Smart Energy Systems ERA-Net

EPC4SES Newsletter

January 2022

Dear reader,

The **ERANet-RegSys project EPC4SES - EPC based Digital Building Twins for Smart Energy Systems** launches its second Newsletter. This being the third year of the project, it is about to come to its end by the end of 2022. Therefore, in this newsletter we would like to inform you about the project results and advancements of each Work Package.

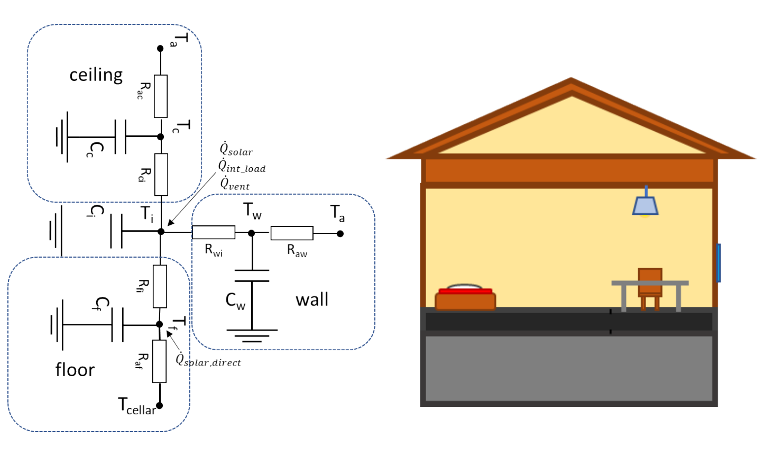
Regional decarbonization plans - as part of good governance - will profit from building data as uploaded into EPC registers. Apart from regional energy planning, data from the EPC process is also valuable for optimizing operation of smart energy systems. The digital twins are a virtual representation of the buildings, allowing simulatipn and model predictive control MPC of the buildings and the whole network. As such usage of renewable energy can be extended, especially if storage might be included in the MPC.

Output and milestones. Key factors and figures

Work Package 3 - Implementation of Research Prototypes (brief description of leaders SUoAS, SEC and WT)

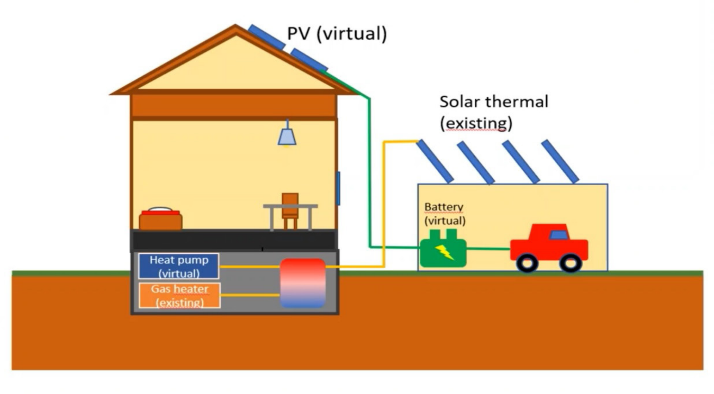
Activities carried out:

- Formulation of research pilots in Kuchl (near Salzburg) and Stockerau (near Vienna).
- Development and evaluation of simplified RC-thermal network model capturing the heat dynamics of buildings (WP3 + WP4).
- Investigation and development of MPC algorithm aiming at utilization of low CO2-emission energy.



Results:

- Development of the three pilots is on their way. The **Berlin** model predictive control was developed for domestic hot water storage tanks, the set temperature for the rooms and the buffer storage for a potential future solar thermal installment on the district network side. Monte Carlo Optimization was used to derive optimal factors, combining the MPC - approaches, resulting in a significant reduction of CO2 intensity. For Berlin and Vienna the buildings are modelled. For Salzburg the building will be represented in a physical scale model.
- The new pilot in the **Vienna** area developes well, the focus is on sector coupling including charging. Apart from the scientific challenge it is important to define a way so wall boxes for charging battery-electric vehicles and heat pumps may be embedded in a sector spanning energy management system.



- Demonstrated XML based RC model, with usage of real weather prognosis and cloud based room temperature sensing for load prognosis and detection of future overheating SEC/EUC.

SUoAS FH Salzburg is a higher education institution located in the federal state of Salzburg, Austria. The Department of Smart Building has been active in research activities related to energy efficient building technology and sustainable development in urban context.

Work Package 4 - Evaluation and Exploitation (lead by WESTERN NORWAY RESEARCH INSTITUTE VESTLANDSFORSKING)

Activities carried out:

- Literature reviews on the evaluation methodology.
- Conducting process evaluation of the project based on literature review, interviews with the project partners and observations.
- Conducting effect evaluation of the project based on literature review, statistics, interviews with relevant stakeholders on national Norwegian level, gathering and analyzing outcomes of the project pilots.
- Preparing and presenting an evaluation draft for the EPC4SES project.

Results:

- Finalized interoperability validation deliverable D4.3 EUC
- Finalized exploitation deliverable and IP securing plan D4.2 SEC and EUC.

The **Western Norway Research Institute (WNRI)** is an international research institute located in Sogndal Norway, with expertise, among others, within energy system evaluation, promotion of knowledge development and sharing, as well as life cycle assessment (LCA). Researchers from WNRI investigate the technical-economic-environmental potential of combining and integrating the existing and planned energy systems, and making best practice in applied smart city research.

MILESTONES - Exploitation Plan for the generated IP, description of SEnerCon

SENerCon drafted the exploitation report, not focusing solely on a paper document - SEC together with EUC confronted stakeholders with six use cases that vary from an individual usage of advanced EPCs by building owners to EPCs and digital twins applied for a whole energy community or an energy supply area. From the stakeholder dialogue, the consortium learnt not only that NGO have dozens of ideas defining detailed applications, but also that some countries/regions are already exploiting data used for EPC for informing building owners and energy consultants, thus paving the ground for high quality energy consulting in the future. However, the situation differs from country to country, in Austria five federal states are having XML schemas, Vorarlberg being the forerunner with the amount of data stored in the XML. The intensity of the data usage might be increasing, especially in countries with good register data base. Common energy data standards and interfaces would be an enabler to enhance the roll-out of EPC4SES on large scale.

SEnerCon GmbH is an energy consulting and software developing company located in Berlin, Germany. SEnerCon has developed various energy software tools that are applied in national climate protection companies of CO2 online. SEnerCon is issuing EPCs on large scale using its own software for asset based EPCs but also offers demand based EPCs and expert energy advice.

Work Package 5 - Knowledge Community (lead by)

Activities carried out:

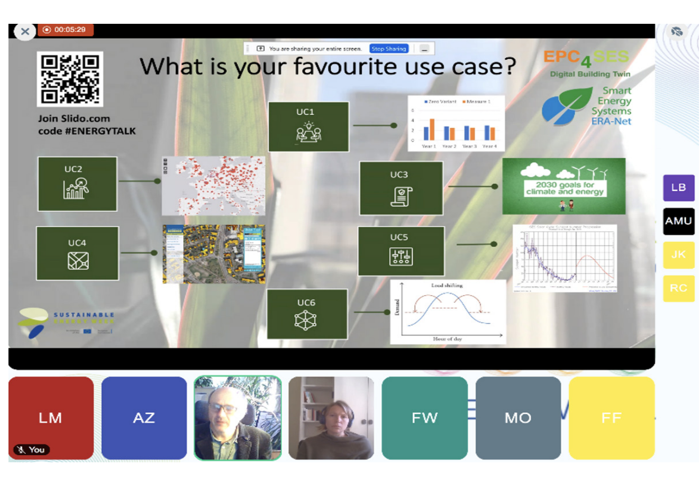
- Participation in the profiling of the project.
- Receiving and integrating feedback to the project.
- Participation in ERANET RegSys Working Groups.
- Contributing to Living Documents.
- Cooperation on communication and dissemination activities of the knowledge community.

WP5 aims to support the cohesion approach within ERANET RegSys community. **CLEOPA GmbH** is a consulting SME in the fields of energy and resource efficiency with a longstanding experience in event organization, scientific communication & dissemination. Cleopa has designed and implemented the communication plan and has proactively engaged and supported partners in participating to international conferences and workshops. Cleopa has actively participated in ERANET RegSys Working Groups, supporting and monitoring partners' participation.

Events & Conferences

Below there is an overview of a selection of events in which EPC4SES has participated:

- **Co-creation workshop ERANET**
  6th September 2021
- **Scientific dissemination at 'Energy and Climate Change Conference'**
  Promitheas, Athens - 14th October 2021



- **EUSEW 2021 Energy Talk** - We presented EPC4SES services and solutions to an audience of experts coming from different backgrounds. Around 50 attendees have registered and more than 100 stakeholders were reached in a 1:1 dialogue.
  28th October 2021
- **ERANET JPP 'Status Conference: Outstanding achievements and contributions of JPP SES projects'.** The Consortium organized an hour of dissemination in which the partners contributed (ENOVA, SUOAS, SEC; WRNI, EUC). The conference started a second cycle of WGs participations on the Expera platform.
  24th November 2021

  We are proud that we could include ENOVA in a conference presenting application of data collected within the EPC process in Norway.

Progress

75%	100%	70%	50%	75%
WP1	WP2	WP3	WP4	WP5
Project management	Specification System Architecture Verification	Implementation of Research Prototypes	Evaluation & Exploitation	Knowledge Community

What is your favorite use case?

EPC4SES aims to make usable the buiding data generated by the energy performance certificate software. In some Austrian regions and in Germany, a standardized XML format is used for this purpose. The availability of the data also plays an important role, i.e. authorities or providers of energy performance certificates must create the conditions that building owners always have the building data from the energy performance certificate easily available electronically. Below a presentation of six possible use cases for data collected in the EPC process and stored in a standardized format. Each use case scenario imply a multilevel perspective of implementatipn ranging from individual to regional scale. You can enter your favourite use case here:

http://uc.smartenergy.nu/

UC1 Energy Consulting Buildings	**UC2** Support of Market Development	**UC3** Support of Energy Policy
UC4 Pre-planning of Energy Systems	**UC5** Building Energy Management	**UC6** Central Load Forecasting

Project lead by effiziente.ST Energie +Umwelt Consulting

effiziente.st Energie - und Umweltconsulting e.U. is located in Graz, Austria. Focusing on energy informatics, effiziente.st is the project leader and product owner and as such has lead two papers and is active in the ERANet WGs. Effiziente.st has developed several MPC models in 2021 and validated the use of the XML data, generated by different EPC software .

Wellness TechGroup SEnerCon ENOVA
WESTERN NORWAY RESEARCH INSTITUTE VESTLANDSFORSKING innovation www.cleopa.de FH Salzburg

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