

**CHINA WATER REUSE TRADE CONSORTIUM'S ENTRY
STRATEGY INTO CHINA'S CONSTRUCTION INDUSTRY TO SELL
WATER REUSE SOLUTIONS**

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Abstract

The purpose of the paper is to provide a marketing strategy for CWRTC (China Water Reuse Trade Consortium) to enter into the construction industry in China that needs new water reuse technologies. In this paper, the authors first review the current water and wastewater market in China, and identify the prospects for future growth. Then the authors analyze in depth the competitors, substitutes, buyers, and suppliers of CWRTC. The authors also investigate the internal strengths and weaknesses as well as external opportunities and threats. After the research and analysis, the authors make recommendations for CWRTC to sell its water reuse products and services into the residential, commercial, and industrial property development market and the building retrofit market. The authors also discuss the potential risks and suggest solutions. The authors end the paper with recommendations for potential issues leading to the next research stage.

Executive Summary

Based on the review and analysis, the authors recommend CWRTC (China Water Reuse Trade Consortium) to enter the water reuse market in China, positioning in the niche market as “the best water reuse solutions from the world’s most inhabitable country”. Marketing mix consists of applicable equipments with cutting edge technology and small space requirement, upper medium level price, distribution and promotion by innovative training program, and sustainable support from the Canadian Government.

In the long term, the authors recommend CWRTC to expand to other areas in China and possibly other countries. The authors also suggest CWRTC to involve in other service sectors such as industrial wastewater treatment, water market investment, or sale of water and wastewater treatment equipments.

The authors evaluate the risks concerning competition, finance and culture. To successfully compete with others, CWRTC needs to properly position itself while gaining various levels of support from the Canadian Government. To avoid financial risks such as payment delay, the CWRTC should target clients with good reputations and disposable profit. Finally, the authors also make recommendations by suggesting that mutual understanding and respect be maintained to solve the problem of cultural difference.

Dedication

This paper is dedicated to those I love and all who love me.

Zihua Du

Thanks to all of my family members, especially my wonderful mother who gives me support, encouragement, and great business insights which inspired me to pursue a career in business.

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Table of Contents

Approval	ii
Abstract	iii
Executive Summary	iv
Dedication	v
Acknowledgements	vi
Table of Contents	vii
List of Figures.....	x
Glossary	xi
1. Introduction.....	1
1.1 Motivation behind the Project: CWRTC.....	1
1.2 Objectives of the Project	2
1.3 Organization of the Paper	5
2. Background of China.....	7
2.1 Economic Growth	7
2.2 Political Situation	8
2.3 Legal Issues	8
2.3.1 Methods to Protect the Rights	9
2.3.2 Environment Law and Regulations.....	10
2.3.2.1 Environmental Protection Law	10
2.3.2.2 Environmental Management Law and Regulation	10
2.3.2.3 Environmental Pollution Law and Regulation.....	11
2.4 Cultural Issues.....	11
2.4.1 Making Appointments	11
2.4.2 Conversation.....	12
2.4.3 Gift-Giving.....	13
2.4.4 Entertaining for Business Success	14
2.5 Real Estate Development.....	15
3. Industry Background.....	18
3.1 The Water Situation in China	18
3.2 Wastewater Situation in China	19
3.2.1 Economic Development and Water Reuse.....	19
3.2.2 Companies in China's Water Reuse Market.....	20
3.3 Municipal Wastewater Treatment Infrastructure.....	20
3.4 China's Municipal Water Treatment Market Size	21
3.5 Grey Water Reuse System.....	22

3.6	Results of the Interviews and CRWTC' s Trip to China.....	26
3.6.1	Great Market Potential.....	26
3.6.2	Technology and Implementation Problems	27
3.6.3	Operation and Maintenance Problems	27
3.6.4	Governmental Administration Problems	28
3.6.5	Decision Making Process for Selecting Water Reuse Solutions.....	28
4.	Water Situation in Beijing and Tianjin.....	31
4.1	Beijing and Tianjin Background.....	31
4.2	Market Opportunities in Beijing and Tianjin	31
5.	Five-Force Analysis	33
5.1	Rivalry Among Existing Competitors	34
5.1.1	Top 10 Water Enterprises.....	34
5.1.2	Other Multinational Firms.....	37
5.1.3	Other Local Companies.....	38
5.2	Threat of New Entrants	39
5.3	Threat of Substitutes	40
5.4	Power of Buyers	40
5.5	Power of Suppliers	41
5.6	Conclusions of Five-Force Analysis	42
6.	SWOT Analysis on CWRTC.....	43
6.1	Strengths	43
6.1.1	Full Service.....	43
6.1.2	Leading Technology	44
6.1.3	Government Participation	45
6.1.4	China Connections	45
6.2	Weaknesses	47
6.3	Opportunities	47
6.4	Threats	49
6.5	Conclusions of SWOT Analysis.....	51
7.	Recommendations.....	52
7.1	Enter the Water Reuse Market in China.....	52
7.2	Target Markets of CWRTC.....	53
7.3	Business Model	54
7.4	Marketing Mix	55
7.4.1	Product Portfolio	56
7.4.2	Training.....	57
7.4.3	Pricing Strategy	58
7.4.4	Distribution and Promotion	59
7.4.5	Government Support	60

7.5	Phases for Market Expansion.....	61
7.5.1	Geographic Expansion	62
	7.5.1.1 Within China.....	62
	7.5.1.2 Other Markets	63
7.5.2	Product and Service Sector Expansion	64
	7.5.2.1 Industrial Wastewater Treatment	64
	7.5.2.2 Water Market Investment.....	65
	7.5.2.3 Sale of Wastewater Treatment Equipments.....	66
	7.5.2.4 Environmental Service	67
7.6	Risks and Risk Management.....	68
	7.6.1 Risk of Fierce Competition.....	68
	7.6.2 Financial Risk	69
	7.6.3 Cultural Difference	71
7.7	Conclusions of Recommendations	71
8.	Limitations and Future Research	73
APPENDIX:	A Survey on the Wastewater Reuse Market in	
	China's Construction Industry	75
	Reference List.....	77

List of Figures

Figure 1:	Conventional and Alternative Schemes for Urban Water Use and Treatment	23
Figure 2:	Low Cost Grey Water Treatment Plant.....	25
Figure 3:	Five Forces Influencing CWRTC	42

Glossary

AIC	Administration for Industry and Commerce, a part of Chinese government
BOT	Build-Operate-Transfer
CCC	Canadian Commercial Corporation
CCP	Chinese Communist Party
CIDA-INC	Canadian International Development Agency, Industrial Co-operation Program
CIEPEC	China International Environmental Protection Exhibition and Conference
CSCC	Centre for Sustainable Communities Canada
CWRTC	China Water Reuse Trade Consortium, in Canada
DBO	Design-Build-Operate
DFAIT	Department of Foreign Affairs and International Trade, a part of Canadian Government
EDC	Export Development Canada
EIA	Environmental Impact Assessment
EPB	Environmental Protection Bureau, in China
EPI	Environmental Protection Institute, in China
EPL	Environmental Protection Law
EST	Environmental Sustainable Technologies
GDP	Gross Domestic Product
Guanxi	Relationship or networking in the Chinese language
IBOC	International Business Opportunities Center, in Canada
IP	Intellectual Property
IT	Information Technology
MBR	Membrane Bioreactor
M&A	Merger and Acquisition
PEMD	Program for Export Market Development, a Canadian Government policy
PRC	People's Republic of China
SCI	Sustainable Cities Initiative, a Canadian Government initiative
SEPA	State Environmental Protection Administration, a part of Chinese government
SME	Small And Medium Enterprise

TOT	Transfer-Operation-Transfer
USBF	A modification of the conventional activated sludge process, incorporating an anoxic selector zone and an up-flow sludge blanket filtration clarifier in an integrated bioreactor vessel; it is made by ECOFLUID in Canada
UV	Ultraviolet
WB	World Bank
WTO	World Trade Organization

1. INTRODUCTION

1.1 Motivation behind the Project: CWRTC

The Center for Sustainable Communities Canada (CSCC) is a non-profit consortium sponsored by the Canadian Government and consists of private and public sector organizations dedicated to the advancement of technologies and services that build sustainable communities. In conjunction with member companies, CSCC develops collaborative marketing opportunities for small companies wishing to enter the global market. It offers research services that support policy, planning development, and market opportunities.

CWRTC is a sub sector under CSCC and specializes in exploring China's market. Canadian manufacturers are recognized leaders in the development of Environmentally Sustainable Technologies (ESTs), including water reuse solutions that have market potential for China. These solutions require a range of expertise not readily available in the Small to Medium-sized Enterprise (SME) manufacturers that presently dominate the water reuse technology sector in Canada. Consequently, a consortium approach is required that comprises a range of companies that provide engineering, architecture, legal, patents, training, operations, and maintenance, as well as management services, in support of the manufactured technologies. CWRTC will market integrated Canadian-developed EST solutions to meet this new business opportunity and help member companies, such as Novatec, Sanitherm, Ecofluid, Ecotek,

BCIT, and Teason open up new international markets for the export of Canadian EST products and services.

To enter the new market in China, CWRTC needs specific market research regarding the market situation, problems and opportunities, and recommendations. CWRTC offered us this project. We, the authors of this paper, are interested in this topic because both of us originate from China, and have some knowledge and connections to China's water reuse market. In addition, we would be happy to apply what we have learnt from the MBA program in this project to contribute to the development of business between Canada and China and to improve the deteriorating environment in China.

This topic is important because it presents a decision-making reference and roadmap for the CWRTC to enter the emerging Chinese market. The Canadian Government, as the sponsor of the CWRTC, may also benefit from the report by understanding what else the government can do assist CWRTC. Moreover, the Chinese government and water reuse companies will be able to access information from the report regarding specifically what the Canadian Government and CWRTC can offer in helping solve the serious water shortage problem in China.

1.2 Objectives of the Project

The primary objective of the project is to provide a marketing strategy for the CWRTC to enter the construction industry that needs new water reuse technologies. To proceed to this goal, it is vital to review and comprehend China's country background such as economic growth and real estate market. There is also a need to understand the water situation and problems in wastewater treatment market. In addition, a specific analysis needs to be presented regarding the competitive situation in the water reuse market, and the CWRTC's internal and external environment. Based on such basic

research and with analysis of such data, recommendations can be made for the company overall.

The scope of the project primarily focuses on the water reuse market in the construction industry in Beijing and Tianjin. The project mainly concentrates on developers of commercial, industrial, and residential buildings that are between 30,000—100,000 square meters, with wastewater flows of up to 1,000 square meters that now need water reuse solutions

For this project, the authors conduct secondary research, interview engineers and architects who have first-hand experience in China, debrief CWTRC's team that has just returned from the trip to China, and analyze this information in the paper, the written report of the project. Therefore, this paper benefits not only from the existing academic resources, but also the first hand experiences of the engineers and managers who have visited the region, making the conclusions of this paper more practical and reliable.

In the area of secondary research, we read materials supplied by CWTRC concerning the water and wastewater market analysis. We further search on the Internet for the updated information. While being careful of the reliability of internet sources, we obtain important information from Chinese websites such as h2o.com and company websites of some Chinese water enterprises such as Beijing Capital co. Ltd, Shengzhen Municipal Water Group. The websites of CWTRC's member firms also offer us information regarding specific companies. For an understanding of the water reuse technology, we refer to professional references such as Handbook of Water and Wastewater Treatment Technology (Cherenmisinoff, 1995). From the secondary research, we collect the information about China's country background, water resources, water reuse market situation, and the information related to the major competitors.

To obtain a better understanding of the problems concerning the wastewater reuse sector in China's construction industry, this paper presents its own questionnaire (Appendix 1). With this questionnaire, we interview some Canadian engineers and architects who have working experience in China's construction market; we also telephone interview a couple of Chinese water reuse engineers. The interviews provide insight about the problems in China water market, typical stages for a wastewater reuse project, and primary comments in the specific market entry strategy presented in this paper.

The first CWRTC team trip to China visited the major destinations of Beijing and the neighbouring municipality of Tianjin, returning on June 1, 2005. The team met with government officials, regulators, developers, manufacturers, and treatment plant operators. The visitors also toured a variety of wastewater reclamation and manufacturing facilities. The team briefed us with regard to its preliminary findings and comparative technology evaluations. These results are critical to our research and form an important element of this paper.

The use of secondary research and interviews conducted for this paper provides information the CWRTC can use to tailor its market strategies, and help member firms understand the competitive environment and refine their business development activities accordingly. The research findings and interviews further identify specific business opportunities in the market and illuminate the decision makers who would be responsible for buying Canadian water reuse solutions.

From the combination of secondary research, interview and debrief, it is apparent that China's economy is growing very fast. There is a huge demand for water reuse technology. There are some obvious problems in the current water reuse market in

China, and it is those problems that can be the focus for the CWRTC's potential opportunities.

To achieve the objectives of the project, there is further analysis of the competition in China's water reuse market, from the perspectives of the rivalry among existing competitors, threat of new entrants, threat of substitutes, power of buyers, and power of suppliers. We also analyze the CWRTC's internal strengths and weaknesses, and the external opportunities and threats the CWRTC faces. Although the CWRTC has its weaknesses and faces fierce competition and other threats from the market, such microanalysis shows that CWRTC should make the most of the market opportunities to sell its competitive products and services.

Recommendations based on the research in this paper show the CWRTC would benefit by entering the water reuse market in China and suggest a marketing mix including product, price, distribution and promotion. We also recommend the long-term strategy of making the market expansion to other geographic areas and other service sectors. To conclude this research, we make specific recommendations regarding further research leading to the next stage of CWRTC's market exploration in China.

1.3 Organization of the Paper

The basic organization of this paper, the written report of this research project, follows a logical sequence for a company interested in entering a foreign market. Specifically speaking, to enter a new foreign country, a company should know the country background in terms of economy development, industry development, legal systems, and cultural issues to ascertain that the macro environment is not hindering the business development. Information related to such issues is presented in the second chapter: background of China.

In the third chapter, we discuss industry background. Beside the country background, the company should understand the industry development situation in the host country. This specific case study will elaborate on the water situation in China, China's municipal water treatment infrastructure and market size, grey water reuse system, and the problems and opportunities in the grey water treatment system market niche.

The details about the target markets—Beijing and Tianjin construction markets are given in the fourth chapter. The information from secondary research in the first four chapters will be used in the analysis presented in the chapters that follow.

In the fifth chapter, Michael Porter's five forces analysis is applied to the specifics of the case, which helps marketers contrast a competitive environment in the target market. Five forces analysis considers the rivalry among existing competitors, threat of new entrants, threat of substitutes, power of buyers, and power of suppliers.

Besides understanding the larger competitive environment, a company should master the detailed information that matches the firm's resources and capabilities to the competitive environment in which it operates. SWOT analysis provides this information and is elaborated in the sixth chapter. Environmental factors internal to the firm usually can be classified as strengths (S) or weaknesses (W), and those external to the firm can be classified as opportunities (O) or threats (T). Such an analysis of the strategic environment is referred to as a SWOT analysis.

Furthermore, we present our recommendations in the seventh chapter, including the entry strategy, company positioning, marketing mix (product portfolio, pricing strategy, distribution channels, promotion, etc), business expansion, and risk management.

2. BACKGROUND OF CHINA

In this chapter we are going to demonstrate the macro economic situation in China is favourable for foreign companies to do business there in terms of economy development, legal systems, cultural issues, and water reuse industry development.

2.1 Economic Growth

“China’s Explosive Growth “could be the dominant event of this century,” says Stapleton Roy, former U.S. ambassador to China. China has the fastest GDP growth rate in the world, averaging at around 8% for the last 25 years, with every sign that the country will keep the rate in the future (Newman, Richard J., 2005). The fast economic growth is attracting foreign companies to do business in China and they can benefit from China’s macro- economic development.

China will be very likely to become the second largest country in economy in the world by 2020, behind US. Last year Americans spent US\$ 162 billion more on Chinese goods than the Chinese spent on U.S. products. And that gap has been growing by more than 25 percent per year as China moves from building toys and clothes into more-sophisticated appliances, auto parts, and semiconductors. In 2004 alone, China’s foreign trade grew by about 35 percent, reaching \$1.15 trillion in combined two-way trade. The People’s Republic of China was the second-largest recipient (after the United States) of foreign direct investment, attracting a total of over US\$ 60 billion in 2004. China has great demand for new energy, raw material and natural sources, such as

water used to fuel its growth. The fast growth has begun to have an impact on the global commodities market. Meanwhile, China's rapid growth has led to an expanding domestic market that is now estimated to include up to 100 million middle and upper income (those earning above US\$ 7,000 per year) consumers (Newman, Richard J., 2005). As the country gets more prosperous and people get richer, the demand for real estate will increase as well.

2.2 Political Situation

The new government, set in November 2002 at the sixteenth congress of the Communist Party, exhibited the ruling party's most stable transition since it ascended to power in 1949. President Jiang Zemin handed over power to Hu Jintao, while vice premier Wen Jiabao took over the post of premier from Zhu Rongji. Stability and cautious reform will be the key focus of Hu and Wen, as both have risen to power in an age of modernization and have expressed an interest in continuing to pursue gradual liberalization. China's current political situation is very stable and this stability will continue into the future, making China a safe place for foreigners to do business.

2.3 Legal Issues

The legal system is another concern of every foreign company, especially when the company has used technology in the products which are trade secrets or intellectual property protected (IP) by law. Without legal protection on the core technology within China, any product faces the risk of losing its competitive edge by having other companies copying it.

China's modern IP institutions were established in the 1980s. With the coming into force of the 1983 Trademark Law, the 1985 Patent Law, the 1991 Copyright Law and the 1993 Law against Unfair Competition, the basic framework of China's IP system was put into place. Further intellectual property laws, regulations, and interpretation of existing laws -- such as the Intellectual Property Protection Customs Regulation -- have made the statute books. This trend is bound to continue as China's economy develops, joining the other "dragon" economies of the Asia-Pacific region. China's first Civil Law on General Procedure, which came into force in 1987, recognized six main kinds of IP rights: copyrights, patents, trademarks, discovery rights, invention rights, and rights to science and technology-related achievements (Bian, 2005).

These measures ensure that foreigners don't need to be concerned with the core technology of their products being stolen. These specific laws have been set up and have been effectively enforced since their creation.

2.3.1 *Methods to Protect the Rights*

It is vital that all owners of IP are aware of what can be done to protect their rights in the largest emerging market, China. Owners of IP should quickly register their trademarks and patents in China. Indeed, counterfeit goods are found on sale in some very specific areas in part of China. Some of the sales areas are very popular among foreigners in China and much business is transacted. Ironically, the sales people in these areas can speak English in order to sell these counterfeit products at a price as high as possible.

IP institutions and awareness are improving in China. This trend will continue provided that the government takes positive initiatives and that IP owners continue to

enforce their rights and participate in the education of all those involved in IP business and the enforcement process.

2.3.2 *Environment Law and Regulations*

China has improved a series of environmental laws and regulations. Since the water reuse industry closely relates to the issue of environmental protection, it's necessary to examine the environmental law and regulations. Current environmental laws and regulations can be classified into two categories: environmental management, and environmental pollution prevention and control. All environmental laws and regulations are stipulated on the basis of the Environmental Protection Law (Department of Commerce, 2005).

2.3.2.1 *Environmental Protection Law*

Effective in December 1989, the Environmental Protection Law (EPL), sets the framework for environmental management and pollution control legislation in China. Other laws outline goals, policies, and requirements to protect various environmental media, such as surface water, groundwater, and the atmosphere. They also specify control requirements for materials such as solid wastes. The EPL functions primarily as a policy statement, and it outlines goals (Department of Commerce, 2005).

2.3.2.2 *Environmental Management Law and Regulation*

China's environmental management measures include environmental impact assessment (EIA), the Three Synchronies Policy, permitting requirements, and reporting requirements. All of these fall under the Environmental Management Law, which is used alongside the environmental protection law outlined above (Department of Commerce 2005).

2.3.2.3 Environmental Pollution Law and Regulation

The Environmental Pollution Law regulated environmental pollution prevention and control measures in China. It applies to various environmental media, including water, water supply, wastewater discharge, air emissions, hazardous waste management, noise, soil, and groundwater. Except for specific laws and regulations, standards were established to guide environmental practices in different sectors (Department of Commerce).

2.4 Cultural Issues

Central to conducting business in China is to build a trusting business relationship, hence a brief explanation. The term Chinese refer to the trusting and harmonious relationship is "Guanxi". The long nurtured relationship is vital to the success of the business. Before the person interested in doing business in China can begin the business in China, he or she has to establish "Guanxi" with the prospecting business partners and friends. In order to build strong "Guanxi", this person has to understand some Chinese culture, at least the essence of Chinese business culture.

As a matter of fact, our client, CWRTC, doesn't have any experience in doing business in China. The contracts it will be looking for mostly depend on "Guanxi" (relationships). Therefore, it's vital to understand the essence of Chinese culture and behave properly for our client to nurture the relationships, and finally get as many contracts as it could.

2.4.1 Making Appointments

Chinese consider it an insult if the person they are meeting is late for an appointment. As a firm interested in doing business in China, when scheduling the

appointments, it should avoid holidays such as Chinese New Year. During May Day (May, 1st) or the National Day (October, 1st), many businesses will be closed for up to a week during this period. The date of this occasion varies from year to year due to an official advisory to allow the long holidays

2.4.2 Conversation

To make a solid business impression, some knowledge of Chinese language, culture, history, and geography will be useful. Effort to learn and use a few words in Chinese will make a positive impression and your initiative will be noticed and appreciated. You may make general inquiries about the health of another's family, such as, "Are all in your family well?" If you speak a little Chinese, the Chinese will really appreciate your efforts and take your initiative of doing business in China more seriously than if you do not speak any Chinese. Moreover, your ability of being able to understand Chinese language will help you to establish a better "Guanxi" with your Chinese associates.

There is proper etiquette for hosts and guests in Chinese culture. Your Chinese host may ask questions about your age, income, or marital status in the small talk. If you don't want to reveal this information, you should tactically and politely change the topic or give a vague answer. However, revealing this personal information can help you build better personal relationships with your Chinese customers because you gain the trust from Chinese by showing your trust on them first. As a result, they may feel more comfortable to talk to you. Once your Chinese host and you feel more comfortable towards each other, you can ask about their family. Question such as "How old is your child?" or "Your child must be busy with school." are not too personal in nature and these are O.K. to use to start a conversation.

You don't have to try to avoid mentioning Taiwan if the subject comes up, just ask how they, your Chinese hosts, feel about Taiwan. Listen to them, and be hesitant to express your opinions. Taiwan is a sensitive topic and stirring up heated debate is not the first step to establish a good relationship. When you are in China, please remember that most Chinese people still have vivid memory about the Japanese invasion of China during World War II. Ninety percent of Chinese people in the mainland do not have a very good impression towards the Japanese government. Sensitive topics such as these should be avoided.

2.4.3 Gift-Giving

It's important to give lavish gifts to some individual in the context of friendship in Chinese business culture. Even though the official policy today forbids luxury gift giving and declares this gesture as bribery, the action still exists but more hidden. If you, someone interested in doing business in China, wish to give a gift to an individual, you must do it privately, in the context of friendship, not business. It is good for you to develop personal relationship with Chinese by giving them a favourable impression by giving gifts.

It's very typical for Chinese to decline a gift three or more times before accepting the gift so as not to appear greedy. You will have to continue to insist and in some case you're expected to do so. Once the gift is accepted, you express gratitude. You will be expected to go through the same routine if you are offered a gift.

Please don't present a gift to one person in the presence of other people, as this gesture will probably cause, not only embarrassment, but also problems for the recipient. This is because you have created an unfair and discriminating situation among the Chinese. This situation is disliked a lot in Chinese culture and the people who are not

offered will feel that they have lost face, which has very bad effect on the process of building a good relationship.

Giving a gift to the entire company, rather than an individual, can be acceptable in Chinese business culture. Gifts should be exchanged after all the negotiations get conclusions. If you can, explain the meaning of the gift to the receiver. Do not get anything that is obviously expensive so that the company will not feel obliged to reciprocate. Valuable gifts should be given to an individual only in private and strictly as a gesture of friendship. Make sure that the gifts given to people of the same level of importance are equal or similar in value.

2.4.4 Entertaining for Business Success

Business lunches and dinners are very popular ways to nurture business relationships. Business breakfasts, however, are not a part of Chinese business culture except in Guangdong, Hangzhou, and Fujian province where the 'Morning Tea' is very popular. Evening banquets are the most popular occasions for business entertaining. Banquets are hosted with varying degrees of extravagance, usually in a restaurant.

Generally, the seat in the middle of the table, facing the door, is reserved for the host. The most important guest sits directly to the left of the host. Everyone else is seated in descending order of status from the host with the exception of the seat directly opposite to the host. This seat is for the most senior member of the party. Follow this seating pattern if you, someone who will do business in China, host a banquet, whether for business or for socialization.

It is not uncommon for a host to order enough food for seven people at a table of five. He or she loses face if there is not plenty of a leftover at the end of a meal. Rice, considered by many Chinese to be filler, is generally not served until the end of a meal.

Therefore, if you want to eat rice with your meal, please be sure to ask the waiter or waitress to serve it early, particularly if the food is spicy.

Forming a personal relationship ['guanxi' in Chinese] in your business dealings is very important. Part of this involves participating in the strong drinking culture that exists in China. Generally, the Chinese regard with suspicion of anyone who does not participate in the inevitable drinking that takes place during almost all business dinners. It is at these kinds of social occasions that most negotiating breakthroughs are made. Prepare some medical excuses for yourself to avoid drinking heavily if necessary. If you really wish to avoid alcohol, the Chinese will accept medical excuses.

2.5 Real Estate Development

Land has been a preserve of China since the communist party took power in 1949. If you visit any major city in China, you will see that it's under reconstruction everywhere. This is a result of rapid economic growth and the government's pressure to upgrade its infrastructure.

The real estate developments started in Shenzhen and Zhuhai, two cities in Southern China, after the Chinese government declared Shenzhen and Zhuhai as special economic zones in 1980s. Gradually, the property boom happened in Fujian and Zhejiang provinces (two east costal provinces). It then moved northward to inland area Beijing, and then back south eastwardly to Shanghai. While commercial developments and office blocks made up the bulk of the developments in the early to mid-1990s, it was not until 1997 that the residential sector kicked off properly, supported by a government policy allowing individuals to take out mortgages to purchase their own residence. This created the second boom in real-estate developments, with the early players able to charge high prices when supply was tight. Today, big local developers are competing to

enter the second-tier cities, acting out the role of the Hong Kong developers in the big cities in the early to mid-1990s (The Property Moguls, 2003).

Now, in the early twenty-first century, the real state development in both of residential and commercial constructions is very explosive across China. Because our client's products can be used in both kinds of buildings, we will briefly describe real estate development in these two areas.

The real estate boom can also be seen in inland regions of China. For example, in Chongqing, a city where the market for modern private housing is in its infancy, a developer offered 900 units in a yet-to-be-built housing complex in July 2005. Two days before the sales date, 3,000 people showed up to purchase the units available (Dolven, 2003). Another example is Lijiang, a mountainous tourist town in western Yunnan province. The streets in Lijiang are full of modern housing blocks (Dolven, 2003).

According to the latest figures released by the National Bureau of Statistics, sales volume of apartment purchases in China was 259.6 billion yuan (US\$ 31.4 billion), up 35.5% over the same period in 2004. The statistics showed that a total of 129.8 million squared meters of house were sold in that period, more than the same period the previous year.

Commercial buildings are being constructed as well. It is said that, Carrefour, a French-based mega market chain, will open 12 stores in each of four cities, Beijing, Shanghai, Guangzhou, Shenzhen, and 6-8 in each of other big and middle sized cities (World Business Forum, 2003).

In Conclusion, the energetic economic growth, fast real estate development, stable political situation, and ever improving legal system create a promising macro environment for business development in China. Beside these uncontrollable macro

factors, we have also talked about some controllable cultural issues, such as making appointments, talking in a right way, giving gifts, and entertaining for business success. In the next chapter, we investigate the water reuse industry's background.

3. INDUSTRY BACKGROUND

Beside the country background, the company should understand the industry development situation in the host country. This chapter elaborates on the water situation in China, China's municipal water treatment infrastructure and market size, grey water reuse system, and the problems and opportunities in the grey water treatment system market niche. Moreover, the details about the target markets—Beijing and Tianjin construction markets will be given in the fourth chapter.

3.1 The Water Situation in China

The total annual average water resource volume in China is estimated at approximately 2.8 trillion cubic meters, making China the fourth largest source for water in the world. However, the water resource volume per capita is only 2,200 cubic meters. In this respect, China ranks 88th in the world and has only one-quarter of the global average of water per capita because of its large population. China's forecasted population growth to 1.6 billion in the mid-21st century will decrease the per capita water resource to 1,760 cubic meters, presaging serious water shortages (U.S. Department of Commerce, 2005).

One of China's most celebrated and possibly its most beautiful water attraction is a 52-mile stretch of the Li River, from Guilin to Yangshuo, south western China. Striking rock formations with names like "Nine Dragons Playing in the Water" and "Yearning for Husband's Return" watch over the winding river like sentinels. Fishermen float by on

bamboo rafts. Surrounded by the river's clear water and the lush landscape it sustains, it is difficult to imagine that, a few hundred miles north, China is facing a water shortage that threatens the continued progress of its economic development. More than 90% of the rivers running through China's cities have been seriously polluted by billions of tons of untreated sewage and industrial waste. According to a 2003 report by the Chinese Academy of Engineering, twenty-one cities along the Yellow River registered the highest levels of measurable pollution (Stein and Nicholas, 2004).

China's current water consumption per capita is far below the developed world, and 650 cities in China lack water. With the country projected to generate 100 billion cubic meters (130.8 billion cubic yards) of wastewater a year by 2010, as many as 1,800 additional water-treatment plants will be required (Cheung et al., 2004).

3.2 Wastewater Situation in China

3.2.1 Economic Development and Water Reuse

Economic development has been shown worldwide to conflict with environmental protection and preservation of natural resources. China's economy has grown at an annual rate of 7-8% for the past decade with no ease of pace evident. China has become the world's second largest economy in GDP, and has the world's largest population, which means a huge potential domestic market (World Bank, 2004). Water shortage is a serious natural resource crisis threatening further economic growth in China. Chinese governments at all levels are desperately seeking a solution to the problem of water shortage.

Water shortages are affecting China's economic and social development. Some of the water resources are difficult to use and many are severely polluted. Almost 75%

of China's lakes are significantly polluted, and 100 billion cubic meters wastewater is generated every year. Because of these conditions, there was still a water supply and demand deficit of approximately 40 billion cubic meters in 2000 (U.S. Department of Commerce, 2005). This conflict between water supply and demand will accentuate as the country develops. Water shortages may limit sustainable economic development in China.

3.2.2 Companies in China's Water Reuse Market

Most companies in China's water reuse market are small domestic companies. There are also some big domestic companies along with multinational water giants such as French Veolia and Suez. More companies, both local and foreign, emerge in the market.

State Environmental Protection Administration (SEPA) reported in 2000 that there were 18,144 domestic enterprises actively involved in the environmental protection and pollution-control sector. Local environmental equipment manufacturers concentrated in the water-pollution treatment and air pollution treatment subsections. Total sales revenues in these two categories accounted for 76% of the revenues in the environmental sector. At the same time, foreign-invested enterprises represented 4% of the total number of companies in the environmental protection sector. The total contractual import value was US\$ 2.5 billion (DFAIT, 2003).

3.3 Municipal Wastewater Treatment Infrastructure

By 2002, 310 of the 660 cities in China had constructed municipal wastewater treatment facilities, but there were no municipal wastewater treatment facilities in most of the 17,000 towns. Approximately 500 municipal wastewater treatment plants were in

operation by 2002. The annual wastewater treatment amount was 13.5 billion cubic meters, equal to 39.9 percent of the total wastewater volume. The actual treatment rate of domestic wastewater, however, is only 22.3 percent because treatment plants often operate below design standards or capacity. Secondary treatment processes are commonly used to treat municipal wastewater in most municipal plants, especially in the larger plants.

3.4 China's Municipal Water Treatment Market Size

A large amount of wastewater in China is now discharged directly into surface water bodies without treatment. The actual wastewater treatment rate in China may be less than 20 percent. The total amount of wastewater discharged in 2002 was 63.1 billion cubic meters. The amount of municipal wastewater treated in 2002 was 13.5 billion cubic meters, with a treatment rate of 39.9 percent (U.S. Department of Commerce, 2005). In counties, towns, and extensive rural areas, wastewater treatment rates were significantly lower. China's market for water and wastewater treatment will increase to US\$ 22.7 billion in 2005 from US\$ 18.7 billion a year earlier, and is expected to reach US\$ 33.2 billion by 2010, predicts Helmut Kaiser Consultancy (HKC). All cities in China are now required by the Chinese government to construct wastewater treatment facilities. Part of the treated water can be reused, and part of the treated water will be discharged. The treated water will emit less pollution to the environment than the untreated water. Wastewater treatment facilities include wastewater collection systems, sewer systems, wastewater treatment plants, sludge disposal systems, and, another important part--grey water reuse systems within the buildings.

Grey water treatment market is the focus of our client; therefore, our study focuses specially on this part of the whole water treatment system. The treatment rate

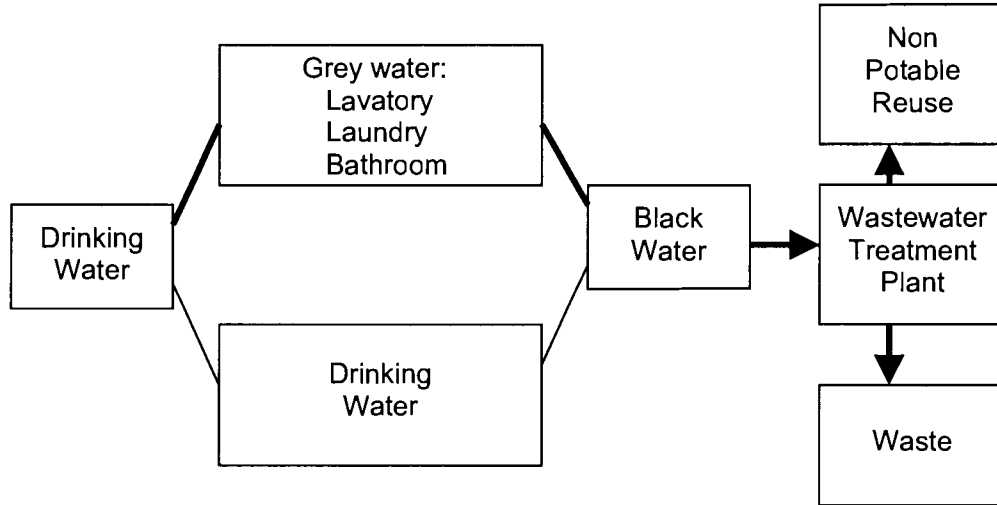
of city municipal wastewater is estimated to increase to 45 percent by 2005, and the wastewater treatment rate in the cities with populations greater than 500,000 will increase to 60 percent (Filtration Industry Analyst, 2005). We can see great market potential under the circumstance that China has urgent need to increase the water treatment and reuse rate in order to solve the water shortage problem. Next, we will talk about what grey water is and how the grey water treatment and reuse works in buildings.

3.5 Grey Water Reuse System

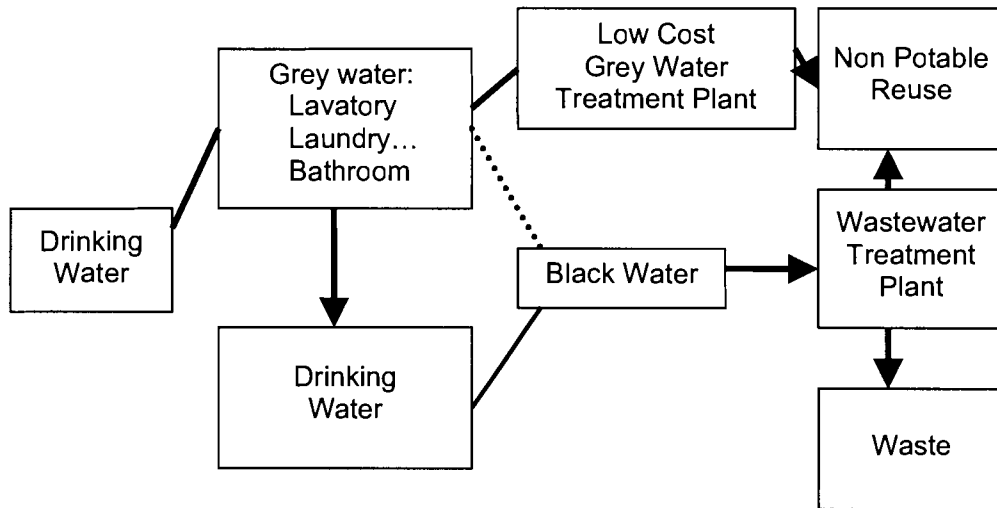
“Grey water” is a term referring to the low polluted wastewater from bathtubs, showers, hand washing basins, and washing machines excluding wastewater from the kitchen and the toilet flushing systems (Nolde, 2000).

Figure 1: Conventional and Alternative Schemes for Urban Water Use and Treatment

Part A. Conventional



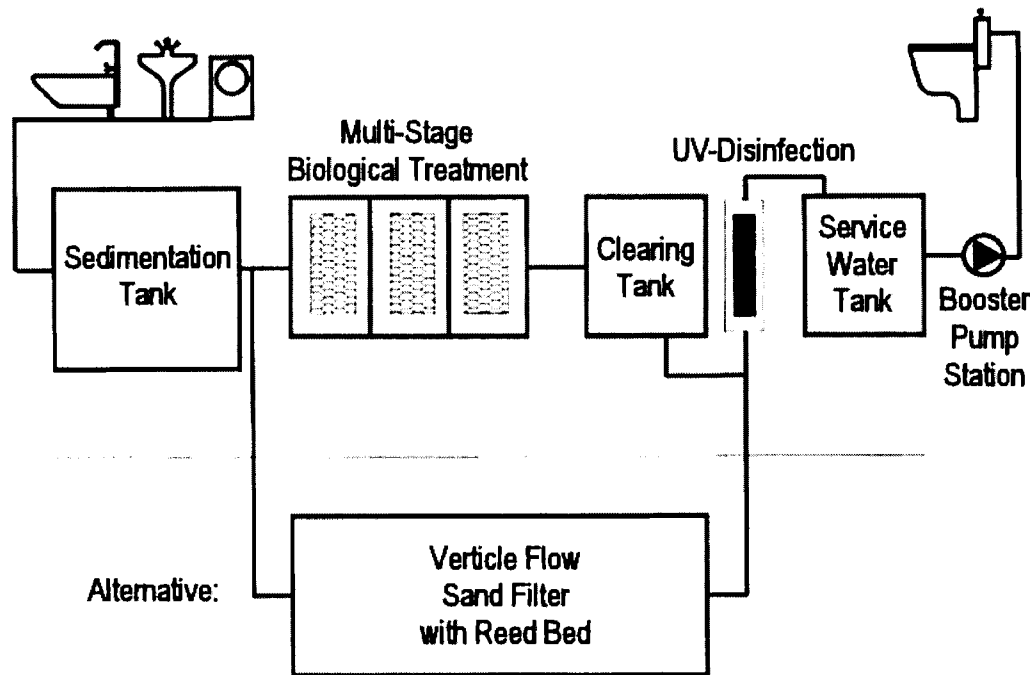
Part B Alternative



Source: Adapted from J.G. March et al., 2004.

A conventional concept for urban water use and treatment is depicted in Figure 1 Part A where, as we can see above, a major part of the drinking water stream is used in bathtubs, showers, hand-washing basins, laundry machines, kitchen sinks, etc., forming so-called "grey" water, which, in general, has a low content of organic matter and pollutants. The remaining part of the stream is used to flush toilets and this stream contains faeces, urine and toilet paper ("black" water). Both parts are considerably different in composition and, consequently, their potential utility and adequate treatment are also different. Nevertheless, both flows are usually mixed and transported (usually involving long distances) to the wastewater treatment plant. Taking this into account, Figure 1 Part B. is more likely to respond to a more reasonable diagram where the grey water is used to flush the toilets, and then the surplus of grey-water can be mixed with black water, or alternatively, can undergo some specific low-cost treatment for grey water. A significant reduction of the load to the water treatment plant is accomplished as a consequence of the indoor reuse, because a large amount of grey water will go to the low cost treatment system and then be reused. Nevertheless, Figure 1 Part B requires dual piping and its implementation in a new building could represent an additional 5% cost to the plumbing budget (Nolde, 2000).

Figure 2: Low Cost Grey Water Treatment Plant



Source: Adapted from Erwin Nolde, 2000.

Figure 2 above is used to explain specifically how low-cost grey water treatment works in Figure 1 Part B. The grey water reuse systems are mainly used in residential buildings, office buildings, business complexes, and other municipal buildings. A similar system is shown in Figure 2, where the wastewater reused came from bathtubs and hand-washing basins. The treatment follows a filtration stage through a filter, sedimentation, and disinfecting with sodium hypochlorite. Treated water is initially stored in a ground level tank (4.5 cubic meters) and from there is elevated using an automatic pump to a terrace tank, which can also be fed with drinking water, if necessary. This tank is inter-connected with six other tanks (total terrace volume 4.0 cubic meters), allowing easy control of the storage volume and, consequently, the residence time of the treated water, according to consumption. From this point toilets'

tanks are fed by gravity and operate at room temperature from 26 to 32°C. The average toilet volume is 6 litres for each use (Nolde, 2000).

3.6 Results of the Interviews and CRWTC' s Trip to China

As mentioned in Chapter 1, we conduct a survey regarding the wastewater reuse market in China's construction industry (Appendix 1), the respondents for which are Canadian architects working in China's construction market, and a couple of Chinese industry insiders. Moreover, the first CWRTC team trip to China has just returned and use has been made of its preliminary findings for our market research and comparative technology evaluations. Combining all sources of information, we present our findings regarding market potential and low operation efficiency in the following sections.

3.6.1 *Great Market Potential*

The results concerning the market potential are very positive. The executive team trip to Beijing and Tianjin, China, found the market even larger than they had originally expected. The population of these two municipalities alone is 3/4 of the population of all of Canada. The growth of this area is beyond belief, with development found everywhere. The area currently has a water shortage and has to rely on reclaimed water to offload potable water demands. Business opportunities are to be found in both the reclaimed requirements for main treatment plants, hotels, and commercial buildings in many regions from the urban centers to small villages, providing agricultural irrigation, as well as waster reuse solutions.

3.6.2 Technology and Implementation Problems

Many current buildings don't have any water reuse facilities. The effluent from the buildings is simply discharged into the municipal sewage system. For those buildings that have installed the water reuse systems, the applied technology is so poor that the results cannot meet the governmental requirements. Problems such as odour control cannot be solved properly. These design problems cause possible infection to the tap water system. As a result, some of the implemented low quality equipments have been shut down.

However, there is progress in water reuse technology at the academic level. Some local academics have earned worldwide recognition for their expertise in water reuse technology. Environment engineering students study the same textbooks prevalent in North America. Nankai University in Tianjin, where the CWRTC executives visited, has its own research center for Membrane Biological Reactor (MBR) technology, one of most advanced technologies applied in this field. However, just miles from the research at Nankai, the local wastewater plant makes elementary equipment operational mistakes such as placing the multi-million dollars equipment in the wrong operational order. While we can not explain why academic achievement is not applied to real problems near by, we see this application a future potential for China to solve water reuse needs. Meanwhile, before the gap between theory and practice is bridged in China, we see opportunities for CWRTC.

3.6.3 Operation and Maintenance Problems

Some of the installed water reuses facilities face operational difficulties. Such difficulties can be as simple as the faculties being closed down due to plant ownership wishing to save on the cost of electricity. Facilities in operation sometimes have

operators who only know how to turn on the machines. They are not instructed in the working of the equipment, how to read the test result of the treated wastewater, or how to maintain the equipments. The CWRTC executive team was not also astonished to learn that the operators at the above mentioned multi-million dollar projects did not know anything about wastewater data and treated effluent, nor did the operators care. This is a situation, from a business perspective, which needs remedy and offers opportunity. It can be seen that the operation efficiency of established water reuse equipment is very low, and translates into a waste of investment.

3.6.4 Governmental Administration Problems

The government has set the regulation requirements of water reuse facilities in the buildings and the standards for effluent, but inspection is far from strict. Water reuse facilities are required in the architecture design. SEPA agents are required to check frequently if these facilities meet regulation requirements after the construction is finished. However, after completion, the agents only visit the sites every six months. In cases the agents find some problems later, punishment for these buildings is not harsh, and is often negotiable depending on Guanxi (networking) between the owners of the buildings and the agents.

3.6.5 Decision Making Process for Selecting Water Reuse Solutions

From information gathered, it is noticed that the potential Chinese clients for CWRTC's water reuse technology have unique decision-making process for choosing water reuse solutions. For foreign business personnel to promote solutions successfully, they have to understand the local decision-making process in terms of who are the decision makers and influencers. Based on the ownership of the buildings, the clients

can be basically divided into two categories, the private sector and the public sector.

Water reuse project stages can be slightly different in the two sectors.

The private sector includes buildings developed by private real estate developers, such as residential buildings, office buildings, and commercial centers. A developer hires architects for the design of a building, including the part of water reuse facility. Then, the design has to be approved by the local Design Institute, which acts like government agency concerning construction regulations, and the local SEPA office. When the construction is finished, it is inspected and approved by agents from the Design Institute and SEPA. For the selection and purchase of the water reuse system, the developer, sometimes assisted by his own consultants, is the decision maker. Even though the developer takes into account the suggestions made by the architects, the local Design Institute, and SEPA, he/she makes his/her own decisions.

The public sector includes all government-funded facilities such as schools, libraries, and army units. This process is a bit more complicated than that of the private sector. Let's take a school as an example. To construct a new building in a school, the principal has to apply for funding from the Education Board, which has more power in decision making of the equipment than the principal of the school. However, the school, as the user of a public facility, may also have same bargaining power. Parties that may influence the decision process, just like the private sector, involve architects, the Design Institute, and SEPA.

Accompanying the economy development and population growth in China is great shortage of water, especially in cities. Moreover, water is not being used in an efficient way. According to China's Tenth Five-Year Plan, the municipal wastewater treatment rate needs to increase to 60% from 39.9%. All cities in China now are required by the government to construct wastewater treatment facilities. The law and

regulations on the grey water treatment have already been put into place. That means all the new constructions must meet the requirements for water discharging; therefore, they have to take careful considerations to choose an efficient water treatment system. As the door to this market has been opened to the foreign companies, it's a good opportunity for foreign companies with the advanced technology and products to compete in the grey water and water reuse market.

4. WATER SITUATION IN BEIJING AND TIANJIN

4.1 Beijing and Tianjin Background

Beijing and Tianjin are two largest cities in Hai Basin region, part of northern China. Economically, not including Hong Kong and Macao, Beijing and Tianjin are the second and third largest economies in China after Shanghai. Politically, Beijing and Tianjin are two of the five cities and districts directly under the administration of the State Council. Beijing is the political centre and the capital of China, while Tianjin is the commercial centre and the biggest port city in northern China.

4.2 Market Opportunities in Beijing and Tianjin

As the 2008 Olympic Games approach, the real estate in Beijing and Tianjin will be further boosted. However, both these cities are heavily short of water. The water resource volume per capita is only 300 cubic meters in Beijing, which is only one thirtieth of the world average level (Beijing Youth Daily, 2005). In Tianjin, the water resource volume per capita is even smaller than Beijing. It is only 150 cubic meters, which is 1/15 of the national average level (Water Community, 2003).

Under the government regulations, all the new buildings in cities or high-density suburbs should adopt grey water treatment systems. Grey water reuse systems will mainly go into these building types.

1. hotels and resorts

2. high-rise residential buildings
3. commercial centres and high rise offices
4. buildings built and owned by big companies for self-use
5. institutional complexes (schools, design institutes, public buildings)
6. other government funded organizations such as army units

To meet the economy development requirement for water, Beijing and Tianjin areas have already decided to invest heavily in the grey water treatment systems and develop the laws and regulations relative to the areas of construction. The water shortage problem is in the most urgent situation regarding demonstrable ability to host a successful and sustainable Olympic Games. Beijing and Tianjin have to solve water shortage problems and adopt the grey water treatment systems in the new constructions. We see Beijing and Tianjin as target markets or CWRTC.

5. FIVE-FORCE ANALYSIS

The previous chapters have discussed related basic economic, political, legal and cultural background in China, as well as industry background concerning water and wastewater situation, construction development, especially in the Beijing and Tianjin areas. So far, this paper has presented the picture of China and its water reuse market, and an explanation of what the market wants and needs. We now consider the CWRTC itself to deduce what it can offer to meet the demand as previously stated. In Chapter 5, we make a five-force analysis to understand the competition situation in this market, from the specific perspective of CWRTC. Chapter 6 presents the SWOT analysis on CWRTC's internal and external environment. The goal of Chapter 5 and Chapter 6 is to re-organize the information presented in the first four chapters, coupled with topics specific to these two chapters, from the perspective of CWRTC, in a specific analytical framework in order to make sound recommendations to CWRTC.

According to Porter (1979), the state of competition in an industry depends on five basic forces. These forces are existing competitors, customers, suppliers, potential entrants and substitute products. The weaker the forces collectively, the greater the opportunity for superior performance. Awareness of these forces can help a company stake out a position in its industry that is less vulnerable to attack. In the following sections, we discuss each force in detail.

5.1 Rivalry Among Existing Competitors

The existing competitors in Chinese water market are from both China and foreign countries. In this section, we discuss the top 10 water enterprises in China (including both multinational and local companies), other multinational firms, and other local companies.

5.1.1 Top 10 Water Enterprises

The appealing market potential in China's water industry has attracted not only the local enterprises, but also multinational firms to make huge investment and apply state-of-art technology in this market. The competition is fierce although there is enormous opportunity for the companies to enter the market. China Water Web (2005) lists "Top 10 Most Influential Water Enterprises In China (2004)", presented in the following:

1. Beijing Capital Co. Ltd (including a joint-venture with Veolia)
2. French Veolia Water (Vivendi Water)
3. Shengzhen Municipal Water Group
4. Sino French Water Development Company Limited (French Ondeo Suez Group)
5. Beijing Municipal Drainage Co. Ltd
6. Beijing Golden State Engineering And Technology Co. Ltd
7. Tsinghua Tongfang Water Engineering Corp.
8. Beijing Sound Environmental Protection Industry Group
9. CNECP Water Service Investment Co. Ltd
10. Anhui Guozhen Environmental Protection Science and Technology Co. Ltd

Although the big companies mainly focus on investment for large projects such as municipal water plants and wastewater plants, most of them are also interested in office and residential building water reuse projects. Because these ten companies

possess advanced water reuse technologies and strong financial resources, they are strong competitors for the CWRTC.

Directly invested by the Beijing Municipal Government, Beijing Capital Co. Ltd enjoys pre-eminent influence among the giants in China's water industry. With a strong government background and affluent capital resources, the group invests in finance, real estate development, and infrastructure construction including highway, airports, water supply, and wastewater treatment. In the water market, Beijing Capital has also benefited from its joint venture and intensive cooperation with Veolia and Beijing Municipal Drainage (Fu, 2005).

French Veolia Water (Vivendi Water), the Water Division of Veolia Environment, is the leading operating company for water services worldwide. Specializing in the outsourced management of water services for municipal and industrial customers, it is the world leader in engineering, design, and execution of construction projects for water treatment plants. The company also creates dedicated technological solutions. This activity, which has been the Group's core business for more than 150 years, encompasses the entire water cycle (Veolia Water, 2005). Veolia Water has fifteen years and US\$ 1 billion investment in China's water market. It has succeeded in joining or establishing 84 water supply and wastewater treatment plants. Veolia's most notable achievements also represent milestones in China's water market development. In 1998, Veolia Water won the first formal Build-Operate-Transfer (BOT) project in China's water market to construct and operate the Sixth Chengdu Water Plant. In 2002, Veolia acquired 50 percent of the assets of the Shanghai Pudong Water Supply Company. In the Shanghai project, Veolia Water became the first foreign company to be granted authority to participate in network construction and provide water supply to end users.

Veolia Water and the Beijing Municipal Drainage Co. Ltd., signed a BOT contract for the Beijing Lugouqiao wastewater treatment plant (U.S Department of Commerce, 2005).

Located in Shengzhen, China's economic reform test field and a city adjacent to Hongkong, the Shengzhen Municipal Water Group has benefited from series of innovative government policy including the approval of establishing China's first water use joint venture with Veolia. In December of 2003, Veolia bought a 45 percent stake of the Shengzhen Municipal Water Group for US\$ 400 million, which was the largest water project purchase ever in China (People's Daily Online, 2004).

Interestingly, of the top 10 most influential enterprises, the top 3 plus Beijing Municipal Drainage Co. Ltd, a traditional professional municipal wastewater treatment company, have connections with the French water giant, Veolia Water.

Another French giant, SUEZ, established a contractual joint venture, Sino French Water Development Company Limited (SFWD), with NWS Holdings Ltd in Hongkong. This venture is set up to invest in China's water market, mainly in the fields of water provision, water treatment, and industrial sewage treatment. With a total investment of over US\$ 230 million, it has established 17 cooperative joint ventures in China, producing 3,100,000 cubic meters of fresh water per day to more than 10 million people. By joint developments, SFWD is leading the way in developing China's water market with its advantages in terms of capital, professionals, techniques, and management skills by providing quality services to the customers (SFWD, 2005).

With their unique background and advantages, the remainder of the top ten companies are originally environmental engineering companies marching into the investment business in water reuse and environmental protection industry (Fu, 2005). Beijing Golden State Engineering and Technology Co. Ltd is a pioneer joint venture with the U.S., winning China's first municipal wastewater treatment BOT project in Beijing

Economic and Technological Development Zone. Tsinghua Tongfang Water Engineering Corp. enjoys the brand effect and technology support from the prestigious Tsinghua University. Beijing Sound Environmental Protection Industry Group successfully raised capital in the stock market by mergers and acquisitions (M & A). CNECP Water Service Investment Co., originally owned by State Environment Protection Agency (SEPA), has exclusive network in the administration system. Anhui Guozhen Environmental Protection Science and Technology Co. Ltd, as a representative of China's private company, has performed efficiently and successfully in the industry previously dominated by government-owned enterprises.

One more phenomenon is that six of the top ten enterprises are headquartered in Beijing. The six firms are Beijing Capital Co. Ltd, Beijing Municipal Drainage Co. Ltd, Beijing Golden State Engineering and Technology Co. Ltd, Tsinghua Tongfang Water Engineering Corp, Beijing Sound Environmental Protection Industry Group, and CNECP Water Service Investment Co. While Beijing market is the most prosperous in China, it also has the fiercest competition.

5.1.2 Other Multinational Firms

In addition to the top ten, there are other active players in the market including several other international water companies that have established niche positions in China's water market. Thames Water won its first water treatment BOT contract (20-year term) in Shanghai, with a total investment of US\$ 68 million in 1995. In 2002, Thames Water strategically invested US\$ 70 million to purchase 48.9 percent of the shares of a water company registered in Hong Kong so that it could win water projects in seven Chinese cities. Berlin Water, Germany's largest water company, holds a commanding market presence in China. Entering China's water market in 1998, Berlin

Water has participated in the construction and operation of water supply and wastewater treatment plants in several major cities. In May 2003, Berlin Water established a joint venture water company in the Tianjin Economic Development Area. The joint venture company plans to invest US\$ 100 million to construct wastewater treatment facilities (U.S. Department of Commerce, 2005). A British company, Anglian Water International invested US\$ 12.1 million in Taizhou Water Plants. Singapore RB Environmental Protection Ltd. Co. won authorization to construct and operate municipal wastewater treatment plants in China. Other names in this field are Marubeni (Japan), and Road King Infrastructure (Hong Kong) (DFAIT, 2003).

There are also some Canadian water companies in this market. Among them, Zenon is popular for its membrane technology, Earth Tech of Tyco International focuses on construction, and HATCH specializes in pipelines. Two Canadian companies, ADI from New Brunswick and Ondeo Degremont from Quebec, have won some new bids for water plants in China (China Water Web, 2005). The majority of the Canadian companies are small and medium-sized companies, specializing in small turnkey, wastewater treatment facilities, using bilateral loans from the Canadian Government.

5.1.3 Other Local Companies

To date, approximately two thirds of wastewater treatment equipments is supplied by local firms, as they have the advantage of local distribution networks and links to local governments. The major Chinese water corporations are located in developed regions, such as the coastal areas in eastern China. Traditionally, eighty percent of China's environmental protection enterprises are medium-sized or small enterprises with comparatively low technical capabilities. Recently, several large enterprises, with registered capital of US\$ 12.1 million have been established in China's

market (U.S. Department of Commerce, 2005). Their services include technology development, equipments fabrication, and environmental engineering services.

In general, CWRTC will face existing competitors from both China and other countries, and the rivalry among existing competitors will continue to be high.

5.2 Threat of New Entrants

In China, the water reuse market in the construction industry is a high growth and high volume market with the opportunity of catching reasonable margins. The threshold for capital for water reuse projects in construction industry is significantly low, compared with the investment needed in building a municipal water or wastewater plant. The technology requirement in this sector is also relatively low, compared with that for industrial wastewater treatment.

The Chinese government encourages investment in the environmental protection industry, which is considered as a “morning industry”, a new and profitable industry. Meanwhile, there are many new emerging small and medium Chinese entrepreneurs eager to find suitable projects to invest in. China’s robust economy and desperate need for water resources also attract various international water reuse enterprises from all around the world. Companies from Europe, North America, Japan, Singapore, Australia and Israel, are rushing to the market. New entrants might be equipped with some breakthrough technologies. One impressive example is a Singapore water reuse company that is able to refine the wastewater to potable level, and it tastes even better than spring water in a blind test. Actually, that company offered every Singapore resident one bottle of this water during the country’s last national celebration (China Water Web, 2005).

Therefore, the threat of new entrants will continue to be high because more and more companies, just like CWRTC, are interested in this developing market.

5.3 Threat of Substitutes

Water reuse technology for office and residential buildings is less sophisticated than the wastewater treatment technology applied in industries such as pulp and paper, petrochemical, and the brewery industry. There are several different applicable technologies for water reuse solutions. These technologies mainly include membrane, biochemical, and ultraviolet (UV). However, the whole water reuse solution consists not only of technology, but also design, construction, operating, and maintenance. A completely new water reuse solution cannot be created easily. The threat of substitutes is relatively moderate and will continue that way into the foreseeable future.

5.4 Power of Buyers

There is a popular saying in the Chinese water industry, “zhongshui (domestic wastewater contract) depends on Guanxi (networking), and industrial wastewater contract depends on technology”. Surrounding a buyer are different solution suppliers. According to the law, a project usually involves a public bidding process, but actually the winner is often decided by the buyer even before the bidding. To add to the problems, there is a serious problem of payment delay in the Chinese construction industry. The time when the construction company or the solution supplier can get the payment mainly depends on the relationship with the solution supplier and the project owner. Thanks to the prosperous real estate market; currently, the developers are enjoying fat profits period. Hence, the water reuse suppliers are also well rewarded. However, once the

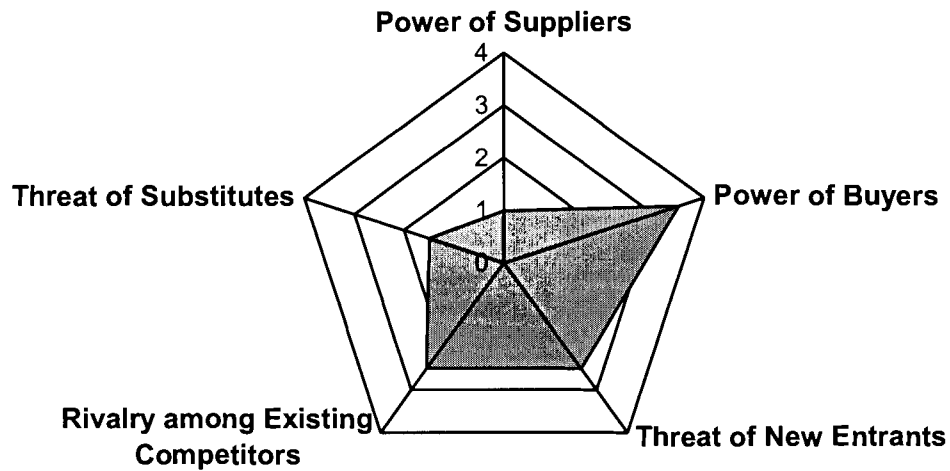
market turns down, it will be a major problem to all participants in the value chain. Therefore, the power of the buyers is high and is the key factor affecting success in this market.

5.5 Power of Suppliers

Water reuse equipments and material suppliers are more than willing to work with the whole water reuse solution providers such as the CWRTC because the manufacturing of the equipments is not sophisticated and the material is easy to find. Equipments and materials are also open to bidding processes and the cost of switching from one supplier to another is low. Suppliers compete with each other, reducing the pressure of supplier bargaining power. The whole solution providers could integrate backward to the equipments-manufacturing sector. Therefore, the power of suppliers is low and will continue to be low.

5.6 Conclusions of Five-Force Analysis

Figure 3: Five Forces Influencing CWRTC



Source: Created by Du & He (the authors), 2005.

Figure 3 summarizes the above analysis of five forces influencing the CWRTC's entry into the water reuse market in China. The power of buyers is the strongest, so the Chinese networking-Guanxi is critical to succeed in this business. Competition from the existing players and new entrants is fierce, and the CWRTC should be well prepared and possess powerful core competency to win clients. The threat of substitutes is moderate and the power of suppliers is relatively low in this market.

6. SWOT ANALYSIS ON CWRTC

SWOT is the abbreviation of Strength, Weakness, Opportunity, and Threat, and is an assessment of an organization's internal and external environments. It seeks to identify meaningful strengths and weaknesses in the organization's internal environment, and opportunities and threats coming from outside, the external environment. A SWOT analysis enables a firm to see opportunities and threats. It helps the firm develop strategies that successfully match what the firm does best with profitable new market opportunities (Solomon et. al., 2003). With the goal of successfully entering China's water reuse sector, we analyze the strengths and weaknesses of CWRTC, and the opportunities and threats faced by CWRTC. We discuss each component of the SWOT analysis in the following sections of the paper.

6.1 Strengths

6.1.1 Full Service

CWRTC assists member firms in developing new international markets through network building that promotes Canadian water reuse technologies and services through the integrated full-service trade association. CWRTC leverages its networking expertise, its knowledge of government programs, the collective market information, and products and services of its member firms to capture new and developing international markets for water reuse solutions (CSCC, 2005).

CWRTC comprises a range of companies that provide engineering, architecture, legal, patents, training, operations, and maintenance as well as management services in support of the manufactured technologies; therefore, it is able to offer full-service water reuse solutions. These solutions require a range of expertise not found in the Small to Medium-sized Enterprise (SME), manufacturers that presently dominate the water reuse technology sector in Canada. Moreover, even the multinational water giants cannot offer the complete service by themselves. Therefore, the ability of offering full service to the clients is one of CWRTC's competitive advantages.

6.1.2 *Leading Technology*

Canadian manufacturers are recognized leaders in the development of Environmentally Sustainable Technologies (ESTs), including water reuse solutions that have market potential for China. The core member of CWRTC, NovaTec Consultants Inc., has a group of leading professional engineers and scientists, with doctorates and master degrees, providing innovative solutions to environmental engineering problems such as water reuse for Canadian and international clients. The company focuses its practice on the areas of specialty of the engineers and scientists, all of whom are actively involved in project work and applied research, thereby remaining at the forefront of their fields (Novatec, 2005). This allows them to supply the advanced technology needed in Chinese water reuse market.

Other members of CWRTC also possess competitive products. For example, Sanitherm's core product, SaniBrane Bioreactor (MBR), possesses cutting-edge treatment technology with a small size (SANITHERM, 2005). Another member, ECOFLUID, has advanced patented wastewater treatment technology; its USBF process is the result of over fifty years of research, development, testing and practical

experience. The USBF is a modification of the conventional activated sludge process, incorporating an anoxic selector zone and an up-flow sludge blanket filtration clarifier in an integrated bioreactor vessel (ECOFLUID, 2005). These products with high efficiency and small size fit well with market demand for water reuse equipments applied in office and residential buildings in Beijing and Tianjin.

6.1.3 Government Participation

The concept of CWRTC has been recommended by leading Economic Development Canada (EDC) economists who note that on a global scale Canadian engineering companies compete with large integrated full service firms or consortiums. EDC recommends that Canadian firms need to strengthen links between engineers, contractors, manufacturers, equipments suppliers and, in some cases, financial institutions and government agencies, to generate the critical mass required to win more profitable integrated projects in the export market. Funding for the CWRTC has been provided by Canadian International Development Agency, Industrial Co-operation Program (CIDA-INC), International Trade Canada and member firms (CSCC, 2005). With the recommendation and funding from these government agencies, CRWTC has organized its member firms together, conducted market research, and visited China to investigate the local water reuse market.

6.1.4 China Connections

CWRTC aims at supplying water reuse technology to China market. It accepts different companies interested in achieving this goal. Hence, it also welcomes foreign companies such as Chinese companies who are familiar with the market situation in China. Some member firms are Chinese. Actually, the CWRTC concept was first

developed out of market research completed by CSCC members in China on water technology related projects. Its Chinese member firm Teon Consulting, based in Tianjin, focuses on water technology consulting in China, while another member, Fujian Newland UV Entech Co. Ltd, is a leading company applying UV technology in wastewater treatment (Newland, 2005). The two Chinese companies have an extensive knowledge about Chinese water reuse market and maintain a good business relationship with Novatec for many years.

Novatec has previous consulting experience in China for the pass ten years. Novatec conducted the Lake Chao Water Basin Management Study, concerning industrial and municipal wastewater effluent, agricultural runoff, and social/environmental impact assessments on water quality within the basin. It also managed and coordinated the San Jiang River Project evaluation, evaluating economics and technical feasibility of the project, in addition to environmental assessment and both industrial and municipal water and wastewater treatment process engineering. Recently, Novatec finished the environmental study of Jiuhoa Mountain and Huangshan Mountain in China's Anhui Province. The study addresses the negative impact caused by the Buddhist shrines in Jiuhoa Mountain, one of China's tourism hot spots. The study also assesses ten sewage treatment plants ranging in capacity between 80 and 1,000 cubic meters per day and serving Huangshan Mountain, another major tourist destination in China (Novatec, 2005). Novatec's experience in China will help CWRTC understand the Chinese water reuse market and take the business opportunities.

Generally speaking, CWRTC has its unique competency for its full service, leading technology, government support to the program, and its various connections with China. Therefore, CWRTC has a lot of strengths, which can help CWRTC successfully enter the water reuse market in China.

6.2 Weaknesses

CRWTC has some weaknesses. First, the member firms are all SMEs, which cannot enjoy the brand effect possessed by multinational water giants already established in China, who benefit a lot from their internationally famous brand names in penetrating a new market. Second, SMEs don't have enough financial resources. It is a common practice in China's construction industry that the engineering company offers the project owner a quality warranty deposit, and the project owner pays the engineering company step by step according to the project process, meaning the engineering company needs a sufficient cash-flow to pay for the equipments and labour in advance. Third, the limited manufacturing capacity has also restricted SMEs to small and medium-sized projects only. Fourth, CWRTC is only a consortium, not one united legal entity. Different member firms may have different interests, different insights of business, and different management styles. These differences may cause conflicts in coordination among member firms and thus may hinder the likelihood of achieving strategic goals. Finally, most of the member firms don't have any local business experience in China; some have never visited China before. Even Novatec has only consulting experience in China.

Therefore, the weaknesses of CWRTC include lack of instantly recognizable brand name, limited finance resources, limited manufacturing capacity, possible conflicts between member firms, and lack of comprehensive service experience in China.

6.3 Opportunities

China's enormous economic growth has created a water crisis that the government is addressing through a number of policies including regulations requiring

water reuse for institutional and new private-residential developments. Regulations publicized by the Beijing Municipal Government revealed that it is a mandatory requirement that new buildings over 300,000 square meters should design and build water reuse facilities (Beijing Online, 2005). The cost of water is dramatically increasing, as evidenced by the 85% increase in the price of water in Beijing in the past years (CSCC, 2005), creating an economic rationale for the introduction of technologies to address this water shortage.

Canadian clean technology, including water reuse technology, has a favourable reputation in China. The Chinese people are also deeply impressed with the concept that Canada is the best place to live, as recommended by UN, while they feel frustrated by their deteriorating environment and water problems. "The best place to live" has attracted a large Chinese immigration population to Canada. The significant number of Chinese-Canadian immigrants has resulted in strong ties between China and Canada. Much of the Canadian investment in China is backed by Chinese Canadians, who help Canadian exporters to build strong and lasting business relationships with clients in China.

Canadian water reuse companies have traditionally benefited from government support such as bilateral loans. CWRTC itself is partially financially supported by Canadian International Development Agency (CIDA). CWRTC may gain further competitive advantage through other Canadian Government policies and initiatives, such as Program for Export Market Development (PEMD), International Business Opportunities Centre (IBOC), Sustainable Cities Initiative (SCI), Canadian Commercial Corporation (CCC), and Export Development Canada (EDC) (DFAIT, 2003). Assistance may be available in areas of finance, technology, and governmental promotion, supplied

by both federal and provincial agencies. All this assistance can help CWRTC enter the new market, create a reputation, and expand its business.

In conclusion, the CWRTC has a great opportunity in the Chinese market because China's massive economy creates thirsty demand for water. Chinese people have a good impression of the Canadian environment being well-protected and a good impression of its environment protection technology. A large number of Chinese immigrants in Canada can help Canadian companies develop the Chinese market. Moreover, the Canadian Government is keen to assist the Canadian companies to gain more share in the overseas market.

6.4 Threats

CWRTC is faced with some potential threats in China. First, as mentioned previously, there is a fierce competition from existing and emerging multinational giants such as Veolia and local entrepreneurs such as Beijing Capital in China.

Payment from the buyer to seller of goods and services can be another problem in the Chinese market, and it is common to see a payment delay in the construction industry. There is a unique concept in China, called "chain debts", meaning the debts between upper and lower enterprises in the value chain. For example, A is the supplier to B, and B is the supplier to C. Because C cannot pay B, then B cannot pay A. The problem is partially caused by the huge historical debts of many badly managed state-owned enterprises. It is also partially caused by the lack of credit and trust system in this new emerging market. Actually, the problem of "chain debts" is so serious in China that former Chinese premier Mr. Zhu Rongji addressed it as a national problem because the "chain debts" prevail in many industries and make the companies' cash flows stagnant.

China is still not a free democratic country, but there is much more economic freedom than before. While enjoying economic freedom, people may expect more political freedom. Further economic reform may encourage political reform from the public, possibly resulting in social turbulence this country experienced a decade ago.

Rapid economic and export growth may bring about inflation and world trade conflicts, resulting in economical instability. Economic instability might trigger a dramatic decrease of real estate price in the construction industry and indirectly impact the water reuse market.

Legal issues such as Intellectual Property (IP) protection is one more concern for Canadian engineers. Although the IP protection environment has improved dramatically, and large intellectually sensitive Information Technology (IT) companies also have invested heavily in China, it might be a problem for water reuse solutions, as the design is not difficult to be understood and copied.

Other problems include cultural differences, which may cost foreigners time, money, and energy to cope. Corruption is not uncommon in some businesses. Lack of transparency concerning government policy and project information, preference towards domestic companies, and the absence of a formal dispute resolution process may severely restrict participation by foreign companies (DFAIT, 2003). These problems, especially dispute resolution, need legal answers to be formally supplied by the Chinese government. Even with China's formal entry into the multilateral trading system, the business and cultural environments remain highly complex. Improvements to the business regime will not take place overnight. Doing business in China can be daunting, even to the most seasoned investors. Canadian investors are most likely to succeed if they are price and quality competitive, prepared for lengthy negotiations, committed for the long term, and experienced in international business development in the past.

Hence, the external threats to the CWRTC consist of fierce competition in the market, the possibility of payment delay, intellectual property protection issues, economic and political instability, and complex cultural environment. If the CWRTC survives all of these issues, it can achieve business success in the Chinese market place.

6.5 Conclusions of SWOT Analysis

To sum up, CWRTC has its unique internal strengths such as the ability of offering full service, possession of leading technology, availability of government support to the program, and its various connections with China. However, CWRTC also has its weaknesses including low brand awareness in the market, insufficient finance resources, limited manufacturing capacity, possible conflicts between member firms, and lack of full service experience in China.

There are a lot of external opportunities for CWRTC in China market because China's vigorous economy growth creates an eager demand for water and water reuse, because Chinese people prefer Canadian environment protection technology, because Chinese immigrants in Canada may assist Canadian companies to explore the new Chinese market, and because the Canadian Government encourages Canadian companies to expand in international market.

CWRTC faces some external threats such as fierce competition from multinationals and local companies in China, the possibility of payment delay, intellectual property protection issues, economic and political instability, as well as the highly complex cultural and business environments in China.

7. RECOMMENDATIONS

In this chapter, we discuss the conclusions generated from our secondary research and analysis, as presented in the first six chapters. We also make recommendations for CWRTC to enter the China water reuse market. Our recommendations include suitable target markets, a business model, and marketing mix variables (product, price, place, and promotion). In addition, we discuss long-term strategy. Finally, we evaluate the potential risks and suggest ways to manage the risks.

7.1 Enter the Water Reuse Market in China

As analyzed previously, China's economy has experienced great growth, which has worsened the environment with water pollution and water shortage, creating a great need and opportunity for water reuse technology.

Although CWRTC has its internal weakness like insufficiency of financial resources and external threat like fierce competition, CWRTC has the strengths of supplying products and services to meet the exact market demand. It is able to offer the unique full service ranging from consulting, design, manufacturing, operating, and training. Its high professional teams possess state-of-the-art technology. It is also supported by the Canadian Government. Therefore, we recommend CWRTC to enter China.

7.2 Target Markets of CWRTC

We suggest CWRTC to choose Beijing and Tianjin as its targeted markets. The demand for water reuse solutions in the construction industry in Beijing and Tianjin is desperate because northern China, where these two metropolitan areas are located, has less rainfall than southern China. Moreover, Beijing and Tianjin are key economic areas in China. One unique feature for Beijing is that, as the capital of China, its practice will be used as an example for the rest of the country. If Beijing successfully implements a new water reuse policy, other cities in China will follow. If CWRTC can succeed in Beijing, its reputation will help its further expansion to other parts of China. Beijing will also host the 2008 Summer Olympic Games, which will affect the image of China to the world. It is also required by the World Olympic Committee that Beijing should improve its environment condition including water quality. Therefore, Beijing has a priority among all cities in China, which also explains why Beijing is the first city in the country to enforce the instalment of water reuse facilities in individual buildings. As per the bylaw issued by the Beijing Municipal Government, on June 29, 2001, it is mandatory to install water reuse facilities in hotels and resorts over 20,000 square meters, government buildings, such as schools, public, cultural and sport facilities over 30,000 square meters, and residential buildings over 50,000 square meters.

In addition, the real estate price in Beijing is the highest in China. The cost of installing water reuse facility may be a relatively low percentage of the total construction cost in a high price real estate market, compared with that in a lower price market. The clients in this market are more able to afford CWRTC's high quality product.

Tianjin, neighbouring city of Beijing, faces the same water shortage problem and shares the same concerns of water reuse management as Beijing. Moreover, one of CWRTC's Chinese member firms, Teon Consulting, is located in Tianjin and has more

knowledge about the Beijing and Tianjin than other cities. We take all these factors into account and recommend CWRTC to start its China exploration in Beijing and Tianjin.

Based on the local government regulations and CWRTC's background, we recommend CWRTC to target at buildings of 30,000—100,000 square meter, with wastewater flows less than 1,000 cubic meters per day. These buildings may include hotels and resorts with western ownership, high-rise residential buildings, building in high density or high-end suburbs, buildings in commercial centers, high-rise offices developed by real estate developers, buildings built and owned by big companies for self-use, and government funded institutional complexes such as schools, public buildings, and army units.

The rationale for choosing these targets is their ability to pay for the high quality, but relatively expensive, service offered by CWRTC. Western-owned hotels, profitable commercial centers, big companies, and the government may have more disposable financial resources to honour the bills than the average Chinese company. The targeted segment is mainly a niche market for state of the art technology, meeting high international standards for recycled water and an improved ecological environment. It therefore makes sense to recommend CWRTC to be positioned as “the world's best water reuse solutions from the world's most inhabitable country” and target at these buildings in Beijing and Tianjin.

7.3 Business Model

To develop the local market, it is necessary for CWRTC to maintain a local presence. We recommend CWRTC to set up an equity joint venture with a local partner . There are several reasons for this recommendation. First, according to local regulations, an engineering company needs a local technical qualification certification

based on the company's local working experience and employment of local engineers. A local partner may have the required qualification certification already. Second, a local partner who has both a good understanding of the market and important personal contacts in the private sector and government can be very useful. Given the fact that establishing personal relationships is an important element of doing business in China, the ability of a local partner to open doors is very beneficial. Third, Chinese companies are inclined to create joint ventures with foreign partners who are able to bring them capital as well as technology; the two parties can share the return of investment on a long-term basis.

CWRTC also needs to set up a manufacturing base in Beijing and Tianjin because water reuse equipments need to be designed and made according to the specifications of the buildings, such as capacity, water flow, and space for instalment. Being close to these buildings help reduce travel expenses as this process requires constant supervision. A local manufacturing base also makes it easier to communicate with local clients. Moreover, a local factory can deliver the equipments to the clients more conveniently. Cheap local labour is also a positive factor to reduce the total manufacturing cost, making the water reuse solutions more competitive.

7.4 Marketing Mix

In this section, we suggest specific marketing mix for the CWRTC to enter Chinese water reuse market. The marketing mix comprise of product portfolio, training, pricing strategy, distribution, and promotion. We also discuss what kind of government support CWRTC should obtain to aid its practice of the marketing mix.

7.4.1 Product Portfolio

CWRTC has the exact technology and products for 30, 000 to 100,000 square meters with wastewater flow of 1,000 metric tons (one cubic meter of water weighs approximately one ton) per day. For instance, its member firm Novatec has two finished sample water reuse projects, the Quayside Village Grey Water Reuse System located at North Vancouver, B.C, Canada, and the N'dilo And Dettah - Water Reuse System at Yellowknife, NWT, Canada. The systems treat all wastewater from homes and incorporate primary solids removal, biological treatment (recirculating filter), solids filtration (roughing, fine & activated carbon), ozonation, and UV disinfection, followed by storage. The systems are currently providing reuse water for toilet flushing (with water savings of \$8,000 per year for Yellowknife project alone), with the intent to provide reuse water for bathing, irrigation, and laundry uses (Novatec, 2005). Such examples can be practiced and copied in the Chinese market.

Another possible product for Novatec to develop is the water reuse equipments for bathing centres and laundry stores. One unique phenomenon in China is that people visit sauna-bathing clubs frequently for relaxation and socialization, which is quite different from the Western culture. Some people even visit the clubs everyday, as it is just part of daily life. There are different price level clubs for people with different incomes. However, the water price for bathing centres is much higher (RMB61.5/ ton) than the price for residential use (RMB3.7/ton) (Zhang, 2004). The rocketing water price is the main cost for the operation of such clubs. The club owners are eager to install the water reuse equipments, as the water price will keep rising, possibly causing them to shut down the prosperous business. There is no product available in the market at present because of the difficulty in maintaining adequate disinfections levels. The Chinese government currently restricts water reuse in bathing, swimming pools, and

laundries. Novatec possesses the technology to develop a suitable product for these facilities. If the government changes the regulation by allowing qualified water reuse in bathing, swimming pools, and laundries, there will be a huge market potential for this new product.

In addition to Novatec's technology and products, Sanitherm's SaniBrane Membrane Bioreactor (MBR) and ECOFLUID's USBF are also competitive. The managers of the two companies have just completed their first business tour to China, and are quite optimistic about the market for their products.

7.4.2 Training

Training is a service CWRTC can supply to the market. Its member firm, BCIT, has a training base in Beijing, in addition to CWRTC's expertise. As previously analyzed, low operating efficiency and inadequate maintenance of the installed equipments is a problem in this market. Many operators only know how to turn on and off the equipments, but don't know or don't care about the wastewater and the treated effluent. Low efficiency is a huge waste of investment and resource. Training to improve operational efficiency is beneficial to the owners of these already established equipments. Training can also help CWRTC's networking, distribution, and promotion.

Training by CWRTC is a good start to networking in this new market. People needing to be trained may include the inspectors from local SEPA offices, who have a good knowledge and network of local water reuse clients. Trainees will also include the operating staffs of the established water and wastewater facilities; they are some of the current clients in the market. CWRTC may benefit a lot by networking with these people and creating a good reputation among them.

For CWRTC to provide training, it has to first investigate the seriousness of the inefficiency and decide what it can do to improve the situation. CWRTC can do the job together with a local research institution under SEPA, or a local professional media, as these institutions may know better what the level of operational efficiency currently is.

With its technology expertise, CWRTC has the ability to help the Chinese government set up strict inspection and operation regulations. After several explosions of industrial boilers taking lives, the government set up mandatory regulations for boiler operation and inspection. The regulations require that all the operators get a certification of training, and the government agents inspect the sites regularly. The same practices can be applied in the water reuse industry. This can be an opportunity for CWRTC to help the Chinese government fine-tune the regulations.

We recommend CWRTC to offer some free training to governmental officials. We hope that, as a result, SEPA will recommend CWRTC as one of the qualified trainers. That is an ideal way for CWRTC to begin the training program, as governmental recommendation can be much more effective than company's own promotion, especially in the local bureaucratic society. What is even more important is that the training program may help CWRTC to approach the whole network in the water reuse sector. Then, CWRTC can promote the solutions to the decision makers and influencers in the process of purchasing water reuse equipments.

7.4.3 Pricing Strategy

Since CWRTC's mainly targeted market is a niche market, where clients emphasize more on product quality than on price, we recommend setting the price higher than average. It is reasonable for the market to pay more for the technology that is of highest quality and that will meet standards consistently.

One of the current problems is that people shut down the implemented low quality equipments because of the annoying odour and possible unsanitary effect on tap water. Such deficient facilities may cause huge loss of business to high quality hotels, offices, and residential buildings. To avoid this problem, higher efficiency facilities should have been installed instead. CWRTC can position itself as a solution provider whose high efficiency facilities would never result in shut-downs due to low quality or low efficiency. These facilities may be a little more expensive, but it would be worth it to pay more upfront to avoid huge loss due to eventual shut-downs or low efficiency.

7.4.4 *Distribution and Promotion*

CWRTC needs to create its own distribution system, through establishing business relations (“Guanxi”) in China. To network does not necessarily mean to bribe although bribery is not uncommon in a developing country like China. To win your customers with your expertise, and brand image is better than bribery for a niche market. High quality and good service itself can speak loudly in the market and spread quickly as word of mouth.

There are several ways to promote the consortium and its integrated solutions of designing, construction, training, and operating. Canadian Mortgage and Housing Corporation has a list of Canadian architects working in China (CMHC, 2004). By cooperating with these architects, CWRTC can promote the high quality water reuse solutions with high quality Canadian architecture, to create an ideal life style for clients in China.

Professional exhibitions are also chances for new companies to promote themselves in a new market. There are several exhibitions concerning water reuse solutions held in China every year. The most important one is the China International

Environmental Protection Exhibition and Conference at Beijing, which originated in 1986 and is sponsored by SEPA. This conference is the largest in China, with the longest history and best quality (U.S. Department of Commerce, 2005).

We recommend CWRTC to join professional seminars, where participants demonstrate and promote their advanced technologies as a way to promote CWRTC and its water reuse solutions. Other promotions may include reports and advertising on professional Websites like China Water Web, which is quite popular in the industry.

We also recommend CWRTC to set up a sample project demonstration center, a permanent project completed by the consortium, in a convenient location where the solution supplier can show the potential clients the solution's advantages and can discuss the clients' needs right there. CWRTC needs to sign an agreement for using the place as a demonstration centre.

7.4.5 Government Support

We recommend CWRTC to seek support from the Canadian Government in three areas: financial support, support in research and setting up a sample project, and support in market promotion.

CWRTC is actually recommended and funded by Canadian governmental agencies; the goal of CWRTC also complies with the interests of the government. CWRTC brings Canadian SMEs together to explore opportunities in China, possibly bringing more employment to Canadian citizens, more profit to Canadian companies, and, finally, more tax revenue for the Canadian Government. Furthermore, the consortium's environmental protection and nature resource saving mission is also positive to the image of the Canadian Government and Canada as a whole.

Although CWRTC should seek to win more funds for its research and sample projects from the government, we suggest CWRTC to seek governmental support in other areas as well. For instance, the Canadian Government can coordinate various relationships within CWRTC's member firms. The Canadian Government can also help CWRTC connect with other organizations such as financial institutions and international organizations (for example, the World Bank) for preferential loans for the projects. One example of government support is the French water companies in China. They are financially and politically supported by the French government, and as a result, they are quite successful (China Water Web, 2005).

Governmental support will also be helpful in market promotion for a consortium of SMEs. SMEs don't have the same name effect as the water giants, but government support can help them to create credibility and trust among clients and the local Chinese government. With Canadian Governmental support, previously mentioned training programs may have more chance to win the approval from SEPA.

To conclude this section of marketing mix, we recommend CWRTC to make a product portfolio consisting products of Novatech's water reuse facility for residential buildings, Sanitherm's MBR, and Ecofluid's USBF. Training is a service we recommend for CWRTC to start is exploration. We recommend CWRTC to distribute and promote its products and services by networking with clients, participating in exhibitions and seminars, and setting up sample projects. To apply this marketing mix, CWRTC should gain further government support in areas of finance, research, and promotion.

7.5 Phases for Market Expansion

In the previous sections of chapter 7, we have suggested CWRTC may start its market exploration of China for selling water reuse solutions in the construction industry

in Beijing and Tianjin, as a short-term strategy. After CWRTC's successful initial presence in this market, we recommend it to expand to other geographic locations as well as other product and service sectors, as its long-term strategy.

7.5.1 Geographic Expansion

7.5.1.1 Within China

For geographic expansion, we first suggest CWRTC to consider expanding its business to other areas within China, such as other coastal metropolitan areas, medium sized cities, western China, and rural areas in China.

China has the world's largest population, and its GDP per capita has just passed the benchmark of US\$ 1000. It has been proved in other developing countries that once a country's per capita GDP exceeds US\$ 1000, there will come a leap in its local consumer market. To avoid head-to-head competition with the multinational water firms in major metropolitan areas, CWRTC should focus more on medium sized cities. These cities are good matches for the size of CWRTC's SMEs. It is revealed in the latest "China Urban Environment Report" by SEPA that 193 out 500 evaluated cities have zero centralized municipal wastewater treatment rate (Jinghua Time, 2005).

To balance the economic growth of the nation as a whole, the Chinese government is encouraging the enterprises to invest in its less developed western area, compared with the eastern coastal area. Cheaper labour and preferential governmental policy in the west have attracted a large amount of investment. However, the water shortage problem is even worse in the western area than other places in China. Generally speaking, there is less rainfall in the north than in the south, and less in the west than in the east of China, resulting in that the northwest has the most serious water

shortage problem. The world famous Gobi Desert is located in northwest China. Big problems can bring big opportunities; CWRTC should keep an eye on that market.

We recommend CWRTC to look into the rural areas in China as well. Contrasted to western countries, China has the majority of its population in its rural area; about 1 billion out of its 1.3 billion people live in the countryside. This is a large percentage of the total market. As we mentioned before, the CWRTC' executive team has just returned from a trip to China and is excited by the market opportunity in the rural areas bordering Tianjin. The Tianjin municipal government plans to build up 330 rural towns, all of which eagerly need water reuse solutions for daily use and irrigation. The same opportunities may exist in other rural areas.

7.5.1.2 Other Markets

North America is where CWRTC originates and the North American market is familiar to CWRTC. According to our recommendations in Section 7.3, CWRTC needs to set up a local manufacturing base for its water reuse facilities in China. CWRTC can consider exporting water reuse equipments manufactured in China to North America.

Another market that CWRTC can expand to is countries neighbouring China, such as India. India has the world's second largest population and is experiencing the same economic development path as China. Its current GDP per capita is around US\$ 500, and the water giants may have less presence in that market. This means a large opportunity for CWRTC to go into India.

We recommend CWRTC to consider North America and the countries neighbouring China as new markets to export its water reuse equipments manufactured in China.

7.5.2 Product and Service Sector Expansion

7.5.2.1 Industrial Wastewater Treatment

For the short-term, we recommend CWRTC to target residential and office buildings in Beijing and Tianjin for its water reuse technologies. The market for industrial wastewater treatment is full of opportunities as well. Many industries generate wastewater, which has to be treated so that it does not pollute the environment. Therefore, in the long run, we recommend CWRTC to expand to its service to industrial wastewater treatment.

Industrial wastewater is the wastewater generated from manufacturing factories in industries such as the petrochemical industry, the pharmaceutical industry, the paper and pulp industry, and the food and beverage industry. Industrial wastewater contributes more than domestic wastewater (including wastewater from office and residential buildings) to the total water pollution in China, in breadth and depth. Industrial wastewater differs from domestic wastewater in that it is usually unstable, contains high pollutant concentrations, and has low biodegradability. Some of the factories for pulp and paper, for example, have caused unrecoverable damage to the water resources and environment in remote rural areas. These enterprises are under pressure from the Chinese government for better treatment performance (CCTV, 2004).

Usually, industrial wastewater treatment involves higher quality technology and equipments, such as technologies that can efficiently remove non-biodegradable organics in pulp and paper, textile, chemical, and petrochemical industries (U.S. Department of Commerce, 2005). International companies possess more competitive technology advantages in industrial wastewater treatment than their Chinese counterparts. In addition, industrial wastewater treatment may have a higher margin for

the higher technology. This is because these enterprises are willing to pay for the high technology to avoid the penalty from the government for discharging untreated wastewater, and at the same time, they can create a better company image to the public.

By combining environmental engineers with chemical, bio-chemical, agriculture, process, civil engineering specialists, and community planners, CWRTC has expertise and experience in industrial wastewater treatment, especially in pulp and paper, and food processing industry (Novatec, 2005). Technology-based industrial wastewater treatment sector may have more market potential for CWRTC than the cost based domestic wastewater treatment sector.

7.5.2.2 *Water Market Investment*

As a long-term strategy, CWRTC should also consider BOT (build-operate-transfer) practices in the wastewater market. BOT requires a qualified investor first to build a project such as a wastewater treatment plant for a local government, then the investor operates it for a period of time to get the investment and profit back. After this period, the project will be transferred to the local government. BOT projects usually involve huge amounts of long-term financial investment. Water and wastewater investment is the largest slice of the water market pie (Guo, 2005), and all the water giants are active in this area.

Although CWRTC is a consortium of technology based SMEs with limited financial ability, CWRTC has the support from the Canadian Government, who is able to make various financial arrangements, just like what the French government does for Velio and Suez. CWRTC is close to the world's largest financial resource—United States, and has certain connections in this field such as GE Financial. Besides,

CWRTC's background of technology, training, and legal services may help it to negotiate, build, and operate BOT projects such as wastewater treatment plants.

BOT projects may also help CWRTC to establish a solid reputation in the industry and build trusting relationships with local municipal governments. Big BOT deals in a new city may bring CWRTC more relatively small deals in other sectors like water reuse projects in residential buildings and manufacturing factories.

7.5.2.3 Sale of Wastewater Treatment Equipments

We also recommend CWRTC to think about the import and export business of wastewater treatment equipments.

China can manufacture some low profile wastewater treatment equipments, but there is a high demand for high profile equipments that cannot be made domestically. Examples of such equipments include membrane separation and manufacturing equipments, high-concentration organic wastewater treatment equipments, series-standard wastewater treatment equipments with high-efficiency, monitoring instruments, and water treatment agents.

China's domestic technology is mature in producing the common plant equipments such as pumps, valves, mixing equipments, reaction equipments, sedimentation equipments, and filtration equipments (U.S. Department of Commerce, 2005). Due to the cheap local labour and economies of scale, these labour-intensive equipments are cost-effective with a stable quality. There is a large demand for them in North America. Although CWRTC itself is technology-based, and does not necessarily manufacture these low-profile equipments, it has extensive knowledge and network in this industry.

We recommend CWRTC to sell high profile North American manufactured equipments to China, and sell low profile products manufactured in China to North

America. In addition, compared with setting up joint-ventures to offer wastewater resolutions or making BOT investment, sale of wastewater equipments is less risky and can start quickly. Hence, CWRTC should seriously consider importing and exporting equipments to expand its products and services.

7.5.2.4 Environmental Service

We further recommend CWRTC to increase its environmental service to management of established water facilities in China as well as environmental monitoring and analysis.

As mentioned previously, the efficiency for the completed water reuse projects in many parts of China is low. The CWRTC executive team was also astonished to learn that a visited Tianjin project placed its imported multi-million dollar equipments in a wrong sequence, and the operators knew nothing about the data of wastewater and treated effluent. Stringent regulations and increasing water prices are expected to prompt companies to upgrade management by either having its own operators trained or contracting operation service. However, the operation service sector for wastewater treatment facilities is not yet well developed in China. While CWRTC is initiating its training program on operation, it can also consider moving into the management service of the established wastewater facilities in the long term.

Another service CWRTC can offer is environmental monitoring and analysis, tests performed while water and wastewater treatment facilities operate and tests on products. Although Chinese environmental research and monitoring institutes, environmental monitoring stations, and environmental protection companies can provide these services, their equipments, devices, and instruments cannot match the quality of those from developed countries. This sub-sector is expected to grow, with new companies entering the field in response to market mechanisms in monitoring demands,

strengthened public opinion, and possible co- supervision with monitoring stations (U.S. Department of Commerce, 2005).

The discussion in Section 7.5 concerning the long-term strategic phases of CWRTC's market expansion is based on what the Chinese water market needs and what CWRTC can possibly offer in the future to satisfy the needs. The long term organizational objective of CWRTC should be a technology-based comprehensive company offering complete solutions for domestic and industrial water reuse and wastewater treatment, with business sectors ranging from consulting, design, equipments manufacturing, construction, operating and management training, trade of related equipments, to investments. CWRTC should also make geographic expansion to other areas in China, countries neighbouring China, and North America.

7.6 Risks and Risk Management

The previous sections of chapter 7 have recommended what CWRTC should do in short-term and long-term to achieve its business success. In this section, we evaluate the risks CWRTC may encounter and make suggestions to avoid or control the risks.

7.6.1 Risk of Fierce Competition

As previously analyzed, CWRTC will face competition from existing and emerging multinational giants and local enterprises. Compared with the water giants, CWRTC, as a consortium of SMEs, has its weaknesses including the lack of recognition of its brand name, limited financial resources, and the fact that its members do not always share the same goals.

To alleviate the negative effects of low brand name awareness, CWRTC should position itself as a high-technology-based Canadian company, primarily offering high

quality service with relatively high price in the water reuse market. The Canadian Government can help to promote the company among the local Chinese clients and government, and can assist CWRTC to make financial arrangements with relevant institutions in North America. By setting a common goal and with the necessary governmental coordination, CWRTC can unite its members to offer more effective water reuse solutions to the Chinese market.

7.6.2 Financial Risk

Payment delay from the project owners to the solution suppliers can be another risk; therefore, CWRTC should target those customers with good reputations and in good financial standing while practically assessing the market situation.

Western-owned hotels, resorts, or other investments may have a good reputation for payment. Payments for government-funded projects are guaranteed. Lucrative industries, such as real estate and petrochemical, are more likely to honour bills than regression industries such as not-so-profitable chemical factories and small paper mills. Payment can be better fulfilled by uncontroversial contract and reasonable payment schedules based on the project process. It will be also critical for CWRTC to establish trust and relationship with the clients and local government as well.

To avoid financial risk, we suggest CWRTC to make practical analysis of the market situation and the clients. Take the Tianjin rural projects as example, it may be difficult for the government and local residents to afford the water reuse equipments in all the 330 planned towns. It is true that China has developed its economy dramatically, but its GDP per capita is only US\$ 1000. Compared to that of developed western countries, China is still a developing country. It is also true that the Chinese government emphasizes on environment, and billions of dollars might have been wasted on repeated

import of low quality equipments (Zhao, 2005) or on low operation efficiency of the installed equipments. In addition, when it comes to specific water reuse projects in a local government, there might exist problems of limited budget or established priority of projects that the government has planned to pay for.

The expenses for public water reuse facilities in rural areas are often paid this way. Usually the government subsidizes parts of the investment while the towns and the residents pay the rest. It is not very difficult for those rich towns to pay their parts, as those towns usually have their own factories or businesses. Such towns would like to pay the bill because they are also hoping to attract other investors by improving the environment and water supply. However, for those remote towns hidden in the mountains where there is no business establishments to appeal to outside investors, it is simply impossible for them to pay for the cost of the facility.

Another fact should be considered in this case is the price. Based on the talk with some Chinese engineers, we conclude that it is practical for suppliers to design the applicable water reuse solutions to be priced between CAD 50,000 and CAD 80, 000, especially for those remote towns. These towns are not for the million-dollar North American equipments, as these high-end equipments may scare those residents living in the remote towns. In some cases, the assets of the entire town added together may be worth less than half of the equipment.

Therefore, we suggest that CWRTC focus on the Tianjin rural projects near the metropolis. Only about 30 to 50 projects of the 330 towns are good candidates for CWRTC firms.

7.6.3 Cultural Difference

It took Bill Gates twelve years and billions of missed revenue dollars to learn how to do business in China. Some investors had even worse luck and failed in this market. One example is Thames Water, who is planning to withdraw from China. It is estimated that up to nine out of the ten unsuccessful investors fail because of "misunderstandings"(Newsweek, 2004).

Understanding changing business values and the characteristics of Chinese business culture is challenging. It is a process of accepting differences, adapting to change and adopting new ways of managing across cultures. International investors should have an open mind to understand and use the concepts of "face" and "Guanxi", a very important aspect of doing business in China. They should find and contact the right people.

In general, to achieve business success in China, international investors need to understand and respect Chinese cultural values: harmony, avoiding conflict, avoiding embarrassing others, respect for age, tradition, honour, and reciprocity.

7.7 Conclusions of Recommendations

China's water sector policy reforms unleashed a wave of optimism in China's water market and created significant market opportunities for investors. Based on its unique strengths and knowledge, CWRTC should march into China to experience the biggest, most exciting happening in business history. We recommend CWRTC to choose water reuse markets in construction industries in Beijing and Tianjin as its initial target markets, and position itself in the niche market as "the best water reuse solutions from the world's most inhabitable country". We also suggest CWRTC to promote its

equipments with cutting-edge technology and at upper medium price level. We further recommend CWRTC to make distribution and promotion by using an innovative training program, with sustainable support from the Canadian Government.

In a long term, we recommend CWRTC to expand to other areas in China and other countries, and involve in other service sectors such as industrial wastewater treatment, water market investment, and sale of water and wastewater treatment equipments. CWRTC should also be aware of the potential market risks such as fierce competition, financial risk, and cultural risk. With its strong management knowledge and skills, CWRTC will be able to avoid potential risks and achieve great success in China.

8. LIMITATIONS AND FUTURE RESEARCH

The sponsor CWRTC generously offers us invaluable reports and articles concerning this project, but we lack detailed knowledge of specific water reuse technology. Such knowledge can only be acquired through years of experience. Therefore, this paper may present a limited understanding or bias on the cost of the sophisticated equipments and the difficulties of technological service sector expansion.

Though we have made use of secondary sources, interviewed engineers, and debriefed the results from CWRTC's trip to China, we have not made any direct investigation on potential clients in the specific Chinese market. We look at the market from the perspective of a Canadian company instead of the perspectives of Chinese clients. Hence, there may exist some subjective bias on market situation and product portfolio in our analysis and recommendations.

Above all, the theories presented in this document need to be tested in reality. A field trip to see the real situation in China and to discuss with the potential clients to conclude if our recommendations make sense would be helpful. Such primary research would help adjust our strategies to be more practical.

Future research should make a detailed survey on specific, potential clients in China. This survey should take place physically in China. The researchers should also talk to these potential clients in depth to understand how they feel about what CWRTC has to offer. The research should also look at, very closely, the problems in the local market and determine specific technology required in the market. It should come up with

a detailed procedure of manufacturing in China and, at the same time, it should find out the exact regulations about technology requirements and investments.

In the past two decades, China has experienced dramatic growth, moving from a state-planned economy to a market oriented free economy, and is now successfully integrated into the world economy. There are indeed great opportunities for CWRTC in China. However, regardless of what recommendations CWRTC will implement in its entry to China, it should exercise caution and proceed step-by-step, just like the Chinese proverb, favoured by the former Chinese leader Mr. Deng Xiaoping, which says the following:

Crossing a river by feeling the stones.

After all, the only way to cross the river is to feel every stone along the way, adjusting one's steps carefully and enjoying the heartfelt experience.

APPENDIX:

A SURVEY ON THE WASTEWATER REUSE MARKET IN CHINA'S CONSTRUCTION INDUSTRY

We would like to thank you in advance for taking the time to complete this survey.

This questionnaire is prepared for the research of market entry strategy for Canadian companies entering into wastewater reuse sector in China's construction industry and is being conducted by SFU MBA students. The information collected will be only used for research objectives and will be kept confidential.

The purpose of this questionnaire is to understand the problems concerning wastewater reuse sector in China's construction industry, typical stages for wastewater reuse project, and market entry strategy. Your experiences and opinions are critical for this research.

If you have any comments, please contact:

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Project sponsor: CWRTC: Dr. Greg Finnegan: gfinn@novatec.ca

Questions:

Part 1: China Market Activities

1. Which cities in China has your company been involved in?
2. What kind of projects have you completed in these cities?
3. What are the problems concerning wastewater reuse sector in China's construction industry? (i.e., technology, operating, management, regulations--IP protection, payment, other problems)
4. How did you choose wastewater reuse suppliers in your design, such as Chinese suppliers, Canadian suppliers, or any other suppliers?
5. Please describe the typical stages of a bidding process of water reuse project in your design in China. How is it different from those in Canada?

6. Who makes the purchase decision for water reuse solutions? Who are the influencers? When and how is the decision made?

Part 2: Market Entry Strategy

1. What is the most effective way to distribute or deliver the products and services? (i.e., direct sale, networking—Guanxi, agent)
2. What are the effective ways to promote the products and services in this market? (i.e., exhibitions, seminars, advertisings)
3. Is a plug-and-play technology showcase feasible? If so, where shall the showcase be set up? And how would it work?
4. Do you have any other comments and suggestions concerning China wastewater reuse market or barriers to undertaking sustainable building projects in China in general?

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