Pathways to Sustainable Energy

National approaches to a global challenge

Baku, 21 October 2016

Country Perspectives

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Group Discussion: Expected Outcomes

- Collection of national and sub-regional insights to formulate regional narratives that fit within the overall global storyline.

- Definition of national and sub-regional key drivers as well as regional trends for the sustainable energy transformation

- Collect regional messages, trends and challenges that will shape future sustainable energy pathways in the context of the global modelling

Groups: Regional focus

- Central Asia countries
- Caucasus countries

- Eastern Europe
- South-Eastern Europe

- Western Europe
- North America

- Non-ECE

Regional Deep-Dives

Which aspects are key to defining sustainable energy for your country and sub-region?

45 min

*How do you define sustainable energy **in 2050** for your sub-region? What are the key pillars, and main aspects in each of the pillars? Where are challenges to come to a shared vision? Which aspects differ among your countries?*
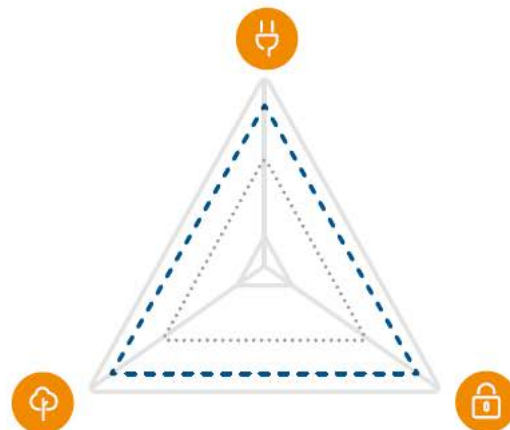
After the discussion, using a triangle visualisation with the key pillars marking the ends, draw 3 triangles in the diagram: one each for 2015, 2030, and 2060.

When would you achieve the „optimal" rating for all three dimensions?
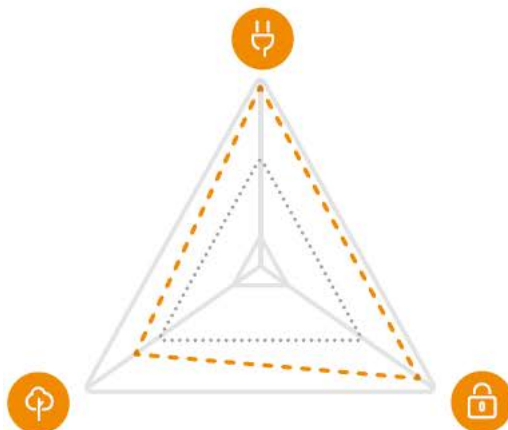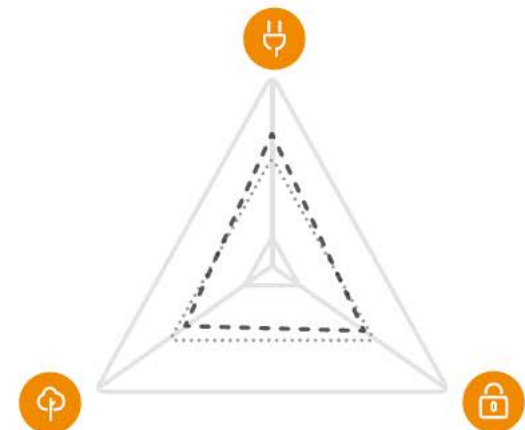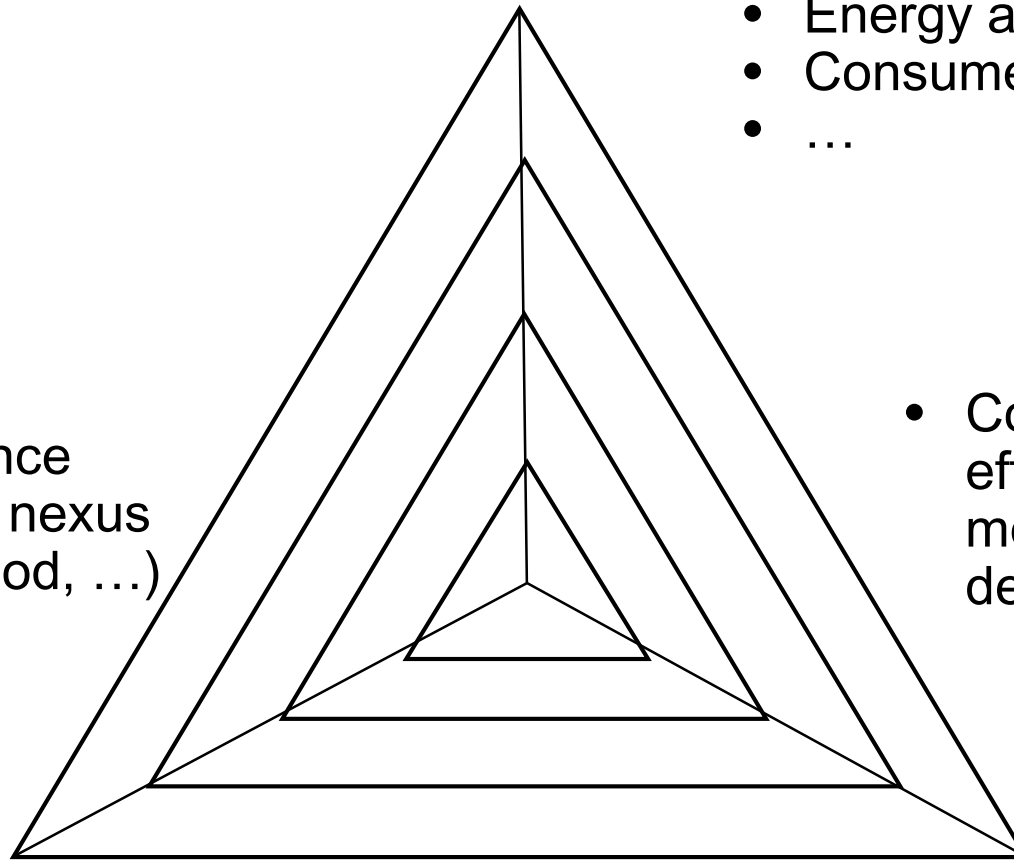

Modern Jazz 2060   Unfinished Symphony 2060   Hard Rock 2060

Energy Sustainability Diagram

Social

- Energy equity
- Energy access
- Energy affordability
- Consumer awareness
- …

- Cost efficiency & effectiveness in meeting energy demand

- Pollution
- Climate resilience
- energy-related nexus (water, land, food, …)
- …

Environmental

**Economic**

Energy Trilemma Chart

Energy Security
The effective management of primary energy supply from domestic and external sources, the reliability of energy infrastructure, and the ability of energy providers to meet current and future demand.
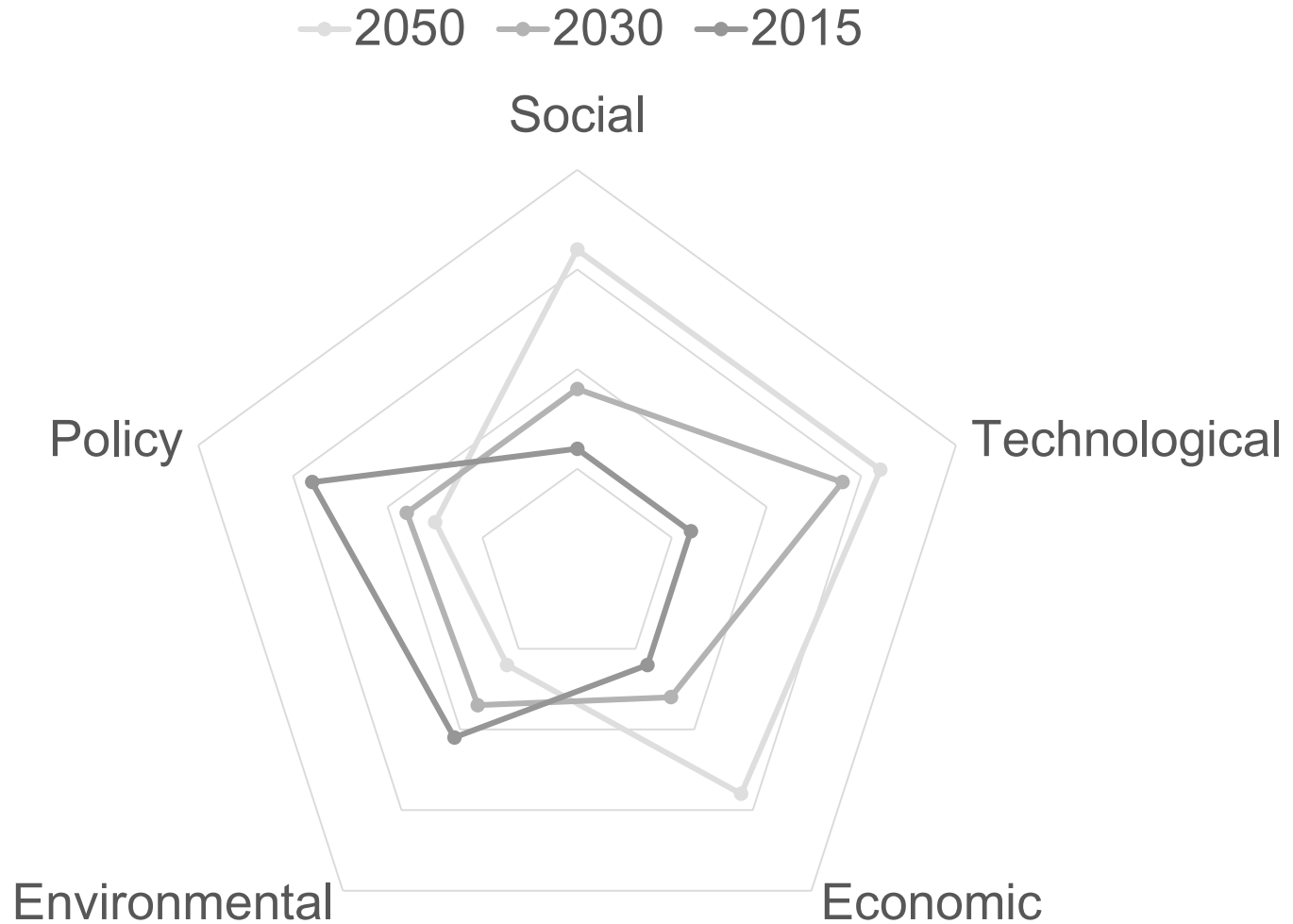
Energy Equity
Accessibility and affordability of energy supply across the population.

Environmental Sustainability
Encompasses the achievement of supply and demand side energy efficiencies and the development of energy supply from renewable and other low carbon sources.

ENERGY
SECURITY

ENERGY
EQUITY

ENVIRONMENTAL
SUSTAINABILITY
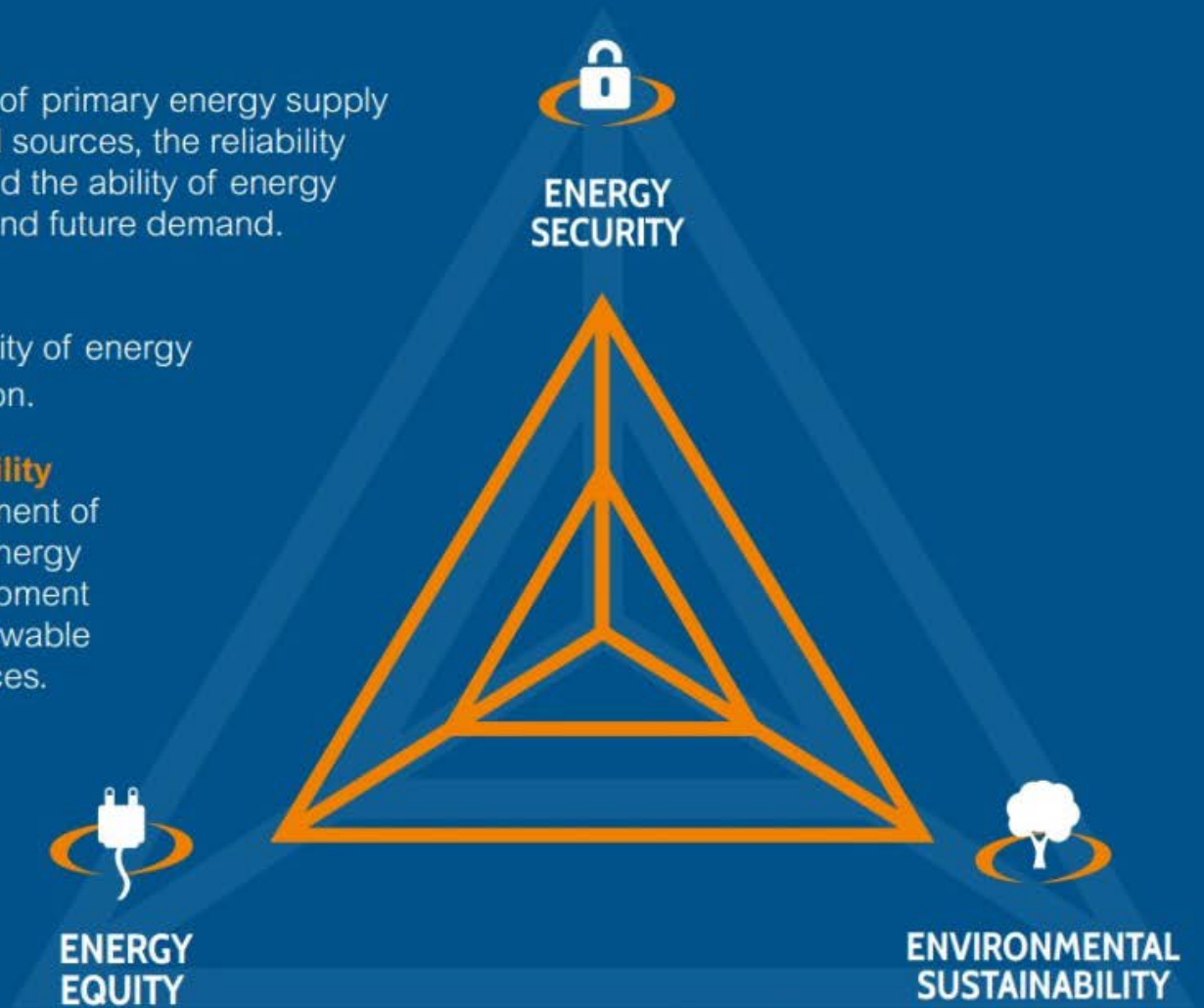
STEEP Diagram

Regional Deep-Dives

What are the key drivers for your country and (sub-) region moving towards sustainable energy in 2050? What are regional drivers (rather than global drivers)?

Starting from the 2 key uncertainties and 27 descriptors clustered according to STEEP (Society – Technology – Economy- Environment – Technology), please discuss in your group the key drivers (about 8-15) for the sustainable energy system going forward in your region?

What are regional trends and/or shocks that should be integrated in the Pathways towards 2050? What are regional messages that should be considered in the storylines?

These trends, risks, disruptions, or messages should have an impact on the energy sector, and can come from a variety of areas, including energy trading, resource pricing and availability, society and consumer behaviour, leadership of specific countries, technology and business innovation, international cooperation, etc.

If possible and time allows, you can allocate each message to one of the four storylines from the Scenario matrix.

Driving Factors

➢ International cooperation on Sustainable Development
➢ Innovation in business and technologies

SOCIETY

- Society Change
- Civil Society
- Consumer awareness about energy conservation & energy efficiency
- Urbanisation

TECHNOLOGY

- Information & communication technology (ICT)
- Grid Development & Infrastructure
- Energy storage
- Low carbon technologies
- Carbon Capture & Storage (CCS)
- Transport

ENVIRONMENT

- Land, water, energy nexus
- Water availability
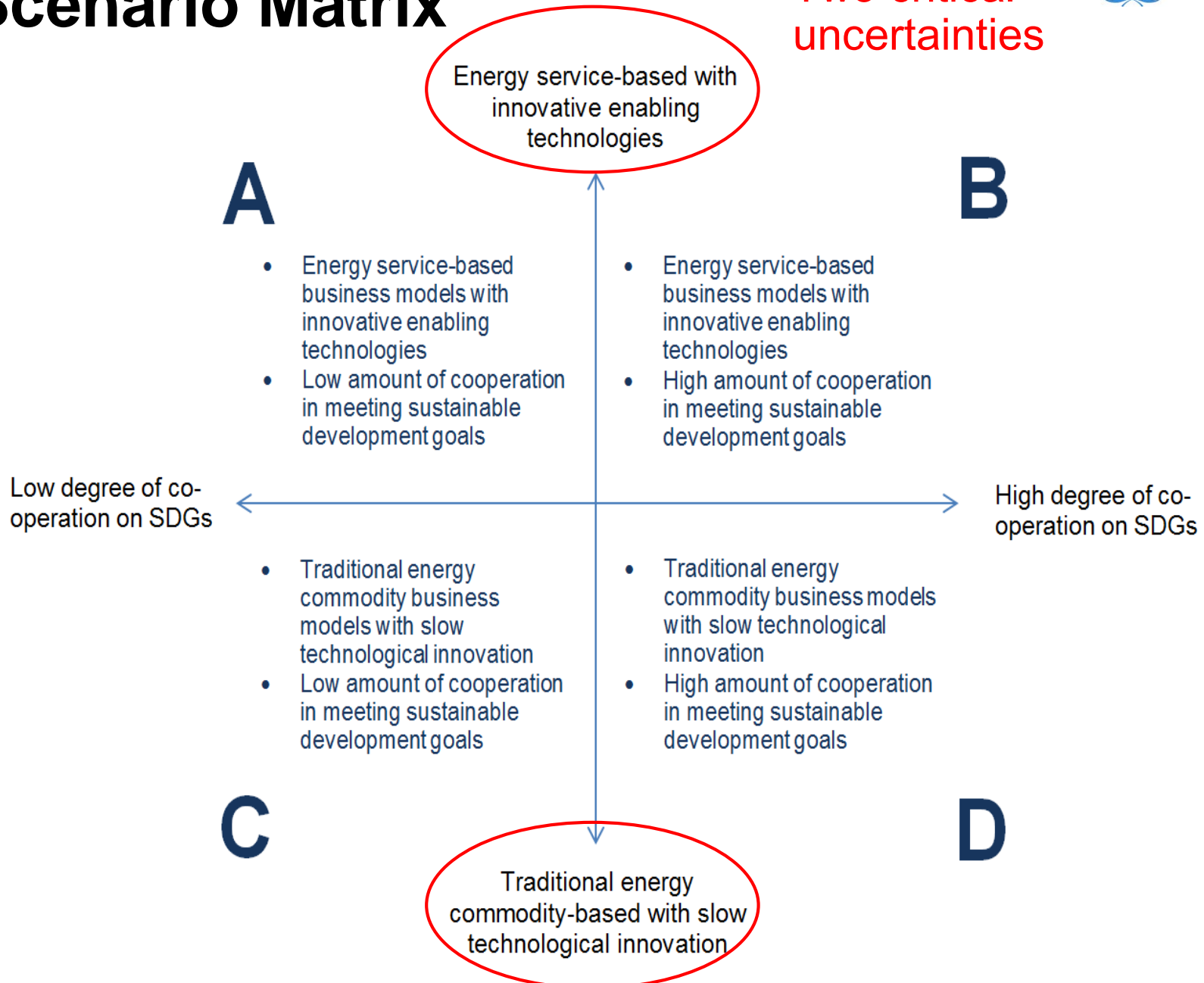- Environmental crisis

ECONOMY

- Cost and availability of energy
- Carbon pricing
- Energy market design
- Business Models
- Global Economic Growth
- Population Growth
- Energy Demand Growth
- Private Sector Initiatives & Investments
- Energy Resource Uncertainty
- Producer responses to changes in the value of energy at source

POLICY & REGULATION

- International Cooperation on Sustainable Development Goals (SDGs) & Paris Agreement (COP 21)
- Country leadership
- Taxes/subsidies for energy
- Policy support of energy efficiency and energy conservation
- Sanctions
- Energy Security

Scenario Matrix

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Energy service-based with innovative enabling technologies

A

- Energy service-based business models with innovative enabling technologies
- Low amount of cooperation in meeting sustainable development goals

B

- Energy service-based business models with innovative enabling technologies
- High amount of cooperation in meeting sustainable development goals

Low degree of co-operation on SDGs ← → High degree of co-operation on SDGs

- Traditional energy commodity business models with slow technological innovation
- Low amount of cooperation in meeting sustainable development goals

- Traditional energy commodity business models with slow technological innovation
- High amount of cooperation in meeting sustainable development goals

C

D

Traditional energy commodity-based with slow technological innovation

DRAFT Global (UNECE) Storylines

Scenario A	Technology development in home markets, with service-based business models and decarbonisation of fossil fuels through CCS and system-wide efficiency.
Scenario B	Service-based business models with emergence of energy "prosumers", increased decentralisation, and aggressive application of low-carbon technologies with renewables, gas, nuclear and storage.
Scenario C	Strong acceleration of energy efficiency measures from source to use leading to improved energy intensity; focus on domestic energy sources with CCS, nuclear, and domestic storage.
Scenario D	Sustained high penetration of gas in the energy system beyond 2030 with increased application of renewable gas and networked collaboration.

Thank you

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Background slides

Grand Transition: Three Scenarios

UNECE

	Modern Jazz	Unfinished Symphony	Hard Rock
Energy Security	• Higher energy production • Greater trading and diversity of international fossil energy suppliers	• Wider diversity of energy resource types • Government-promoted investment in Infrastructure	• More domestic production • Lower capacity for funding infrastructure • Lower trade
Energy Equity	• Energy Access for all by 2060	• 0 – 0.5 bn people still lack access to energy	• 0.5 – 1 bn people still lack access to energy
Environmental Sustainability	• Surpass Carbon budget in early 2040s • Emissions fall 28% below 2014 volumes in 2060	• Surpass carbon budget in before 2060 • Emissions fall 61% below 2014 volumes in 2060	• Surpass carbon budget in early 2040s • Emissions are 5% above 2014 volumes in 2060

Source: World Energy Council, Paul Scherrer Institute, Accenture Strategy