Annex 1

Ministry of Commerce/United Nations Development Program

China Hydrogen Economy Demonstration Project

Rugao Hydrogen Energy Development Roadmap (TOR)

Project name: China Hydrogen Economy Demonstration Project

Project no.: 00096939

Project duration: 13 months

Target project commencement date: November 2016

Budget: Less than USD 300,000

1. Project Brief

Hydrogen energy is a huge and promising industry. In 2004, about 57 million metric tons of hydrogen were produced in the world, which equal 1700 million tons of fossil fuel. The world output has been increasing at a rate of about 10% annually since then. Hydrogen energy, a clean secondary energy of zero carbon emission, is valued by various countries in the world. In recent years, automobile hydrogen energy and fuel cell technology has been developing rapidly internationally. The developed countries and regions such as the US, Japan, South Korea, and EU are increasing their investment in the research of hydrogen energy and fuel cells, and have set clear targets for industrialization of the new technology. In 2012, China produced 20 million tons of hydrogen, the largest producer in the world. The Chinese government has been supporting the development of hydrogen energy and fuel cell automobile technology in its national science and technology planning, and has been launching demonstration projects and promoting applications of the technology.

To facilitate the development of hydrogen energy and fuel cells, China International Center for Economic and Technology Exchanges of the Ministry of Commerce and the United Nations Development Program are jointly launching the China Hydrogen Economy Demonstration Project. The project is targeted to demonstrate in the city of Rugao hydrogen production and application technologies, and build a “hydrogen energy city” in order to realize sustainable development and alleviate climate changes. To fulfill the target above, we will take the following measures: 1) develop a roadmap for developing hydrogen energy in Rugao; 2) demonstrate hydrogen energy production technology, including production of hydrogen from renewable energies in order to increase production capacity and develop relative standards; 3) develop hydrogen storage technology and construct hydrogen fuel station; 4) apply hydrogen fuel cells in the field of transportation, combine it with thermal electricity supply, and develop relative standards; 5) research in policy system and framework for hydrogen energy development and methods for carbon trading; 6) promote public awareness of hydrogen energy to facilitate the development of hydrogen economy.

2. Background for Subcontracting

China Hydrogen Economy Demonstration Project was officially launched on August 27, 2016. It is one of the project’s critical activities to develop the medium and long-term (2016-2025) roadmap for Rugao’s hydrogen energy development. The roadmap is an overarching plan for demonstration and application of hydrogen energy and fuel cells in Rugao. Developing the overarching plan requires an investigation of the hydrogen energy resources in Rugao, relative supply chains, and fuel cell automobiles. Considering that Rugao currently does not have a plan for hydrogen energy development, the roadmap will help Rugao work out technology paths, procedures, targets, and supporting measures for developing the hydrogen energy industry in Rugao, and the roadmap will serve as a guide for the Rugao municipal government to develop the hydrogen energy industry in a scientific and effective manner. In addition, the roadmap is the base of the other five parts of the project. The details of the other parts may be changed according to the roadmap.

3. Targets for Subcontracting

The Rugao economic development plan/roadmap will be based on an investigation of the current status, development trends, and other factors of hydrogen energy and fuel cell applications at home and abroad and in light of the economic development situation of Rugao. It should include targets and paths for developing hydrogen energy and fuel cell technology in Rugao in the period 2016-2025, as well as the targets, overall layout, technological path, and business models for developing the industries related to the applications of hydrogen and fuel cells (transportation, electricity generation, etc.).

4. Major Activities

1) Analyze current status and development trends of the industry worldwide.

* Analyze systematically the current status of hydrogen energy and fuel cells in the world, including current policies and technologies as well as the current status of the industry; review and summarize the best practices of the typical countries, regions, cities, and companies.
* Investigate the international development trends of hydrogen energy and fuel cell automobiles and finalize the principles for developing the Rugao economic development plan/roadmap.

2) Investigate current status, problems and development trends of the industry in China.

* Analyze systematically the current status of hydrogen energy and fuel cell automobiles in China, including current policies, hydrogen energy resources and their availability, development of fuel cell technology in transportation and other fields, demonstrations and applications, and supply chains.
* Evaluate the effects of existing incentive policies and measures and the different models of hydrogen energy acquisition; analyze any problems with hydrogen energy and fuel cell technology and industry development in China.
* Analyze the different future scenarios of the hydrogen economy in China based on the economic development, development of the automobile industry, and availability of hydrogen energy resources in China in light of the current status of hydrogen energy and fuel cell technology and industry development, and with reference to the international advanced experience.

3) Investigate Rugao’s economic situation.

* Investigate the current status of hydrogen and fuel cell automobile industry in Rugao, including hydrogen energy resources and the companies involved as well as companies for automobile parts and OEM manufacturers.
* Analyze and evaluate comprehensively the strengths and weaknesses of Rugao’s economy, including the advantages and disadvantages for Rugao to develop hydrogen economy.

4) Complete Rugao’s economic development plan/roadmap.

Rugao’s economic development plan/roadmap should include the following:

* Set up development goals. Propose near-term (2016), medium-term (2020), and long-term (2025) goals for Rugao’s economic development. The goals should be based on a comprehensive understanding of the economic development needs, resource availability, current status and development trends of technologies and industries, market demands, fuel supply system, policy environment, and other factors, and an analysis of the different scenarios.
* Propose development path. Propose the appropriate priorities for developing the hydrogen economy in Rugao, appropriate business models for industry development and project construction, milestones for near-term, medium-term, and long-term development and key indexes and targets to be achieved at the milestones and, finally, development path. The proposal above should be based on best practices in the world, technology and industry development in China, and the development goals above.
* Propose action plan. Propose a plan of actions that should be taken by the city to achieve the development goals and key indexes above, including phased action plans for resources, technology, production, market, and other aspects.
* Propose policies. Based on the analysis above, propose supporting systems, policy framework, and measures needed to implement the plans and achieve the targets above. The proposal should be comprehensive, covering resource availability, technology and research, scale production, market fostering, and business model support, among others.
* Organize seminars. Organize seminars on the plan/roadmap, inviting relative government departments, research institutes, manufacturing companies, and industrial experts to discuss the draft roadmap and collecting their opinions.
* Complete final draft of the roadmap. Revise the draft roadmap according to the feedback from the seminars above and complete the final draft of Rugao’s economic development plan/roadmap.

5. Key deliverables and timetable

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| Output | Target completion date | Comments |
| Final project plan (including project research) | December 30, 2016 |  |
| 1) Analysis of the current status and trends of the hydrogen energy and fuel cell automobile industry in the world2) Analysis of current status, problems, and development trends of hydrogen energy and fuel cell automobile industry in China3) Report on the current status of the hydrogen energy and fuel cell automobile industry in Rugao | June 30, 2017 |  |
| Final draft of 2016-2025 Rugao economic development plan/roadmap | September 30, 2017 |  |
| Final draft of 2016-2025 Rugao hydrogen economy development plan/roadmap | November 30, 2017 |  |

6. Qualification Requirements

1) Good visibility in the automobile industry, close partnership with other companies in the industry, and exceptional capability for organization and coordination;

2) At least 10 years of experience in the automobile industry, experience in clean energy vehicle development, management, and organization being a plus;

3) In-depth understanding of the field of hydrogen energy and fuel cell and experience of research in relative national or local policies and technology planning, experience of research in automobile technology roadmaps being a plus;

4) Good team work;

5) Good management and collaboration skills, experience in large complicated projects being a plus.