Industrial Clustering for Steel Manufacturing

Mechanisms to Enable Technology Deployment and Scaling Up
Case Studies of the UAE

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1. Introduction: The Steel Decarbonisation Challenge

- Steel industry's 7% contribution to global GHG emissions

International Renewable Energy Agency (IRENA), World Steel Association, World Economic Forum, McKinsey & Company, and peer-reviewed academic literature

https://www.irena.org/Publications/2023/Jul/Towards-a-Circular-Steel-Industry

- Growing steel demand vs. urgent need for decarbonisation

Oliver Wyman, World Economic Forum, IRENA, the International Energy Forum, and industry consultants—as increasing steel demand is juxtaposed against the industry's large emissions footprint and global climate goals.

https://www.oliverwyman.com/our-expertise/insights/2023/jun/how-green-steel-can-take-the-lead-in-decarbonization.html

- Challenge: maintaining competitiveness while reducing emissions

OECD and Boston Consulting Group – Metals and Mining Industry – 'Transforming the Steel Industry May Be the Ultimate Climate Challenge'

https://www.bcg.com/publications/2022/steel-industry-carbon-emissions-challenge-solutions

2. The Clustering Option: – Abu Dhabi Metal Park

Clustering Definition: A geographic concentration of interconnected companies, suppliers, service providers, and supporting institutions in the metals sector (such as steel, aluminium, copper, fabrication, and processing industries).,

Abu Dhabi Ports Group (AD Ports Group) has established and begun implementation of an integrated metal hub in the Khalifa Industrial Zone Abu Dhabi (KIZAD) in partnership with Metal Park Investment ME Ltd.

450,000 square meter facility based in KIZAD

2025 Metal Park launched its first phase of operations

Integrated infrastructure for storage, handling, processing, fabrication, R&D, and business support, functioning as a one-stop hub for the metal sector.

https://www.adportsgroup.com/en/news-and-media/2022/02/28/ad-ports-group-signs-agreement-to-establish-450000-sqm-metal-park-in-kizad

How Clustering Enables Technology Deployment

1. Pooling infrastructure to reduce costs
2. Optimising logistics and resource sharing
3. De-risking investment through coordination
4. Attracting sustainable finance at scale

3. Middle East Case Study: Regional Advantages & Company Profiles

- Access to low-cost renewable energy
- Strategic government-backed industrial zones
- Proximity to energy export markets
- Public-private partnerships for climate infrastructure

AGSI
ARABIAN GULF STEEL INDUSTRIES
NET ZERO STEEL

EIF - Electric Induction Furnace

AGSI's electricity mainly from renewable sources

100% locally sourced steel scrap used as the feedstock

30% improvement in carbon emissions across with,

58% scope 1 and scope 2 emissions reductions

PAS2060:2014 products verified as carbon-neutral

95% of crude steel emissions lower than traditional blast furnace-based production.

إمستيل
EMSTEEL

أركان
ARKAN

DRI - Direct Reduced Iron technology and EAF - Electric Arc Furnaces

Carbon capture technologies implemented

40% target for reduction in absolute greenhouse gas emissions in its steel business unit by 2030

Green hydrogen groundbreaking pilot project in partnership with MASDAR using hydrogen to extract steel from ore replacing fossil fuels

45% lower carbon intensity than the global average

4. Core Decarbonisation Technologies for Steel in the UAE

Green Hydrogen Direct Reduced Iron (H2-DRI)

EMSTEEL and MASDAR have launched the region's first project to produce iron using green hydrogen rather than natural gas, to reduce CO_2 emissions in steelmaking by up to 95% and positions the UAE as a future hub for green steel production.

Carbon Capture, Utilisation & Storage (CCUS)

EMSTEEL in partnership with ADNOC and MASDAR is among the first in the world to capture part of its CO_2 emissions from steelmaking, which is then stored or utilized to further lower its carbon footprint.

https://sustainabilitymag.com/news/green-steel-can-you-procure-carbon-neutrality

Electric Furnace Steelmaking

AGSI achieves net-zero steel using electric induction furnaces powered by renewable energy and 100% scrap steel as feedstock, greatly lowering both direct and indirect GHG emissions.

Renewable Energy Integration

Both EMSTEEL and AGSI rely increasingly on clean electricity, with EMSTEEL reporting 80%+ renewable power for operations and ambitions to reach 100% by 2030.

6. The Finance & Governance Dimension

Dimension	Examples/Tools in UAE Steel Hubs
ESG Disclosure	TCFD, ISSB, GRI frameworks; detailed emissions & governance reporting
Policy Tools	Carbon pricing, green procurement mandates, green finance frameworks
ESG Risk Management	Integration into ERM, COSO, GRI, SASB standards; board oversight

These finance and governance dimensions support investor trust, enable premium financing, and help position UAE and similar clusters as world-class, sustainable industrial hubs.

7. Pathway Forward: Scaling Decarbonisation

Overcoming Financial,
Regulatory,
& Technological Barriers

Clusters as Platforms
for
Climate Technology Scaling

Aligning Infrastructure Investment
with
Innovation Ecosystems

8. Conclusions & Call to Action

✓ Clustering as a viable, regionalised approach

Regionally coordinated hubs can effectively pool resources, share infrastructure, and accelerate decarbonisation at scale while maintaining global competitiveness.

✓ Twin goals: climate alignment + economic resilience

By simultaneously pursuing net-zero targets and strengthening industrial capacity through advanced technologies like green hydrogen and electric furnaces, the UAE's steel sector proves that climate leadership and economic growth are not competing priorities but complementary drivers of long-term prosperity.

✓ Invitation for cross-industry collaboration

Achieving sustainable steel transformation requires collective action: we invite stakeholders across the value chain—from raw material suppliers and technology providers to investors, policymakers, and end-users—to join this collaborative journey toward building a resilient, low-carbon metals ecosystem for the region and beyond.

Thank You