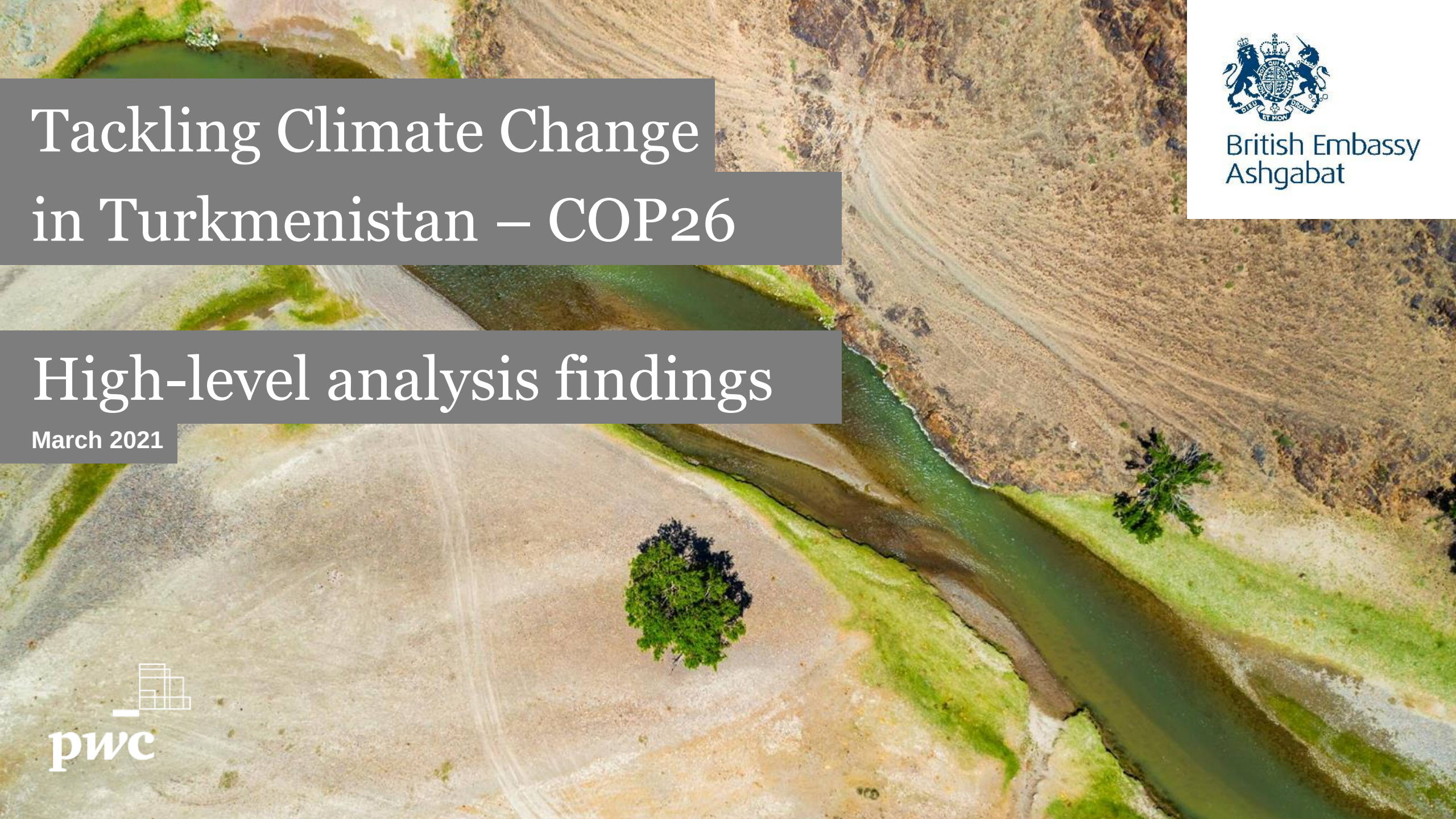


Tackling Climate Change in Turkmenistan – COP26

High-level analysis findings

March 2021

British Embassy Ashgabat

pwc

Event agenda

16:00 - 16:10	Opening remarks
16:10 - 17:10	High level analysis findings: presentation
17:10 - 17:25	Questions and comments
17:25 - 17:30	Final remarks from the British Embassy

Purpose of the report

The British Embassy has engaged PwC to develop a high-level analysis on approaching climate change in Turkmenistan. The analysis is intended to contribute to the ongoing efforts to address climate challenges and preparation for COP26.

The analysis involves:

Context setting - understanding the challenges related to climate change, current landscape of climate action and efforts already undertaken

Case studies and best practice analysis - identifying international and regional best practices in the area of climate change mitigation and adaptation

Identification of opportunities related to addressing climate change and potential actions supporting economic growth in a sustainable way

Contents of the presentation

1. Context setting
2. Climate pathways – UK case study
3. Review of international sectoral case studies
4. Towards green growth and resilience – key opportunities

Context setting

Climate change impact already creates significant costs globally. Low-carbon transformation can create economic opportunities and new jobs

Climate related disasters costed the world

$650 bn

Just between 2016-2018

Morgan Stanley, 2020

Current costs a year…

$ 18 billion

in low and middle income countries due to damage power generation and transportation infrastructure

$ 390 billion

At least are the cost triggered by wider disruptions for households & firms

…are expected to raise

World Bank, 2021

The direct economic benefits of low-carbon, sustainable growth is

$ 26 trillion

and potential for create

65 million new jobs

compared with the business-as-usual path by 2030

The Global Commission on the Economy and Climate, 2021

Higher returns for investments in resilience infrastructure

Per every dollar invested, $4 dollar in benefits are generated

World Bank, 2021

Decreased water accessibility and rising temperatures will affect almost all areas of the economy and harm living standards

Expected impact of climate changes for Central Asia

Water resources

- Melting glaciers and permafrost
- **Decreased water availability** ⚠
- Increased competition over water

Health

- **Increased food insecurity** ⚠
- Shifting infectious disease burden
- **Health threats – cardiovascular diseases**

Energy

- **Increased energy demand** ⚠
- Decreased energy production (hydro)
- Damage to energy infrastructure

Agriculture and livestock

- **Soil erosion - Decreased agriculture productivity and availability** ⚠
- Increased storm and flood damage – impacting on arable land availability
- **Decreased water availability for agriculture and drinking** ⚠

Biodiversity

- Melting glaciers and permafrost
- Increased forest fires
- **Shifting distribution & loss of species** ⚠

⚠ **Particularly relevant for Turkmenistan**

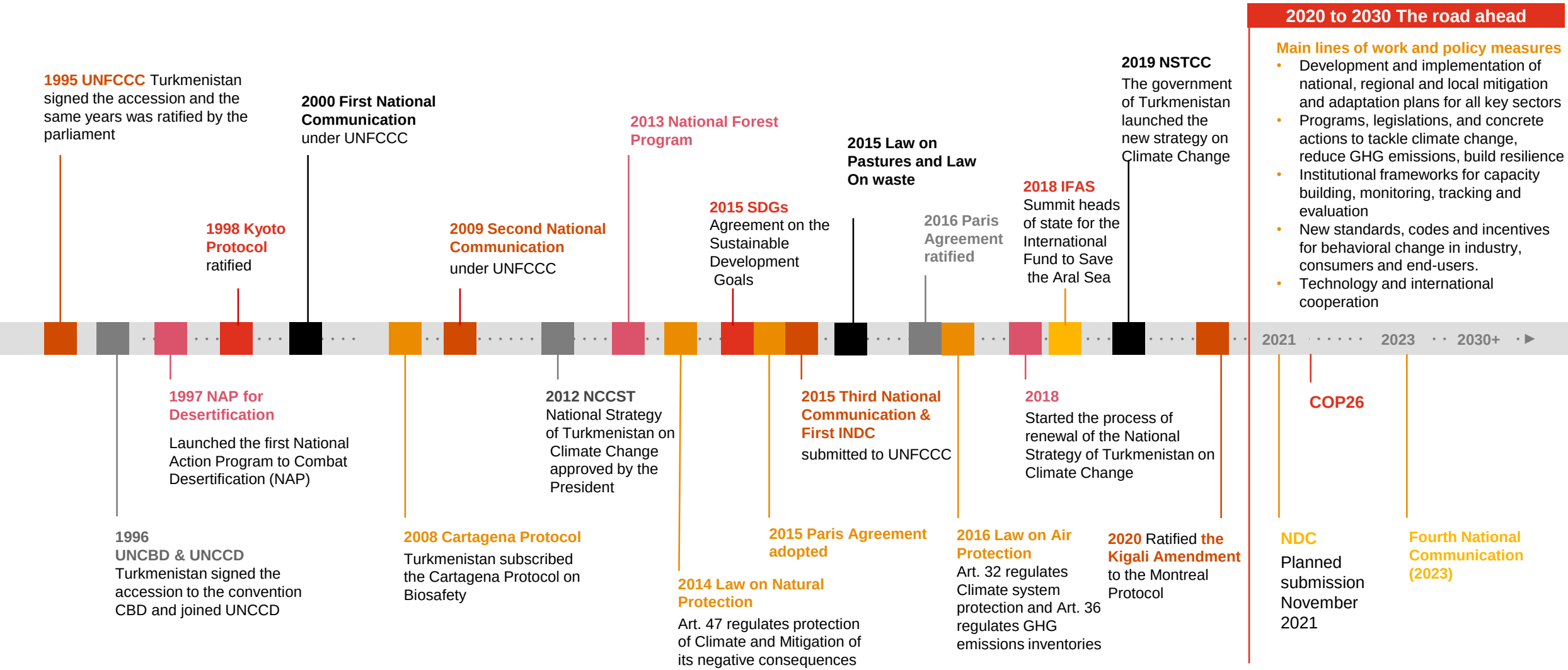
Source: Climate Change Knowledge Portal, World Bank, Climate Risk Profile Central Asia: Fact Sheet, 2018, USAID; https://www.preventionweb.net/files/12033_CCCAdec2009.pdf

COP26 will host over 30,000 delegates - including head of states, government officials, climate experts, business leaders, campaigners, activist and civil society representatives.

What is expected?

- In the Paris Agreement, Parties agreed to review their commitments **towards GHG emissions and climate change actions every five years**. **This year will be the first "check-point"**. More ambitious NDCs from countries are expected.
- **Negotiations around article 6** will continue. Article 6 is to set the rules for a global carbon market and exchange of carbon credits. Both elements are controversial for some Parties.
- Discussion on **the $100 bn climate finance target, further targets for climate finance**, and loss and damage funding.

Turkmenistan has put climate change as an integral part of the development path



Case study: UK

The United Kingdom leads the way towards a greener future by steadily reducing GHG emissions while maintaining strong GDP growth at the same time

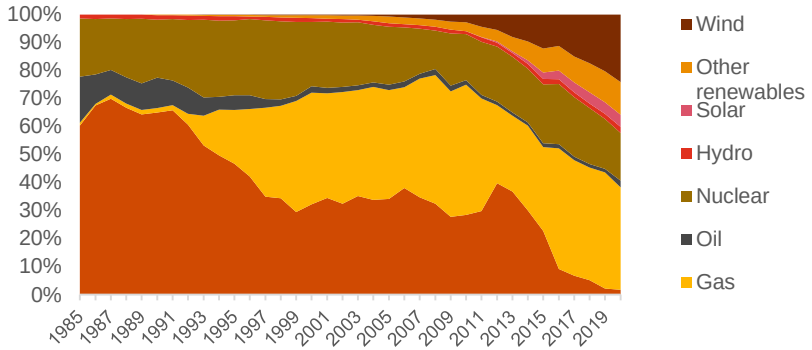
What has been done?[1]

- UK's **GDP rose by 78%** from 1990 to 2018 years while **emissions were cut by 43%**
- **460,000 jobs** are already being supported due to shift towards low-carbon industry
- In 2019, UK became the first major economy to set a target for **net zero GHG emissions by 2050** as a binding obligation for the country
- **The Ten Point Plan for a Green Industrial Revolution** accepted in November 2020

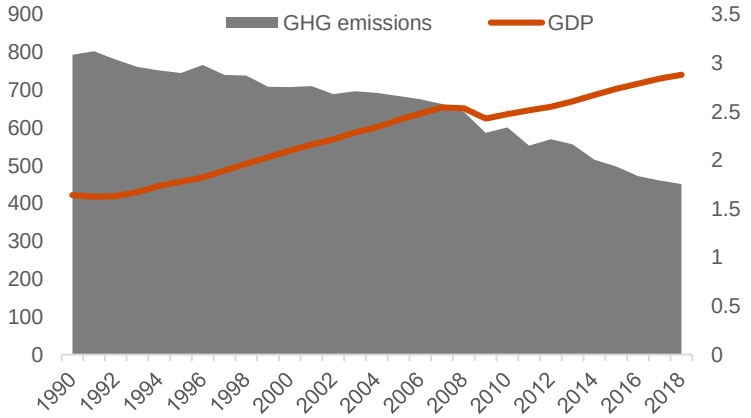
The Ten Point Plan for a Green Industrial Revolution *is build around ten major areas for the transition towards Net Zero:*[1]

1. *Advancing Offshore Wind*
2. *Driving the Growth of Low Carbon Hydrogen*
3. *Delivering New and Advanced Nuclear Power*
4. *Accelerating the Shift to Zero Emission Vehicles*
5. *Green Public Transport, Cycling and Walking*
6. *Jet Zero and Green Ships*
7. *Greener Buildings*
8. *Investing in Carbon Capture, Usage and Storage*
9. *Protecting Our Natural Environment*
10. *Green Finance and Innovation*

UK Electricity Generation, by source 1985 – 2020[1]



GHG emissions (Mt of CO2e)[2] and GDP (constant 2010 USD, trillion)[3]



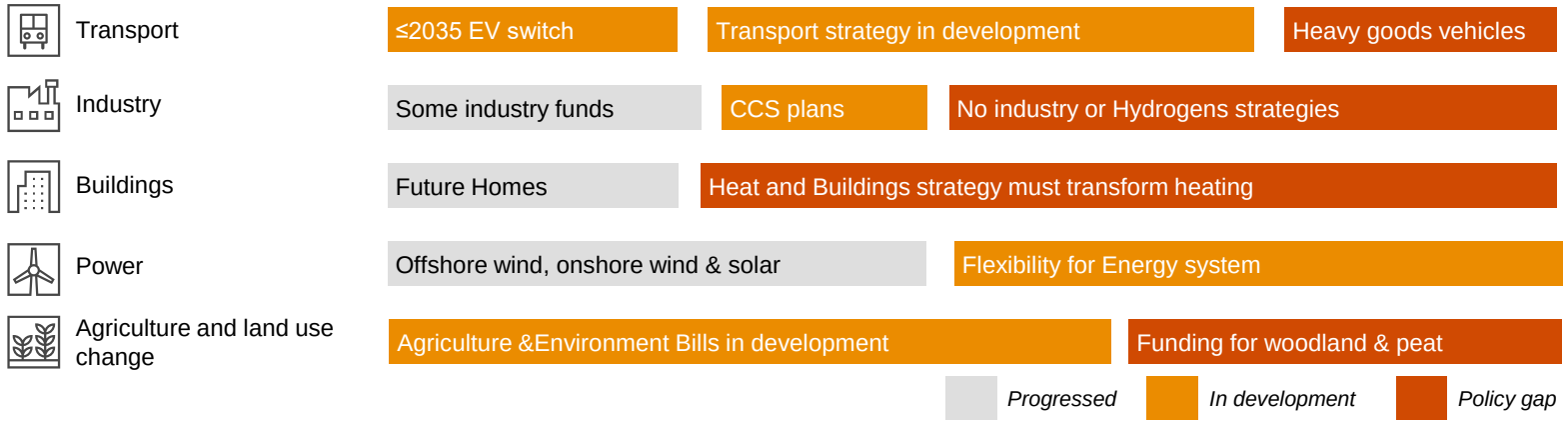
Source: 1) The Ten Point Plan for a Green Industrial Revolution, HM Government November 2020; 2) 2018 UK greenhouse gas emissions: final figures - data tables; 3) WorldBank 4) http://www.h2fcsupergen.com/about/ ; *H2FC SUPERGEN Hub

Even though the UK is a global leader in GHG reduction, it still faces several challenges

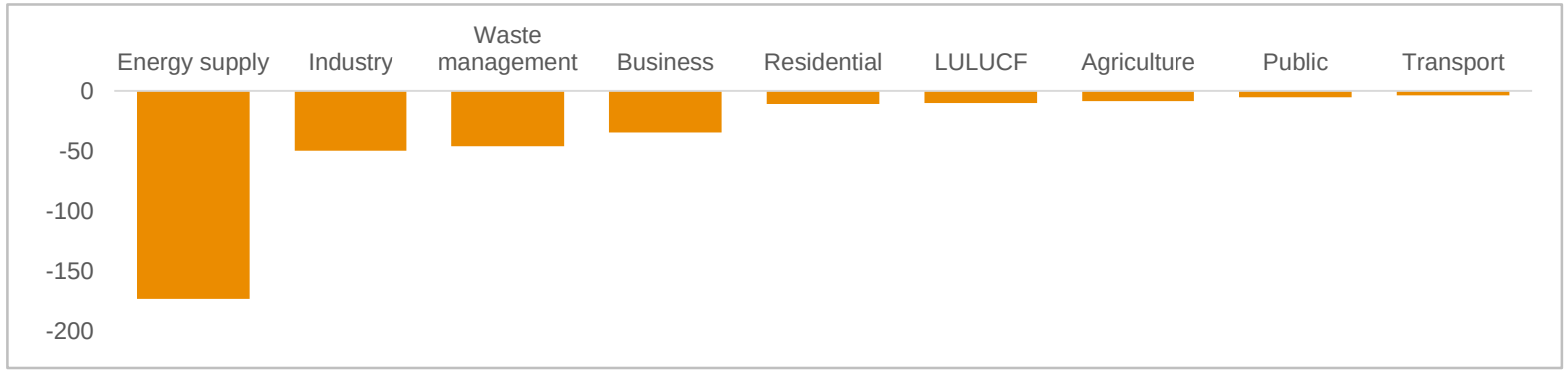
Challenges ahead: the power sector is not the only polluter

- Despite significant reduction in emissions from power generation, the focus now has to be shifted to other sources of GHG.
- Policies needs to be implemented for various sectors to support the transition.

Sectoral policy – status of progress



Change in UK GHG emissions, 1990 - 2018 ($MtCO_2e$)



Source:1) National Statistics, Final UK greenhouse gas emissions national statistics: 1990 to 2018; 2) Committee on Climate Change: Progress Report to Parliament 2020

Review of international sectoral case studies

Review of international sectoral case studies: mitigation

Sector	Case study brief	Good practices	Potential relevance
Oil and gas sector 	In **2018 Mexico published one of the most comprehensive regulation for oil and gas methane to date**	• Consultative process to develop regulation - cooperation with international organizations and stakeholder engagement • Setting clear reduction target and applying regulation across the whole oil and gas sector value chain • Approach based on continuous improvement for conservation of natural gas instead of destruction - leading to economic benefits • Mandatory quarterly leak detection and repair programmes	• Capturing gas can result in net positive benefits - as an example CNG and LNG can be used as a fuel. • Curbing methane emissions benefits public health and the environment by reducing air pollutants
Electricity, heat production 	**Morocco renewable energy transformation**: focused primarily on large scale projects	• Clear long term RES targets - increasing certainty of investors and international partners • Setting institutional framework with clear responsibilities • Renewable energy sector liberalization, supporting private investments and enabling large scale projects • Cooperation with international organizations, including multilateral development banks, to support transition and projects	• High renewable energy potential • Example of leveraging international climate finance - primarily for large scale, but also small scale renewable projects • Institutional set-up allowing for building national capacities

Review of international sectoral case studies: mitigation

Sector	Case study brief	Good practices	Potential relevance
Industry 	Decarbonizing industries and investing in hydrogen in **the Netherlands**.	• Combining mandatory emissions reduction and energy efficiency targets with incentives and investing in research and development. • Hydrogen Strategy focused on setting regulatory framework, cost reduction & scaling up hydrogen. Large range of projects, incl. large scale hydrogen with CCUS are advanced.	• Rich in natural resources such as natural gas, country can seize long term opportunities related hydrogen from natural gas and mitigate the emission by applying CCS/CCUS
Transportation 	Introducing fuel and energy efficient transportation in the **EU, including Germany, Italy, Malta and Romania, India and Mexico**	• Setting fuel-efficiency and emission standards for vehicles • Introducing regulations and incentives for Electric Vehicles / Hybrid cars for passengers. Investments into EV vehicles and infrastructure for public transportation • Regulation with mandatory guidance to include EV charging stations in private buildings and incentives/regulations for EV public charging stations	• Electric vehicles offer synergies for renewable energy integration - flexibility of charging allows for grid balancing

Review of international sectoral case studies: mitigation

Sector	Case study brief	Good practices	Potential relevance
Energy efficiency in: **Buildings & key infrastructure** 	Improving energy efficiency in buildings and key infrastructure in **Serbia**	• Introduction of Energy Management System based on the Japanese experience (developed in cooperation with Japan) • Capacity building and awareness raising at national and local levels, including development of the model ESCOs contract leading to Increased investments into EE • Establishing a Budgetary Fund for EE and supporting EE municipal investments • Establishing clear codes and standards for building energy efficiency	• Improving EE in buildings and infrastructure can result in positive benefits for achieving the national energy saving objectives • Capacity building, setting guidelines and standard contracts can support key stakeholders
Appliances and smart metering	Introducing and promoting smart monitoring & energy efficiency appliances in **Australia and the UK**	• Introduction of energy monitoring and smart metering systems to increase consumer awareness about energy consumption • Introduction of energy efficiency appliance labelling and awareness raising programs about the economic benefits of EE	• Programs focus on consumer awareness, monitoring & metering energy consumption can support the country's objective to increase energy efficiency at household levels.

Review of international sectoral case studies: mitigation

Sector	Case study brief	Good practices	Potential relevance
Agriculture - livestock & land conservation 	Sustainable agricultural practices in **Uruguay and the EU**	• Establish measures for monitoring and reporting methane and enteric fermentation • Providing incentives for the implementation of agri-environmental climate measures such as low-tilling, smart utilization of fertilizers and land conservation • Introduction of incentives and plans to support the introduction of new technologies, and support programs to help boost market competitiveness	• Popularization of sustainable agriculture practices can decrease land degradation and increase resilience in the food production sector
Carbon sinks 	Increase greenhouse gases removal through reforestation and afforestation in **China**	• Introduction of national and regional strategies for reforestation and afforestation with native species along with sustainable agricultural practices to promote land conservation and recovery. • Supporting planting of native species and biodiversified forest (instead of monocultures) • Providing incentives and subsidies to farmers for forest recovery • Introduction of metering and monitoring systems for carbon sinks	• Ongoing efforts to plant new trees and extend carbon sinks in the country. • Creating new forest or replanting forests supports the process of carbon removal.

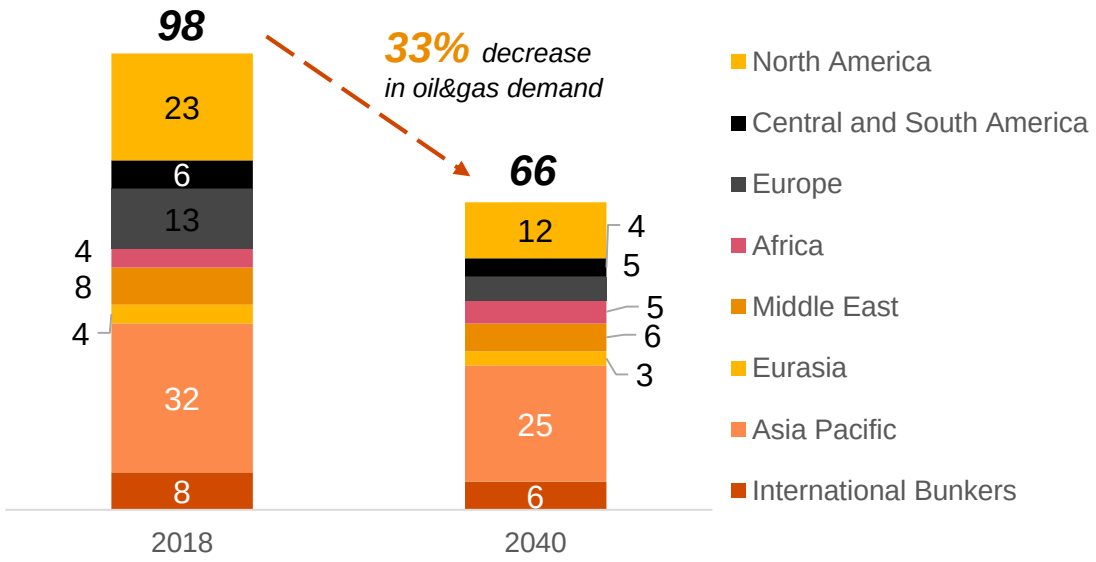
Review of international sectoral case studies: adaptation

Sector	Case study brief	Good practices	Potential relevance
Agriculture 	Addressing agricultural related climate risks - examples of **Spain, Nepal, India, Zambia and the International Fund for Agricultural Development**	• Introducing crop-resistant to extreme weather conditions to ensure food security and agricultural adaptation • Promote research and innovation initiatives across the whole agriculture value-chain • Promote insurance schemes for small and size medium farmers to protect their crops, reduce risks and incentivize investments	• Agriculture is one of the most vulnerable sectors to climate change. Improving agricultural resilience can support food security • Insurance schemes can protect the farmers from natural calamities
Water 	**Addressing water-related climate risks in Morocco**	• Develop comprehensive plans and strategies to address water-usage for industries, sectors and the population • Introduce regulations and incentives for water management, reutilizing grey-water and harvesting water technics • Build and maintain canals and efficient irrigation infrastructure • Introduce national monitoring systems to track water usage and availability, including individual metering systems	• As much as 30% of loss in glaciers area was recorded in the region in the last 50 years. Rising temperatures will further accelerate this process • Water is a critical input for agricultural production.

Towards green growth and resilence

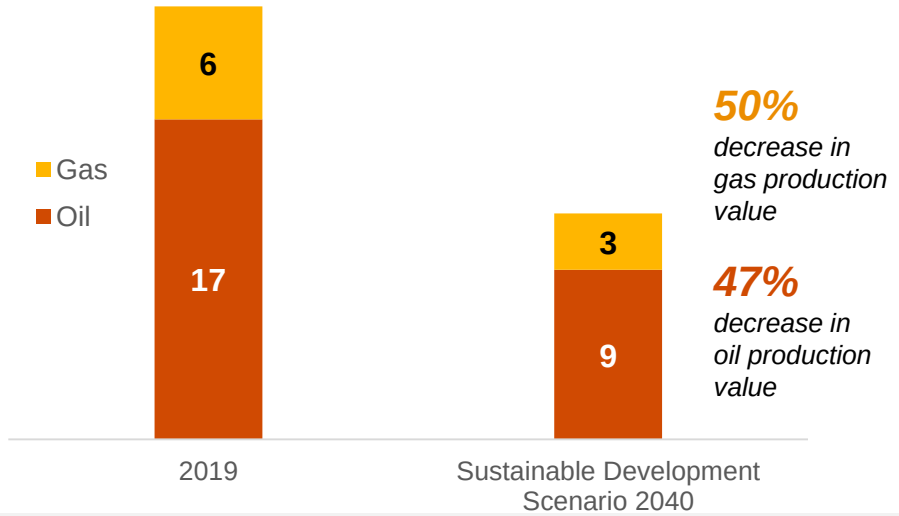
Expected falling demand for oil and gas may affect countries heavily dependent on hydrocarbons

Forecasted demand for oil and gas to 2040, mb/d[1]



- Under a Sustainable Development Scenario a 33% decrease is expected in 2040 in comparison to 2018
- As the source of energy shifts to Renewable Energy, a significant drop in oil & gas demand is forecasted.
- Demand in Eurasia is forecasted to fall 25% by 2040 and in Asia Pacific by ca. 20%

Estimated present value of future oil and natural gas production to 2040, trillion USD[2]

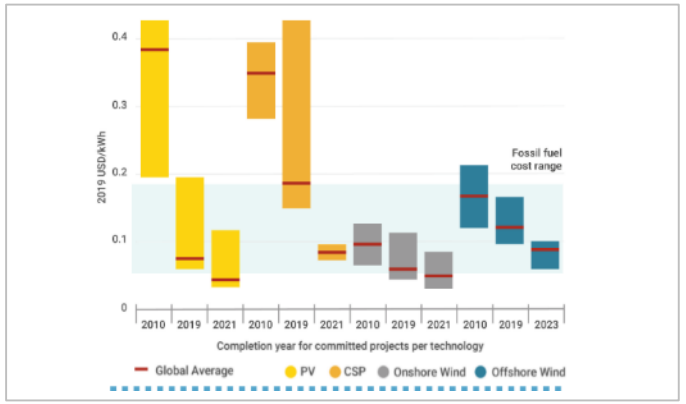


- A forecast decrease in global demand will trigger a fall in oil & gas production, resulting in a 50% drop in gas and 47% in oil comparing with 2019
- This may in turn affect countries with large hydrocarbon reserves and heavily depend on them economically
- A decrease in investments is already being observed in 2020 with 244.1 USD billion decrease in the oil & gas sector in comparison with 2019.

Source: 1) World Energy Outlook 2019, IEA; 2) World Energy Outlook 2020, IEA

Solar and wind electricity generation presents an opportunity for Turkmenistan

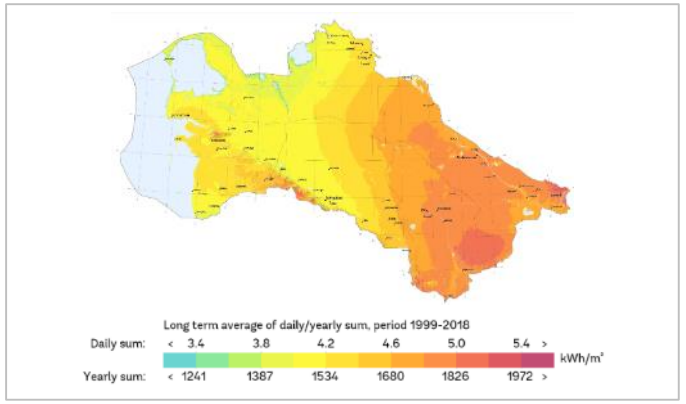
Falling cost of RES solutions[1]



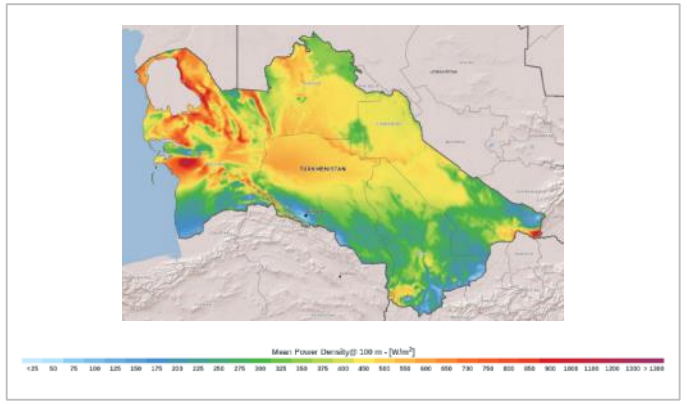
Ten-year decrease in cost of RES solutions[1]

82% PV	**47%** Concentrating Solar Power
39% Onshore Wind	**29%** Offshore Wind

Solar potential[3]



Wind potential[4]

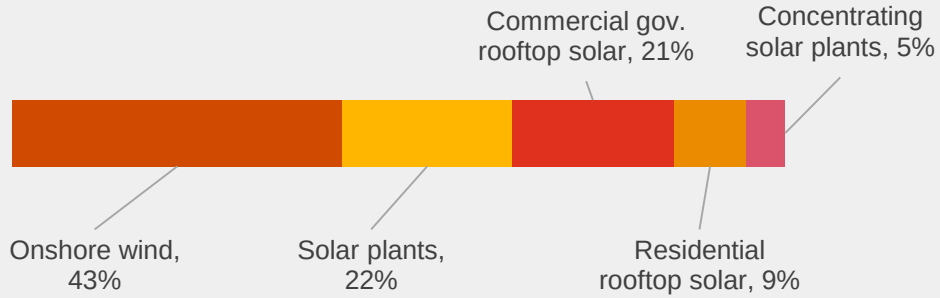


Potential scenario of 100% clean Renewable Energy Sources for Turkmenistan by 2050

According to Stanford University under **100% RES Scenario***, estimated Health **Cost Savings** can reach as much as **5.6%** of 2050 GDP and more than **2,000 lives can be saved** per year.

5.6%
Mean avoided cost as percent of 2050 GDP

2 thousand
lives saved/year



Source: 1) https://www.irena.org/newsroom/articles/2020/Jun/How-Falling-Costs-Make-Renewables-a-Cost-effective-Investment;
2) https://thesolutionsproject.org/why-clean-energy/#/map/countries/location/TKM 3) https//globalsolaratlas.info/download/turkmenistan 4) https://globalwindatlas.info/downloads/gis-files

*assuming complete transition to clean energy sources

Climate funding, financing and technical assistance are available to countries willing to take action on climate

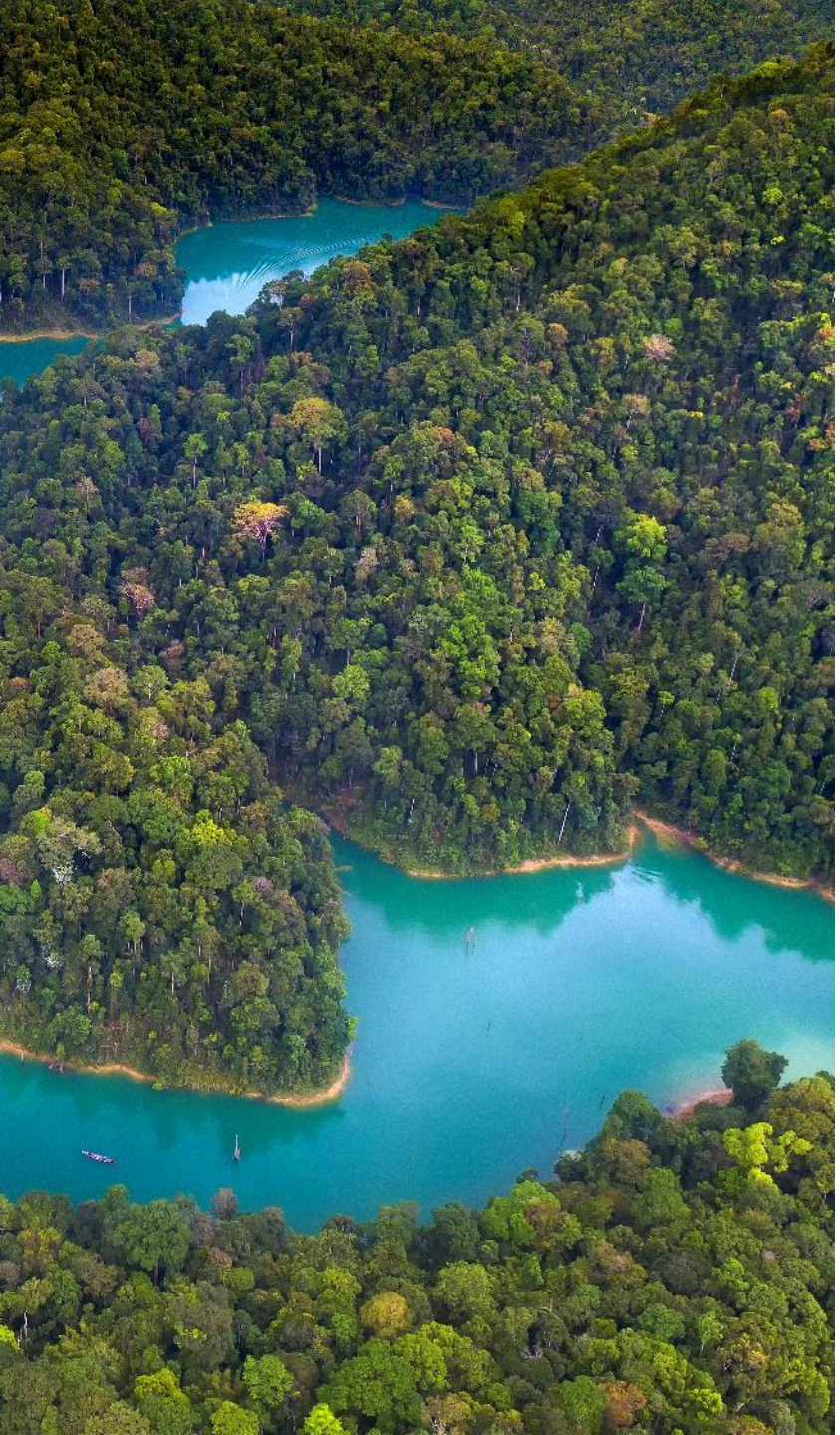
There are several cooperation mechanisms that support countries in their transition to a low-carbon path, including climate finance mechanisms set by UNFCCC.

Multilateral development banks are providing financing and technical assistance.

Technical assistance is also provided by intergovernmental organisations and NGOs.

	Financing	Funding	Technical Assistance	Status in TKM
UNDP		✓	✓	●
Global Environment Facility	✓	✓	✓	●
Green Climate Fund	✓	✓	✓	●
Adaptation Fund		✓	✓	●
FAO		✓	✓	●
European Commission		✓	✓	●
USAID		✓	✓	●
EBRD	✓		✓	●
The World Bank Group	✓		✓	●
Asian Development Bank	✓		✓	●
IRENA			✓	●
Overseas Development Institute			✓	●
NDC Partnership			✓	○

● Active ● Existing regional project ● Existing projects / initiatives ○ Not present



Countries can transform climate threats into opportunities for future sustainable growth

Leaders across the globe are taking action on climate mitigation and adaptation. This will trigger further changes on the global market

Those changes bring not only threats, but also **opportunities**, such as renewable energy generation or hydrogen

There is **no ‘one-size-fits-all’ solution** and national differences need to be accounted for. International best practices can provide valuable lessons learnt.

Cooperation schemes can support countries’ on their green growth pathways, including **technical assistance, climate funding and financing**

Contents of the report:

Key findings - Towards green growth

Thank you

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