

INNOVATION WATCH #3

Sustainable Industry

Industry accounts for up to 30% of emissions in cities, with 75% of these emissions related to the combustion of energy, often fossil fuels, as well as industrial processes and electricity consumption. Certain sectors are considered energy-intensive, including steel manufacturing, petrochemicals, paper production, cement, glass, aluminum, and fertilizer (ammonia) production. The greenhouse gas emissions of an energy-intensive sector like aluminum production are highly dependent on the energy mix, as the carbon emission factor can vary from 1 to 10 depending on the European countries.

Consortia are currently developing **floating offshore wind turbine projects**, particularly in Norway, that could be installed several dozen kilometers offshore (in areas inaccessible to bottom-fixed technology).

These turbines, when installed in farms, **are capable of generating as much electricity as a nuclear power plant**.



According to the International Energy Agency, offshore wind could provide the equivalent of half of global electricity demand by 2040, becoming the cheapest renewable energy source.

In France, as part of the National Low-Carbon Strategy, the 50 main emitting sites have been identified and are required to produce a **decarbonization roadmap** in collaboration with government services, based on sector-specific roadmaps.

Several levers exist to reduce greenhouse gas emissions linked to industry.

- **Modification of material inputs: the incorporation of recycled raw materials, the valorization of by-products, and the development of processes that use fewer inputs or less emissions-intensive inputs.**

New processes are enabling the development of **carbon-neutral steel** (Hybrid project using green hydrogen in Sweden) or **low-emission cement** (Hoffmann Green).

Through economic development agencies and local industrial associations, cities can lead or co-finance **circular economy assessments** at the scale of an industrial zone and co-finance **industrial water, steam, CO2, and raw material networks**.



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Cities can encourage industries that settle in their area to identify local raw material sources and opportunities for the sharing of by-products. In the Caux Seine industrial zone in France, at the initiative of the local government and the development agency, in addition to industrial water, steam, green hydrogen, and biomass networks, the **industrial metabolism includes exchanges of CO₂, recycled oils, propane, butadiene, methane, and by-products.**

Local authorities can also participate in the structuring of **sorting systems** at the regional level to supply recycling units. Amsterdam, a member of the European Circular Cities Network, is a pioneer in structuring sorting and recycling systems, with **78% of waste being recycled in the Netherlands**, and only 3% sent to landfills.

A call for project in France, "**Low Carbon Industrial Zones**" (ZIBAC), also promotes the organization of local authorities, development agencies, ports, major emitters in an industrial zone, and industrial associations within a consortium to implement a study program aimed at mobilizing public and private funding for the decarbonization of the industrial area and the development of circular and industrial economy: exchanges of steam, raw material inputs, by-products, green hydrogen, and sharing to address the challenges faced by industries in achieving climate neutrality.

Cities can also, independently or in association with port actors, commission decarbonization studies for industrial areas. **The Clean Industrial Deal** announced in february plans to establish a Decarbonization Bank with a budget of 100 billion euros to facilitate the decarbonization of European industry.



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- **The energy performance of technologies and processes and the recovery of waste heat.**

Startups like Metron and Grid Edge offer energy management systems that allow industries to optimize, control, and measure the energy efficiency of their sites.

Industrial sites, on the other hand, typically release about one-third of their energy consumption as waste heat, half of which is above 100°C. The **reuse of industrial waste heat in steam networks** or district heating systems developed by local authorities like Helsinki and industrial players helps optimize the use of this energy.



- **The substitution of fossil fuels with decarbonized fuels (biomass, biogas, green hydrogen, geothermal energy, etc.) and the electrification of heat and processes.**

The use of recycled products such as biomass requires the structuring of supply chains and the securing of resource deposits.

Cities, on land they own, can refuse carbon-intensive projects and **reserve land allocation**, through direct negotiations or calls for projects, **for units producing substitutes for fossil fuels** (biosourced plastics, e-SAF such as e-methanol, biofuels, biosourced chemicals), and for **recycling** (recycling of batteries, textiles, plastics, and critical materials). **The Port of Antwerp**, for example, prioritizes the installation of chemical plastic recycling units. Territories can also prioritize the production of components necessary for clean energy, particularly wind turbines, as in **Izmir**, where a platform is also being created to provide tools for industrial players to connect and develop circular economy projects.

Like **Barcelona** for sustainable textiles (Reimagine Textile) and sustainable agriculture (Barcelona Activa), local authorities can support the development of cleantech technopoles in identifying mature technologies, scaling up relevant startups, and connecting them with economic players. In the energy sector, Barcelona also contributes to consortiums with private and research actors on green technologies.

Local authorities can provide companies with a European and national funding unit that supports companies in applying for grants from the **European Innovation Fund, Horizon Europe, IPCEI, InvestEU, CEF, or Feder**. Similar to Innoviris in Brussels, they can finance research and innovation in energy and the environment.



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- **Capture, storage, and utilization of residual CO2 emissions.**

The CO₂ resulting from the processes of the installations in an industrial zone can thus be **captured, centralized, and either stored or utilized in sustainable fuels or construction materials.**

For example, the North Sea hosts the **large-scale CO₂ capture project** at the Port of Antwerp, Antwerp@C CO₂ Export Hub, which aims to capture 9 million tonnes of CO₂ per year and is financed with €140 million from the CEF.

Stockholm, in a project funded by the Innovation Fund, plans to **implement a large-scale CCS project on a biomass unit** (BECCS Stockholm) through the local energy provider, which supplies 80% of the city's district heating and in which it is a shareholder. The project aims to **avoid the emission of over 7 million tonnes of CO₂**, thereby **compensating for all of the city's residual emissions in 2030**. The Swedish Energy Agency and the Frontier Carbon Removal Coalition, which represents buyers such as large digital companies and international banks have signed over €1.8 billion in carbon credit purchase agreements for this unique project in Europe.



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