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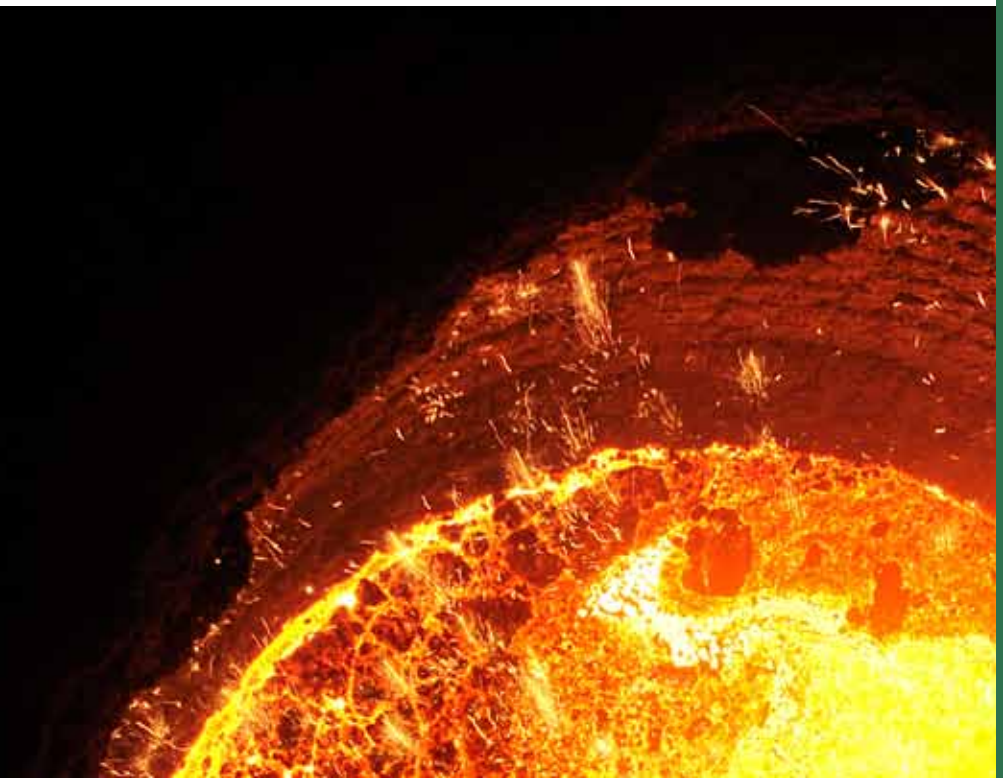

GREEN economy

Manufacturing

Investing in energy and resource efficiency

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List of acronyms

BAT	Best available technology
BAU	Business-as-usual
BPT	Best possible technology
BRIICS	Brazil, Russia, India, Indonesia, China and South Africa
CCS	Carbon capture and storage
CDM	Clean Development Mechanism
CHP	Combined heat and power
DMC	Domestic material consumption
EROIE	Energy return on investment in energy
ETFP	Ethical Trade Fact-finding Process
EU ETS	European Union Emissions Trading Scheme
EPR	Extended producer responsibility
FTE	Full-time equivalent
GHG	Greenhouse gas
GDP	Gross Domestic Product
HPV	High production volume
IWRM	Integrated water resource management
IEA	International Energy Agency
IIASA	International Institute for Applied Systems Analysis
ILO	International Labour Organization
ISEAL	International Social and Environmental Accreditation and Labelling Alliance
ISIC	International Standard Industrial Classification of All Economic Activities
LCD	Liquid Crystal Display
LDCs	Least Developed Countries
OHS	Occupational Health and Safety
OECD	Organisation for Economic Co-operation and Development
ROI	Return on investment
REACH	Registration, Evaluation and Authorization of Chemicals
RoHS	Restriction of Hazardous Substances
SME	Small and medium-sized enterprise
WEEE	Waste Electrical and Electronic Equipment
WBCSD	World Business Council for Sustainable Development

Key messages

1. As currently configured, manufacturing has a large material impact on economy, environment and human health. Manufacturing is responsible for around 35 per cent of global electricity use, over 20 per cent of CO_2 emissions and over a quarter of primary resource extraction. Along with extractive industries and construction, manufacturing currently accounts for 23 per cent of global employment. It also accounts for up to 17 per cent of air pollution-related health damage. Estimates of gross air pollution damage range from 1 to 5 per cent of global Gross Domestic Product (GDP).

2. Key resource scarcities – including easily recoverable oil reserves, metal ores and water – will challenge the sector. As industries resort to lower-grade ores, more energy is required to extract useful metal content. Improved recovery and recycling will increasingly become a decisive factor for both economic performance and environmental sustainability. The same applies to water use by industry, which is expected to grow to over 20 per cent of global total demand by 2030.

3. Win-win opportunities exist, if manufacturing industries pursue life-cycle approaches and introduce resource efficiency and productivity improvements. This requires supply and demand-side approaches, ranging from the re-design of products and systems to cleaner technologies and closed-cycle manufacturing. If the life of all manufactured products were to be extended by 10 per cent, for example, the volume of resources extracted could be cut by a similar amount. The costs of end-of-pipe pollution control can be reduced by cleaner production approaches in management, cleaner raw material selection, and cleaner technologies that reduce emissions and integrate by-products into the production value chain. With the use of alternative production equipment, processes and inputs, returns on investment can be substantial and with relatively short payback periods.

4. Key components of a supply-side strategy include remanufacturing – for example of vehicle components – and the recycling of heat waste through combined heat and power installations. Closed-cycle manufacturing extends the life-span of manufactured goods, making revamped goods available for re-use, and reduces the need for virgin materials. Repair, reconditioning, remanufacturing and recycling are fairly labour-intensive activities, requiring relatively little capital investment. Remanufacturing operations worldwide already save about 10.7 million barrels of oil each year, or an amount of electricity equal to that generated by five nuclear power plants.

5. While direct job effects of greening manufacturing may be neutral or small, the indirect effects are significantly higher. Manufacturing has become increasingly automated and efficient, which has been accompanied by job losses. This can be countered by life-cycle approaches and secondary production, for example, in the form of recycling, to secure jobs, for which safe and decent working conditions are of paramount importance.

6. Green-investment-scenario modelling for manufacturing suggests considerable improvements in energy efficiency can be achieved. By 2050, projections indicate that industry can practically "decouple" energy use from economic growth, particularly in the most energy-intensive industries. Green investment will also increase employment in the sector. Tracking progress will require governments to collect improved data on industrial resource efficiency.

7. Innovation needs to be accompanied by regulatory reform, new policies and economic instruments in order to enable energy and broader resource-efficiency improvements. Environment-related levies, including carbon taxes, will be required to ensure producers include the cost of externalities in their pricing calculations. Mindful that manufacturing is not a uniform industry, governments need to consider approaches that meet the realities of specific industries and their value chains that often stretch across national economies. Governments are also challenged to find mixes of policies and regulatory mechanisms that best suit national circumstances. Developing countries have a strong potential to leapfrog inefficient technologies by adopting cleaner production programmes, particularly those that provide support to smaller companies, many of which serve global value chains. Of special importance to manufacturing is the introduction of recognised standards and labels, backed by reliable methodologies.