

Microgrid benefits north macedonia

With a population of just over two million people, the small Western Balkan country of North Macedonia is already punching above its weight when it comes to renewable energy. Even though the country has historically been dependent on lignite coal mining for around 30% and gas imports for an additional 15% of its electricity production, it has nonetheless set very ambitious goals for decarbonization.

As part of the Powering Past Coal Alliance, North Macedonia has committed to a coal phase-out by 2027. It was also the first contracting party to the Energy Community to complete a National Energy and Climate Plan (NECP)--committing to increase the share of renewable energy sources in its gross energy consumption to 38% by 2030.

And the country is well on its way to achieving these goals. The Oslomej solar park, built on a former lignite open pit mining site, is already partly operational and will have an installed capacity of 120 MW when fully completed. There are also a series of auctions for solar power investments to ensure more solar PV projects in the pipeline.

However, despite its small land area, North Macedonia also stands out as a biodiversity hotspot, housing a significant portion of Europe's biodiversity. This includes 64% of the continent's bird species and 34% of mammal species--all on an area smaller than 0.3% of the European subcontinent.

Like others in the region, North Macedonia must balance its need to rapidly accelerate the transition to renewables to secure its energy future with the need to ensure that future is one where both the country's nature and people thrive.

Seeing the country's forward-thinking approach to renewables and natural beauty, The Nature Conservancy (TNC) identified North Macedonia as a prime candidate for the implementation of the smart siting approach currently being undertaken in Croatia and Serbia as well. Because the science and art of successful renewable siting requires consensus, TNC partnered with the Macedonian Academy of Sciences and Arts and NGO Ekosvest to undergo an extensive stakeholder consultation to help inform the scope of the analysis.

Feedback from these engagements underscored the importance of integrating low-impact energy siting into spatial planning, engaging local communities in energy projects, preserving habitats and articulating the overarching benefits of renewable energy. Moreover, there was an emphasis on prioritizing development on degraded land and avoiding high-value agricultural land.

The results of the study are unambiguous: North Macedonia has an enormous untapped potential for renewable energy development. Even when completely excluding all important bird and plant areas, the potential comes to as much as 11 GW for solar PV and 0.35 GW for wind. This means that if only a half of

these priority locations were built out, they could produce 7.7 terawatt-hours of electricity per year--which exceeds North Macedonia's current electricity consumption and could even fully cover the estimated electricity consumption in 2030 under the energy efficient scenario of the NECP.

By prioritizing development in brownfields, degraded and converted lands that also boast strong energy potential, the country can easily meet its renewable energy targets without impacting nature. It can also ensure that the jobs created by new wind and solar installations stay in the former mining communities so that no one is left behind in the transition.

The initiative undertaken in North Macedonia is a template that can be scaled and replicated across the region, provided there is robust political commitment and a clear strategic direction. Capitalizing on brownfields, degraded and converted lands for an ecologically sensitive and just energy transition presents an opportunity not only for sustainable energy generation, but also for restoring and repurposing land that has lost its primary utility.

With this in mind, we put forth the following recommendations:

We recommend integrating detailed maps that highlight brownfields, degraded, and converted lands into critical planning documents. Specifically, forthcoming iterations of the Energy Strategy of North Macedonia, the National Energy and Climate Plan (NECP), and plans for site-specific renewable energy auctions should consider these maps. The maps don't merely depict potential renewable energy sites, but also paint a picture of how energy scenarios can pragmatically evolve on the ground. By incorporating these insights, the government can craft well-informed, actionable policies that align with ground realities and future energy goals. The national government should also remove any legal barriers to siting renewables on mine sites and degraded land.

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