REDAP

REGIONAL ENERGY DEMAND ANALYSIS PORTAL

INSIGHTS FOR SUSTAINABLE, CONNECTED, PROSPEROUS REGIONS

Report to ERA-Net SES, Funders, Need-Owners & Observers.

May 2020

Focus Regions:

Gothenburg (SE)

Dublin (IRL)

Waidhofen an der Thaya (AT)

Consortium Partners:

AIT Austrian Institute of Technology

Codema Dublin's Energy Agency

NUI Galway OÉ Gaillimh

spatial outlook

Chalmers University of Technology

Funded by:

FFG Austrian Research Promotion Agency

seai Sustainable Energy Authority of Ireland

Swedish Energy Agency

Fund Coordinator:

Smart Energy Systems ERA-Net

Understanding the energy pulse of regions

Welcome to this introductory brochure for the Regional Energy Demand Analysis Portal research project, an energy modelling platform which aims to support regional decision-makers during times of significant change. The following sections will explain what REDAP is, why it is required, how it will be developed, along with the consortium's future vision and ambitions for the project.

REDAP is a system for the digital and connected age. It is based on an understanding of the value of cross-boundary solutions for overcoming shared challenges. In this new decade, population growth, energy-intensive lifestyles, climate change impacts along with market and regulatory integration, all underline the critical importance of understanding today's energy demand.

The REDAP consortium is developing an advanced system for analysing the distribution and patterns of energy demand in the building and mobility sectors. This innovation will be achieved by leveraging valuable knowledge, skills and resources from across Europe - including powerful computing infrastructure, authoritative data, and a proven and established reporting methodology. The consortium will also work with a network of front-line energy planning experts who will utilise the REDAP technology to make decisions which will affect the lives of millions of citizens.

By late 2021, we aim to deliver a fully standardised GovTech system - one which can be integrated into existing decision-making processes and replicated across distinct regions. The robust yet adaptable system will provide insights to help unlock value for society. This will include enabling municipalities to tailor and adjust relevant policies and responsive planning strategies, and to invest in and procure the most efficient energy solutions for decarbonised building and mobility sectors. This 'extra layer of decision-making certainty' provided by REDAP will help create regions which are in the future more sustainable, better connected, and more prosperous.

Thank you for your support and interest in the project so far. We look forward to engaging with you in the future in order to ensure that the true value of digitalisation projects such as REDAP is realised for the benefit of all.

The REDAP Consortium Partners,
15 May 2020

This project has received funding in the framework of the joint programming initiative ERA-Net Smart Energy Systems' focus initiative Integrated, Regional Energy Systems, with support from the European Union's Horizon 2020 research and innovation programme under grant agreement No 775970.

The project is funded by the Austrian Research Promotion Agency, the Sustainable Energy Authority of Ireland, and the Swedish Energy Agency. Project partners include the Austrian Institute of Technology (AIT), Codema (Dublin's Energy Agency), the National University of Ireland Galway, SME project-managing partner Spatial Outlook Ltd., and Chalmers University of Technology (Sweden). Need-owners include Codema, the Energy Agency of the Regions (Austria), and City of Gothenburg (Sweden) .

WHY UNDERSTAND DEMAND

Data Analytics - for efficient & low-carbon energy systems.

Situational awareness using data analysis systems is about keeping pace with ever-evolving trends and patterns. It allows decision-makers to develop clear and credible sectoral decarbonisation strategies, to inform and justify policy, plans and actions and to identify the best available solutions. The importance of effective monitoring and reporting on regional energy matters is underlined by the United Nations:

> *"Regular, robust, inclusive, country-led reviews will be fundamental to achieving the [Sustainable Development Goals] SDGs, given their complexity and breadth."*

WHAT DRIVES MODERNISATION

Right development, right place, right time.

Energy system modernisation is often held back by the uncertainty around regional energy demand. This includes district heating, building refurbishment and upgrade, and transport electrification projects which require consistent, accurate and timely insights into the characteristics (i.e. size, type, distribution) of related demand. REDAP will help regions to overcome this challenge by providing actionable insights, clarity, and direction to those involved in the complex decision-making process.

As a starting point, the consortium will build upon an established and proven methodology called Spatial Energy Demand Analysis (SEDA), an evidence-based process for building stock analysis that has been utilised by project partner Codema. Incorporating into this process Austrian and Swedish research, the REDAP system will include a process for analysing transport energy demand along with an improved reporting interface which is tailored to the various end-users' regional context.

"Creating a SEDA has enabled the regional energy use to be understood in a format that the Dublin Local Authorities can understand and is tangible, rather than being conveyed in energy engineering terms. The overlap of other geographic datasets allows insights into the energy sector that are not available anywhere else, and enables an understanding of the socio-economic patterns of the local energy landscape. REDAP builds upon the SEDA process to help the Dublin local authorities (DLA) integrate energy planning into their practices. Codema will use the output portal developed through REDAP to update the SEDAs and to provide greater insight into the energy use of the Dublin Region. The outputs from this project will also be used to update the baseline energy data for both the DLAs' Climate Change Action Plans and the Covenant of Mayor's Sustainable Energy and Climate Action Plans."

Codema, Dublin's Energy Agency

DIGITAL. EFFICIENT. MODERN.

Innovation is about bringing together what exists, to make something better.

Today's regional energy systems have become increasingly dispersed, on-demand and intermittent, with more mobile, more connected energy consumers. For this reason, it is essential to locate, analyse, and understand the complex patterns and distribution of energy demand. In order to develop this energy demand analysis system, the partners will utilise authoritative data, advanced computing infrastructure, data management best-practice, and interoperable standards-compliant software. This will ensure that REDAP is designed to be secure, scalable, and replicable across other regions. It will also ensure that the regional decision-making process is served by digital systems which are efficient, resilient, robust, and flexible.

The research process:

Our consortium will follow a carefully designed process for integrating data, procedures and know-how, and for building a high-quality monitoring and reporting system.

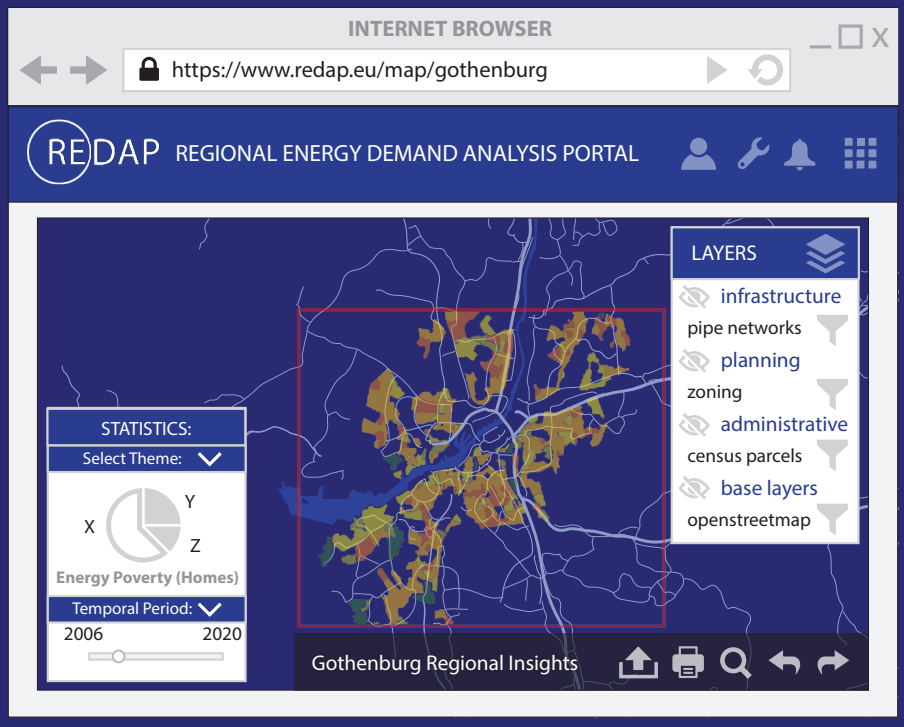
Collate a range of actionable datasets

Integrate with decision-making processes

Develop front & back-end frameworks

Test & Maintain the data-driven system

Deliver relevant, focused insights.



HOW TO INTEGRATE REGIONS

Our focus: engagement, collaboration, cross-sectoral synergies.

To support the development of sustainable, connected and prosperous regions, and to ensure empowerment of regional decision-makers, the priority of our research is integration. This is why we will be developing REDAP for the benefit of geographically distinct European regions - including Dublin, Ireland; Gothenburg; Sweden; and Waidhofen an der Thaya, Austria. Within each of these 'test-bed' regions, the consortium will work with front-line energy planning experts and decision-makers. These ***'Need-Owners'*** have practical insights into the actual 'on-the-ground' energy problems facing their respective regions, as well as an interest to be involved in the development of an optimal solution. With REDAP, this involves helping to remove any existing decision-making barriers which may be caused by a lack of certainty on regional energy demand.

BUILDINGS & TRANSPORT

REDAP will enable users to better understand the complex relationship between sectors which possess distinct energy, infrastructural and timeframe/financial requirements. To do so, we model the '*energy demand landscape*' as static building '*spaces*' and the network '*connections*' between these spaces.

The building component will deliver insights regarding the energy demand of residential and non-residential buildings. This includes estimations on energy use intensity, the type of fuel consumed, average demand and expenditure per building type, along with on regional heat demand densities and areas at risk of energy poverty. These derived results will help inform strategies for retrofitting, energy efficiency improvement and on-site renewable energy generation, synergies between new and old developments (e.g. designing district heating systems networks), as well as to inform medium-large scale plans and energy master plans.

In a similar manner, the mobility energy demand analysis component will enable estimation of regional transport energy density. By analysing information on chosen transport modes and routes, REDAP insights could inform strategies for optimising the location of road-side and in-building recharging infrastructure, for improving public sector fleet management and fuel efficiency, and for developing strategies which accommodate 'shared transport' options.

DIGITALISING TOMORROW'S ENERGY SYSTEM, TOGETHER

This project is driven by an understanding that no one region has all of the answers to today's shared challenges. What is essential, therefore, is that regions work together to ensure that the right insights are provided to the right people at the right time. This will enable decisions to be made which energise regions - making them sustainable, connected, and prosperous. By 2021, our consortium aims to demonstrate to the project funders, need-owners, and observers that REDAP has the potential to become an efficienct, reliable and value-creating digital system.

Until then, we wish to thank you for your continued support and interest in the REDAP project.
For more information or enquiries, visit **www.redap.eu**.

REDAP

Energy demand. Understood.

REDAP

ENERGY DEMAND. UNDERSTOOD.

"Good data is an essential component of good policy making on energy efficiency."

International Energy Agency

"The overlap of other geographic datasets allows insights into the energy sector that are not available anywhere else, and enables an understanding of the socio-economic patterns of the local energy landscape."

Codema, Dublin's Energy Agency

Website & Enquiries: www.redap.eu

Author: Spatial Outlook Ltd. is focused on working with partners and stakeholders to manage the on-going development and improvement of the REDAP digitalisation system.