

#1/2021

Newsletter



Dear cross-border colleagues,

Dear friends of sustainability research in the Upper Rhine region,

In this fourth newsletter edition, we would like to present to you the main results of three of our work packages and provide you with more information about the events that have taken place over the past four months. This includes two workshops and a mid-term colloquium attended by more than sixty participants.

In this issue, we also share information about the project's future development plans.

We wish you happy reading!

The RES-TMO Coordination Team in Freiburg



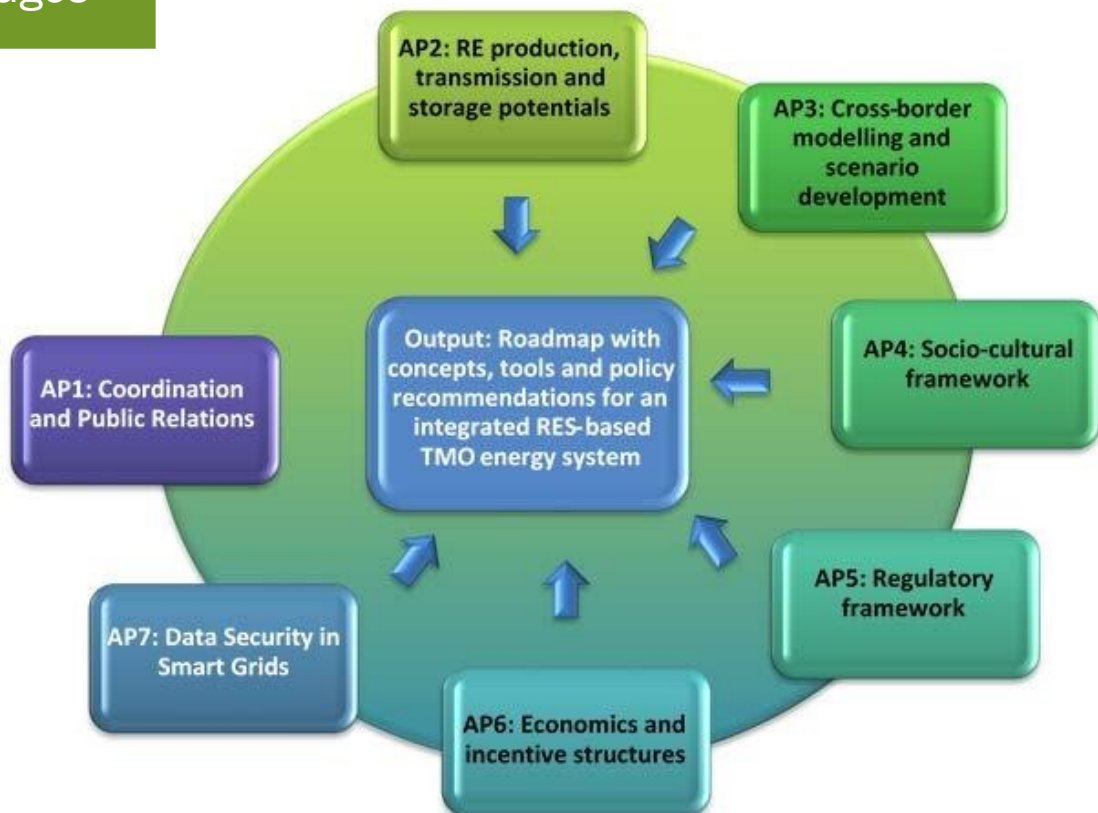
RES-TMO is a three-year project funded by Interreg V Upper Rhine and it was developed in the framework of the Upper Rhine Cluster for Sustainability Research (URCforSR). The project aims to accelerate the energy transition by uncovering synergies from complementary generation, demand and storage capacities as well as cross-border energy initiatives in the trinational Upper Rhine metropolitan region.

The work of the RES-TMO project is organized around seven work packages, or WPs in short. In this issue, we will give a short update on the work of three WPs for the last 2 years (WP2, WP3 and WP4). Detailed information on the project can be found on [our website](#), where you can also find our [previous newsletters](#).

During the mid-term colloquium on 1 December 2020, we took stock of the project work and the results of each work package were presented by the project researchers and discussed together with more than sixty participants. The event took place online in both French and German with simultaneous translation.

The discussions were fruitful based on the fact that the attendees were from different areas, including science, business, politics, and civil society. The event was organized by the project coordination office together with the trinational energy and climate network of the Upper Rhine, TRION-climate e.V.

Work packages



The keynote speaker was Mr. Georges Walter, Director of Environment at the Conseil Départemental du Haut-Rhin, France. The first part of the online event was focused on the analysis of production and storage potentials of renewable energy as well as energy system modelling using two different methodologies and the second one on the sociocultural, regulatory and economic aspects of the development of an integrated, regional and RES-based energy system.

Following the presentation series and related discussions, the main conclusion of the event was that the energy transformation will be enabled by the facilitation of cross-border cooperation, which provides opportunities for local energy stakeholders and considers diverse technological and social aspects.

More information about the event as well as the presentations can be found on the [project website](#).



3. Workshops

Over the past four months, we held two online stakeholder workshops, which we had announced in our previous newsletters.

Citizens as Prosumers: Legal Status, Rights, Involvement in the Energy Transition (7 October 2020)

The second workshop organized by the SAGE laboratory (WP4 and WP5) and the coordination office of the University of Freiburg brought together 30 key regional stakeholders from France, Germany and Switzerland.

Three presentations were held by: Damian Wimmer from Energieagentur Regio Freiburg, Rémi Bastien, co-founder of Enogrid (Paris) and Christian Moll, responsible knowledge management at Swissolar (Zurich).

Each expert emphasized the impact of the respective national regulations (DE, FR, CH) on individual and collective energy consumption. Participants also had the opportunity to engage in discussions with the speakers. The key message emerging from this workshop was that the best way to promote small-scale renewable energy projects is to develop appropriate decentralized structures, and that the development of a viable market model needs to take into account the distribution of resources and taxes.

More information about this event can be found on our [website](#).

Regional energy resilience and decarbonization through decentralized RES: pathways, technologies, regulations, challenges (10.11.2020)

RES-TMO's third cross-border workshop was held online on 10 November 2020 and hosted by the coordination office of the University of Freiburg. 26 stakeholders from France, Germany and Switzerland took part and discussed regional energy resilience and decarbonization through decentralized renewable energy systems. Prof. Bruno Burger and Dr. Christoph Kost from Fraunhofer ISE, Peter Majer from Badenova, and



Etienne Sorin from EDF gave insightful presentations about viable ways to transform the national energy systems using renewable energy and related system flexibility technologies, including storage, by 2050. They highlighted both the opportunities and the challenges that will be faced in doing so.

After the expert presentations, the workshop participants were split into two breakout groups, where they had fruitful discussions about storage needs, the management of energy surpluses, the challenge of matching supply and demand and maintaining power grid balance at all times under increased RES penetration rates as well as the different types of storage technologies, including hydrogen-based technologies.

The main conclusion of the workshop was that the switch from the current system to one with a high share of renewables requires strong policy, economic and technical support, as well as a multi-service and multi-technology approach with interventions at multiple levels.

More information about this event can be found on our [website](#).



4. Updates on the Work in different aspects of the project

WP2: Analysis of renewable energy generation and storage potentials

Within this work package, the focus has been on the extension of the spectrum of renewable energy sources and, in particular, the solar energy potential. The solar energy potential can be divided into open space and roof area potential. So far, the focus has been on the latter. For this purpose, the housing stock was first determined uniformly for the region using OpenStreetMap data. From the determined floor plans of the buildings, statistical distributions of roof pitch and orientation were used to estimate the area available for photovoltaic panels. Further refinements of the technique, for example the classification of buildings into use categories (e.g. residential, industrial, agricultural) and their distinctions in terms of statistical roof area distributions are planned.

The freely available PVMAPS tool was used to calculate the solar irradiance in high resolution for different sloped surfaces. By combining the solar irradiance with the available area, a first estimation of the energy generated by solar rooftop photovoltaics could be made taking into account technical factors (e.g. conversion efficiency). The key finding so far is that there is a significant potential for the generation of electricity by photovoltaic modules installed on roofs.

WP3: Modelling and scenario development of TMO energy system

Within this work package, three models are being developed or adapted in order to understand the effects of different energy scenarios in the TMO on the European, regional and end user level. The main activities include:

- 1) The European energy system model (“PERSEUS”) was extended in the GAMS mathematical modelling language by including the TMO as a separate market zone.
- 2) The model of a microgrid was developed in MATLAB-SIMULINK that resembles a real microgrid installed on the campus of UHA. The model balances electricity production and consumption with a focus on decentralized energy production. With this model, different production and consumption scenarios are simulated. The model will be extended to the TMO.
- 3) The Regional Energy Planning Model (REPM) was extended by new storage system alternatives, backup, and methods for capacity sizing and cost calculation. The new version was tested to analyze scenarios of intermittent energy penetration into the mix, initially of the Grand-Est region of France. The scenarios show that a significant storage capacity and an overproduction of intermittent energy is required in order to reduce the backup needs to zero.

The challenges that were faced are related to the availability of hourly energy demand data for the whole Upper Rhine region. Due to the health crisis, scenarios could not be conducted at the university site of UHA.

To mitigate this issue, scenarios planned as experiments were conducted as simulations.

WP4: Analysis of socio-cultural framework conditions and integration of stakeholder perspectives

In order to ensure a solid empirical basis for the analysis of the socio-cultural conditions for the development of a renewable energy market and a better integration of the points of view of the territorial stakeholders of the Upper Rhine's tri-national energy sector, WP4 conducted more than 40 interviews with these key actors and studied two citizen energy initiatives: the Centrales Villageoises de Saverne and Zussamme Solar Colmar. Three cross-border workshops were also held on citizen renewable energy projects, on the status of prosumers, on regional energy resilience and decarbonization (see 3. above). The participation of speakers and multiple stakeholders enabled fruitful exchanges.

In 2020, in addition to the working paper reporting the first results of WP4 on the RES-TMO website, a presentation was held at the International Seminar on Environment and Society in Lisbon and an article in the magazine Etopia was published. Finally, a collective publication project is in progress.



5. Upcoming events

- Fourth Stakeholder Workshop, 9 March 2021: Regional energy resilience via distributed RES and the role of smart grids / microgrids: challenges and opportunities. Speakers TBC.



6. References

- Philippe Hamman, Marie Mangold, « Les coopératives énergétiques, levier de transition écologique ? Quelques réflexions comparées France-Allemagne-Suisse-Belgique », Revue Etopia, n°14, 2020, pp. 137-174, en ligne : <https://etopia.be/books/revue-etopia-15-lecologie-politique-pour-inventer-le-xxie-siecle/>



Concepts for an Integrated, Efficient and Sustainable Energy Supply and Storage in the Upper Rhine Region

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