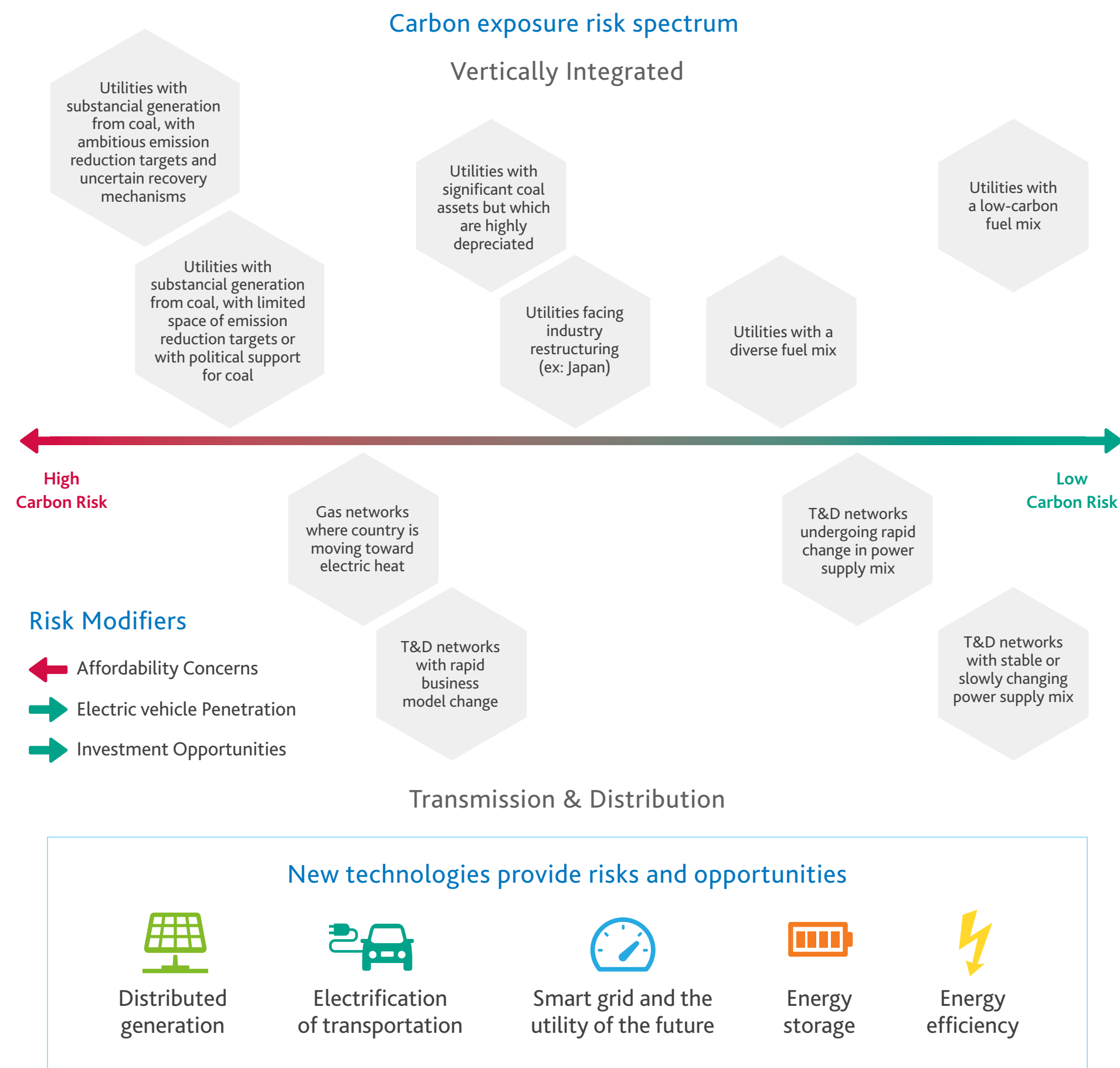


# Global Regulated Electric and Gas Utilities and Networks Carbon Risk

Utilities are strong credits because they are regulated monopolies allowed to recover costs and earn an authorized return. How this framework functions will drive the credit impact of decarbonization.



## Carbon transition risk transmission channels for regulated utilities



### Policy and Regulatory Uncertainty

- » Magnitude, timing and pace of carbon transition
- » Business and fuel mix
- » Market forces



### Demand Substitution and Changes in Customer Preference

- » Green energy supply
- » Electrification of heating and transportation
- » Energy efficiency



### Risk of Disruptive Technological Shocks

- » Investment opportunities
- » Disruption of utility business model

## The power and transportation sectors are big contributors to greenhouse gas emissions in many countries\*

	Electricity/Heat	Transportation
South Africa	56%	10%
Japan	48%	16%
China	40%	7%
United States	37%	27%
India	35%	8%
Canada	29%	24%

Electricity/Heat Transportation % of total emissions (2014)

## Fuel mix varies widely among countries\*\*

Utility sector fuel mix in countries with regulated generation (2015)

	Coal	Oil	Gas	Waste	Nuclear	Renewables
South Africa	92%	0%	0%	0%	0%	8%
India	75%	2%	5%	0%	3%	15%
China	70%	0%	2%	0%	3%	24%
Japan	33%	10%	39%	1%	1%	16%
United States	34%	1%	32%	0%	19%	13%
Canada	10%	1%	10%	0%	15%	63%

\* Note: Countries shown here are those where Moody's rates regulated utilities that own generation. Transportation is also shown because its electrification represents a potential growth opportunity for utilities. Source: World Resources Institute's CAIT Climate Data Explorer 2015. \*\* Source: IEA