Low Carbon Ukraine

Policy advice on low-carbon policies for Ukraine

Supported by:

Federal Ministry for Economic Affairs and Climate Action

IKI INTERNATIONAL CLIMATE INITIATIVE

on the basis of a decision by the German Bundestag

Pathways for the decarbonisation of Ukraine's power sector
Scenario comparison, impact of CBAM and the role of Ukraine's upcoming Emissions Trading System (ETS)

Rouven Stubbe
Energy Economist and Consultant, Low Carbon Ukraine & Berlin Economics

Berlin/Kyiv, March 2024

Implemented by

Berlin Economics

1. Berlin Economics and Low Carbon Ukraine

Berlin Economics
Economic Consultancy

- Advising governments of transition countries in Eastern Europe, Western Balkans, Caucasus and Central Asia on economic policy reform and sustainable development
- Strong in-house expertise in economic, energy and climate policy supported by a wide network of external experts

Low Carbon Ukraine

- Supporting the Ukrainian government with demand-driven analysis and policy proposals to transition towards a low-carbon economy since 2018
- Part of the International Climate Initiative and supported by German Federal Ministry of Economy and Climate Protection (BMWK)
- Since 2022, additional focus on green reconstruction of Ukraine and creating a more resilient energy system

Low Carbon Ukraine

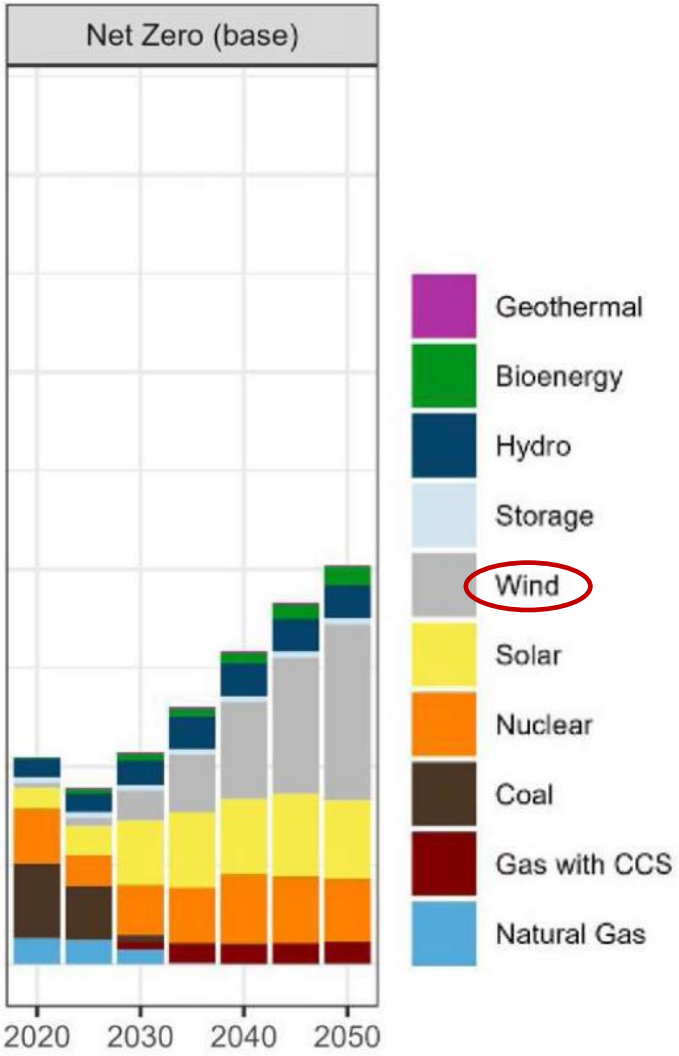
2. Pathways for the decarbonisation of Ukraine's power sector

	Net Zero World (COP28 Report) Net-zero – base scenario	REKK/DIXI/IEF Net-zero – RES scenario	LCU cost-optimal power plant park *(preliminary results for 2030)*
2030	RES: 34% Nuclear: 52% *[re-calculated in LCU model]*	RES: 39% Nuclear: 53%	RES: 43% Nuclear: 48%
2040	RES: ~ 45% Nuclear: ~ 45%	RES: 71% Nuclear: 26%	/
2050	RES: ~ 65% Nuclear: ~ 33%	RES: 93% Nuclear: 6%	/
Installed solar (2030)	~ 17 GW	16 GW	9.5 GW
Installed wind (2030)	~ 7 GW	7 GW + 0.2 GW offshore	18.7 GW
Installed gas (2030)	~ 4 GW	5.7 GW	4 GW

- **Highly decarbonised** power systems by 2030 / 2040 are possible
  - 85-90% clean generation by 2030
  - coal phase-out by 2030-2035
- **Full decarbonisation of power sector by 2050** is possible and economical
  - feasible without new nuclear reactors & power prices similar to fossil scenarios

Low Carbon Ukraine

2. Pathways for the decarbonisation of Ukraine's power sector



Net Zero World (COP28 Report)
Net-zero – base scenario

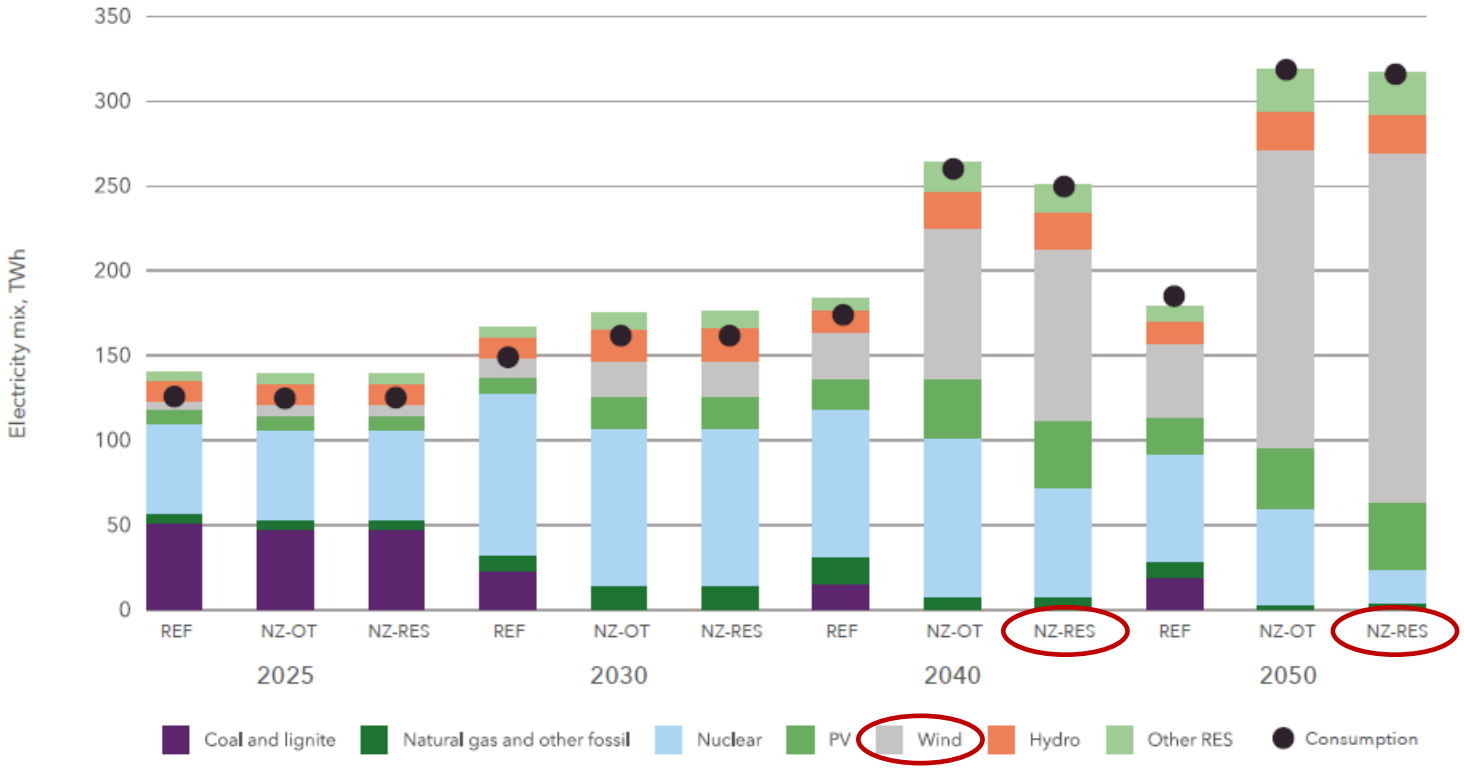
➢**Largely wind-based** renewable generation, especially post-2030

Source: Net Zero World Initiative (2023). Clean Energy Roadmap: From Reconstruction to Decarbonisation in Ukraine.

Low Carbon Ukraine

2. Pathways for the decarbonisation of Ukraine's power sector

REKK/DIXI/IEF, Net-zero – RES scenario



Source: REKK, DiXi Group, Institute for Economics and Forecasting of the National Academy of Science of Ukraine, Austrian Institute of Technology, and Regulatory Assistance Project (2024). LONG-TERM DECARBONISATION PATHWAYS FOR UKRAINE'S POWER SECTOR.

Low Carbon Ukraine

3. Designing an ETS for Ukraine – Key Considerations

- **Carbon price uncertainty is inherent to any ETS**
  - Price is determined by market forces (supply and demand for allowances)
  - Demand depends on economic growth, technological progress and other structural changes to the economy
- **Carbon price uncertainty would be extremely high for Ukraine**
  - Heightened uncertainty regarding the structure of Ukraine's future energy sector and industrial asset base
  - Large uncertainties concerning the timing and dynamics of Ukraine's post-war reconstruction and economic recovery

    → **Large uncertainty about future demand for fossil fuels and thus emissions allowances**

- **Difficult for ETS allowance cap-setting**
- **Same cap could lead to extremely different carbon prices under different scenarios for post-war recovery**

Low Carbon Ukraine

3. Designing an ETS for Ukraine – Key Considerations

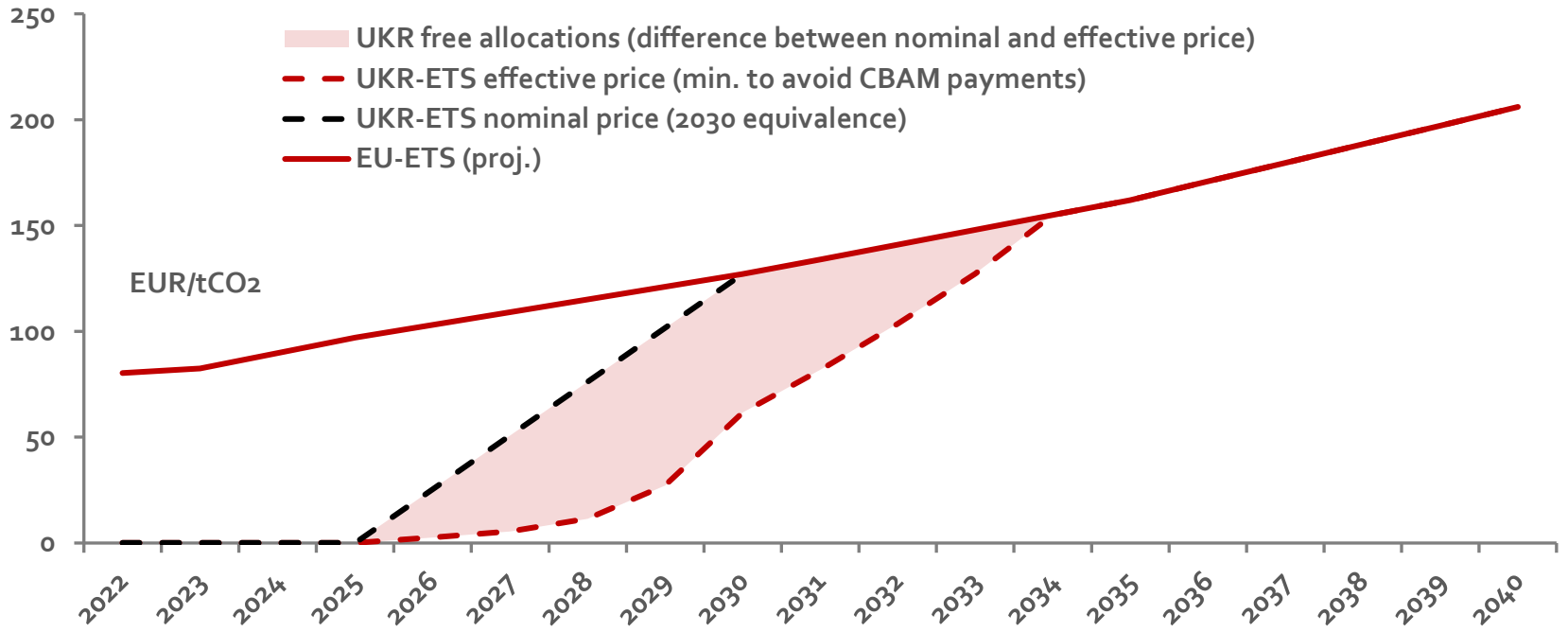
- Avoiding such a high level of carbon price uncertainty will be paramount for a successful ETS design.
- Without a predictable carbon price, the level of green investment will be significantly lower.

→ **How to reduce carbon price uncertainty in an ETS?**

- **Option 1:** Transitional period with fixed prices (no hard cap)
- **Option 2:** Price collar with increasing carbon price floor

Low Carbon Ukraine

4. Price path matters for EU convergence & CBAM



Possible price trajectory and level of free allocations to obtain CBAM exemption for electricity

Sources: Pahle et al. (2023), CBAM Regulation (Regulation (EU) 2023/956), own calculations

→ **Convergence with EU-ETS prices** to **avoid a carbon price shock** at EU accession

→ **Nominal price convergence in 2030** (CBAM exemption condition, electricity sector)

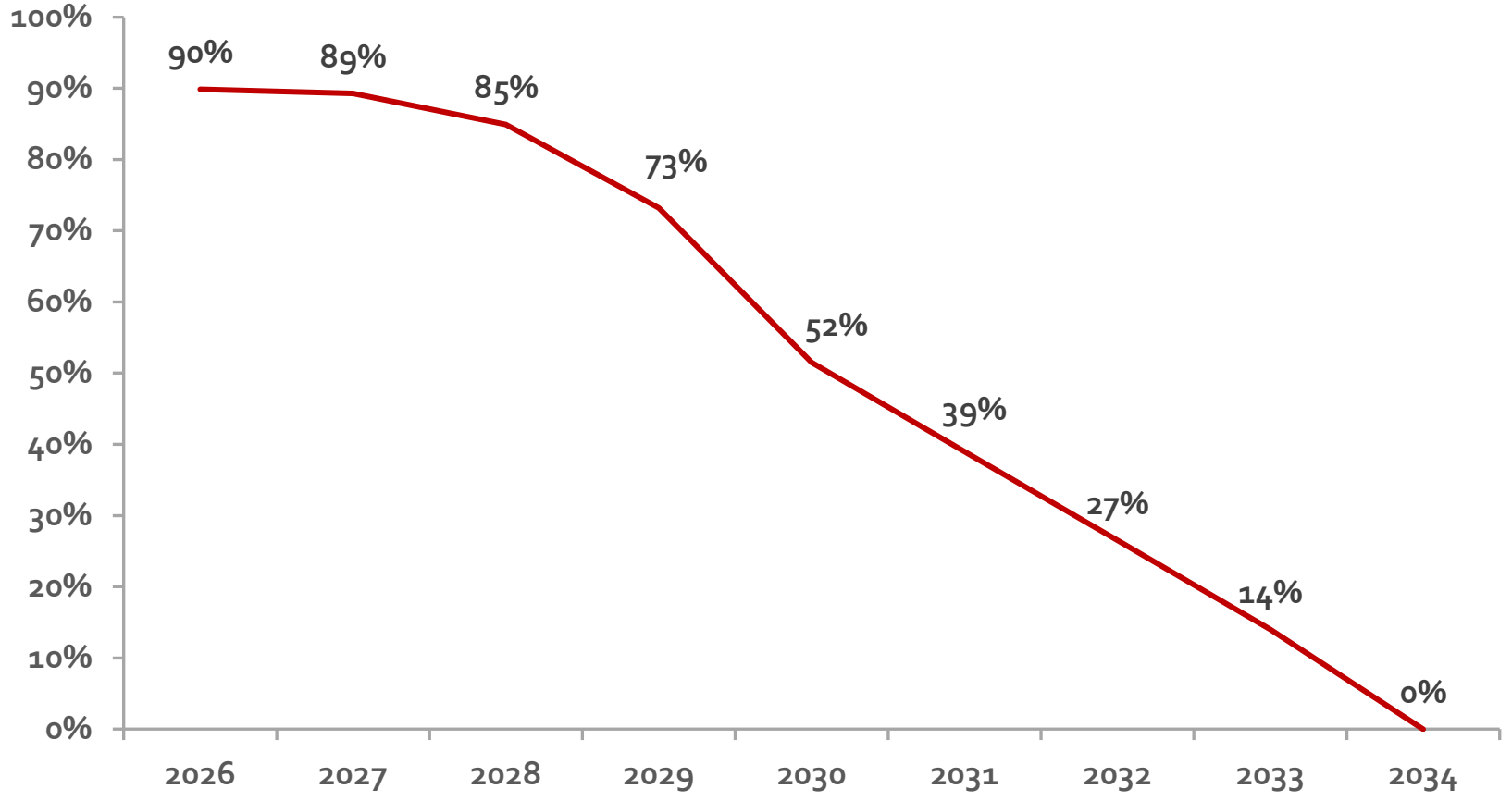
→ **Temporary use of free allowances** to mitigate impact on competitiveness

→ **<u>Effective</u> carbon price follows phase-in path of CBAM** to avoid CBAM payments*

*in non-exempt sectors

Low Carbon Ukraine

6. Share of free allocations with proposed price path

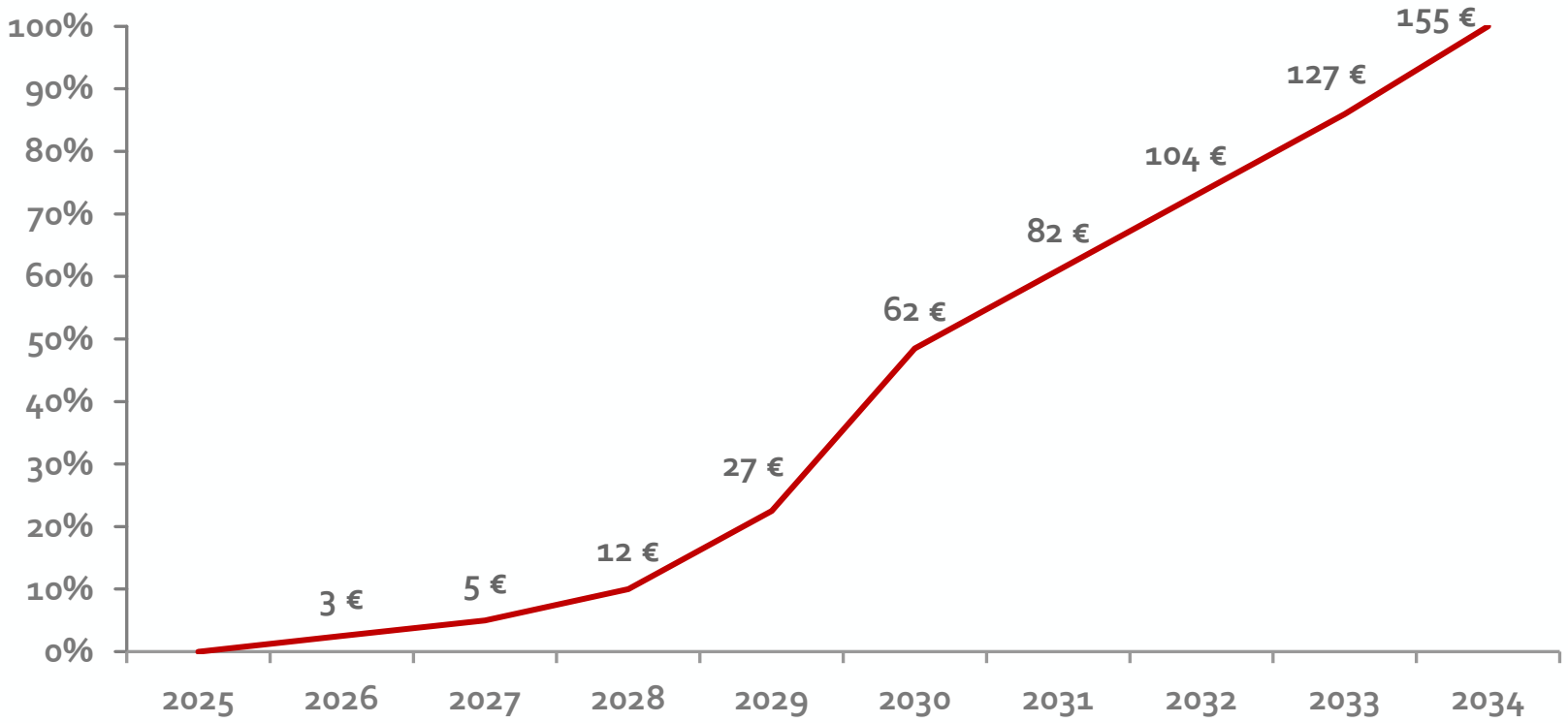


Share of free allocations to achieve effective price convergence by 2034 under nominal price convergence by 2030 (scenario from previous slide)

Source: own calculations

Low Carbon Ukraine

5. Phase-in trajectory of EU-CBAM (% of EU-ETS & proj. EUR)



Phase-in trajectory of EU-CBAM (% of EU-ETS price level)

Source: CBAM regulation (Regulation (EU) 2023/956)

Low Carbon Ukraine

Conclusion (Power Sector Decarbonisation)

- **Highly decarbonised** power systems by 2030 / 2040 are possible
  - 85-90% clean generation by 2030
  - coal phase-out by 2030-2035
- **Full decarbonisation of power sector by 2050** is possible and economical
  - feasible without new nuclear reactors
  - power prices similar to fossil scenarios
  - front-loaded investment needs refinanced by operational / fuel savings
- **Largely wind-based** renewable generation seems more cost-optimal
  - Especially post-2030
  - More sensitivity analyses needed to assess role of solar PV
- **Electricity market reforms**, independence of the regulator and mitigation of excessive market power are key
- **Emissions Trading System (ETS)** for the power sector can stimulate a cost-optimal, market driven coal phase-out if carbon prices increase predictably

Low Carbon Ukraine

Conclusion (ETS)

- **High uncertainty in a Ukrainian ETS could jeopardise the scheme without a strong price stability mechanism**
- Predictable carbon prices are essential for businesses and investors to form reliable price expectations and **plan investments**, including in green and low-carbon assets
- **Two options for a reliable price stability mechanism:**
  - **Option 1:** Transitional period with fixed prices (no hard cap)
  - **Option 2:** Price collar with increasing carbon price floor
- A predictable **price convergence to EU-ETS price levels** is also essential to **avoid a carbon price shock upon EU accession**
  - Moreover, also helps to **retain carbon revenues in Ukraine** that would otherwise be collected by EU-CBAM
- Price (floor) trajectory should be **set and announced for several years in advance** to allow businesses and investors to plan long-term investments
- A well-designed **carbon leakage protection** system based on partial free allocations and/or a domestic Ukrainian CBAM could help **avoid excessive adverse impacts on Ukraine's energy-intensive industries**

Low Carbon Ukraine

Further readings…

Link to publication

Link to publication

Low Carbon Ukraine

Policy advice on low-carbon policies for Ukraine

Supported by:

Federal Ministry for Economic Affairs and Climate Action

IKI INTERNATIONAL CLIMATE INITIATIVE

on the basis of a decision by the German Bundestag

Implemented by

Berlin Economics

Head of Energy and Climate
Robert Kirchner
kirchner@berlin-economics.com

Project Manager
Elena Budaragina
budaragina@berlin-economics.com

www.lowcarbonukraine.com

Tel.: +49 30 2064 34 64 – 0