



## Emergence of Industry and their Main Stages

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**Abstract:** In this article, the stages of the origin of industrial areas, the level of their negative impact on the environment, as well as the role of industry in the country's economy are mentioned.

**Keywords:** Industrialization, reconstruction of industrial areas, urban planning, ecology, industrial ecology, manual labor, economy, environment.

**Introduction.** Economic development in any country has been a constant focus. We may face some problems in this regard: development, improvement and acceleration of production are necessary to live well.

This, in turn, leads to an increase in the anthropogenic impact on the environment during the development period. Air pollution is a serious environmental problem for large industrial areas and adjacent areas (*table 1*).

*Table 1.*

SOURCES OF AIR POLLUTION	
natural	anthropogenic
dust storms	industrial enterprises
volcanism	transport
forest fires	electric power industry
weathering with blowing	home heating
decomposition of postures of living organisms	agriculture
natural gas release	release of gas and filtrate from waste storage

That is, the issues of regulation of the atmosphere state are of the greatest importance, the industrial sector, as well as the wrong attitude to the environment, have caused a number of environmental problems related to air and water pollution [1].

An example of this is the negative change of water bodies, soil composition and other consequences of industrialization and urbanization. However, many experts believe that the way out of the ecological crisis is not in reducing social production, but in eliminating the negative consequences of industrialization and urbanization.

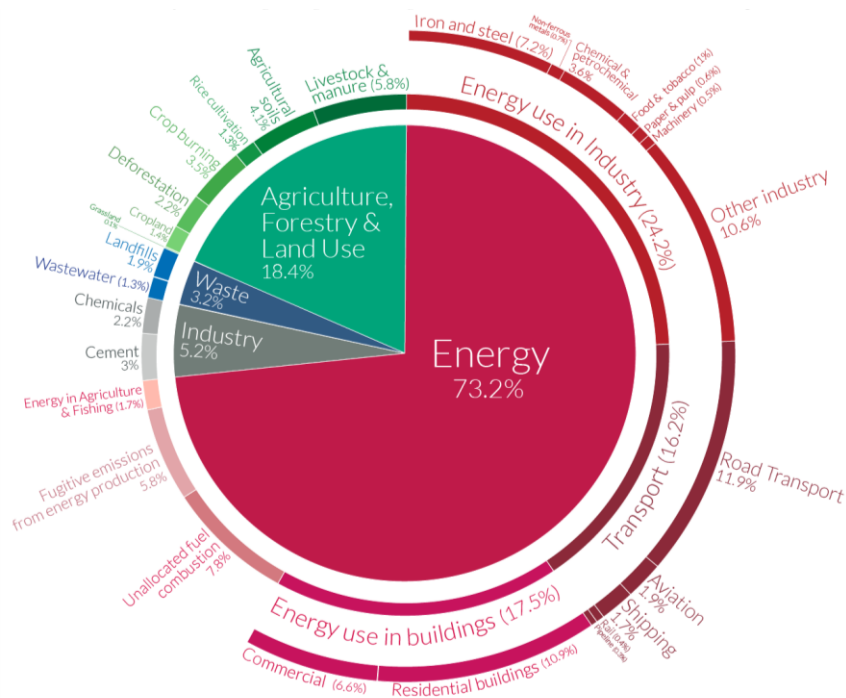


Figure.1. Emissions by industry (<https://ourworldindata.org/emissions-by-sector>).

There is no scientific and ecological basis for the reconstruction and reconstruction of industrial areas in modern socio-economic conditions, industrial enterprises and their complexes from the point of view of architecture, as well as urban planning.

**Main part.** Architectural and urban planning decisions at all stages of ecological design: design, construction and use of industrial areas and their complexes, as well as reconstruction, serve as an indispensable condition for weakening or eliminating the negative impact of production capacity in the city [2,3].

We observe the gradual aggravation of ecological contradictions between the city and industrial production, as well as the history of the industrial sector and its ecological connection with the city in the following:

Phase I (17th century - 1st half of 18th century) is the period before industrial development, there were "factory-towns" (metallurgy, salt production), "textile villages". The first guidelines on industrial ecology appeared.

II stage (18th - early 19th century) - the first industrial revolution, transition from manual labor to industrial production. The advent of steam engines influenced the changes in industrial technologies and the architectural and spatial systems of industrial buildings. During this period, the development of legal documents on some environmental issues began.

III stage (19th - early 20th centuries) - the second industrial revolution, the age of "machinery and technology". Thanks to the new technology, it is located in accordance with the new spatial and urban planning areas of industrial development. Industrial concentration in cities, its formation, stages of development of state legislation on industry have begun.

IV stage (1917-1959) - the second industrial revolution, the age of "electricity". In the 40s of the 20th century, the practice of building industrial districts on the basis of a unified plan began in the former Union, as well as abroad.



However, at that time, environmental protection was not yet paid attention to. Industrial areas were the "black area" of the city. After the revolution, industrialization and post-war revival of industry, attention to the environment began to appear.

Stage V (1960-1983) - the third industrial revolution, "scientific-technical" century. Rapid industrial development and uncontrolled urbanization are observed in all countries of the world. Despite the attention of the world community to this issue, the level of environmental pollution reaches the highest level.

Development of state ecological plans, consideration of environmental requirements in design, development of industrial construction, science and construction legislation.

Stage VI (1984-1990) - the age of "stagnation of industrial construction" begins in the territory of the former union.

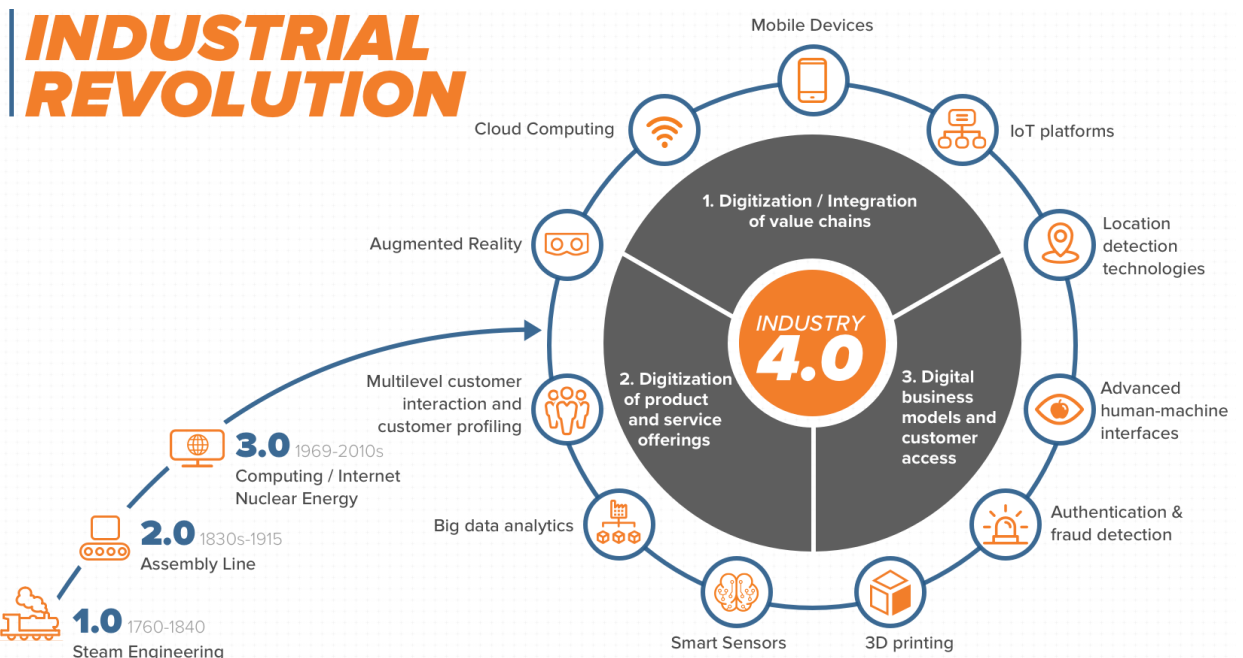
A system of state bodies for environmental protection management will be established. Mass withdrawal of production from developed countries, globalization of industry, establishment of industrial multinational companies. Environmentally harmful sources are moved to another area (colony).

New industries began to emerge, with many new architectural and planning techniques being developed to accommodate the city.

Stage VII (1991-1994) - the process of sovereignization of Russia, reconstruction of the economy. Introduced into the system of globalization of industry.

Stage VIII (1995-2006) - the development of market relations in Russia, including the increasing number of industrial production areas. Legislation and international cooperation in the field of environmental protection began to be introduced.

Regardless of the general requirements for urban industrial enterprises and their complexes all over the world, each country has its own specifics in industrial construction, develops specific standards and methods for planning, building, organizing and operating urban industrial facilities and territories according to their principles, therefore they are diverse in form and in names: "industrial area", "industrial zone", "industrial city", "industrial hub" (USSR, Russia); "industrial district" (industrial district), "industrial park" (USA); "multi-factory building", "industrial estate", "trading estate" (England); "industrial zone" (Italy); "technopark", "industrial park", "industrial hotel", "technopolis", "science city", "scientific city" - are used all over the world in recent years to designate research and production complexes (typical for era of the third industrial revolution).



(<https://www.weforum.org/agenda/2019/01/the-fourth-industrial-revolution-needs-new-forms-of-leadership/>).

<p><b>First Industrial Revolution</b> (Mid-18th to Mid-19th Century)</p>	<p><b>Second Industrial Revolution</b> (Late 19th to Early 20th Century)</p>	<p><b>Third Industrial Revolution</b> (Mid-20th to Late 20th Century)</p>	<p><b>Fourth Industrial Revolution</b> (21st Century)</p>
<p><b>Examples of New Technologies</b> Mechanization, Steam Power, Water Power, etc.</p>	<p><b>Examples of New Technologies</b> Assembly Lines, Electricity, Mass Production, etc.</p>	<p><b>Examples of New Technologies</b> Information Technology, Internet, etc.</p>	<p><b>Examples of New Technologies</b> Additive Manufacturing, Big Data, Virtual Reality, etc.</p>
<p>Replica of the De Witt Clinton steam locomotive. The original locomotive was built in 1831. Source: <i>Wikimedia Commons</i> at <a href="https://tinyurl.com/ybk372ln">https://tinyurl.com/ybk372ln</a>.</p>	<p>The ten millionth Model T on the assembly line in the Ford Motor Assembly Plant in Highland Park, Michigan, 1924. Source: <i>Robohub</i> website at <a href="https://tinyurl.com/y9sf5g68">https://tinyurl.com/y9sf5g68</a>.</p>	<p>The Colossus was the first electronic digital programmable computing device and was used to break German code during World War II. It remained a military secret well into the 1970s. Source: <i>Wikimedia Commons</i> at <a href="https://tinyurl.com/yakt6khh">https://tinyurl.com/yakt6khh</a>.</p>	<p>Researchers at the European Space Agency in Darmstadt, Germany, exploring virtual reality for controlling planetary rovers and satellites in orbit. Source: <i>Wikimedia Commons</i> at <a href="https://tinyurl.com/y9g98oe7">https://tinyurl.com/y9g98oe7</a>.</p>

**Figure. 2. History of industrial revolutions**

(<https://www.asianstudies.org/publications/ea/archives/asias-role-in-the-four-industrial-revolutions/>).

A new stage of the scientific and technological revolution in the world began in the late 1970s. There have been changes in the productive forces, sectoral structure and production methods. Priority development was given to the so-called “high technologies” (“high tech”). This concept includes new directions in science (electronics, biotechnology, etc.). actual technological innovations (plasma, membrane, laser processes in production), organization of the factory process (integrated automation, introduction of new energy sources, etc.), and as well as the development and production of new types of equipment, etc [4].



**Conclusion.** It is possible to consider the origin and increase of environmental problems during the stages of industrial development. They also allow us to draw the following conclusions:

- the initial development of the productive forces of the society in which the evolutionary form of scientific and technical development prevails;
- during the scientific and technical revolutions of the 18th century, the uncontrolled increase of the industrial sector one after the other;
- Large-scale production and biosphere change, countries needing to solve environmental problems, putting environmental problems in the first place in the 21st century became urgent.

The urban industrial territories that have developed to date, as a rule, do not satisfy both the environmental and architectural planning requirements of the organization of a modern city. In the same time they play a city-forming role, because sometimes occupy up to half of all urban land in established cities. In order to restore the broken ecological balance, directions for optimizing the industrial development of the city during its reconstruction are proposed.

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