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for a sustainable future

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Gain the competitive edge By pursuing low emission development

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Key messages

- Low emission industrial development and resource efficiency offer excellent opportunities for increasing competitiveness of economies and companies.
- There is often a clear business case for switching to lower emission technologies, with payback periods ranging largely from 0.5–5 years, leveraging financial investment.
- Resource productivity has a huge potential in moving towards circular economies and zero carbon societies.
- Many green industry policies, tools, and means of implementation exist that can drive low carbon competitiveness as part of Nationally Determined Contributions (NDCs) or wider development strategies.

Green industry promotes sustainable patterns of production and consumption that are resource and energy efficient, low carbon and low waste, nonpolluting and safe, and which produce products that are responsibly managed throughout their life cycle. It includes greening existing industries and stimulating new green industries.

Circular economy refers to maintaining the value of products, materials, and resources in the economy for as long as possible and minimizing the generation of waste.

How can low emission development benefit competitiveness?

Industries are increasingly modifying their production models to more sustainable ones. By making more efficient use of materials and optimizing inputs, in particular energy and water, companies can reduce

costs and improve their competitiveness. Now, with the digital and technological revolutions, investing in the future starts to pay off, in terms not only of public image, but also of economic competitiveness. Recent studies¹ suggest that performing circular economy business models and optimizing resource productivity could generate potential savings of around US\$3–4 trillion until 2030.

Climate resilient industrial development involves continued efforts to mitigate climate change while at the same time preparing industry to adapt to its impacts.² Many opportunities to foster climate resilient industrial development and competitiveness are based on 'green industry.' This covers both the greening of existing industries to continuously improve their resource productivity, and the creation of green industries that deliver environmental

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- Promote gender equality
- Ensure energy security
- Boost ecosystem resilience
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This series of short papers gives an overview of selected benefits and development goals linked to LEDS and Nationally Determined Contributions (NDCs).

Series editor: Natalie Harms, Energy research Centre of the Netherlands (ECN)

goods and services. The greening of industries is key to economic competitiveness, since resource inputs represent an important production cost, and improving efficiency can create a competitive advantage. Research by the United Nations Industrial Development Organization (UNIDO) confirms that industrial energy efficiency could save 30% of today's industrial energy consumption with competitive rates of return and high profitability for companies.³

How is low emission development linked to competitiveness?

Industrial development remains a top priority for governments around the world, particularly in developing countries. However, industry and energy related greenhouse gases produce 75% of global emissions,⁴ making it opportune and necessary to align industrial development and climate change strategies. Boosting local manufacturing that integrates renewables or green technologies favors local job creation, encourages exports, and facilitates integration into global value chains. New business and management models are emerging, such as chemical leasing and energy system optimization, which reduce or optimize the use of chemicals or energy for production and improve competitiveness. Other examples contributing to competitiveness are industrial symbiosis, where the waste of one company becomes the resource of another (including combined heat and power); and eco-industrial parks (Figure 1), where industries cluster to produce at economies of scale in a low emission manner.

Chemical leasing is a strategy that creates a business environment to tackle the challenges of the changing global context, and offers solutions for sound management of chemicals and reduction of emissions to the environment.



Integrating competitiveness benefits into low emission policy and planning

Transforming industry and energy systems need to be included in countries' NDCs if the latter are to spell out the low emission development pathways necessary to achieve the well below 2 degree goal agreed upon in Paris in 2015. Barriers such as lack of awareness of investment opportunities, limited access to finance, inadequate technical know how, and market failures still exist but can be overcome. The integration of green industry policies across government should take place both vertically—between the international, national, and local tiers of government; and horizontally—across sectors of government. International support projects such as UNIDO's Programs for Country Partnership can assist governments to drive forward inclusive and

sustainable industrial development at all levels by demonstrating the benefits of greening industry. The Programs for Country Partnership were launched in countries with strong demand for low emission, resource efficient industrial processes, to drive competitiveness. As a result, steering committees have been established in respective prime ministerial offices to oversee the progress in key industrial sectors and to mainstream sustainability activities in cooperation with relevant stakeholders.

More generally, many tools are available to drive forward green industry policies. Governments can support skill development, technology diffusion, and access to finance mechanisms or development of eco-industrial parks. They can create incentives for industry through voluntary agreements; support greening of supply chains; set industry standards or create ecolabeling schemes; reward sustainable industry projects in public procurement; and penalize 'dirty' industrial practices via environmental taxes.

Case studies

MED-TEST and industrial symbiosis

Under the **MED-TEST** project in Egypt, Morocco, and Tunisia,⁵ green technology was transferred in 43 pilot industries (textiles, food and beverage, leather, ceramic, metal processing, petrochemical, pulp and paper) with overall results of US\$17 million, 9.7 million m³ water and 263 GWh energy saved per year, and return of investment for companies of 54% within 0.5 years and 77% within 1.5 years. Moreover, the US\$2 million project could leverage US\$20 million investments by local companies. Under **SWITCH-MED**⁶ this approach is replicated to support 130–150 industries by 2017.



MED TEST II training. Photo credit: UNIDO

The **Industrial Symbiosis** project in the Tianjin Binhai New Area in China⁷ gathered 800 small and medium enterprises and created 99 synergies in which the waste of one company became the raw material for the other. As a result, 1.4 million tons of waste were diverted from landfill and 167,000 tons of CO₂ emissions avoided, with a cost saving of approximately US\$9.5 million and an increase in revenues of US\$14.6 million. Some examples of the materials recovered are sludge, reused as organic fertilizer and foaming agent; coal ash powder and desulfurized gypsum, used as building materials; and alumina red mud, turned into aluminum ingots.



The central business district of Tianjin Binhai New Area. Photo credit: Yaohua2k7

Methodology and tools

A number of methodologies and tools exist to assess options for resource and energy efficiency, identify benefits and trade offs, and determine associated costs and returns. UNIDO has developed a range of toolkits and materials to guide policy development and assess opportunities for cleaner production and phase out of emission intensive materials.⁸ The UNIDO **Cleaner Production Toolkit**,⁹ for instance, can be used for company training or within a company for a pathway to cleaner production, from introducing green concepts, through analyzing material and energy flow, fostering innovation, identifying options for green procurement, hazard analysis, developing indicators for environmental control and waste management, to auditing, networking, and implementing an environmental management system. The **Institute for Industrial Productivity (IIP)**¹⁰ maintains an industrial energy efficiency database on technologies, policies, supply chain initiatives, financing for efficiency options, and an overview of energy efficiency programs and energy management measures. The **Sustainable Energy for All (SE4ALL)**¹¹ initiative tracks global energy targets and efforts. Such databases and tools assist policymakers and sector stakeholders to share successful technology, policy, and financing options to reap the benefits of energy and resource efficient industrial development options beyond emission reduction.

Resources

Sustainable development platforms

Inclusive and Sustainable Industrial Development Operation Platform	isid.unido.org
Green Industry Platform	www.greenindustryplatform.org
Sustainable Energy for All	www.se4all.org

Sustainable development networks

Network for Resource Efficient and Cleaner Production	www.recpnet.org
Climate Technology Centre & Network	www.ctc-n.org
Global Network of Regional Sustainable Energy Centres (GN-SEC)	www.se4allnetwork.org

UNIDO and its resources

UNIDO publications on safeguarding the environment	www.unido.org/resources/publications/safeguarding-the-environment.html
UNIDO statistical data	www.unido.org/resources/statistics/statistical-databases.html

Tools and toolkits

<i>UNIDO green industry: Policies for supporting green industry</i>	www.unido.org/fileadmin/user_media/Services/Green_Industry/web_policies_green_industry.pdf
UNIDO Cleaner Production (CP) Toolkit	www.unido.org/resources/publications/safeguarding-the-environment/industrial-energy-efficiency/cp-toolkit-english.html
<i>Preparing for HCFC phase-out: Fundamentals of uses, alternatives, implications and funding for Article 5 countries.</i>	www.unido.org/fileadmin/user_media/Publications/Pub_free/Preparing_for_HCFC_phaseout.pdf
IOMC Toolbox for decision making in chemicals management	http://iomctoolbox.oecd.org/default.aspx?idExec=ae25b3f3-9bd7-4461-a2e2-a973aa187bac
SE4ALL Global Tracking Framework	www.se4all.org/tracking-progress
IIP Industrial energy efficiency databases	www.iipnetwork.org

Notes

1. McKinsey Global Institute (2011) 'Resource revolution: Meeting the world's energy, materials, food, and water needs.'; Lacy, P. and Rutqvist, J. (2015) 'Executive summary' in *Waste to Wealth*. Chicago, IL: Accenture.
2. UNIDO (n.d.) *Promoting climate resilient industry*. Vienna: United Nations Industrial Development Organization.
3. UNIDO (2011a) *Industrial Development Report 2011: Industrial energy efficiency for sustainable wealth creation: Capturing environmental, economic and social dividends*. Vienna: United Nations Industrial Development Organization.
4. IPCC (2014) *Climate change 2014: Mitigation of climate change*. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., Pichs-Madruga, R., Sokona, Y., Farahani, E., Kadner, S. et al. (eds)]. Cambridge, UK and New York, USA: Cambridge University Press.
5. UNIDO: 'About Med Test.'
6. UNIDO and UNEP: 'SwitchMed.'
7. SWITCH-Asia: 'Industrial symbiosis.'; SWITCH-Asia (2014) *SWITCH-Asia project – Industrial symbiosis in Tianjin Binhai New Area. Facilitating industrial symbiosis in Chinese industrial parks to reduce environmental impact*. Tianjin, China: Tianjin Economic and Technological Development Area Administrative Commission (TEDA).
8. UNIDO (2011b) *UNIDO green industry—Policies for supporting green industry*. Vienna: United Nations Industrial Development Organization.
9. UNIDO: 'CP Toolkit (English).'
10. IIP: 'Industrial energy efficiency databases.' Washington, DC: Institute for Industrial Productivity.
11. Sustainable Energy for All: 'About us.'

The **United Nations Industrial Development Organization (UNIDO)** is the specialized agency of the UN that promotes industrial development for poverty reduction, inclusive globalization, and environmental sustainability. UNIDO's aim is to promote and accelerate inclusive and sustainable industrial development in developing countries and economies in transition, as recognized by the ninth Sustainable Development Goal in particular: "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation." Accordingly, UNIDO's programmatic focus is structured in three thematic priorities: creating shared prosperity, advancing economic competitiveness, and safeguarding the environment. www.unido.org

The **LEDS GP Benefits Assessment and Communication Working Group** focuses on identifying, communicating, and integrating social, economic, and environmental benefits associated with low emission pathways. The group works to advise on development impact assessment to provide tools and exchange knowledge and guidance on how to align development priorities with climate change policies and measures. Contact: benefits@ledsgp.org

The **Low Emission Development Strategies Global Partnership (LEDS GP)** was founded in 2011 to enhance coordination, information exchange, and cooperation among countries and international programs working to advance low emission, climate resilient growth. LEDS GP currently brings together LEDS leaders and practitioners from more than 160 countries and international institutions through innovative peer to peer learning and collaboration via forums and networks. www.ledsgp.org

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