

IEA-EBRD workshop on low-carbon roadmap for iron and steel industry

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European Bank
for Reconstruction and Development

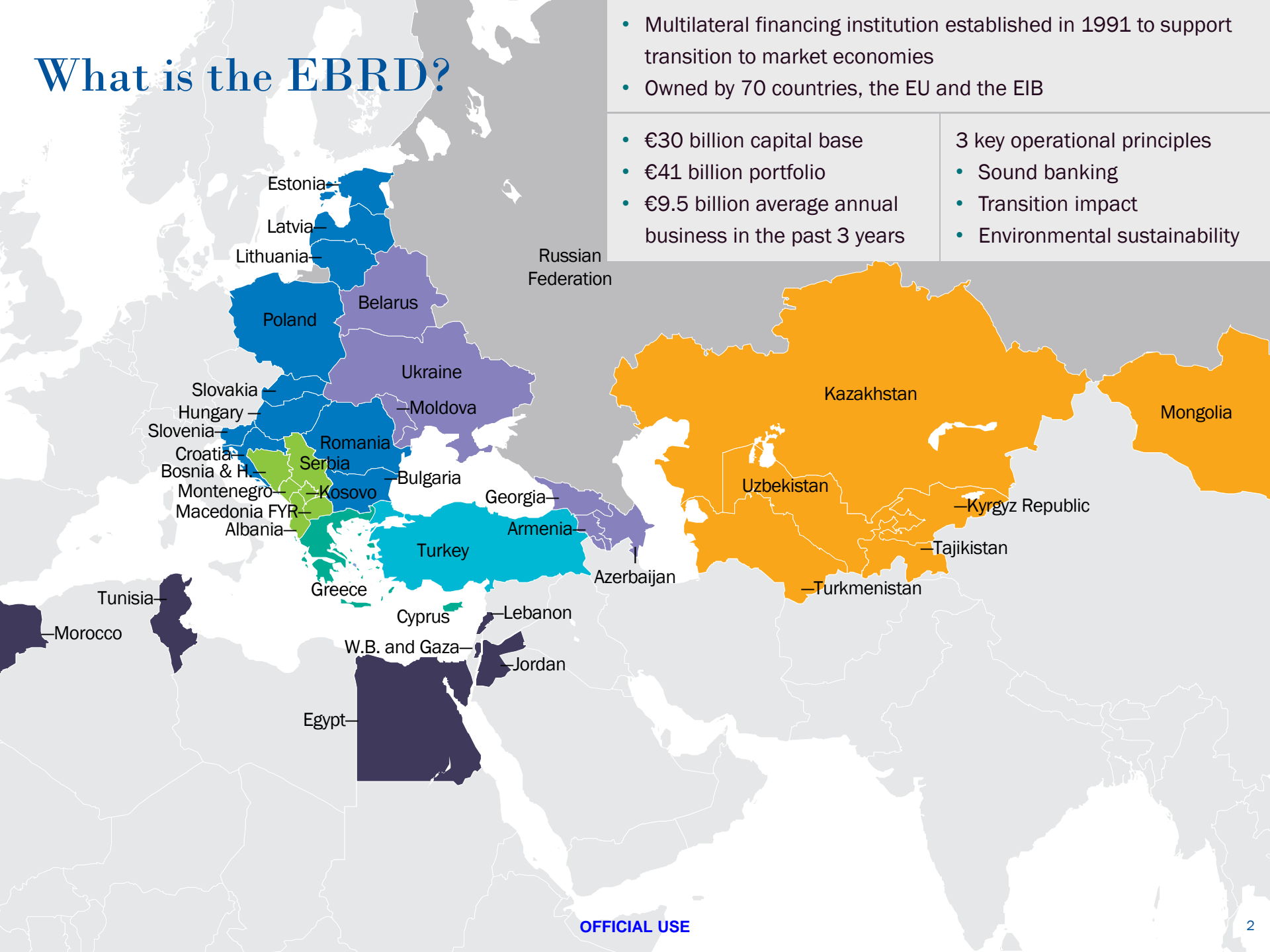
What is the EBRD?

- Multilateral financing institution established in 1991 to support transition to market economies
- Owned by 70 countries, the EU and the EIB

- €30 billion capital base
- €41 billion portfolio
- €9.5 billion average annual business in the past 3 years

3 key operational principles

- Sound banking
- Transition impact
- Environmental sustainability



Green Economy Financing Results: 2006 – 2018



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FINANCED

1,500+
green projects

1000+ directly financed projects with green components, and
400+ credit lines to local financial institutions for on-lending to smaller projects

SIGNED

**€ 28.5
billion**
of green financing

For projects with a total value of €160+ billion
Since 2016 green financing has represented 35% of EBRD's total business.

REDUCED

93 million
tonnes of CO₂/year

Emission reductions equal to the annual energy use related emissions of Greece

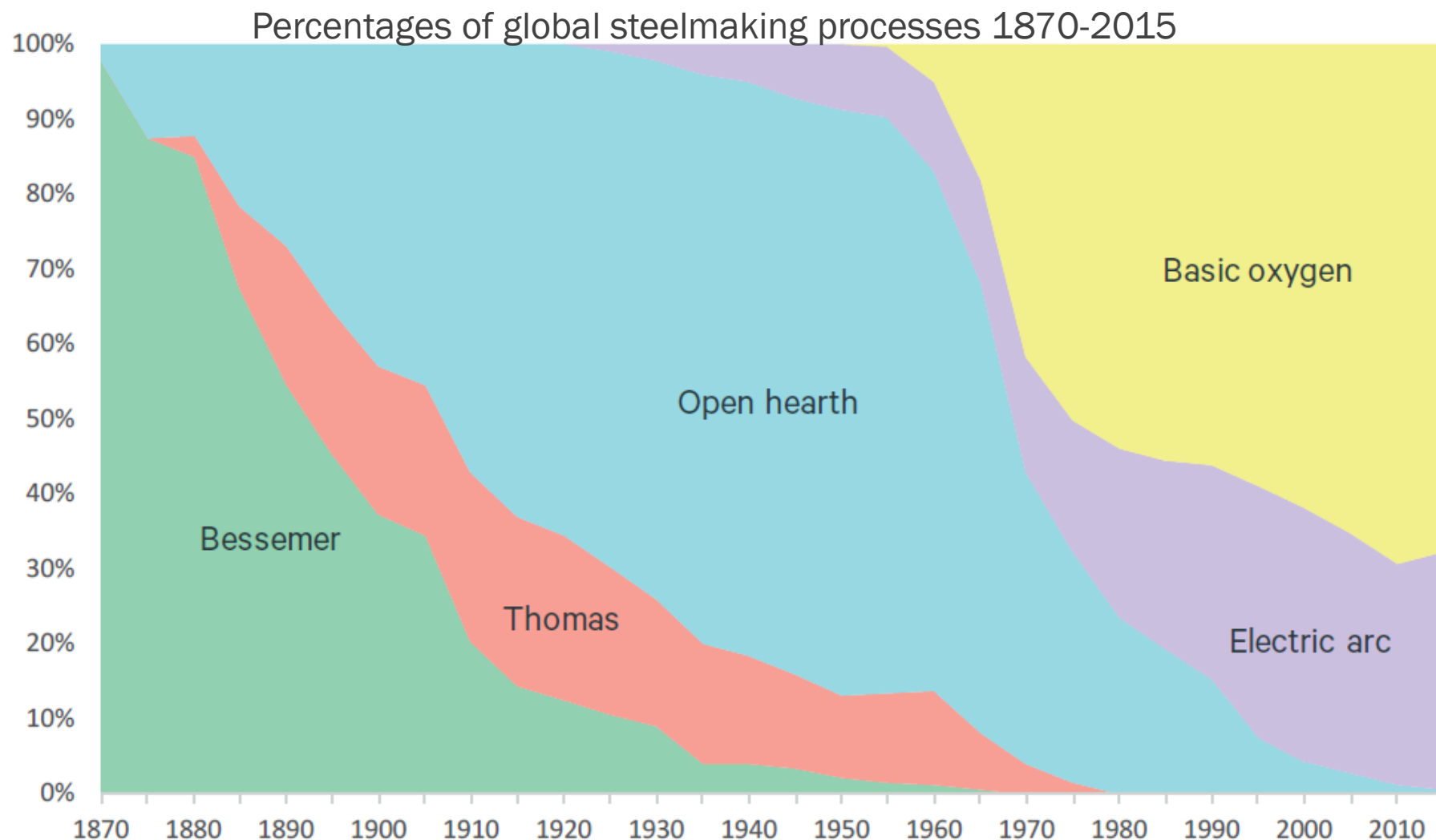
Technology	Condition
CCU routes – incremental	Partnership with Chemicals sector
CCS routes – breakthrough (higher opex)	Partnership for hubs with other sectors
Hydrogen/DRI routes - breakthrough (huge capex/higher opex)	Availability of low-cost Green Hydrogen

“Breakthrough Technologies require Breakthrough Policies” (Eurofer)

A Great Disruption for the 2020s/2030s?



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Source: Åhman, M., Olsson, O., Vogl, V., Nyqvist, B., Maltais, A., Nilsson, L. J., ... Nilsson, M. (2018). Hydrogen steelmaking for a low-carbon economy: A joint LU-SEI working paper for the HYBRIT project. (109 ed.) (EES report 109). Lund: Miljö- och energisystem, LTH, Lunds universitet.

Stages of Financing for Breakthrough Technologies



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Stage	Estimated investment
Pre-Pilot	Eur millions
Pilot	c.Eur 50m
Demonstration	c.Eur 500m-1bn each (capex/opex)
Dissemination	Eur billions (capex/opex)

Stages of Financing for Breakthrough Technologies



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Stage	Estimated investment	Example
Pre-Pilot	Eur millions	<ul style="list-style-type: none">• H2FUTURE/voestalpine's PEM• Salzgitter's SALCOS• COURSE50
Pilot	c.Eur 50m	<ul style="list-style-type: none">• HIsarna: Tata/EC (now to India)• Hybrit: SSAB/LKAB/Vattenfall/Swedish Energy Agency
Demonstration	c.Eur 500m-1bn each (capex/opex)	<ul style="list-style-type: none">• ULCOS Florange TGR (withdrawn)• AM/French Gov• EC Eurofer proposal (Sept'18)
Dissemination	Eur billions (capex/opex)	<ul style="list-style-type: none">• Steel companies• Power companies - Hydrogen

Session 4: “Economic feasibility of demonstrating innovative I&S technologies and overcoming barriers”

Shibojyoti Dutta, Tata Steel:

- Market mechanisms inadequate
- Need for additional grant funding, e.g. Green Climate Fund (GCF)
- Governments engage industry in scenario analysis
- Need for “time bound action plan”

Lin, BHP Billiton Industry Carbon Capture Project - three possible mechanisms:

- Projects supported by carbon allowance
- Market production as “zero-carbon steel”, with significant premium
- Tax refund: subsidy

Supported by concessional finance from MDBs?

“How to reach Net-Zero CO2 Emissions for Steel”

Innovation	Policy	Industry/Business
<ul style="list-style-type: none">• Develop and pilot hydrogen-based DRI• New technologies for carbon capture on BF-BOF• Develop metallurgy to enable higher value recycling	<ul style="list-style-type: none">• Carbon tax \$50-70 by 2030 (coalition of governments)• Regulations on embedded carbon intensity of steel-based products• Commit to 100% “green steel” in publicly-funded infrastructure by 2040	<ul style="list-style-type: none">• “Green steel” standards• Automotive industry’s commitments to “green steel” by 2040• Producer/user collaboration to increase recycling

Source: Energy Transitions Commission: Mission Possible (November 2018)

Lessons Of ULCOS Project? (EU public/private collaboration): 2004-2014

- Three technologies developed (all linked to CCS for major CO2 reduction)
- Two technologies piloted (TGR/ Hlsarna smelting)
- One technology to early demonstration (Hlsarna) - now to be pursued by Tata Steel in India
- TGR demonstration project (Florange) withdrawn from EC NER-300 funding competition: location and risk issues
- After 15 years, no continuing demonstration projects in Europe; hydrogen projects still embryonic

- Low profitability (compared with oil and gas/power)
- Cyclicity (compared with power/automotive), exacerbated by chronic overcapacity - constraint on borrowing
- International competitiveness (compared with power) - constraint on carbon pricing and on higher priced steel
- Limited effectiveness of carbon pricing in decarbonisation, due to lack of substitute materials and high ability to pass through increased prices to customers

Solutions To Accelerate Decarbonisation (1)

(1) Financing from steel industry revenues:

- Carbon pricing-based: \$50/tCO₂? 100/tCO₂?
 - But competitiveness/trade issues
 - The problem of pass-through (higher prices, with no change in technology)
- Customer-led: automotive procurement of “Green Steel”
- Public Procurement-led: construction contracts based on “Green Steel”
- Investor-led: Task Force on Climate-related Financial Disclosures (TCFD)
- Responsible Steel

But impact on developing breakthrough technologies too slow?

Solutions To Accelerate Decarbonisation (2)

(2) With external support

- Green hydrogen
 - Massive scale-up by power suppliers? Financing? Location?
- Concessional finance (e.g. from Multilateral Development Banks/ Green Climate Fund (GCF) for developing countries)
 - EBRD experience with GCF e.g. Green Cities
 - But subject to company borrowing constraints and sound banking
- Public support for developing and supporting breakthrough technologies
 - In EU: Innovation Fund; Horizon Europe; Eurofer proposal for Partnership for Low Carbon Steel (Eur 2bn for demonstrators (2021-2027) - 50% to be funded by EU; conditional on supportive policies, e.g. carbon pricing/trade)
 - Monetisation of Carbon reductions under article 6 of Paris Agreement? To be discussed at COP25 (2019)
- For Demonstration projects: do we need a new Sectoral approach? a new Fund?
- Is Trade Policy a condition for higher-priced steel?

THANK YOU

For more information:

<http://www.ebrd.com/what-we-do/get/knowledge-hub.html>

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