Open letter to the International Energy Agency and its member countries: Please remove paywalls from global energy data and add appropriate open licenses

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8 December 2021

Dr Fatih Birol
Executive Director
International Energy Agency
Paris, France

Dear Dr Birol, dear members of the IEA, dear representatives of IEA member countries,

We the undersigned ask that the **International Energy Agency** (IEA) makes the datasets it receives and collates from its member countries available under suitable open licenses so that this information can be freely used and reused.[1] Such status would enable both independent energy system analysts and the interested public to investigate and better understand future net-zero and net-negative energy systems. We will also address this same request to IEA member countries, associate member countries, and strategic partners in the hope that they can also influence IEA policies on this particular matter.

In this open letter, we review the arguments in support of our request, provide some legal context, introduce our community and conclude with the list of signatories.

Key arguments and proposed solution

Roser and Ritchie (2021) have already described the problems arising from the IEA providing their data behind paywalls. They also offer a simple solution: make the data publicly available and then have the member countries increase their financial contributions to the IEA by a modest amount (Roser and Ritchie estimate 5-6 million USD in total per annum) to make up the foregone revenue from proprietary data licensing. We therefore present here just a brief summary of the situation and the proposed solution. Those needing more context and detail should refer directly to Roser and Ritchie (2021).

Three decades of research have shown that we, as a global human society, need to **rapidly transition to net-zero** — and ultimately net-negative — emissions, in order to avoid the worst outcomes from a changing climate. The majority of anthropogenic emissions are related to energy conversion and use in some form or another — and particularly through the unabated use of fossil fuels. Besides climate change, energy conversion processes can be major contributors to other types of environmental and human harm, including local air pollution.

[1] The contents of this document are published under a Creative Commons CC0 1.0 public domain dedication. The names of the undersigned should not be replicated separately from this document to preserve personal privacy and retain context.

High-quality data are required to create effective and efficient transition pathways towards a net-zero society. These transition pathways rely on a thorough analysis and accurate modeling of current systems, including energy systems. The quality of the analytics and modeling is, however, critically determined by the data used to describe and characterize the systems of interest.

High-quality datasets already exist: they are **published by the IEA** but remain behind paywalls. And despite the IEA being a publicly funded institution, researchers and other interested third parties have to normally pay and consent to non-disclosure to access the IEA data — while often working for public institutions, including universities, themselves.

Ultimately, a lack of data availability will lead to net-zero transition pathways that are both **more costly and less effective** than they should have been. It is also highly likely that the total amount of revenue foregone by the IEA, should they decide to stop selling their data, bears no relation to the global cost of less-than-optimal transition pathways. As indicated earlier, Roser and Ritchie (2021) estimate that the IEA licensing fees net about 5-6 million USD annually. The cost differentials between the various net-zero transition pathway scenarios will typically be several orders of magnitude higher than that from IEA data licensing fees.

The **benefits of open data** extend beyond climate change mitigation efforts. The McKinsey Global Institute estimates that for the electricity, oil and gas, and transport sectors alone, open data could create an economic value of 1.3–2.0 trillion USD per year (Manyika *et al*. 2013). Open data leads to less duplication of research efforts — with fewer resources wasted on recreating the paywalled IEA data from alternative and often inferior sources. Open data reduces inequality, since researchers from well-off countries and institutions are better positioned to afford the purchase of IEA data. The credibility and replicability of research is enhanced: independent researchers can verify or challenge studies based on common data. Transparency is enhanced in relation to public policy development. Finally, open data improves outreach and engagement by reducing barriers for journalists and the public to access the data and understand its implications. It is therefore in everyone's interest that the IEA data be open and freely available.

The **proposed solution** is straightforward and consists of two aspects: first, the IEA should remove the paywalls to its datasets while its member countries increase their financial contributions to the IEA to compensate for the foregone revenue from data licensing fees. The IEA has an important role in the ongoing energy transition, therefore it is clear that the organization requires adequate funding. Second, the liberated data then needs to be provided with appropriate open licenses to enable its use and reuse.

The undersigned will also ask their respective governments to **increase their financial contributions** to the IEA. The resulting benefits from available and open data, including more cost-efficient net-zero transition pathways, are very likely to outweigh the lost sales revenue by a very significant multiplier.

Summing up: making all past and present IEA datasets openly available should enable a **more rapid, less costly, and more equitable** transition to net-zero global energy systems, create additional economic value, increase the quality and quantity of research, and improve outreach and engagement with the public. The cost of this outcome is modest, and we believe could easily be shared among IEA member countries.

As Hannah Richie (2021) states in her *Nature* commentary: *"To tackle global problems, the world must create open data*." We, the undersigned, agree wholeheartedly.

Legal aspects

The concept of open data is often not well understood. We therefore review some legal aspects in this section. As with any data that can be made public legitimately, the IEA data needs to carry appropriate **open licensing**.

We support the recent view of the United Kingdom Ofgem regulator that the **Creative Commons CC-BY-4.0 license** may be the most suitable (Ofgem 2021, footnote 7), while the metadata should be marked public domain via a CC0-1.0 dedication to minimize any friction associated with downstream processing (Kreutzer 2011).

The **European Union defines open data thus** in recital 16 of the 2019/1024 Open Data Directive (European Commission 2019): "*Open data as a concept is generally understood to denote data in an open format that can be freely used, re-used and shared by anyone for any purpose.*" That definition clearly rules out prohibitions on commercial usage.

We note that clause 1 of the **2021 UNFCCC COP26 agreement** (UNFCCC 2021) reads that the agreement: "*Recognizes the importance of the best available science for effective climate action and policymaking*". That must mean that key policy-relevant national energy statistics should neither reside behind paywalls nor remain legally encumbered regarding their use and re-use.

We note that paragraph 15.2 of the **1966 UN ICESCR covenant** (International Covenant on Economic, Social and Cultural Rights) reads: "*The steps to be taken by the States Parties to the present Covenant to achieve the full realization of this right [to science and culture] shall include those necessary for the conservation, the development and the diffusion of science and culture.*" That must mean that member countries contributing data to the IEA have an obligation under international law to also provide those same national energy statistics to energy system analysts and the interested public for independent research and analysis as suitably licensed open data.

We wish to stress that the current situation is highly detrimental to our investigations into rapid decarbonization pathways for national and regional energy systems and their relative merits. On that exact theme, we would like to be able to **replicate the results reported in the landmark IEA (2021a) roadmap** — but are prevented from doing so because we cannot source and freely use and reuse the underlying datasets.[2]

[2] In the case of the net-zero by 2050 study (IEA 2021a), the underlying datasets (IEA 2021b) are, upon registration, available under a Creative Commons CC-BY-NC-SA-3.0-IGO license. The use of an established public license is a clear step forward, but that particular license choice is, in our view, inadequate on two counts. First, the non-commercial (NC) attribute means the license does not qualify as open under established definitions for open data (for example, European Commission (2019) recital 16, also quoted in full elsewhere in this document). And second, only Creative Commons licenses from version 4.0 onwards are suitable for use on data. Earlier licenses versions, such as the CC-BY-NC-SA-3.0-IGO license in question, do not waive the 96/9/EC database rights enabled by European Union law and also currently included within United Kingdom law. Use of the CC-BY-NC-SA-3.0-IGO license may therefore mean that a user could inadvertently infringe the intellectual property that has naturally attached to the data that underpins the IEA net-zero by 2050 study. This eventuality is clearly unsatisfactory, even if the prospect of litigation is low. Moreover, researchers cannot legitimately mix this IEA data with other data under CC-BY-4.0 licensing and reissue the

Finally, we, as a community, are **more than happy to liaise** with the IEA on practical measures to help make this important information freely usable and reusable (Hirth 2020, Morrison 2018). We have experience interacting with the European Commission, the ENTSO-E[3] umbrella organization, market regulators, market operators, and various energy companies in this context.

List of signatories

We the undersigned are **energy system analysts** and many of us are active in the Open Energy Modelling Initiative (openmod) community[4]. Notwithstanding, we sign here simply as individuals.

The Open Energy Modelling Initiative was established in September 2014 to promote open source modeling and genuinely open data. The community has approximately **900 members** subscribed to its mailing list and 800 in the discussion forum. To date, the openmod community has held 14 workshops, and our next post-Covid event is in planning.

Nationals from the following **18 countries** are represented in the list of signatories: Albania, Austria, Belgium, Canada, Denmark, France, Germany, India, Ireland, Italy, Netherlands, New Zealand, Norway, South Africa, Spain, Switzerland, United Kingdom, and USA.

As indicated, some of the undersigned will forward copies of this open letter to **their respective governments** in order to highlight the problem in a national context too.

Name	Organization	Role
Dhruvak Aggarwal	Council on Energy, Environment and Water (CEEW), India	Researcher working on power sector reforms, energy efficiency and renewable energy integration
Cruz Enrique Borges Hernández, PhD	University of Deusto, Spain	Researcher modeling household investment decisions on the energy transition
Tom Brown, PhD	Technical University of Berlin, Germany	Professor of energy systems, developing open source energy transition models for use around the world that rely on high quality national data
Antoine Dubois	University of Liège, Belgium	PhD candidate in modeling and expansion planning of power systems on large geographical scopes (Europe and beyond)
Martha Frysztacki	Karlsruhe Institute of Technology, Germany	PhD candidate researching the Future Energy System to reach dedicated climate goals by using and improving open models
Johannes Hampp	Justus Liebig University Giessen, Germany	PhD candidate working on international energy systems and exchange

aggregate. This certainly presents a major impediment to effective low carbon research. Notwithstanding, we welcome this move to make some of the data held by the IEA more accessible.

[3] European Network of Transmission System Operators for Electricity, https://www.entsoe.eu

[4] The Open Energy Modelling Initiative is also covered on Wikipedia.

Sacha Hodencq	Grenoble Electrical Engineering Laboratory (G2Elab), France	PhD candidate working on open science for the design and operation of energy systems
Daniel Huppmann, PhD	International Institute for Applied Systems Analysis (IIASA), Austria	Coordinator of the research theme “Scenario Services & Scientific Software“ at the Energy, Climate, and Environment Program (ECE)
Jesse Jenkins, PhD	Princeton University, USA	Assistant Professor of Mechanical and Aerospace Engineering and the Andlinger Center for Energy and the Environment
Febin Kachirayil	University of Aberdeen, UK	PhD candidate working on modelling decentralized energy systems
Kamaria Kuling	Simon Fraser University School of Sustainable Energy Engineering, Canada	Graduate student and researcher in the ΔE^+ Research Lab, working on energy systems modelling
Breno Lamassa	Politecnico di Torino, Italy	Student and researcher modelling energy scenarios with a focus on social and economic impacts, prioritizing open data
Francesco Lombardi, PhD	TU Delft, Netherlands	Post-doctoral researcher working on energy systems modelling to support the European energy transition
Pietro Lubello	Università degli Studi di Firenze, Italy	PhD candidate on residential energy systems and energy communities modelling
Gunnar Luderer, PhD	Potsdam Institute for Climate Impact Research (PIK) & Technical University of Berlin, Germany	Leader of the Energy Systems Group Professor and Chair of the Global Energy Systems Department
Mahendranath Ramakrishnan	TU Delft, Netherlands	PhD candidate modelling the pathways to net-zero
Barry McMullin, PhD	Dublin City University, Ireland	Researcher in Paris-aligned energy system decarbonization policy
Pierre McWhannel	Simon Fraser University School of Sustainable Energy Engineering, Canada	PhD Student in energy systems modelling and machine learning
Robbie Morrison	open energy modeling community	Focus on open science, open data, and associated legal issues
Christopher Mutel, PhD	Paul Scherrer Institute, Switzerland	Researcher in prospective life cycle assessment of energy and mobility systems
Fabian Neumann, PhD	Technical University of Berlin, Germany	Researcher on transitions in the European energy system

Taco Niet, PhD	Simon Fraser University School of Sustainable Energy Engineering, Canada	Assistant Professor of Professional Practice Principal Investigator, ΔE^+ Research Lab
Bryn Pickering, PhD	ETH Zürich, Switzerland	Researcher on cross-sectoral energy system decarbonization, from sub-national to continental scales
Sylvain Quoilin, PhD	KU Leuven / University of Liège, Belgium	Assistant Professor and head of the “Integrated and Sustainable Energy Systems” research group
Malte Schäfer	Technische Universität Braunschweig, Germany	PhD candidate modeling and analyzing electricity related emissions
Mirko Schäfer, PhD	University of Freiburg, Germany	Researcher working in energy system modelling and analysis, with a focus on scenario analysis and emission accounting
Ingmar Schlecht, PhD	Neon.energy and ZHAW School of Management and Law, Germany	Director at Neon, energy economics policy consulting Postdoctoral researcher at ZHAW, power system market design and modelling
Jannick Schmidt, PhD	Aalborg University, Denmark	Professor in life cycle assessment and hybrid-IO
Erlet Shaqe	Albanian Energy Association (AEA), Albania	Co-founder and energy consultant
Adam Stein, PhD	Breakthrough Institute, USA	Researcher in energy system planning for decarbonization, resilience, and social equity
Johannes Thema	Wuppertal Institute for Climate, Environment and Energy, Germany	Researcher in energy policy modeling
Oskar Vågerö	University of Oslo, Norway	PhD candidate analyzing social implications of energy systems through modelling
Bo Weidema, PhD	Aalborg University, Denmark	Professor and President of the International Life Cycle Academy
Frauke Wiese, PhD	Europa-Universität Flensburg, Germany	Associate Professor "Energy System Transformation" and head of the “Energy Sufficiency" research group
Grant Wilson, PhD	University of Birmingham, UK	Head of the Energy Informatics Group, interested in local energy systems data for cross vector decarbonization
Jarrad Wright, PhD	Past: Council for Scientific and Industrial Research (CSIR), South Africa; future: National Renewable Energy Laboratory (NREL), USA	Researcher working on developing a national level full-sector energy model utilizing open modelling frameworks

Fei Wu	ETH Zürich, Switzerland	PhD candidate on energy systems modelling

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