



CommONEnergy



## DELIVERABLE 5.9

Interactive Web-Tool showing scenarios for the energy demand and uptake of renovation activities in the EU commercial building sector

European Commission  
DG Research and Innovation

SP1 - Cooperation

Collaborative project

Large-scale integrating project

FP7-2013-NMP-ENV-EeB

GRANT AGREEMENT No. 608678

*CommONEnergy*

*Re-conceptualize shopping malls from consumerism to energy conservation*



FP7 European Union Funding  
for Research & Innovation



## Technical References

Project Acronym	CommONEnergy
Project Title	Re-conceptualize shopping malls from consumerism to energy conservation
Project Coordinator	Roberto Lollini Accademia Europea Bolzano, Viale Druso 1, 39100 Bolzano/Italy roberto.lollini@eurac.edu
Project Duration	1 October 2013 – 30 September 2017 (48 Months)

Deliverable No.	D5.9
Dissemination Level	PU
Work Package	WP5
Lead beneficiary	TU-Wien
Contributing beneficiary(ies)	N/A
Author(s)	A. Toleikyte, R. Bointner, E. Aichinger
Co-author(s)	N/A
Reviewed by	N/A
Date	24.01.2017
File Name	WP5_D5.9_20170124_P05_Interactive Web-Tool

**This document has been produced in the context of the CommONEnergy Project.**

The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 608678. The content of this document does not reflect the official opinion of the European Union. Responsibility for the information and views expressed in the document lies entirely with the authors.



## Contents

1. Introduction .....	4
2. Aim and objectives of the tool .....	5
3. Methodology .....	6
4. Using the tool.....	7



## 1. Introduction

The CommONEnergy project aims to "re-conceptualize shopping malls through deep retrofitting, developing a systemic approach made of innovative technologies and solution sets as well as methods and tools to support implementation and to assess their environmental and social impact in a life cycle approach." The project encourages the development of sustainable shopping centres by supporting the energy efficient refurbishment of existing shopping centres and providing knowledge, which will foster the efficient planning and design of new shopping centres.

To enable the development of energy saving strategies and recommendations in a framework addressing Europe's shopping centre, there is a need for a comprehensive energy demand analyse and an outlook on future energy demand scenarios.

The potential to reduce energy demand in the shopping centre building stock is strengthened compared with other buildings due to the opportunities to implement cost effective energy saving measures, a very high renovation (redesign) rate and the immaturity of the shopping centre market in many European countries, with expectations for many centres to be built over the next years, with the consequential future energy demand impact.

The non-residential building sector is more heterogeneous and complex compared to the residential sector due to variations in usage pattern, energy intensity and construction techniques. Shopping centre buildings equate this complexity. To meet this challenge, this report aims to

- analyse energy demand for energy services in different shop types and shopping centres built in different periods;
- calculate the final energy demand of the shopping centre building stock in all EU-28 and Norway;
- model the final total energy demand from 2012 to 2030 taking into account new building construction and energy saving while retrofitting the existing building stock.

Scenario results are shown on an online tool that gives a quick, easy and tailor-made access to the results on the energy demand development of the European shopping centre building stock. Moreover, the scenario tool enables to compare the European countries based on different indicators.

The scenario tool is available on the CommONEnergy website at the following link:

[http://commonenergyproject.eu/data\\_mapper.html](http://commonenergyproject.eu/data_mapper.html)



## 2. Aim and objectives of the tool

The scenario tool is an online tool that gives a quick, easy and tailor-made access to scenario results on the energy demand development of the European shopping centre building stock.

There are different indicators showing the energy saving potential and good ground to implement energy efficiency measures.

The aim of the Interactive Web-Tool is to show scenarios for the energy demand and uptake of renovation activities in the EU commercial building sector.

The tool shows the following parameters for EU-28 and Norway:

- Energy demand for energy services in different shop types and shopping centres built in different periods;
- Total final energy demand reduction until 2030 for space heating, cooling, hot water, refrigeration, appliances, lighting and ventilation of the total shopping centre building stock;
- Floor area development from 2012 to 2030 taking into account new building construction.

Scenarios were developed in Task 5.7 “Replication potential in EU-27 + Norway” of the CommONEnergy project and are described in deliverable 5.8 “Replication potential”. The results were visualized using different type of graph. The scenario tool is available on the project website.



### 3. Methodology

Total final current and future energy demand as well as CO<sub>2</sub>-emissions by 2030 in the shopping centre's building stock is calculated using a bottom-up approach. The shopping centres are categorised based on the building period, building size and types of shops in the building. For each category, the specific energy demand for space heating and cooling, lighting, ventilation, refrigeration and appliances is calculated.

Modelling of the future energy demand is based (I) on the development of the shopping centre building stock, taking into account the renovated floor area and new building construction and (II) on the specific energy demand of the installed new technologies for appliances, lighting and refrigeration as well as insulation of the building envelope influencing energy demand for space heating and cooling. Four different scenarios are calculated showing the influence of abovementioned parameters: (1) status quo scenario, (2) energy efficiency scenario, (3) internet sales scenario and, (4) energy efficiency obligations scenario.



## 4. Using the tool

The tool is an extension of the data mapper (see **Figure 1**) which is an online tool giving a quick, easy and tailor-made access to national and comparative international indicators of the commercial building stock. **Error! Reference source not found.** and Figure 3 show a screenshot of the tool. A European country can be selected navigating through the map. Country specific data are displayed below the map.

The tool shows two types of data:

- Country specific data on energy demand scenarios “Target countries”
- Cross-country analysis “EU-28 + Norway”

For each country, the following figures are provided:

- Electricity demand for space heating, cooling, hot water, appliances, lighting, refrigeration and ventilation by different building types
- Share of the total gross leasable area by opening year and shop type in 2012
- Share of the total gross leasable area in 2030 of new buildings built between 2012 and 2030 and existing building stock built until 2012 in different scenarios
- Share of buildings on the total final energy demand in 2012 and 2030. In 2030, new buildings are these built between 2012 and 2030
- Energy carrier share on the total energy demand in the total building stock shopping center in 2012 and 2030, Status quo scenario
- Change in total energy demand for space heating, cooling, appliances, ventilation, refrigeration and lighting from 2012 to 2030 in different scenarios
- Change in CO<sub>2</sub> emissions caused by the space heating, cooling, appliances, ventilation, refrigeration and lighting from 2012 to 2030

In the field “EU-28 + Norway”, the following figures are shown:

- Change in total energy demand for space heating, cooling, appliances, ventilation, refrigeration and lighting from 2012 to 2030 in the European countries in different scenarios
- Energy carrier share on the total energy demand in the total building stock shopping center in 2012 and 2030, BAU scenario
- Share of buildings on the total final energy demand in 2012 and 2030. In 2030, new buildings are these built between 2012 and 2030. BAU scenario



Figure 1 Data mapper available on [http://commonenergyproject.eu/data\\_mapper.html](http://commonenergyproject.eu/data_mapper.html)

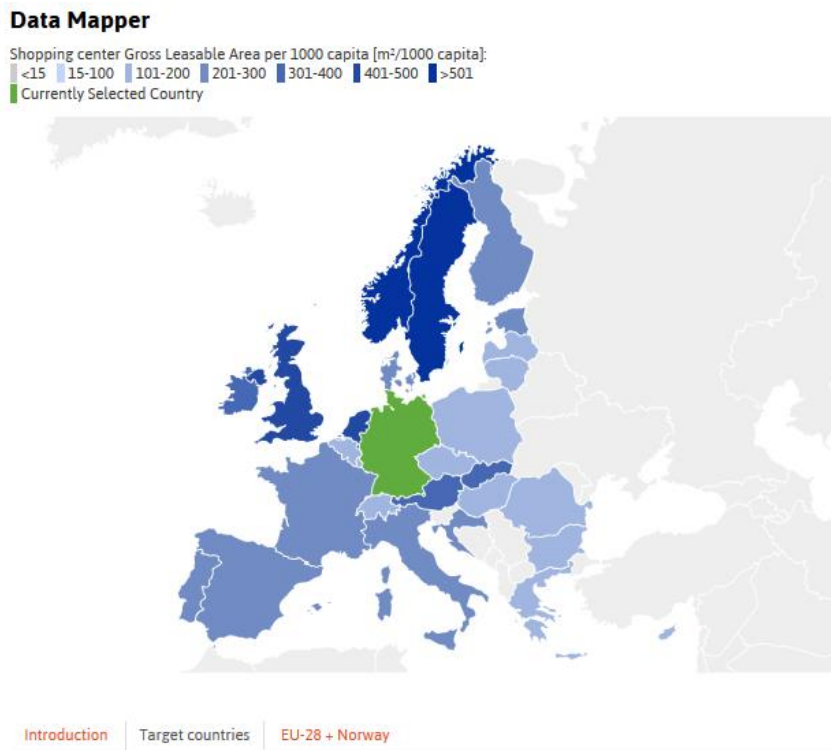
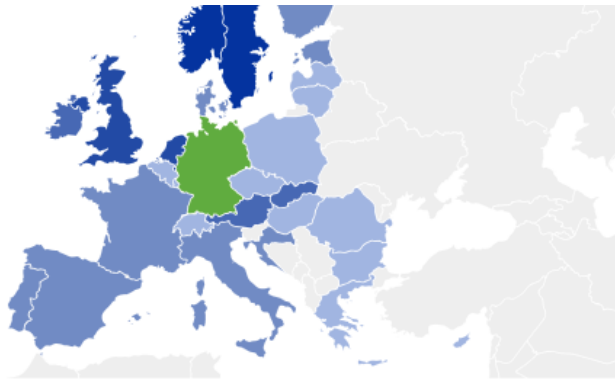


Figure 2 Screenshot of the Online Data mapper showing energy demand scenarios for the European countries





Introduction Target countries EU-28 + Norway

### Germany

#### Annual Energy Demand by service

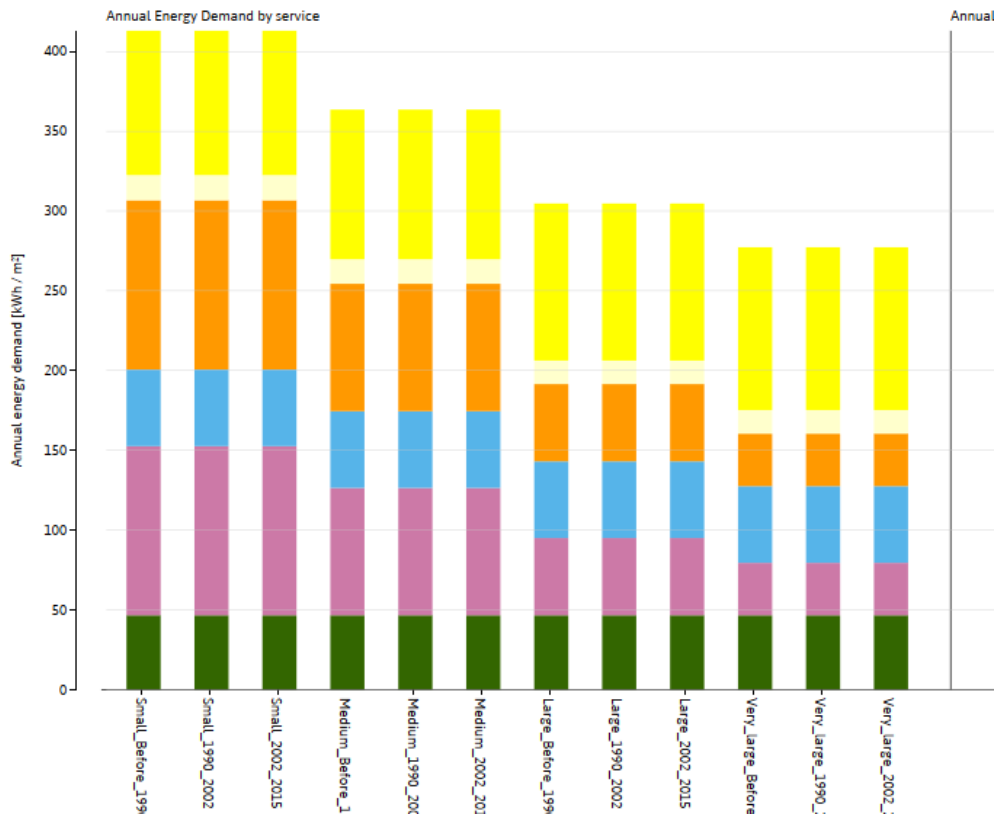


Figure 3 Screenshot showing electricity demand for space heating, cooling, hot water, appliances, lighting, refrigeration and ventilation by different building types