gambhir, A., Turhan, E., Baptista, B.V., & Doukas, H. (2020). The desirability of transitions in demand: Incorporating behavioural and societal transformations into energy modelling. *Energy Research & Social Science*, 70, 101780.

DOI: <https://doi.org/10.1016/j.erss.2020.101780>

Zenodo link: <https://zenodo.org/record/4061526>

Publication Date: September 21, 2020

Access: Gold (Open)

Citation (APA): Koasidis, K., Nikas, A., Neofytou, H., Karamaneas, A., Gambhir, A., Wachsmuth, J., & Doukas, H. (2020). The UK and German Low-Carbon Industry Transitions from a Sectoral Innovation and System Failures Perspective. *Energies*, 13(19), 4994.

DOI: <https://doi.org/10.3390/en13194994>

Zenodo link: <https://zenodo.org/record/4058501>

Publication Date: September 23, 2020

Access: Gold (Open)

Citation (APA): Labella, Á., Koasidis, K., Nikas, A., Arsenopoulos, A., & Doukas, H. (2020). APOLLO: A Fuzzy Multi-criteria Group Decision-Making Tool in Support of Climate Policy. *International Journal of Computational Intelligence Systems*, 13(1), 1539-1553

DOI: <https://doi.org/10.2991/ijcis.d.200924.002>

Zenodo link: <https://zenodo.org/record/4084727>

Publication Date: October 1, 2020

Access: Gold (Open)



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