Perspectivas de la transición energética en Europa

Foro público: La transición energética en Europa: Desafios oportunidades para Colombia; Valledupar, 30.10.2017

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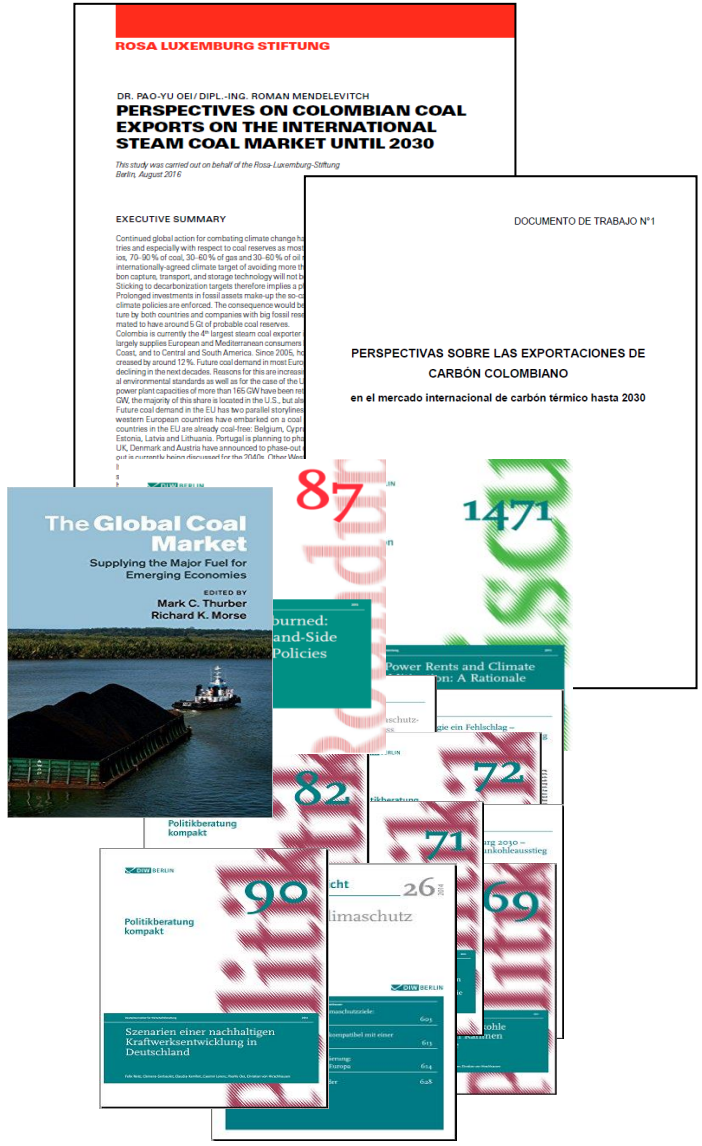
Agenda

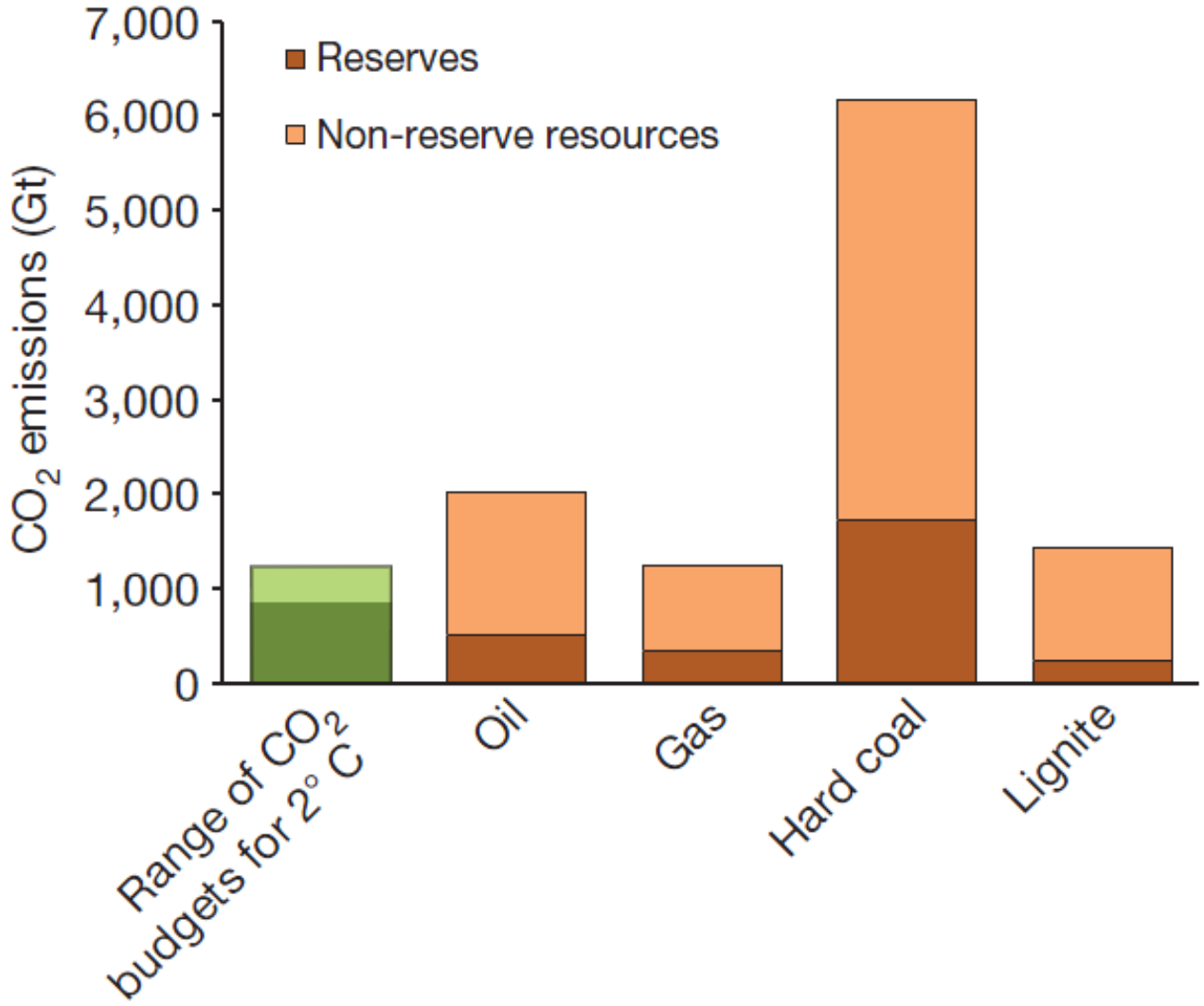
1. Motivation
2. Experiences from Germany and the EU
3. Trends in USA, China and Indien
4. Effects on the Global Coal Market
5. Conclusion

Publications on coal (selection)

- Oei and Mendelevitch (2016): Perspectivas sobre las Exportaciones de Carbon Colombiano.
- Oei and Mendelevitch (2016): Perspecitves on Colombian Coal Exports on the International Steam Coal Market until 2030
- Oei et al. (2016): „Kohlereserve“ vs. CO_2-Grenzwerte in der Stromwirtschaft – Ein modellbasierter Vergleich“, Energiewirtschaftliche Tagesfragen, 1-2/2016
- Collins, and Mendelevitch (2015): Leaving Coal Unburned: Options for Demand-Side and Supply-Side Policies, DIW Berlin, DIW Roundup 87, Berlin, Germany.
- Richter, Mendelevitch and Jotzo (2015): Market Power Rents and Climate Change Mitigation: A Rationale for Coal Taxes?, DIW Berlin, DIW Discussion Paper 1471, Berlin, Germany.
- Holz, Haftendorn, Mendelevitch, and Hirschhausen (2015): The COALMOD-World Model: Coal Markets until 2030, in R. K. Morse and M.C. Thurber (Eds.) “The Global Coal Market - Supplying the Major Fuel for Emerging Economies”. Cambridge University Press.
- Oei et al. (2014): Modeling a Carbon Capture, Transport, and Storage Infrastructure for Europe“. Journal of Environmental Modeling and Assessment 05/2014



Motivation: 70-90% of coal, 30-60% of gas and 30-60% of oil reserves has to stay unmined to reach the 2°C target



Source: McGlade & Ekins (2015)

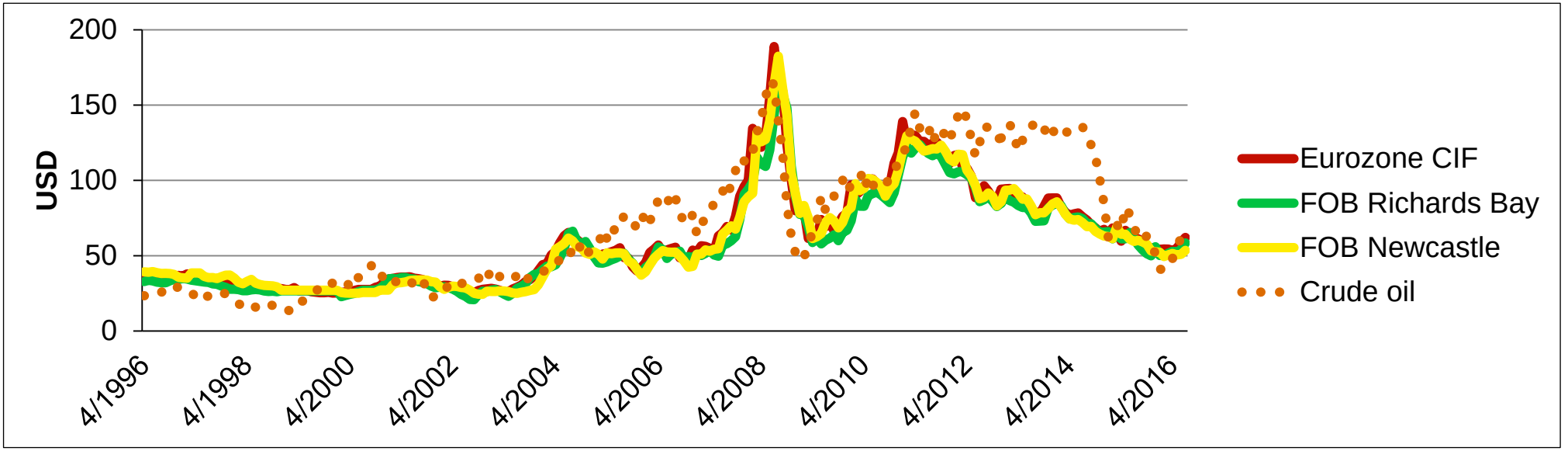
Times are changing for coal

The success of renewables (and lower gas prices in some regions) have lead to a reduction of coal demand in the western world. Several smaller countries in the EU are already coal-free or will phase-out in the 2020s.

The Republic of China has introduced a moratorium on new coal power plants and mines and India is observing a much slower increase of coal demand than expected.

As a result, steam coal production declined by around 28% between 2005 and 2015.

Coal companies world-wide are struck with low prices and are challenged by ongoing divestment movements.



Source: HWWI commodity prices in the Thompson Reuters Datastream database.

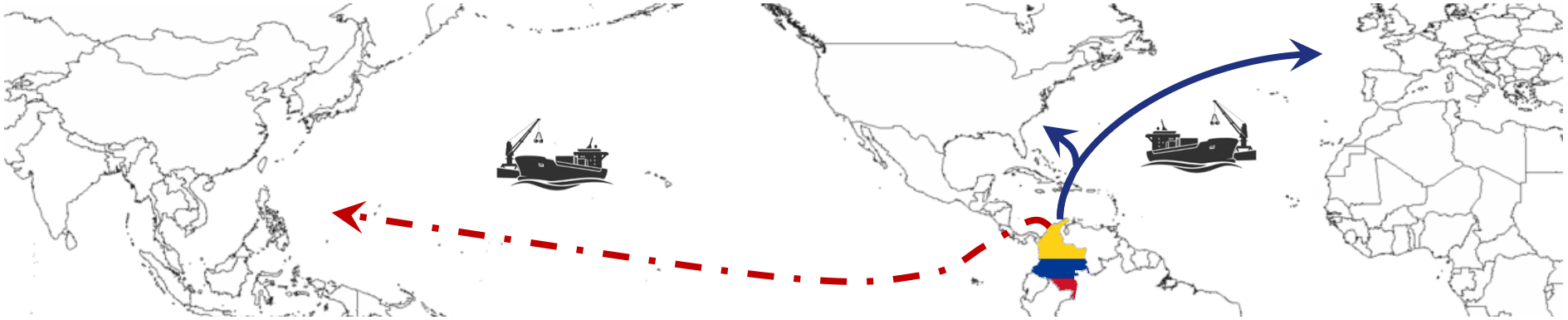
Colombia`s future as 4th largest exporter of steam coal

There exists a wide range of studies that put foci on various environmental and social implications of the coal mining industry in Colombia (e.g., see Moor and van de Sandt 2014; CAN 2016b; Hawkins 2014; Chomsky and Striffler 2014; CINEP/PPP 2014; Schücking 2013).

Our research focus lies on: How will coal exporting countries, such as Colombia, be affected by the decline of the coal industry?

Doing so, requires an analysis of

- **the competitiveness of the coal exporting country (in this case: Colombia),**
- **current market development in other coal producing and consuming countries,**
- **prospects for future Colombian coal exports.**



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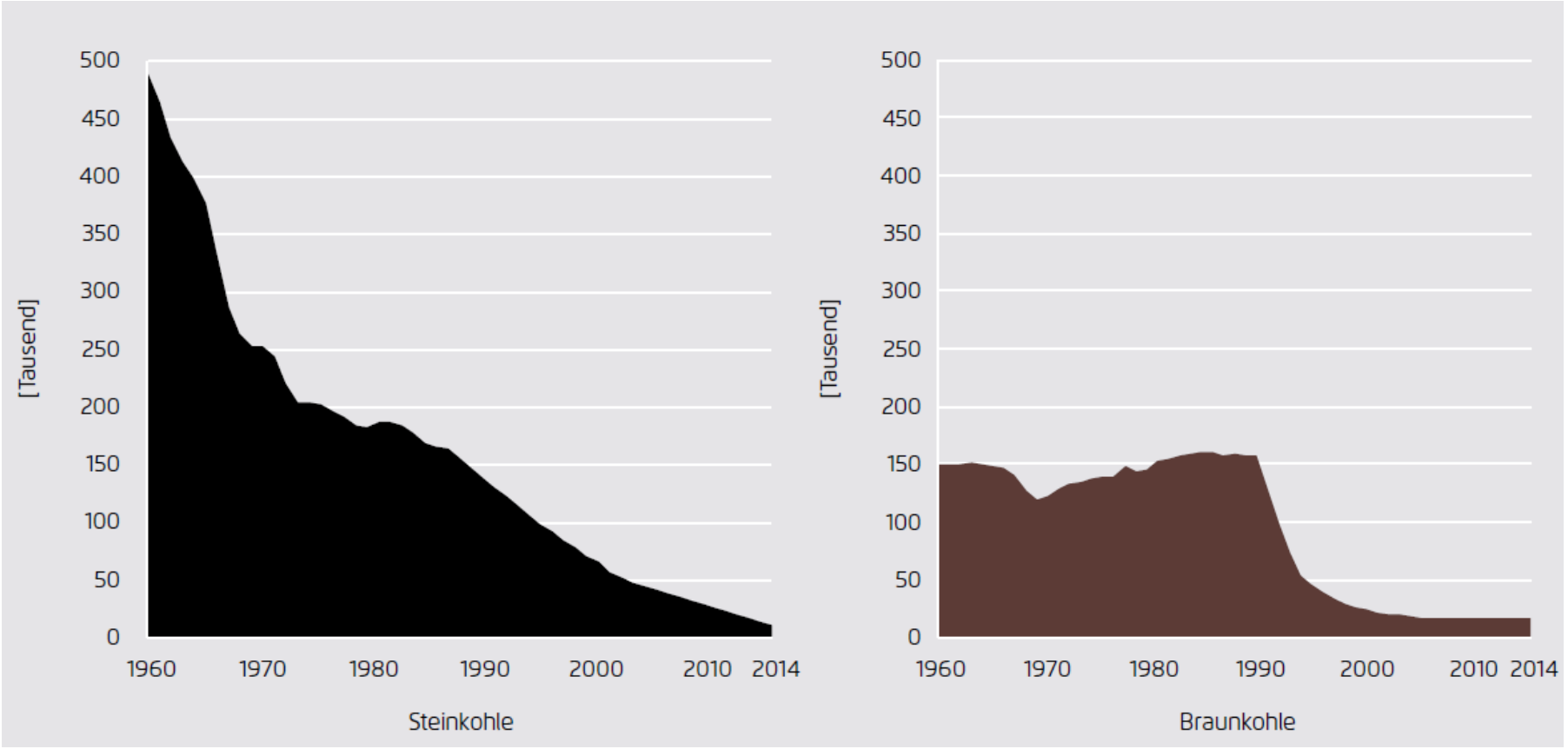
Comparision of Colombia and Germany

		
Population 	**83 Mil.**	**49 Mil.**
GDP 	**42.000 USD/capita**	**6.000 USD/capita**
CO_2 Emissions 	**9 t/capita**	**2 t/capita**

Experiences from Germany: Employment in coal industry

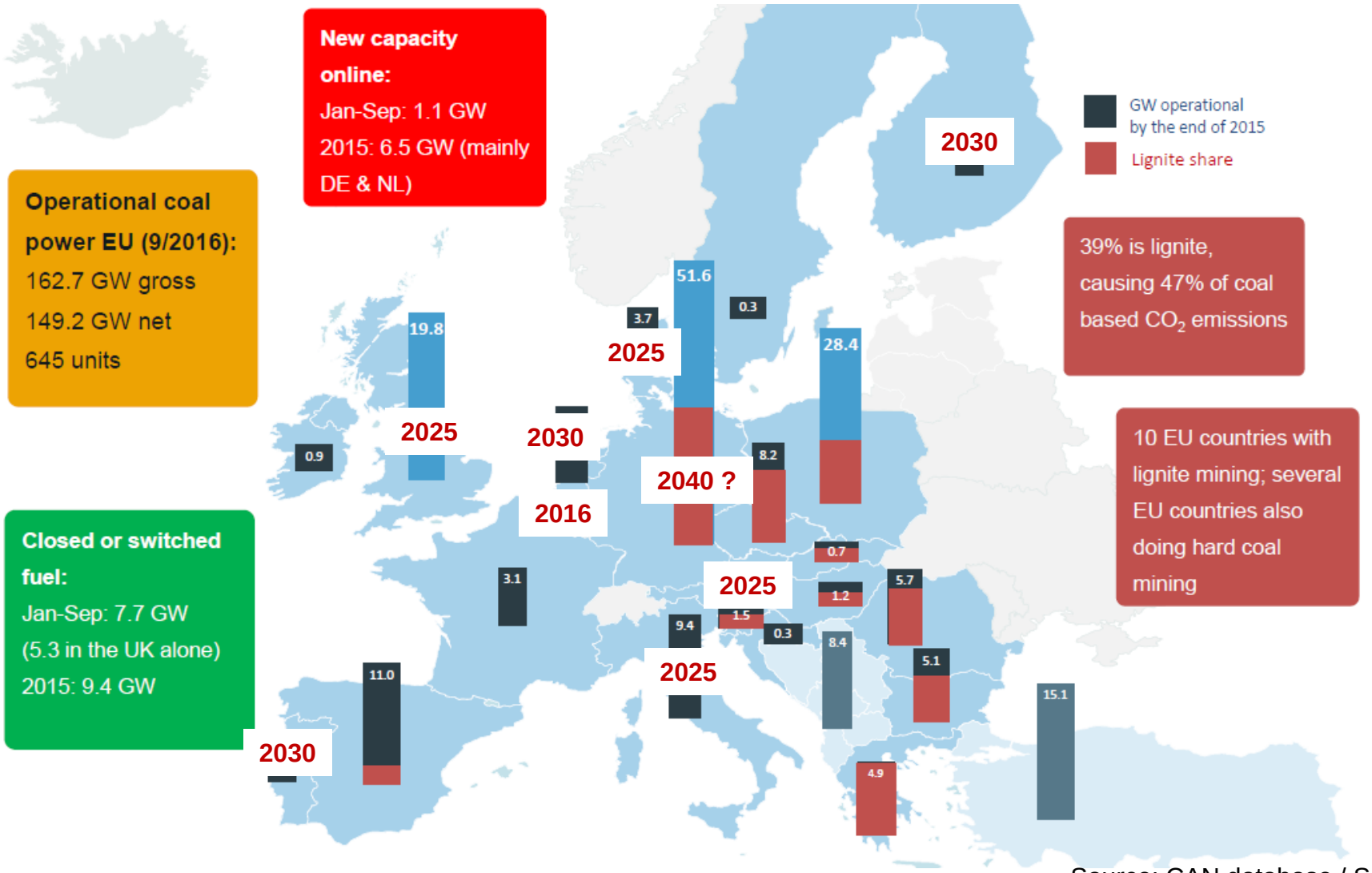
Hard coal: 500.000 → 10.000

Lignite: 150.000 → 30.000



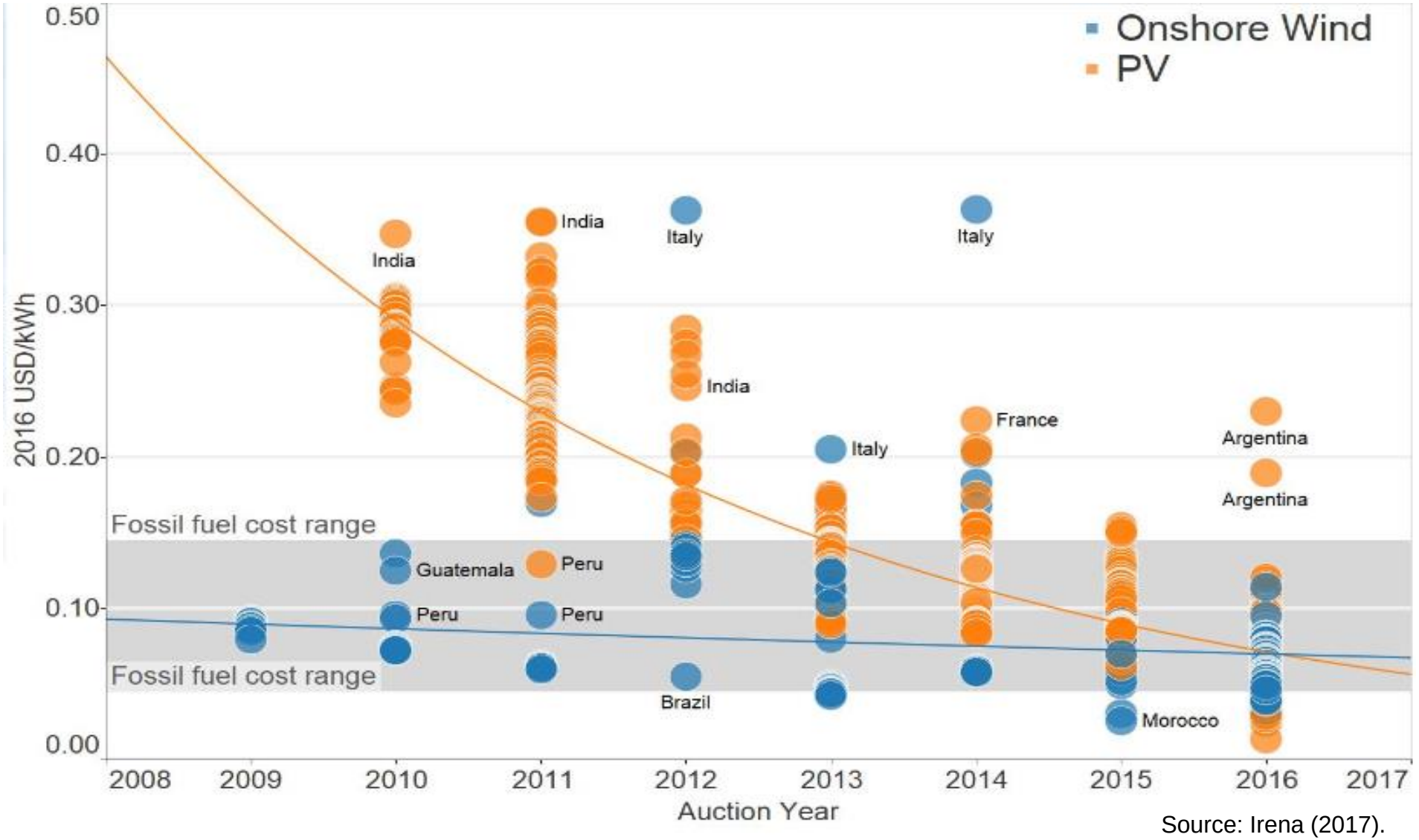
Colombia: 30.000 → ?

Coal capacities in Europe observe a decreasing trend.
Coal free countries in the EU: BE, CY, EE, LT, LU, LV, MT



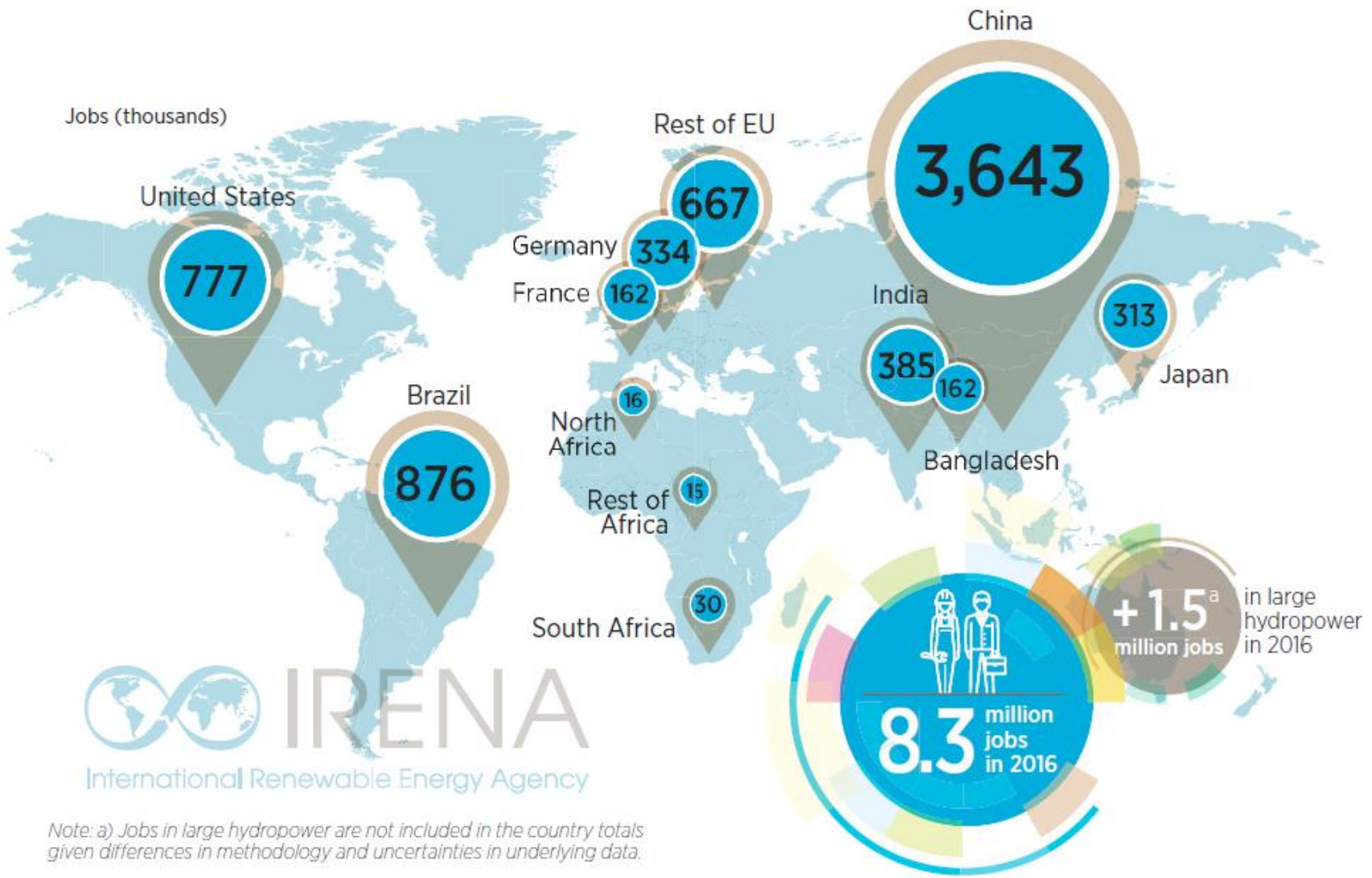
Source: CAN database / Sandbag (2016)

Cheaper renewable alternatives cause the drop in coal demand



Source: Irena (2017).

New jobs are being created in the field of renewables



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The outlook for coal in the US is negative. The change of national government will not influence the global dynamics.

The share of coal in total electricity generation declined from 52.3% in 2000 to 34.3% in 2015.

Important drivers are **federal and state level promotion of wind and solar energy** as well as **environmental policies for coal-fired power plants**.

Numerous U.S. coal producers (including Peabody Energy Cooperation, Arch Coal Inc., and Alpha Natural Resources, listed first, second and forth in the top four U.S. coal mining companies) have **filed for bankruptcy and 271 mines were closed** in the last years.

The current U.S. administration, however, targets to take back climate measures and announced to withdraw from the Paris Agreement. However, **the competitiveness of the US domestic coal sector will be governed by the evolution of the gas price and cost of renewables rather than by the rollback of the Trump Administration**.

Source: SPON (2017).

The global coal power pipeline is currently observing a major hault, dominated by the happenings in China and India [MW]

Emerging countries are expecting rising energy demands due to population growth and economic development.

China and India account for 86% of global installed coal power capacity 2006-2016.

Many projects, however, were shelved in the last year.

Country	Pre-Construction	Construction	All Active Development	On Hold	Operating
China	134,480	145,573	280,053	441,749	921,227
India	128,715	48,168	176,883	82,495	211,562
Turkey	66,852	2,640	69,492	17,654	16,362
Indonesia	38,450	7,820	46,270	8,385	27,399
Vietnam	29,580	15,177	44,757	2,800	13,394
Japan	17,343	4,256	21,599	0	44,078
Egypt	17,240	0	17,240	0	0
Bangladesh	15,685	275	15,960	3,935	250
Pakistan	10,418	4,860	15,278	5,310	190

Coal capacities are displayed in GW; Source: Shearer et al. (2017).

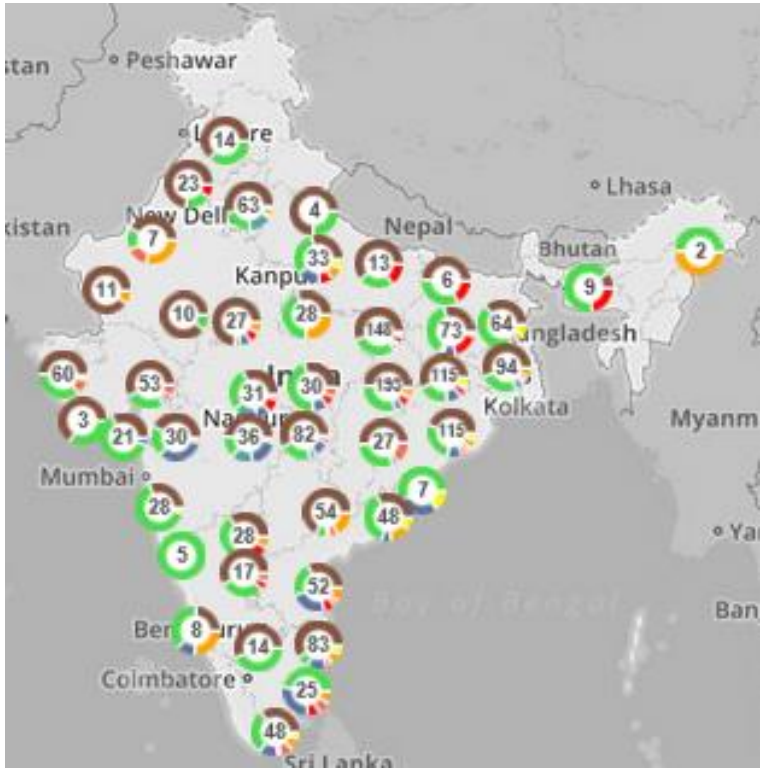
Dramatic changes to China's coal pathway with a big uncertainty about future developments

- **Electricity generated by coal peaked in 2013**, coal power capacity cap of 1,100GW to be reached in 2020 (921 GW installed as of January 2017; representing 47% of global installed power capacity).
- **Capacity factor of power plants decreased** below 50% in 2015 and 2016.
- **Plans to retire older coal power plants.**
- **Suspension of new plant approvals and halt on construction** in several provinces; Total amount of cancelled projects between 2010 and 2016: 203 GW. Cancellation of 100 specific plant projects from September 2016 to January 2017.

- **The implemented national climate and environmental policies resulted in a hault of coal consumption and a shift towards low carbon energy sources.**
- **The beginning of the Chinese coal phase-out came earlier than expected.**

Sources: Climate Action Tracker (2017a); Endcoal (2017a, 2017b); Isoaho (2016); Shearer et al. (2017).

Status-quo of coal in India



- **Installed coal capacity grew from 71 GW in 2007 to 212 GW in January 2017** (11% of global capacity).
- Rapid expansion resulted in **falling capacity factors.**
- Leading coal power producers (e.g. Adani) suspended investments and further development.
- Draft Electricity Plan: **No new coal** capacity needed **between 2022-27**, apart from the 48 GW already under construction.
- India implemented a **tax on coal** of US$ 3.2/t coal; revenues go to the National Clean Environment Fund.

➢ **Indian coal consumption has grown much slower than expected.**

➢ **India needs decentral renewable energy sources to provide cheap energy access.**

Coal capacities in 2017 [GW]

Installed capacity	Put on hold in total (end 2016)	Previously under construction put on hold	Cancelled during 2016	Pre-construction	Active construction
212	82	13	115	129	48

Sources: Climate Action Tracker (2017b); CoalSwarm (2017); Shearer et al. (2017)

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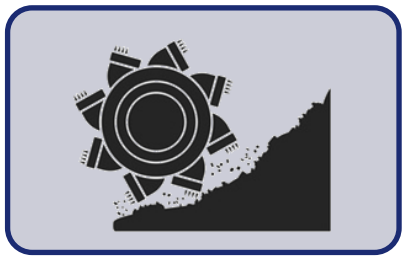
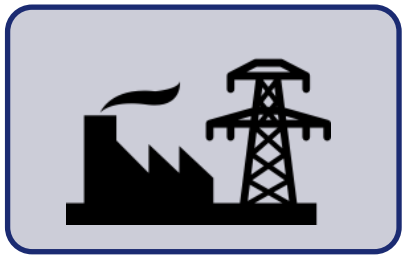
The upcoming coal phase out effects countries differently and therefore needs a combination of various political instruments

Need to differentiate between countries:



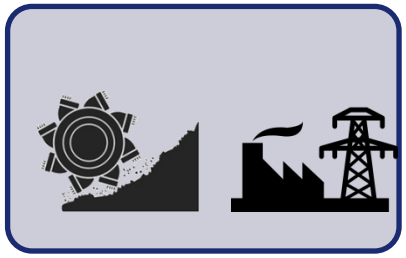
that only mine coal (e.g. Colombia)

- employment
- income from exports



those burning coal (e.g. UK and many countries in Europe)

- energy security
- (employment)



those doing both (e.g. US, China, India, South-Africa, Germany)

- energy security
- employment
- (income from exports)

Coal phase-out concepts need to incorporate different regional aspects

	e.g. Colombia	e.g. Europe or US	e.g. China or India
1	**Financial payments as compensation for a moratorium on new mines**	Moratorium on new mines	Moratorium on new mines; maybe linked with compensations
2	----------	**Existing coal power plant fleets need to be closed**	**Moratorium for new plants to prevent (stranded) assets**
3	**Support for RES to meet rising energy demand, enable energy access & create jobs**	Support for RES to replace fossil capacities & create jobs	Support for RES to meet rising energy demand, enable energy access & create jobs
4	**Active & passive labour market instruments to enable a just transition**	Active & passive labour market instruments to enable a just transition	**Active labour market instruments to create new jobs**

Mining Problems in Germany: Technical and Environmental Risks of Iron Ocre: Threat for Individuals and Tourism

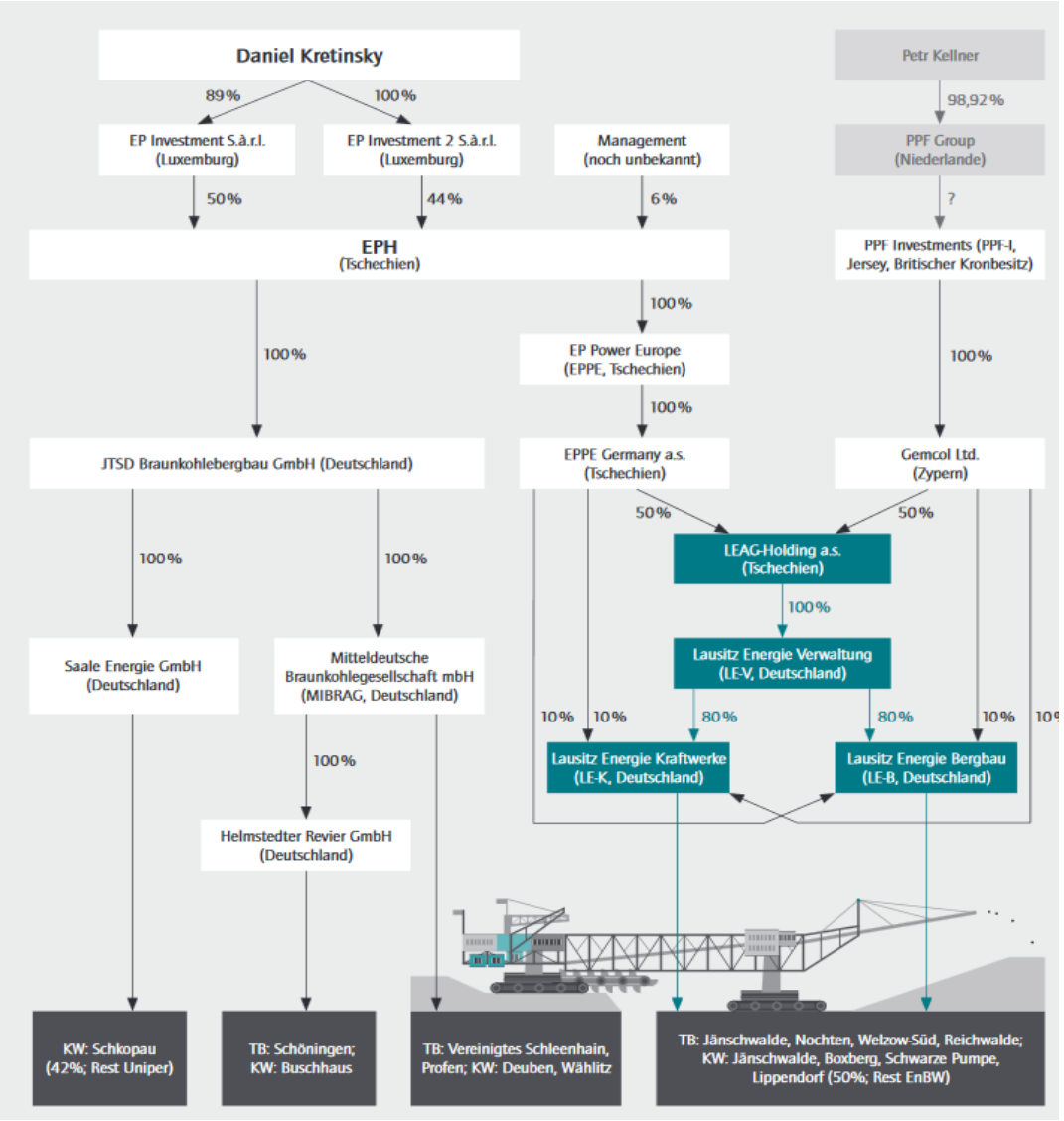
Mining Problems in Germany: Economical Risks of Liabilities

What happens if a company goes bancrupt with:

- **Jobs and Pensions**
- **Renaturation**
- **Compensation payments**

Things become complicated if companys consist of multiple (international) subsidiaries
(see owners of German mines →)

→ **Securing sufficient funds from mining companies as long as they make profits**



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Conclusion

		**Demand for (Colombian) Coal is shrinking fast in Europe and the US.**
		**Alternative markets in China or India are unlikely.**
		**The majority of coal has to remain in the ground.**
		**The phase-out of mining is resulting in several problems:** - **Liabilities,** - **Jobs,** - **Renaturation.**
		**Active joint effort can result in new solutions.**

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