

Roadmap to tracking public investment in energy research

Suzy Leprince – Energy Data Officer – Innovation indicators – Energy Data Centre Online – 5th April 2023

Why collect public energy RD&D data?

- Design, evaluate and adjust public innovation policies
- Identify gap and opportunities
- Evaluate effectiveness of programmes and policies
- Help the private sector define their own innovation strategies

IEA Energy Technology public RD&D Budgets Database

The latest update of the database will be released on May 3rd and available for download on its <u>IEA data</u> product page.

What is in the IEA RD&D database?

Research, development and demonstration budgets data funded by national governments and state-owned enterprises from 1974 to 2022, for 184 different technologies.



Challenges in collecting public energy RD&D data



Submission assessment of IEA countries

- Setting up a completely new data collection system
- Identifying possible improvements
- Expanding the coverage
- Improving the disaggregation
- Maintaining data quality
- Ensuring metadata accuracy

Roadmap to tracking public investment in energy technology research

- Published in September 2022
- Description of the variety of country approaches to set up a public energy RD&D data collection system
- Based on a set of interviews with 20 governments between November 2021 and March 2022
- Roadmap intended as a guide for countries near the beginning of their journeys towards the collection of public energy RD&D budgets data, but also for countries with more advanced systems, looking at strengthening specific areas

Thanks to:

Austria Brazil Canada Czech Republic Estonia Finland France Germany Hungary Ireland Japan Lithuania Netherlands Norway Poland Portugal Spain Switzerland United Kingdom European Union

lea

Tracking Public Investment in Energy Technology Research – A Roadmap



Purpose	Institutional Arrangement	Process	Data management and technology	Dissemination
1 - Define clear objectives	2 - Set up the framework	5 - Assess data availability	8 - Select and create the IT tools	9 - Share the data
	3 - Map partners and data sources	6 - Design the collection and classification		10 - Communicate the findings
	4 - Create the network	7 - Develop validation process		
		Continuous improvements	3	
11 - Establish a learning and adap	tation culture			

Structure of the roadmap – Country annexes

Tracking Plate heads are argument Reporting institution Mainty for Technologinal framework programment spoker, in the fields of sustainable development, climate, energy transition and biodiversity Tracking Plate heads by Plate State Secretarial for Energy State Secretarial for Energy Department of States, energy transition Mainty for Technology and State Secretarial for Energy Department of States, energy transition Vary to formation No specific legal framework codo collobaration between public and semi-public enstitutions and the ministry Mainty for Technology and State Secretarial for Energy Department for Stratege, Plane Programming Mainty for Technology and miniptement for Stratege, Plane Department for Stratege, Plane State Secretarial for Energy Department for Stratege, Plane State Secretarial for Energy Department for Stratege, Plane State Secretarial for Energy Department for Stratege, Plane Programming Vary to formation State Secretarial for Energy Department for Stratege, Plane Survey (Frequency) Annual Data validation Collection already in the survey Data validation NeDIO is a major ROBD for Technology and findstrop programment and technology Data platform Exchange of Excel files by email Advanced data analytics No Data platform Exchange of Excel files by email Advanced data analytics No Data platform Exchange of Excel files by email Advanced data analytics No Main data usees Goverment, public	Annes Tracking Public Investment in Sine Industry (TIM) nd Climate Policy ning and Lithuania	
Reporting institution Ministru for Exclusion Upgentimed of Data Ministration Data Ministrution Role of reporting institution Responsible for preparing and implementing the development is being memory in the field of substandable development is being memory. Control of the development is being memory in the field of substandable development is being memory. National arrangement and validation process Role of reporting institution No funding responsibilities of the implementary the memory. National for Strategies Programming Technology are implements do and semi-public an	rtacking Public Investment in Ener Industry (TIM) Ind Climate Policy Ining and	
Responsible for preparing and implementing the development of policy operment's policy in the field of statistable development, climate, energy transition and biodrensity. Institutional arrangement Funding responsibilities of the velopment's policy in the field of statistable development, climate, energy transition and biodrensity. Institutional arrangement Funding responsibilities of the velopment's polic in responsibilities No funding responsibilities of the responsibilities Ministry for Technology and policy of the Technology and policy of the Technology and implements domained of the responsibilities of the resonance of the climpton of the funding responsibilities of the resonance of the responsibilities of the resonance of the resonance of the responsibilities of the resonance of the responsibilities of the resonance of the reson	Tracking Public Investment in Ener Mustry (TIM) nd Climate Policy Ining and	
Funding responsibilities No funding responsibilities Way to formatise relationship between institutions No specific legal framework (Concerns) (Con	ndustry (TIM) nd Climate Policy ning and Lithuania	
Way to formatise relationship between institutions No specific legal framework institutions Reporting institution Collection, classification and validation process Type of data collection State Selection and Validation Programming and Process Provide data to the LA classification and validation process Type of data collection State classification and validation process Survey IEA questionnaire Survey IEA questionnaire Survey Reporting institution Quasification Check to treaks in the time survey Data validation Check to treaks in the time series at the aggregated and technology Data platform Exchange of Excel files by email Advanced data analytics No Survey IEA classification and validation Data management and technology Way to formatise relationship Dota management and technology Data a platform Exchange of Excel files by email Advanced data analytics No Sessemination channel Velosite Main publication Prodes data collection Increase in Funding for New Technology. Data collection on the IEA for New Technology. Purpose France collects energy RD&D to assess innovation in the filed of energy technology, in addition to the U	ning and Lithuania	
Collection, classification and validation process Type of data collection Structured survey Type of survey EA questionnaire Survey frequency Annual Classification EA questionnaire Survey frequency Annual Classification EA questionnaire Survey frequency Annual Classification EA questionnaire Question EA questionnaire Question EA questionnaire Classification EA questionnaire Question EA questionnaire Question Classification already in the survey Data validation Check for treads in the time survey Data platform Exchange of Excel files by email Advanced data analytics No Data platform Exchange of Excel files by email Advanced data analytics No Data dissemination Way to formalise relationship Main duta users Government, public Dissemination channel Publics and private database Main publication Interenaio for Now Technology	ent and Innovation	
Type of data collection Structured survey Type of data collection Structured survey Type of data collection Structured survey Sarvey frequency Annual Classification EEA questionnaire Classification Check for breaks in the time series at the aggregated and technology and findicates Data management and technology Puppose Data discomment Exchange of Excel files by email Advanced data analytics No Collection, classification and validation provided to the European Loggistication science of the public collection, classification and validation provided to the European Loggistication science of the public collection, classification and validation provided to the European Loggistication science of the public collection, classification and validation provided to the European Loggistication science of the public collection, classification and validation provided to the European Loggistication science of the public collection, classification and validation provided to the European Loggistication science of the public collection, classification and validation provided to the European Loggistication science of the public collection, classification and validation provided to the European Loggistication science of the public classification to the EA. The data are used to inform Purpose France collects energy RD&D to assess innovation in the field of energy technology, in addition to the sufficience of the text are used to inform Puta collection on the EA. The data are us	Reporting institution	
Type of survey EA questionnaire Survey frequency Annual Classification IEA questionnaire Survey frequency Annual Classification IEA classification already in the survey Data validation Check for breaks in the time series at the aggregated and technology Data platform Exchange of Excel files by email Advanced data analytics No Data platform Exchange of Excel files by email Advanced data analytics No Dissemination Collection, classification and validation provides data are provided to the European Advanced data analytics Main data users Government, public Dissemination channel Public Spending in Energy RBD in 2020-Sharp Increase in Funding for New Technology Purpose Type of clata collection France collects energy RDB to assess innovation in the field of energy technology, addition to the submission to the IEA. The data are used to inform	ndustry: Manages and provides	
Type of sorrey Lick spondent name Classification Lick spondent name Classification Lick destination Data validation Object Kor kroke in the me series at the aggregated and technological levels Data validation Data management and technology Data platform Exchange of Excel files by email Advanced data analytics No Data data users Government, public Dissomination Data collection, classification and validation provided lata latabase Main data users Government, public Dissomination Public Spending in Energy R&D in 2020-Sharp Main publication Intercase infinding for New Technology Purpose Contexts Data collection France collects energy RD&D to assess innovation in the field of energy technology, in addition to the submission to the EX. The data are used to inform Data management and technology	Role of reporting instituti	
Construction EA classification Fundamental classification Technology and Industry Data validation Check for breaks in the time series at the aggregated and technology and Industry Funding responsibilities of the NRDIO is a major RDB0 fundatry Data validation Data management and technology Way to formalise relationship Non-encry RDB data are provided to the European Logging and and technology Data platform Exchange of Excel files by email Advanced data analytics No Data dissemination Exchange of Excel files by email Dotor malse relationship Dotor of EKC Dissemination channel Website Type of data collection Public sepanding in Energy RBD in 2000 - Sharp Main publication Increase in Frunding for New Technology Internal classification and validation of Collection Purpose France collects energy RDB to assess innovation in the field of energy technology, in addition to the submission to the EA. The data are used to inform Data validation Data ranagement and technology	to the Ministry for	
Construction of the Vectors in the fine series at the aggregated and technological fields with the advanced data analytics No Collection, classification and validation provide advanced data analytics No Collection, classification and validation provide advanced data analytics Nain public cation Purpose France collects energy RD&D to assess innovation in the field of energy technologi, in addition to the submission to the EA. The data are used to inform	Funding responsibilities	
Data management and technology Nonergy R&D data are inprovided to the European U operation by the finance operation of the European U operation U operation of the European U operation U op	er Way to formalise relation between institutions	
Unda management and technology Organisations by the strong organisations by the strong Organisation by the strong Organi	ically collected and on and international Collect	
Data platorim Exchange of Excert files by email Advanced data analytics No Data dissemination The national report on GHL Main data users Government, public Dissemination dissemination Public Spending in Energy R&D in 2020-Sharp Increase in Funding for New Technology Main publication Public Spending in Energy R&D in 2020-Sharp Increase in Funding for New Technology France collects energy R&D to assess innovation in the field of energy technology, in addition to the submission to the IEA. The data are used to inform	gulated by Act No. Type of data collection	
Advanced data analytics No Data dissemination Collection, classification and validate uport of the set of not one control of the set one control on control on the set one control on the control on the set one control on the set one control on the control	nergy. Type of survey	
14). 14). Main data users Government, public Dissemination channel Website Main publication Public Spending in Energy R&D in 2020-Sharp Main publication Public Spending in Energy R&D in 2020-Sharp Main publication Public and private database Contacts Data collected directly from Classification Classification Interace in Funding for New Technology. Purpose Data validation to the submission to the IEA. The data are used to inform Data mangement and technology. Point collects energy Data management and technology. NOIO concrete conclusion on the IEA. The data are used to inform	No. 278 of 2014 (XI. Survey frequency	
Main data users Government, public Collection, classification and validation p Dissemination Public Spending in Energy RAD in 2020-Sharp Increase in Funding for New Technology Type of data collection Public and private database Main publication Public Spending in Energy RAD in 2020-Sharp Increase in Funding for New Technology Contacts Data collected directly from Classification Purpose France collects energy RD&D to assess innovation in the field of energy technology, in addition to the submission to the IEA. The data are used to inform Data management and technology	Classification	
Type of data collection Public and private database Main publication Puppose France collects energy R&D to assess innovation in the field of energy technology, in addition to the submission to the IEA. The data are used to inform NDIO Contracts Data validation Data val	Data validation	
Main publication Public Spending in Energy R&D in 2020-Sharp Increase in Funding for New Technology. Option Contacts Data collected directly from Classification Purpose France collects energy RD&D to assess innovation in the field of energy technology, in addition to the submission to the IEA. The data are used to inform Data validation Data validation		
Main publication Increase in Funding for New Technology. Classification Internal classifications Purpose Data validated using data finance Data validated using data finance Data validated using data finance France collects energy RD&D to assess innovation in the field of energy technology, in addition to the submission to the IEA. The data are used to inform Data validation Data validated using the finance	erformers	
Purpose France collects energy RD&D to assess innovation in the field of energy technology, in addition to the submission to the IEA. The data are used to inform NDICE and additional addited add	Data platform	
Purpose Central Statistical Unice Central St	n the Hungarian Advanced data analytics	
France collects energy RD&D to assess innovation in the field of energy technology, in addition to the submission to the IEA. The data are used to inform NDDDO assess and technology		
policy molecto and the public through reports produced by the Minister of	Main data users	
poincy inverse and the poinc allough reports produced by the ministry of Data platform to request RD&D funding to request RD&D funding	Dissemination channel	
Advanced data analytics Filtering by fields of science	lassification (tier 1-3) Main publication	
Data dissemination	Purpose	
PAGE 178 Main data users Policy makers	In 2020, Lithuan	
Dissemination channels Events newsletters	available were the g ents newsletters However these stat	

Institutional arrangement				
Reporting institution	Lithuanian Energy Agency, with oversight from the Ministry of Energy of the Republic of Lithuania			
Role of reporting institution	Assessing the state of renewable energy and energy efficiency, and the progress towards the energy sector targets under the National Energy and Climate Plan (NECP)			
Funding responsibilities	Not a funding institution			
Way to formalise relationship between institutions	In the process of setting up a legal framework for energy RD&D data collection			
Collection, classification and validation process				
Type of data collection	Voluntary survey			
Type of survey	Same as the IEA survey			

Survey frequency	Annual
Classification	IEA classification at the survey stage
Data validation	High-level assessment of the figures

Data ma	Data management and technology	
ata platform	Exchange of Excel files by email	
dvanced data analytics	No	

Data dissemination		
Main data users	Policy makers Co-operative research programmes in the Baltic region	
Dissemination channel	IEA publication	
Main publication	Assessment of the need for an internal publication	

energy RD&D data. Before, the only data ata produced by the national statistics office. uch higher level than the IEA classification, This effort to collect data that are more a combination of three main drivers.

Purpose



Examples of key questions

- What are the national needs for the public energy RD&D data collection process?
- · What type of data has to be collected?
- What are the requirements of the different innovation stakeholders?



In 2018, **Brazil** launched an ambitious project to improve its process for collecting and compiling energy RD&D data. The main objectives in boosting this effort were to guide public policy and fill gaps to efficiently compile investment in energy RD&D statistics.

Institutional Arrangement

- 2 Set up the framework
- 3 Map partners and data sources
- 4 Create the network

Examples of key questions

- Who will coordinate the public energy RD&D data collection and what resources are available?
- Who funds and performs public energy RD&D in the country?
- Who will be the key contacts for collection and validation in the relevant institutions and how to ensure and maintain a working relationship?

In **Austria**, the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology externalized the data collection through a tender. It is currently carried out by the Austrian Energy Agency.



7 - Develop validation process

Examples of key questions

- Is there and existing data collection process in place that could be build upon?
- What would be the best means to collect the data: surveys, database?
- How can data be checked for consistency and accuracy and by whom?



In **Switzerland**, the Federal Office of Energy set up a data collection process including existing projects databases, surveys to research organisations and secondary data sources.

Data management and technology

8 - Select and create the IT tools

Examples of key questions

- What IT tools will be used to collect the data?
- Would AI be useful in the process?
- What type of software tool could be used to store the data?



In **Estonia**, the data collection is done fully through a database and the project categorization is based on keywords related to energy.

Dissemination

- 9 Share the data
- 10 Communicate the findings

Examples of key questions

- How can the data be effectively communicated to the ministries and RD&D actors? To the public?
- · Can the data be published in open access?
- What methodology and metadata documents should be published with the dataset?



In **Canada**, the data are published annually by Natural Resources Canada in their <u>Energy Fact Book</u>.

Conclusion

- Tool for countries to **internally assess** their data collection system
- Basis for discussion with countries on how to improve or set up their data collection
- For any questions on the roadmap, please contact <u>RDD@iea.org</u>
 - The IEA would be happy to collaborate with interested countries to assess the status of their data collection and identify priority steps through this tool. Don't hesitate to express your interest.

