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Introduction

In the world environmental protection industry developing history, Europe and America has been in the leading position all the time. Due to problem of industrial foundation, Vietnam hasn’t licensed any technology. Chinese environmental protection equipment technology has gone through decades of licensing, absorption and development. Under this circumstance, the technologies of some companies in China have been in the leading level among environmental protection technologies in the world. In recent years, Vietnam has become one of the fastest economy growing countries in the world. Chinese environmental protection equipment industry will seize this opportunity and manifest its distinguishing competence with advanced technologies.

1. Current status of Vietnamese Power Industry and Developmental Forecast

1.1. An overview of Vietnamese Power Industry Management

Vietnamese power industry system is managed by the Ministry of Industry and Trade (MOIT). The Electricity Regulatory Authority of Vietnam (ERAV) which is established by MOIT has a right to be in charge of market development and management and dealing with economical management. The MOIT owns Electricity of Vietnam (EVN), which is a national company. The EVN directly administers some related companies in supplying and distributing power through the whole country. Currently, the MOIT has changed subsidiary companies of EVN to joint-stock companies and these companies have yielded significant benefits.

1.2. The status of Vietnam power industry

In the last 2 decades, the sustainable economic growth in Vietnam brings the remarkable growth of the demands in electricity. The annual power consumption growth rate has reached 14 percent and the annual install capacity growth rate reached 12 percent in 1998 to 2009.

Vietnam power market is mainly monopolized by several national enterprises led by the EVN. It is worth mentioning that the evident tendency of the financial groups in developed countries such as US and South Korea having directly invested in Vietnam power market[¹].

1.3. The tendency of Vietnam power development

The Vietnam had passed through “The 6th National Electric Power Development Planning” in 2006. It proposes the power development plan, and puts forward the vision before 2025. The above is listed in Figure 1. This plan predicts that when we set GDP as the basic category, the install capacity will expand 17% [²].

Vietnam has enormous hydropower potential. If it can’t make good use of hydropower generation
plants, the negative parts of the project are hard to handle. In the meantime, the Vietnam domestic coal-fired power industry is boomingly developed (as shown in figure 2), which makes Vietnam thermal power a main stream in Vietnam power industry \(^1\). The government has planned to put 26,000MW thermal power generator into use from 2006 to 2020. Besides, the Vietnam government is considering building several nuclear plants and generating into the national grid in 2020 and the government is becoming more and more interesting in wind power and ocean power, which is due to Vietnamese geographical advantages \(^3\).

![Figure 1. Total installed capacity planned to 2025.](image1)

![Figure 2. The tendency of domestic coal supply (\(\times 10^3\)ton).](image2)

2. Analysis of environmental requirements and pollution control technology in Vietnam

In recent years, along with the booming accelerate of Vietnam economic, industrialization, urbanization and damage by a large quantities of mining resources, which has win society highly attention. In order to encourage produce and sell environmental protection products and encourage using every kind of cleaning produce techniques, they had issued the “Law of Environmental Protection”. On the finical side, the throw in environmental protection will be increased, such as giving some privilege in investigation, construction and loan for the development of environmental protection industry.
At present, the Vietnam economical society development is making the pollution problem more and more serious. And the industry itself increase is mainly rely on oil, electricity, cement and steel industry, but the emission controlling ability of these industries are quite low. And the investment shows, nowadays 80% of Vietnamese producing units and industry districts do not have wastes treatment measures, and they only have 200 enterprises which are available for cleaning product, which is only 0.1% of the entire Vietnam enterprises.

Set the power industry for example, with the rapid growth of economy, the power usage has a booming increase tendency. And when come to 2020, there will be more power companies, and more pollution problems. Most of the power plant for flue gas, dust, solid waste and emissions processing system is not perfect enough, and rely on import.

At present, Vietnam has 4,000-5,000 tons of T/R oil which contains PCBs which can’t be well handled. It can provide opportunity for investment and production of related monitoring and treatment equipment. In addition, the power industry is the industry which has the largest CO₂ emission[^4]. Vietnam is lacking relative monitor, for example, the power industry hasn’t install any concentration monitor equipment for stack outlet.

3. The feasibility analysis on the environmental cooperation between China and Vietnam

3.1 The prospect analysis of environmental protection equipment market in Vietnam

During the period of industrialization and urbanization, the treatment of environment pollution contains a huge business opportunities. Therefore, the minister of the MOIT express that advance the environmental protection products and skills, established environmental protection industry is the future point. In general, the Vietnam environmental protection industry is just begin nowadays, and the future market development potential is quite huge, which has no doubt given Chinese companies a big market opportunity.

Set the power industry for example, Vietnam has an increased demand of energy by the booming develop of economy in the past 20 years, and Vietnam economic accelerating rate had reached 7.5% in the past 5 years, Vietnam power demand accelerating rate had reached 16% annually between 2008 and 2010, and the power rate even hold a 11% accelerate in 2011-2015. Depend on the EVN data, Vietnam power consumption reached 74.479GWh in 2009.

### Table 1 The Vietnam power accelerating rate prediction in 2011-2030.

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<tbody>
<tr>
<td>High speed GDP</td>
<td>16.0%</td>
<td>11.6%</td>
<td>9.2%</td>
<td>8.4%</td>
</tr>
<tr>
<td>Basic speed GDP</td>
<td>14.1%</td>
<td>9.9%</td>
<td>8.1%</td>
<td>7.2%</td>
</tr>
</tbody>
</table>
The energy research institute under control of MOIT has finished composing of “The 7th Power Developing Plan” and has submitted it for approval. The program plans the development of power industry in 2011-2030, and announced a vision for 2030 [4]. The prediction of power demand accelerating rate is showed in Table 1 blow. Figure 3 illustrates that the thermal power total capacity is catching up to the hydropower capacity, this also gives our Chinese dust removing equipment suppliers a better market prospects for development.

3.2 The market situation for foreign environmental enterprise in Vietnam

After Vietnam opening-up to the whole world, the government was devoted to do energy construction by using foreign investment. Besides Chinese investment, the other sources were mainly invested by Japan, Korea and America. Depending on the present condition, the EPC of power projects invested by these countries are mostly choose to procure equipments from China, considering the advantages of Chinese Equipment, such as low price and good quantity, short distance of transport etc. According to the survey for actual projects, Vinh Tan No. 4 phase 2*600MW project, the ESP (electric precipitator) was purchased from Hamon Environmental in Belgium. Besides, the Mong Duong 2*600MW project, the ESP was purchased from Halla Energy & Environment, Korea.

As per the performance of foreign environmental protection enterprise in the Vietnam market, only HAMON and Halla in Korea have made virtual progress, but they does not have own manufacturing capability, which make their comprehensive abilities a little bit insufficient.

However, as per the feedback of the recent Vietnam market, HAMON has planned to cooperate with one sub-company of EVN to manufacture ESP product, which was what the Vietnam government is dreaming about, so it may have a certain market share in the near future. But we believe, as most of the investment comes from China and Chinese environmental protection industry has a quite large scale and mature, as well as the cost is also lower than the native company in Vietnam, therefore, the competition structure can’t change immediately at present [5].

4. Strategies on the electricity environmental protection cooperation between China and Vietnam

(1) Win the trust of user by advanced technology

Chinese environmental protection equipment technology has gone through decades of licensing,
absorption and development. During this period, emission standard of Chinese atmospheric particulate matter has reduced from 100 mg/Nm$^3$ to 50 mg/Nm$^3$ and further reduced to 30 mg/Nm$^3$ in 2014$^{[6]}$. For Beijing-Tianjin-Hebei district, Yangtze River Delta district and Pearl River Delta district, the emission requirement is less than 5 mg/Nm$^3$. Under this circumstance, the technologies of some companies in China have been in the leading level among environmental protection technologies in the world. To output most advanced technology by the most competent company to win the trust of Vietnam user.

(2) Hold the cost advantage
As Vietnam has in particular presents itself as a potential market, Chinese environmental protection equipment has a quite large scale, a lower integrated cost and also its suppliers with advanced technologies of dust removing, ash handling, desulfurization and denitrification, which could perfectly meet the demand of Vietnam market. Therefore, they will seize this opportunity and proof its distinguishing competence by advanced technologies. Nowadays, 200 Chinese enterprises, which have the ability for dust removing equipment design, manufacturing and accessories supply, all have the chance for entering the Vietnam market. But there are only few enterprises with good competitiveness, mainly including Zhejiang Feida Environmental Science & Technology Co., Ltd. (brief as Feida Enviro.), Fujian Longking Environmental Protection Co., Ltd. (brief as Fujian Longking), Shanghai Metallurgical Mining Machinery Factory (brief as Shanghai Metallurgical), Lanzhou Electric power Building and Repairing Factory, etc. We believe Chinese environmental protection equipment companies will gain more than half of the market share with their advanced environmental protection technologies in future. The recent reference of Chinese Environmental Equipment Companies in Vietnam Market is listed as Table 2.

(3) Further develop the advantage of convenient service
Vietnam is the neighbor of China and is connected with China by same mountains and rivers. It provides convenience for engineers coming in and going out and also provides enormous convenience for the operation and maintenance of equipment, so that good operation of equipment could be guaranteed.

(4) Seek native cooperative partner in good time and carry out local manufacturing
With the excess production capacity of China, we need to seek native influential cooperative partner for cooperation and carry out local manufacturing, which is the long-term strategy of Chinese environment protection industry.$^{[7]}$

Table 2. Reference of Vietnam Market for Chinese Environmental Equipment.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Project</th>
<th>Facility</th>
<th>Unit (MW)/Boiler Capacity (T/H)</th>
<th>Efficiency</th>
<th>Supplier</th>
<th>Time of Signing Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vietnam Vinh Tan 1 BOT Project</td>
<td>ESP</td>
<td>2×620MW</td>
<td>≥99.9</td>
<td>Feida Enviro.</td>
<td>2015</td>
</tr>
<tr>
<td>2</td>
<td>Vietnam Vinh Tan Project Phase II 1#,2#</td>
<td>ESP</td>
<td>2×622MW</td>
<td>≥99.48</td>
<td>Feida Enviro.</td>
<td>2010</td>
</tr>
<tr>
<td>3</td>
<td>Vietnam DUYEN HAI 3 Extension Thermal Power Plant</td>
<td>ESP</td>
<td>1×600MW</td>
<td>≥99.71</td>
<td>Feida Enviro.</td>
<td>2015</td>
</tr>
<tr>
<td>4</td>
<td>Vietnam Mong Duong Project</td>
<td>ESP</td>
<td>2×500MW</td>
<td>≥99.91</td>
<td>Feida Enviro.</td>
<td>2012</td>
</tr>
<tr>
<td>5</td>
<td>Vietnam Thanh Long 2×300MW Power Plant Project</td>
<td>ESP</td>
<td>2×300MW</td>
<td>≥99.85</td>
<td>Feida Enviro.</td>
<td>2013</td>
</tr>
<tr>
<td>6</td>
<td>Vietnam Mao Khe Project 1#,2#</td>
<td>ESP</td>
<td>1×220MW</td>
<td>≥99.87</td>
<td>Feida Enviro.</td>
<td>2010</td>
</tr>
</tbody>
</table>
5. Conclusions

(1) With the prosperous development of Vietnam economy and the persistent promote power demand. Facing such a pressure of air pollution based on the development, facing such development potential of Vietnam market. We believe that Chinese environmental protection equipment industry will accomplish much in Vietnam.

(2) In recent years, China’s neighbor, Vietnam, has become one of the fastest economy growing countries in the world and thus is among the most attractive market for international environmental protection companies. Because of the relative market saturation of developed countries and China, some developing countries like India, Vietnam and Indonesia have emerged as strategic and competitive market opportunities for the environmental protection equipment suppliers in China.

(3) The developmental cooperation between China and Vietnam promotes the development of the world’s environmental protection industry.

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References


