

# Carbon Emissions

After dominating the 21st Century, fossil fuels are of course the focus of tightening restrictions around the world. Here we discuss the use of catalytics in the drive to a Net Zero Carbon Economy.

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Carbon emissions are being brought down as a result of a range of initiatives with different objectives. International agreements, such as the UN Kyoto Protocol on Climate Change, mandated reduced emissions from 2008, while the Paris agreement of 2015 aims to substantially reduce greenhouse gas emissions, thereby limiting global climate increases to 2 degrees above pre-industrial levels. In order to meet these international commitments, individual countries are supplementing their own laws and regulations, such as the UK government's ban on the Internal Combustion Engine and hybrid vehicles by 2035.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028						
N. America	EPA 10				GHG Regulation Phase 1								GHG Regulation Phase 2												
Europe	Euro V			Euro VI																					
Japan	Japan 2009							Japan 2016 (WHTC)																	
China	China III			China IV				China V						China VI a		China VI b									
India (Main cities)		BS IV										BS VI													
India (National)	BS II	BS III							BS IV				BS VI												
Russia	Euro IV				Euro V																				
Brazil	PROCONVE P6		PROCONVE P7																	PROCONVE P8 (buses from 2020)					
S. Korea	Euro V				Euro VI																				

Further pressure is being brought by efforts to improve environmental standards, including the Task Force on Climate Related Financial Disclosures, established by the G20, that obliges companies to publish information on climate risks and opportunities. To support the EU's objective of achieving carbon neutrality in 2050, the EU parliament has passed sustainable investment legislation that has established environmental definitions and criteria, aimed at assisting fundraising for environmental initiatives.

Another source of pressure comes from multi governmental initiatives such as the EU's Hydrogen Strategy, seen as a way of de-carbonising heavy transport such as shipping, aviation and road haulage, as well as polluting industries such as the steel and chemical sectors.<sup>1</sup> Hydrogen is used in electrochemical devices - termed fuel cells - that convert energy from hydrogen into electricity, with water and heat as by-products. Platinum or palladium is used as a catalyst to convert hydrogen and oxygen, producing electricity.<sup>2</sup>

Oil major BP's announcement of plans to build an industrial scale electrolyser – splitting water into hydrogen and oxygen – that will be powered by renewable energy from North Sea wind farms, illustrates the scale of the ongoing transformation.<sup>3</sup>

## Footnotes

1. [European Union](#).
2. [International Platinum Group Metals Association](#).
3. [Guardian](#), November 2020.

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