

هيئة تنظيم الخدمات العامـــة Authority for Public Services Regulation

PROGRESSING ENERGY TRANSITION VIA EFFECTIVE POLICIES AND REGULATION

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#ERRACONFERENCE2025

CONFERENCE DAILY NOTES | DAY 1 | MONDAY, MAY 5, 2025

Hosted in the Sultanate of Oman, the ERRA Annual Conference 2025 commenced with a formal opening ceremony on May 5 with His Highness Sayyid Asa'ad bin Tariq Al Said, Deputy Prime Minister for International Relations and Cooperation Affairs and Special Representative of His Majesty being the Guest of Honour.

The event began with the national anthem, followed by a series of welcome speeches that set the tone for the days ahead. Mr. Khalid Al Salami served as the Master of Ceremony, guiding the proceedings. Opening remarks were delivered by H.E. Dr Mansoor bin Talib Al Hinai, Chairman of the Authority for Public Services Regulation of Oman, emphasizing the country's commitment to regional cooperation and regulatory excellence. An opening video presentation followed, providing visual context and thematic framing for the conference. Ms. Andrijana Nelkova-Chuchuk, ERRA Chair and representative of the Energy, Water Services and Municipal Waste Management Services Regulatory Commission of North Macedonia, then addressed the audience, underlining ERRA's role in promoting regulatory dialogue and knowledge-sharing across member countries.



The 22nd edition of the ERRA Annual Conference is convened with the key theme of 'Progressing Energy Transition via Effective Policies and Regulation, through 2 days of presentations and panel discussions.

As the ERRA Conference is convening for the first time in the Gulf region, the opening session has been devoted to exploring the Gulf region's energy sustainability, allowing the policymakers and regulators to compare their experiences on the progression of national energy transitions and discuss strategic interconnectivity prospects.

Each session comprises the presentations and a panel discussion aiming at summarizing key takeaways and enabling an interactive environment between the speakers and the audience.



Session I: PROGRESSING ENERGY TRANSITION IN THE GULF REGION

Following the opening ceremony, the conference proceeded with an introductory presentation by Mr. Abdullah Abou Ali, Associate Programme Officer for the MENA Region at the International Renewable Energy Agency (IRENA). In his remarks, Mr. Abou Ali underscored the rapid growth in global renewable energy investments, noting that investments in renewable capacity additions reached USD 570 billion in

2023—a 27% increase from USD 448 billion in 2022. However, he emphasized that this momentum must be significantly scaled up, as annual investments in renewable power, grids and flexibility, energy efficiency, and conservation need to rise from USD 1.29 trillion in 2023 to USD 4.5 trillion per year between 2024 and 2030 to meet the UAE Consensus targets.

He also highlighted the region's significant renewable resource potential, pointing out that the GCC countries benefit from high solar irradiance, with average annual global horizontal irradiation (GHI) ranging between 1,700 and 2,500 kilowatt hours per square metre. Moreover, Mr. Abou Ali identified areas in central and northern Saudi Arabia, southern Oman, and north-western Kuwait as having promising wind resources, with wind speeds exceeding 7.5 metres per second—offering strong prospects for utility-scale wind development.

The session transitioned into a moderated panel discussion featuring **Eng. Thamir Alhammad**, Vice Governor of Consumer Affairs at the Saudi Electricity Regulatory Authority, and **Eng. Hilal Al Ghaithi**, Director of Energy at the Authority for Public Services Regulation in Oman. The panel explored pressing regulatory challenges and emerging trends in consumer protection and market development across the region. The discussion concluded with a joint Q&A session, where Mr. Abdullah Abou Ali rejoined the stage to respond to audience questions and further elaborate on IRENA's initiatives to support regional energy transformation.

Session II: GRID INTEGRATION AND MANAGEMENT

Mr. Luca Lo Schiavo addressed the growing challenge of grid integration, echoing the IEA's warning that "grids risk becoming the weak link of clean energy transitions." While renewable energy investments have surged, grid investments have stagnated around USD 300 billion annually. He illustrated the issue with examples such as the 2,600 GW connection backlog in the U.S. and Sicily's 80 GW of connection requests against a 3.5 GW peak demand.

He introduced to the audience two key ERRA reports. The 2024 ERRA-RAP report *Navigating Power Grid Scarcity in the Age of Renewable Energy* offers a regulatory toolbox and case studies focused on optimizing



existing infrastructure. The forthcoming 2025 Grid report Investments: Regulatory Evaluation Incentives analyzes and how regulators assess grid operator plans and incentivize timely investments, drawing on data from 13 ERRA members and five case studies.

Highlighted practices included Oman's Project Delivery Incentive, France's transmission investment

mechanisms, Armenia's DSO planning, and Rhode Island's reliability investment framework. A separate Romanian case on locational tariff signals was also referenced from ERRA's latest newsletter. Mr. Lo Schiavo concluded by announcing an ERRA technical workshop in Winter 2025–26 focused on investment needs and capital attraction for grid development.

Mr. Mohammed Atif, Area Manager for Energy Systems at DNV AS (Dubai Branch), followed with a presentation on the transformation of power systems. Drawing on recent global examples, he discussed the technical vulnerabilities of systems with high renewable penetration. He cited a recent blackout in Spain, where solar accounted for 55% of electricity supply—an imbalance that, coupled with insufficient firm capacity scheduling, led to the sudden disconnection of 15 GW and a major grid disturbance. Mr. Atif emphasized the need for improved scheduling, integrated storage, and stronger grid management practices. He also noted the promising outlook for the Middle East and North Africa region, where solar and wind deployment is set to accelerate from the mid-2040s, leveraging the region's high solar irradiance, available land, and alignment of solar generation with peak cooling demand.

The session concluded with a U.S. perspective from **Ms. Ann E. Rendahl**, Commissioner at the Washington Utilities and Transportation Commission and First Vice President of NARUC. She outlined several key challenges in grid integration, including the intermittency of renewables, the growing complexity of decentralized and inverter-based resources, and the need for enhanced system operator visibility and control. Ms. Rendahl emphasized the strategic shift needed to evolve the grid from a centralized, one-directional model to a flexible, dynamic system that accommodates variable, local generation. She highlighted tools such as demand flexibility, virtual power plants, and advanced grid optimization.

Ms. Rendahl also addressed the importance of reliability standards, referencing recent grid disturbances in California and Texas linked to the ride-through failure of inverter-based solar resources. In response, new NERC rules—effective May 2025—will require all bulk power system-connected inverter-based resources, regardless of capacity, to register and comply with standards such as PRC-024. These include frequency and voltage protections and ride-through capabilities for system disturbances within defined thresholds. Her remarks reinforced the growing need for regulatory frameworks to adapt alongside evolving technologies, ensuring that system stability and investment readiness keep pace with decarbonization goals.

Following the presentations, the session concluded with a moderated panel discussion that brought together regulatory perspectives from across four continents. The panel offered a dynamic exchange on how countries with vastly different market structures and renewable trajectories are responding to the shared challenge of grid integration.



Eng. Hisham Al Riyami, General Manager of Planning at Oman Electricity Transmission Company, opened the discussion by emphasizing the critical role of digitalization and real-time data systems in modern grid management. He highlighted OETC's focus on developing a unified platform to collect and consolidate relevant information across the grid. The goal, he noted, is to enable rapid and wellinformed decision-making as the system grows more complex. Drawing

on earlier insights from ERRA and DNV, he underlined that such a platform will be essential to organize and analyze the significant volume of data produced by diverse systems. He also stressed that the pace of the energy transition demands that transmission system operators and regulators stay up to speed, as new technologies and system dynamics reshape planning and operations.

Mr. Hasan Özkoc, Secretarty General of the Mediterranean Energy Regulators (MEDREG), provided a regional perspective, emphasizing the Mediterranean's potential as a future green power hub. He outlined MEDREG's efforts to harmonize regulatory frameworks and promote investment in cross-border infrastructure. Özkoc stressed that grid systems, much like renewables, require clear regulatory incentives to attract financing. He emphasized that funding remains one of the key barriers to building the necessary grid infrastructure and called for more attention to regional banking mechanisms that could support investment in transmission networks.

Ms. Ann E. Rendahl expanded on her earlier remarks, reflecting on the need for regulatory cooperation and harmonized standards to manage risks associated with inverter-based resources. She emphasized stakeholder engagement, as well as the value of coordinated reliability measures, particularly in response to recent disturbances in U.S. systems caused by ride-through failures. She pointed to new NERC requirements, taking effect in 2025, which will mandate stricter performance standards for inverter-based generation connected to the bulk power system.

Ms Rendahl also drew attention to the growing importance of advanced technologies such as grid-forming inverters, which can support system stability by providing frequency response. She noted that implementing such solutions will be a process of discovery, requiring continuous innovation and adaptation. In the United States, active efforts are underway to understand how these technologies can be most effectively integrated into evolving power systems. The role of innovation, she stressed, will be critical in ensuring that technical solutions keep pace with policy ambitions for a cleaner and more resilient grid role of stakeholder engagement and cross-border coordination in managing regional reliability.

Ms. Ludimila Silva, Brazil's Energy Regulatory Agency (ANEEL) and a representative of the Association of the Portuguese-Speaking Energy Regulators, shared insights from Brazil's experience integrating large volumes of renewables into its hydro-dominant system. She emphasized the benefits of long-term centralized auctions, evolving grid codes, and the resilience offered by complementary energy resources. However, she also pointed out that expanding the grid comes with high financial costs, often borne by consumers—an issue regulators must manage carefully. In addition, land availability and spatial constraints pose real challenges to large-scale

grid development. For this reason, Silva suggested that instead of focusing exclusively on expansion, regulators and operators should prioritize making better use of existing infrastructure and improving grid efficiency, which may deliver faster and more cost-effective outcomes.

The panel reinforced the consensus that while challenges differ across jurisdictions, the solutions—flexibility, transparency, coordination, and forward-looking regulation—are increasingly global.

Session III: CROSS-BORDER COOPERATION; MARKET INTEGRATION

The third session shifted focus toward regional power market integration and cross-border regulatory cooperation, spotlighting examples from the Balkans, the Nordics, West Africa, and the Gulf region. As energy systems become increasingly interdependent, the session explored how regional cooperation can unlock greater efficiency, enhance security of supply, and support the energy transition at scale.

The first presentation came from **Mr. Marko Bislimoski**, President of North Macedonia's Energy Regulatory Commission. He shared updates on cross-border cooperation efforts underway in the Balkans, a region historically shaped by fragmentation but now moving toward regulatory alignment and infrastructure integration. The Balkans have highly diverse energy mixes—ranging from coal and hydropower to increasing shares of renewables—and many countries remain dependent on imports during supply shortages. Bislimoski emphasized that improved cross-border infrastructure is key to ensuring regional power system stability and efficiency.

He further outlined North Macedonia's strategy to expand its natural gas transmission infrastructure, with planned interconnections to Greece, Kosovo, Serbia, Albania, and Bulgaria. The national TSO aims to connect all major cities to gas supply, and importantly, all new pipelines will be hydrogen-ready, with current infrastructure under assessment for compatibility with future hydrogen use. These developments not only support diversification but also position the country to play a strategic role in regional energy flows.

Building on the theme of integration, **Mr. Luis Boscán** of Ea Energy Analyses offered a comparative perspective from the Nordic region. Drawing from decades of experience with deep market integration, he outlined the key factors that have enabled the Nordic countries to successfully operate a shared electricity market. Among the most important lessons, Boscán highlighted the need for strong political will, mutual trust, and cooperation among countries. He emphasized that relatively simple market design—rather than overly complex systems—has proven to be the most effective approach.

Mr Boscán also advised that countries and regulators should first spend time understanding why market integration and cross-border trade are relevant to their specific context. Starting with a clear vision, he noted, is more important than rushing into regulatory details—policy and regulatory design should follow a clearly articulated objective. He added that full-scale market reform is not a prerequisite for starting integration; countries can begin cooperation and cross-border coordination incrementally while continuing to build their regulatory frameworks.

A joint Q&A session followed, where both speakers emphasized the central role of regulators in enabling trust and cooperation across borders. While regional contexts differ, both presentations reinforced the message that integration efforts require long-term commitment, coordination, and technical capacity at all levels.

The panel discussion that followed further enriched the conversation with insights from Africa, the Gulf, and the Baltics. **Dr. Nasser Al-Shahrani**, Chief Operating Officer at the Gulf Cooperation Council Interconnection

Authority, discussed the operational experience of the GCC grid and the benefits of regional interconnection for reliability and emergency support. He explained how the GCC's unique configuration—linking six countries across the Arabian Peninsula—has enabled a shared reserve mechanism and offers lessons for other regions with close geographic and political ties.

Mr. Rolands Irklis, Chairman of Latvia's transmission operator AST, presented the Baltic region's ongoing integration with the Continental European Network, including efforts to synchronize grid operations and increase cross-border trade. He stressed the importance of energy security and political alignment in driving these changes, particularly in the current geopolitical climate. Irklis also emphasized the need for efficient regulatory design, noting that when designing regulations, the first priority should be to eliminate unnecessary obstacles, such as long permitting procedures or overly complex approval systems. He further suggested that regulation should not only remove barriers but also create positive incentives—encouraging the demonstration of new services and products for balancing markets and supporting investment in innovative solutions. Regulation, he argued, should work in both directions: reducing barriers while also actively promoting innovation and investment.



Ms Souad Nassir of Morocco's National Office of Electricity and Drinking Water closed the panel by underscoring Morocco's ambition to become a regional hub for clean energy trade. She noted that beyond technical interconnection, regulatory readiness and political will are critical to unlocking the full benefits of cross-border trade. As a case in point, she highlighted Morocco's participation in the emergency plan that helped restore electricity supply to the Spanish power system during a recent

major incident in Spain and Portugal. This type of regional solidarity, she emphasized, demonstrates the value of having interconnected systems not just for efficiency, but also for resilience.

Collectively, the session illustrated how cross-border cooperation—whether in mature or emerging markets—relies on trust, institutional capacity, shared rules, and a common vision for energy transition.

Session IV: CAPTURE RATES FOR SOLAR AND RE-THINKING SUPPORT SCHEME

The final session of the day explored how electricity markets must evolve to meet the demands of the energy transition, including variable renewable energy (VRE) integration, electricity storage, and regional coordination. Experts shared insights into challenges, innovations, and regulatory solutions that can unlock investment, efficiency, and resilience.

Mr. Stephen Woodhouse of AFRY opened with an overview of the evolving market landscape, noting that decarbonization is intensifying the need for centralized and coordinated decision-making, especially around investment planning and system security. At the same time, markets are becoming increasingly decentralized,



shaped by new technologies, products, and services. While governments are taking more control over the technology mix via support schemes and strategic direction, he stressed that markets still have a vital role to play and should not be sidelined.

Mr. Guido Bortoni, Chairman of CESI, focused on the need for reforms in market design to integrate

renewables and storage effectively. He highlighted the non-dispatchable and distributed nature of VRE as a core challenge, alongside wholesale markets' inability to provide sufficient long-term investment signals. As a response, he introduced the "Three Forward Markets" model, first proposed by Rocchio and Boschi in 2020, which sequences forward contracting mechanisms to support system adequacy and security.

In the moderated panel, **Dr. Firas Al Abduwani** from Oman emphasized the importance of a regional, holistic view within the GCC. While the Gulf System Interconnection (GSI) has mainly supported emergency sharing, it could evolve into a more dynamic framework enabling increased power trade and regional market development—potentially supporting electricity exports beyond the GCC. He stressed that achieving this vision would require not just infrastructure, but also forward-thinking market frameworks.

Mr. Jesse Cohen from RMI added that interconnection processes must be clear, transparent, and designed to promote genuine competition among renewables and other technologies. He emphasized that any incentive mechanisms must rest on sound economic principles to be effective and sustainable.

Mr. Volkan Yiğit of Türkiye highlighted that while increased renewable penetration is essential, it can also lead to unintended outcomes—such as zero or even negative market prices. In Turkey, the market floor is currently set at zero, but negative pricing is being actively considered as renewable capacity grows. Aligning the integration of renewables with appropriate regulatory adjustments is a complex challenge that Turkey's regulatory framework is currently working to address.

Mr. Francisco Salazar, representing ICER, offered a global outlook on market reform, highlighting that the challenges of integrating VRE and creating investment signals are shared across jurisdictions. He pointed to regulatory innovation, international cooperation, and robust governance frameworks as the keys to moving forward.



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