



Energy Sector Strategy

2019-2023

As approved by the Board of Directors at their meeting of 12 December 2018

European Bank
for Reconstruction and Development

Table of Contents

European Bank
for Reconstruction and Development

Executive summary

European Bank
for Reconstruction and Development

- The energy sector is key to economic stability and inclusive growth. The new Energy Sector Strategy (ESS) promotes **secure, affordable, and sustainable energy** through the transition to a market-oriented low-carbon energy sector. Central to this is a scaling-up of renewable energy.
- The ESS covers the Bank's activities in two areas: electricity generation, transmission, distribution, storage and supply; and hydrocarbon extraction, processing, transportation, distribution, storage and supply.
- The strategy **covers all the Bank's countries of operations**, and interfaces with other strategies, approaches and policies of the Bank. Energy sector operations are particularly important for delivering the Bank's **Green Economy Transition** approach, which promotes energy efficiency and sustainability across all the Bank's activities.
- The ESS has been developed to account for the work being undertaken by MDBs on alignment with the Paris Agreement.
- Four key developments influence how the Bank will support energy in its countries of operations:
  - The global challenge of **climate change**, driving increasing electrification of economies and decarbonisation of electricity.
  - Concerns about **air quality** leading to fuel switching and electrification.
  - Dramatic falls in the cost of **renewable energy**, which enables massive deployment of affordable low-carbon generation capacity.
  - Widely available **natural gas** offering a potential transition alternative to more polluting energy sources.
- **Innovation** and technology developments are critical to meet climate goals, and facilitate the integration of renewables, energy efficiency and the electrification of economies.
- These developments give rise to the interrelated **strategic directions** of the ESS, which aims to promote:
  - **Decarbonised economies** that are highly efficient, electrified by mainly renewable energy sources.
  - **Energy markets that are competitive, regionally integrated and resilient.**
  - **Cleaner oil and gas value chains** limited to supporting the transition to low-carbon economies and consistent with the Paris Agreement.
  - **Inclusive and energy-efficient** economies that promote gender equality and deliver sustainable energy for all.
- To support climate goals and air quality concerns, the Bank will focus on scaling-up renewable energy and will:
  - **not finance thermal coal mining or coal-fired electricity generation capacity**;
  - **not finance any upstream oil exploration;** and
  - **not finance upstream oil development projects except in rare and exceptional circumstances where the projects reduce greenhouse gas emissions or flaring.**
- The Bank will continue to **support the gas sector during the Strategy period where it is consistent with a low-carbon transition that is both secure and affordable**.
- To support alignment with the SDGs and the Paris Agreement, and reflecting the risk of carbon lock-in, hydrocarbon investments will need to be consistent with nationally determined contributions (NDCs) and be subject to the Bank-wide "Shadow Carbon Pricing Methodology" for use in EBRD projects with high greenhouse gas emissions.

Scope and structure of the Energy Sector Strategy

European Bank
for Reconstruction and Development

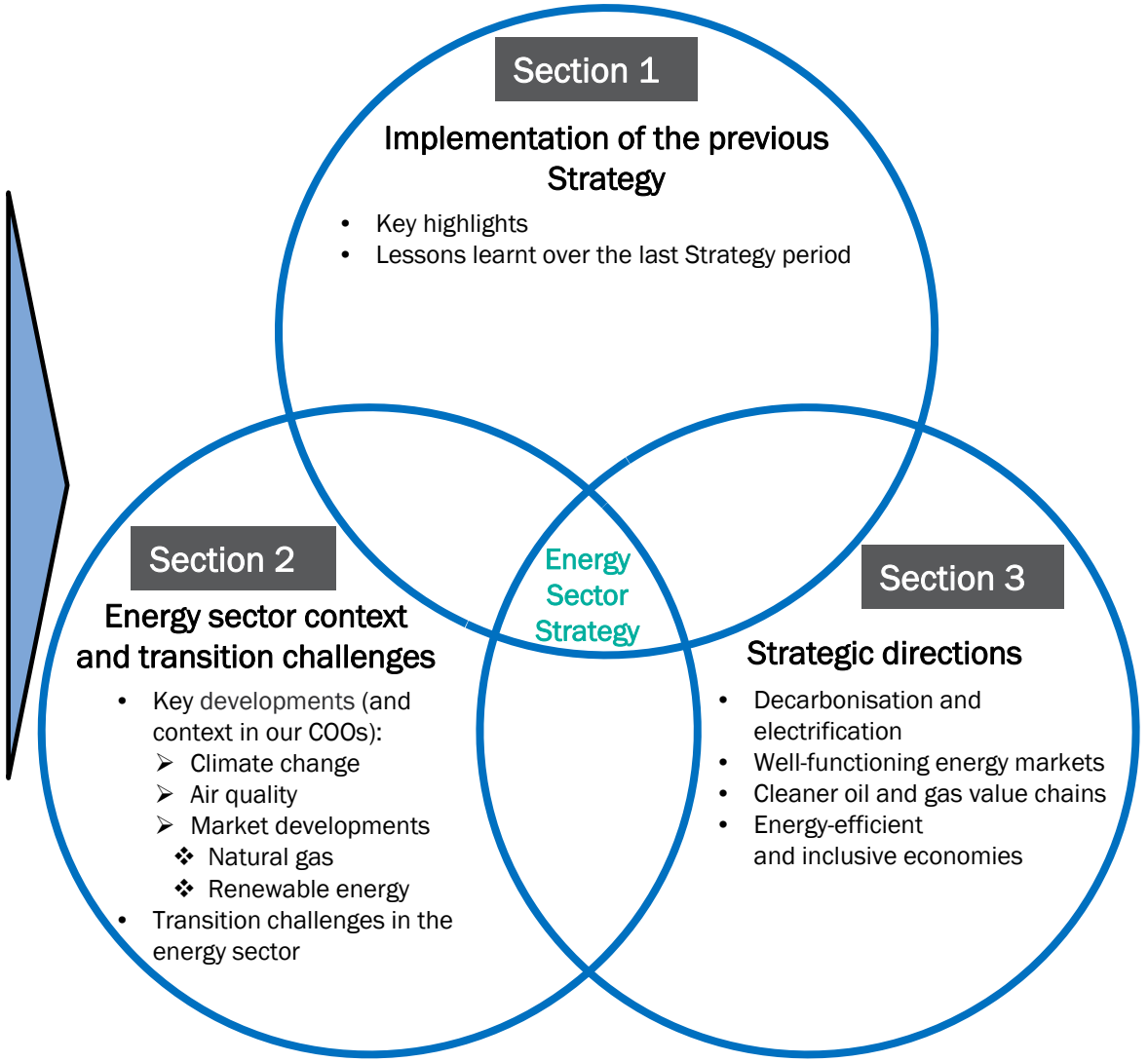
The ESS covers the Bank's activities throughout 2019-2023 in two areas:

- Electricity generation, transmission, distribution, storage and supply.
- Hydrocarbon extraction, processing, transportation, distribution, storage and supply. Hydrocarbons for this purpose include oil, gas (including hydrogen) and thermal coal.

The Strategy covers all the Bank's countries of operations (COOs), taking into account their specific transition gaps.

The Strategy interfaces with other strategies, approaches and policies, including:

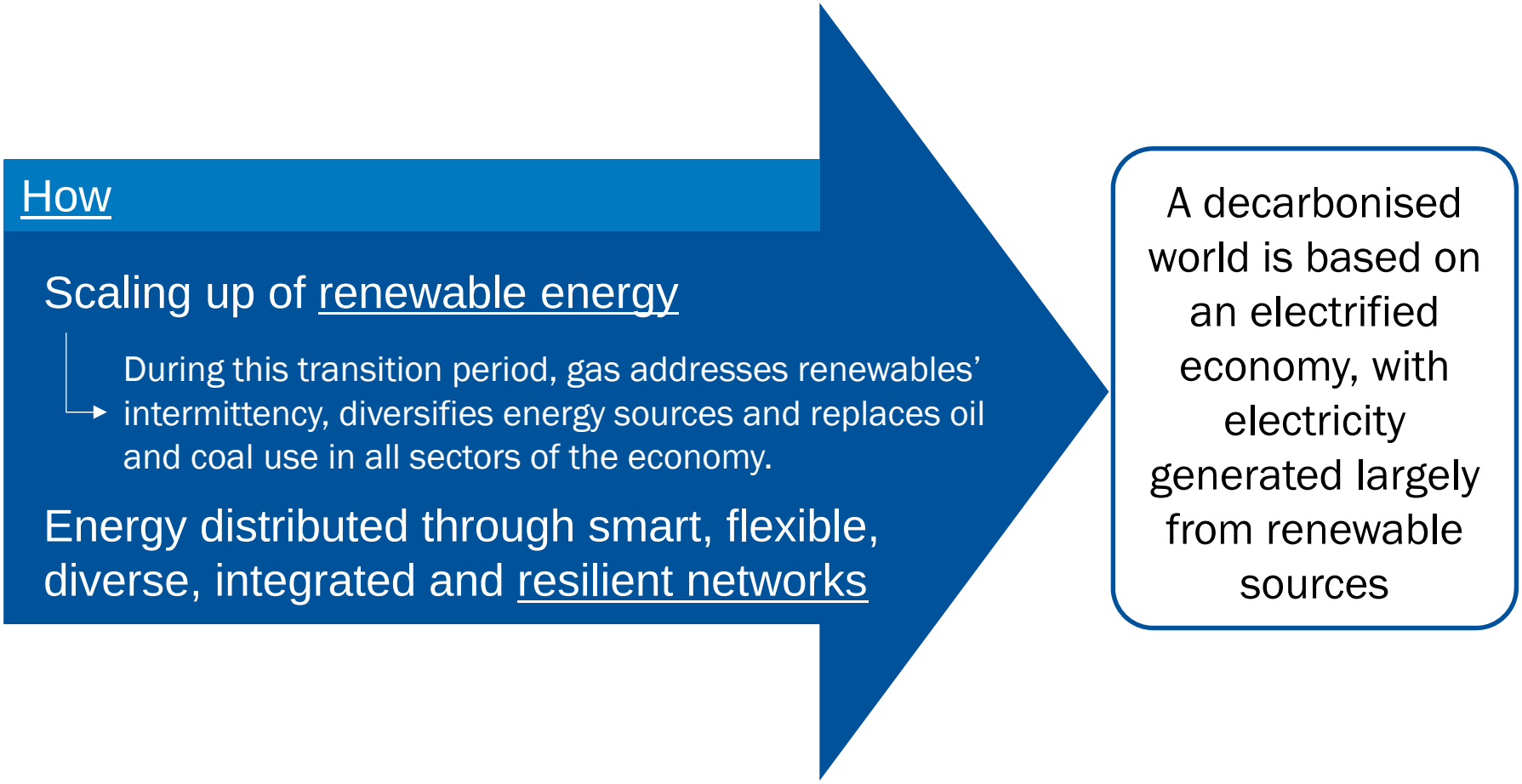
- Country strategies.
- Other sector strategies, such as transport, extractive mining industries, municipal and environmental infrastructure, agribusiness, and property and tourism.
- Thematic strategies and approaches, such as the Green Economy Transition approach, the Strategy for the Promotion of Gender Equality and the Economic Inclusion Strategy.
- Policies, such as the Environmental and Social Policy, and the Public Information Policy.



Snapshot of the ESS

European Bank
for Reconstruction and Development

The EBRD Energy Sector Strategy (ESS) promotes **secure, affordable, and sustainable energy** through the transition to a market-oriented low-carbon energy sector.



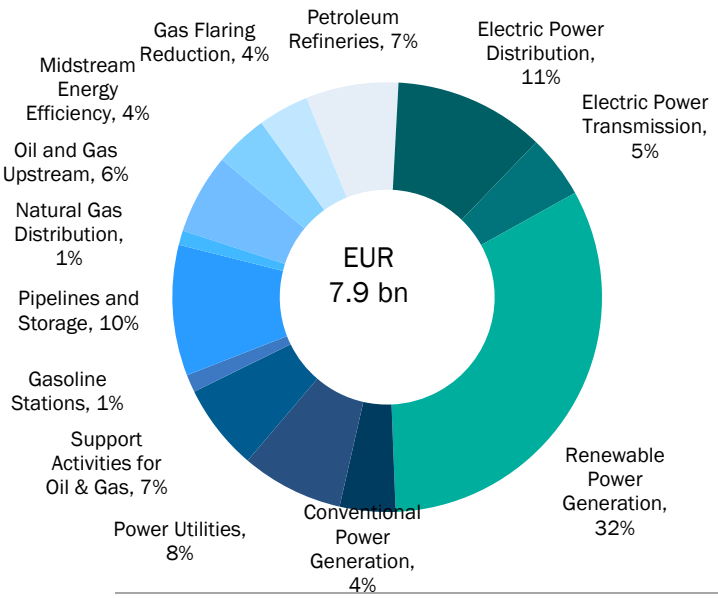
1.1. Implementation of previous Strategy – snapshot of energy activities

European Bank
for Reconstruction and Development

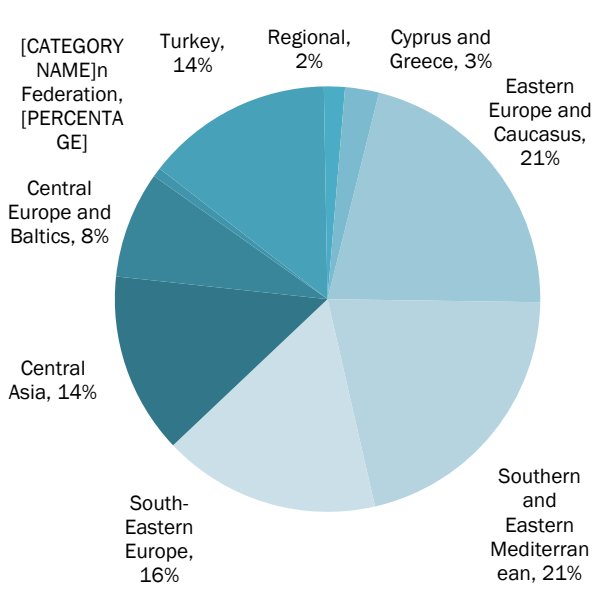
Key figures

183 # projects	€ 7.9 bn Cumulative investments[2]
70 ETI (Bank average is 67)	>70 Portfolio Transition Impact
76% Private sector projects	>15,500kt/yr CO2e reduction[3]
84% GET related projects[1]	> 5.0 GW Generation capacity
	of which 3.7 GW in renewables

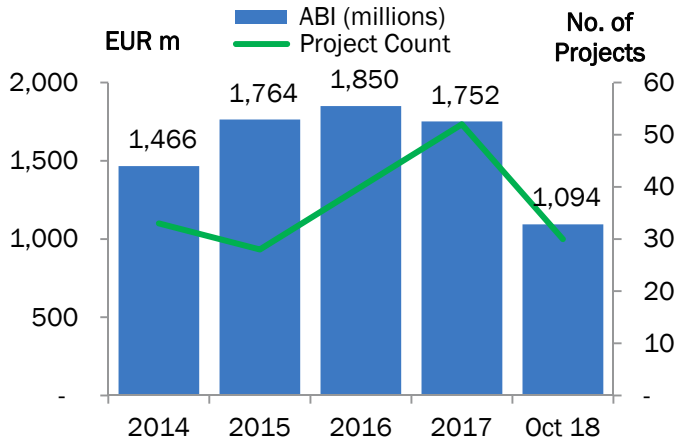
Investments by subsector 2014 - Oct 2018



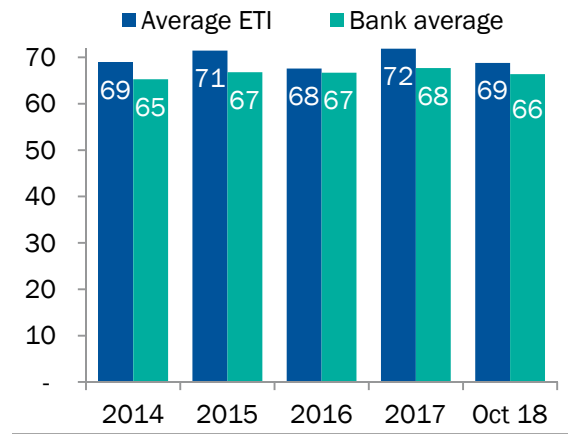
Investments by region 2014 - Oct 2018



Investments and No. of projects 2014 – Oct 2018



Expected Transition Impact 2014 - Oct 2018



[1] Number of projects with a GET component (or SEI/SRI, which are the predecessors of GET) over total number of projects 2014-Oct 2018; [2] "Cumulative investments" refers to the reported figures for Annual Bank Investment. [3] Figure does not include emissions reductions in our COOs from TANAP (the inclusion of which would lead to total emissions reductions of over 28,000 kt CO2e/year).

1.2. Implementation of previous Strategy – operational highlights (2014-2017)

European Bank
for Reconstruction and Development

Outcomes[1]	Key results highlights
1.Improved energy and resource efficiency / lower energy intensity	64 operations contributed to primary energy savings of over 3.6 Mtoe per year. Operations in Egypt, Jordan, Poland and Tajikistan were the major contributors.
2. Improved climate performance	107 operations contributed to a cumulative expected annual emissions reduction of more than 15,000 kt CO2e/year.[2] Egypt (including upstream (gas flaring reduction) and midstream (waste heat recovery) oil and gas projects), Jordan, Tajikistan and Kazakhstan were expected to deliver most of these reductions.
3. Enhanced quality and security of supply	67 renewable energy projects delivered over 3,300 MW of capacity. Solar was the dominant technology among renewables financed in 2017 (led by investments in Egypt and Jordan). Over 40 projects had a specific focus on quality and security of supply.
4. More open and better functioning markets	119 operations contributed to more widespread private ownership, notably multiple private-sector renewable energy projects (including, in Egypt, Jordan, Kazakhstan, Morocco, Mongolia, Montenegro, Serbia, Turkey and Ukraine). Several policy dialogue activities were aimed at market opening, reduced state ownership, and introducing more cost-reflective pricing in several countries such as Kazakhstan, Tajikistan and Ukraine.
5. Improved transparency, governance, skills and standards/practices	Over 80 projects set standards for corporate governance and business-conduct outcomes with particular efforts in Albania, Serbia and Ukraine.

[1] Source: EBRD Evaluation Department's Review of the EBRD Energy Sector Strategy (2014-2018), which developed the above key performance outcomes. [2] Figure does not include emissions reductions in our COOs from TANAP (the inclusion of which would lead to total emissions reductions of over 28,000 kt CO2e/year).

1.3. Implementation of previous Strategy – lessons learnt

European Bank
for Reconstruction and Development

The new Strategy is informed by lessons learnt from the previous Strategy period.

Challenges	Key lessons
• Energy security concerns and fossil fuel subsidies contribute to high emissions intensities in COOs	• Ensuring alternative low-carbon energy sources are cost-effective, removing fossil fuel subsidies, and creating regional markets enables the switch away from indigenous carbon-intensive fuels.
• Poor governance of SOEs	• Commercialisation and reforms of SOEs need to prioritise key areas, and also be realistic, incremental and holistic.
• Energy affordability poses challenges for tariff reform	• Subsidised end-user prices in many countries of operations inhibit investments. Subsidy reform is a challenging and incremental process and must be tackled through policy engagement in coordination with other international organisations. [1]
• Renewable energy investments require significant capacity building (particularly in early stages)	• Assistance to set up administrative regulatory support schemes (e.g. feed-in tariffs) for renewable energy has been important to enable the first rounds of renewable energy investments.
• Policy reversals have affected renewable energy	• The move to competitive procurement for renewables is key to delivering lower prices and transparent price discovery. This in turn increases the sustainability of the schemes.
• Low environmental and energy-efficiency standards in oil and gas	• There is scope for investments and policy engagement to achieve significant environmental benefits in the oil and gas value chains – for example, reducing gas flaring and fugitive emissions,[2] environmental remediation, or improving energy efficiency of infrastructure.
• Water-stressed regions face significant risks	• It is critical for COOs that are dependent on hydropower[3] and/or that are water stressed to diversify their energy mix and employ climate change adaptation measures that improve resilience and resource efficiency.
• Absorbing increasing penetration of intermittent renewable energy	• Greater renewable energy penetration can lead to curtailment or grid stability issues. It is important to improve interconnection and market size, strengthen grids, improve capacity of system operators, and add reserve capacities and flexible sources.
• Weak operating context for demand-side energy efficiency	• Low-energy prices and lack of regulation in certain markets limit investment by final consumers in energy-efficient solutions. The experience with GEFFs shows that a combination of financing and technical assistance can overcome challenges.

[1] See Annex J for the EBRD's position vis-à-vis other IFIs and partners. [2] Fugitive emissions in the context of the ESS refers to emissions of methane or volatile hydrocarbons. [3] See Annex K for hydropower guidance note.

2. Sector context – developments and their implications for the energy sector

European Bank
for Reconstruction and Development

Important developments in the past 5 years

Air quality

Air pollution from electricity, heat, transport and industry is increasingly a critical social concern

Climate change

Urgent need to reduce greenhouse gas emissions reaffirmed

Market developments

Renewables: Costs have fallen sharply and are grid competitive in a growing number of countries

Natural gas: More widely available and affordable, with multiple potential roles in the energy transition

- **Energy sector emissions need to fall** to meet international climate change goals
- **Rapid deployment of technologies** required to improve energy efficiency and reduce emissions intensity of energy
- The **transition away from coal** is a key challenge
- A **shift to cleaner energy sources** and **electrification** is needed to improve air quality **and decarbonisation across all sectors of the economy.**
- Scaling up **of renewable energy** is central to enabling secure and affordable **decarbonisation**
- **Gas can support the energy transition**

The transition to a secure, affordable and sustainable energy sector will be supported by technological innovation and new business models

An energy sector with a growing role for electricity	Electricity generated increasingly from renewable sources	Gas can diversify energy sources and provide energy security	Clean oil and gas value chains	Energy distributed through smart, flexible, diverse and resilient networks

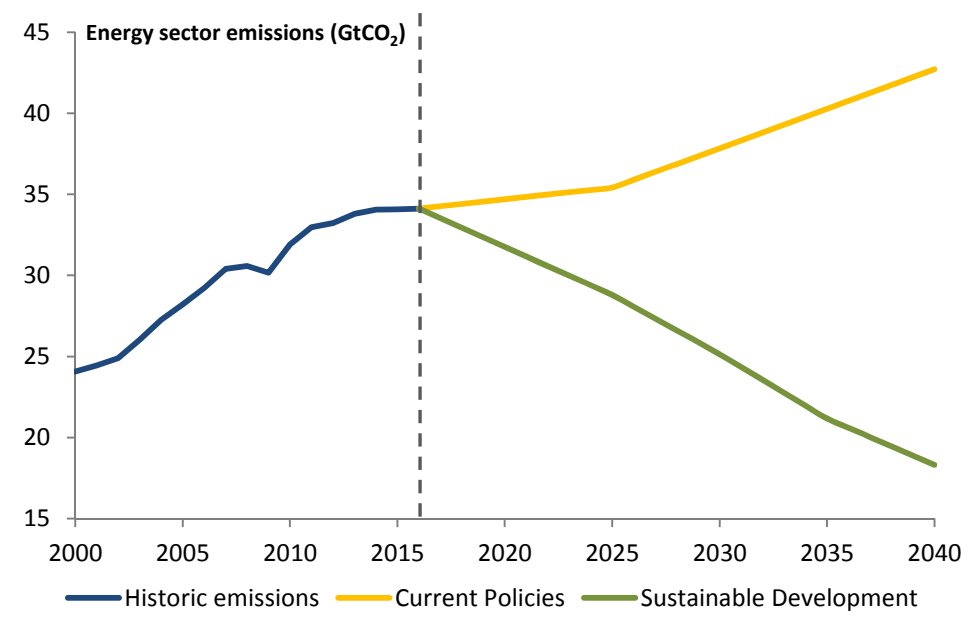
2.1. Sector context – climate change

European Bank for Reconstruction and Development

- **Reaffirmation of international efforts to address climate change**, most notably through the 2015 Paris Agreement. The agreement commits countries to emission pathways consistent with "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels."
- These efforts resulted in **coordinated, country-led, efforts to address climate change**, primarily through the development of Nationally Determined Contributions that will be periodically assessed, updated and enhanced.
- Climate change goals are also a key part of the Sustainable Development Goals (SDGs), alongside other goals such as **access to affordable and clean energy**. Energy-sector activities cut across many SDGs, and are therefore critical for achieving them. See Annex I for more on the links between the energy sector and the SDGs.

The fall in greenhouse gas emissions that is needed to meet the Paris Agreement goals*

- A sharp fall in energy sector greenhouse gas emissions must begin during the Strategy period (2019-2023) to meet international climate goals.
- The trajectory of emissions under current policies is very different from what is needed to meet the Paris Agreement goal.
- The remaining global carbon budget is only 1,320 $GtCO_2$.[2] This will be exhausted in a handful of years at current emissions rates.



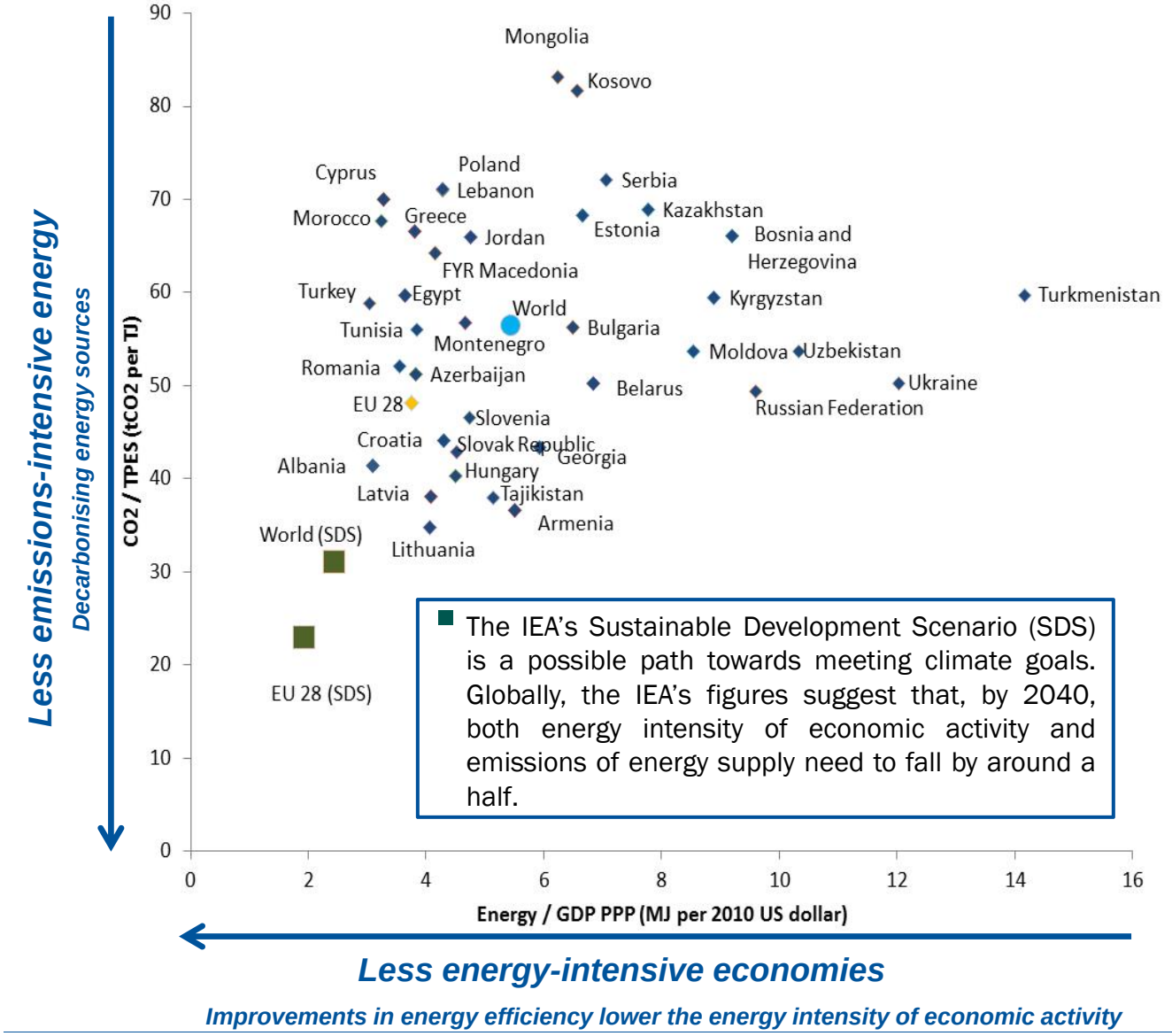
Source: International Energy Agency (2017), World Energy Outlook 2017, OECD/IEA, Paris.

** The IEA's Sustainable Development scenario "paints a picture to 2040 that is consistent with the direction needed to achieve the objectives of the Paris Agreement".*

[1] *The scenarios presented are for illustration purposes only. The EBRD acknowledges the October 2018 IPCC Special Report (SR15). The Bank's approach to the energy sector is informed by relevant climate change related developments on an ongoing basis.* [2] *Estimate from IPCC SR15 for limiting global temperature increases to 2 ° C (66% probability). The carbon budget using the IPCC AR5 methodology would be lower. The remaining carbon budget for limiting warming to 1.5 ° C ranges from 420-570 $GtCO_2$ (depending on methodology; 66% probability). See chapter 2 of IPCC SR15.*

2.2. Sector context – the climate challenge

European Bank for Reconstruction and Development



The IEA's Sustainable Development Scenario (SDS) is a possible path towards meeting climate goals. Globally, the IEA's figures suggest that, by 2040, both energy intensity of economic activity and emissions of energy supply need to fall by around a half.

Improvements in energy efficiency lower the energy intensity of economic activity

Emissions and energy use

All EBRD countries must:

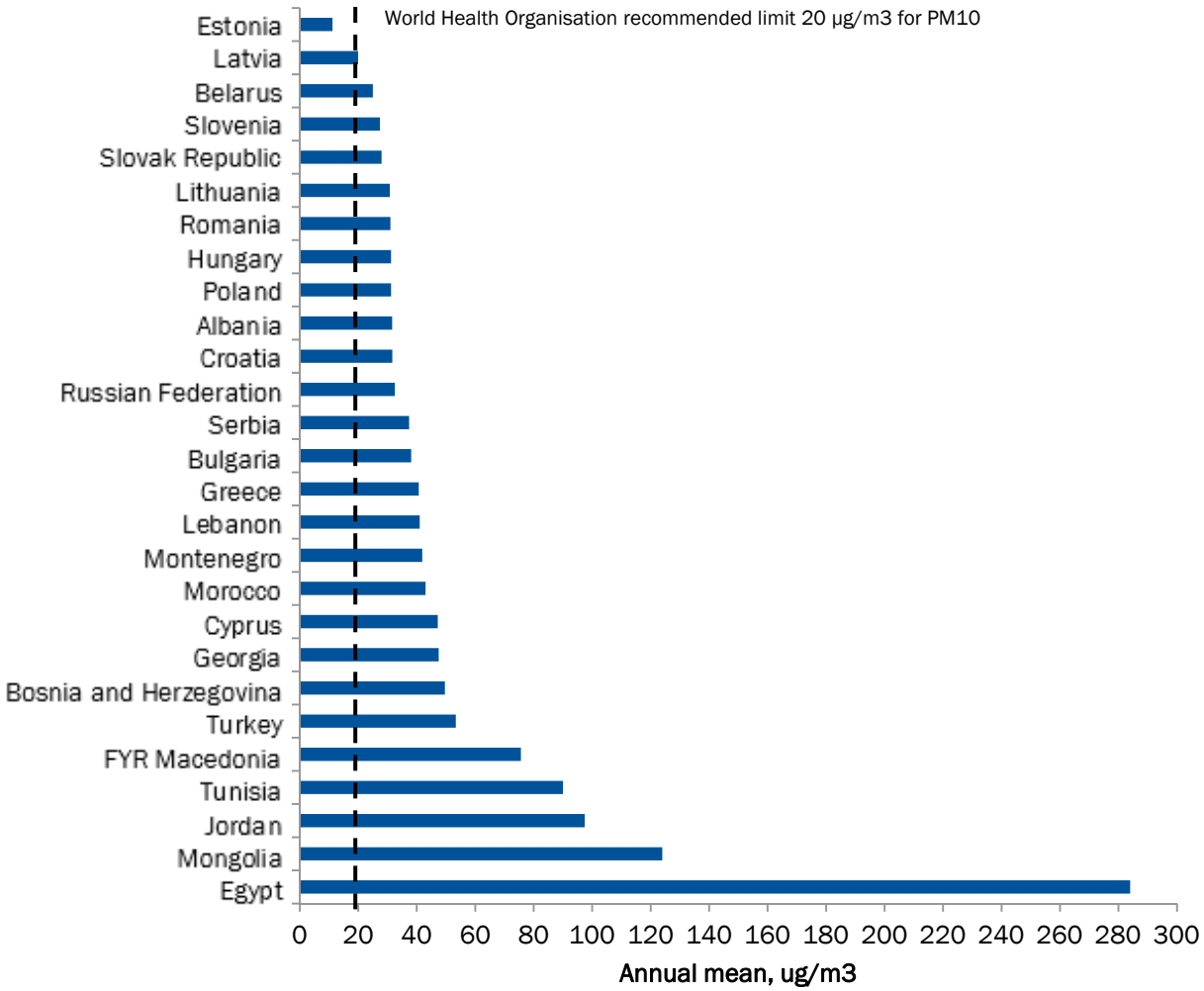
- reduce the energy intensity of their economies (in particular through energy efficiency); and
- reduce the carbon intensities of their energy (through decarbonisation).[2]

[1] *Source: IEA, IMF, World Bank.* ***Data for 2015.*** [2] *See Annex F for a case study of the decarbonisation of the power sector in the Western Balkans region.*

2.3. Sector context – air quality in EBRD countries

European Bank for Reconstruction and Development

PM10 levels in most populous city of EBRD's COOs[1]



Air quality

- Concentrations of particulate matter exceed the WHO recommended limit in almost all EBRD COOs.
- Key sources of particulate matter include: lower-quality transport vehicles and fuels; use of coal and oil in district and domestic heating and industrial facilities located close to urban centres.
- Electrification and switching to cleaner fuels, including higher-quality liquid fuels (e.g. lower sulphur content), are key to improving air quality.

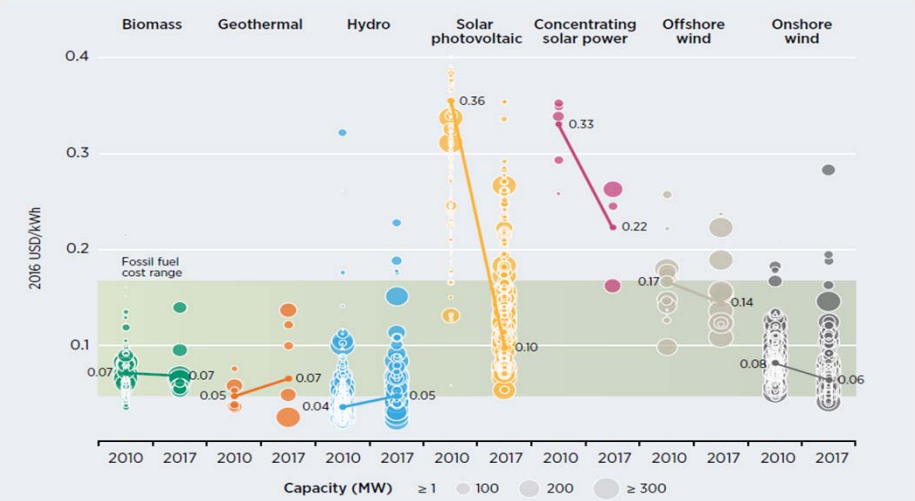
[1] *Ambient Air Quality Database, WHO, April 2018.* ***Data from latest available year in the period 2009-2016.*** *Some countries have not been included due to lack of available data (Armenia, Azerbaijan, Kazakhstan, Kosovo, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Uzbekistan, Ukraine).*

2.4. Sector context – renewable energy and electrification

Falling cost of renewables

- A combination of factors have contributed to the fall in per unit costs of renewables, including improvements in efficiency, falling raw material costs, innovation, international competition among developers, economies of scale and competitive procurement.

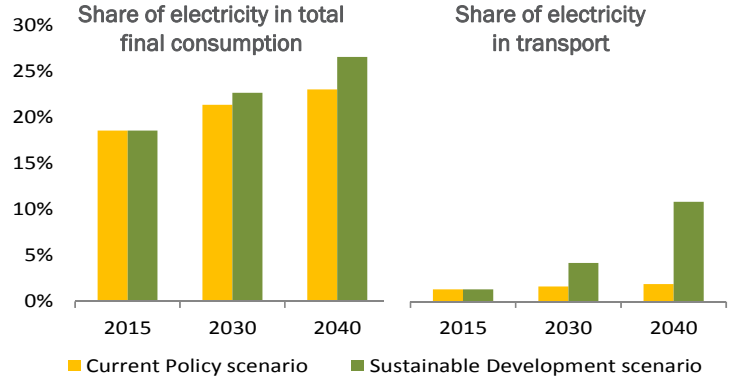
Historical cost declines for renewables



Source: IRENA, Renewable Power Generation Costs in 2017.

Electrification is central to climate and air quality ambitions

- Lower-cost renewables provide a cost-effective path for the decarbonisation of the power sector.
- A combination of decarbonising the power sector and electrifying the economy (including transport and heating) is needed to meet climate change goals and improve air quality.
- Despite greater energy efficiency, electricity consumption would grow in all lower-carbon scenarios.[1] Electrification is particularly prominent in transport, but occurs gradually and requires supporting measures (and other fuels continue to account for a majority share).



Source: International Energy Agency (2017), World Energy Outlook 2017, OECD/IEA, Paris".

Key integration responses required to scale up intermittent renewables

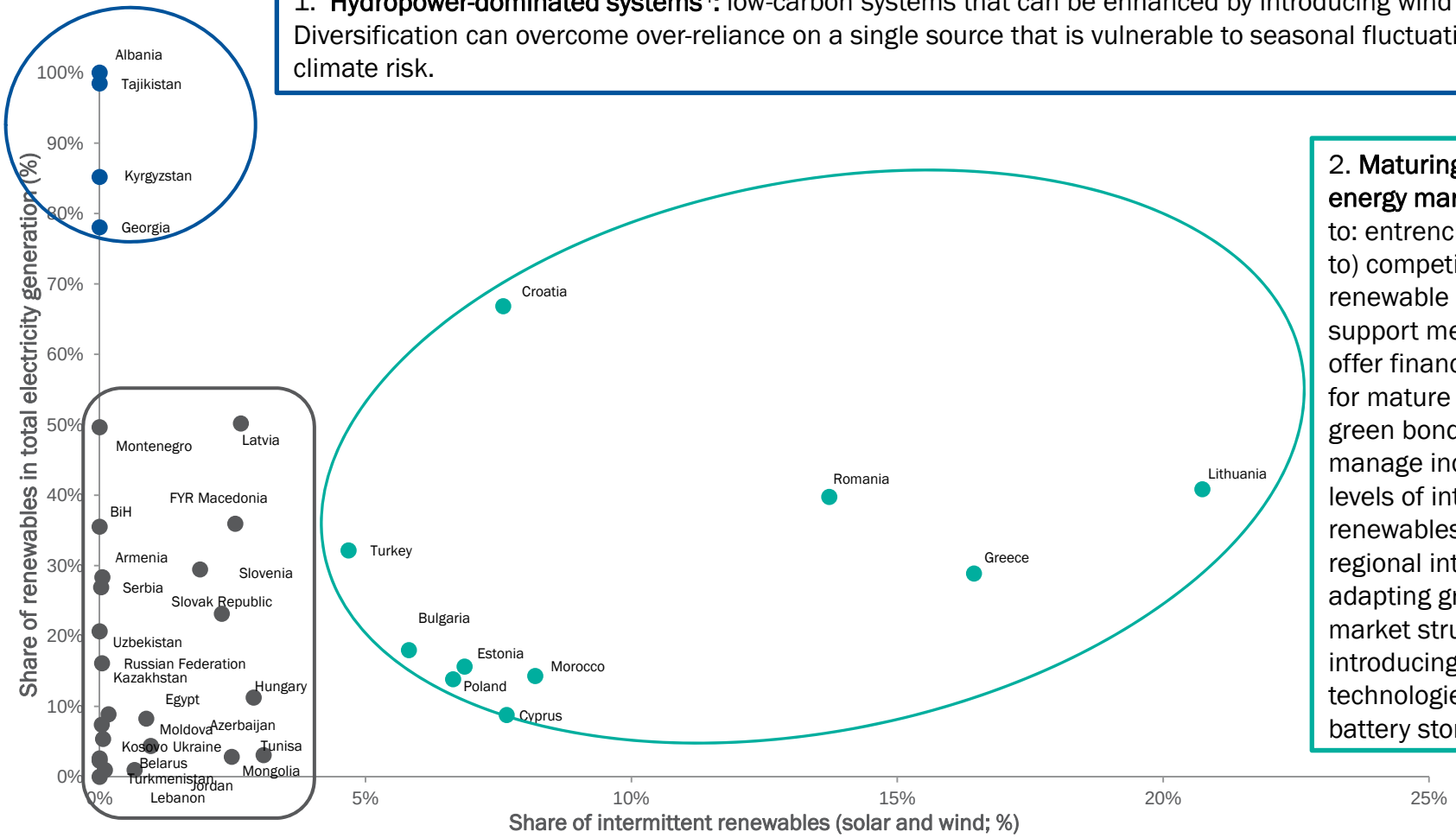
Flexibility	Grid infrastructure	Adapting electricity markets
Storage and flexible energy sources such as batteries and gas, spare capacity in generation and fuel infrastructure	Interconnectors, distributed generation sources, smart grids, smart meters and demand-side management	Accommodate near-zero marginal cost sources and increases in integration costs

[1] *See Annex G on electrification scenarios consistent with international climate goals.*

2.5. Sector context – renewable energy[1]

European Bank for Reconstruction and Development

1. **Hydropower-dominated systems[4]:** low-carbon systems that can be enhanced by introducing wind and solar. Diversification can overcome over-reliance on a single source that is vulnerable to seasonal fluctuations and climate risk.



2. **Maturing renewable energy markets**[2] need to: entrench (or move to) competitive renewable energy support mechanisms; offer financing solutions for mature markets (e.g. green bonds); and manage increasing levels of intermittent renewables through regional integration, adapting grids and market structures, and introducing new technologies such as battery storage.

3. **Early stage renewable energy markets:** [3] priority is to establish stable and supportive regulatory frameworks, grid studies and grid-reinforcement investments to allow for the absorption of renewables, and project financing of the first and second waves of projects.

*[1] Source: IEA (2017b), "World Energy Balances 2017". **Data for 2015 only**. [2] Maturing renewable energy markets: group of countries with more than 5% of generation from intermittent renewables. [3] Early stage renewable energy markets: group with very low (<5%) penetration of intermittent (i.e. wind and solar) generation. [4] See Annex K for EBRD hydropower guidance note.*

2.6. Sector context – role of gas

European Bank for Reconstruction and Development

Globally the role of gas is changing

More gas sources	More infrastructure	More markets
Large increase in gas production in the United States and new discoveries in Asia and the eastern Mediterranean are changing supply patterns in many regions. These changes are set to continue as more gas from diverse sources is traded globally.	More widespread use of flexible supply options such as FSRUs, additions of new pipelines (for example, the Southern Gas Corridor), and additional LNG infrastructure (for example, in the eastern United States and in EU countries).	Combination of diversity of gas sources, new infrastructure and regulatory reforms has led to the trading of gas as a commodity in its own right. In mature regulatory jurisdictions, gas is traded more flexibly in national and regional markets.

Gas has multiple potential roles in the transition to energy decarbonisation, depending on country-specific conditions *(see also Annex E)*

- Supporting the scaling-up of intermittent renewables
- Switching to cleaner fuels to reduce GHG emissions and/or improve air quality
- Delivering energy security

Investments must consider methane emissions and technological competition

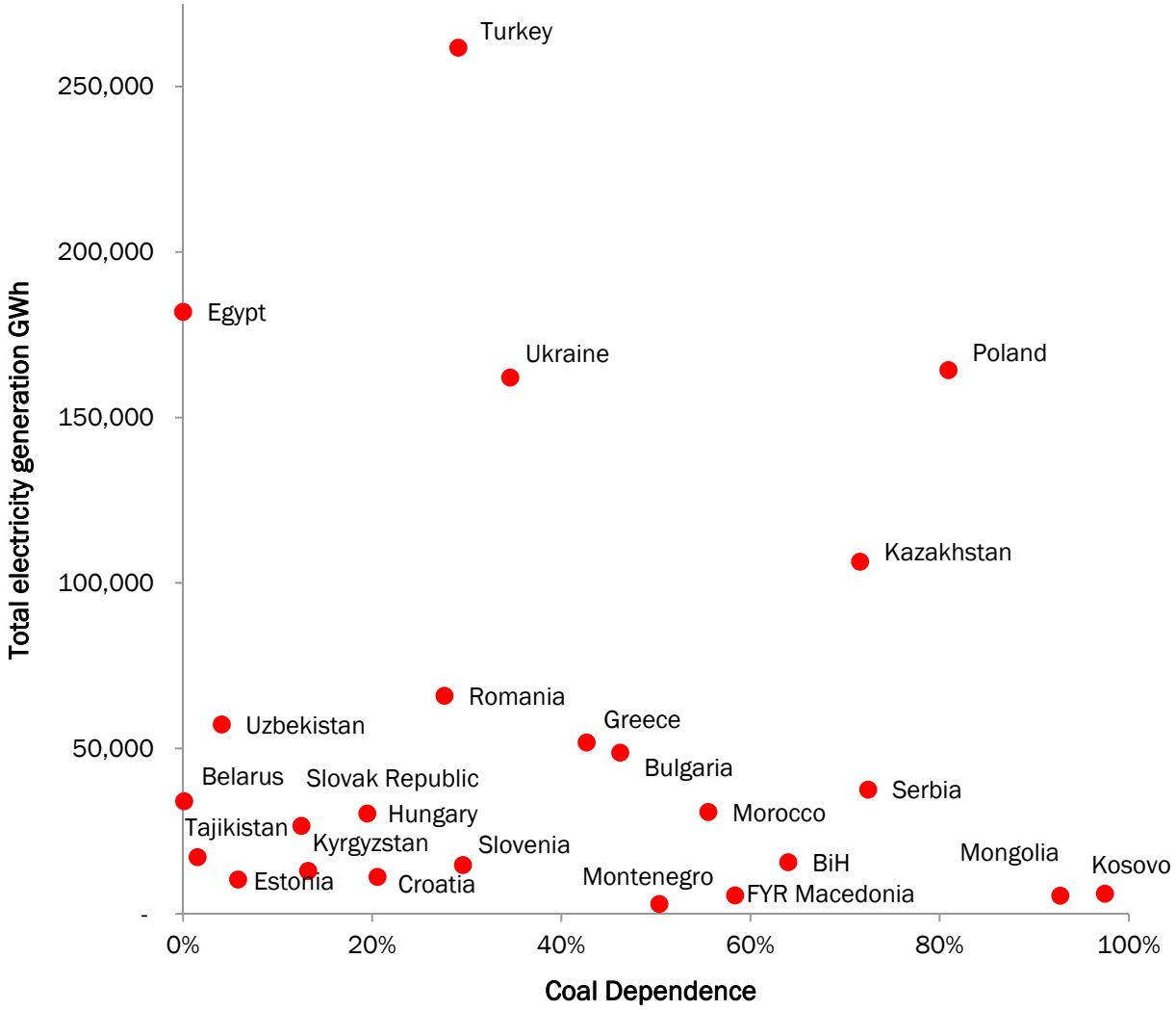
Criteria for gas investments

- not displace less carbon-intensive sources, or lead to carbon lock-in or stranded assets (see Annex C).
- account for flexibility in the design (both technical and contractual) of energy solutions to facilitate the energy transition.
- be subject to the Bank-wide approach to conducting economic assessments of projects, which will account for key externalities and apply a shadow price of carbon.
- be consistent with NDCs[1] and the Bank's Environmental and Social Policy (including requirements for using best available techniques).

[1] *Or, when relevant, a country's Intended Nationally Determined Contributions (INDCs)*

2.7. Sector context – transition away from coal[1]

European Bank for Reconstruction and Development



Dependence on coal

- 16 EBRD COOs have a significant (>20%) reliance on coal for electricity generation. This includes 4 of the largest 6 generators amongst EBRD COOs (Turkey, Poland, Ukraine and Kazakhstan).
- Excluding hydro-powered Albania, the 'Western Balkans Six' rely on coal for more than 70% of their electricity production (see Annex F). Overall more than 25% of generation from EBRD COOs is coal-fired.
- Replacement of coal with renewables and gas significantly reduces GHGs.
- Transition away from coal requires a sector-wide strategy to develop alternative energy supplies based on renewable deployment, regional integration, smart networks and balancing, and backup capacity from gas and other sources.

Notes: Russian Federation not shown due to scaling of y-axis (total generation of more than 1 million GWh and coal dependence of c. 15%). Countries with no coal use and electricity generation of less than 25,000 GWh are not listed (Albania, Armenia, Azerbaijan, Cyprus, Georgia, Jordan, Latvia, Lebanon, Lithuania, Moldova, Tunisia, and Turkmenistan). Some countries are heavily reliant on oil shale – Cyprus (91%), Lebanon (97%) and Estonia (78%). Switching from oil to gas can reduce GHG and local emissions.

[1] *IEA (2017b), "World Energy Balances 2017". **Data for 2015**.*

2.8. Sector context – innovation in the energy sector (1)

European Bank for Reconstruction and Development

Fugitive methane emissions detection
- Sensors will improve efficiency at specific upstream points
- Drones and other remote monitoring technologies will help detect midstream leakage

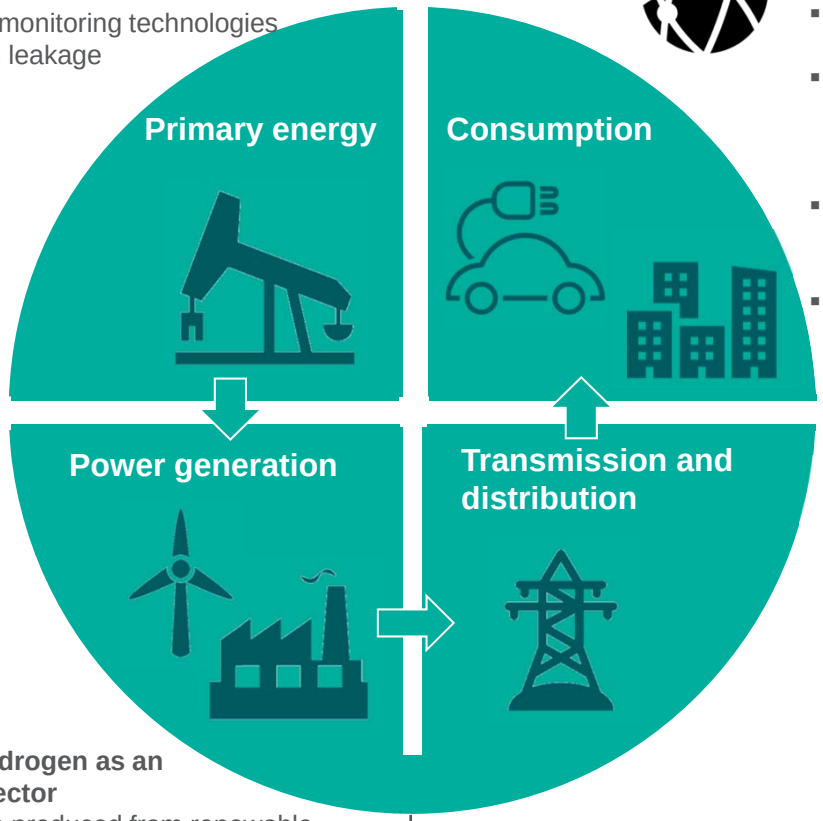
Waste to fuels
- Waste to power

Biomass to fuels
- Can progress into complex biofuels such as diesel and bio-jet fuel

Renewable technology developments
- Bifacial solar panels allowing higher-energy production, a lower degradation rate than standard modules and increased durability

Carbon capture and storage (CCS); and carbon capture and utilisation (CCU)
- Commercialisation can facilitate decarbonising of fossil fuel use and abate process emissions in industry

Green hydrogen as an energy vector
- Can be produced from renewable power via electrolysis
- Can have multiple uses including energy storage (seasonal and peak), transport fuel, industry feedstock and in heating
- Potential to use some existing gas infrastructure



Grid-edge technologies, mini grids, smart meters & demand-side management
- Quickly decreasing costs of distributed energy, trend towards DC microgrids
- Innovations enable grid balancing, new ancillary service markets, new electricity market models and precise grid synchronisation
- Digitalisation can enable local energy trading, including peer-to-peer and consumer-to-grid
- Coupled with grid-edge technologies, electric vehicles can be integrated into electricity markets

Ultra high-voltage cable (UHV)
- UHV transmission technology is able to transmit electricity over vast distances at sharply reduced cost
- Large-scale adoption could enable greater regional integration of power grids at a cost significantly below that of power produced locally

Chemical batteries and thermal storage
- Battery storage can facilitate the integration of intermittent power sources (e.g. renewables)
- Thermal CSP pumps for use in heating and small-scale cooling applications

Source: SYSTEMIQ, Energy Transitions Commission reports, Financial Times, Scientific American.

2.9. Sector context – innovation in the energy sector[1] (2)

European Bank for Reconstruction and Development

Innovation	Characteristics of countries/regions influencing deployment of technologies	Examples of potential EBRD countries/regions
Fugitive methane emissions detection	• Presence of significant upstream oil and gas activities and/or gas transport infrastructure	• Azerbaijan, Egypt, Kazakhstan, Ukraine, Uzbekistan
Biomass to fuels	• Significant agricultural sector, land suited to biofuel cultivation, and/or links to regional biofuel supply chains	• Baltic countries, Belarus, Poland, Ukraine, Western Balkans
Renewable technology developments	• Regulatory frameworks supportive of investments that use new technologies	• All COOs
Carbon capture and storage (CCS); and carbon capture and utilisation (CCU)	• Significant economic activity in hard-to-abate sectors with limited decarbonisation alternatives • Presence of sectors in which captured carbon can be utilised (e.g. oil production) • Presence of infrastructure for CO2 storage (e.g. depleted oil and gas fields)	• Central Asia, SEMED
Green hydrogen as an energy vector	• High quality of renewable energy resources allowing electricity production at low cost • Presence of infrastructure that could be used for hydrogen transport	• Central Asia, SEMED
Grid-edge technologies, mini grids, smart meters & demand-side management	• Maturing electricity markets that enable market integration • Regulatory frameworks that remunerate investors (including consumers) for new technologies	• EU countries, Western Balkans
Ultra high-voltage cable (UHV)	• Presence of large demand centres that are geographically dispersed, providing scope for cross-border trading	• Central Asia, Mongolia
Chemical batteries and thermal storage	• Shares of intermittent renewable energy are increasing • Limited sources of flexibility in power systems	• Jordan, Kazakhstan, Morocco

1. *See Annex H for further details on EBRD activities and innovation.*

2.10. Key transition challenges[1]

European Bank
for Reconstruction and Development

Competitive	**Market liberalisation:** A well-functioning competitive energy market stimulates innovation and promotes efficiency, pushing down costs and improving the quality of service for end users. Energy sector liberalisation in the Bank's COOs is a continuous process and is at an early stage in many countries. Regulated third-party access, privatisation of SOEs, entry of private-sector operators, tariff reforms and gradual subsidy reforms are required to promote competitive energy markets. **Renewable energy support schemes:** The cost of renewable energy (RE) has fallen dramatically in recent years but it imposes pressures on system costs (especially as integration costs increase). Competitive tenders for the procurement of RE capacity can facilitate price discovery and help push down costs. Fuller participation of renewables in power markets, including assumption of balancing costs, can reduce integration costs.
Well-governed	**Governance of firms:** Poor corporate-level governance is a major impediment to the competitiveness of energy companies and private-sector investment. Corporate governance improvements in line with international best practices increase transparency and unlock revenue generation potential. The commercialisation of SOEs, in particular where these account for a large share of economic activity (e.g. national oil and gas companies), has a significant impact on national resource allocation and productivity. It also improves overall market transparency. **National governance:** Corruption and lack of transparency is an issue, in particular in the extractive industries. By adopting initiatives such as the Extractive Industries Transparency Initiative, governments can increase public confidence and attract private investment.
Green	**Sustainable energy:** Achieving the SDGs and the goals of the Paris Agreement will require considerable climate change mitigation and adaptation measures. This includes increasing Renewable Energy generation, rolling out smart technologies, capturing significant emission savings in large greenhouse-gas-emitting sectors such as oil and gas, and making domestic energy supplies climate resilient. This will contribute to building more efficient, low-carbon, flexible and resilient energy systems and improving air quality.
Inclusive	**Affordability and access to energy supply:** Vulnerable customers face affordability issues in many of the Bank's COOs. This should be met with targeted efforts to develop social safety nets. Insufficient access to stable energy supply, particularly in the most rural and remote regions, may impede business development. **Access to employment and skills:** Technically complex energy sectors can face substantial challenges in attracting qualified talent in the Bank's COOs. Improved vocational training and workforce diversity can both help address these gaps and empower excluded groups.
Resilient	**Legal and regulatory framework:** A lack of empowered, independent energy regulators to oversee market functioning hinders the development of robust regulatory frameworks that provide confidence to potential investors. Legal and regulatory reform catalyse increased private-sector participation and monitor effective functioning of natural monopolies. **Supply diversification:** Many of the EBRD's COOs rely on limited sources of energy and are therefore vulnerable to supply shocks. Energy systems which rely on diversified sources of supply are better placed to absorb and respond to supply disruptions. **System reliability:** Network reliability and flexibility is an issue across the Bank's COOs that are further challenged by higher renewable energy penetration and increasingly decentralised energy systems. Promoting least-cost storage solutions, fuel switching options, and demand-side response is necessary to ensure the reliable operation of energy systems and minimise service disruption.
Integrated	**Cross-border cooperation and improved interconnectivity:** A lack of integrated regional markets is an impediment to energy security and efficient energy flows both within and across national borders. This would foster competition and lower prices, and would facilitate the integration of intermittent renewable energy sources. This poses a particular issue where small market size means regional cooperation is required to develop liquidity. The establishment of cross-border energy trading mechanisms or the construction of new infrastructure fosters integration.

1. *For further details on transition qualities please visit : http://www.ebrd.com/our-values/transition.html.*

3. Strategic directions overview

European Bank
for Reconstruction and Development

Aim

The Bank will promote secure, affordable and sustainable energy through the transition to a market-oriented low-carbon energy sector.

How?

By **decarbonising economies,** making them highly efficient, powered by renewable energy and increasingly electrified.

Interrelated strategic directions

1. Decarbonisation and electrification
2. Well-functioning energy markets
3. Cleaner oil and gas value chains
4. Energy-efficient and inclusive economies

Interface with Bank-wide approaches, initiatives and policies, other sector strategies, and country-specific characteristics.

What we will not do

No thermal coal mining or coal-fired electricity generation capacity[1]
No upstream oil exploration[2]
No upstream oil development except in rare and exceptional circumstances[2]

[1] *See Annex D.II for the Bank's approach to coal for energy use in other sectors.*
[2] *See slide 3.3 and Annex C.III for further details.*

3.1. Decarbonisation and electrification

European Bank
for Reconstruction and Development

Decarbonisation and electrification

Decarbonising power generation

Primary TI Quality targeted: Green[1], Resilient

- Investment in renewable energy:
  - Scaling up investments in COOs.
  - Financing facilities that support projects through intermediary institutions (GEFFs).
  - Policy engagement to promote the use of competitive procurement schemes.
- Supporting the integration of intermittent renewables:
  - Investing in networks, including: reinforcing grids and interconnections, facilitating distributed generation sources, smart grids and smart meters.
  - Investing in infrastructure that facilitates integration, including flexible generation sources, energy storage, and demand-side management.
  - Policy engagement to promote reforms that facilitate the integration of renewable energy into electricity markets while also meeting reliability and flexibility needs.
- Promoting the switch to cleaner and resilient generation sources:
  - Switching to less carbon-intensive sources, in particular from coal to renewables and gas.
  - Facilitating improvements in energy efficiency through investments and improving market signals (for example, smart grids, smart metering and demand-side management).
  - Technologies and practices to enhance resilience (for example, dry-cooling, hydrological modelling and turbine upgrades).
- The **Bank will not finance thermal coal mining or coal-fired electricity generation capacity** (including upgrades to existing plants or the construction of new capacity).[2]
- The **Bank will engage with countries of operations with significant coal dependence to develop strategies to support a transition away from coal that addresses issues of air quality, retrenchment and energy security.**
- Working with utility companies to develop smart networks, promote demand-side energy efficiency, and reduce losses in networks.

Promoting electrification

Primary TI Quality targeted: Green, Integrated

- Facilitating the electrification of the economy with electricity generated from cleaner energy sources:
  - Investments in infrastructure to allow for the electrification and decarbonisation of key sectors such as transport, industry and heat (where feasible) – for example, grid expansions or charging infrastructure. See Annex D for cross-sector links.
  - Policy assistance to develop strategies for electrification.

[1] *This does not imply that all activities listed target the green quality and/or will be classified as GET by the Bank. The Bank's approach to GET classification is outlined in "Implementing the EBRD Green Economy Transition", which is available on ebrd.com.*

[2] *See Annex D.II for the Bank's approach to coal for energy use in other sectors.*

3.2. Well-functioning energy markets

European Bank
for Reconstruction and Development

Well-functioning energy markets

Infrastructure that facilitates the development of well-functioning energy markets

Primary TI Quality targeted	Resilient	Integrated

- Supporting electricity networks through investments that enable the development of well-functioning electricity markets (in particular, markets that expand wholesale and retail competition, facilitate market integration of consumers and renewable energy producers, provide signals for efficient investment, reflect location and timing in the value of electricity, and deepen regional integration and cross-border trade). Examples include interconnectors, transmission-related investments, distribution related investments, smart grids, smart meters, energy exchanges, and DC microgrids.
- Supporting different types of gas infrastructure – for example, upstream, midstream, interconnectors, transmission and distribution networks, underground storage, LNG terminals, floating storage and regasification units – that improve interconnectivity, create well-functioning markets, provide flexibility to energy systems and enable fuel switching from coal and heavy fuels.

Policy engagement to foster well-functioning energy markets and private-sector participation

Primary TI Quality targeted	Resilient	Green
	Well-governed	Competitive

- Supporting policy makers to develop well-functioning energy markets, establish regulators and build their capacity.
  - Developing regulatory frameworks for market participants (including energy utilities) that foster competition, deepen regional integration, promote innovation and provide signals for efficient investment – for example, third-party access, unbundling of network companies, market rules for integrating end users and renewable energy producers, regulations ensuring transparent and independent operation of energy exchanges and effective market-monitoring mechanisms, and efficient charging structures for networks.
  - Promoting cost-reflective pricing and the removal of subsidies (including fossil fuel subsidies), while taking into account concerns for energy affordability.
- Supporting greater private-sector participation through financing private sector clients, supporting privatisations, facilitating models that increase private-sector participation (for example, PPPs, concessions, service contracts), and strengthening regulatory frameworks to attract private sector investment.
- In line with Bank-wide approaches and initiatives to support COOs to meet climate objectives, the Bank will support the development of market-based solutions for meeting climate change objectives (including, national and international carbon markets, energy efficiency, and demand-side management).

3.3. Cleaner oil and gas value chains

European Bank
for Reconstruction and Development

Cleaner oil and gas value chains

Reflecting environmental and transition concerns in upstream hydrocarbon activities

Primary TI Quality targeted: Green, Well-governed

- The **Bank will not finance upstream oil exploration.**
- The **Bank will not finance upstream oil-development projects except in rare and exceptional circumstances where project's proceeds exclusively target the reduction of GHG emissions or flaring, from existing producing fields.**
- Any investment must include improvements in standards of operations (for example, inclusive work practices, environmental remediation, transparent sub-soil codes).
- The Bank will continue to support upstream gas activities that benefit our COOs (for example, activities that replace coal or provide energy security or flexibility).

Midstream and downstream activities

Primary TI Quality targeted: Green, Competitive

- Assisting countries and companies to reduce fugitive emissions along the oil and gas value chains.
- Supporting energy-efficiency improvements along the oil and gas value chains– (for example, waste-heat recovery) and increasing the capacity of companies to adopt energy-efficiency improvements.
- Supporting investments that facilitate the availability of cleaner fuels used by downstream activities (for example, transport fuels that reduce local emissions such as LNG, CNG, low-sulphur liquid fuels).
- Supporting downstream operations (for example, fuel stations) that promote private-sector entry and the development of competitive and resilient markets.

Promoting climate goals

Primary TI Quality targeted: Green, Well-governed

Hydrocarbon and fossil fuel projects will:[1]

- not displace less carbon-intensive sources, or lead to carbon lock-in or stranded assets.
- account for flexibility in the design (both technical and contractual) of energy solutions to facilitate the energy transition.
- be subject to the Bank-wide approach to conducting economic assessments of projects, which will account for key externalities and apply a shadow price of carbon.
- be consistent with NDCs[2] and the Bank's Environmental and Social Policy (including requirements for using best available techniques).

[1] See Annex C for further details. [2] Or, when relevant, a country's Intended Nationally Determined Contributions (INDCs)

3.4. Energy-efficient and inclusive economies

European Bank
for Reconstruction and Development

Energy-efficient and inclusive economies

Governance and practices of SOEs and energy companies	Primary TI Quality targeted	Well-governed

- Reflecting the importance of state-owned enterprises (SOEs), and the successful experience of promoting transition through SOE reform, the Bank will assist SOEs in delivering effective governance with the goals of greater transparency and efficiency.
- The Bank will promote the reporting and disclosure of emissions and carbon-related risks for companies with significant carbon assets and encourage the development of plans for decarbonisation.
- More broadly, the Bank will support energy companies to improve practices, including environmental, health and safety and social practices, as well as corporate governance (for example, adoption of IFRS accounting).

Promoting inclusion across the energy sector	Primary TI Quality targeted	Inclusive

- The Bank will support the adoption of practices, policies and standards that promote inclusion and gender equality in the energy sector, which is a significant employer in the EBRD's countries of operations.

Promoting transparency in extractive industries	Primary TI Quality targeted	Well-governed

- The Bank will finance projects that promote improvements in the corporate governance and corporate social responsibility of its clients, and that also comply with the principles of the Extractive Industries Transparency Initiative at company and country level.

Promoting demand and supply-side energy efficiency	Primary TI Quality targeted	Green

- The Bank will support the improvement of energy efficiency across the economy in line with its Green Economy Transition approach and individual sector strategies such as transport, municipal and environmental infrastructure and agribusiness. This includes support through initiatives such as the Green Cities Framework.[1]

Promoting nuclear safety	Primary TI Quality targeted	Well-governed

- While the Bank will not provide funding for the construction of new nuclear power plants it will continue to consider funding for safety improvements of operating plants as well as for radioactive waste management and decommissioning of nuclear facilities.

[1] *See Annex D for cross-sector linkages*

4. Performance Monitoring Framework (1)

European Bank
for Reconstruction and Development

1. Decarbonising power generation, and promoting electrification (GREEN, RESILIENT)			
Specific objectives	**Activities**	**Tracking indicators**	
		Outputs	**Outcome (for relevant countries tracked in Country Strategies)**
• Increased renewable energy • Increased supply-side efficiency • Improved network infrastructure to allow for electrification	• Investment • Policy engagement • Capacity-building • TC • External partnerships	• Number/volume of investments supporting renewable energy • Number/volume of investments supporting infrastructure for the use of cleaner power generation (network expansion, charging infrastructure, flexible sources) • Number of policy engagements and capacity-building activities supporting renewable energy • Number/volume of investments supporting supply-side energy efficiency (including strategies for cleaner fuels) • Number of policy engagements and capacity-building activities supporting supply-side energy efficiency (including strategies for cleaner fuels)	• Number/volume of renewable energy loans extended by PFIs supported by EBRD • Total renewable electricity capacity installed (MW) • Legal/regulatory/institutional frameworks for renewable energy improved: competitive procurement schemes and network integration • Total CO2e reduced/avoided from cleaner power generation (ton/year)
2. Fostering the development of energy markets and integration into regional markets (INTEGRATED, COMPETITIVE, RESILIENT)			
• Improved electricity networks (electricity infrastructure) • Improved gas infrastructure • Improved regulatory frameworks for the energy sector • Increased private-sector participation	• Investment • Policy engagement • Capacity-building • TC • External partnerships	• Number/volume of investments fostering the development of energy markets (including improving regulatory frameworks for energy, improving private-sector participation, market-based solutions, unbundling) • Number of relevant policy engagement and capacity-building activities fostering the development of energy markets and integration into regional market (electricity and gas infrastructure, private-sector participation) • Number/volume of investments that promote integration into regional markets (cross-border networks) • Number/volume of investments in upstream gas • Number of investments with private sector	• Improved regional/cross-border energy infrastructure capacity through Bank-assisted projects • Improved gas-infrastructure capacity through Bank-assisted projects (including upstream, LNG terminals, floating storage and regasification units) • Legal/regulatory/institutional frameworks for developing of well-functioning energy markets including carbon markets (third-party access, unbundling, cost-reflective pricing, market reforms) • Increased private-sector participation

Note: The Performance Monitoring Framework has been designed to align with the Bank's approach to results measurement.

4. Performance Monitoring Framework (2)

European Bank
for Reconstruction and Development

3. Improving environmental standards and energy efficiency in the oil and gas value chains (GREEN, WELL-GOVERNED)			
• Increased energy efficiency in mid-stream and downstream activities • Reducing gas flaring and fugitive emissions • Strengthened developments for the delivery of climate policies	• Investment • Policy engagement • Capacity-building • TC • External partnerships	• Number/volume of investments contributing towards improvements of standards and energy efficiency in the oil and gas value chains in mid-stream/downstream activities (including waste-heat recovery and cleaner fuel uses) • Number of policy engagements and capacity-building activities contributing towards improvements of standards and energy efficiency in the oil and gas value chains in mid-stream/downstream activities • Number/volume of investments that support reduction in emissions footprint of upstream activities (including gas flaring, fugitive emissions and environmental standards on climate policies)	• Number/volume of energy-efficiency loans extended by PFIs supported by EBRD in mid-stream and downstream activities • Energy saved (GJ/y) • Total CO2e reduced/avoided (ton/y), including from gas flaring and fugitive emissions • Legal/regulatory/institutional frameworks for oil and gas related to environmental policies • Number and/or qualitative account of oil and gas value-chain clients with improved operational practices
4. High operating standards through energy efficiency and inclusive economies (WELL-GOVERNED, INCLUSIVE)			
• Support improved standards of operations of energy firms • Support SOE commercialisation • Promoting inclusion across the energy sector	• Investment • Policy engagement • Capacity-building • TC • External partnerships	• Number/volume of investments supporting high operating standards (including inclusive standards, commercialisation) • Number of policy engagement and capacity-building activities (including inclusive standards, commercialisation and improving accounting standards)	• Number of energy sector clients introducing improved operating standards • Number of SOE commercialisation/restructuring • Number and/or qualitative account of operations that contribute to economic inclusion (inclusive standards)
Context indicators			
• *Total primary energy supply per unit of GDP* • *Energy CO2 emissions per unit of GDP* • *Energy CO2 emissions per capita* • *Share of coal in electricity generation* • *Share of intermittent solar and wind in electricity generation* • *Share of renewables in electricity generation* *(See Annex B)*			

Annexes

European Bank
for Reconstruction and Development

Annex A: Abbreviations

Annex B: Context indicators

Annex C: Approach on climate goals
- I. The Bank's support for international climate goals
- II. Identifying and mitigating climate risks
- III. Criteria for hydrocarbon investments
- IV. Overview of carbon pricing

Annex D: Cross-sector links
- I. Cross-sector energy efficiency
- II. Cross-sector linkages with energy (including the use of coal for energy in other sectors)

Annex E: Gas in the low-carbon transition in EBRD COOs
- I. Gas continues to have a role in enabling the low-carbon transition under specific conditions
- II. Gas can complement the scaling-up of intermittent renewables under appropriate conditions
- III. Gas can have a role in shifting away from carbon-intensive fuels such as coal
- IV. Gas can play a role in supporting energy security for certain COOs
- V. Technological and market conditions will determine the potential role of gas in the energy transition
- VI. Controlling fugitive methane emissions and flaring are key to enabling climate benefits from fuel switching

Annex F: Case study: decarbonising the Western Balkans

Annex G: Electrification in low-carbon scenarios

Annex H: Innovation and the EBRD's role

Annex I: Sustainable Development Goals

Annex J: EBRD position vis-à-vis other IFIs and partners

Annex K: Environmental and Social Policy and the Energy Sector Strategy

Annex A: Abbreviations

European Bank
for Reconstruction and Development

1. ABI – annual business investment
2. ADB – Asian Development Bank
3. AIIB – Asian Infrastructure Investment Bank
4. BRUA – Bulgaria-Romania-Hungary-Austria gas pipeline
5. CASA – Central Asia-South Asia power project
6. CCGT – combined cycle gas turbine
7. CCS – carbon capture and storage
8. CCU – carbon capture and utilisation
9. CEB – Central Europe and the Baltic states
10. CEER – Council of European Energy Regulators
11. CNG – compressed natural gas
12. CO2 – carbon dioxide
13. CO2e – carbon dioxide equivalent
14. COOs – countries of operations
15. COP 21 – The twenty-first session of the Conference of the Parties
16. CSP – concentrated solar power
17. DC – direct current
18. EBRD – European Bank for Reconstruction and Development
19. EIB – European Investment Bank
20. EITI – Extractive Industries Transparency Initiative
21. EPS – Serbian state-owned electric utilities company
22. ETC – Energy Transitions Commission
23. ETI – Expected Transition Impact
24. EU – European Union
25. EUR – Euro currency
26. EvD – evaluation department
27. FMO – Netherlands Development Finance Company
28. FSRU – floating storage regasification unit
29. Gas TPP – gas thermal power plant
30. GDP – gross domestic product
31. GCF – Green Climate Fund
32. GEFF – Green Economy Financing Facilities
33. GET – Green Economy Transition
34. GHG – greenhouse gas emissions
35. GW – gigawatt
36. IEA – International Energy Agency
37. IFC – International Finance Corporation
38. IFI – International Financial Institution
39. IFRS – International Financial Reporting Standards
40. IPP – Independent Power Producer
41. ICBC – Industrial and Commercial Bank of China
42. ICD – Islamic Corporation for the Development of the Private Sector
43. IRENA – International Renewable Energy Agency
44. IsDB – Islamic Development Bank
45. KESH – The Albanian Power Corporation
46. KfW – Kreditanstalt für Wiederaufbau (German development bank)
47. LCOE – levelised cost of energy
48. LNG – liquefied natural gas
49. MidSEFF – The Turkish Mid-size Sustainable Energy Financing Facility
50. MJ - megajoule
51. MW – megawatt
52. Mtoe – million tonne of oil equivalent
53. NDCs – nationally determined contributions
54. OPEC – Organisation of the Petroleum Exporting Countries
55. PPP – public-private partnership
56. PPP – purchasing power parity
57. PV – photovoltaic (solar cell) panels
58. PV of total cost – present value of total cost
59. RE – renewable energy
60. RES – renewable energy sources
61. SDGs – Sustainable Development Goals
62. SDS – the IEA's Sustainable Development Scenario
63. SEE – south-eastern Europe
64. SEI – Sustainable Energy Initiative
65. SEMED – south-eastern Mediterranean
66. SOE – sate-owned enterprise
67. SRI – Sustainable Resource Initiative
68. TANAP – Trans-Anatolian pipeline
69. TC – Technical Cooperation
70. TI – Transition Impact
71. TJ – terajoule
72. TPA – Third-party access
73. TPES – total primary energy supply
74. UNFCC - United Nations Framework Convention on Climate Change
75. US – United States
76. USAID – United States Agency for International Development
77. USD – United States dollar
78. WHO – World Health Organisation

Annex B: Context indicators (1)

European Bank
for Reconstruction and Development

	Country	Energy (TPES) / GDP PPP (MJ per 2010 USD)	CO2 / Energy (TPES) (tCO2 per TJ)	CO2 emissions per capita (tCO2 per capita)	Share of coal in electricity generation (%)		Share of intermittent solar & wind in electricity generation (%)		Share of renewables in electricity generation (%)	
		2015	2015	2015	2010	2015	2010	2015	2010	2015
Central Europe and the Baltic states	Croatia	4.29	44.1	3.69	16%	21%	1%	8%	63%	67%
	Estonia	6.64	68.3	11.9	4%	6%	2%	7%	8%	16%
	Hungary	4.48	40.3	4.34	17%	19%	1%	3%	8%	11%
	Latvia	4.06	38.1	3.40	<1%	-	1%	3%	55%	50%
	Lithuania	4.05	34.7	3.62	-	-	4%	21%	23%	47%
	Poland	4.27	71.1	7.34	88%	81%	1%	7%	7%	14%
	Slovak Republic	4.51	42.8	5.44	15%	13%	<1%	2%	22%	23%
	Slovenia	4.73	46.5	6.10	33%	30%	<1%	2%	29%	29%
South-eastern Europe	Albania	3.08	41.4	1.31	-	-	-	-	100%	100%
	Bosnia and Herzegovina	9.19	66.0	5.84	53%	64%	-	-	47%	36%
	Bulgaria	6.47	56.2	6.08	49%	46%	2%	6%	13%	18%
	FYR Macedonia	4.14	64.2	3.43	65%	58%	-	3%	33%	36%
	Kosovo	6.54	81.7	4.78	97%	97%	<1%	-	3%	2%
	Montenegro	4.65	56.7	4.00	32%	50%	-	-	68%	50%
	Romania	3.54	52.0	3.51	34%	28%	1%	14%	33%	40%
	Serbia	7.04	72.0	6.27	67%	72%	-	<1%	32%	27%
	Turkey	3.03	58.8	4.09	26%	29%	1%	5%	26%	32%
	Greece	3.79	66.5	5.93	54%	43%	5%	16%	19%	29%
	Cyprus	3.27	70.0	7.38	-	-	1%	8%	1%	9%
EU-28		**3.75**	**48.2**	**6.28**	**26%**	**26%**	**5%**	**13%**	**21%**	**30%**
OECD		**4.61**	**53.2**	**9.18**	**34%**	**30%**	**3%**	**7%**	**18%**	**24%**

Source: IEA (2017b), "World Energy Balances 2017" and "World CO2 Indicators 2017".

Annex B: Context indicators (2)

European Bank
for Reconstruction and Development

	Country	Energy (TPES) / GDP PPP (MJ per 2010 USD)	CO2 / Energy (TPES) (tCO2 per TJ)	CO2 emissions per capita (tCO2 per capita)	Share of coal in electricity generation (%)		Share of intermittent solar & wind in electricity generation (%)		Share of renewables in electricity generation (%)	
		2015	2015	2015	2010	2015	2010	2015	2010	2015
Eastern Europe and Caucasus	Armenia	5.49	36.6	1.57	-	-	<1%	<1%	39%	28%
	Azerbaijan	3.81	51.2	3.21	-	-	<1%	<1%	18%	7%
	Belarus	6.83	50.3	5.60	<1%	<1%	<1%	<1%	<1%	1%
	Georgia	5.91	43.3	2.27	-	-	-	-	93%	78%
	Moldova	8.53	53.7	2.11	-	-	-	<1%	7%	5%
	Ukraine	12.02	50.2	4.19	37%	35%	<1%	1%	7%	5%
Central Asia	Kazakhstan	7.76	68.8	12.9	81%	72%	-	<1%	10%	9%
	Kyrgyzstan	8.87	59.4	1.65	5%	13%	-	-	92%	85%
	Mongolia	6.22	83.1	5.73	96%	93%	-	3%	-	3%
	Tajikistan	5.12	38.0	0.51	-	2%	-	-	100%	98%
	Turkmenistan	14.16	59.7	12.8	-	-	-	-	-	-
	Uzbekistan	10.31	53.6	3.05	4%	4%	-	-	21%	21%
Southern and eastern Mediterranean	Egypt	3.62	59.7	2.17	-	-	1%	1%	10%	8%
	Jordan	4.74	65.9	3.13	-	-	<1%	1%	<1%	1%
	Lebanon	4.27	71.0	3.85	-	-	-	-	5%	3%
	Morocco	3.22	67.6	1.60	46%	56%	3%	8%	17%	19%
	Tunisia	3.83	56.0	2.27	-	-	1%	2%	4%	4%
Russian Federation		9.58	49.4	10.2	16%	15%	<1%	<1%	16%	16%
EU-28		**3.75**	**48.2**	**6.28**	**26%**	**26%**	**5%**	**13%**	**21%**	**30%**
OECD		**4.61**	**53.2**	**9.18**	**34%**	**30%**	**3%**	**7%**	**18%**	**24%**

No data available for West Bank and Gaza.
Source: IEA (2017b), "World Energy Balances 2017" and "World CO2 Indicators 2017".

Annex C.I: The Bank's support for international climate goals

European Bank
for Reconstruction and Development

The EBRD and climate goals	• Climate change is the result of critical market failures. Addressing climate change therefore reflects the Bank's mandate to promote the transition to market-based economies and its commitment "to promote in the full range of its activities environmentally sound and sustainable development"[1]. • The Paris Agreement reflects a broad-based international commitment to address climate change. The agreement commits countries to emission pathways consistent with "holding the increase in the global average temperature to well below 2° C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 ° C above pre-industrial levels." The Agreement emphasises the need for efforts to promote both climate change mitigation and climate change adaptation. • The Paris Agreement has widespread support from the Bank's shareholders, and has been signed by all but one of the Bank's countries of operations.[2] • With other development financing institutions, the Bank has committed to supporting the outcomes of the Paris Agreement in the 2015 *Joint Statement by the Multilateral Development Banks at Paris, COP21*. This commitment was reiterated in a joint declaration with other development finance institutions at the One Planet Summit in 2017.

Supporting international climate change goals	• Operationally, the Bank's support for international climate goals is delivered through:
	  • Investment activities. In particular, the Bank has several processes and procedures to promote climate change mitigation and adaptation investments – most notably, those associated with the Green Economy Transition approach.
	  • Policy engagement activities. These extend to:
	  • Support to develop, refine and increase the ambition of Nationally Determined Contributions – for example, through the Bank's NDC Support Programme.
	  • Other activities such as defining and shaping sector and/or country-specific emissions pathways.
	• A key element of the Bank's activities to support climate goals is to identify and mitigate the climate risk associated with its activities – specifically, the risk that activities are inconsistent with mitigation and/or adaptation goals.

[1] *Article 2.1(vii) of the Agreement Establishing the EBRD.*
[2] *Kosovo is unable to be a signatory of the Paris Agreement due to its status at the United Nations.*

Annex C.II: Identifying and mitigating climate risks

European Bank
for Reconstruction and Development

Climate risks

- The presence of climate risks could lead to assets becoming stranded – i.e. "assets that have suffered from unanticipated or premature write-downs, devaluations, or conversion to liabilities"[1]. All assets face the risk of becoming stranded – for example, because of falls in the cost of alternatives or changes in demand. Climate change poses a specific set of risks to assets, principally from the lack of an explicit price of greenhouse gas emissions.
- A carbon-intensive asset may avoid becoming stranded if its contractual framework allows it to continue operating at the expense of less carbon-intensive assets (for example, because it benefits from a long-term contract that guarantees operation). In such cases, however, the asset would result in carbon lock-in – i.e. an asset that continues to operate even when changes in the operating environment mean that a less carbon-intensive asset would be chosen instead if the decision to invest was taken today.
- The Bank has become a supporter of the Task Force on Climate-related Financial Disclosures, which provides a clear framework for assessing and disclosing climate-related risks.

Identifying and mitigating climate risk

- Reflecting these risks, the Bank will use measures to identify and mitigate the risk of investing in assets that result in carbon lock-in and/or become stranded. Such measures, which will continue to be refined over time may include:
  - Assessments that account for key externalities – in particular, greenhouse gas emissions through the use of a shadow price of carbon (see Annex C.IV for further details).
  - Consistency of investments with NDCs[2] (which, over time, will provide an increasingly robust means to assess consistency with the goals of the Paris Agreement).
  - Promoting technological flexibility – allowing the asset to be adapted in the future to reduce its emissions footprint (e.g. a power plant being operated as peaking capacity rather than as baseload; the addition of CCS; or the use of natural gas infrastructure for biogas or hydrogen).
  - Promoting contractual flexibility – for example, using capacity payments to mitigate the risk of stranded assets while also avoiding carbon lock-in so that the asset no longer operates when it is economically feasible for a lower carbon alternative to meet the same needs.
  - Other measures that are sector specific – for example, consistency with: sector-specific performance standards; sector and/or country-specific pathways; and/or other sector-specific approaches.
- Energy sector investments, like those in other sectors, will reflect these measures. Energy-sector-specific approaches for hydrocarbons are presented in Annex C.III.

[1] *This broad definition is used by the Smith School of Enterprise and the Environment at the University of Oxford for stranded assets in the context of climate change.*
[2] *Or, when relevant, a country's Intended Nationally Determined Contributions (INDCs)*

Annex C.III: Criteria for hydrocarbon investments

European Bank
for Reconstruction and Development

Coal-fired power generation	• The Bank will not finance thermal coal mining or coal-fired electricity generation capacity (including upgrades to existing plants or the construction of new capacity).[1] • Through policy dialogue, the Bank will engage with countries of operations with significant coal dependence to design a transition away from coal that addresses issues of air quality, retrenchment and energy security.
Upstream oil	• The Bank will not finance upstream oil exploration. • The Bank will not finance upstream oil development projects except in rare and exceptional circumstances where project's proceeds exclusively target the reduction of GHG emissions or flaring, from existing producing fields. • Any investment must include improvements in standards of operations (for example, inclusive work practices, environmental remediation, transparent sub-soil codes, etc.). • Investments meeting the relevant criteria will be subject to an economic assessment (which will account for key externalities and apply a shadow price of carbon). • All investments will be consistent with the Bank's Environmental and Social Policy (including requirements for using best available techniques). • All investments will need to be consistent with NDCs.[2]
Mid and downstream oil Natural gas	• Investments meeting the relevant criteria will be subject to an economic assessment (which will account for key externalities and apply a shadow price of carbon). • All investments will be consistent with the Bank's Environmental and Social Policy (including requirements for using best available techniques). • All investments will need to be consistent with NDCs.[2] • Investments will not displace less carbon-intensive sources, or lead to carbon lock-in or stranded assets. • Investments will account for flexibility in the design (both technical and contractual) of energy solutions to facilitate the energy transition.

[1] *See Annex D.II for the Bank's approach to coal for energy use in other sectors.*
[2] *Or, when relevant, a country's Intended Nationally Determined Contributions (INDCs)*

Annex C.IV: Overview of shadow carbon pricing approach

European Bank
for Reconstruction and Development

Why use a shadow carbon price?	• A carbon price can be part of the policy package to achieve the goals of the Paris Agreement. It seeks to put a monetary value on greenhouse gas emissions and corrects for the market failure associated with this externality in the absence of carbon markets or equivalent tools (e.g. a carbon tax). Although there has been substantial progress in recent years, carbon prices remain limited or non existing in many of EBRD COO. Applying shadow carbon pricing as part of an economic assessment offers reassurance that supported projects achieve the transition and sustainability goals of the EBRD.
Existing approach	• The EBRD already committed to use a shadow carbon price in the context of the 2014 Energy Strategy, through a methodology for evaluating coal-fired generation projects (summary available on EBRD website).

Future EBRD carbon pricing approach	• Building on the coal methodology, the EBRD will apply shadow carbon pricing as part of an economic assessment of projects that significantly increase GHG emissions. Implementation will begin in 2019, for projects passing concept review after the 1st of January.
	  • Analysis will be triggered by projects that increase emissions by 25,000 metric tonnes of CO_2e per year relative to a baseline and/or 100,000 tons in absolute terms.
	  • EBRD will use prices consistent with the recommendations of the High-Level Commission on Carbon Prices.
	  • The assessment will incorporate other relevant externalities and market distortions when they are likely to have a material effect. Examples may include local air pollution, reliability of energy supply and energy subsidies.
	  • As per standard practice, analysis will cover Scope 1 (direct) and Scope 2 (indirect/electricity) emissions. Impacts of Scope 3 emissions may be assessed in some circumstances – for example, oil and gas pipelines.
	  • The outcomes of the economic analysis incorporating a shadow carbon price will be an important input in the Bank's decision making on projects. The economic analysis will supplement Bank's existing approaches to additionality, sound banking, environmental and social due diligence etc.
	  • A summary with key information will be reflected in Board documents in a dedicated annex.

[1] *See Annex D.II for the Bank's approach to coal for energy use in other sectors.*

Annex D.I: Cross-sector energy efficiency

European Bank
for Reconstruction and Development

Energy efficiency cuts across many sectors and covers a variety of activities

Assist economies to upgrade **infrastructure**:

- District heating
- Public transport networks
- Water supply systems
- Green Cities Programme provides a systematic approach to promoting low-carbon cities via a holistic assessment of gaps, opportunities and priorities for upgrading a city's infrastructure and services

Assist **corporates** to assess energy and resource-efficiency potential by:

- Conducting resource efficiency audits to identify priority investments
- Introducing advanced energy and resource management practices
- Providing financial solutions tailored to businesses and their projects

Credit lines to local **financial institutions** for on-lending to small and mid-sized green projects:

- Technical assistance teams, who identify and assess investment opportunities, train local bank staff, and develop marketing activities.
- If needed, this is complemented with incentive payments to end-borrowers.

Annex D.II: Cross-sector linkages with energy (including the use of coal for energy in other sectors)

European Bank
for Reconstruction and Development

Sector team	Approach
1. Transport	• The Bank will not finance port terminals principally dedicated to thermal coal, nor will it finance transport links principally dedicated to carrying thermal coal (for example, a rail line transporting coal from a mine or port terminal to a power generation plant). • In promoting the development of sustainable transport, the Bank will support lower-carbon technologies and alternative fuels for transport operations. This extends to promoting electrification where feasible and affordable – for example, financing infrastructure for charging as well as electric vehicles.
2. Municipal and Environmental Infrastructure	• For district heating the Bank will not finance any investment in coal-fired heat-generating plants. It may, however, finance district heating companies that use coal as part of their energy mix provided that the investment is not related to, or is outside the boundary of, coal-based heat generation. In such instances its focus will be on energy efficiency investments such as network rehabilitation, installation of modern controls, improved metering and demand-side measures. • The Bank will promote sustainable urban transport in cities, and will support lower-carbon technologies and alternative fuels for transport operations. This extends to promoting electrification where feasible and affordable – for example, infrastructure for charging as well as electric vehicles.
3. Manufacturing and Services, Agribusiness, and Mining	• Industrial operations typically use fossil fuels in production processes and to generate energy used in their operations (for example, as process heat for drying). • The ESS commits the Bank not to finance any electricity-generating asset that uses thermal coal. The Bank may finance electricity generation assets which use waste heat and steam from coal-fired plants designed principally to supply heat or steam to industrial processes. • The use of metallurgical coal (including coking coal and pulverised coal injection coal), which is used in the ferrous metal industry as a feedstock, is not covered under the ESS. • Non-thermal coal (e.g. pet coal) is also used as fuel for some building materials processes, and is accepted as Best Available Techniques under the EU Industrial Emissions Directive and Best Available Techniques requirements. This is not covered under the ESS. • In general, the use of thermal coal in production processes is reviewed on a case-by-case basis, taking into account low carbon technologies and methodologies (e.g., use of alternative fuels, waste heat recovery and pre-combustion CCS technologies). • The Bank may finance environmental and efficiency upgrades of existing coal-fuelled heat generators, located within industrial facilities, supplying heat to industrial processes and/or district heating networks; provided that as a result of the investments, the specific units comply with EU emissions limits and Best Available Techniques requirements.

Annex E.I: Gas in the low-carbon transition in EBRD countries of operations

European Bank
for Reconstruction and Development

Gas continues to have a role in enabling the low-carbon transition under specific conditions

Gas has multiple potential roles in the energy transition, depending on country-specific conditions

Supporting the scaling-up of intermittent renewables

See Annex E.II

- While renewables continue to face the intermittency challenge, gas can be one of the mix of technologies and solutions that provide electricity system stability.
- Much of the EBRD's region also experiences significant seasonal fluctuations in electricity and heating demand, driving further need for flexible power sources.
- Other technologies such as battery storage, hydrogen storage and demand-side response will play an increasingly important role over time.

Switching to cleaner fuels to reduce GHG emissions and/or improve air quality

See Annex E.III

- Coal continues to play a significant role in many of the EBRD's COOs (and in many cases, the dominant role).
- In addition to GHG impacts, emissions from coal and other polluting fuels in transport, industry and heating are a major source of local emissions – a significant health concern in many cities (see section 2.3).
- A switch to gas is a key step towards a cleaner energy system for many countries.

Delivering energy security

See Annex E.IV

- For countries importing fuels and/or power, diversity in the routes and sources of non-indigenous fuels is an important element of energy security.
- Better integration into regional markets can deliver energy security effectively and efficiently.
- Appropriate gas infrastructure and regulations can facilitate better integration into regional markets.

However, any investments must consider a number of factors

Technological competition
See Annex E.V

- Gas-infrastructure investments should not displace less carbon-intensive sources, or lead to carbon lock-in or stranded assets.
- To enable flexibility and energy security, investments should prioritise flexible assets (e.g. those that can respond at short notice such as peaking plants) and infrastructure that supports integration and market development.
- Infrastructure developments should be mindful of future alternative 'green gas' feedstocks such as hydrogen and biogas.

Methane emissions
See Annex E.VI

- Methane is a potent greenhouse gas. Whether natural gas use is a cleaner alternative depends on fugitive emissions across the value chain.
- Reducing fugitive emissions in the gas (and oil) value chain is also an important abatement opportunity.

Annex E.II: Gas in the low-carbon transition in EBRD countries of operations

European Bank for Reconstruction and Development

Gas has multiple potential roles in the transition to energy decarbonisation, depending on country-specific conditions

Supporting the scaling-up of intermittent renewables

Switching to cleaner fuels to reduce GHG emissions and/or improve air quality

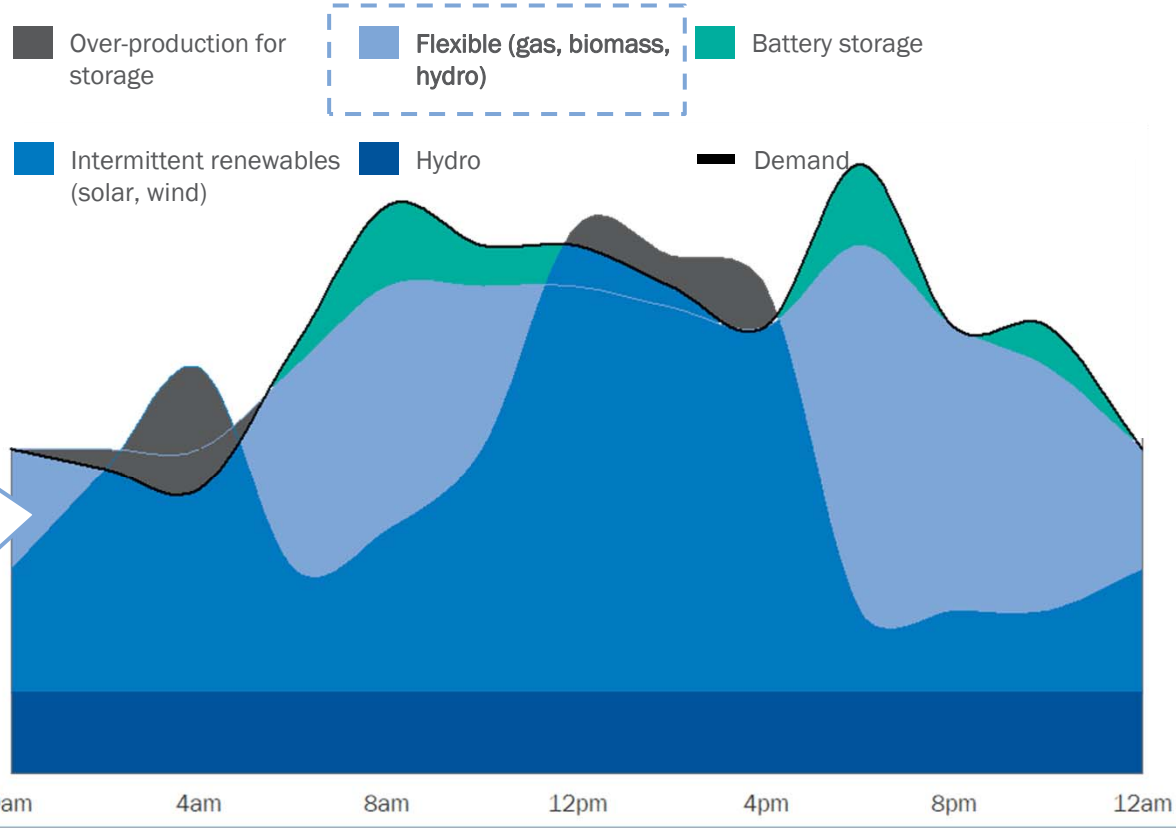
Delivering energy security

Gas can complement the scaling-up of intermittent renewables under appropriate conditions

As the share of intermittent renewable energy sources increases, flexible power will have an increasingly significant role. **Gas will be one of the key sources of a flexible power supply, depending on the country context.**

Over time, a combination of storage and hydrogen may overtake flexible gas plants for both short-term and seasonal storage.

Net load diagram for a future, renewables-heavy power system (illustrative only)



Source: REN 21, SYSTEMIQ.

Annex E.III: Gas in the low-carbon transition in EBRD countries of operations

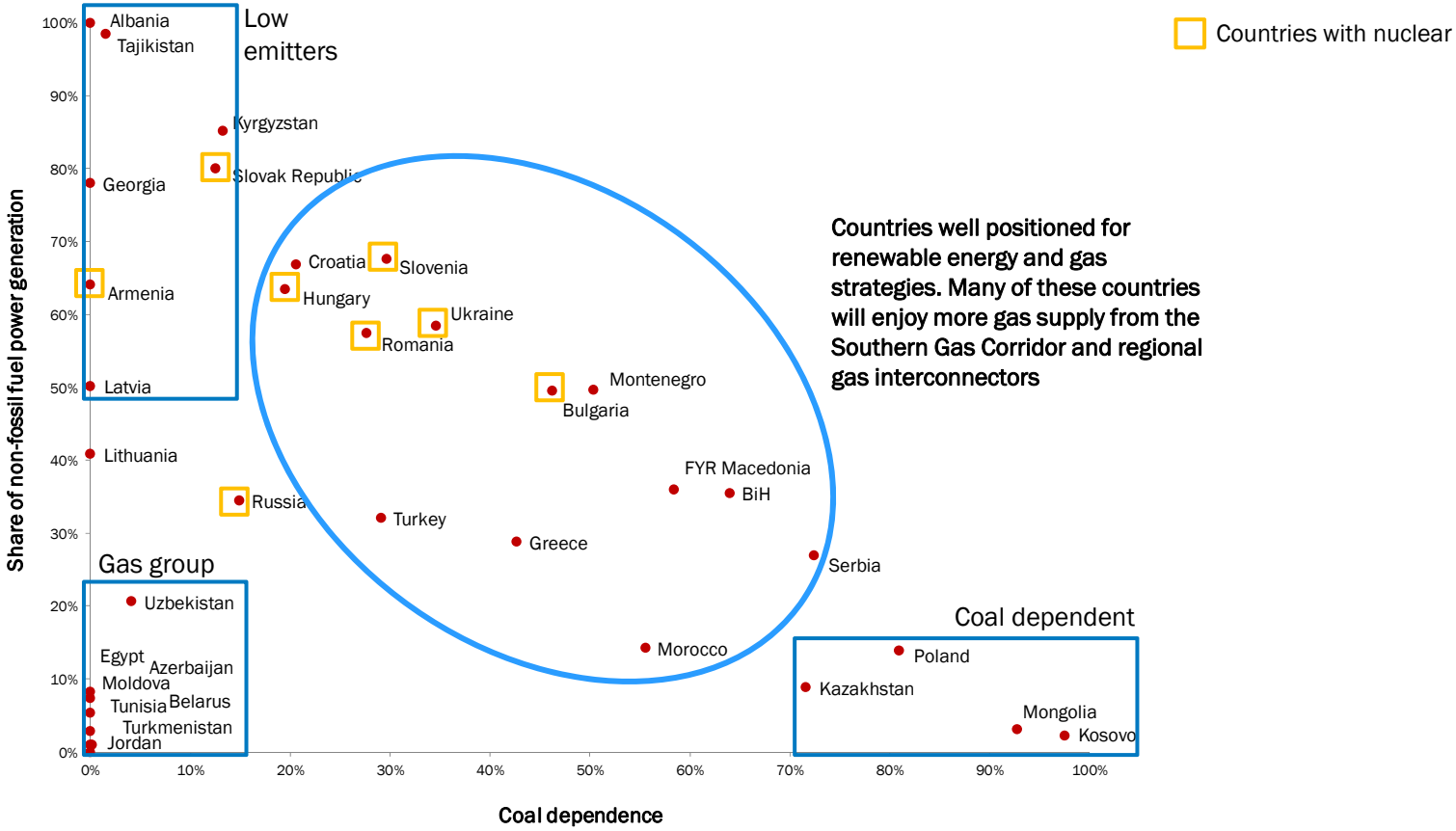
European Bank for Reconstruction and Development

Gas has multiple potential roles in the transition to energy decarbonisation, depending on country-specific conditions

- Supporting the scaling-up of intermittent renewables
- **Switching to cleaner fuels to reduce GHG emissions and/or improve air quality**
- Delivering energy security

Gas can have a role in shifting away from carbon-intensive fuels such as coal

Decarbonisation in EBRD countries of operations [1]



Source: IEA (2017), "World Energy Balances 2017". ***Data for 2015 only.***

Annex E.IV: Gas in the low-carbon transition in EBRD countries of operations

European Bank
for Reconstruction and Development

Gas has multiple potential roles in the transition to energy decarbonisation, depending on country-specific conditions

- Supporting the scaling-up of intermittent renewables
- Switching to cleaner fuels to reduce GHG emissions and/or improve air quality
- Delivering energy security

Gas can play a role in supporting energy security for certain countries of operations

- The ESS takes the view that diversification of sources, in particular through better integration into regional markets, is an effective and efficient means to promote energy security.
- Diversification of routes and sources of gas supply through infrastructure and market-enabling regulations (for example, unbundling or the development of gas hubs) is therefore an important means for promoting energy security.
- Some EBRD regions have limited or no gas supply sources (for example, the Western Balkans). In others, such as Central Asia and SEMED, energy security could be enhanced through more extensive national and cross-border infrastructure and accompanying regulatory reforms that lead to the development of regional markets.

The Southern Gas Corridor

The Southern Gas Corridor consists of a series of pipelines that will transport Caspian gas to southern Europe (with various offtake points along its route). It will help to diversify gas supplies to a number of countries and regions – for example, Bulgaria, Greece, southern Europe and Turkey. The Southern Gas Corridor travels through Albania, and could be a source of gas for the Western Balkans region (which currently has no major gas supply sources).

Source: TAP website. Available at: http://www.tap-ag.com/the-pipeline/the-big-picture/southern-gas-corridor.

Annex E.V: Gas in the low-carbon transition in EBRD countries of operations

European Bank
for Reconstruction and Development

Key considerations | Technological competition | Methane emissions

Technological and market conditions will determine the potential role of gas in the energy transition

Deployment of flexible technology solutions

- Gas infrastructure investments should avoid the risk of carbon lock-in and/or stranded assets (see Annex C)
- Assets need to be designed and optimised for differing and often more flexible contexts
- Flexibility extends to the potential to use 'green gas' feedstocks, such as hydrogen and biogas, as a future alternative

Development of flexible markets and contractual solutions

- In the EBRD's region, virtually all gas comes from traditional long-term gas contracts
- Recent experience in Western Europe shows maturing gas markets can facilitate more flexible trading of gas
- Liquid trading hubs can additionally provide greater diversity of supply, supporting energy security

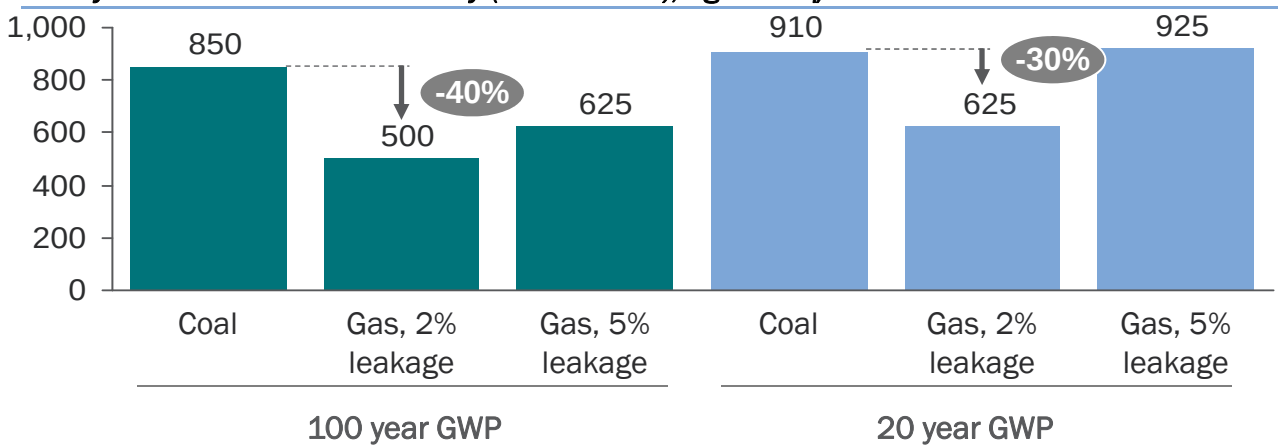
Annex E.VI: Gas in the low-carbon transition in EBRD countries of operations

European Bank for Reconstruction and Development

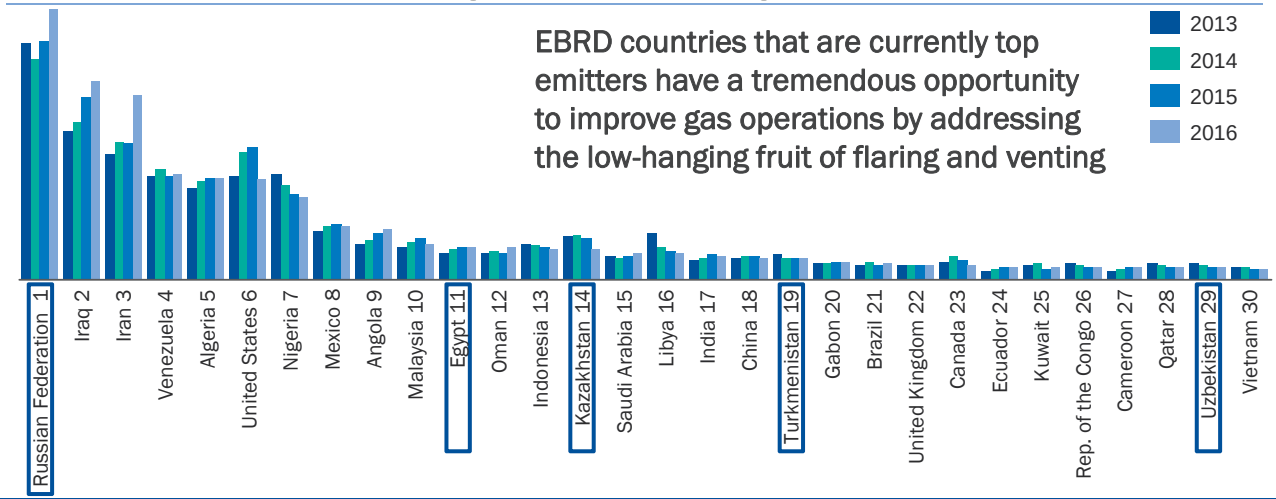
Key considerations | Technological competition | **Methane emissions**

Controlling fugitive methane emissions and flaring are key to enabling climate benefits from fuel switching

Life-cycle GHG emissions intensity (without CCS), kg CO2eq/MWh[1]



Several EBRD countries are amongst the top 30 flarers globally[2]



Natural gas is less GHG-intensive than coal, but only when leakage of methane is low.

The IEA estimates that "it is technically possible to avoid ~75% of the current 76 Mt of oil and gas methane emissions." They further suggest that "~40-50% of current methane emissions could be avoided at no net cost."[3]

Note: Life-cycle emissions associated with the production of equal amounts of electricity from newly constructed power plants that operate for 30 years and then retire. Comparison based on 100-year and 20-year Global Warming Potential for methane. Coal refers to the average emissions of pulverized coal and ultra-supercritical pulverized coal plant. Gas refers to a combined-cycle natural gas turbine plant.

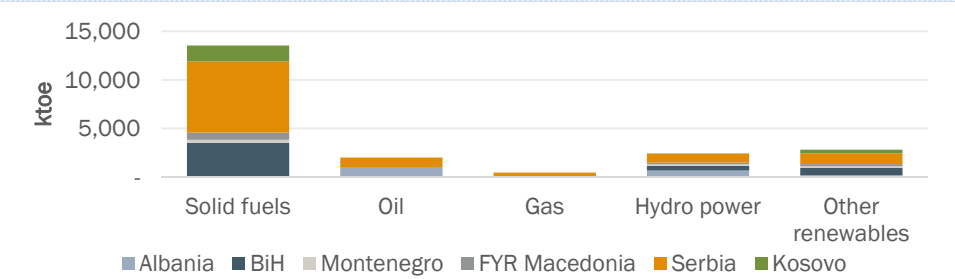
Sources: 1. Energy Transitions Commission, Copenhagen Economics analysis based on Farquharson et al (2016); Lazarus et al (2015). 2. National Oceanic and Atmospheric Administration/Global Gas Flaring Reduction Partnership 3. IEA's World Energy Outlook.

Annex F.I: Case study – generation capacity in the Western Balkans

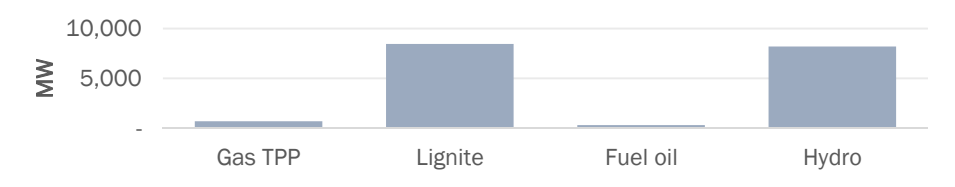
European Bank
for Reconstruction and Development

- Total primary energy supply across all countries[1] amounted to around 21.2 Mtoe in 2016.
  - Dominated by solid fuels (64% of total energy produced), followed by other renewables (13%)[2], hydro power (11%) and oil (9%). Gas plays a negligible role.
  - Serbia's energy consumption is around half (51%) of total energy consumption in the region, followed by Bosnia and Herzegovina (22%).
  - Final energy consumption for the six countries is 18.6 Mtoe and is split across transport (30%), industry (24%), and other sectors (46%).
- Total power generation capacity across the Western Balkans region is 17.6 GW in 2018. Lignite capacity accounts for 48%, followed by hydro (46%), gas (4%) and fuel oil (2%).
- Peak hourly load in January 2017 was 10.8 GW; in July 2017 it was 8.3 GW.
- Capacity in the region is ageing, with little investment in new thermal (see chart) or hydroelectric capacity in the last 30 years. **Current capacity will therefore need to be refurbished and/or replaced in the coming years.**

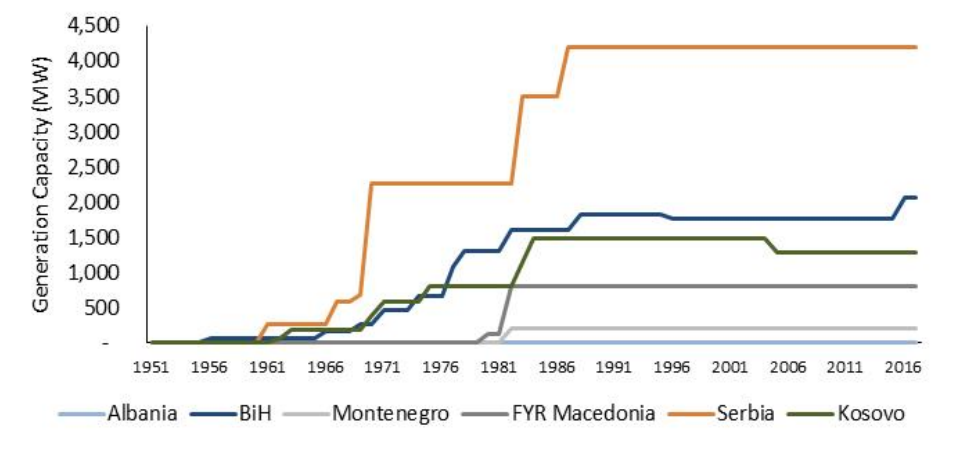
Primary energy supply (2016)



Current power generation mix (2018)



Changes in thermal generation capacity over time (MW)

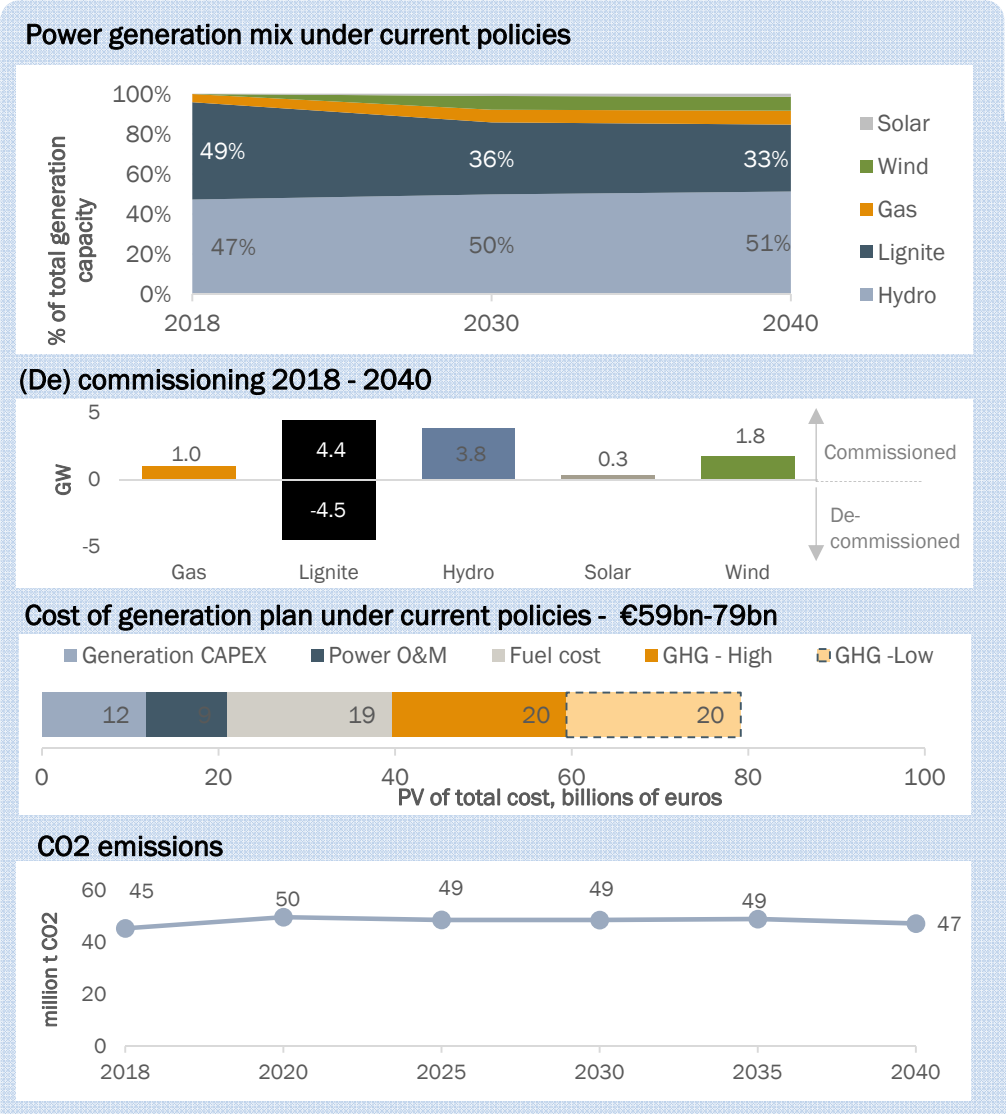


[1] *Here, the Western Balkans region consists of: Albania, Bosnia and Herzegovina, FYR Macedonia, Kosovo, Montenegro, and Serbia.*
[2] *Other renewables consist mainly of biomass.*

Annex F.II: Case study – current official power generation plans (development to 2040)[1]

European Bank
for Reconstruction and Development

- Government plans anticipate peak demand for the region to grow from 10.8 GW to 15.3 GW by 2040.
- Current government power generation plans across the Western Balkans suggest a future generation mix dominated by lignite and hydro capacity.
  - Ageing lignite capacity to be replaced, ensuring total lignite capacity remains constant at 8.5 GW until 2040 (35% of 2040 capacity).
  - Hydropower resources to be expanded from 8.2 GW today to 12 GW in 2040 with additional run of river plants (50% of 2040 capacity).[2]
  - Non-hydro renewables targets to reach 2.1 GW in 2040 (9% of 2040 capacity) - focus is on wind.
  - At 1.7 GW in 2040 (7% of 2040 capacity), gas is only expected to play a minor role.
- Total costs[3] associated with these plans could be in the region of €40bn. Including the cost of GHG emissions could add an additional €20-40bn.
- Annual GHG emissions in the period to 2040 would remain close to current levels.



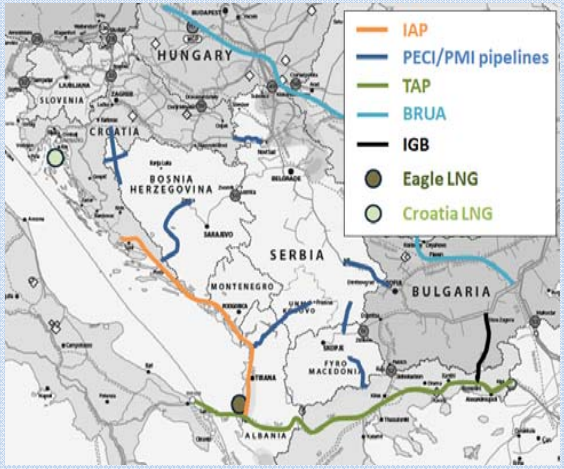
[1] *The estimates presented on this slide are based on analysis undertaken by Economic Consulting Associates.* [2] *The Bank does not take a position on the feasibility of expanding hydropower to this extent, but notes that this may pose environmental and social concerns.* [3] *The cost of air pollution has not been included in the estimates. To illustrate the size of the GHG externality, the low and high values from the World Bank's November 2017 "Guidance note on the Shadow price of carbon in economic analysis" are used.*

Annex F.III: Case study – alternative options for power sector development

European Bank
for Reconstruction and Development

- Other potential power sector development options can be based around natural gas, renewables and interconnections:
  - **Natural gas.** The region currently has limited access to gas sources and associated infrastructure. However, future gas infrastructure projects are being considered for the region (see panel).
  - **Renewable energy sources.** The costs of intermittent renewable energy sources such as solar PV and wind have been declining. Renewables can be competitive relative to conventional sources.
- Illustrative scenarios based on different development options are on the next slide.
- All these development options can be complemented by:
  - **Energy efficiency and smarter energy networks.** Energy efficiency can reduce the need for new generation capacity. Moreover, a combination of energy efficiency and smarter energy networks can support the integration of intermittent renewable energy sources.[1]
  - **Interconnections.** Cross-border electricity trading within the region, as well as between the region and neighbouring countries, can reduce the need for additional generation capacity and facilitate the integration of intermittent renewables.

Gas infrastructure proposals



Source: Energy Community Secretariat

- Important future gas infrastructure projects include:
  - Trans-Adriatic Pipeline (TAP) – will supply Caspian gas to European markets. TAP travels through countries, including Albania, but there are currently no plans for gas to be delivered to the region.
  - The Ionian-Adriatic Pipeline (IAP) – the main objective is to enable gas supplies from the Caspian and Middle East regions to reach the established Croatian gas market and help gasify Albania and Montenegro.
  - Projects in the gas masterplans of Albania, Montenegro and Macedonia, which suggest extensive gasification of the countries.
  - Albania-Kosovo Gas Pipeline, which would transport gas from TAP.

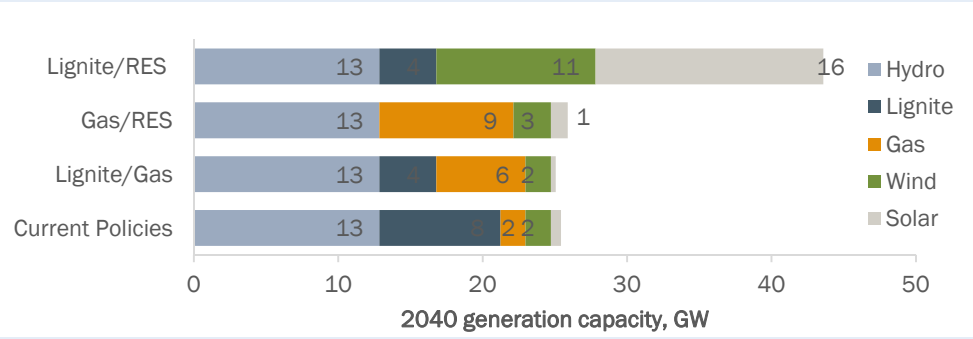
[1] *Energy efficiency has not been explicitly modelled in this analysis due to a lack of granular estimates and the illustrative nature of the scenarios. However, its effect would be to reduce overall electricity demand. This would reduce the need for generation capacity, facilitating the closure of coal-fired power plants and/or reducing the need for new generation investments. It can also facilitate the integration of renewable energy sources.*

Annex F.IV: Case study – illustrative scenarios for power sector development[1]

European Bank
for Reconstruction and Development

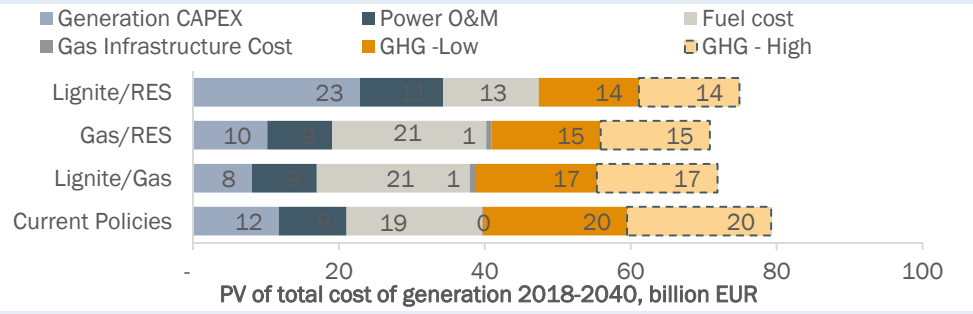
Three illustrative scenarios for power sector development:[2]

- 'Lignite/Gas' – replace all new lignite plants with gas
- 'Gas/RES' – decommission all lignite and replace with gas
- 'Lignite/RES' – maintain small base of lignite and focus on solar and wind. This would require a significant increase in capacity

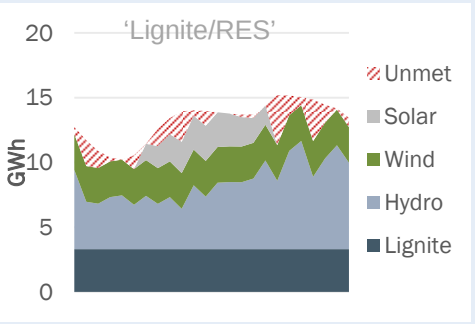


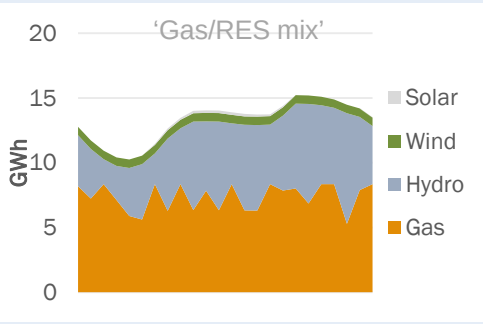
Lowest-cost scenario over the period 2018-2040 and in present value terms would be Gas/RES due to lower CAPEX and environmental costs.

However, these numbers do not include import cost for unmet electricity demand, which is significant in the Lignite/RES scenario (see below).



Dispatch analysis shows maintaining a lignite base and focusing on renewables expansion could lead to heavy reliance on imports outside the region (of the order of 24 GWh per winter day in 2040 or around 7% of total daily demand). The risk of supply interruptions in a renewables-dominated system could be mitigated with battery storage (although current costs of battery storage are high).





Development based on a combination of renewable energy sources and natural gas (and complemented by interconnections and energy efficiency) will be a cost-effective route to a low-carbon and secure power sector.

[1] The material presented on this slide is based on analysis undertaken by Economic Consulting Associates. [2] These scenarios are illustrative. They are not intended to reflect optimal (on the basis of least-cost dispatch) combinations of technologies to meet demand growth. Instead, they represent different technology-based scenarios that provide insight into the trade-offs associated with different development options. All scenarios are based on current plans for hydropower expansion. These may not materialise (and may result in significant environmental and social impacts). In the absence of such expansion, greater investment will be needed in other generation sources, including in sources providing flexibility.

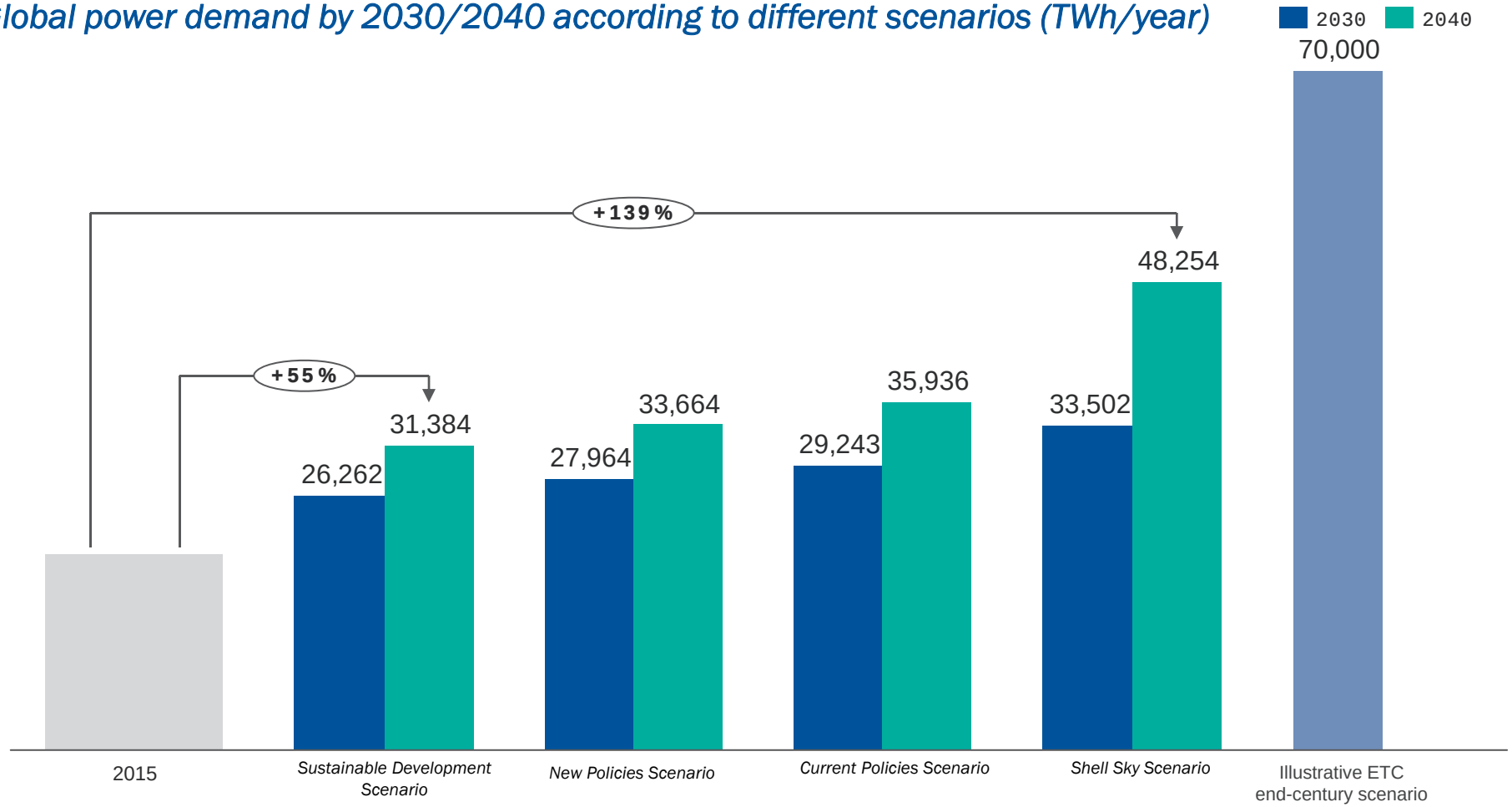
Annex G: Electrification in low-carbon scenarios

Electrification could increase global electricity requirements by over 139% in 2040

European Bank
for Reconstruction and Development

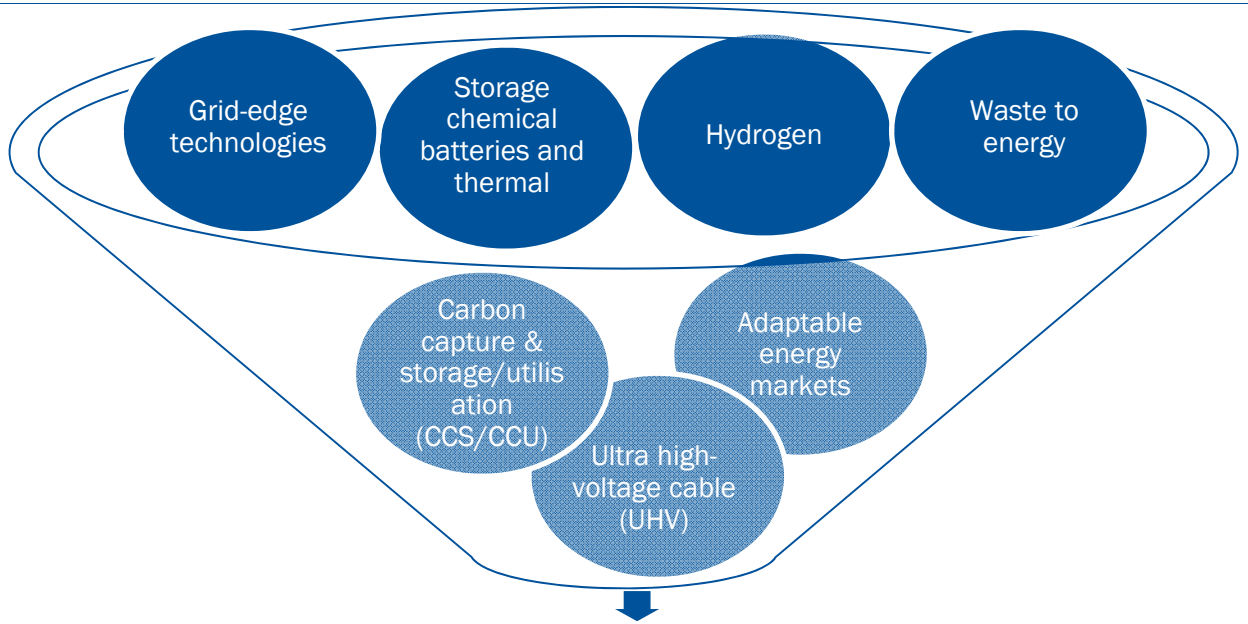
Electrification could lead to significant growth in demand for electricity in EBRD COOs

Global power demand by 2030/2040 according to different scenarios (TWh/year)



Source: Energy Transitions Commission, IEA WEO 2017 (Sustainable Development Scenario, New Policies Scenario, Current Policies Scenario) & Shell Sky Scenario 2018

Annex H: Innovation and the EBRD's role



Through financing and policy engagement, the Bank can support the introduction of innovative technologies and approaches in its countries of operations.

Examples of Bank activities to support innovation:

- **Financing:** providing financing for technologies that have limited adoption in a country of operations (for example, first utility-scale solar PV or wind power plants in the country, or smart meters).
- **Policy engagement:** developing regulatory frameworks to facilitate the introduction of new technologies (for example, storage) or new market-based mechanisms (for example, renewable energy auctions).
- **Green bonds:** supporting green capital market development by offering clients assistance and guidance to turn their bonds into green and/or climate bonds (for example, Climate Bond Initiative).
- **Green Innovation Programme:** promoting innovation linked to energy efficiency, renewable energy, waste recycling and other environmental benefits where clients can benefit from technical cooperation and investment grants to support R&D and the deployment of relevant technologies.
- **FINTECC and Climate Innovation Vouchers:** supporting companies to implement advanced climate technologies (primarily those with low market penetration and good replicability potential) by providing incentive grants in the context of a direct EBRD investment. Innovation Vouchers are grants for companies to purchase R&D services.

Annex I: Sustainable Development Goals

The energy sector plays a role across all 17 Sustainable Development Goals

European Bank
for Reconstruction and Development

Secure, affordable and sustainable energy is central to achieving the Sustainable Development Goals

Cost-competitive biomass potential in south-eastern Europe is up to 4.7 GW, with an average LCOE slightly below €72/MWh in the medium cost of capital scenario[5]

Hydropower accounts for 75% of south-eastern Europe's existing renewable capacity. However, most of it was constructed several decades ago[6]

GHG emissions in EBRD countries are 20% higher than in comparator countries[7]

Innovations around demand-side management and embedded generation allow producer-consumers to responsibly manage their energy consumption

The EBRD's Green Cities Framework offers a comprehensive business model for green urban development, including greening urban energy systems

Many EBRD countries do not have adequate safety mechanisms to protect the energy poor[1]

Eastern European and Balkan countries have the most annual air-pollution-related deaths in Europe[2].

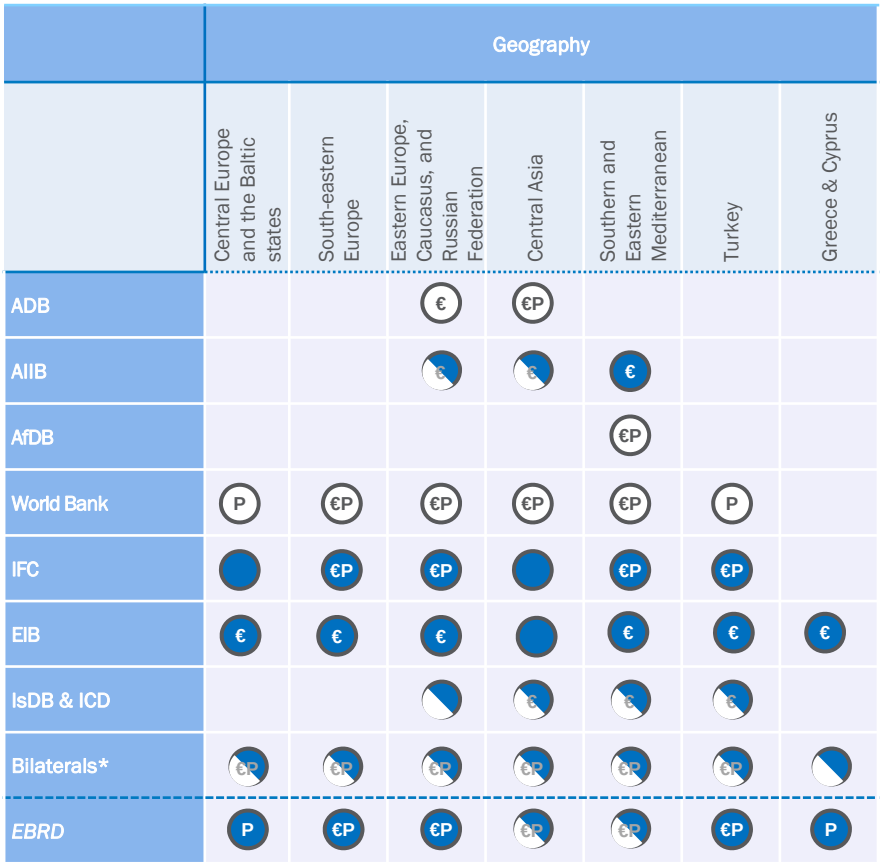
A lack of reliable access to household utilities can significantly increase women's unpaid work burden, and have a knock-on effect on women's ability to take on paid work, as well as on girls' ability to attend school.[3]

94% of the SEMED region's primary energy supply came from fossil fuels in 2015[4]

[1]Energy Poverty in Eastern Europe: Hidden Geographies of Deprivation by Stefan Buzar. [2]World Health Organization, World Health Statistics 2017: Monitoring health for the SDGs. [3]The EBRD's Strategy for the Promotion of Gender Equality 2016-2020. [4]EBRD Transition Report 2017-2018. [5]IRENA Cost-competitive renewable power generation: Potential across South East Europe 2017. [6]Ibid. [7]EBRD Transition Report 2017-2018. [8]SYSTEMIQ

Annex J: EBRD position vis-à-vis other IFIs and partners

European Bank
for Reconstruction and Development



Central and South-eastern Europe

- In Serbia, the EBRD alongside the IFC has been actively assisting Serbia's Ministry of Energy in their strategy to support renewable energy in the country. Both institutions financed the construction of a 158 MW windfarm.

Eastern Europe and Caucasus

- The TANAP section of the Southern Gas Corridor was financed by the EBRD alongside other IFIs (including the AIIB, World Bank and EIB). The Project will facilitate the integration of regional gas markets through cross-border energy transportation, support the diversification of gas supply sources, and support the development of energy-sector regulation in Azerbaijan through associated policy dialogue (creation of an independent regulator).
- In Moldova, the EBRD together with the World Bank, EU, Energy Community and EIB have been engaged in policy dialogue with the Government to promote market reforms.
- The EBRD alongside the ADB have financed the modernisation of the electricity transmission network in Armenia. The Bank engaged in policy dialogue with the regulator on the reform of distribution tariffs to bring them in line with EU practices.
- In Ukraine, the EBRD has worked extensively with international development partners (including the IMF, World Bank and EU) to support the reform of the energy sector.

Central Asia

- In Mongolia, the EBRD together with the EIB and EKF co-financed the 55 MW Sainshand wind power plant. In parallel, the Bank engaged in policy dialogue with the regulator.
- In Tajikistan, the World Bank, EIB, UK DfID, IsDB and USAID all co-financed the construction of the converter station and related infrastructure as part of the high-voltage transmission line for the Central Asia-South Asia Electricity Transmission and Trade project (CASA-1000). The project promoted the establishment of an independent energy-sector regulator.

Southern and Eastern Mediterranean

- In Egypt, the EBRD together with the GCF, IsDB, ICD, ICBC, FMO and Proparco have engaged in policy dialogue on a renewable energy framework that has included 16 solar projects.
- In Jordan, the first solar projects were financed following detailed engagement with the government on the drafting of the PPA. As a result, 7 solar projects were financed with OPIC and Proparco and €60 million were mobilized through B loans from FMO.

IFI activity mapping based on publicly available information.

Annex K: Environmental and Social Policy and the Energy Sector Strategy

European Bank
for Reconstruction and Development

The Bank's Environmental and Social Policy and associated Performance Requirements establish the criteria for any EBRD financing. The Requirements set the minimum environmental and social requirements for financing and are applied pragmatically on a risk basis.

The issues typically faced on energy projects include environmental and social management; labour and working conditions; pollution prevention and use of Best Available Techniques; emission to air; water management; waste management; health and safety of workers and communities; compensation for economic and/or physical displacement; impacts on biodiversity caused by land take and/or habitat fragmentation; the preservation of cultural resources; and the provision of meaningful consultation with local communities to ensure that they are aware of site activities and operations, and that communities understand how to seek additional information and how to file a grievance. For the energy sector, the EBRD also has a dedicated Environmental and Social Guidance Note for Hydropower Projects.

A challenge for clients in the Bank's countries of operations in the energy sector is meeting EU environmental standards across a range of issues, for example:

- the EU Industrial Emission Directive and Best Available Techniques;
- addressing cumulative impact associated with the project developed (including associated infrastructure); and
- considering biodiversity and habitat.

EBRD will work with clients to identify pollution impacts and ensure compliance with national and applicable EU standards. The Bank will support the development and implementation of projects with Green Economy Transition elements in support of less energy intensity, less water usage, and reduction of greenhouse gas and air pollution emissions. The Bank will work to improve the implementation of the circular economy where possible, as well as to work on institutional strengthening and policy engagement, as relevant.

Details of the Environmental and Social Policy can be found at:
http://www.ebrd.com/news/publications/policies/environmental-and-social-policy-esp.html