



VIENNA ENERGY FORUM-THE VEF VIRTUAL SERIES

Sustainable Energy and Industry Integration- Session 1



1. OVERVIEW OF KEYNOTE & PLENARY ADDRESS

These esteemed speakers urged participants to explore the opportunities for the integration of sustainable energy in industry, and identify interventions to galvanise action. Tackling the challenges of maintaining industrial growth, achieving global climate ambition and ensuring economic competitiveness requires a collective effort.

“Co-creating new solutions are required to drive progress to achieve the low carbon industrial goals” (Stephan Sicars).

This session was the first of eight virtual sessions on sustainable energy-industry integration. The aim of the sessions is to:

- Provide a platform to collectively explore intervention pathways available to countries looking to achieve sustainable energy-industry integration, given different capabilities and contexts;
- Facilitate learning and partnerships that can unlock these opportunities;
- Collectively inform a set of policy briefs and other initiatives to be undertaken ahead of the VEF; and
- Provide a basis for designing VEF sessions and a potential global initiative that can galvanise action towards the intended outcomes.

SETTING THE SCENE PRESENTATION

The Integration of Sustainable energy (renewable energy and energy efficiency) and Industry represents an opportunity to contribute to tackling current crises and delivering on development goals.

There has been an increase in sustainable energy integration in industry but much more is possible:

- Globally, the industrial sector (refining, mining, manufacturing, agriculture and construction) accounts for the largest share of energy consumption of any end-use sector, currently at more than 50%.
- Industry emissions are larger than the emissions from either building or transport end-use sectors, and represented just over 30% of global GHG emissions in 2010.
- There has been just under 1% industrial energy consumption growth per year, between 2010 & 2018
- Renewable heat consumption has gained relevance over the last decade where renewables' industrial energy demand for heat rose to 10% in 2018.
- Despite this increase, CO₂ emissions from industry dropped by 0.6% in 2018, indicating a reduction in industrial energy intensity. Additionally, there has been a limited decline of fossil fuel use, from 73% to 69% of industrial energy mix.

Significant barriers remain including:

- Continued reliance on fossil fuels – e.g. coal meets as much as 75% of energy demand in iron and steel;
- Renewable energy's inability to produce the high-temperature heat required by many industrial processes;
- Lack of carbon pricing, emissions trading and border adjustment taxes, which are key in ensuring competitiveness of low carbon technologies; and
- Weak policy environments– only 25% of industrial energy use is covered by mandatory energy efficiency standards.

There are **opportunities to leverage and enhance existing processes** such as COVID-19 recovery and industrialisation plans, as well as the updating of countries' climate change Nationally Determined Contributions (NDCs):

- COVID-19 has impacted industry (supply chain disruption, a global downturn in investment, increased unemployment and significant shifts in supply and demand) but industrial growth can play a pivotal role in the acceleration of a socio-economic recovery.
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- Industry-related measures are included in many NDCs (e.g. specific emission reduction targets, energy management and energy-efficient programmes, and increasing renewable energy generation) and these are a good proxy to identify potential investment and support opportunities for low-carbon industrial growth in the specific country. NDCs offer a platform to recognise and enhance country responses towards its national climate efforts, and showcase projects and programmes in a particular sector e.g. industry.

There are additional opportunities to focus on high potential areas to deliver sustainable energy integration:

- **Digitalisation:** The response to COVID-19 is speeding up digitalisation & spurring innovation. Sectors/countries/companies that have shifted have been more resilient. Upscaling digitalisation can address energy, climate and industrial growth targets. How can industry capitalise on this moving forward?
 - **COVID & SMEs:** SMEs play crucial roles in industry often with outdated technology; some of the hardest hit by the impacts of COVID-19. Other SMEs have been agile and innovative and capitalised on opportunities. SMEs are important in sustainable energy-industry based post COVID-19 socio-economic recovery.
 - **Equity, gender and youth:** Women and youth are under-represented in industry and industrial value chains; face numerous challenges. COVID-19 and sustainable energy-industry provides opportunities to address the challenges. There is a need for practical steps for increasing diversity; understanding the role of sustainable energy-industry integration; and understanding the valuable role of women and youth.
 - **Renewable Energy and Energy Efficiency:** There has been an increase in the share of renewable energy in industry with COVID-19 but a stalled supply chain is limiting growth. The future role of renewable energy in industry is uncertain - will "green stimulus" translate? Industrial energy efficiency opportunities are well understood. They will not deliver a step change but are important and need to be ramped up (especially in long-lived industrial assets).
 - **Decarbonisation:** Post COVID-19 developing country industrial sectors face the threat of trade protectionism and decreasing demand for carbon-intensive industrial products (transition to net-zero emissions). Hard-to-abate sectors are particularly at risk but there are also opportunities (increased/new demand for low carbon products). There is a need to manage the transition - building resilience and positioning for emerging opportunities.
 - **Inclusive Infrastructure:** Quality low carbon infrastructure (e.g. energy, transport, ICT etc.) is a prerequisite for achieving low carbon industrialisation but remains a bottleneck. Investment is needed in the necessary physical, digital and socio-economic infrastructure - can enable industrialisation that is resilient, competitive and low carbon.
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2. SUMMARY OF BREAKOUT DISCUSSIONS

2.1 GLOBAL PERSPECTIVES

Sub-question 1: What strategies are needed to demonstrate that the integration of sustainable energy in industry can ensure transformational development outcomes?

Industrialisation is important for economic development, and sustainable energy integration has the potential to deliver win-win outcomes.

Challenges: Industry decarbonisation is critical and is not being adequately achieved. Different approaches are needed for different technology types:

- Technologies that do not yet exist (e.g. hydrogen in steel manufacturing);
- Existing technologies that need to be scaled (e.g. in transport and heating)
- Decarbonisation of electricity generation (renewable energy costs are, in many instances, less than that of fossil fuel costs)
- Energy efficiency (presenting a clear business case that contributes to firms' profitability)

Opportunities: According to IRENA, half of the potential for decarbonisation lies in renewable energy. Progress is being made as industrial players are increasingly driving demand for renewable energy and energy efficiency. There is strong interest from industry who are actively engaging in sustainable energy-related conversations. Innovation is driving new models (e.g. new "utilities" like Tesla).

Recommendations: Several recommendations emerged from the discussions, including the need to:

- Work with distribution companies;
 - Set long term goals that drive action and commitment;
 - Focus on electrification through renewables to produce green hydrogen;
 - Drive smart sector coupling (e.g. to enable flexibility for inclusion of renewables in the power system);
 - Integrate SDGs into companies' strategies;
 - Consider nuclear energy as a part of the solution;
 - Explore ammonia from green hydrogen as a new and promising option; and
 - Focus on the marketing strategies associated with green products.
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Sub-question 2: Which are the most important enablers to allow effective interventions that consider dimensions relevant to country's capabilities and contexts?

- **Energy and industry stakeholder collaboration:** there is a need to engage other players in energy discussion, to be open to a new way of working together, of crowding in different skills and knowledge. This will enable learning and evolution.
- **Communication:** the economic benefits need to be highlighted (the transition to sustainable energy industry integration will increase competitiveness).
- **Incentives beyond regulation:** regulations and carbon pricing have not brought about adequate technological change to date.
- **NDCs as a leverage point:** NDC updates are an opportunity to raise ambition and drive more focus on sustainable industry. China's announcement of carbon neutrality is of huge significance. Ownership of the goals in the government is important. Multinational companies are setting their own net-zero targets taking a proactive stance, meeting growing demand.
- **Enabling infrastructure is needed:** governments have a role to play but industry is willing. Developing countries can leapfrog. Industrialised countries may need to upgrade. Industry is likely to move to where renewable energy is located requiring infrastructure for industry in new geographies.
- **Standards and incentives:** Standards for, and certification of, green commodities, and renewable energy and energy efficiency suppliers is needed. Fossil fuel subsidies need to be removed.

Other Areas:

- **Managing the transition:** Decentralised solutions bring up new players. "We need to take it progressively." "It's not just about technology - social and political acceptance of the changes is critical".
- **Success stories:** The discussions noted the GGGI project in the Cambodian textile industry which led to a 20% increase in renewable energy and energy efficiency, an energy connectivity increase and reduced energy cost. In Chile, the renewable energy sector is being seen as a competitive advantage to attract companies to the country.

2.2 COUNTRY VOICES

Sub-question 1: What are the remaining challenges and untapped opportunities on the integration of sustainable energy in industry?

- **Highlights:** There is currently a good energy mix (including renewable energy) in industry. There is a National Programme for energy-intensive industry, that offers technical assistance in implementing energy efficiency measures and technology upgrades. And there is a programme for SMEs integrating energy efficiency in broader efforts to support lean manufacturing.
- **Recommendations:** When designing programs for industry, it is important to integrate energy efficiency with broader change management practices.

Morocco

- **Highlights:** The country has a coherent energy regulatory framework (energy efficiency Law, renewable energy framework), there is effective governance (dedicated Energy Agency), energy efficiency projects are supported financially (e.g. the EU has supported 260 projects to the value of EURO 100m with payback periods of less than 5 years), industrial policy is aligned with climate policy (i.e. discounted subsidizing fossil fuels) and there are successful examples of implementing ISO 50 001 capacity building programmes.
- **Challenges:** Awareness raising among industry and management.
- **Recommendations:** Ensuring policy coherence across various domains is important (e.g. energy pricing vs. incentives for IEE) and customized capacity building.

India

- **Highlights:** Successful emission trading scheme (focus on large emitters; measurement and tracking system).
- **Challenges:** Ensuring adequate network infrastructure for the alternatives (fuel switching).
- **Opportunities:** Pathways to renewable and efficient energy systems for Micro, Small and Medium Enterprises (MSMEs) clusters, with a specific focus on increasing electrification to clusters, increasing renewable energy use, establishing a viable network infrastructure (for fuel switching) and exploring carbon pricing.
- **Recommendation:** A cluster approach for MSMEs has worked well in India along with across-the-board support for baseline accounting.

Austria

- **Highlights:** National Climate Protection Programme with focus on SMEs (klimaaktiv), the key role of standardisation in the area of Energy Management Systems (EnMS) and efficiency, the key role of qualification of the experts in the area of energy efficiency, and a Web Portal on EnMS for knowledge sharing.
- **Challenges:** There are challenges in energy efficiency markets, such as knowing the energy consumption in industry. There is a need for building capacity on monitoring and measurement.
- **Recommendation:** Invest in a strong certification scheme for qualified technicians and equipment labeling.

South Africa

- **Highlights:** The country has an effective regulatory framework (mandatory reporting on energy consumption/plans in process), carbon tax policy and tax incentives (two approaches: equipment-based and consumption-based) with a strong focus on monitoring and verification.
- **Challenges:** The country's utility (Eskom) is poorly structured, lacks flexibility and can make limited investments due to significant debt. This has resulted in tariff increases and rolling blackouts ("load-shedding"). There are opportunities for tariff reform.
- **Recommendations:** Innovation and experimentation in policy options. For example, use a variety of push and pull factors, but this requires a strong base of qualified and certified verification experts.

Sub-question 2: How are various countries addressing those challenges and unlocking the opportunities to ensure transformational development outcomes?

Key challenges are finance and a knowledge gap (understanding energy consumption, especially for SMEs).

However, there are significant opportunities for policy innovation, innovative finance models, critical network infrastructure (optimization of existing and designing for future fuels), capacity building across value chains (including SMEs), digitalisation as a critical enabler to transform markets (requiring new skillset for IT, data analytics, databases, electronic applications), and energy efficiency networks that facilitate learning.

Summary take-aways:

There are a variety of approaches and measures to driver change in industry behavior, the common aspects to pay attention to include:

- **Policy and regulations:** policy innovation and experimentation (fenced), mix of instruments, differentiation in approach by industry (large vs. small, cluster approaches), ensuring policy coherence and coordination;
- **Programmes:** ensure adequate customization to create the right incentives. Bundle energy efficiency with broader technology and behavior change programmes (Brazil), customize tools to the needs of industry professionals (EnMS for SMEs, Morocco), support efforts for measurement and monitoring of energy use, especially among SMEs; and
- **Challenges and opportunities:** ensure skills are kept up to date with the convergence of digital solutions (more IT, data analytics, etc.) than just mechanical and electrical skills. Network infrastructure is needed for alternative fuels/fuel switching (from coal to gas or electrification) ensuring SMES still have good access. Upgrade capabilities to manage more complex supply-demand scenarios with storage options.

2.3 ENABLERS FOR PROGRESS

Sub-question 1: What are the key enablers to effective interventions in the energy industry nexus?

- **Policy:** Focus on market transformations, with targeted sub-sectors and clear targets for implementation. Also, consider fiscal measurements that would look at tariffs for energy and water, and adjusting subsidies.
- **Invest in R&D** with the specific goal to access the commercialisation of available and established technologies such as hydrogen, and in developing comprehensive policy frameworks for energy-intensive and hard-to-abate sectors.
- **Focus on NDCs:** Find a way to deduce and have an integrated policy framework linked specifically to the NDCs, where measures would need to be much more disaggregated and involve different industries rather than just placing the focus on measures that target energy efficiency and access to renewable energy.
- **Enforcing international agreements:** Not only through incentives, but also through building capacity. Aim for assisting countries at operational and institutional levels.
- **Improving data reporting systems** and data consistency, which needs to be tackled to progress effectively across different industry sectors. Having systems that collect data and make it transparent is critical for any policy mission and framework.

Sub-question 2: What are examples of effective interventions where industry is progressing in integrating low carbon technologies?

There is an opportunity to integrate low carbon technologies with existing, more widely used, technologies. For example, hydrogen production and storage has the potential to be used as a means to solve intermittent renewable energy, or in nuclear plants, the possibility to scale back and focus on hydrogen production, to be used as a storage medium.

Successful examples exist in the UK and Sweden for using electrolysis for hydrogen production and integrating it with low and high temperatures and large scale industries to connect to the existing hydrogen demand - which is expected to increase.

Poland is successfully working on a nuclear programme for energy supply and stable electricity prices and decarbonisation, for what is traditionally a very coal-reliant country.

Implementation of procurement policies in cities or government offering incentives such as a procurement bonus for low carbon materials that come at the end of supply chain for industrial processes, or imposing a procurement standard such as in the state of California in the USA.

Voluntary efforts to create a demand-aggregation space, such as the Renewable Energy Buyers Alliance where corporates purchase renewable energy, has a huge impact on scaling the renewable energy markets and being able to scale up the provision, and reduce the costs, of renewable energy and clean energy. This has been replicated in different countries such as the USA, India, Columbia and China.

2.4 DATA AND EVIDENCE

Sub-question 1: Which countries offer the most potential for the integration of sustainable energy in industry?

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- Countries with high energy intensity and CO2 mitigation potential, such as India and China;
 - Countries with political will for industry decarbonisation, expressed through targets in NDCs and supporting regulatory environment for sustainable energy;
 - Countries with a vibrant entrepreneurial environment that can support the development of innovative solutions and partnerships, such as Tunisia and Egypt;
 - Countries that have a strong industrial base and have the capacity to self-finance sustainable energy investments, such as GCC;
 - Countries that are recipients of donor aid and/or are embedded in international cooperation frameworks.

From a socio-economic impact, it might be better to focus on developing countries that have industrialisation plans, whereas from a CO2 mitigation perspective it may be better to focus on countries with a strong industrial base.

Sub-question 2: What evidence and data sets should be used to identify those countries and prioritise the interventions?

The interventions should be focused on building capacities of countries in order to:

- Strengthen data collection capacities at the national level, enhancing monitoring & evaluation frameworks.

- Support data tracking activities using artificial intelligence and digital technologies.
- Build capacity and awareness of policymakers, decision-makers and the public sector in general towards energy and industry development.
- Strengthen the capacity and awareness of parliamentarians on questions related to sustainable energy development and industry decarbonization, as they are the legislators and have the capacity to create opportunities for more investment.

It is also important to prioritise a youth-centered approach. We need to support and believe in their potential. This will result in so much socio-economic value-added.

Technologies for industry decarbonisation are available, but regulatory frameworks often need to be improved to facilitate the deployment of these technologies. We need to work closely with decision-makers on enhancing regulatory frameworks.

Other Areas:

- Increase innovative financing options for energy efficiency projects;
 - SMEs require different financing than large corporations- challenging to strike the right balance;
 - Encouraging resource efficiency in industrial sector and expanding the lifetime of products;
 - Focus efforts on reducing process-related CO2 emissions;
 - Finding alternative materials to cement, iron and steel, as these will be in high demand due to increased urbanisation in the years to come;
 - More focus on greening agriculture industries and incorporation of PAYGO services, especially in sub-Saharan Africa;
 - Promote access to relevant information for different stakeholders to enable better decision making;
 - Many people lost their jobs during COVID-19. Government/public sector should focus on expanding expertise (in sustainable energy in industry) and on workforce development. Many countries regard education and health as priority areas. However, it is also important that countries see energy as an important field.
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