EKN’s and SEK’s Scientific Climate Council: Notes – 3 February 2026

About EKN’s and SEK’s Scientific Climate Council

The Scientific Climate Council is an advisory expert body whose purpose is to guide the Swedish export finance system in aligning its operations with the objectives of the Paris Agreement and the 1.5-degree target. The Council serves as a knowledge resource and discussion partner for EKN and SEK on matters of principle.

Meetings of the Climate Council are held under the Chatham House Rule. These meeting notes aim to reflect and summarise the key messages and insights that EKN and SEK take forward from the discussions.

Participants – 3 February 2026 (in-person meeting)

Climate Council: Måns Nilsson, Linda Styhre, André Månberger

SEK: Magnus Montan, Mattias Hasselbo, Maria Simonson, Annika Ahlgren

EKN: Åke Nordlander, Peter Tuving, Karin Wessman

Key questions for the Climate Council’s twelfth meeting

- **The role of energy storage in the climate transition**
  What role does energy storage play in the climate transition in terms of replacing traditional backup power, managing cost and technology shifts, and influencing the development of electricity markets?
- **Geopolitics and climate**
  How does the geopolitical landscape affect the climate transition, and what consequences may this have in the short and long term?

Key takeaways – The role of energy storage in the climate transition

- Energy storage is a system-critical component of the energy transition. Its development is driven by increasing demand for electricity, energy and system flexibility, combined with the rapid expansion of solar and wind power.
- Energy storage can be categorised into: mechanical storage (surplus electricity is used, for example, to produce hydrogen or pump water into reservoirs), thermal storage (solar thermal energy) and electrochemical storage (battery systems).
- Batteries currently dominate the energy storage market but are mainly used for short-duration storage (up to a few hours). Other technologies are better suited for storage over several days or weeks.

- High costs and uncertain revenue models remain key barriers to investment in energy storage technologies.

Key takeaways – Geopolitics and climate

- Geopolitical factors significantly influence the climate transition and constitute a central credit and business risk.
- The development of value chains, circularity, and secure access to raw materials is crucial for long-term stability.
- China currently dominates global supply chains for certain energy technologies and critical raw materials, creating vulnerabilities.
- The EU and Sweden face strategic trade-offs between a rapid transition with import dependency and a slower but more autonomous industrial development path.
- Climate policy, security policy and industrial policy are closely interlinked, particularly in fossil-dependent countries. Geopolitical relations and increasing regional fragmentation (EU, US, China and emerging markets) affect energy security, the pace of transition, and how projects and portfolios can be developed.

The role of energy storage in the climate transition

Technological development

- Batteries dominate current developments, particularly for short-duration storage (up to a few hours), and are widely used in buildings and electric vehicles.
- Long-duration storage remains both technically and economically challenging and requires alternative technologies such as mechanical or thermal storage, or hydrogen.
- Several types of lithium-ion batteries are currently available. New technologies, such as sodium-based and flow batteries, are under development, but their future market niches, commercialisation timelines and market shares remain uncertain.
- Hydrogen storage for later reconversion into electricity involves significant energy losses compared with batteries. More efficient use cases may include using stored hydrogen as fuel in fuel cells, for the production of renewable fuels such as e-methanol or ammonia, or as an input in industrial processes.
- Electrification of ferries (fully electric or hybrid solutions) is cost-efficient in operation but typically involves higher upfront investment costs.
- Battery lifetimes in electric vehicles have proven longer than previously expected. Batteries could therefore be reused for stationary energy storage once vehicles reach end-of-life, or be used more intensively during the vehicle’s lifetime through bidirectional charging (vehicle-to-grid).

- The transition to an energy system with a high degree of storage may take up to 20 years, although certain components could be implemented more rapidly than anticipated.

System perspective and business models

- Energy projects should be assessed as part of broader system solutions rather than as stand-alone investments.
- Ports and industrial clusters have the potential to develop into strategic energy hubs[1], where electricity, battery storage, and the production and use of renewable fuels are integrated.
- Energy storage costs remain high, making business models and revenue streams challenging.
- System flexibility and balance are becoming increasingly important, for example to manage peak loads or production disruptions.
- System operators see a role for energy storage in normal operations but are more hesitant regarding its role during power outages. Today, the largest system costs arise from ensuring the capacity to meet peak demand, as markets require very high security of supply.
- Although large-scale deployment of energy storage may take time in many markets, battery storage can already have a near-term negative impact on business models and revenues for existing power generation, such as conventional balancing power. This is because batteries are scalable, can reduce price volatility, and thereby affect revenues from balancing services.

Significant regional variation

- Global differences are substantial. Mature markets generally have integrated power systems, while decentralised solutions are often more relevant in emerging markets.
- Local initiatives, such as hydrogen projects linked to wind power on Gotland, can reduce grid congestion and smooth supply through storage.
- In sparsely populated countries such as Australia, large-scale grid expansion can be difficult to justify economically. Smaller, decentralised solar and battery systems may therefore be cost-effective alternatives. Similarly, in developing countries lacking existing grid infrastructure, battery storage and decentralised systems can offer advantageous system solutions.
- China is a global leader in battery technology development and production, shaping global supply chains.

[1] **An energy hub** is a central location or infrastructure where different forms of energy are integrated, converted, stored or distributed. It functions as a node within an energy system, often with the purpose of integrating renewable energy sources, balancing supply and demand, and enabling sector coupling (for example by linking the electricity system with heating networks or the transport sector).

SEK ekn

Geopolitics and climate

Political and regulatory factors

- The climate transition is affected by political change and regulatory uncertainty, which may lead to slowdowns at both global and national levels.
- Sweden and the EU continue to demonstrate strong technical expertise and innovation capacity. Innovation is a key driver of the climate transition. Swedish and European companies are dependent on Chinese technology and know-how, while the need for strategic autonomy is increasing from a resilience and security perspective. A balance is required between cooperation and independence, including control over critical infrastructure such as ports.
- The EU faces a strategic choice between rapid transition with import dependency and a slower, more autonomous industrial development. Full independence from China is neither desirable nor realistic.
- Swedish technical competence and innovation capacity remain strong. Stability in EU ambitions and regulatory frameworks is important to provide predictability for companies.

Global examples and market perspectives

- Despite various challenges, there is continued public support for climate action in many countries, and the climate transition is progressing globally.
- In the United States, developments vary between states. Some sectors, such as electric vehicles, have slowed, while profitable investments in areas such as solar energy continue.
- For example, in Texas – the leading US state for oil and gas production – large-scale expansion of solar and wind power is driven by economic profitability, as these technologies are more competitive than fossil-based power generation.
- Geopolitical events, such as Russia’s full-scale invasion of Ukraine, act both as a constraint and a catalyst, particularly in fossil-dependent countries such as Poland. In the short term, some governments have increased subsidies for fossil energy to mitigate acute economic impacts. At the same time, longer-term trends aligned with the climate transition are evident, including REPowerEU, with objectives to improve energy efficiency, replace imported fossil energy with climate-friendly alternatives, and increase diversification.

Conclusion

- Next meeting: 28 April
