Perspective on Energy Transition and Regional Cooperation

Joong Yeop Lee
Programme Officer, Country Engagement and Partnerships

Expert Group Meeting: Vienna Programme of Action Subregional Review in North and Central Asia
8 June 2023
**RE, efficiency and electrification dominate energy transition**

- Reducing emissions by 2050 through six technological avenues
- 90% of all decarbonisation in 2050 will involve Renewable Energy through direct supply of low-cost power, efficiency, electrification, bioenergy and green H2.
Global WA-LCOE from utility-scale solar PV projects fell by 85% between 2010-2020, CSP by 68%; on-shore wind by 56%, and off-shore wind by 48%.
Record 295GW growth in renewables achieved in 2022
### The energy transition is far from being on track to 1.5°C

- **Significant acceleration** is needed across energy technologies, from deeper end-use electrification, to **direct renewable use**, **energy efficiency** and **infrastructure** additions.
- The **lack of progress** will increase future **investment needs** and the **costs of worsening climate change effects**.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Recent years</th>
<th>2030</th>
<th>2050</th>
<th>Progress (Off / on track)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RENEWABLES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renewable 27th power capacity additions</td>
<td>295 GW/yr</td>
<td>975 GW/yr</td>
<td>1066 GW/yr</td>
<td></td>
</tr>
<tr>
<td>Share of renewables in final energy consumption</td>
<td>19%</td>
<td>34%</td>
<td>83%</td>
<td></td>
</tr>
<tr>
<td>Energy intensity improvement rate</td>
<td>0.6 %/yr</td>
<td>3.5 %/yr</td>
<td>2.9 %/yr</td>
<td></td>
</tr>
<tr>
<td><strong>ENERGY EFFICIENCY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of direct electricity in final energy consumption</td>
<td>22%</td>
<td>29%</td>
<td>51%</td>
<td></td>
</tr>
<tr>
<td><strong>ELECTRIFICATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrifier capacity</td>
<td>0.5 GW</td>
<td>233 GW</td>
<td>5722 GW</td>
<td></td>
</tr>
<tr>
<td>CCS/CCU to abate emissions in industry</td>
<td>0.01 GtCO2 captured/yr</td>
<td>1.0 GtCO2 captured/yr</td>
<td>3.0 GtCO2 captured/yr</td>
<td></td>
</tr>
</tbody>
</table>
Electricity becomes the main energy carrier in 2050

- Total final energy consumption decrease by 15% from 2020 to 2050
- Renewable energy deployment, improvements in energy efficiency and the electrification of end-use sectors contribute to this shift
- More significant roles of modern biomass (16%) and hydrogen (14%) in 2050
- 94% of hydrogen consumption in 2050 from renewables
Power generation needs to more than triple by 2050

2020

Gross electricity generation (PWh)

- Fossil fuels: 62%
- Nuclear: 10%
- Renewables: 28%
- Total: 27.0 PWh

2050: Where we need to be (1.5-S)

Gross electricity generation (PWh)

- Fossil fuels: 91%
- Nuclear: 5%
- Renewables: 4%
- Total: 89.8 PWh
The way forward – 3 priority pillars of Energy Transition

**PHYSICAL INFRASTRUCTURE**
- Forward-looking planning
- Invest in grids and trade routes on land and sea
- Facilitate national, regional and global strategies for new supply-demand dynamics and promote equity and inclusion.

**POLICY AND REGULATION**
- Design of policy and regulatory frameworks
- These need to enable different levels of the energy transition, from local to global, and account for new supply-demand dynamics.

**INSTITUTIONS AND SKILLED WORKFORCE**
- Capacity among institutions, communities and individuals to acquire the requisite skills, knowledge and expertise
- Develop a skilled workforce
Deployment of RE requires a significant amount of critical materials.

Installed Capacity by 2050

**Wind**
- 2021: Onshore: 769 GW, Offshore: 56 GW
- 2050: Onshore: 6,170 GW, Offshore: 2,002 GW

**Solar**
- 2021: 481 GW
- 2050: 14,036 GW

**EV**
- 2021: 6.8 mln
- 2050: 1.7 bln
Long-term Supply is Not a Show-Stopper for the Energy Transition

- **Challenges exist and vary by material**
  - Time needed to ramp-up supply
  - Lack of geographical diversification
  - Lack of ESG practices across the supply chain
  - Lack of precise and transparent assessment of needs and activities to date

- **Solutions already exist and their mix is needed**
  - Innovation in chemistries helps reduce or eliminating material demand; in mining, processing and recycling, advance efficiency and sustainability
  - Circularity concept enables material and product reuse and recycling
  - Need for a third-party ESG verification
IRENA’s Energy Transition Support

IRENA’s engagement with Parties to the Paris Agreement

**Input to NDC already provided**

**Implementation of support**

**Work plan development**

**Scoping**

**Latin America and the Caribbean**
- Antigua and Barbuda
- Belize
- Cuba
- Dominican Republic
- Ecuador
- El Salvador
- Grenada
- Nicaragua
- Paraguay
- Saint Kitts and Nevis
- Uruguay

**Europe**
- Armenia
- Austria
- Belgium
- Bulgaria
- Croatia
- Cyprus
- Czech Republic
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Iceland
- Ireland
- Italy
- Latvia
- Lithuania
- Luxembourg
- Malta
- Monaco
- Montenegro
- Netherlands
- Norway
- Poland
- Portugal
- Romania
- Russia
- San Marino
- Serbia
- Slovakia
- Slovenia
- Spain
- Sweden
- Switzerland
- Turkey

**Asia and the Pacific**
- Afghanistan
- Bangladesh
- Bhutan
- Brunei Darussalam
- Cambodia
- China
- Cook Islands
- Cuba
- Democratic People’s Republic of Korea
- Fiji
- France (including New Caledonia)
- Georgia
- Germany
- Greece
- India
- Indonesia
- Iran
- Iraq
- Japan
- Korea
- Kuwait
- Laos
- Malaysia
- Mongolia
- Myanmar
- Nepal
- New Zealand
- Nicaragua
- Niue
- Pakistan
- Papua New Guinea
- Philippines
- Qatar
- Republic of Korea
- Robert
- Russian Federation
- Samoa
- Saudi Arabia
- Singapore
- Solomon Islands
- South Africa
- Sri Lanka
- Syria
- Taiwan
- Thailand
- Tonga
- United Arab Emirates
- United States
- Vietnam

**Africa**
- Angola
- Benin
- Botswana
- Burkina Faso
- Burundi
- Cameroon
- Cape Verde
- Central African Republic
- Chad
- Comoros
- Democratic Republic of the Congo
- Egypt
- Equatorial Guinea
- Eritrea
- Ethiopia
- Gabon
- Gambia
- Ghana
- Guinea
- Guinea-Bissau
- Haiti
- Ivory Coast
- Jamaica
- Kenya
- Lesotho
- Libya
- Madagascar
- Malawi
- Mali
- Mauritania
- Mauritius
- Morocco
- Mozambique
- Namibia
- Niger
- Nigeria
- Sierra Leone
- Somalia
- South Africa
- Sudan
- Swaziland
- Tanzania
- Togo
- Tunisia
- Uganda
- United Arab Emirates
- United Kingdom
- United States
- United States Virgin Islands
- Uruguay
- Zambia
- Zimbabwe

**Disclaimer:** This map is provided for illustrative purposes only. Boundaries and names shown on this map do not imply any official endorsement or acceptance by IRENA.
IRENA’s Engagement with Central Asia

- **Webinar on Advancing the Energy Transition in Central Asia through NDCs and LTS** (2021, with UK COP26 Presidency)

- Capacity Building for Renewable Energy Targets and **Renewables Readiness Assessment** for Kyrgyzstan (2022)

- Strengthening Bioenergy Data of Kazakhstan for Monitoring SDGs and NDCs (2023)
IRENA’s Engagement with Central Asia

• Scaling Up Renewables in Landlocked Developing Countries (LLDCs) (2022)
  - Ambitious renewables targets consistent with NDCs and LTS offers a strong business case for investment.

• 3 Solar Projects under the ETAF in Uzbekistan (2023)
  - Masdar and the AIIB have agreed to commit capital.

• SolarCity Simulator for Tashkent (ongoing, with UNDP)
  - A web-based platform for planning of rooftop PV
THANK YOU!