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Steel: The Backbone of the Energy Transition

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Steel: The Backbone of the Energy Transition

The Role of Steel in Modern Infrastructure Projects

Dr Daniel Carvalho



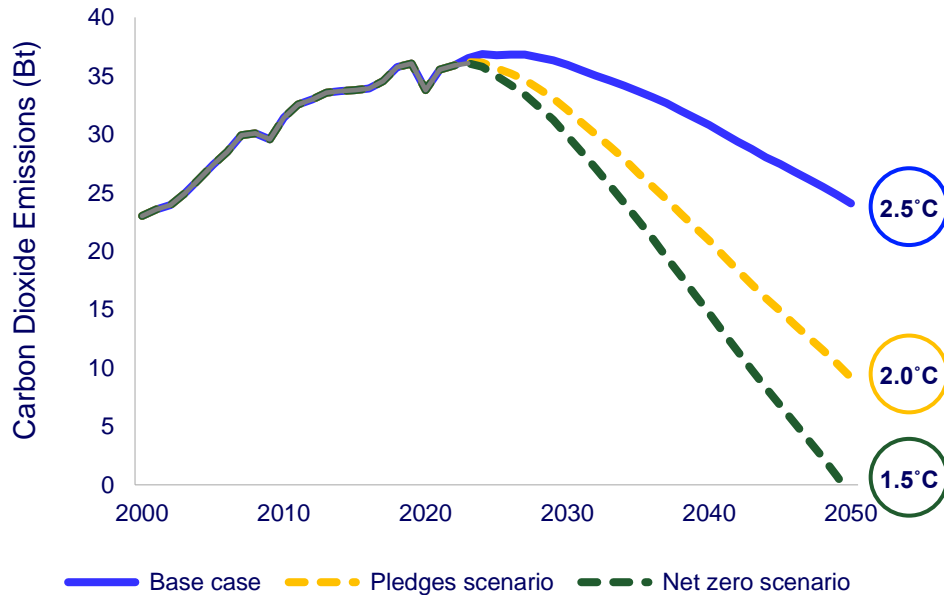
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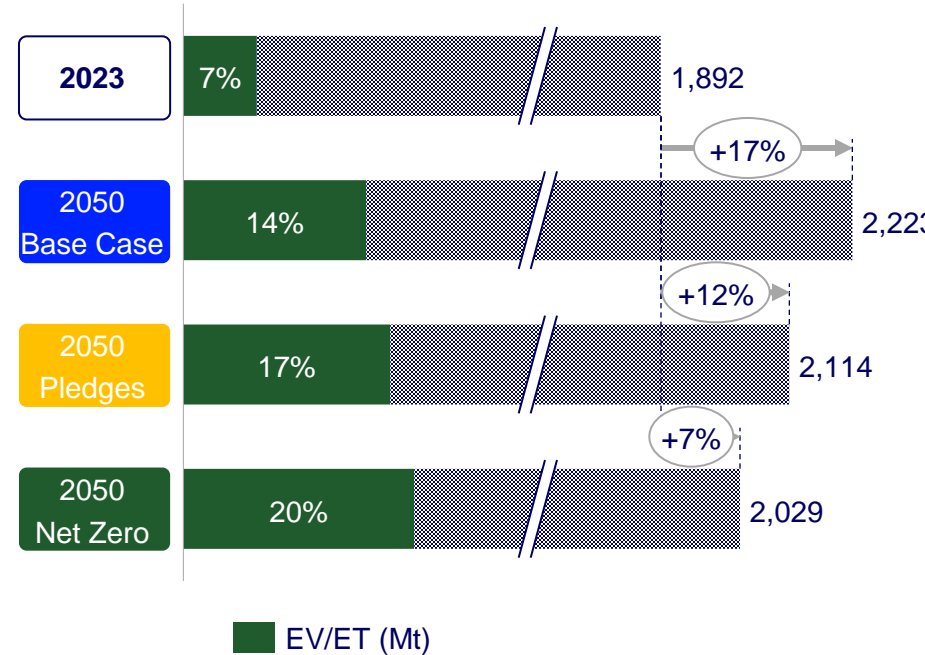
Steel remains critical for building the infrastructure needed to support the Energy Transition

Low carbon electrification remains a significant engine for demand, requiring 14-20% of total steel for EV and ET

Global energy-related CO₂ emissions, Bt



Crude Steel Production (Mt)

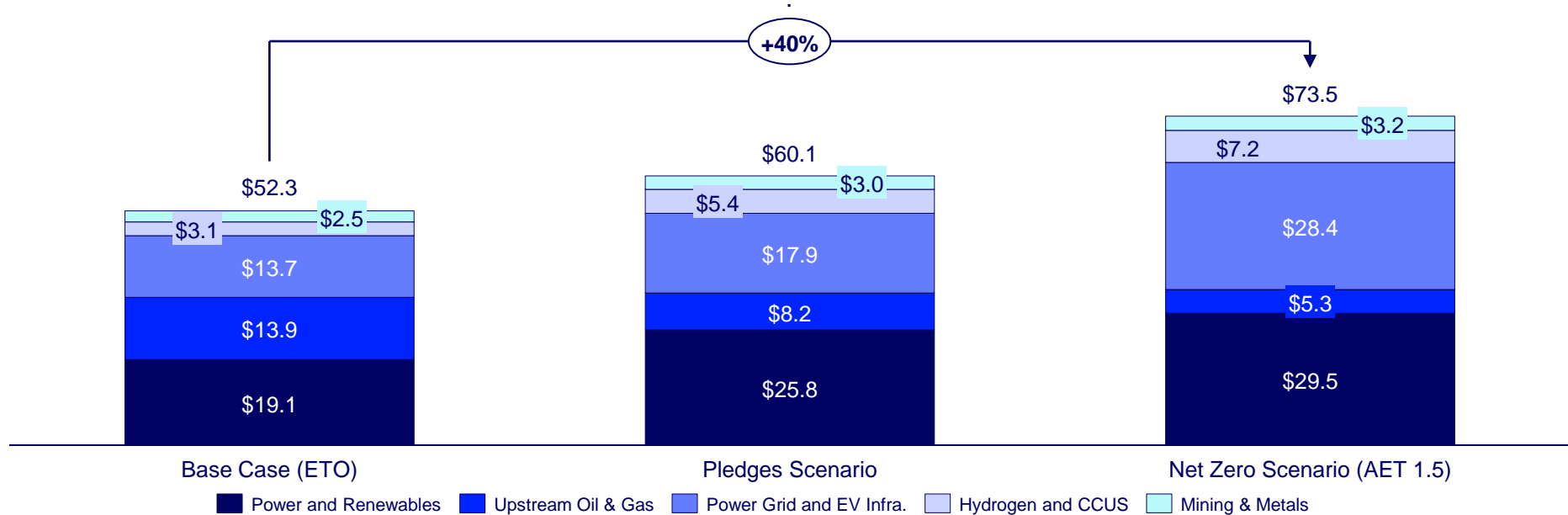


Source: Wood Mackenzie

Energy Transition will require US\$ 52-73 trillion in investments, a major boost for steel

Power and renewables account for 40%, upstream decline 3x by 2050, and green steel will entail US\$ 1.5 trillion

CAPEX for Different Energy Transition Scenarios (US\$ trillion)

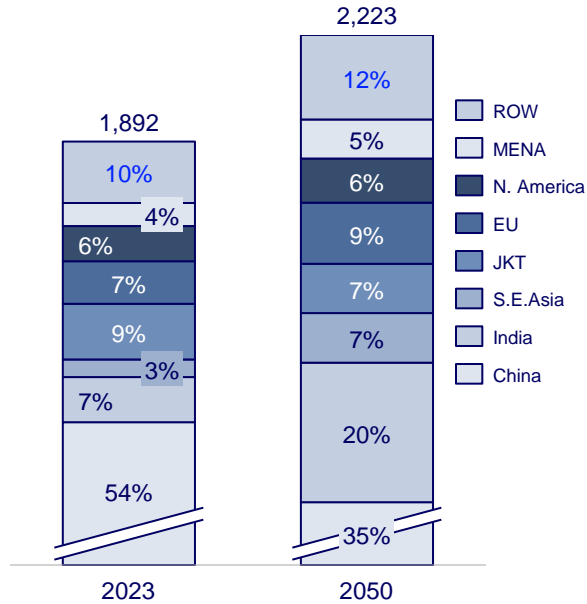


Source: Wood Mackenzie

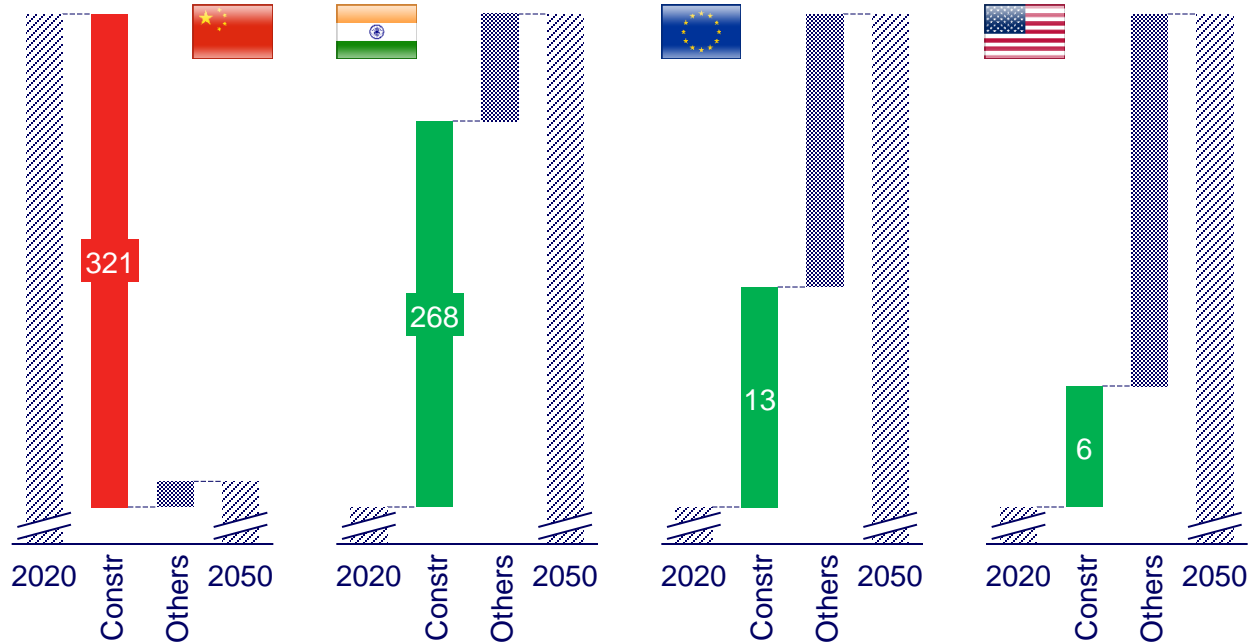
India and SE Asia offset China's CSP decline, infrastructure is the main driver

Steel demand for infrastructure: China's slowdown and underdeveloped infrastructure in India and Southeast Asia create room for expansion, and EU and US policy-driven growth to support Energy Transition

Global CSP (in Mt)



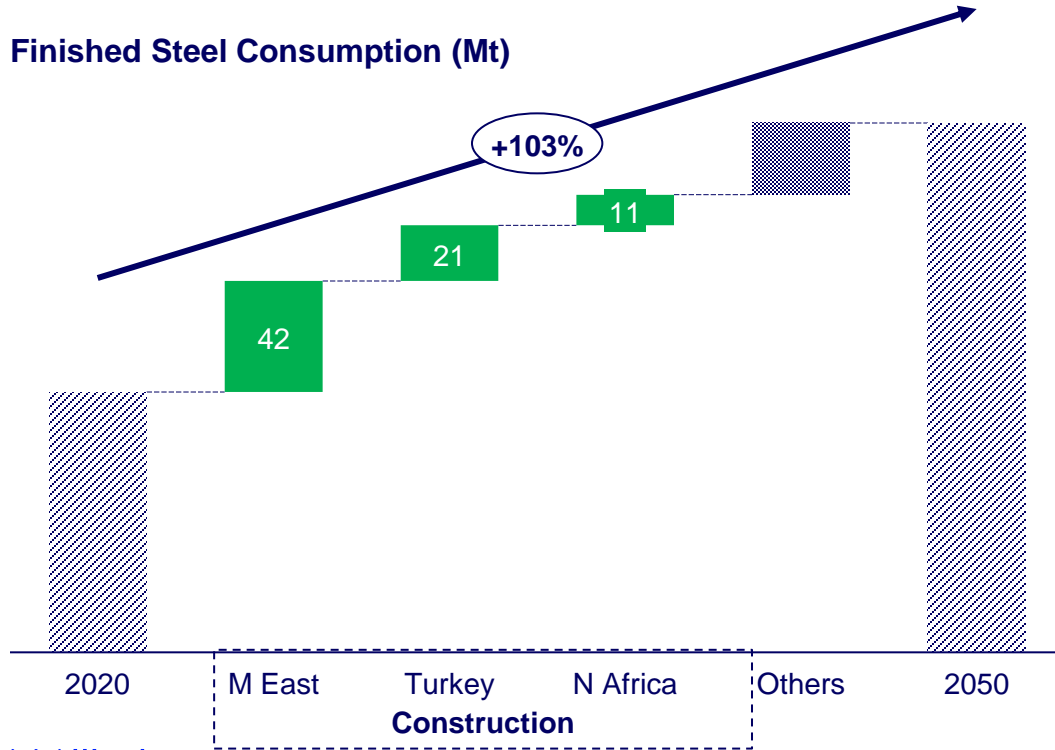
Finished Steel Consumption (Mt)



Building the future: MENA's infrastructure boom and the growing demand for steel

Economic diversification and large-scale projects drive long-term steel demand

Finished Steel Consumption (Mt)



Key points:

- MENA's strategic shift away from oil dependency is accelerating large-scale infrastructure projects.
- Population growth and rising income levels are fuelling increased demand for infrastructure and steel.
- Steel demand in the MENA region is projected to grow at a 2.4% CAGR by 2050.
- Enhanced infrastructure and connectivity will position the region to attract significant foreign investment.

Source: Wood Mackenzie. Construction includes Infrastructure, buildings, energy, and renewables.

Thank You!

Daniel Carvalho, PhD

Director – Metals and Mining Consulting

Biography

Originally from Brazil, Daniel is based in London, where he serves as the **Director of Metals and Mining Consulting**. He brings over 18 years of experience as a global operations, process, and technology executive.

He has a proven track record of establishing new operations, managing crises, executing operational turnarounds, and shaping strategies in complex environments. His extensive experience spans the iron and steel industry, where he played a key role in designing and launching **Ternium's** global upstream R&D and managing operations and process technologies for **ThyssenKrupp CSA**. His career highlights include leading the scale-up of new lithium-ion gigafactories for **Northvolt** in Sweden.

Prestigious industry awards recognize his commitment to innovation, excellence, and the advancement of the iron and steel industry. The 2021 Hunt-Kelly Award from **AIST** and the **American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME)** made him the first Latin American recipient since 1920.

Daniel combines advanced business education with deep technical expertise. He holds an **MBA** as a **Sloan Fellow** from **London Business School (UK)**, a **PhD** in Iron and Steel Technology from **Montanuniversitaet Leoben (Austria)**, and an engineering foundation with a degree in **Metallurgical Engineering** from **Universidade Federal de Minas Gerais (Brazil)** and an **MSc** in Metallurgy from **Universidade Federal Fluminense (Brazil)**. This unique blend of business and technical knowledge, developed while working full-time, equips him to solve complex challenges and drive strategic success.

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