

**Schweizerische Energie Stiftung (SES)
Fossil Phaseout Congress**

**Can the World Deliver on Its Ambitious Environmental Goals
and Keep the Lights On?**

Technopark, Zürich

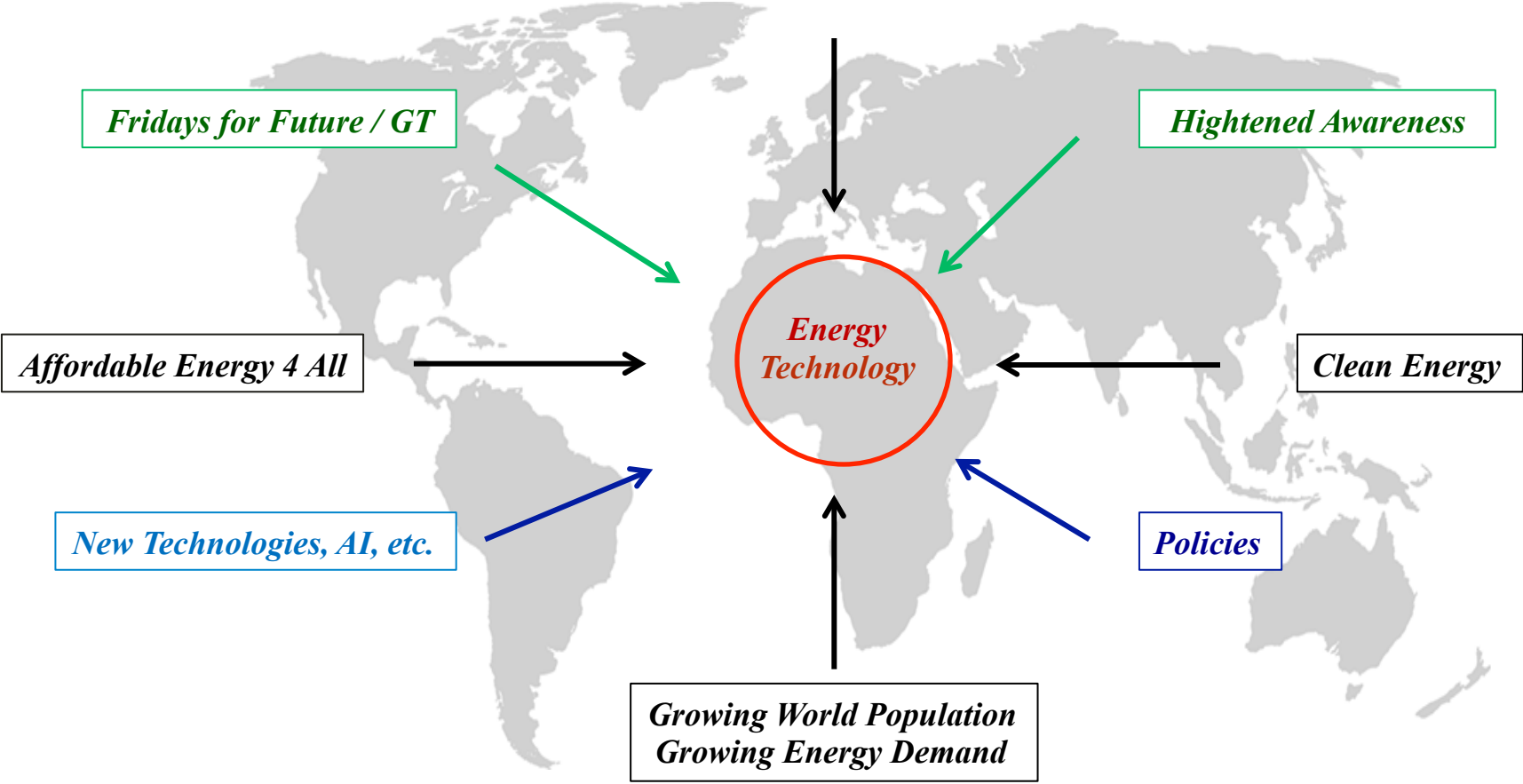
September 30, 2019

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The Backdrop

Setting the Stage

Paris Climate Accord: 1.5 – 2°C



Conundrum: Affordable Energy 4 All + Achieve Paris Climate Goals
→ Can Only Be Achieved Through **Technology, Policies, Investment & Champions**

The Steps

Chronology

The World As Is.



Technologies / Companies



Policies



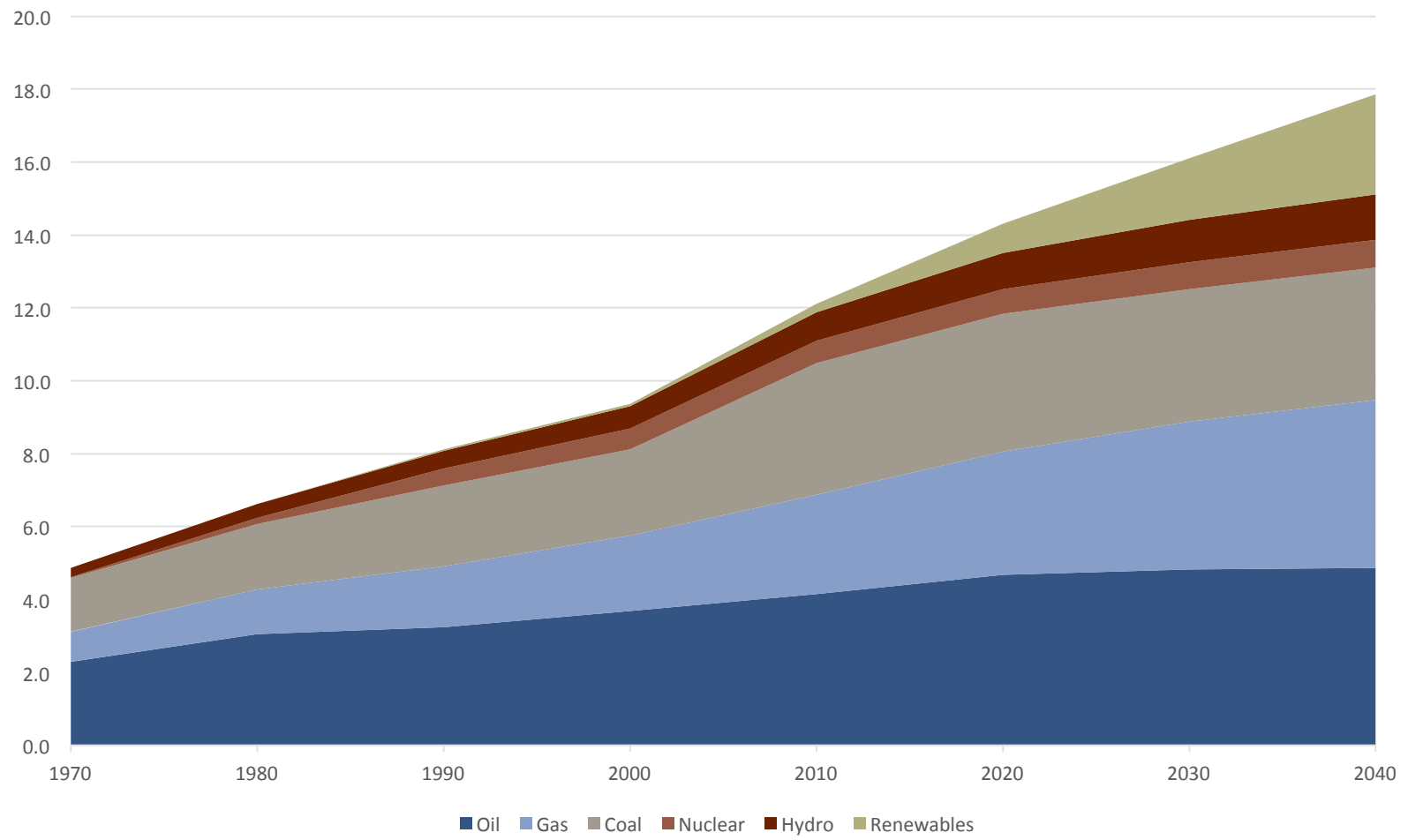
What to Learn / What to Avoid

Need To Identify What Has Most “Bang For Buck”

The World As Is

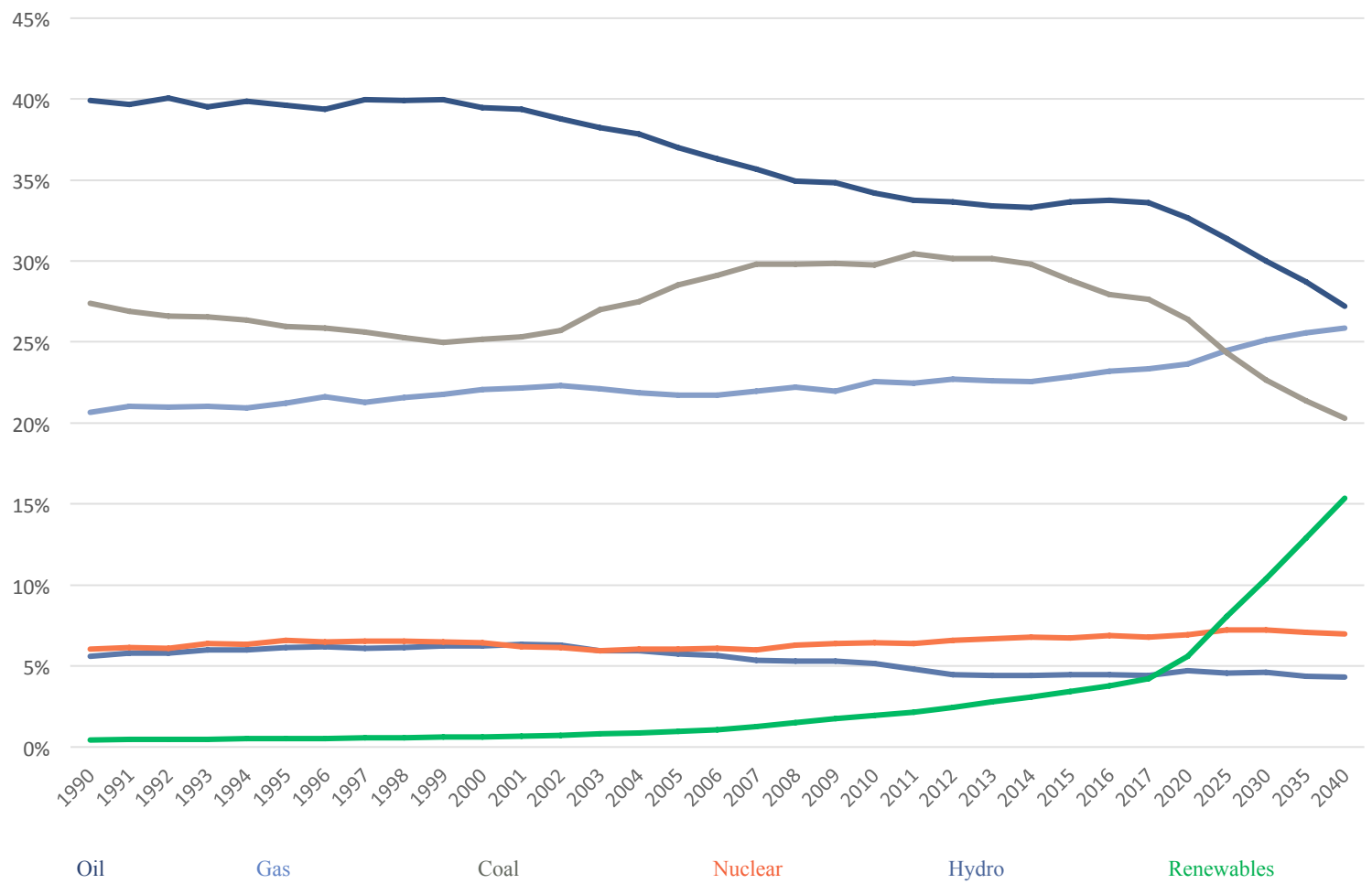
Primary Energy Demand 1970 - 20140

Diagrammtitel



Growth Until 2040 – How To Achieve Climate Goals?

Primary Energy Demand: Change in Relative Shares



Will Not Achieve A Carbon Neutral World By 2050

Environment

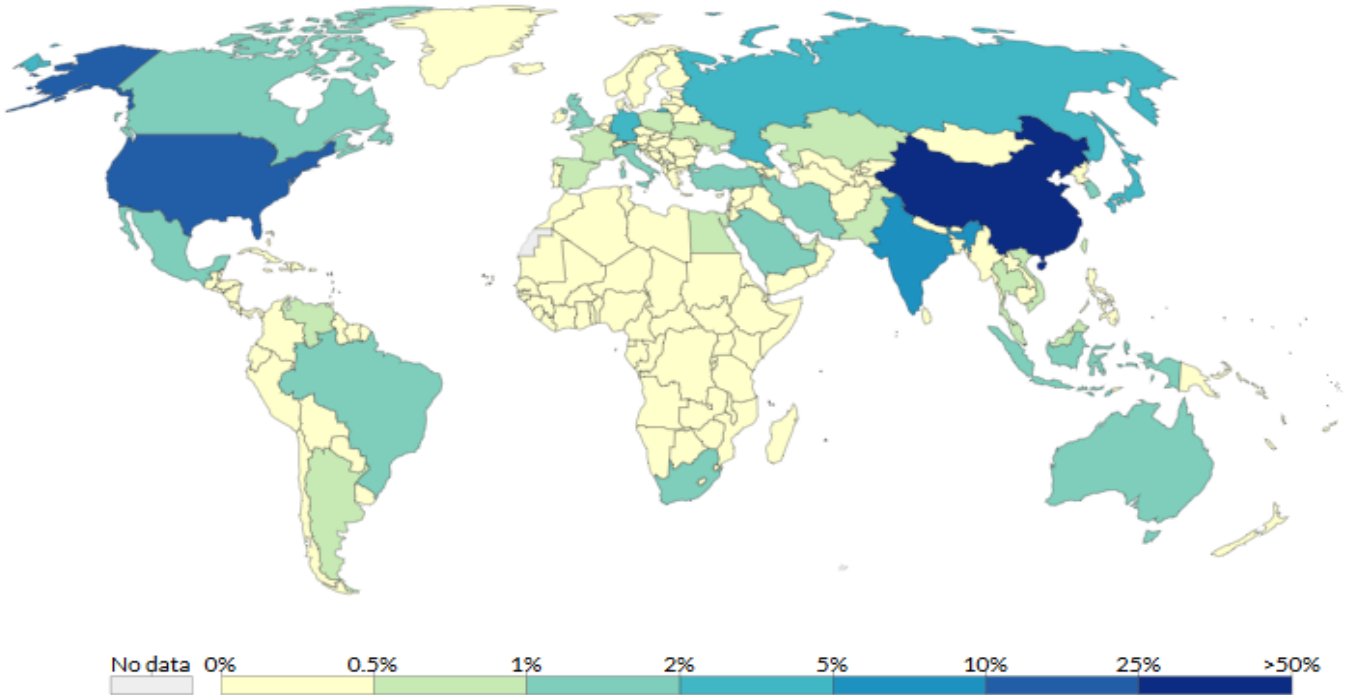
CO2 Emissions

- 52 GT
- Current trajectory: 52 – 58 GT in 2030
- For 1.5 °C : 25 – 30 GT in 2030
- Net 0 emissions by 2050

Only Possible With Massive Technology Deployment Across The Globe

CO2: The Culprits

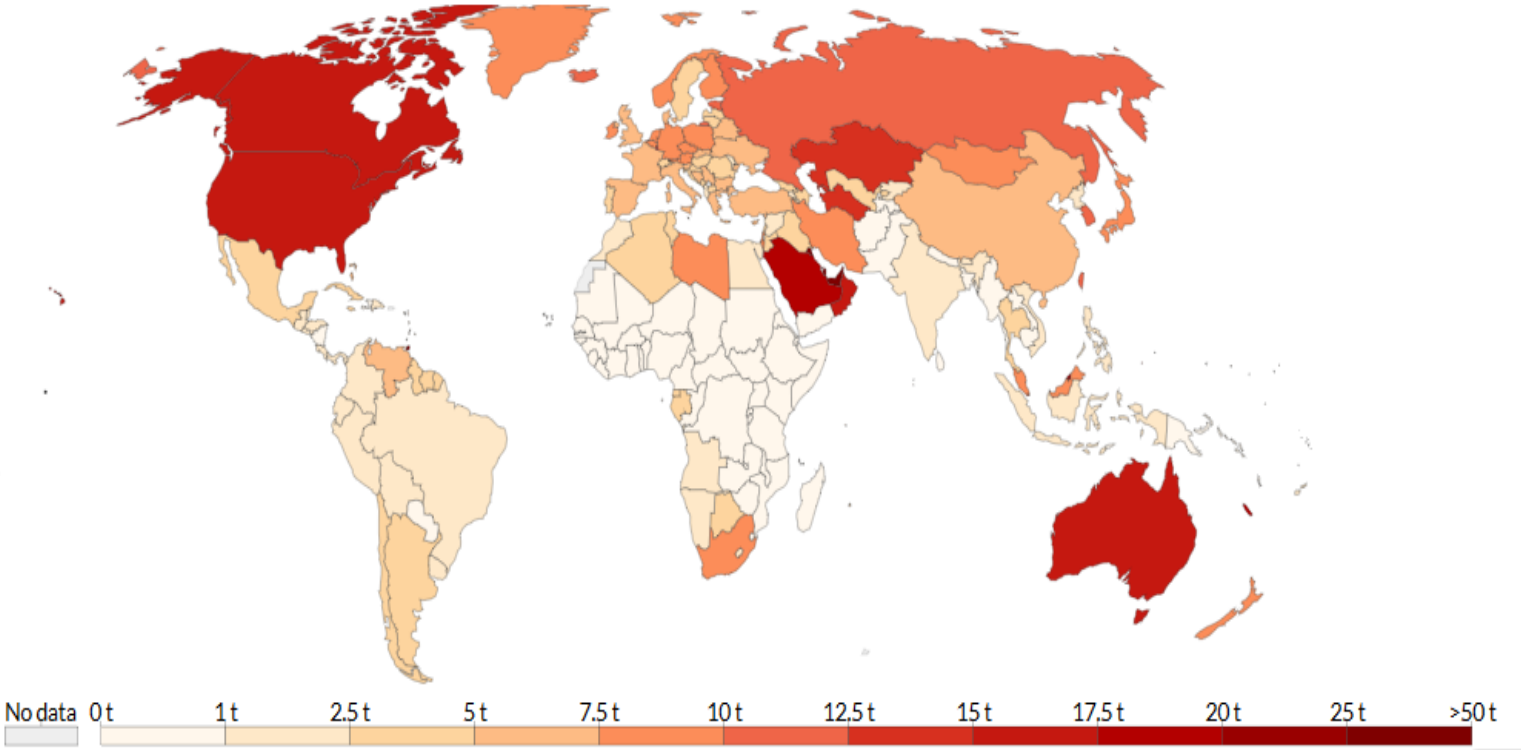
Annual share of global CO₂ emissions, 2016



It Is About China, North America, India & Russia

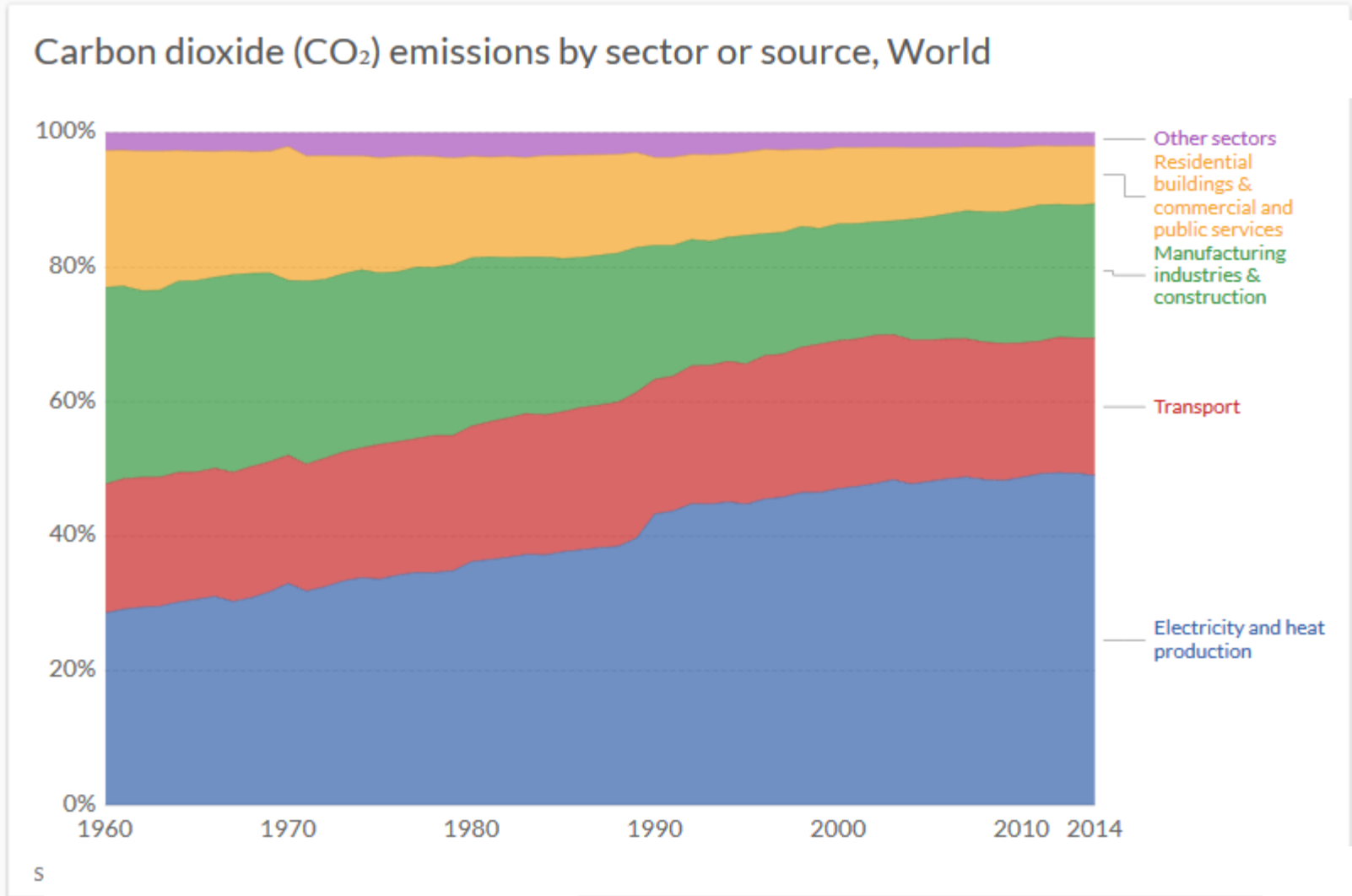
The Culprits: Per Capita

CO₂ emissions per capita, 2016



It Is About North America, Australia & GCC

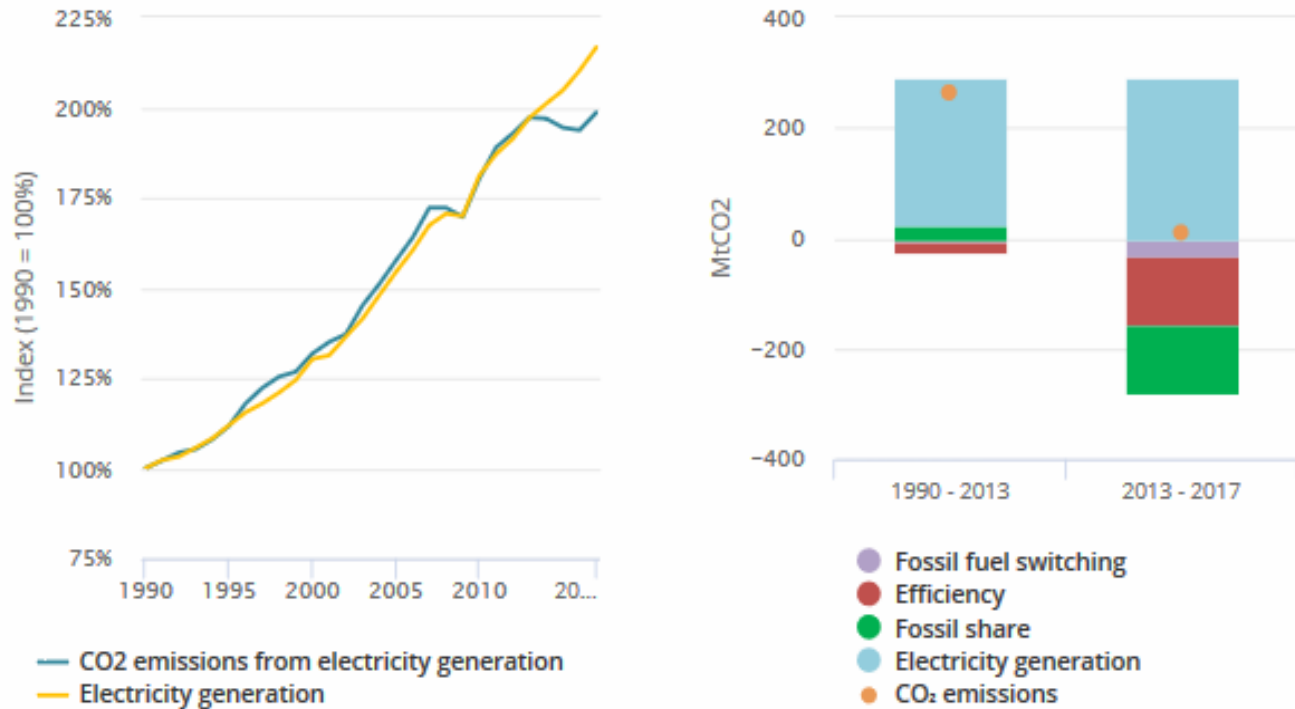
The Culprits: Sectors



Electricity, Transport, Manufacturing & Buildings

CO2 & Electricity Generation

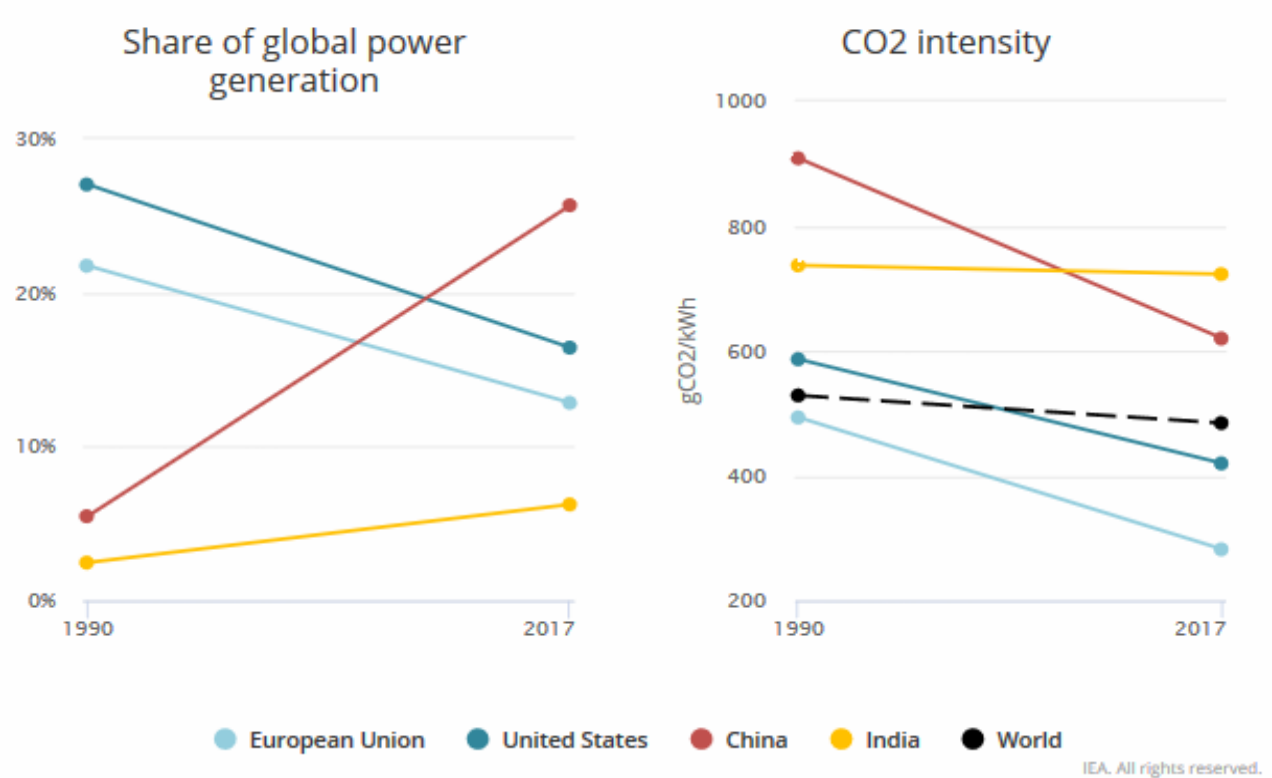
Decoupling between electricity generation and related CO2 emissions, and key contributing factors



We Are At The Beginning → A Lot Can & Will Have To Be Done

CO2 & Power Generation

How are new players in power generation affecting the global carbon intensity of electricity?



US, China & India Is Where It Is At

Technologies / Companies

To Achieve Paris Climate Change Goals

- Energy:
 - 1) Renewables: PV / wind
 - 2) Nuclear
 - 3) Hydro
 - 4) How long do we need oil, gas & coal?
- Buildings:
 - 1) Retrofitting
 - 2) Smart buildings
 - 3) Smart cities
- **Smart Grids / AI**
- Transportation (**mind poverty trap**)
- Food & consumption / supply chains (**mind poverty trap**)

Decarbonization & Digitization → Surge In Electricity Demand

Industrial / Energy Companies:

- ABB, Vestas & Co
- Schneider Electric
- Siemens
- Utilities
- GE Sempra
- Mitsubishi, etc.
- J Hanwa, Guodiang Minyang
- Masdar
- Car manufacturers
- Battery Manufactureres BYD
- Rolling Stock
- BP Shell

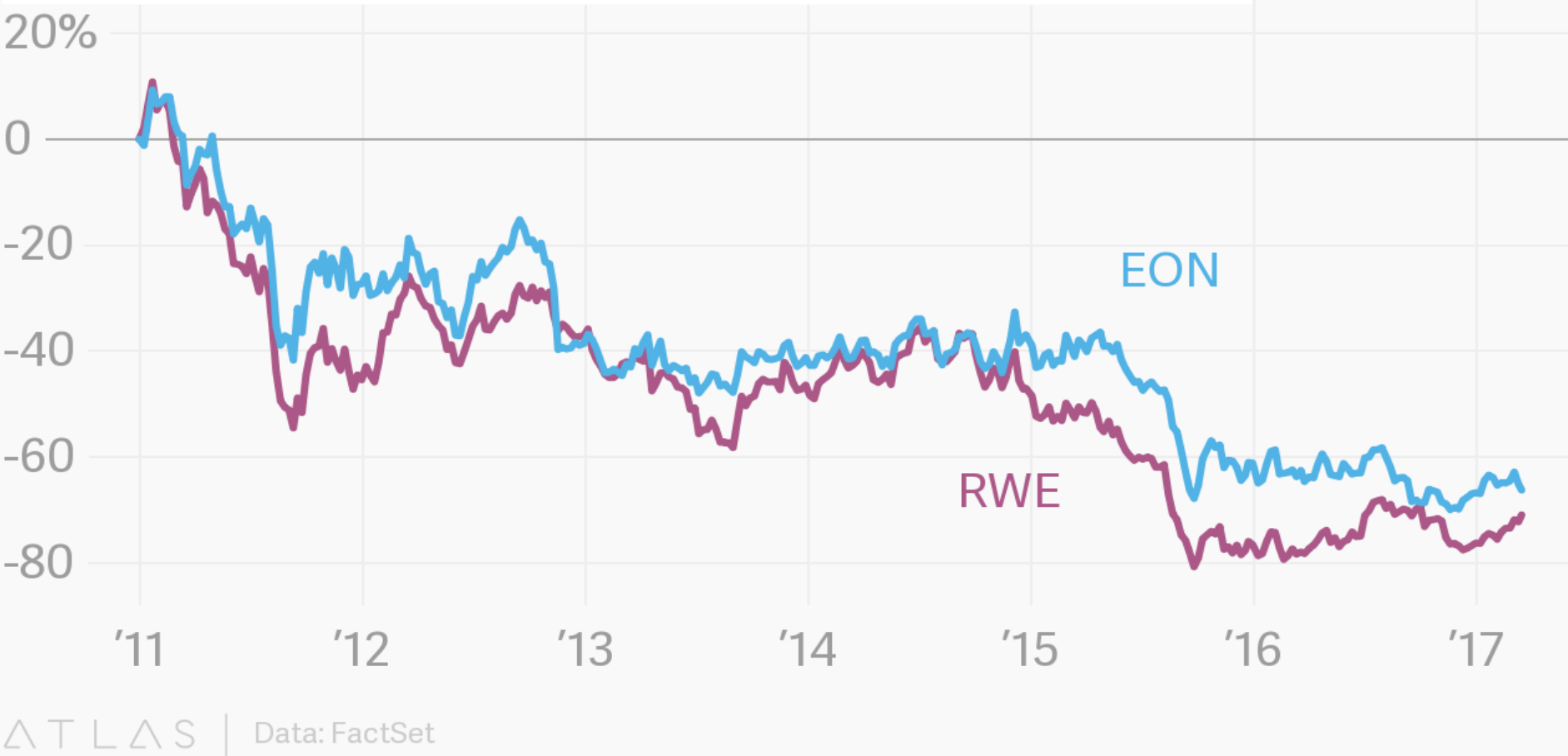
Oil /energy & industrial companies need to reinvent themselves think borader
→ integrated systems suppliers

→ Condition: reliable electricty supply

Need Reliable Energy Companies, OEMs & Utilities

Economic Performance of Utilities

Share Price of German Utilities



OEMs & Utilities Need To Be Allowed to Be Profitable

Policies

Europe:

Energy:

- EU: 2030 Energy Strategy:
 - 40% emissions reduction compared to 1990
 - 32% renewable energy
 - 32.5% increase in energy efficiency
- Energiewende

Buildings:

- Strict building codes:
 - Retrofitting
 - New building materials:

Transportation:

- Strict emissions standards:
 - EU 2020 renewables strategy
 - Dieselgate :costs

→ *Some outcomes → not desirable*

World:

Energy :

- China: 20% renewable enrgy by 2030 /15% by 2020
- India: 100 GW of solar power by 2030 / double nuclear
- Ambitipous renewable projects
Masdar, New Saudi & other champrions

Buildings:

- Smart buildings (China, UAE / Masdar, etc.)
- China: 500 of 100 global smart cities
- India smart cities programme retrofitting
- KSA Great Opoortunity?

Transportation:

- Mass transit
- EVs hybrids, etc.

→ *Ensure Policies Are Thought Through*

Policy Approach

Prescriptive Policies:

- Clear guidelines & bans
- Example: heating systems



Elective Policies:

- Incentives (financial)
- Example: heating systems

Financing:

- No / reduced investment in ff
- Example: Norway SWF
- ESG investing



Financing:

- Investing in technology (Bill Gates)
- ESG investing

Difficult Choices: Between Aspirations, Stretch Goals & What Is Achievable

Conclusion

Conclusion

Achieving CC goals of Paris Accord → will affect every aspects of our lives



Global task



Mindful approaches needed → realistic stretch goals



Massive investments needed

In Order To Achieve Goals: Need To Change Lives & Companies Need To Rethink / Reinvent Themselves & Allowed To Generate Returns

Thank You!
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