RES-TMO

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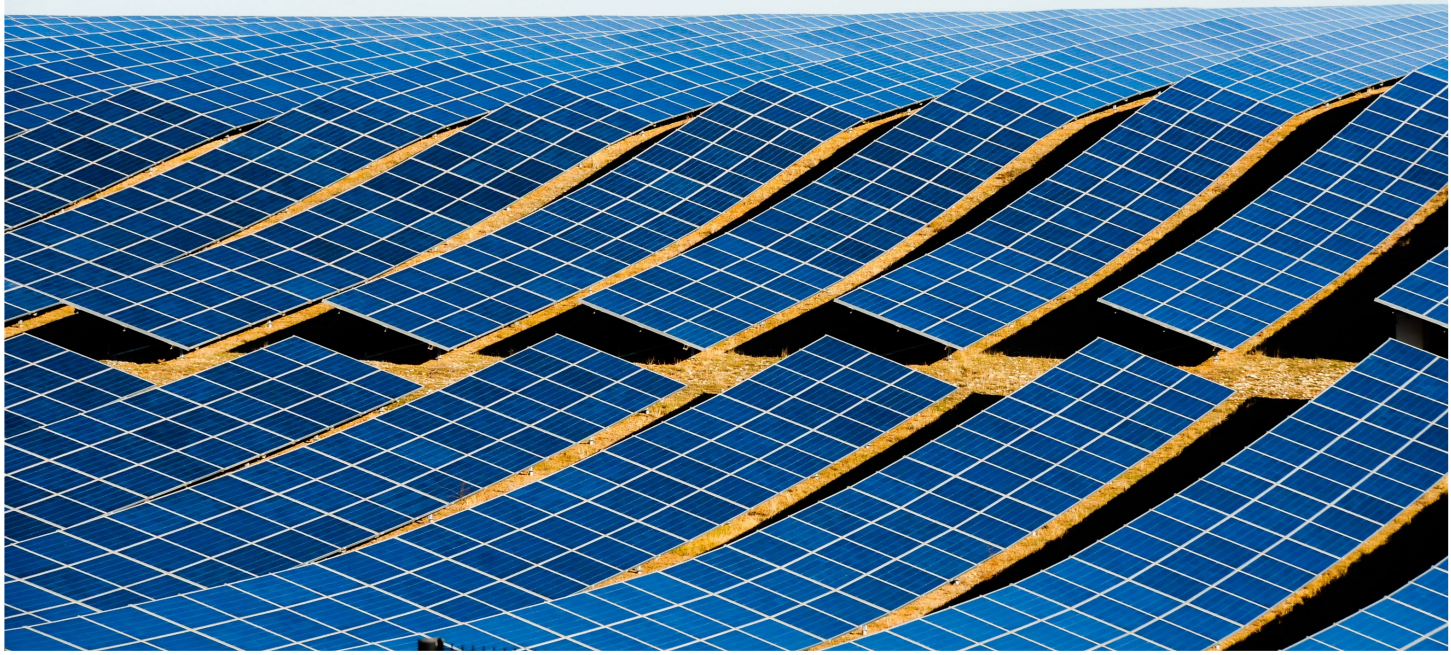
Newsletter



Dear cross-border colleagues,
Dear friends of sustainability research in the Upper Rhine region,

In this second newsletter edition, we are sharing insights from the project work that was conducted during the COVID-19 pandemic, our challenges and adaptive solutions. In addition, we present information regarding upcoming events and project outputs. In this issue, we also introduce the work of two of our seven work packages.

We wish you happy reading!

The RES-TMO Coordination Team in Freiburg

1. Project overview

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 the synergies arising 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 be updating you on two of these: WP2, which analyzes renewable energy generation and storage potentials; and WP3, which models the TMO energy system and explores transformation scenarios and pathways. Detailed information about the project can be found on our website, where you can also find our previous newsletter.

2. Project updates

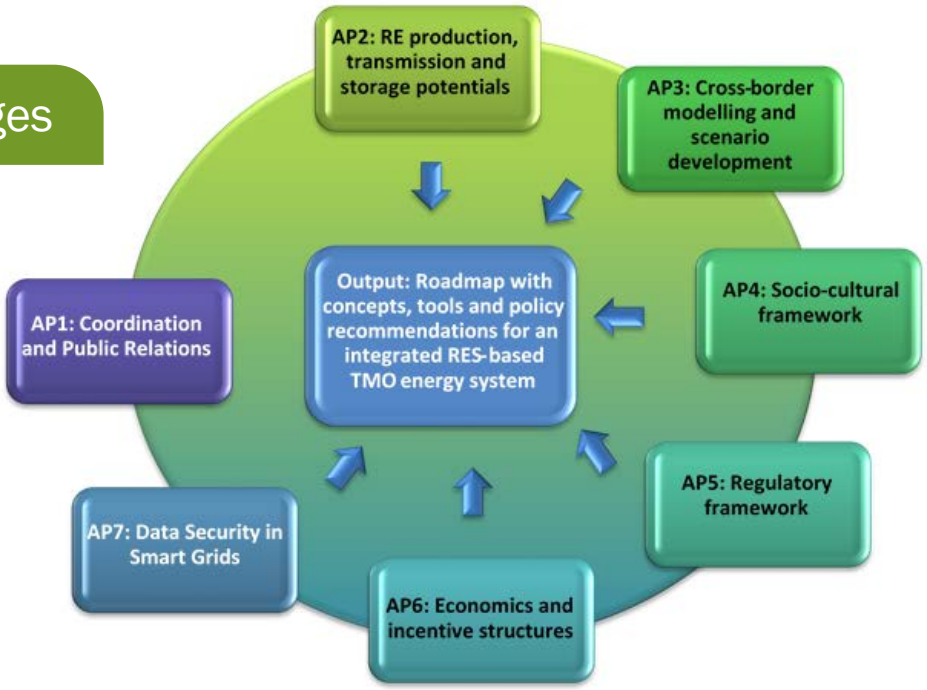
WP2: Analysis of Generation and Storage Potentials

A general overview of the Work Package can be found on our website.

Project status: This workstream of RES-TMO aims to estimate the renewable energy potential in the TMO based on a consistent cross-border database. To date, much of the work has focused on literature reviews and data collection, in order to assess the renewable energy potential of specific locations (e.g. Baden-Württemberg, Germany; Région Grand Est, France).

Diverse datasets have been collected and combined, including data on infrastructure, land use and protected areas for nature conservation, and online-platforms such as OpenStreetMap and GeoRhena.eu are also being used. In a subsequent step, the different GIS data layers are combined with meteorological data on the availability of renewable energy sources (RES) to estimate the geographical potential. >>

Work packages



Data sources include the online PVGIS tool for solar and wind energy potential, the Windspeed Windshear (WSWS) statistical model, and geothermal energy potential information (from Baden-Württemberg State Office for Geology; the Information system for near-surface geothermal energy Baden-Württemberg (ISONG) for shallow geothermal; the Geopotentiale.org Interreg project for deep geothermal energy).

Data has also been collected on electrical demand and grid infrastructure. Due to the transnational concept of the project, problems have arisen from the multiplicity of actors dealing with energy and grid infrastructure in the TMO. This has resulted in strong variations in data availability and quality, making data harmonization a key next step in the project.

In this context, data exchange with TransnetBW has been established, giving us access to the current transmission grid structure and information to downscale the electrical load on a regional level. Electrical load in hourly resolution in Baden-Württemberg has been collected from the transparency platform of ENTSO-E, the European Network of Transmission System Operators (TSOs), bringing together and representing at EU level 43 electricity TSOs from 36 European countries. Data collection for France and Switzerland is also underway. Heating demand data is so far only available for Baden-Württemberg and only on a yearly basis, as provided by the Regional Office for the Environment in their energy atlas. Storage of energy in gas form in existing infrastructure is also being investigated.

WP3: Modelling and Scenario development for TMO Energy System

A general overview of the Work Package can be found on our website.
Project status: WP3 has reviewed several sources of local electricity provision in the Upper Rhine region. Conventional power plants in the three countries have been identified. The river Rhine accounts for an important source of hydropower, as a high number of run-of-river plants are installed here providing relatively reliable base-load. Local profiles for wind and photovoltaic electricity production were derived from a regionally resolved dataset. Simulation results from the meteorological model WRF (Weather Research and Forecasting) were also performed for the region for the years 2010 and 2018, in order to detail these solar and wind potentials. Pumped-storage units in the south of the Black Forest will be needed to balance increasing intermittent renewable energy generation. In order to define the transmission capacities to the adjacent countries, data from electricity grid representations have been analyzed. For future scenarios, the Ten-Year Network Development Plan (TYNDP) published by ENTSO-E and national grid development plans will be included into the analysis with the PERSEUS model.

Main activities:

- New version of regional Energy Planning Model (EPM) including new storage system alternatives, backup, sizing and costs calculation was developed.
- The sensitivity of storage, and energy generation technologies to different parameters was studied.
- An analysis of trends for the costs and main operation parameters is being developed to evaluate the trends of the costs up to 2050.
- A smart building model is also in progress to model consumption behavior and renewable energy needs. The model can be extended to a regional scale.

Collaborations: WP2 and WP3 researchers work closely together and exchange on a regular basis, since data and results from WP2 flow into the modelling exercises conducted within WP3.

3. Changes due to COVID-19

The COVID-19 situation and self-isolation have deeply altered the workflow of many organisations and projects, and RES-TMO is no exception in this regard. We summarize here some of the key changes:

- 2nd Stakeholder Workshop: Initially planned for 28 May 2020 in Strasbourg. It is now being moved to an online platform and will take place on 7 October 2020. Organizers: WP4, WP5 and Coordination Office.
- 3rd Stakeholder Workshop on energy decarbonization pathways, related technologies and challenges: The event is currently planned for 10 November 2020 online, and is organized by the Coordination Office.
- RES-TMO Mid-Term Event: Currently being planned as a major event for 1 December 2020 and organized in Freiburg by the Coordination Office and TRION-climate. The event will, conditions allowing, take place in person with corresponding security measures. It will bring together over 100 representatives from policy, industry, academia and civil society, and offer them insights into the project's work.

4. Upcoming publications (WP2-WP3)

- Chapter in RES-TMO collective book coordinated by WP4 (Editors: Philippe Hamman, Marie Mangold, University of Strasbourg): Ines Gavrilut, Felix Kytzia, Kristina Izmailova, Barbara Koch, Johannes Miocic, (University of Freiburg); Adrien Barth, Nadège Blond, Alain Clappier, Marco Guevara (University of Strasbourg). Synthetic overview of energy system models and decarbonization pathways for the (EU) energy sector: scenarios, technologies, policy.

- Johannes Miocic. Shallow geothermal energy potential of Baden-Württemberg.

- Johannes Miocic. Hydrogen storage in geological formation – scientific challenges of the energy transition.

5. Policy Changes and Challenges

COVID-19 and a Green Europe

The scale of the economic crisis linked to the COVID-19 pandemic in Europe has triggered the European Union to take action to help all member states. The European Commission has made clear that measures would be part of a green recovery and would be in line with the goals of the European Green Deal. The outcome, so far, has been the "Next Generation Europe" support package of €750 billion, which includes funding for a large-scale renovation of buildings and infrastructure, a more circular economy, energy transition via renewable energy projects, and sustainable mobility[1]. On the downside, COVID-19 has delayed a large number of environmental initiatives at the EU level considered "less essential"[2].

Shifts in the energy landscape: less nuclear and fossil fuels

The two reactors of the French nuclear power plant (NPP) in Fessenheim were shut down this year – the first in February and the second in June 2020 (Tagesspiegel 2020). The Philippsburg nuclear plant was already shut off at the end of December 2019. Two major sources of electricity in the TMO valley are thus not available anymore.

After the introduction of tenders for renewable energy capacities in Germany, the installation of wind turbines in Baden-Württemberg has almost come to a complete stop, as locations in the south are structurally disadvantaged (ZSW 2019). In general, onshore wind energy expansion struggles with acceptance issues. This has consequences for the expansion of renewable energy generation in the TMO as well. Under those circumstances, local RES targets will be more difficult to achieve.

Credits: Leonid Andronov

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1 https://ec.europa.eu/commission/presscorner/detail/en/ip_20_940

2 https://www.euractiv.com/section/energy-environment/news/leaked-full-list-of-delayed-european-green-deal-initiatives/

Minimum distances for onshore wind turbines from housing

In May 2020, the German government weighed in on the long-lasting debate in Germany on prescribed minimum distances for onshore wind turbines to housing. It decided against introducing a general and universal minimum distance, and instead passed the decision on to the federal states. Current legislation varies significantly between federal states. In Baden-Württemberg, distances of 700 m must be established between wind turbines and housing infrastructure, though this value can be adjusted in specific cases. In Rhineland-Palatinate, a fixed minimum distance to housing infrastructure has also not yet been established.

As of now, it is unclear how this will evolve. In November 2019, the government of Baden-Württemberg positioned itself against the introduction of a generalized minimum distance, in an effort to avoid further endangering the expansion of wind energy. Indeed, in the past years, the growth of onshore wind energy has slowed due to both legislative reasons and residents' opposition. The introduction of a universal minimum distance between wind turbines and housing infrastructure would have had a significant negative effect on the expansion of onshore wind energy in Germany. This discussion not only influences the wind energy potential by setting the legislative framework, but also the social acceptance and economics of wind energy. These are critical points for the RES-TMO project, and its transdisciplinary nature will allow the project team to shed light on these issues.

6. Further Reading

European Commission (2020). Europe's moment: Repair and prepare for the next generation. Press release. 27.05.2020. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_20_940

Tagesspiegel (2020). Zweiter Reaktor im Akw Fessenheim wird heruntergefahren. [Second reactor in the Fessenheim NPP is being shut down], 29.06.2020. Available at: https://www.tagesspiegel.de/wirtschaft/franzoesischer-pannen-meiler-stellt-betrieb-ein-zweiter-reaktor-im-akw-fessenheim-wird-heruntergefahren/25960590.html

ntv (2020). AKW Fessenheim ist endgültig vom Netz. 30.06.2020. Available at: https://www.n-tv.de/wirtschaft/AKW-Fessenheim-ist-endgueltig-vom-Netz-article21879579.html

ZSW (2019). Monitoring der Energiewende in Baden-Württemberg. Available at: https://www.zsw-bw.de/uploads/media/Monitoringbericht_2019_barrierefrei.pdf.

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IRENA (2020). Renewables Increasingly Beat Even Cheapest Coal Competitors on Cost. Retrieved from: https://www.irena.org/newsroom/pressreleases/2020/Jun/Renewables-Increasingly-Beat-Even-Cheapest-Coal-Competitors-on-Cost

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

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