Environmental Impact Assessment and Sustainability Analysis in P Industrial High-Tech Development Zone
Executive Summary

Yinan Liu

Professional Science Master's (PSM) in Environmental Sciences
Oregon State University
January, 2022

The world is facing unprecedented environmental challenges in this contemporary era. In recent years, a new round of scientific and technological revolutions and industrial transformation are gaining momentum in China. Green, low-carbon, and circular economy developments have become the trends in modern science parks construction systems. President Xi announced that China will aim to hit peak carbon dioxide emissions before 2030, and for carbon neutrality by 2060 during the 19th National Congress of the Communist Party of China (CPC). He emphasizes that it is significant to investigate a novel pattern of coordinated development between mankind and a diversity of factors, including the economic system, ecology, society, and culture. Moreover, he underlines environmental professionals should step up the building of the new development paradigm in the new development stage. Hence, it is crucial to understand and implement the new development philosophy featuring innovative, coordinated, green, open and shared growth.

National high-tech developing zones, as trailblazers of high-quality developing areas, should take actions in order to reach these goals in terms of green construction and development. P vanadium-titanium high tech Industrial Developing Zone (hereinafter referred to as "P high-tech zone") is located in Jinjiang Town, Renhe District, Panzhihua City (Figure 1). Its construction was started in 2001 and approved as a provincial high tech Industrial Park in 2013.

In 2015, it was successfully upgraded to a national high tech Industrial Development zone approved by the State Council, becoming the first national high-tech zone focusing on the industrial development of metal materials. which covers an area of 120 square kilometers.

In recent years, P high-tech zone has always put the construction of ecological civilization in a prominent position and actively built an ecological, circular, low-carbon and efficient green development path. In 2020, it was included in the pilot list of circular transformation of parks in Sichuan Province, driving all parks in the city to carry out circular transformation, and embarking on a new green development path of integration of development and ecology and win-win of ecology and economy, adding new green impetus to the construction of Panxi strategic resources innovation and development pilot zone. However, with the rapid development of heavy-industrialization and the considerable increase of chemical enterprises, various environmental problems have been brought to this high-tech industrial zone. Necessary solutions should be carried out to implement policy in terms of national green projects and for future sustainable development

Figure 1. Transportation map of P high-tech zone (Cited from *Five-year action plan for green development of Vanadium and Titanium High-tech Zone*)

In order to thoroughly implement the spirit of the 19th National Congress of the Communist Party of China and the 2nd, 3rd, 4th, and 5th Plenary Sessions of the 19th National Congress

of the Communist Party of China, we are expected to comprehensively implement President Xi's thoughts on ecological civilization, and to implement the Party Central Committee's series of decisions and deployments on strengthening ecological civilization construction and environmental protection. A solid job also has to be done on carbon peaking and carbon neutrality work to promote green development to a new level. In accordance with the "Several Opinions of the State Council on Promoting the High-quality Development of National High-tech Industrial Development Zones", and the "National High-tech Zone Green Development Special Action Implementation Plan", a Five-year Action Plan for Green Development of P Vanadium and Titanium High-tech Zone (2021-2025) should be established.

As an environmental intern student, I was pleased to be hired by the Great Wall Enterprise Institute (GEI) to enroll in this five-year plan establishment project. My role was as an environmental data analysis to conduct environmental-related investigations and report design. My complete internship progress was divided into 5 stages:

1) Investigation stage

2) Data collection and collation stage

3) Data analysis stage

4) Discussion stage

5) Conclusion stage

For the investigation, data collection and collation stages, we collect data and information through on-site investigation. Our respondents were governmental sectors and enterprises. Due to the fact the high-tech zone involves a diversity of industrial chains, it is impossible to comprehensively cover all enterprises through the on-site investigation, hence, we narrowed

the enterprises respondents to the large-scale and well-running enterprises. A series of data and documents have been successfully collected, including meeting records, reports of enterprise's scale and business, interview records of governmental officers, and environmental data of the park.

For data analysis stage and discussion stage, the fundamental job was inspecting, sorting out, and cleansing preliminary data required by the project report which would be illustrated to our clients further. The report contains 5 parts:

1) Basic introduction of P high-tech zone

2) Environmental assessment on water pollution, air pollution and solid waste pollution

3) Assessment of the industrial structure, energy structure, human resources and financial resources of P high-tech industrial zone.

4) Suggestions and recommendations to government officers, stakeholders, and decision-makers of enterprises to address the environmental problems.

5) Suggestions and recommendations for sustainable development for the industries to implement policy in terms of national green project in P high-tech industrial zone.

The investigation data results were demonstrated from the dimensions of air exhaust pollution, wastewater discharge pollution, solid waste pollution and a general carbon emission accounting.

With respect to exhaust emissions in P high-tech zone, all enterprises in the park should implement the class II of the Integrated Emission Standard of Air Pollutants (GB16297-1996) under supervision by the government. The equal standard pollution load ratios of major exhaust pollutants in the high-tech zone were: sulfur dioxide (32.19%), particulate matter (14.37%),

nitrogen oxide (42.59%), phosphorus pentoxide (8.40%), ammonia gas (0.45%), sulfuric acid mist (1.81%) and chlorine (0.19%).

With respect to wastewater discharge, the designed waste water quality of the sewage treatment plant should meet the Level I discharge standard of pollutants for municipal wastewater treatment plant class A (GB18918-2002). The equal standard pollution load ratio of main wastewater pollutants discharged were: suspended solid (25.00%), chemical oxygen demand (54.77%), ammonia nitrogen (10.30%) and sulfate (9.93%).

With respect to solid waste discharge, the waste that is produced by enterprises are mainly titanium dioxide through the sulfuric acid method, including sulfur gypsum, waste slag, boiler slag, dust removal ash, waste gas metal scraps, waste packaging materials, and chlorinated slag. General industrial solid waste shall comply with the standard for pollution control of general industrial solid waste storage and disposal sites (GBL8599-2001). Hazardous wastes shall be subject to the pollution control standard for hazardous waste storage (GBL8597-2001).

The total carbon emissions in the park reached 508,342 million tons in 2020, with 392,250 tons of net carbon emissions and 116,093 tons of carbon sink. Three causal factors were found, which are direct energy emissions, indirect emissions from electricity transfer, and carbon emissions from wastewater treatment, accounting for 99.46%, 0.03% and 0.5%, respectively.

Finally, we delivered and demonstrated a final report to our clients in the conclusion stage.

References

Han,Xue *Five-year action plan for green development of Vanadium and Titanium High-tech Zone*. Augest, 2021.

Li, Shan. Jun.8, 2021. *Report of Panzhihua industrial development suggestions under the background of "carbon peak" and "carbon neutralization"*

Outline of five year action plan for green development of national high-tech zone. *Ministry of Chongqing Ecological Environment*

Planning of Panzhihua Vanadium and Titanium High-tech Industry Development Zone (2018-2030). May, 2020. Nanjing Guohuan Technology Co., Ltd