

STRATEGIC ELECTRIFICATION: ENABLING STRATEGIES FOR AFFORDABILITY, ENERGY SECURITY, AND RELIABILITY

Executive Summary of the 21st Century Power Partnership (21CPP) Strategic Electrification Report (2026)

Background

Electrification is becoming increasingly important to economic growth, competitiveness, and energy security. Transport, buildings, cooling, industrial electrification, and digital infrastructure are placing new demands on power systems, while global electricity demand is rising rapidly.

This creates major opportunities. Smart, well-planned, and well-executed electrification can reduce exposure to volatile energy markets, improve efficiency, and support new industries. But these benefits depend on the ability of power systems to provide clean electricity reliably and affordably. Managing supply and demand holistically is a critical enabling condition.

This 21st Century Power Partnership (21CPP) Strategic Electrification report brings together insights from across Clean Energy Ministerial (CEM) and MI workstreams.[1] Its central message is that electrification should be approached as a whole-system delivery challenge: with efficiency, affordability flexibility, and resiliency in mind. Clean power grids, supply chains, markets, investment, regulations, institutions, and workforce needed to deliver must evolve together.

Collaborating Workstreams

IRENA and the IDDI Secretariat, coordinated by UNIDO, provided thought leadership and technical input to this report.

Actionable insights and practical cooperation for leaders to consider

Electrification — shifting transport, buildings, and industry onto electricity — can strengthen a country's energy security. But that benefit is not automatic: it depends on whether the power system behind it is planned, modern, and capable of delivering clean power reliably and affordably when it is needed.

1. Electrification can be a key pillar of energy security strategy, but only if the power system is well planned, modern, and capable.

Energy security today isn't just about addressing energy supply risks but is also about whether the power system itself comprising the wires, fuel, generation capacity, and the people running it, can deliver when it's needed most. Shifting cars, buildings, and industry onto electricity can reduce a country's exposure to fuel-price shocks and supply disruptions, but only if the grid behind it is modern, reliable, affordable, and well-run.

1. On behalf of 21CPP, ISGAN, GPFM, IDDI, ERAD, SEAD, LTES, EVI, and EPI Workstreams.

2. Plan for new electricity demand before it shows up — not after.

Electric vehicles, air conditioning, data centers, and industrial electrification are all about to place major new demands on power grids. Handled well — with the right rules and incentives in place early — this new demand can actually make the grid stronger and more efficient. Handled poorly, it simply overwhelms the system. The difference comes down to planning ahead rather than reacting.

3. Drive smart and efficient products as a key pillar of electrification.

An inefficient air conditioner or appliance sold today locks in higher electricity demand for years to come — demand the power system has to build capacity to meet. Efficiency standards and smart product requirements directly lower costs and reduce how much new infrastructure a country has to build.

4. Incorporate Flexibility as a key pillar of strategic electrification.

The cheapest way to meet rising demand isn't always more power lines and power plants or allowing inefficient demand. Often, smarter use of the existing grid (for instance, better market integration across jurisdictions, storing energy, or making demand more flexible) costs far less. Ministers, policymakers and regulators should compare all these options before committing to expensive infrastructure that locks in costs for decades.

5. Building bigger isn't enough — countries also need to use what they already have, better.

New power infrastructure takes years to build and rarely keeps pace with fast-growing demand. Relying on construction alone leads to higher bills, long connection delays, and underused capacity sitting idle. Faster, cheaper progress comes from pairing that necessary construction with smarter and increasingly AI-enabled tools — technology that reveals where spare grid capacity already exists, flexible connection options, and local arrangements that squeeze more value out of the system already in place.

6. Leveraging CEM workstreams and partners for practical cooperation

CEM's comparative advantage builds on diagnosing the problem to helping countries act on shared delivery solutions. This report forms the basis for practical cooperation: country diagnostics, Action Plans, peer-to-peer learning, and concrete actions for 2027 workplans.

Strategic electrification: A practical agenda

The themes below give CEM a practical cooperation agenda. The aim is to help countries plan demand, keep electrification affordable, modernize grids, manage new risks, and build the people and institutions needed to deliver. The most practical starting point is where the themes intersect: demand growth planning, grid utilization, flexibility, affordability, and investment sequencing.		**Relevant CEM Workstreams to support**
Plan and shape rising electricity demand	Forecast by end-use, location, time, weather, credibility, and flexibility; integrate efficiency and large-load transparency before demand locks into generation and network needs.	LTES, ISGAN, IDDI, SEAD, EVI, 21CPP
Keep electrification affordable through least-cost system design	Use efficient products, tariffs, flexible demand, probabilistic planning, and non-wire alternatives to reduce unnecessary peak-driven investment and protect consumers.	LTES, 21CPP
Modernize infrastructure, increase system utilization and unlock flexibility	Combine permitting reform, hosting maps, Grid Enhancing Technologies/ Advanced Transmission Technologies (GETs/ATTs), flexible connections, Distributed Energy Resources/ Virtual Power Plant (DERs/VPPs), digitalization, AI, and credible investment pipelines.	ISGAN, 21CPP
Manage fuel, physical, and cyber risks in electrified systems	Embed fuel, physical, cyber, supply-chain, and operational resilience into strategic electrification planning.	LTES, 21CPP
Build the workforce and institutions to deliver	Treat workforce, skills, regulatory capacity, institutions, and just transition as core delivery enablers, not co-benefits.	EPI, ERAD

CEM offer: CEM's comparative advantage is practical cooperation: helping countries learn from shared delivery problems and turning that learning into Action Plans, clinics, templates, and tools they can use in 2027.

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The 21st Century Power Partnership is a multilateral effort of the Clean Energy Ministerial and serves as a platform for public-private collaboration to advance integrated policy, regulatory, financial, and technical solutions for the largescale deployment of clean energy in combination with deep energy efficiency and smart grid solutions.

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