

Germany's Coal Phase-Out. Insights from the German Commission on Growth, Structural Change and Employment (“The Coal Commission”)

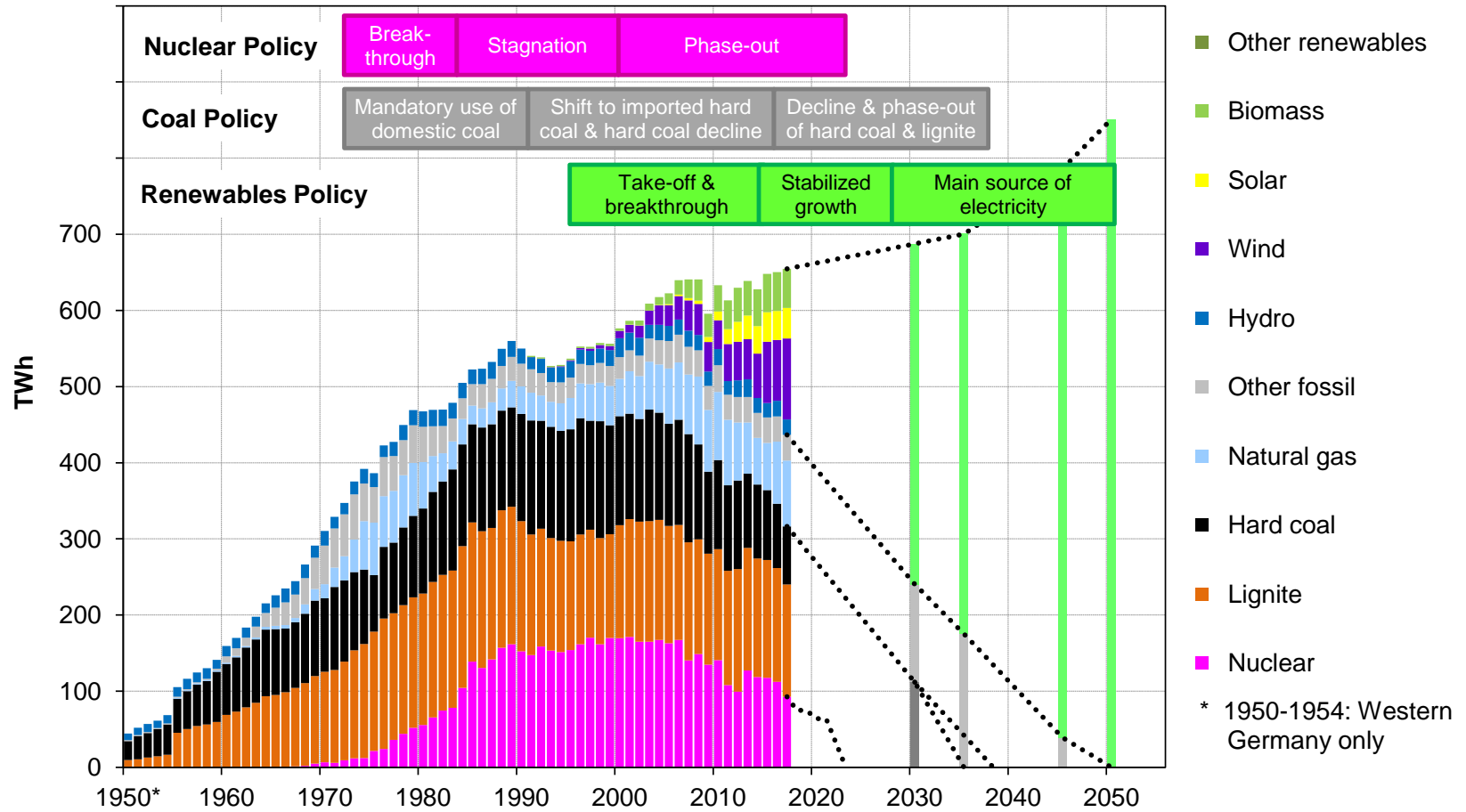
Third Regional Forum for Sustainable Development
in Latin America and the Caribbean

Dr. Felix Chr. Matthes

Santiago de Chile, 25th April 2019

The transformation of the German electricity system

The bigger picture



The German Coal Commission

The challenges

Energy and climate policy

- power generation from coal is by far the largest single source of greenhouse gas emissions in Germany
- the coal-fired power plant fleet is quite diverse in terms of age and location
- it represents a significant share in (net) power generation (36% in 2017) as well as firm (net) capacity (40% in 2017)
- phase of coal phase-out runs parallel to the final phase of the nuclear phase-out (12% of net power generation, 9% of net firm capacity in 2017)
- German coal phase-out runs parallel to coal phase-out policies in other European countries

Employment and regional policy

- lignite industry (mining and power generation) employs approx. 20,000 workers directly and another 20,000 indirectly in the regions
- regional challenges are very different (Lusatian region as hot spot)

German energy & climate policy in a corporatist environment

The taxonomy of (non-permanent) commissions

Expert Commissions

- Expert Commission on the Monitoring Process "Energy of the Future"

Joint Parliament/Expert Commissions

- Study Commissions ("Enquete-Kommissionen") of the Federal and the State Parliaments

Stakeholder Commissions with a (more or less) narrow mandate and/or (more or less) pre-defined outcomes

- Commission to Review the Financing for the Phase-out of Nuclear Energy
- Ethics Commission on Nuclear Phase-out

Stakeholder Commissions with a broad mandate and/or (more or less) open outcomes

- Commission on the Storage of High-level Radioactive Waste
- Commission on Growth, Structural Change and Employment ("Coal Commission")

The German Coal Commission Composition

- **3 representatives from industry/business associations, 3 representatives from trade unions, 2 representatives from energy industry associations**
- **3 representatives from environmental NGOs, 1 representative from a renewable energy association**
- **3 scientists specialized on energy & climate, 2 scientists specialized on structural change & labour market, 1 scientist specialized on innovation**
- **3 representatives from non-energy companies**
- **2 (retired) minister presidents from (East German) lignite mining states**
- **1 representative from other organization**
- **2 pro-coal representatives from lignite mining regions, 2 anti-coal representatives from lignite mining regions**
- **3 MPs from the Federal Parliament (ruling coalition, no voting rights)**
- **Observers: coal mining states, federal ministries, Chancellery**

The German Coal Commission Recommendations & implications (1)

A programme on employment and structural change

Targets and implementation mechanisms for coal phase-out

- coal capacity -30% by 2022, -37% by 2025, -60% by 2030, complete phase-out by 2038/2035
- GHG emission reduction by 150...160 million t CO₂ by 2030 and by approx. 200 million t CO₂ by 2035/38

Embedding the coal phase-out in a broader energy policy (1)

- security of supply measures
- expansion of renewables
- network infrastructure roll-out
- electricity price compensation
- cancellation of EU ETS emission allowances
- modernization of taxes, levies and surcharges and carbon pricing

The German Coal Commission Recommendations & implications (2)

Embedding the coal phase-out in a broader energy policy (2)

- model regions and “real laboratories”: maintaining the general orientation as energy regions
- innovation support: developing a general orientation as innovation regions

A consistent review process

- 2023, 2026 and 2029 mandatory review (and add'l measures if needed)
- detailed proposal on indicators and procedures

Lessons learned (not only from the Coal Commission)

What energy transformation is really about

The conventional concerns and challenges on the future energy system become less relevant

- technologies are available or at least visible in the innovation pipeline
- costs (in terms of system costs for newly built systems and on a LCOE basis) are almost comparable (at moderate CO₂ prices)

The real challenges from the transformation result from the needs for managing structural change (= modernization)

- new technologies with new technical characteristics (more diverse, variable production, distributed, digitized) and new coordination needs
- new cost structures (entering an extremely capital-intensive system)
- new structures of players and/or market/system participants
- new spatial patterns with new needs for network infrastructure

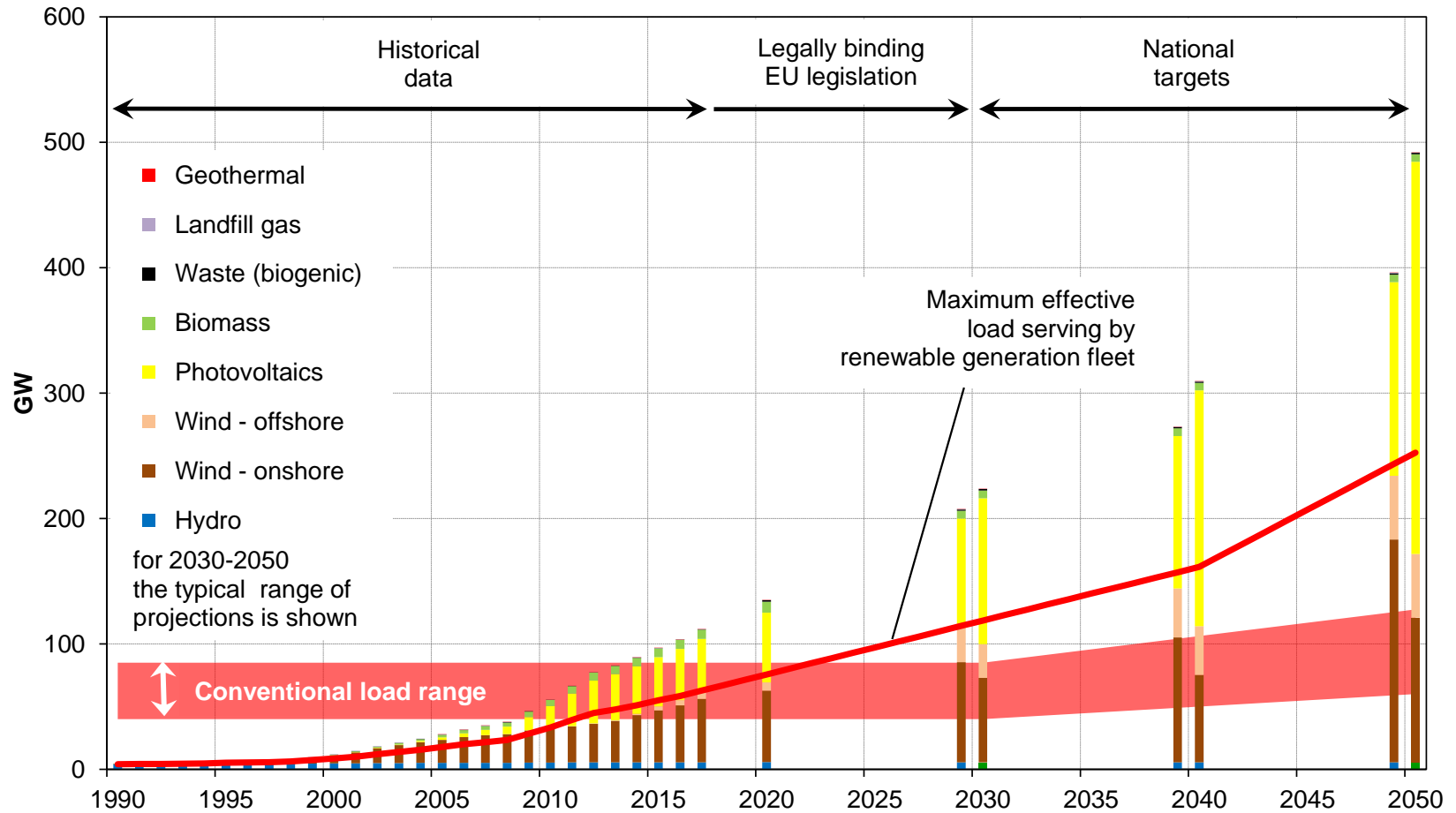
Lessons learned (not only from the Coal Commission)

Clear targets & robust strategies & flexible implementation needed

- 1. Paving the way – for energy efficiency, clean generation & flexibility options (renewables & complementary flexibility)**
 - the German priority #1 for many years
 - new jobs (in new regions?) but also new distributional challenges
- 2. Designing the exit-game – for the non-sustainable capital stocks**
 - a blind spot until the Coal Commission triggered a new approach
 - job losses in hotspot regions
- 3. Triggering the necessary infrastructure adjustments with sufficient lead-times**
 - a blind spot for too long, long-term visions are needed
 - public acceptance is crucial and new distributional challenges
- 4. Making the necessary innovation work in time**
 - targeted support and creating an ecosystem of innovation will make the economy ready for a sustainable future

The German Coal Commission

Deep dive (1): New phase of RES roll-out & the need for storage



The German Coal Commission

Deep dive (2): Old spatial patterns (and regional identities)

Low load / medium conventional region North

Low load
 Medium nuclear capacities
 Low conventional capacities

Low load / high coal region East

Low load
 High coal capacities
 High CHP capacities

High load / high coal region West

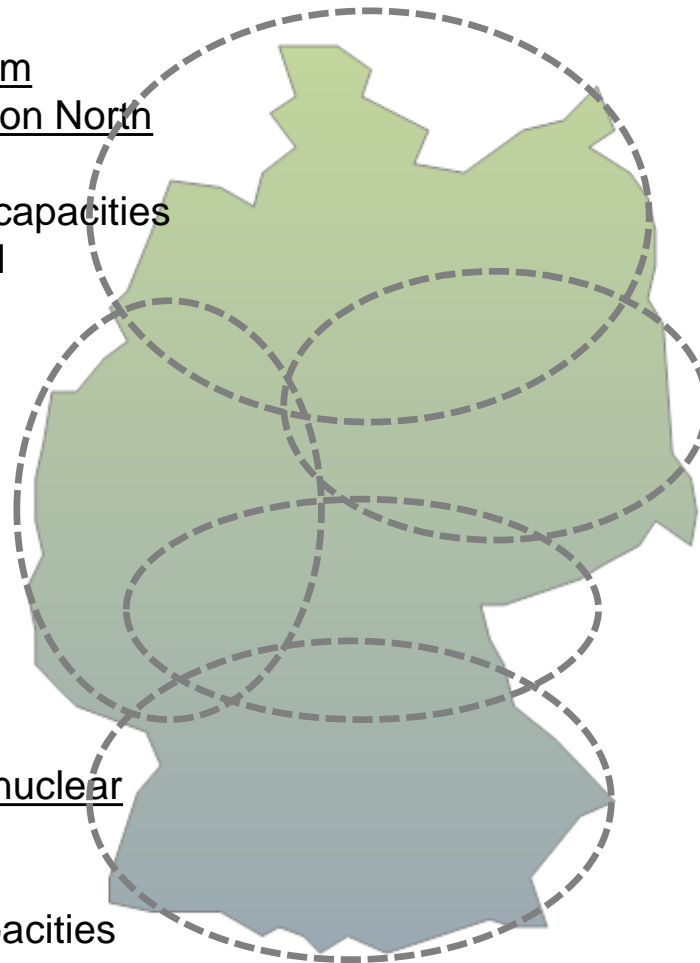
High load
 High coal capacities
 High CHP capacities

Medium load / storage region Center

Medium-/ high-load
 High pump-storage capacities

High load / high nuclear region South

High load
 High nuclear capacities



The German Coal Commission

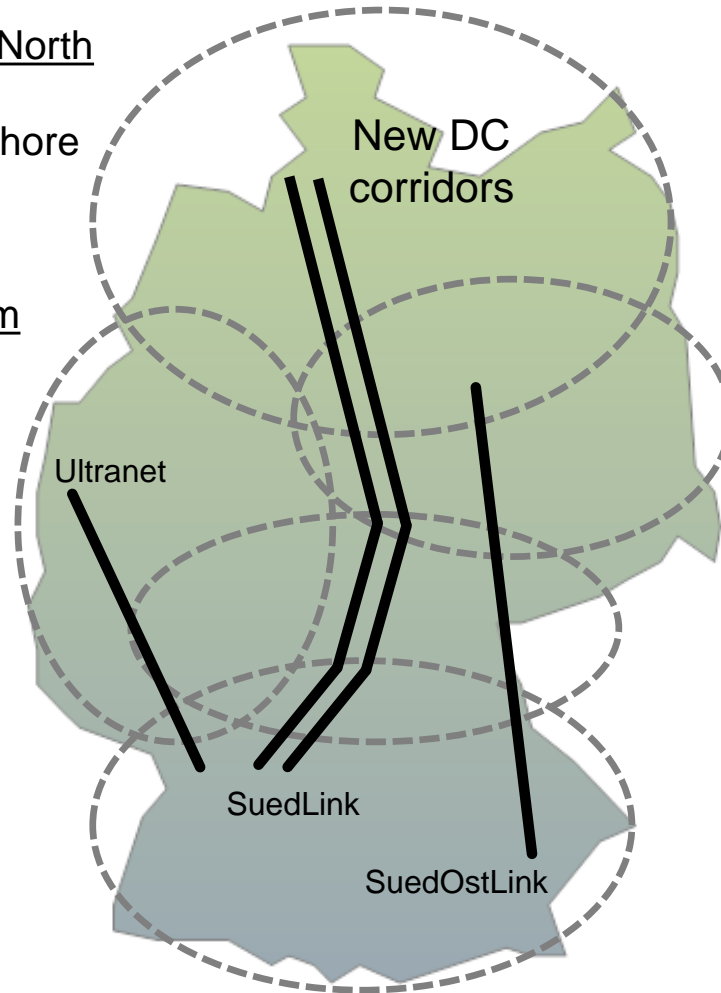
Deep dive (2): New spatial patterns (and regional identities)

High wind region North
 Low load
 High onshore/offshore wind

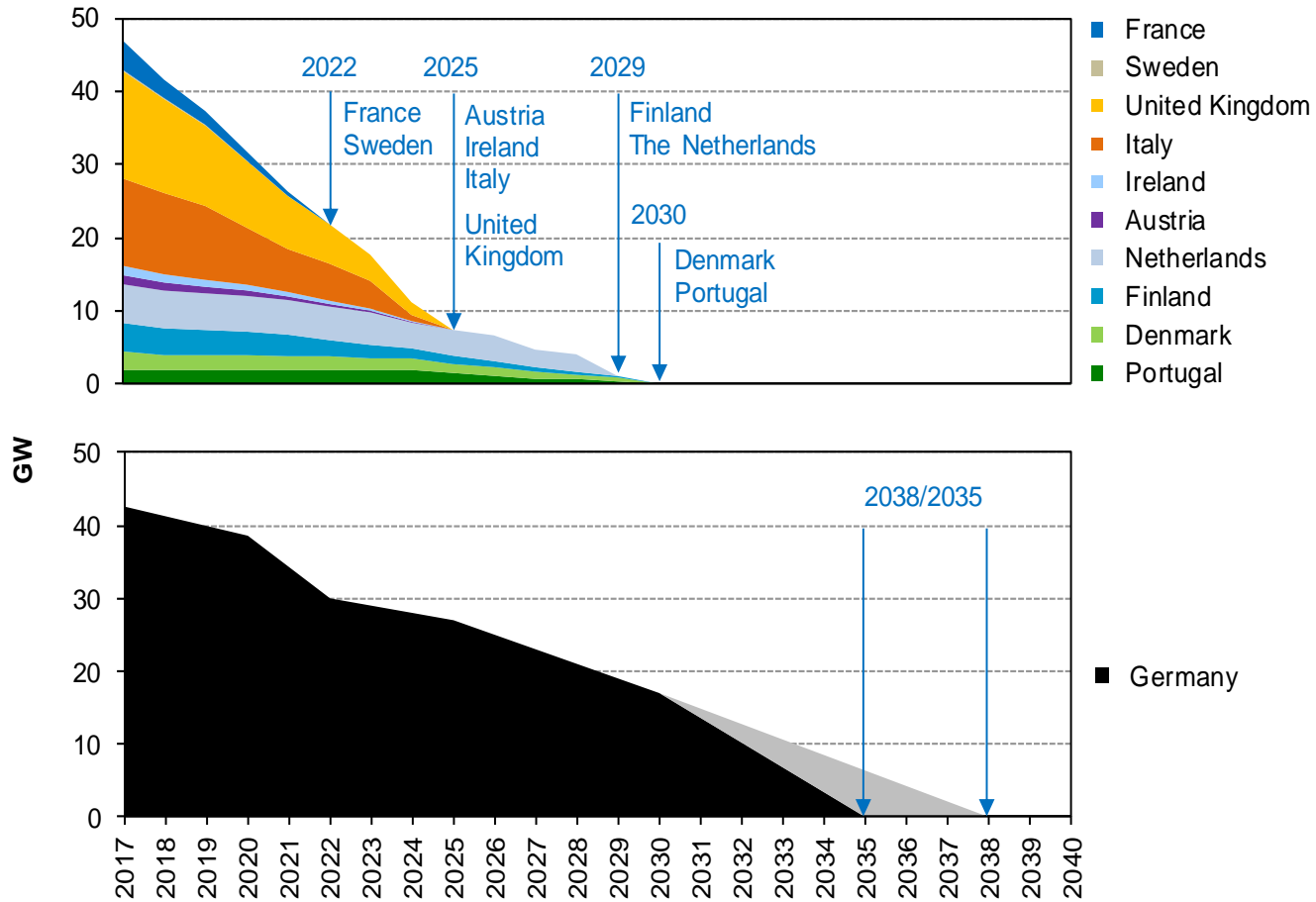
High load /medium RES region West
 High load
 Medium RES
 High CHP
 Coal phase-out

Low load / high wind Region East
 Low load
 High wind
 High CHP
 Coal phase-out

Medium load / infrastructure & storage Region Center
 Medium/high load
 Medium RES
 High pump storage capacities
 Large electricity transits



Last but not least: The German coal phase-out in the context of other European efforts



Thank you very much

The report of the Coal Commission is available
in English at:

https://www.bmwi.de/Redaktion/EN/Publikationen/commission-on-growth-structural-change-and-employment.pdf?__blob=publicationFile&v=3



Dr. Felix Chr. Matthes
Energy & Climate Division
Berlin Office
Schicklerstraße 5-7
D-10179 Berlin
f.matthes@oeko.de
www.oeko.de
twitter.com/FelixMatthes



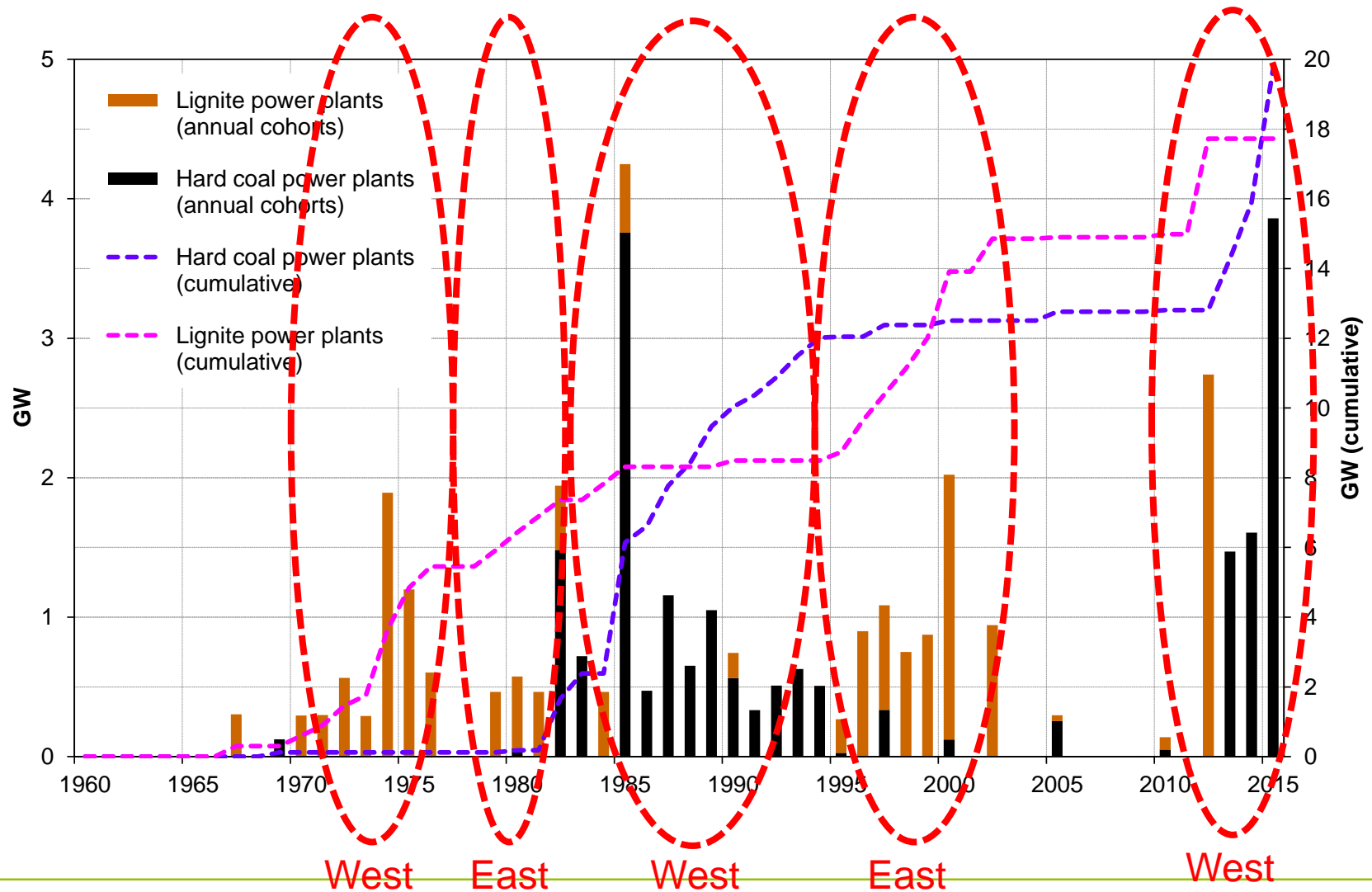
Backup

Starting point: Energy transformation as a target- & policy-driven structural change of the energy system

Targets as of ...														
	2018	2016	2016	2016	2016	2016	2010	2018	2010	2010	2010	2010	201	2019
	Greenhouse gas emissions						Renewable energies		Energy efficiency				Nuclear energy (capacity)	Power from coal (capacity)*
	Total	Energy sector	Buildings	Transport	Industry	Agriculture	Gross final energy	Power generation	Primary energy	Space heating	Final energy transport	Electricity consumption		
2011													-41%	
2015													-47%	
2017													-54%	
2019													-60%	
2020	-43%						18%	35%	-20%	-20%	-10%	-10%		
2021													-80%	
2022													-100%	-30%
2025														-37%
2030	-55%	-61 to -62%	-66 to -67%	-40 to -42%	-49 to -51%	-31 to -34%	30%	65%						-60%
2035														(-100%)
2038														-100%
2040	-70%						45%	85%						
2050	-80 to -95%						60%	80%	-50%	-80%	-40%	-25%		
Base year	1990	1990	1990	1990	1990	1990	-	-	2008	2008	2005	2008	(2010)	2017

Note: * according to the recommendations of the Coal Commission

Coal phase-out in Germany: a three-dimensional challenge lignite vs hard coal, new vs old, East vs West



The German Coal Commission Recommendations & implications (3)

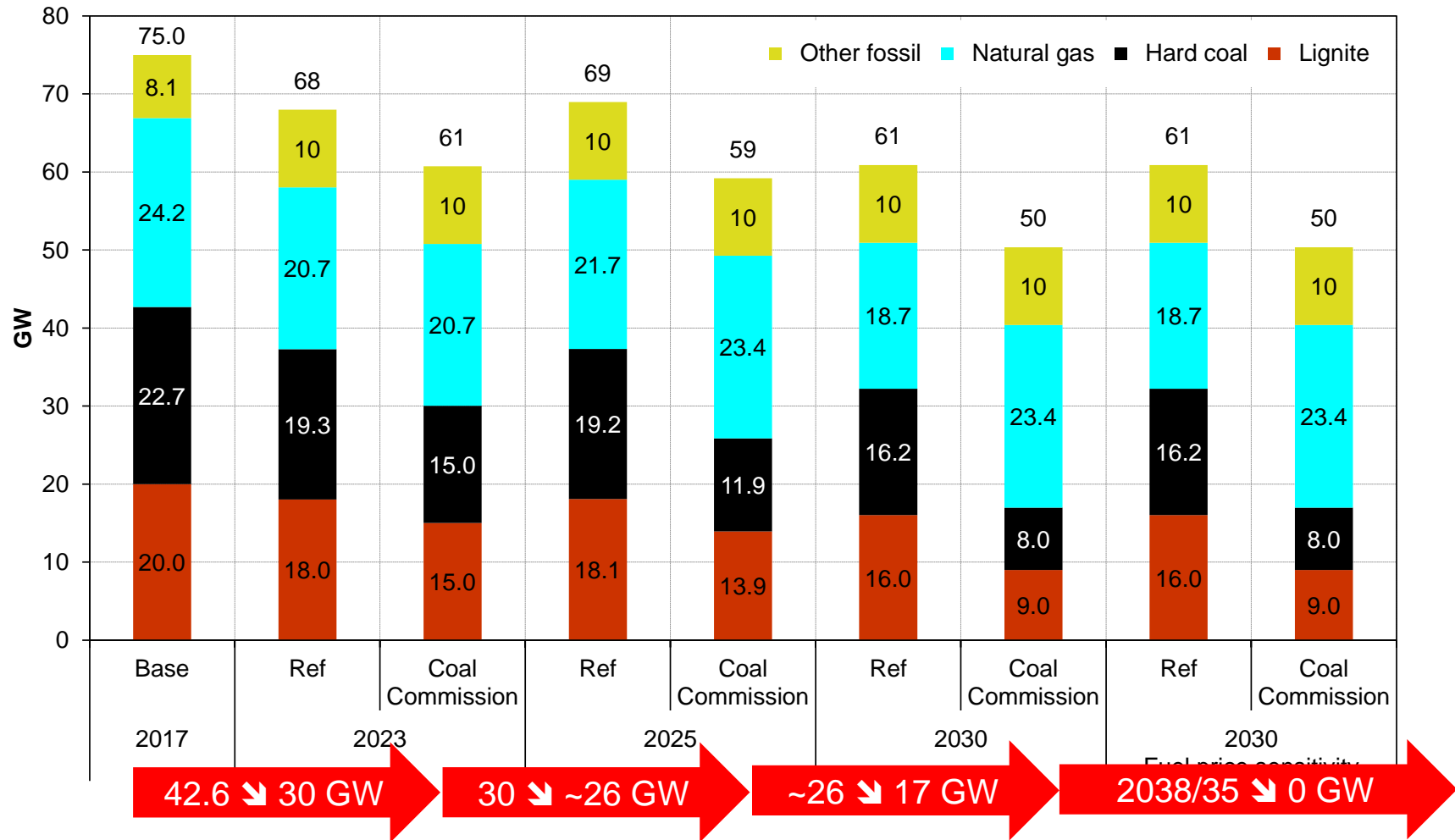
The I3SEC programme on structural change

- infrastructure (transport, digitization)
- investment support
- innovation (set-up and funding of research institutions in the mining regions, demonstration projects, innovation zones)
- settlement of government agencies (incl. military)
- early retirement/adaptation allowance mechanisms (labour market policies following the blueprint of hard coal mining phase-out)
- civil society and community support programmes

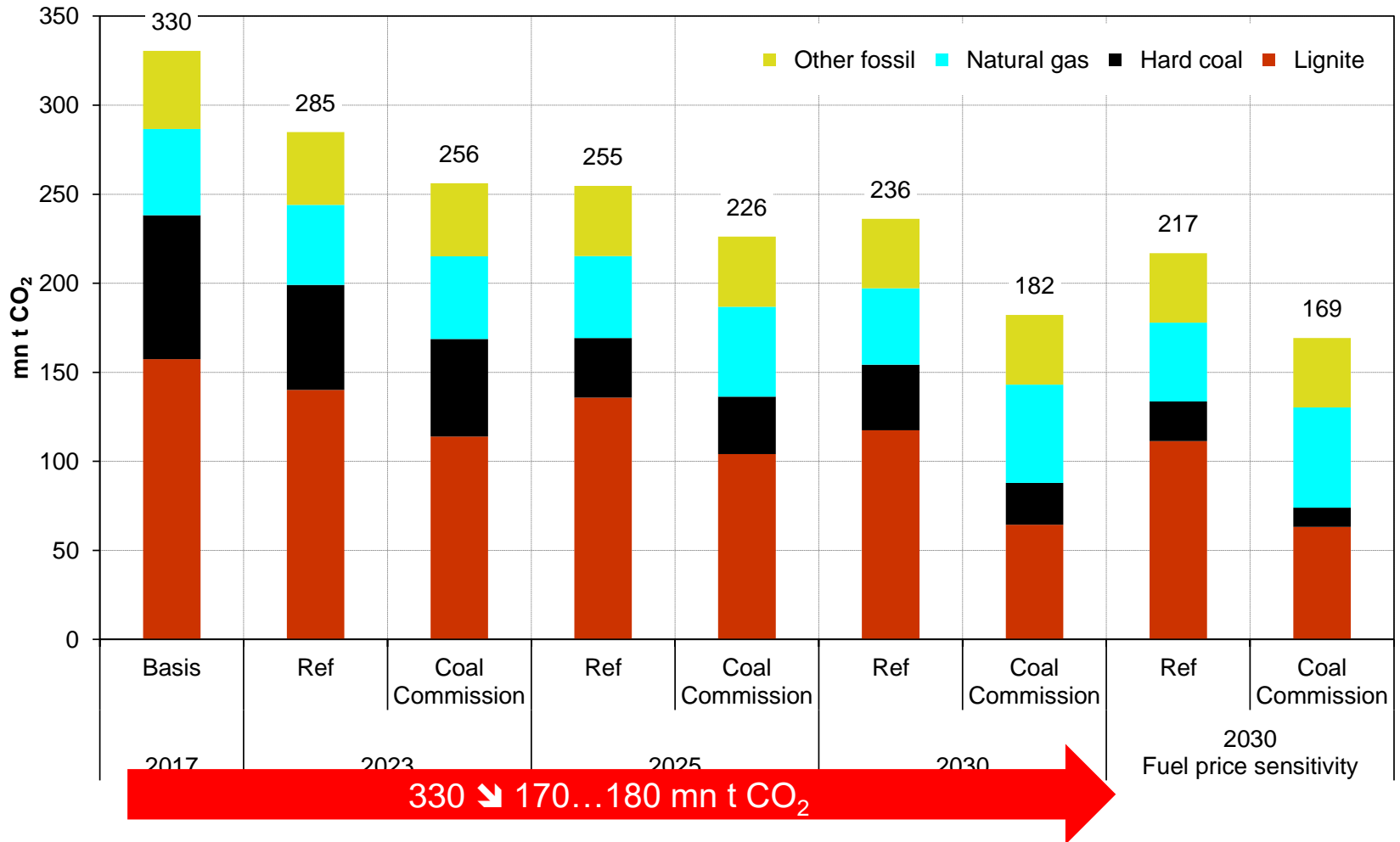
Funding resources

- €1.3b annually for 20 years for specific measures (controlled by federal legislation), €0.7b annually for 20 years at the disposal of the States
- funds will be only partly additional (re-distribution of existing funding mechanisms)

The German Coal Commission Recommendations & implications (4): Capacity buy-out



The German Coal Commission Recommendations & implications (5): Emission abatement



The German Coal Commission Recommendations & implications (6)

The necessary embedding in a broader energy policy (1)

- security of supply
 - more stringent monitoring
 - will a new capacity mechanism become necessary (systematic investment framework, aka capacity market, new EU framework with 550 g/kWh threshold)?
 - new gas-fired capacity and/or other dispatchable capacities/ flexibilities need to be commissioned from 2025 onwards
- expansion of renewables
 - 65% renewables in 2030 to be fixed in Renewable Energy Act (tender volumes etc.)
 - 65% renewables in 2030 to be fixed in network development
- network infrastructure roll-out
 - updated network development plans & legislation

The German Coal Commission Recommendations & implications (7)

The necessary embedding in a broader energy policy (2)

- electricity price compensation
 - contribution from federal budget to transmission network access fees
 - potentially starting in 2023, volume (€2b annually?), updating, state aid approval
- cancellation of EU ETS emission allowances
 - basic legal EU framework exists, implementation provisions pending, volume to be fixed
- modernization of taxes, levies and surcharges and carbon pricing
 - evaluation and revision process need to be started soon
 - major implications for electricity costs, self-consumption, storage, power-to-X

The German Coal Commission Recommendations & implications (8)

The necessary embedding in a broader energy policy (3)

- model regions and “real laboratories”: maintaining the general orientation as energy regions
 - funding
 - specific (experimental) framework provisions
- innovation support: developing a general orientation as innovation regions
 - sector integration
 - flexibility
 - hydrogen and power-to-X

The review process

- 2023, 2026 and 2029 mandatory review (and add'l measures if needed)
- detailed proposal on indicators and procedures