UNEZA
UTILITIES FOR NET ZERO ALLIANCE

Transforming power
2030 and beyond

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About UNEZA

The Utilities for Net Zero Alliance (the "Alliance") is the international platform for co-operation among entities operating within the power utilities ecosystem, to address and overcome common barriers to the realisation of net-zero ambitions and more near-term emissions reduction targets. Through it, shaping dynamic new partnerships, and forging effective channels for dialogue with key public and private stakeholders.

UNEZA's members and partners recognise that the key to unlocking the utility sector's global energy transition potential lies in the ability to deliberately target existing structural, regulatory, and financial impediments and challenges that may stand in the way of progress.

UNEZA operates under the guidance of the International Renewable Energy Agency (IRENA) and the UN Climate Change High-Level Champions, ensuring a focused and strategic approach to achieving a sustainable energy future.

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IRENA
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2030 BREAKTHROUGHS

UNEZA
UTILITIES FOR NET ZERO ALLIANCE

Foreword

Leading by example: The critical role of utilities in delivering the clean energy transition

The Utilities for Net Zero Alliance (UNEZA), established in 2023 under the UAE's COP28 Presidency, is an alliance born out of necessity. Despite numerous high-level energy transition goals and targets, meaningful progress has remained elusive, and the utilities that form the backbone of the global energy system have historically remained under-represented in the climate and energy transition discourse.

While targets are essential, the challenge is to translate them into planning consents, final investment decisions, supply chain procurement, job creation, technology development and, ultimately, clean electricity generated and delivered to consumers. An even greater challenge is delivering these outcomes fast enough to meet energy transition goals while maintaining an unyielding focus on security of supply. This is the fine line we tread every day as utilities.

The aim of UNEZA was therefore to create a coalition of global power sector organisations with a shared commitment to advancing the low carbon transition, while highlighting and addressing industrial and policy barriers; just over a year since our establishment, we have made encouraging progress.

As this report highlights, we have more than doubled our membership, welcoming utilities and power sector suppliers from around the world, underscoring the fact that collaboration is vital in this crucial sector.

On the ground, we have delivered on our commitments, focusing our efforts on key, real-world enablers to speed up the deployment of clean energy infrastructure. The Alliance has issued tangible, specific recommendations to policy makers on how to build diverse and resilient supply chains, while sending a clear demand signal to industry with our joint commitment to invest more than USD 117 billion per year, matching every dollar invested in renewables with a dollar in grids.

Tripling renewables by 2030, building or refurbishing 80 million kilometres of grids by 2040 and realising net zero by mid-century collectively represent one of the most ambitious industrial undertakings of our age. As key delivery agents, utilities are rising to the challenge and our efforts will be buoyed by the powerful platform UNEZA is becoming.

Underpinned by the unwavering support of the International Renewable Energy Agency (IRENA) and the United Nations Climate Change High-Level Champions, we are well positioned to lead a power system transformation that is good for growth, good for people and good for the climate.

We look forward to continuing our close engagement, both within UNEZA and with ecosystem partners, in the run up to COP30.

UNEZA Co-Chairs

Alistair Phillips-Davies,
Chief Executive Officer, SSE

Jasim Thabet,
Chief Executive Officer, TAQA

Contents

Utilities for Net Zero Alliance: Mission and vision

The Utilities for Net Zero Alliance (UNEZA) was established at the 28th United Nations Climate Change Conference (COP28) with the adoption of the ***UAE Declaration of Action*** (UNEZA, 2023). The Alliance unites leading global utilities and power companies with the aim of spearheading the development of grids that are ready for renewable energy, promoting clean energy solutions and advancing electrification efforts. UNEZA operates under the guidance of the International Renewable Energy Agency (IRENA) and the UN Climate Change High-Level Champions, ensuring a focused and strategic approach to achieving a sustainable energy future.

UNEZA's members and partners recognise that the key to unlocking utilities' potential to advance the global energy transition lies in the ability to target and overcome structural, regulatory and financial impediments to progress. They work proactively to address challenges through global co-operation, knowledge development and public-private consultations.

The mission of UNEZA is to create a new, meaningful and deliberate international platform for co-operation among entities operating within the power utility ecosystem, to address and overcome common barriers to the realisation of net-zero ambitions and more immediate emissions reduction targets. It is shaping dynamic new partnerships, and forging effective channels for dialogue with key public and private stakeholders.

Growing membership

UNEZA's membership has nearly doubled since last year, growing from 25 partners and members to 54, and members' operations have expanded across continents. This growth reflects the increasing global commitment to advancing the transition to net zero, as members work together to drive impactful investments in grid infrastructure and renewable energy.

The powerful global community of utilities and power sector suppliers is led by the Abu Dhabi National Energy Company (TAQA) and SSE plc as co-chairs.

UNEZA invites companies to join the common vision of accelerating the energy transition. Membership is open to utilities, developers, power system technology companies and knowledge partners that are determined to accelerate the transition towards a net-zero future by 2050.

The Alliance consists of members, institutional partners and ecosystem support partners (Figure 1). UNEZA members include utilities and technology providers engaged in the business of power production, transmission or distribution. Institutional partners provide strategic guidance to the work of the Alliance and facilitate co-ordination among the members and ecosystem support partners, providing decision-making support where appropriate (UNEZA, 2024a).

Figure 1 UNEZA institutional partners, industry members and ecosystem support partners (December 2024)

Powerful co-operation platform

Institutional partners

IRENA International Renewable Energy Agency

2030 Breakthroughs Retail

Industry members

TAQA

هيئة كهرباء ومياه دبي Dubai Electricity & Water Authority

الاتحاد للماء والكهرباء Etihad Water & Electricity

MASDAR

BUI POWER AUTHORITY Renewable Energy Leaders

DLO ENERGY RESOURCES GROUP (PTY) LTD

EDF

e·on

edp

enel

ENGIE

Hitachi Energy

Iberdrola

JINKO POWER 晶科科技

KEGOC

KenGen Energy for the nation.

nationalgrid

octopus energy

RWE

Schneider Electric

SIEMENS

sse

TENAGA NASIONAL Better. Brighter.

uniper

Xlinks

EDISON INTERNATIONAL

SMUD

ACWA POWER

ducab

Ørsted

adani Energy Solutions

adani Renewables

HUAWEI

granular energy

CEMIG

ENEC الإمارات للطاقة النووية

univers

INGRID CAPACITY

HUSK.

intertrust

edenor

CTC GLOBAL

هيئة الربط الكهربائي لدول مجلس التعاون لدول الخليج العربية GCC Interconnection Authority

Eco system support partners

Global Renewables Alliance

IEC

COORDINADOR ELECTRICO NACIONAL

Green Grids Initiative

CLIMATE COLLECTIVE

MCC Economics & Finance

accenture

LDES

TII Technology Innovation Institute

Total 54 members and partners with IRENA as Alliance Secretariat

Roadmap to 2030 and beyond

During IRENA's 14th Assembly Ministerial Roundtable, "Infrastructure for the Energy Transition", convened in April 2024, UNEZA adopted the ***Roadmap to 2030 and Beyond*** (UNEZA, 2024b), addressing key challenges and expanding impact with a focus on three priorities:

1. **Accelerate the net-zero transition through stronger international collaboration in the power sector.** Identify future energy system needs in 2030-2050 and highlight key challenges and bottlenecks hindering the sustainable development of a resilient future energy system (with a focus on capital, supply chains and policy).
2. **Collectively contribute to tripling renewable power and doubling energy efficiency, increasing energy storage, improving grids and facilitating a green energy zone and corridors by 2030.** Recommend ways to relieve bottlenecks to the sustainable development of a resilient energy system and implement initiatives across UNEZA members to drive impact.
3. **Achieve net-zero emissions by 2050 at the latest.** Members commit to reaching net zero; successful initiatives could be scaled beyond UNEZA.

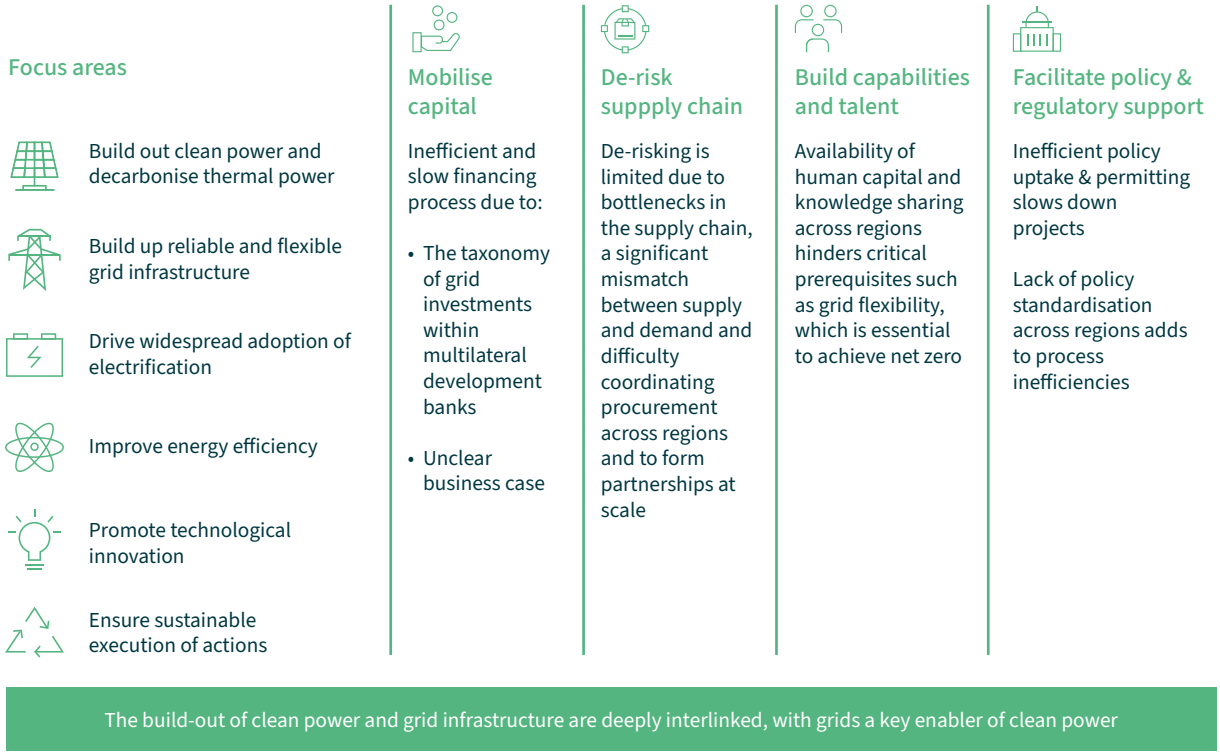
Priority areas

UNEZA's structured approach to achieving net zero highlights six priorities that encompass various aspects of sustainability and the clean energy transition. Members of UNEZA acknowledge and share a desire to work towards these priorities from now until 2050. The priorities will be organised around four pillars: mobilisation of capital, the global supply chain, capabilities and talent, and policy and regulatory support.

In the immediate future, 2024-2025, UNEZA's priorities are: (1) the build-out of clean power and reliable and resilient grid infrastructure, with a focus on facilitating policy and regulatory support, (2) de-risking the supply chain and (3) mobilising capital.

To accelerate the energy transition, six focus areas are defined where action along four pillars can alleviate challenges in the ecosystem (Figure 2).

Figure 2 UNEZA challenges, focus areas, pillars and priorities for 2024-2025



Actions 2024

For 2024, UNEZA members identified the development of reliable, resilient and flexible grid infrastructure as the main priority, which in turn supports the development of clean power. Key reasons to accelerate and expand grid development efforts include the following.

The need to make up for lost time. To date, the (long-term) sustainable development of energy grids that can support the transition has had too little attention.

High complexity. Grid development, especially to support the adoption of clean power, is a complex task, with obstacles that include, but are not limited to, long lead times for permitting and approvals, stretched global supply chains and insufficient capital spending.

Great urgency. Many renewable projects and businesses are waiting to be connected to the global grid. Currently, over 3 000 gigawatts (GW) of renewable generation capacity are in “grid queues”, with many projects at advanced stages of development (IEA, 2023). Staying on course towards the 1.5°C Scenario targets for 2030 requires USD 1 550 billion in annual investment in renewable power generation capacity and USD 720 billion in power grids and flexibility (IRENA, 2024).

High ecosystem impact. The grid can be a catalyst for positive change. Improved grid infrastructure not only supports the development of clean power, it will also drive electrification and thereby further emissions reduction.

UNEZA has followed a two-step approach to accelerate progress: (1) highlight key challenges and bottlenecks hindering the transition towards a net-zero energy system, and (2) offer recommendations to accelerate the energy transition specifically within the power sector.

In its Plan of Action (UNEZA, 2024c), UNEZA advocates specific recommendations to ease bottlenecks to the build-out of the future energy system and implement initiatives across UNEZA members to drive impact and monitor progress against goals.

Through the Global Infrastructure Program, UNEZA has implemented a strategy with three focus areas to support the goal of tripling renewable energy capacity by 2030 and beyond (see Figure 3).

Figure 3 UNEZA focus areas and actions

Support 2030 energy transition ambitions through a

Global infrastructure programme

A UNEZA strategy to drive grid infrastructure investments to support tripling and beyond by 2030

Focus area 1	Focus area 2	Focus area 3
Drive supply chain capacity expansion for grid development and ease constraints	**Engage policy and regulatory community to ease bottlenecks and simplify permitting**	**Mobilise capital to modernise and build out infrastructure for the energy transition**
• Announce a strong collective, medium-term demand signal to encourage capacity expansion among OEMs • Encourage mandates for the use of harmonised international standards for critical equipment, promoting interoperability and easing supply chains • Publish joint high-level policy statement with actionable recommendations to policy makers	• Thought leadership "Grid lock" to tackle global resilient grid bottlenecks and advance solutions • Champion global "grid superhighways", easing administrative burden, promoting regional co-operation and paving the way for an interconnection revolution • Address barriers to clean energy deployment • Empower system operators with the flexibility to make anticipatory investments	• Facilitate grid investments to ensure grid's availability, resilience and availability • Advance business cases for electrification and enhancing the development of new markets for scaling-up renewable energy technologies • Co-operation with key MDBs to drive investments in infrastructure in the Global South

Source: (UNEZA, 2024c).

Notes: MDB = multilateral development bank; OEM = original equipment manufacturer.

Expand supply chain capacity for grid development and ease constraints

Action: Announce a strong, collective medium-term demand signal to encourage capacity expansion among original equipment manufacturers

During the UNEZA CEO Leadership Meeting at COP29, a strong implementation signal was announced, and UNEZA global utilities backed the pledge to enhance grids and boost storage. The world's leading utilities and power sector companies endorsed the commitments that governments and international stakeholders made at COP29 to boost power system storage capacity six-fold by 2030 and add or refurbish 80 million kilometres (km) of grids by 2040. This pledge, announced in Baku and endorsed by multiple governments, civil society organisations and industry players, including UNEZA, will support global efforts to triple renewable energy capacity by 2030 and the transition to a net-zero energy system.

As a basis for equipment manufacturers to scale up production in support of grid development, UNEZA reinforced its commitment to annual grid and renewable investments of more than **USD 117 billion** at its meeting "Accelerating Large Grid Infrastructure Projects – Highlights for Policy Makers". Around 48% of the planned and committed investments will go into grid infrastructure, underpinning the ambitions outlined by governments to add or refurbish 80 million km of grids by 2040. Further, members also committed to plans to increase total installed renewable capacity 2.6 times by 2030, increasing from today's 329 GW to 850 GW.

Figure 4 Representation of UNEZA targets

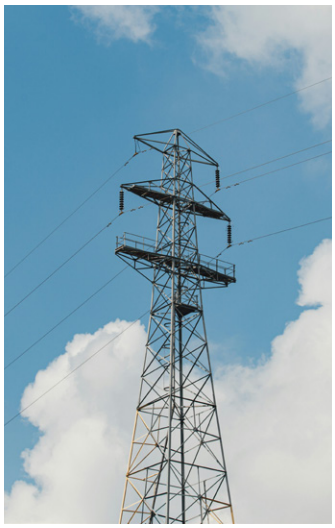
UNEZA members are committed to support the tripling agenda by 2030

Joint target progress indicators

Grids

>USD 57 billion p.a.

investment already committed for the coming years



Renewables

>USD 60 billion p.a.

investment already committed for the coming years

2.6X by 2030

Increased total installed renewable capacity, GW

Notes: GW = gigawatt; UNEZA = Utilities for Net Zero Alliance; the members of UNEZA have individual plans that, combined, represent a greater ambition than the joint UNEZA targets by 2030; individual company commitment timelines vary from 2025 to 2030; data aggregated from information provided by UNEZA members and collected from public sources, and information from subsidiary companies is included in the joint targets; joint targets are aggregated based on individual achievements and targets of the UNEZA members, as per different baseline years, and the targets will be updated annually to represent the Alliance's ambition.

At its event "Enabling the COP29 Grids and Storage Pledge: From Target Setting to Practical Delivery", the Alliance engaged with key partners and policy makers. Expanding and modernising grids to connect and transport renewables, and delivering the storage capacity to back up an increasingly intermittent, renewables-led system will be key enablers of the pledge to triple renewable capacity by 2030, signed as part of the United Arab Emirates (UAE) Consensus at COP28.

Action: Publish a joint high-level policy statement with actionable recommendations for policy makers

The energy transition will not materialise without well-functioning, robust, diverse and cost-efficient industrial supply chains. Renewable energy supply chains are highly globalised, requiring increased collaboration to maintain healthy competition, ensure consumers can access energy at the most cost-competitive rates and maintain the highest levels of deployment. As the demand for these technologies grows, key challenges include securing critical minerals, scaling manufacturing and developing a skilled workforce – each of which presents opportunities in terms of investment and employment. Policy makers must adopt innovative policy and business models to drive progress and investment at local, national, regional and global levels.

Figure 5 UNEZA High-Level Statement

During the Global Renewables Summit 2024, UNEZA published a ***High-Level Statement*** (UNEZA, 2024d) on building a resilient and diverse clean energy technology supply chain.

Enormous renewable capacity and grid development will place extreme pressure on clean energy technology supply chains globally. These supply chains include material sourcing; production; transport; and the installation of the technologies that generate, transmit, transform, store or use clean energy (*e.g.* wind turbines, solar panels, batteries, high-voltage direct current systems and transformers).

UNEZA highlights that if the world is to collectively triple renewable capacity by 2030 in line with the COP28 outcome and achieve net zero by 2050, robust and resilient supply chains are needed across the entire power system value chain. The supply of the goods, materials and technologies supporting the energy transition must transcend national interests as governments look to step up decarbonisation efforts.

As the demand for these technologies increases significantly, efforts to ensure resilient supply chains must address three challenges: (1) the availability of critical minerals and materials, (2) the scale-up of manufacturing capacity and (3) the development of a skilled workforce. With each challenge comes the opportunity for new investment, new value chains and new skilled jobs.

UNEZA, in partnership with the Green Grids Initiative and the Global Renewables Alliance, has developed recommendations for policy makers to support industry to scale up global supply chains to meet these challenges.

Regarding power grids, UNEZA highlights the need to leverage global supply chains and free trade and the planning of forward-looking, integrated power system development combined with multi-project approvals and permitting.

For wind energy, UNEZA believes that increasing volume and predictability requires addressing barriers to the wind industry's growth in terms of land, grids and permitting, while providing clear and bankable signals of market demand.

For solar energy, industrial strategies and value chain localisation policies should be supported by a robust evidence base. The free, fair and open exchange of solar power should be incentivised. Strong environmental, social and governance principles and criteria are needed to ensure transparency. Also, technology transfer can support the development of diversified solar supply chains, particularly in emerging markets and developing economies.

For hydropower, there is a need to scale up the mature supply chain, addressing issues such as prolonged lead times and the concentration of existing production capacity in a few countries. The decarbonisation of hydropower development, which relies on concrete and steel, is important. So is making the sector attractive to a new generation of employees, while ensuring the knowledge of those approaching retirement is retained and passed on.

Action: *Encourage mandates for the use of harmonised international standards for critical equipment, promoting interoperability and easing supply chains*

UNEZA members and the International Electrotechnical Commission underline that international standards cover a wide range of tangible and intangible items, including products, processes, measuring methods and services. These standards are essential for managing quality and risks; facilitating international trade; and ensuring the safety, efficiency and interoperability of electrical and electronic products and systems. By providing a common "language" for technology and business practices, standards play a crucial role in modern commerce and everyday life.

Figure 6 Stakeholders' requirements from standards

Stakeholders' Requirements from Standards

Policy Makers & Regulators

- Supporting compliance with regulations & legislation

Standards Makers

- Facilitating trade
- Facilitating communication & understanding

Manufacturers & Installers

- Common performance specifications
- Testing, sampling
- Materials
- Quality assurance, quality control

Investors & Fiscal Support

- Confidence & trust in what is being funded
- Ability to clearly specify what is being funded
- Ability to verify and audit investment

Verification & Auditing

- Clear processes, procedures & specs to audit against
- Consistency
- Harmonised approach
- Protocols established

Users of Products & Services

- Confidence
- Trust
- Consistency
- Understanding – performance, safety, etc.

Source: (IRENA, 2024).

UNEZA members believe that establishing standards can help governments and policy makers to: (1) overcome supply chain bottlenecks, which can delay the availability of the required materials and technologies; (2) encourage investments in renewable energy projects to ensure sufficient funding and support; and (3) facilitate permitting processes, which is crucial to expedite the development and implementation of clean energy infrastructure.

UNEZA members and partners have discussed ways to reduce supply chain bottlenecks; these include, but are not limited to, improving interoperability and compatibility, enhancing transparency and visibility, streamlining customs and regulatory compliance, and promoting best practices. Friction points and inefficiencies leading to bottlenecks can be significantly reduced if a common framework for processes, methodologies and procedures, including verification and international standards, together with testing and certification, is provided.

Investment can be stimulated, for example, by improving quality and consistency, facilitating market access and increasing competitiveness. Countries that adopt and enforce international standards and accept conformity assessment certificates of bodies, signal their commitment to good governance and responsible business practices. This can attract investors looking for stable, well-regulated environments.

Permitting could be facilitated by harmonising requirements, providing a common technical language, incorporating up-to-date technical knowledge and supporting innovation. By leveraging international standards, regulators can create more efficient, transparent and globally aligned permitting processes that support innovation and trade, while maintaining the requisite public health, safety and environmental safeguards.

***Action**: Engage the policy and regulatory community to ease bottlenecks and simplify permitting*

UNEZA members engaged policy makers through the World Utilities Congress hosted by TAQA Group in mid-September 2024. A series of ministerial discussions and leadership roundtables formed an important cornerstone. In closed-door conversations, C-level industry executives and policy makers engaged in addressing, debating and analysing the latest trends affecting the utilities market. Participants in these sessions sought to collectively address challenges and explore solutions that can shape the future of utilities, and foster open and impactful conversations among influential decision makers who are shaping the future of a responsible energy industry, and implementing innovative business strategies to create a cleaner and more secure energy landscape.

UNEZA members have shared infrastructure case studies related to large projects, highlighting best practices and challenges in financing, permitting and stakeholder engagement, while considering the legal, technical, commercial and sustainability aspects, especially in relation to net-zero goals. Hitachi Energy led the action with “Enablers of Large Grid Infrastructure Projects – Highlights for Policy Makers”, which was presented during the September 2024 Climate Week NYC.

The energy transition, characterised by a strategic shift towards renewable electricity and green hydrogen, is crucial for reducing global carbon emissions and necessitates a comprehensive re-design and strengthening of energy infrastructure. Central to this evolution are advancements in power grids, which require modernising for efficient integration and diffusion of renewable energy, and the establishment of robust hydrogen infrastructure, including pipelines, ports and storage facilities, essential for the use and transport of green hydrogen.

Example grid infrastructure projects

London Power Tunnels

In 2011, National Grid embarked on a seven-year, GBP 1 billion programme, building 32 km of tunnels and two new substations in North London. Previously, most of the electricity supply in North London was transmitted via underground cables laid just below the road surface. Housing new electricity cables in deep underground tunnels instead causes less disruption for society during construction but also during maintenance, repairs, and further enhancements and future additions.

Image © National Grid.

Caithness Moray Shetland

Europe's first multi-terminal high-voltage direct current (HVDC) system was energised in 2024, on time and within budget. The Shetland interconnector will connect to the existing 320 kilovolt Caithness-Moray Link to form a three-terminal HVDC network. The link will make it possible to harness and develop wind power resources in Shetland by enabling the transmission of much-needed clean renewable power to Scotland, supporting the United Kingdom's energy transition. This project is the precursor to meshed offshore grids in Europe.

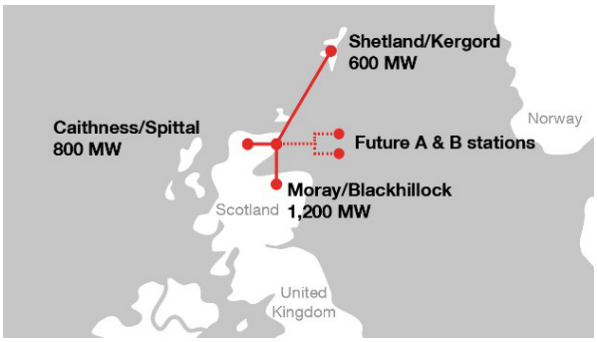


Image © Hitachi Energy.

IRENA's analysis indicates that physical infrastructure upgrades, modernisation and expansion will increase resilience and build flexibility for a diversified and interconnected energy system. Planning for large grid infrastructure projects requires a comprehensive approach that integrates technology, policy and regional needs. Long-term infrastructure plans and investments must be aligned with national and regional climate goals. The evolution of the power system can be optimised if it is co-ordinated with the expansion of renewable energy and local requirements are addressed using tailored solutions and flexible storage.

UNEZA members developed key challenges along with recommendations for policy makers to prioritise when accelerating the development of large-grid infrastructure projects, including the need for more visibility on grid investments. Longer-term strategic power system plans (*e.g.* up to 20 or 25 years) are required, developed on a regional basis and considering cross-sector demand growth as well as cross-border needs.

Policy makers and regulators play an essential role in creating an enabling environment for innovative approaches to ensuring the sustained resilience of the supply chain. Several immediate and medium-term supply chain challenges can be addressed by leveraging new and innovative business models, as well as adopting suitable policy, and regulatory approaches, for example, programmatic procurement or capacity reservation contracts.

Regarding finance, delivering the level of investment needed for a net-zero energy system by 2050 requires an immediate step change. While incentive schemes are important and can accelerate the deployment of large-scale grid infrastructure, policy makers must deliver on stable and progressive governance at the same time.

Enhancing power infrastructure's resilience to climatic events

IRENA and the UN Climate Change High-Level Champions point out that the number of extreme climate events has been increasing and is projected to continue doing so, along with their frequency, intensity, unpredictability and duration. Power systems must be designed and operated so as to be resilient to high-impact, low-probability events, acknowledging that events once considered rare are becoming increasingly frequent and severe. UNEZA members discussed how extreme weather events impact every stage of the power system life cycle, demanding a comprehensive approach to resilience.

Figure 7 Effects of climate change on segments of the power system value chain

Climate change is not only increasing the frequency and intensity of extreme weather events, but also posing a significant challenge to the resilience of power systems. These systems are vulnerable at every stage, from fuel supply to consumer demand.

Fuel supply	Generation facilities	T&D	Consumers
			
Fossil-fuel-based power plants rely on fuel supplies that can be disrupted by extreme weather events, such as storms, floods and droughts. This dependence creates vulnerabilities in the supply chain.	Power plants themselves are vulnerable to extreme weather. Extreme heat can reduce the efficiency of thermal power plants, while hurricanes and floods can damage infrastructure, leading to outages.	T&D grids are often exposed to the elements, making them susceptible to damage from strong winds, heavy rains and flooding. This can disrupt the flow of electricity to consumers.	Extreme weather events, such as heat waves, can lead to spikes in energy demand, particularly for cooling. This can strain the grid's capacity, potentially leading to blackouts or brownouts.

Note: T&D = transmission and distribution.

Climate change is increasing the frequency and intensity of extreme weather events, exacerbating the vulnerabilities of power systems and posing serious threats to energy security. UNEZA concluded that a robust approach to enhancing power system resilience requires a comprehensive strategy that integrates vulnerability assessments, proactive planning and targeted investments.

Mobilise capital for resilient grid infrastructure

Action: Co-operate with key multilateral development banks to drive infrastructure investments

Grids have largely been overlooked by financiers, and green finance has predominantly been directed towards renewable generation. Capital deployment for grid investments faces multiple challenges, including prolonged planning and permitting lead times, difficulty securing concessional finance, lack of performance data, and global supply chain disruptions and the related inflationary pressure on projects.

Eligibility for climate and concessional finance is important for project financing because green projects may have better access to private capital. However, since grids transmit power from all connected generation sources, their environmental impact is more complex to assess compared with that of individual generation projects.

Grid investments in emerging markets and developing economies often need concessional financing since these regions face numerous challenges: limited creditworthiness of utilities, heightened regulatory and country risks due to market structure and energy dispatch regulations, low end-user tariffs and expropriation rules that might erode investment profitability. Under current approaches, only 40% of grid projects are eligible for concessional funding, and consensus on a single methodology for defining green grids' eligibility remains elusive.

UNEZA has closely collaborated with the Green Grids Initiative to consult on "Which Grids are Green? Climate Finance Principles to Unlock Green Grids Financing" (Fuselli *et al.*, 2024). There is still no consensus on the criteria for defining a green grid. The financial world remains divided on which grids qualify for green and climate finance. This lack of consensus risks holding back the investments, co-financing and securitisation needed to develop the grid enhancements and interconnections required for the renewable energy transition, especially in fossil-fuel-intensive emerging markets and developing economies, where financing is needed most.

Upon consultation at key international fora, UNEZA and the Green Grids Initiative plan to issue a joint open letter, addressed to the heads of multilateral development banks, asking them to scale up investments in modernising and expanding grid infrastructure and including a call to adopt the Climate Finance Principles for Green Grids, which will form the basis for a harmonised definition of what constitutes a "green grid".

UNEZA outreach and events

14th session of the IRENA Assembly

Abu Dhabi, United Arab Emirates, 17 April 2024

Figure 8 UNEZA at the 14th Session of the IRENA Assembly

The roundtable addressed the crucial role of infrastructure in the energy transition and in achieving the goal of tripling renewables by 2030. Key discussions addressed the topics of overcoming barriers, accelerating the energy transition to reduce emissions and unlocking the utility sector's potential to achieve the net-zero target by addressing structural, regulatory and financial challenges.

During the session, UNEZA launched its Plan of Action and Roadmap, which will drive international co-operation among utilities to deliver infrastructure for the energy transition through (1) the mobilisation of low-carbon capital and the de-risking of instruments; (2) de-risking of the supply chain, materials' availability and manufacturing capacity; (3) facilitation of enabling regulatory and policy support; and (4) continuous improvements in workforce capability.

IRENA 27th Council

Abu Dhabi, United Arab Emirates, 14 June 2024

Figure 9 IRENA 27th Council

UNEZA presented industry views in the session "Industry-Driven Partnerships for Accelerated Energy Transition" within IRENA's 27th Council meeting. The session facilitated exchange among IRENA members and the private sector on how the power sector could practically support national net-zero and decarbonisation goals for an expedited energy transition. It was underlined that, under IRENA's 1.5°C Scenario, electricity consumption in end-use sectors will triple to over 87 000 terawatt hours by 2050, compared with 2020. To meet the rising demand, the power sector will need to undergo significant decarbonisation, which would involve an increase in the renewable energy share to 91% by 2050.

World Utilities Congress

Abu Dhabi, United Arab Emirates, 16 September 2024

Figure 10 Global Leadership Panel with UNEZA Members' CEOs at the World Utilities Congress 2024

The Leadership Panel "Industry Leadership on the Road to 2030 and Beyond (UNEZA)" at the World Utilities Congress 2024 brought together senior executives from key energy sectors to discuss the critical role that utilities, energy companies and industry leaders play in driving the global energy transition. The session explored the challenges and opportunities and the strategic actions required to decarbonise the energy system. The session emphasised that remaining within the 1.5°C Scenario requires considerable investment in grids and renewable energy generation capacity, the bulk of which will need to be mobilised from the private sector. Delivering this build-out will place extreme pressure on clean energy technology supply chains globally.

Participants identified practical measures to alleviate supply constraints and support an accelerated energy transition, including, but not limited to, the availability of critical minerals and materials, the need to scale up manufacturing capacity and the development of a skilled workforce. To succeed in delivering a net-zero future, decision makers must remain agile, forward thinking and innovative. Yet, with each challenge, comes the opportunity for new investment, new value chains and newly created skilled jobs.

Climate Week NYC 2024

New York, United States of America, 23-24 September 2024

Figure 11 Roundtable session on strengthening supply chains for renewable energy during New York Climate Week 2024

UNEZA hosted two successful events during NYC Climate Week 2024, focusing on the critical role of grid infrastructure in accelerating the global energy transition and the supply chain needs for enhancing clean energy deployment.

The session "Accelerating Large Grid Infrastructure Projects – Highlights for Policy makers", organised on 23 September 2024 at the Accenture headquarters, brought together key stakeholders from the utility sector, government and finance to address the challenges and opportunities in scaling up large grid infrastructure projects. The second event took place at the Global Renewables Summit in New York and convened representatives from the public and private sectors to address the central issues surrounding global supply chains for advancing the global energy transition.

The roundtable “Strengthening Resilient and Diverse Supply Chains for Renewable Energy”, held on 24 September 2024, highlighted the urgency of establishing robust, resilient and cost-effective supply chains to meet the COP28 commitment to triple renewable capacity by 2030. Stakeholders recognised the critical need for resilient local and regional supply chains, more robust research and development policies, sustainable sourcing of critical minerals, expanded manufacturing capabilities and workforce development as the energy transition picks up pace. Discussions within the roundtable, which was hosted by the Global Renewables Alliance and partners including Bloomberg Philanthropies and the WTO Secretariat, highlighted the need for international collaboration to scale supply chains, reduce costs and ensure the equitable distribution of benefits.

COP29

Baku, Azerbaijan, 15 November 2024

Figure 12 UNEZA CEO leadership meeting at COP29

During a pivotal CEO leadership event, “Transforming Power to 2030 and Beyond”, at COP29, UNEZA announced strategic commitments to drive the clean energy transition and support global net-zero objectives.

The session provided strategic directions to realising UNEZA’s “Roadmap to 2030 and Beyond”. The Alliance announced enhanced key targets towards net zero. Moreover, UNEZA presented its High-Level Statement on building a resilient and diverse clean energy technology supply chain, and a collective, medium-term demand signal to encourage capacity expansion was announced. UNEZA collectively endorsed the COP29 Global Energy Storage and Grids Pledge and the COP29 Green Energy Pledge: Green Energy Zones and Corridors.

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