

MAINTAINING MOMENTUM IN THE ENERGY TRANSITION

A Now-Next-Later Needs Framework

Synthesis report based on NTNU Energy Transition Week workshops, held in Trondheim in March 2026

BRIEF

SYNTHESIS REPORT – OCTOBER 2026

This synthesis report summarizes two high-level workshops held as part of NTNU Energy Transition Week 2026, organized by the NTNU Energy Transition Initiative. The report argues that maintaining momentum in the energy transition requires coordinated action across three overlapping horizons: measures that reduce immediate vulnerabilities, investments that build resilient low-carbon system capability, and early strategic choices that avoid future dependencies and lock-in. It synthesizes key discussions on energy security, affordability, infrastructure, digitalization, supply chains, flexibility, critical minerals, low-carbon fuels, and public legitimacy. The main conclusion is that transition policy should not treat all measures as serving the same purpose, but should clarify which actions protect the current system, which build future system capability, and which prevent new forms of lock-in.

NTNU Energy Transition Initiative · <https://www.ntnu.edu/energytransition/energy-transition-week-2026>

Key Messages

Maintaining momentum requires addressing three distinct strategic needs: reducing immediate vulnerabilities now, building the resilient low-carbon system next, and avoiding future dependencies and lock-in later. Now, next, and later describe different strategic roles rather than their relative importance or a strict sequence of action; all three require immediate attention in parallel.

I. INTRODUCTION

A. WHY TIMING MATTERS

Maintaining momentum in the energy transition has become more difficult as climate policy becomes increasingly entangled with energy security, affordability, industrial competitiveness, digital vulnerability, and geopolitical risk. The transition remains necessary for reducing emissions, but it is now also expected to strengthen resilience, reduce exposure to volatile fossil-fuel markets through electrification, support new industries such as clean technology, and protect critical societal functions such as healthcare. This makes the task more complex: measures that accelerate decarbonization must also be credible amid uncertainty, conflict, infrastructure stress, and public concern over costs.

This report synthesizes insights from two high-level workshops held during NTNU Energy Transition Week 2026, organized by the NTNU Energy Transition Initiative: one on drivers for a resilient and secure energy transition, and one on co-benefits between climate, affordability, and security [1], [2]. The report synthesizes the discussions analytically rather than presenting them as a consensus among participants.

The Now-Next-Later Needs Framework provides a concise structure for distinguishing measures that (i) address immediate needs, (ii) build system capability, or (iii) require early action to prevent future infrastructure and technology lock-in. Timing matters because transition measures do not all serve the same function. Some actions reduce present vulnerabilities in the existing system. Others build the infrastructure and market conditions needed for the next stage of electrification. A third group prepares for long-term risks that are difficult to reverse once locked in.

B. DIFFERENT MEASURES SERVE DIFFERENT NEEDS

Across the two workshops, presentations and discussions covered a wide range of energy-transition challenges and possible responses; this synthesis organizes them within the Now-Next-Later Needs Framework. Cyber preparedness, emergency routines, demand reduction, and responsibility chains require immediate attention because they address existing

vulnerabilities. Grids, storage, flexibility, interconnection, and market design require sustained investment because they shape the system that must carry the next phase of the transition. Critical minerals, clean-technology supply chains, low-carbon fuels, and circularity require early preparation because neglecting them can create future dependencies and lock-in. Skills, institutional capacity, trust, and finance support action across all three horizons.

The three horizons distinguish different needs and their time to impact, not when action begins; measures across all three may need to start in parallel. The now horizon focuses on reducing immediate exposure and protecting the transition from current disruption. The next horizon focuses on building a resilient low-carbon system. The later horizon focuses on avoiding lock-in and preventing new dependencies from replacing old fossil-fuel vulnerabilities. In this sense, maintaining momentum requires not only ambition, but also coordination of measures with different lead times and stronger institutional readiness.

II. NOW: REDUCING IMMEDIATE EXPOSURE

This section covers measures that can reduce current vulnerabilities and strengthen near-term preparedness.

A. ENERGY EFFICIENCY AND DEMAND REDUCTION

Reducing energy demand lowers bills, emissions, import dependence, and pressure on infrastructure.

B. CYBER PREPAREDNESS AND MANUAL FALLBACK

Digital systems must be protected, while operators must also be trained to work when digital systems fail.

C. CRITICAL INFRASTRUCTURE RESPONSIBILITY CHAINS

Authorities, operators, regulators, municipalities, and defense actors need clear roles before a crisis occurs.

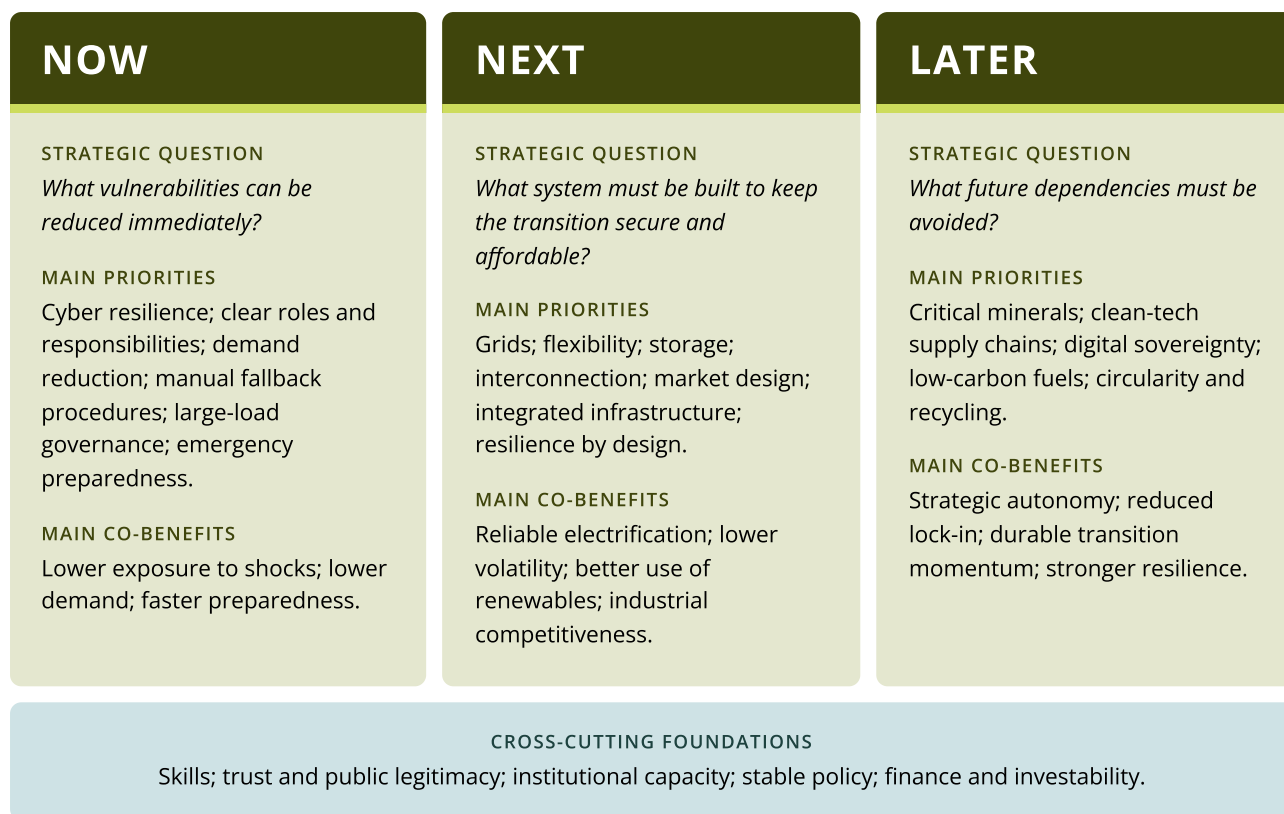


Fig. 1. A synthesis of transition requirements across immediate preparedness, system-building, and long-term strategic positioning. Actions across all three horizons may begin now and continue in parallel.

D. RULES FOR LARGE NEW ELECTRICITY LOADS

Connection and operating rules for data centers and other large new loads should consider flexibility, ramping, backup capability, and security.

E. RECOVERY AND REPAIR PREPAREDNESS

Operators need adequate repair capability, critical spare parts, and tested restoration procedures to recover from major disruptions.

III. NEXT: BUILDING SYSTEM CAPABILITY

This section covers measures that are too large to deliver immediately but are essential for maintaining transition momentum.

A. GRID REINFORCEMENT AND BETTER GRID UTILIZATION

Rising electricity demand requires both new grid capacity and smarter use of existing infrastructure.

B. STORAGE AND FLEXIBILITY PORTFOLIOS

Various storage technologies, hydropower, demand response, industrial flexibility, and interconnectors are required to provide different types of system flexibility.

C. LOCAL RESILIENCE AND ISLANDING CAPABILITY

Some areas and critical functions should be able to operate locally during a disruption.

D. FLEXIBILITY AND RESILIENCE

Flexibility and resilience need clear incentives and funding, whether delivered through markets, regulation, or strategic investment.

E. RESILIENCE BY DESIGN

New infrastructure should account for physical, cyber, and climate risks, as well as repairability and recovery, from the outset.

IV. LATER: AVOIDING FUTURE LOCK-IN

This section covers measures that shape the long-term structure and dependencies of the low-emission system.

A. CRITICAL MINERALS AND CLEAN-TECHNOLOGY SUPPLY CHAINS

The transition must reduce fossil dependence without replacing it with fragile dependence on minerals, components, or manufacturing.

B. LOW-CARBON FUELS FOR HARD-TO-ELECTRIFY USES

Aviation, shipping, defense & some industrial sectors may need low-carbon fuels even in a highly electrified system.

C. CIRCULARITY, RECYCLING, AND SUBSTITUTION

Recycling, material substitution, repairability, and circular design can reduce future supply-chain dependence.

V. CROSS-CUTTING FOUNDATIONS

A. SKILLS, TRUST, AND INSTITUTIONAL CAPACITY

Transition success depends as much on people, legitimacy, competence, and coordination as on technology.

B. FINANCE AND INVESTABILITY

Policy and financing arrangements must reduce investment risk and mobilize private capital, especially where borrowing costs are high.

VI. CROSS-CUTTING TENSIONS

This section examines tensions that must be managed across the now, next, and later horizons.

Speed versus security: Rapid deployment is necessary, but security risks increase when resilience is added too late.

Efficiency versus redundancy: Highly optimized systems can become fragile if spare capacity, fallback options, and redundancy are removed.

Affordability now versus long-term savings: Many transition measures may reduce costs over time, but short-term costs can weaken political support.

Openness versus strategic autonomy: Open trade remains important, but critical dependencies require diversification, trusted partners, and strategic reserves.

Centralization versus decentralization: Large-scale infrastructure and local distributed systems both matter, but resilience depends on coordination between them.

VII. CONCLUSION

Maintaining momentum requires acting across all three horizons at once while keeping their purposes distinct. Immediate measures should reduce present exposure, system-building investments should develop the capability needed for secure electrification, and early strategic choices should prevent new dependencies and lock-in.

The value of the Now-Next-Later Needs Framework is that it organizes a broad transition agenda around distinct but interconnected strategic needs while preserving the links between climate, affordability, and security.

REFERENCES

- [1] NTNU Energy Transition Initiative, "[Workshop on Drivers for a Resilient and Secure Energy Transition](#)," Trondheim, Norway, Mar. 16, 2026.
- [2] NTNU Energy Transition Initiative, "[Maintaining Momentum in the Energy Transition: Co-Benefits between Climate, Affordability, and Security](#)," Trondheim, Norway, Mar. 17, 2026.