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## Decarbonizing the residential sector

*A Data Management Plan created using DMPonline.be*

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**Funder:** Fonds voor Wetenschappelijk Onderzoek - Research Foundation Flanders (FWO)

**Template:** FWO DMP (Flemish Standard DMP)

**Principal Investigator:** Geert Goeyvaerts

**Grant number / URL:** 12C9323N

**ID:** 197424

**Start date:** 01-10-2022

**End date:** 30-09-2025

### Project abstract:

At this moment, the decarbonization of the economy is going too slow to keep the global temperature increase below 2°C. The residential sector is no exception. Residential energy consumption per capita decreased by merely 6.5% in the EU over the course from 2000 to 2016. Completely decarbonizing the residential sector by 2050 will require a faster reduction in energy consumption, electrification and switch to renewables. This research project aims to support the process of decarbonizing the residential sector by applying state-of-the-art methods from program evaluation and empirical industrial organization to exceptional rich data at the micro-level in order to identify market failures that hinder this process and evaluate the cost-effectiveness of energy efficiency policies. These include some of the most widely used policies, e.g. minimum efficiency requirements for new development, as well as policies that have not yet been introduced or only in a few countries such as a carbon tax and minimum efficiency requirements in the rental market. The results from this project will allow policymakers to see how much these policies reduce energy consumption and at what cost. Moreover, it will show how this cost is distributed across the income distribution. Policymakers will therefore not only be able to compare the cost-effectiveness of the different energy-efficiency policies but they will also be able to decide whether or not they should be combined with distributional policies.

**Last modified:** 15-03-2023

## Decarbonizing the residential sector

### Application DMP

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#### Questionnaire

**Describe the datatypes (surveys, sequences, manuscripts, objects ... ) the research will collect and/or generate and /or (re)use. (use up to 700 characters)**

Question not answered.

**Specify in which way the following provisions are in place in order to preserve the data during and at least 5 years after the end of the research? Motivate your answer. (use up to 700 characters)**

Question not answered.

**What's the reason why you wish to deviate from the principle of preservation of data and of the minimum preservation term of 5 years? (max. 700 characters)**

Question not answered.

**Are there issues concerning research data indicated in the ethics questionnaire of this application form? Which specific security measures do those data require? (use up to 700 characters)**

Question not answered.

**Which other issues related to the data management are relevant to mention? (use up to 700 characters)**

Question not answered.

# Decarbonizing the residential sector

## FWO DMP (Flemish Standard DMP)

### 1. Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

				Only for digital data	Only for digital data	Only for digital data	Only for physical data
Dataset Name	Description	New or reused	Digital or Physical	Digital Data Type	Digital Data format	Digital data volume (MB/GB/TB)	Physical volume
		<i>Please choose from the following options:</i> <ul style="list-style-type: none"> <li>• Generate new data</li> <li>• Reuse existing data</li> </ul>	<i>Please choose from the following options:</i> <ul style="list-style-type: none"> <li>• Digital</li> <li>• Physical</li> </ul>	<i>Please choose from the following options:</i> <ul style="list-style-type: none"> <li>• Observational</li> <li>• Experimental</li> <li>• Compiled/aggregated data</li> <li>• Simulation data</li> <li>• Software</li> <li>• Other</li> <li>• NA</li> </ul>	<i>Please choose from the following options:</i> <ul style="list-style-type: none"> <li>• .por,</li> <li>• .xml,</li> <li>• .tab,</li> <li>• .cvs,.pdf,</li> <li>• .txt, .rtf,</li> <li>• .dwg,</li> <li>• .gml, ...</li> <li>• NA</li> </ul>	<i>Please choose from the following options:</i> <ul style="list-style-type: none"> <li>• &lt;100MB</li> <li>• &lt;1GB</li> <li>• &lt;100GB</li> <li>• &lt;1TB</li> <li>• &lt;5TB</li> <li>• &lt;10TB</li> <li>• &lt;50TB</li> <li>• &gt;50TB</li> <li>• NA</li> </ul>	
Socio-Economic Survey 2001	Socio-economic data of persons and households	Reuse existing data	Digital	Observational	NA		
Census 2011	Socio-economic data of persons and households	Reuse existing data	Digital	Observational	NA		
Census 2021	Socio-economic data of persons and households	Reuse existing data	Digital	Observational	NA		
Demographics national registry number	Demographics and location of persons and households	Reuse existing data	Digital	Observational	NA		
Tax records	Income tax data	Reuse existing data	Digital	Observational	NA		
Energy consumption	Annual gas and electricity consumption	Reuse existing data	Digital	Observational	NA		
Predicted energy use and energy efficiency	Predicted energy and data on energy efficiency of housing units	Reuse existing data	Digital	Observational	NA		
Subsidies	Data on subsidized energy-efficiency investments	Reuse existing data	Digital	Observational	NA		
Sale records	Data on sales of housing units	Reuse existing data	Digital	Observational	NA		
Rental contracts	Data on rental contracts of housing units	Reuse existing data	Digital	Observational	NA		
Tariffs	Tariffs of distributionsystem operators	Reuse existing data	Digital	Observational	NA		

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

Dataset Name	Source
Socio-Economic Survey 2001	Statistics Belgium (Statbel)
Census 2011	Statbel
Census 2021	Statbel
Demographics national registry number	Statbel
Tax records	IPCAL via Statbel
Energy consumption	Fluvius via Statbel
Predicted energy use and energy efficiency	Vlaamse Energie en Klimaat Agentschap via Statbel
Subsidies	Fluvius via Statbel
Rental contracts	Algemene Administratie Patrimonium Documentatie (AAPD) via Statbel
Sale records	AAPD via Statbel
Tariffs	Vlaamse Regulator van de Elektriciteits- en Gasmarkt (VREG)

**Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? Describe these issues in the comment section. Please refer to specific datasets or data types when appropriate.**

- No

**Will you process personal data? If so, briefly describe the kind of personal data you will use in the comment section. Please refer to specific datasets or data types when appropriate.**

- Yes

Almost all the data sets contain personal data. All of these data sets will be linked to a specific person or household by Statistics Belgium. These data can be split in the following broad categories: 1) socio-economic characteristics like a person's age, gender, education, disposable income and employment status, 2) characteristics regarding to the housing unit the person lives in like energy-efficiency related characteristics such as predicted energy use, the type of heating and levels of insulation to more general characteristics of the house like size, number of (bath)rooms, and year of construction, and lastly financial information regarding the house such as sales price or rental price depending on the tenure type, 3) energy consumption and investments in energy efficiency.

**Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, ...)? If so, please comment per dataset or data type where appropriate.**

- No

**Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material/Data transfer agreements/ research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.**

- Yes

We cannot transfer or share any of the personal data that we will receive from Statistics Belgium. We are only allowed to publish descriptive statistics and results from empirical analyses which cannot be used to identify an individual.

**Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.**

- No

## 2. Documentation and Metadata

**Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g., in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, Codebook.tsv etc. where this information is recorded).**

Each dataset will be accompanied by a document in which Statbel lists the source of the data and provides some information on the variables in the dataset. I will summarize this information in a single document in which I list all the data sets and indicate whether the data are related to persons or housing units, and explain how the different dataset can be linked to one and another. I will also list potential problems Statbel experienced when linking the different datasets.

**Will a metadata standard be used to make it easier to find and reuse the data? If so, please specify (where appropriate per dataset or data type) which metadata standard will be used. If not, please specify (where appropriate per dataset or data type) which metadata will be created to make the data easier to find and reuse.**

- No

The data that are used for a specific paper will be described in detail in the Appendix of the paper. The reader will know which of the datasets listed above are used for a specific analysis and how we linked, managed and cleaned the data.

## 3. Data storage & back-up during the research project

**Where will the data be stored?**

The data will be stored on the server of housing market research group of the Department of Economics.

**How will the data be backed up?**

The data will be backed up in a folder on the KU Leuven OneDrive account of Geert Goeyvaerts.

**Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely. If no or insufficient storage or backup capacities are available, then explain how this will be taken care of.**

- Yes

The storage and backup capacity are expected to be more than large enough to store the data (both are larger than 1 terrabyte).

**How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?**

The folder on the server will only be accessible for the researchers involved in the research project. The same holds for the folder on OneDrive, which will only be accessible by myself.

**What are the expected costs for data storage and backup during the research project? How will these costs be covered?**

Little to nothing since we can use existing capacity on the server and OneDrive. If the data storage and/or backup generates any cost then I expect to cover them with my bench fee.

#### **4. Data preservation after the end of the research project**

**Which data will be retained for at least five years (or longer, in agreement with other retention policies that are applicable) after the end of the project? In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).**

All of the data listed above will be retained for at least five years after the end of the project.

**Where will these data be archived (stored and curated for the long-term)?**

These data can be stored and curated on the server of the housing market research group at the Department of Economics.

**What are the expected costs for data preservation during the expected retention period? How will these costs be covered?**

We expect the data preservation will cost little to nothing.

#### **5. Data sharing and reuse**

**Will the data (or part of the data) be made available for reuse after/during the project? In the comment section please explain per dataset or data type which data will be made available.**

- No (closed access)

It is not allowed by Statistics Belgium, under any set of conditions, to make the data available to others.

**If access is restricted, please specify who will be able to access the data and under what conditions.**

NA

**Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)? Please explain in the comment section per dataset or data type where appropriate.**

- Yes, Privacy aspects

Most of the data sets contain personal data which cannot be shared due to the agreement with Statbel.

**Where will the data be made available? If already known, please provide a repository per dataset or data type.**

NA

**When will the data be made available?**

NA

**Which data usage licenses are you going to provide? If none, please explain why.**

NA

**Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, you have the option to provide it in the comment section.**

- No

**What are the expected costs for data sharing? How will these costs be covered?**

NA

## **6. Responsibilities**

**Who will manage data documentation and metadata during the research project?**

Geert Goeyvaerts

**Who will manage data storage and backup during the research project?**

Geert Goeyvaerts

**Who will manage data preservation and sharing?**

Geert Goeyvaerts

**Who will update and implement this DMP?**

Geert Goeyvaerts