European Commission

Why do the final steps toward 100% renewables feel the heaviest?

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Setting the stage: from ambition to complexity

- **The closer we get to 100% RES, the steeper the path becomes…**
  Getting to 20% RES is about adding capacity. Going beyond 60%, 80% or more means dealing with **system-wide transformation**.

- **… and the need to balance four perspectives is always there, but it gets tougher**
  - *Economic viability*
  - *Technical feasibility*
  - *Environmental sustainability*
  - *Social acceptance*

Ventotene Island, Italy

Follower Islands program

- Protected natural and environmental heritage
- Symbolic site for the European hystory
- High RES potential (solar and wind)
- Currently powered by diesel generation
- ~2.7 GWh annual electricity consumption
- High energy use peaks driven by seasonal tourism

More renewables,
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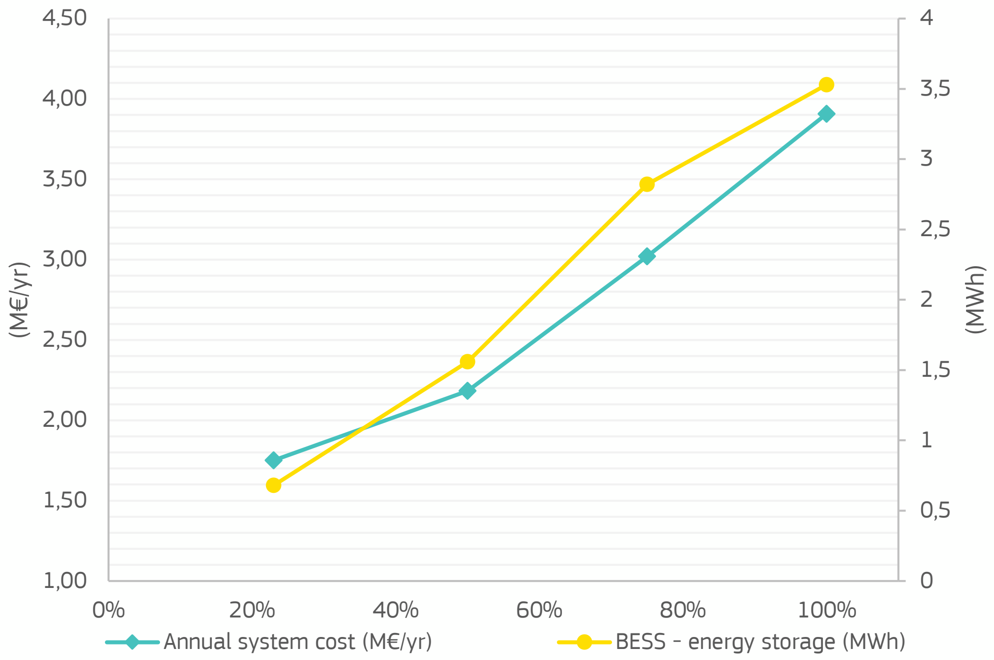
Techno-economic perspective



Annual system cost and battery size vs. RES penetration

Pushing further increases both system cost and storage needs exponentially.

Socio-environmental perspective

- Initial steps rely on available, low-impact areas.

- But as RES penetration increases, new projects may require **more contested land**, touching on **natural heritage**, **local values**, and **social acceptance**.
  In short: each step forward becomes more sensitive.

Real decisions, real constraints: the case of Ventotene

PV on former ash deposit (under remediation)

📍 **Location:** Brownfield site (repurposing polluted land)

🌱 **Environmentally positive**: valorises degraded area

⚙️ **Technically complex**: far from grid; risk of voltage instability

💰 **High connection cost**: ~€250k due to remote location

🌿 **Proximity issue**: near a **bird ringing and observation centre**

🎯 **+ PV (100 kWp)**

PV on playground area

📍 **Location:** Near existing diesel power

⚙️ **Technically optimal**: easy integration, minimal losses

💰 **Cost-effective**: low connection and infrastructure cost

👫 **Social concern**: space currently used as playground

🌍 **Cultural/environmental constraint**: adjacent to a **site of high historical value** for European history

Conclusions

- **The further the energy transition goes, the more complex the decisions become.**
- **Globally optimal solutions may no longer be possible.** Optimality depends on how well we balance **technical**, **economic**, **environmental**, and **social** dimensions.
- **Complex trade-offs must be acknowledged, not avoided.** Every additional RES project requires deeper dialogue and careful design.
- **Bottom-up engagement becomes essential.** Open participation is essential to build solutions that reflect all the dimensions and perspectives of the energy transition.

Key questions the community has faced

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1. **Would you approve the installation of a PV plant on a children's playground, knowing that playground fundings could not be secured within the next two years?**
2. Is it acceptable to install a PV plant near a site of major historical value for Europe, if it allows lower costs and better technical integration?
3. Would you place PV on a former ash deposit under remediation, even if it involves much higher connection costs and complex grid integration?
4. Is it acceptable to install a PV plant near a bird ringing and observation centre, if the land has no other social use and is already degraded?
5. If you could only choose one, which site would you use for the 100 kW PV plant?

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Thank you!

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