Request for Proposal by T.G.TIGER Motorcycles for Fuel Cell Equipped Scooters in Taiwan

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Project Objective

Taiwan Green Tiger Motorcycles, TGTM, is looking for an international partner, to join in a joint venture, to help with the design and manufacture of fuel cell powered scooters for retail sale in Taiwan. The goal is to design, manufacture, and sell at least 5,000 fuel cell powered scooters per year in Taipei and the surrounding areas.

Project Scope

T.G.Tiger Motorcycles is a manufacturer of motorcycles and scooters in Taiwan. Currently producing 1500 scooters a month, with capacity to do 4,000, we are seeking to add a line of fuel cell powered scooters through a joint venture company. TGTM's technological expertise and experience include a working knowledge of the scooter industry, an assembly line and additional space for manufacture and storage of fuel cells and required systems, as well as an experienced R&D team, managerial, engineering, and line staff, and finally a thorough knowledge of the laws and operations governing Taiwan.

The joint venture partner should provide fuel cell technology and manufacturing, as well as the following personnel: fuel cell technicians, mechanical engineers for the redesign of combustion engine scooters to fuel cell scooters, and chemical engineers to aide the process of methanol production and development of distribution stations.

TGTM TEAM

Logan Larson — Chief Executive Officer, Larson@cooper.edu
Babak Hedayati — Chief Financial Officer, kababi@123iran.com
John de la Para — Chief Technology Officer, Delapa@cooper.edu
Huiyen Lau — Chief Cultural Officer, cuhiuyan@yahoo.com

Project Background Information

Taiwan
-General

The Republic of China, more popularly known as Taiwan, is an island of 13,731 square miles located in Eastern Asia. Taiwan has a multi-party democratic government. The current president is Chen Shui Bian from the Democratic Progressive Party; also know as the "Green Party" due to its emphasis on environmental protection.

The population in Taiwan is now 22,370,461, with a growth rate of 0.8% in 2000. The age structure is shown below. Currently, there are 15.6 million people who fit into the target market for marketing of fuel cell scooters in Taiwan.

	Age Groups	% of Total	Male	Female

Age Structure	0 – 14 years	21.22	2,470,270	2,276,108
	15 – 64 years	69.97	7,944,451	7,707,250
	65 years and over	8.81	1,034,230	938,152

The population of Taiwan is a combination of 84% Taiwanese, 14% Mainland Chinese and 2% aborigine. The official language is Mandarin and the dominant religion is a mixture of Buddhist, Taoist and Confucian. While Taiwanese still keeps and values the Chinese traditions, they are very open to new ideas. For that reason, TGTM feels fuel cell scooters will be embraced by the communities of Taiwan.

-Economic

The economy of Taiwan has grown steadily over the past decade. Due to the global economic slow down, the economic growth rate for 2001 is estimated at 4.02% and the gross domestic product (GDP) is estimated to be US$308.5 billion in 2001, with 3% accounted to agriculture, 33% accounted to industry, and 64% accounted to services. GDP per capita, purchasing power parity, is an estimated US$14,082. Consumer Price inflation is an estimated 1.21%.

The estimated labor force in Taiwan is 9.8 million. The unemployment rate was 3.2% in 2000. The distribution of the participating labor force is the following: 7.8% in agriculture, 37.2% in industry, and 55.0% in services.

Petroleum is the dominating fuel in Taiwan, occupying 71% of the market. The annual consumption is 41,118 MLOE (Megaliter Oil Equivalence) in 2000. Thirty-five percent of this goes to the use in transportation, reflecting a 7.4% growth in the last twenty years. Petroleum product prices are shown in below.

Recent Selected Petroleum Product Prices (Including Taxes) of Taiwan in Comparison to Selected Countries

Item		Automotive Fuels	Automotive Fuels	Residential Fuels		Industrial Fuels	
		Premium Gasoline	Diesel Fuel	Light Fuel Oil	LPG	Light Fuel Oil	Heavy Fuel Oil
Region / Country	Date	U.S. Dollars per gallon	U.S. Dollars per Barrel				
United States	1/2000	1.47	1.36	1.26	0.63	36.33	22.55
United Kingdom	1Q/2000	5.13	4.77	1.13	--	39.81	30.09
China	5/2000	1.44	1.30	--	--	--	17.68
Hong Kong	1Q/2000	5.11	3.22	1.06	2.22	88.69	44.55
Japan	1Q/2000	3.65	2.89	1.60	--	43.65	30.39
Korea, South	1Q/2000	4.09	1.95	1.73	--	--	40.04
Taiwan	3/2000	2.50	1.76	0.73	0.94	--	--

Deficiency in energy reserves means Taiwan has a very high degree of dependence on energy imports. To solve this problem, the Ministry of Economic Affairs (MOEA) issues energy policy that ensures the stabilization of energy supplies, the upgrading of the efficiency of energy use, and the extension of energy conservation concepts and methods. Further, in response to the steady heightening of environmental consciousness, MOEA encourages the development and promotion of new and clean energy by granting tax incentives to companies that research in this area. TGTM feels fuel cell technology would be a favorable solution.

As previously mentioned, transportation consumes more than one third of petroleum use in Taiwan. Furthermore, scooters are very popular in Taiwan. Every 1.9 person owns one motorcycle or scooter. In 2001, out of the 17.2 million registered motor vehicles, 4.5 millions are scooters, which represents nearly 27% of all registered motor vehicles. As scooters are already a popular mode of transportation, in combination with fuel cell power, wide spread usage would be a huge relief to the demand of Taiwan's petroleum consumption.

-Environmental

Pollution became a major concern in Taiwan as industry started to grow rapidly in late 1970s. Pollutant Standard Index (PSI) is used in Taiwan to examine the quality of air. The main air pollutants are Suspended Particulate (PM_{10}) and Ozone (O_3), mainly emitted by motor vehicles and factories. In the recent decade, the number of motor vehicles has increased 7.3 millions, nearly 76%.

The government issued the Air Pollution Control Act in 1975, and has revised it numerous times in the last decade. It introduced "polluter pay". The first-stage air pollution fee (APF) was collected from July 1995 to June 1998. The EPA collects fees based on the fuel consumption of factories and motor vehicles and establishes the Air Pollution Control Foundation (APCF). These fees are specifically applied in the air pollution control tasks. The collected APFs are collected from the factories and motor vehicles. As a result, the air quality of Taiwan, is gradually improving, which is shown in the table below. However, there is still much to be done in order to restore the air to its best. The development of fuel cell technology is very much needed.

Item	Year	1992	1993	1994	1995	1996	1997	1998	1999
AIR									
Pollutant Standards Index (PSI) Level	**%**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Good (0-50)		15.28	16.16	34.41	37.08	40.39	40.67	47.97	46.68
Moderate (51-100)		73.40	75.66	58.76	57.19	53.49	54.11	47.42	48.63
Unhealthful (101-199)		11.24	8.07	6.82	5.72	6.08	5.20	4.60	4.68

Very Unhealthful (200-299)	0.08	0.11	0.01	0.01	0.04	0.03	0.02	0.00
Hazardous (>299)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Government Investment Incentives

- Research and Development (R&D) Incentives
  - A company can enjoy a 25% tax credit against income tax payable for any expenditure for developing new products, improving production technology, advancing technology for provision of services, or improving the manufacturing process.
  - Equipment and instruments exclusively used for R&D, experiments or quality inspection can be depreciated over a two-year period.
  - Private companies engaged in R&D of new industrial products may apply for loans to cover basic R&D expenditures.
  - Professional consultation and financial assistance for developing new products or new production technology are available to companies engaged in traditional industries.
  - Manufacturing machinery and equipment, apparatus and equipment exclusively used for research, experiment and quality inspection that are not manufactured domestically can be imported duty-free with approval of the MOEA (Ministry of Economic Affairs).
- Incentives to Improve Pollution Control
  Any company expenditure for purchase of locally made environmental protection equipment can be granted a 20% tax credit against income tax payable. The tax credit rate for imported equipment is 10%, and for pollution control technology, 5%.
- Incentives for Energy Conservation
  Between 5% and 20% of a company's expenditure on equipment or technology for use of new and clean energy, energy conservation, or improved energy efficiency may be credited against its income tax payable.
- Incentives for Reducing Greenhouse Gas Emissions
  Between 5% to 20% of a company's expenditure on equipment or technology for reducing greenhouse gas emissions may be credited against its income tax payable.

T.G. Tiger Motorcycles

TGTM is an established manufacturer of both motorcycles and scooters in Taiwan, located in the Hsidu District in the city of Keelong. The TGTM research and development team was established in 1979, and since that time we have striven to provide our customers with products that are above and beyond their expectations. Through our team spirit, we have obtained the know how and technology necessary in research and design, and production of scooters and motorcycles to become one of the leading companies in our field. Our long-term

approach has given us the competitive edge we need in today's market. TGTM is founded on the belief that quality is the key to success, and because we pay attention to every manufacturing process in detail, we are able to make an excellent product that is consistently among the leaders in the field. From molding, forging, and casting, to gear machining, engine assembly, wielding, and painting, TGTM has built an integrated manufacturing system. Based in northern Taiwan, approximately 40 miles out of Taipei, TGTM is strategically located to distribute in both urban areas as well as in Mainland China, as production and demand increases.

TGTM is devoted to producing the most environmentally friendly motorcycles and scooters. From the company's outset, we have endeavored to be environmentally conscious, always emphasizing environmental protection and industrial safety. Developing a line of scooters powered by clean fuel cells is a logical next step in our company's growth and dedication to a clean environment.

TGTM has spared no expense to get the best R&D experts, technicians, and managers available. The current labor surplus in Taiwan will assure sufficient manpower in the manufacturing plant. The TGTM manufacturing facility is large enough to accommodate a new line for the production of fuel cell powered scooters, in addition, the campus has sufficient storage areas which we will make available to for the joint venture.

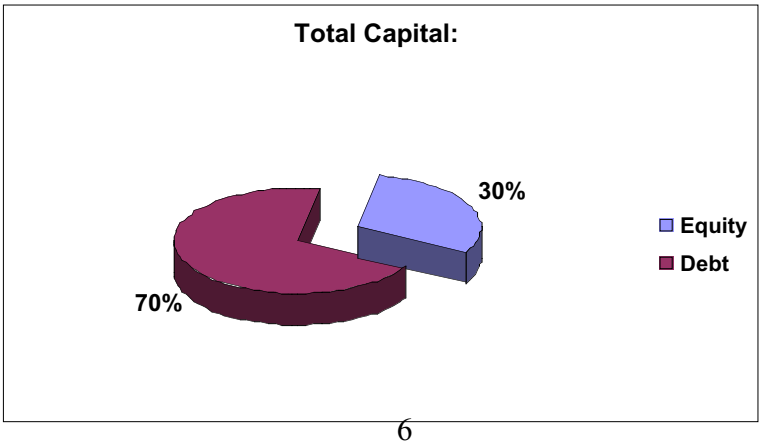
TGTM Management Team

- Logan Larson – CEO, responsible for overseeing company operations, communications, and new programs.
- Babak Hedayati – CFO, financial expert.
- Hiuyan Lau – Chief Cultural Officer, specializes in cultural, political, economical and environmental aspects of Taiwan.
- John de la Para — Chief Technical Officer.

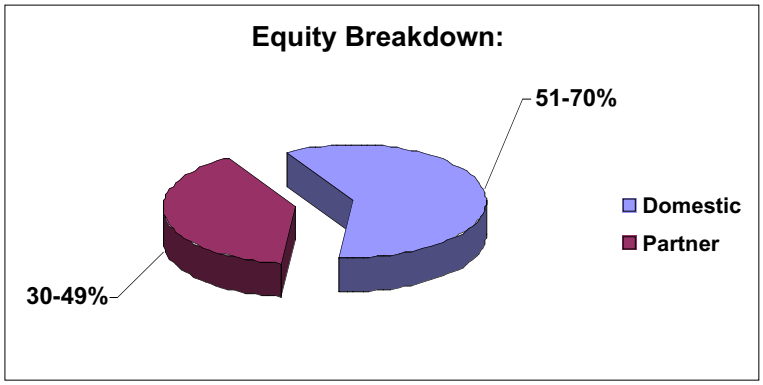
Joint Venture

Capital Breakdown

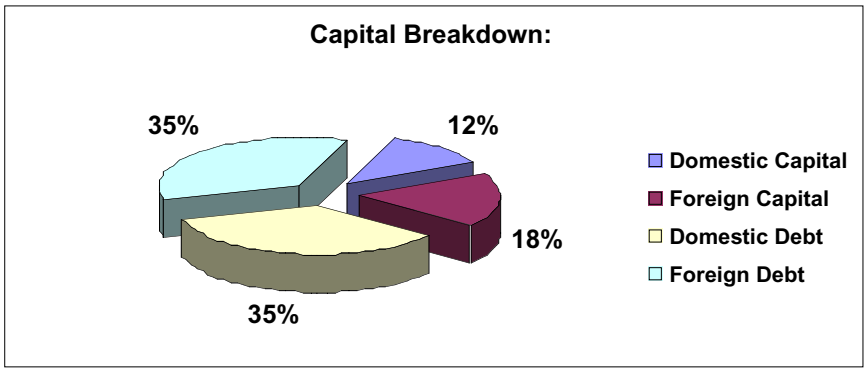
The joint venture company will be formed as a limited liability company. The total capital for this company shall be comprised of 30% equity, issued as stock, and 70% debt, which shall be raised through loans from international banks, investment firms, and private investors.



TGTM shall have no less than 51% of the shares of emerging company, with our partner having no less than 30% of the shares.



For the 51-70% Equity, TGTM is willing to contribute a maximum of 40% of the initial capital, or 12% of the total capital. Our partner will be responsible for a minimum of 18% of the total capital, for which they will receive a total of 30-49%



of the equity.

Managerial Structure of Joint Venture

The J-V Board of Directors shall be comprised of 11 people. The Chairman of the board will be nominated internally.

4 TGTM executives
    CEO, COO, Lawyer, and Technology Expert
3 Fuel cell partner executives
    CFO, Technology Expert, and Investment Banker
1 Environmental Advocate
2 Academics
    Backgrounds in alternative energy and urban transportation
1 Government Official

Technology Transfer and Personnel Training:

Although we would consider a short period of fuel cell imports from your facility, we would like the joint venture to fabricate fuel cells locally ASAP. Please describe clearly in your Proposal your ideas regarding technology transfer and training of the local workforce. In Taiwan we have highly skilled technicians and engineers who could easily master this new technology.

Technical Specifications

-The Power Source

TGTM is interested in forming a joint venture to develop fuel cell powered scooters because fuel cells are more efficient with respect to fuel input. Furthermore, fuel cells are also cleaner than either internal combustion engines, (ICE), or battery-powered engines, (BPE), and give out less emissions. TGTM recommends using proton exchange membranes, (PEM), because they are small, have high efficiency and comparatively low operating temperatures.

-The Scooter

TGTM proposes to use the Growl 50cc, the most popular model, for the prototype scooter. Performance should similar, if not the same. The specifications follow:
Engine – 2 stroke, single cylinder, air cooled
Compression Ration – 7.2:1
Displacement – 49.26 cc
Bore x Stroke – 40 x 39.2mm
Max Horsepower – 3.7hp/5500rpm
Max Torque – 0.57 kg-m/5500rpm
Maximum Speed – 62 km/hr
Fuel Consumption – 45 km/l
Ignition – Electronic CDI and variable timing

Starter – Electric and kick starter
Frame – Pressed steel monocoque

Front suspension – Hydraulic shock absorber

Rear suspension – Automatic

Transmission - Automatic
Length – 1,730mm
Width – 680mm

Wheel base – 1,220mm
Height – 1100mm

Dry weight – 75kg

Technical Infrastructure

A method of fuel distribution will be required if the joint venture is to be successful. Options include refillable hydrogen tanks or refueling stations. The proposal should detail which method is more economical and efficient, and give plans accordingly, including where fuel purchase will occur.

Proposal Deliverables

TGTM is very excited by the prospect of this joint venture. By November 19, 2001, 10 PM EST, USA, we will welcome proposals that include detailed and clear answers to our concerns. A technical report and sketches are required for consideration. Please submit all proposals to the GTK-7 web site Webmaster Alex Lin (line@cooper.edu) prior to that date. Additionally, financial calculations for the startup period and the next 10 years are required. For information regarding the required financial analysis please review the Project Financial Evaluation Forms on the Resources page of the GTK-7 web site (www.cooper.edu/GTK-7). The proposal should also include and additional ideas or concerns that may be relevant to the project.

Any questions or concerns can be directed to Logan Larson via e-mail (larson@cooper.edu). We look forward to reviewing your proposal.