BuiltHub

Breakout session – Data Assembly

BuiltHub Project – Work Package 3

Simon Pezzutto (EURAC Research), 24.03.2022

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BuiltHub

BREAKOUT SESSION PROGRAM

Topic	Time
1) INTRODUCTION	3 minutes
Scope of the BuiltHub project	(1)
Partners involved in the project	(1)
Introduction to WP3 objectives	(1)
2) WORK CARRIED OUT	4 minutes
Overview on the tasks of the WP3	(2)
Timeline and Gantt chart	(1)
Focus on task 3.1 – Data assembly	(1)
3) TASK 3.1 – DATA ASSEMBLY	6 minutes
BSO Analysis and limits	(2)
Definition and prioritization of indicators	(2)
New data and metadata assembly	(2)

Topic	Time
4) OVERVIEW ON COLLECTED DATASETS	4 minutes
Main topics of the datasets	(1)
List of 30 datasets collected	(2)
More data are needed	(1)
5) TIME FOR QUESTIONS AND ANSWERS	

INTRODUCTION
SCOPE OF THE BUILTHUB PROJECT

Dynamic EU building stock knowledge hub

BuiltHub" is a 4-year European project funded under the Horizon 2020 Program of the European Union. **The project seeks to develop a roadmap to continuously enhance the data needed to decide on building-related policy and business for involved stakeholders through a community and its data hub.** It seeks to positively disrupt policy and market decision making through a continuously community-enhanced evidence base. The BuiltHub community and its platform shall change the way knowledge on the EU building stock is developed and shared and represent the full range of building stakeholders from across Europe.

https://builthub.eu/news?c=search&uid=F62Fx2cj

INTRODUCTION

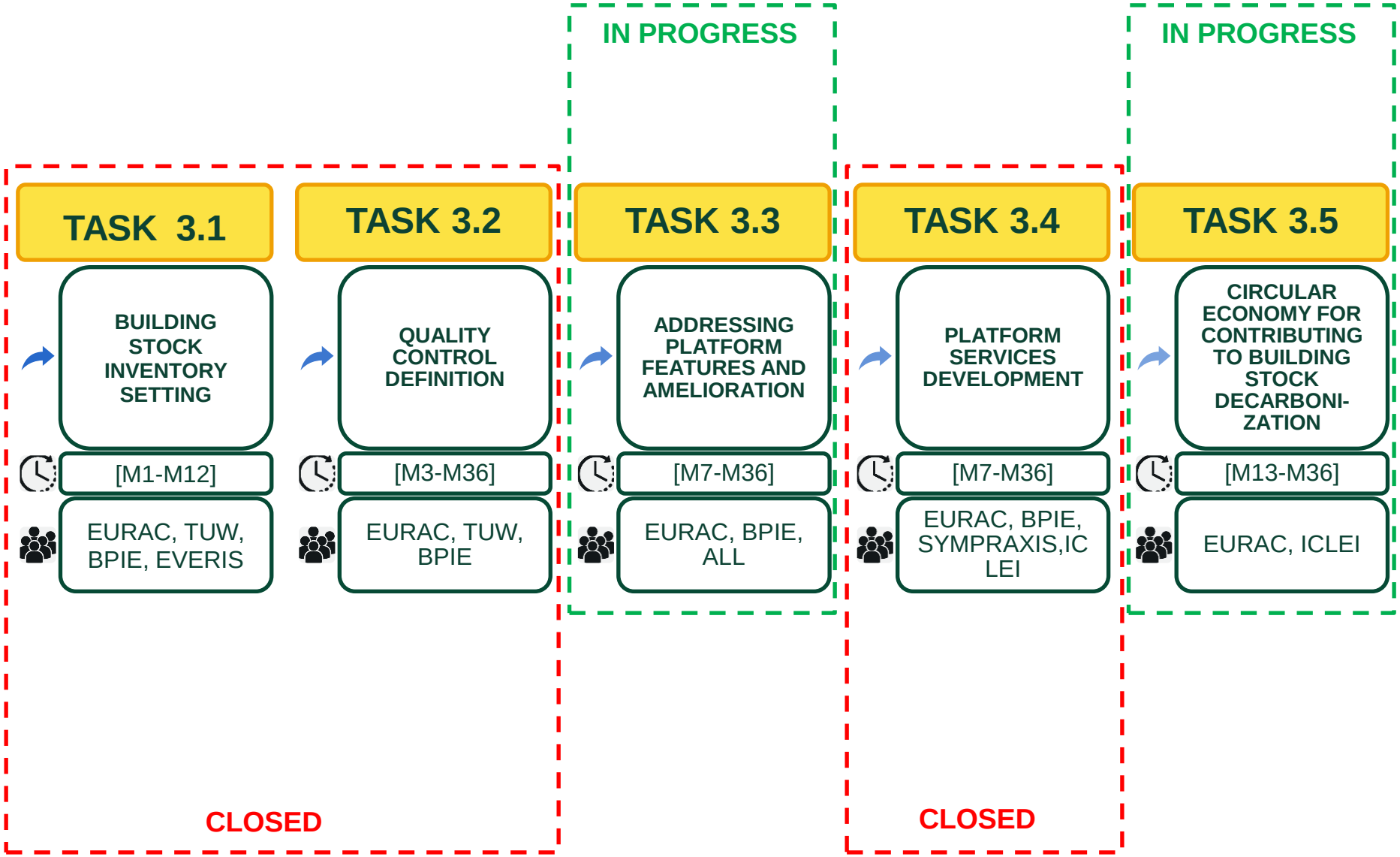
PARTNERS INVOLVED IN THE PROJECT

WORK PACKAGE 3 main goals (EURAC LEAD)

- Analysis of the Building Stock Observatory
- Provision of useful dataset and metadata to populate the BuiltHub platform
- Perform quality analysis on collected datasets
- Provide a service o self amelioration during the different phases of the platform development
- Provide datasets related to circular economy and construction and demolition waste concepts (CDW)

WORK CARRIED OUT

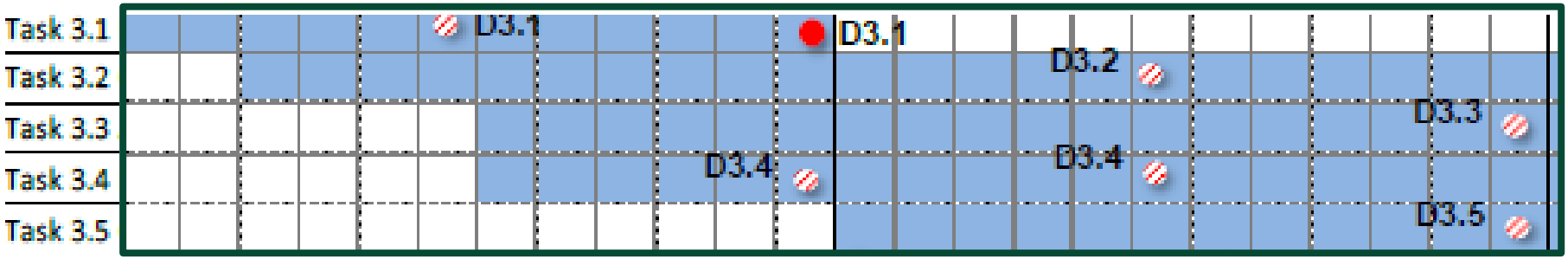
OVERVIEW ON THE TASKS OF WORK PACKAGE 3



WORK CARRIED OUT

TIMELINE AND GANTT CHART

WP3 - Data assembly (EURAC)
Task 3.1 Building stock inventory setting (EURAC)
Task 3.2 Quality control definition (EURAC)
Task 3.3 Addressing platform features and amelioration (EURAC)
Task 3.4 Platform services development (EURAC)
Task 3.5 Circular economy for contributing to building stock decarbonization (EURAC)



WORK CARRIED OUT

FOCUS ON TASK 3.1 – DATA ASSEMBLY

TASK 3.1

BUILDING STOCK INVENTORY SETTING

[M1-M12]

EURAC, TUW, BPIE, EVERIS

MAIN POINTS OF THE WP3 – TASK 3.1

1. • **BUILDING STOCK OBSERVATORY ANALYSIS – DATA LACKS**

2. • **INDICATORS CHOICE AND PRIORITIZATION + INDICATORS INTEGRATION**

   •RESIDENTIAL SECTOR
   •NON-RESIDENTIAL SECTOR

3. • **DATASETS AND METADATA PROVISION**

   •METADATA TABLE – 30 DATASETS

4. • **DELIVERABLE D3.1**

TASK 3.1 – DATA ASSEMBLY

BSO ANALYSIS AND LIMITS

BSO ANALYSIS → INDICATORS CHOICE → CLUSTERING CHOICE → DATA LACKS IDENTIFICATION → DATA AND METADATA FILLING → STAKEHOLDER IDENTIFICATION

BUILDING STOCK OBSERVATORY - DATA AVAILABILITY ANALYSIS

Sector	Indicator level 1	Indicator level 2	Unit	Years	Availability	Final Indicator	Mentioned in BuiltHub	HIGH PRIORITY	MEDIUM PRIORITY	LOW PRIORITY
RESIDENTIAL AND ALL BUILDINGS	Building stock characteristics	Building stock				-				
						-				
						-				
						-				
						-				
			Thousand	2000-2016	All countries	Total number of dwellings	X	X		
						-				
			Thousand	2012-2017	All countries	Number of single family dwellings		X		
			Thousand	2003-2018	All countries	Number of detached houses				
			Thousand	2004-2018	All countries	Number of semi-detached houses				
			Thousand	2017	All countries	Number of multi-family dwellings				
						-				
			Thousand	2000-2016	All countries	Number of permanently occupied dwelling		X		
						-				
			Thousand	2000-2016	No LU,LIT,LV,CY	Number of single family dwelling permanently occupied		X		
			Thousand	No result	No results	Number of detached single family dwelling permanently occupied				
			Thousand	No result	No results	Number of semi-detached single family dwelling permanently occupied				
			Thousand	2000-2016	No LU,LIT,LV,CY	Number of multi family dwelling permanently occupied				
			Thousand	2017	All countries	Number of secondary residences			X	
						-				
						-				
						-				
			Share (%)	2011-2014	No Austria	Share of dwellings built between before 1945		X		
			Share (%)	2011-2014	No Austria	Share of dwellings built between 1945 and 1969				
			Share (%)	2011-2014	No Austria	Share of dwellings built between 1970 and 1979				
			Share (%)	2011-2014	No Austria	Share of dwellings built between 1980 and 1989				
			Share (%)	2011-2014	No Austria	Share of dwellings built between 1990 and 1999				
			Share (%)	2011-2014	No Austria	Share of dwellings built between 2000 and 2010				
			Share (%)	2011-2014	No Austria	Share of dwellings built after 2010				
						-				
			Share (%)	2011 and 201	Only 2017 all countrie	Share of owner-occupied dwellings		X		

BSO indicators | Ind

TASK 3.1 – DATA ASSEMBLY

BSO ANALYSIS AND LIMITS

LIMITS OF THE BSO

- Data lacks
- Poor flexibility of the platform
- Poor metadata provision
- Not strong possibilities to interact for end-users
- Important data missing

TASK 3.1 – DATA ASSEMBLY

DEFINITION AND PRIORITIZATION OF INDICATORS

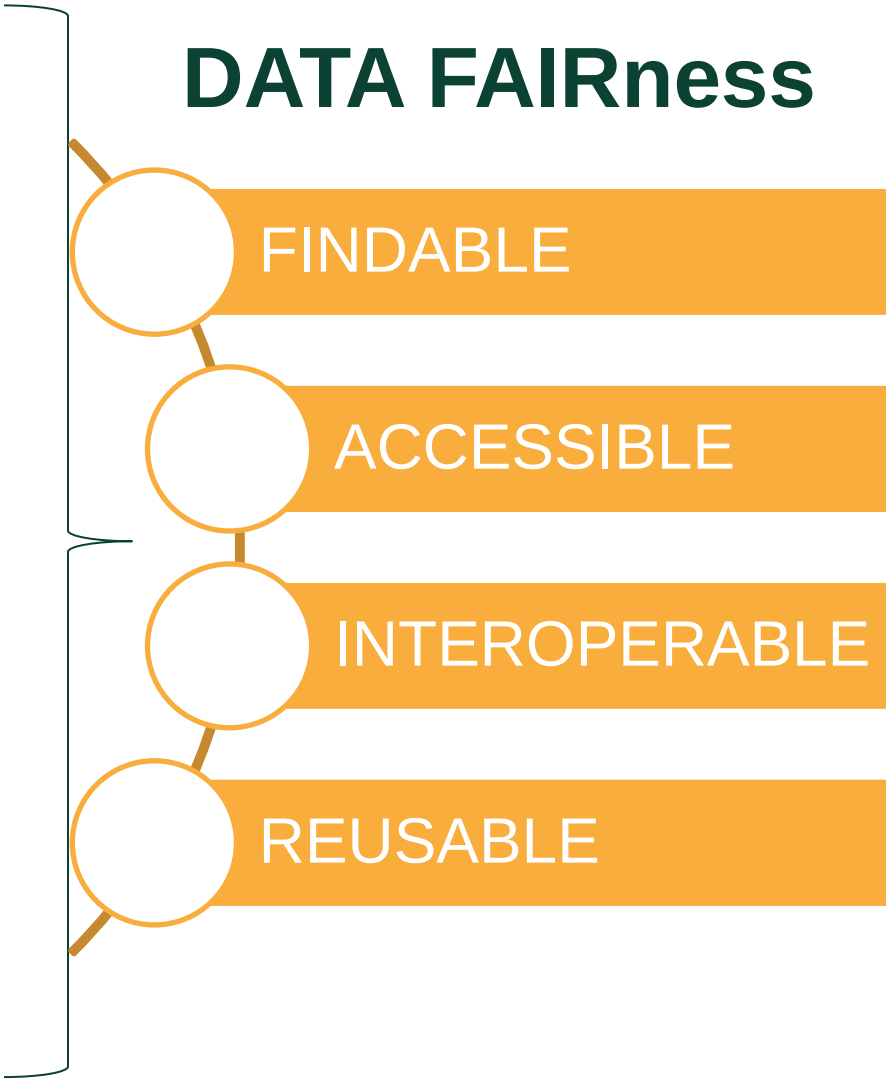
Prioritization of the final indicators selected by the consortium

Final Indicators – RESIDENTIAL SECTOR	Unit	Indicator number	HIGH PRIORITY	MEDIUM PRIORITY	LOW PRIORITY
BUILDING STOCK CHARACTERISTICS					
Total number of dwellings	Thousands	1	X		
Number of single family dwellings	Thousands	2	X		
Number of multy family dwellings	Thousands				
Number of apartment blocks dwellings	Thousands				
Number of permanently occupied dwelling	Thousands	3	X		
Number of single family dwelling permanently occupied	Thousands	4	X		
Number of multi-family dwelling permanently occupied	Thousands				
Number of apartment blocks dwelling permanently occupied	Thousands				
Number of secondary residences	Thousands	5		X	
Share of dwellings built between before 1945	Share (%)	6	X		
Share of dwellings built between 1945 and 1969	Share (%)				
Share of dwellings built between 1970 and 1979	Share (%)				
Share of dwellings built between 1980 and 1989	Share (%)				
Share of dwellings built between 1990 and 1999	Share (%)				
Share of dwellings built between 2000 and 2010	Share (%)				
Share of dwellings built after 2010	Share (%)				
Share of owner-occupied dwellings	Share (%)	7	X		
Share of tenants occupied dwellings	Share (%)				
Share of dwellings with single-person households	Share (%)	8	X		
Share of dwelling occupied by 2 persons	Share (%)				
Share of dwelling occupied by 3 persons	Share (%)				
Share of dwelling occupied by 4 persons	Share (%)				
Share of dwelling occupied by more than 5 persons	Share (%)				
Total floor area of dwellings	Mm2	9	X		
Total floor area of singlefamily dwellings	Mm2	10	X		
Total floor area of multi family dwellings	Mm2				
Total floor area of apartment blocks dwellings	Mm2				

TASK 3.1 – DATA ASSEMBLY

NEW DATA AND METADATA ASSEMBLY

- Name
- Content
- Author/s
- Dataset URL
- Reference and publication year
- Spatial extension
- Granularity
- Methodology URL
- Methodology description
- Accuracy
- Completeness
- Source
- Access
- License
- Terms of Use
- Source type



OVERVIEW ON COLLECTED DATASETS

MAIN TOPICS OF THE DATASETS

OVERVIEW ON COLLECTED DATASETS

LIST OF 30 DATASETS COLLECTED

NAME	CONTENT	AUTHOR/S	DATASET URL
IEE TABULA project: Typology Approach for Building Stock Energy Assessment	Building stock data and other data focusing on technical systems for heating, cooling and domestic hot water production in different buildings types are the main outputs of this dataset. Final energy consumption and envelope performance data are available as well.	TABULA Project Consortium	http://webtool.building-typology.eu/#bm
IEE EPISCOPE project: Focus of building stock monitoring	The main focus point of the EPISCOPE Project is the energy refurbishment of houses in 20 European countries. Interesting information collected concern the construction period (definition of different classes in each country) and the building type (single or multi-family house, terraced house and apartment block), as well as performance-related parameters.	EPISCOPE Project Consortium	https://episcope.eu/welcome/
IEE ZEBRA2020 project: Nearly Zero-Energy Building Strategy 2020	Building stock data including data for energy efficiency trends in buildings as well as data for net zero energy buildings. The project focused on the newly built buildings. This project focused on the creation of an observatory for monitoring the market uptake of nZEBs across Europe. It contains information related to energy performance certificates, materials employed for the buildings, energy performance and final energy consumption and more.	ZEBRA2020 Project Consortium	https://zebra-monitoring.enerdata.net/
IEE ENTRANZE project	Policies to Enforce the TRAnsition to Nearly Zero Energy buildings in the EU27This dataset provides the mapping of several data coming from different sources. The main outputs of the projects are the mapping of building stock related data such as floor area of residential and non-residential buildings, heating/AC system data, and final energy consumption by sector and more.	ENTRANZE Project Consortium	https://entranze.enerdata.net/

OVERVIEW ON COLLECTED DATASETS

MORE DATA ARE NEEDED

NAME	CONTENT	AUTHOR/S	DATASET URL
H2020 ODYSSEE - MURE project	Comprehensive monitoring of efficiency trends and policy evaluation in EU countries, Norway, Serbia and Switzerland. This dataset presents building stock related data including floor area of dwellings, final energy consumption by source, and stock of appliances and dwellings for the EU countries, Norway, Serbia and Switzerland.	ENERDATA	https://odyssee.enerdata.net/database/
Horizon 2020 HotMaps project: Building stock analysis	Complete building stock analysis for the EU27+UK. Values related to final energy consumption and useful energy demand for space heating, space cooling and domestic hot water, construction materials and methodologies, technologies used and building stock data/information (thermal transmittance, building stock vintages and characteristics, household occupancy related data, etc.) can be found both for the residential and the non-residential sectors per building types and construction vintages.	Simon Pezzutto, Silvia Croce, Stefano Zambotti, EURAC	https://gitlab.com/hotmaps/building-stock/-/tree/master/data
FP7 CommON-Energy Project: building stock	Building stock data including building sector data and final energy demand data for non-residential buildings, especially focusing on the trade sector (shopping malls, …)	Vienna University of Technology - Energy Economics Group (EEG)	https://eeg.tuwien.ac.at/commonenergy/floor-area-non-residential
JRC IDEES 2015	The JRC IDEES (Integrated Database of the European Energy System) is focused on the incorporation in a single database of all necessary information for a better understanding of the off the European energy system dynamics. In this way it provides a way to better analyze both the past and to create the best possible basis for future policy assessments. JRC IDEES offers a set of disaggregated energy-environment-economy data, compliant with the EUROSTAT energy balances, as well as widely acknowledged data on existing technologies. It also contains a plausible decomposition of final energy consumption.	European Commission's Joint Research Centre (JRC)	https://data.jrc.ec.europa.eu/dataset/jrc-10110-10001/resource/f590b6f1-60e5-49a6-a972-60bc2b2e34b3
SET-Nav - Strategic Energy Roadmap	The project intends to support strategic decision making in Europe's energy sector, enhancing innovation towards a clean, secure and efficient energy system.	SET-Nav Consortium	http://www.set-nav.eu/

OVERVIEW ON COLLECTED DATASETS

MORE DATA ARE NEEDED

NAME	CONTENT	AUTHOR/S	DATASET URL
H2020 ExcEED Project: building stock data	The ExcEED project (European Energy Efficient building district Database) takes the pulse of the actual energy consumed by last generation of buildings. The project answers the need for transparency and comparability of energy performance calculations. The scope of ExcEED is to create a European database for measured and qualitative data on beyond the state-of-the-art buildings and districts.	ExcEED Consortium	http://www.exceedproject.eu/
FP7 iNSPiRe project: building stock analysis	The building stock analysis and data gathering exercise focused its attention on published literature and other sources, aiming to extrapolate information about the current residential and office building stock. Among the different data gathered it is possible to mention number and floor area of residential buildings/dwellings and office buildings / construction by type and age distribution / typology/ façade and glazing types / geometry / average floor area/ number of floors / U-value, thermal characteristic and performance of the buildings, by age / ownership and tenure i.e. number of social housing, owner occupied, private renting etc. / energy consumption and demand in terms of both, total and individual end-use including space heating, domestic hot water, cooling, lighting; fuel and heating system types and comfort requirements. Interest has been set on lighting-related data.	iNSPiRe Consortium	https://zenodo.org/record/3256270#.X_wayHqSnIU
Energy consumption and energy efficiency trends in the EU-27+UK for the period 2000-2016 - FINAL REPORT	This report shows the present status of final energy consumption in the EU-27+UK focusing the results on the most energy consuming sectors: residential, tertiary, transport and industry. Therefore, the report demonstrates the energy consumption progress from 2000 to 2016 in the mentioned four sectors. There is a special focus on electricity and gas consumption, as they are the most important alternatives to oil. The report includes an analysis of the most important factors influencing final energy consumption trends such as economic growth, population, heating demand, household characteristics and energy prices.	European Commission's Joint Research Centre (JRC) – Tsemekidi Tzeiranaki Sofia, Bertoldi Paolo, Labanca Nicola et Al.	https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/energy-consumption-and-energy-efficiency-trends-eu-28-period-2000-2016

OVERVIEW ON COLLECTED DATASETS

MORE DATA ARE NEEDED

NAME	CONTENT	AUTHOR/S	DATASET URL
Comprehensive study of building energy renovation activities and the uptake of nearly zero-energy buildings in the EU - FINAL REPORT	This study is focused on the delivery of a comprehensive analysis of the renovation activities and nearly zero-energy buildings (NZEB) uptake in the EU27+UK starting from 2012 up to 2016. Indicators in line with the Building Stock Observatory (BSO) have been applied. The main results are available for the EU27+UK and for each of the single Member States.	Directorate-General for Energy (European Commission), IPSOS, Navigant	https://op.europa.eu/en/publication-detail/-/publication/97d6a4ca-5847-11ea-8b81-01aa75ed71a1/language-en/format-PDF/source-119528141
EUROSTAT: Final energy consumption in households	The final energy consumption in households is a measure of the total energy consumed by households as final users. In this dataset it is expressed in thousand tons of oil equivalent.	Statistical Office of the European Union (Eurostat)	https://ec.europa.eu/eurostat/databrowser/view/t2020_rk200/default/table?lang=en
EUROSTAT: Final energy consumption in households by fuel	The share of seven types of fuel over the final residential energy consumption is reported in this dataset. The types of fuels considered are solid fossil fuels, other fuels, oil and petroleum products, natural gas, electricity, heat and renewables and biofuels. The share of each fuel is expressed in per cent of the total consumption.	Statistical Office of the European Union (Eurostat)	https://ec.europa.eu/eurostat/databrowser/view/t2020_rk210/default/table?lang=en
EUROSTAT: Disaggregated final energy consumption in households	This dataset provides disaggregated values for the final energy consumption	Statistical Office of the European Union (Eurostat)	https://ec.europa.eu/eurostat/databrowser/view/nrg_d_hhq/default/table?lang=en

OVERVIEW ON COLLECTED DATASETS

MORE DATA ARE NEEDED

NAME	CONTENT	AUTHOR/S	DATASET URL
ZENSUS 2011	This dataset contains disaggregated data concerning a building stock analysis for Germany, information about the occupancy of the buildings and socio/economic related data. Information concerning the type of heating systems used are reported too. The goal of the 2011 Census is to provide the most accurate snapshot possible of basic data on the country's population and the employment and housing conditions.	Statistische Ämter des Bundes und der Länder 2020	https://ergebnisse.zensus2011.de/#
DPE - Diagnostic de Performance Energetique	This dataset contains data regarding the distribution of Energy Performance Certifications at a granularity of NUTS3 level in France.	ADEME - Environment and Energy Management Agency	https://www.observatoire-dpe.fr/index.php/graphique/dpeParEtiquette
Towards a sustainable Northern European housing stock - Sustainable Urban Areas 22	This report contains complete data for a building stock analysis with data varying from State to State between 2000 and 2006. Data concerning material used and (heating, ventilation and cooling) systems installed are reported too. Construction/Demolition rates (1980-2004) have been added to the report.	Laure Itard, Frits Meijer - TU Delft	https://www.arct.cam.ac.uk/Downloads/towards-a-sustainable-northern-european-housing.pdf
DEEP - De-risking Energy Efficiency Platform	The De-risking Energy Efficiency Platform (DEEP) is an open-source database for energy efficiency investments performance monitoring and benchmarking. The platform provides an exhaustive analysis on the performance of energy efficiency investments in order to support the assessment of the related benefits and financial risks. more in the detail it could be possible to extrapolate data concerning the energy savings per renovation type or per building type.	Launched by the Energy Efficiency Financial Institutions Group (EEFIG) in the context of its De-risking project	https://deep.eefig.eu/overview

OVERVIEW ON COLLECTED DATASETS

MORE DATA ARE NEEDED

NAME	CONTENT	AUTHOR/S	DATASET URL
Energy consumption and efficiency technology measures in European non-residential buildings	This paper provides an overview on the results of the data collected by the Green Building Program (GBP) and its main results from the launch in 2006 up to its completion in 2014. The paper focuses on building characteristics, energy performance, efficiency measures and energy savings. The paper categorizes the main technological measures related to envelope, appliances and systems.	Delia D'Agostino, Barbara Cuniberti, Paolo Bertoldi	https://www.sciencedirect.com/science/article/abs/pii/S037877881730676X
Dataset of the publication: Europe's Building Stock and Its Energy Demand: A Comparison Between Austria and Italy	Building stock analysis data for Italy and Austria, evaluating also space cooling, space heating and final domestic hot water consumptions.	Pezzutto S., Haas F., Exner D., Zambotti S.	https://link.springer.com/chapter/10.1007%2F978-3-319-75774-2_3
National Housing Census: European statistical System	This dataset contains a variety of data collected in relation to the national census performed in 2011 by EU27+UK member states. More specifically it is possible to find data concerning households such as the number of components of single households at a granularity till NUTS3 level.	Statistical Office of the European Union (Eurostat)	https://ec.europa.eu/CensusHub2/query.do?step=selectHyperCube&qhc=false
Energy prices in 2019 - Household energy prices in the EU	This report provides the households prices both for electricity and natural gas for the second semester of year 2019, comparing these values with the ones of the previous year.	Statistical Office of the European Union (Eurostat)	https://ec.europa.eu/eurostat/documents/2995521/10826603/8-07052020-AP-EN.pdf/2c418ef5-7307-5217-43a6-4bd063bf7f44

OVERVIEW ON COLLECTED DATASETS

MORE DATA ARE NEEDED

NAME	CONTENT	AUTHOR/S	DATASET URL
EUROSTAT: GDP per capita in PPS	Gross domestic product (GDP) is a measure for the economic activity. The volume index of GDP per capita in Purchasing Power Standards (PPS) is expressed in relation to the European Union average set to equal 100 (EU27). If the index of a country is higher than 100, this country's level of GDP per head is higher than the EU average and vice versa. Please note that this index is thought for cross-country comparisons rather than for temporal comparisons.	Statistical Office of the European Union (Eurostat)	https://ec.europa.eu/eurostat/databrowser/view/tec00114/default/table?lang=en
EUROSTAT: Population on 1 January by age, sex and NUTS 2 region	This dataset provides a complete overview of the population of each NUTS2 region of the EU27+UK	Statistical Office of the European Union (Eurostat)	https://ec.europa.eu/eurostat/databrowser/view/DEMO_R_D2JAN__custom_442767/default/table?lang=en
EUROSTAT - Cooling and heating degree days	A complete dataset of the cooling and heating degree days at NUTS2 level is provided both on annual and on monthly basis	Statistical Office of the European Union (Eurostat)	https://ec.europa.eu/eurostat/web/energy/data/database
EDGAR (Emissions Database for Global Atmospheric Research) CO2 Emissions	Carbon Dioxide (CO_2) emissions by country and sector (Buildings, Transport, Other industrial combustion, Power Industry and other sectors) have been collected for the years between 1970 and 2018 and are reported expressed in $MtCO_2$/year.	Crippa, M., Oreggioni, G., Guizzardi, D., Muntean, M., Schaaf, E., Lo Vullo, E., Solazzo, E., Monforti-Ferrario, F., Olivier, J.G.J., Vignati, E. (Joint Research Centre)	https://github.com/openclimatedata/edgar-co2-emissions

OVERVIEW ON COLLECTED DATASETS

MORE DATA ARE NEEDED

NAME	CONTENT	AUTHOR/S	DATASET URL
CORDEX - Regional climate model data on single levels for Europe	Climatic data for Europe expressed in daily, monthly and seasonal mean values as well as 3/6 hours resolution. Data for air temperature at 2 m, wind speed, atmospheric pressure and humidity can be found.	European Centre for Medium-Range Weather Forecasts	https://cds.climate.copernicus.eu/cdsapp#!/dataset/projections-cordex-single-levels?tab=overview
PVGIS - Photovoltaic Geographical Information System	This GIS dataset contains data related to the solar radiation. It takes into account both day and night-time periods expressing the solar radiation raster map in W/m2.	Climate Monitoring Satellite Application Facility (CM SAF)	https://ec.europa.eu/jrc/en/PVGIS/downloads/CMSAF

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TIME FOR QUESTIONS AND ANSWERS

BUILTHUB PROJECT
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IN WHAT THEMATIC AREA COVERED BY THE BUILTHUB PLATFORM ARE YOU MORE INTERESTED?

ARE THERE THEMATIC AREAS RELATED TO THE BUILDING STOCK NOT COVERED YET YOU WOULD BE INTERESTED IN?

DO YOU KNOW WHERE TO FIND SUCH DATA?

BUILTHUB PROJECT
DATA ASSEMBLY BREAKOUT SESSION

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ARE THERE DATA SOURCES YOU KNOW, WHICH MIGHT BE USEFULL FOR THE PURPOSES OF THE BUILTHUB PROJECT?

FOR WHAT PURPOSE WOULD YOU USE THE DATA WHICH MIGHT BE PROVIDED BY THE BUILTHUB PLATFORM?

BUILTHUB PROJECT
DATA ASSEMBLY BREAKOUT SESSION

Thank you for your collaboration!

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