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Sustaining the development of industry in Trinidad and Tobago: Renewable Energy, Energy Efficiency and Green Manufacturing

The Trinidad and Tobago manufacturing sector began its growth and development in the 1980s, mushrooming from its economic insignificance, relative to the fossil fuel energy sector, to become a key component in the country's economy.

Import controls were used by the government to allow infant industries to grow and, by the late 1980s, the downstream petrochemical sector, iron and steel production, the food and beverage sector were the main offspring of a burgeoning manufacturing sector.

From that period to the present, the T&T manufacturing sector is easily identifiable as the largest and most vibrant within the Caricom region. Over the years, industries have increased in terms of scope and scale; today, the following sub-sectors make up local manufacturing, inter alia: Food, Beverage and Tobacco, Printing and Packaging, Chemicals and Non-Metallic Materials, Assembly Type and Related Industries, Wood and Related Products, Construction, Miscellaneous Manufacturing and Downstream Petrochemicals.

Over the course of the last decade, 2000 – 2009, the manufacturing sector's contribution to Gross Domestic Product has averaged 7%, according to the local Central Statistical Office (CSO). As indicated earlier, this is very critical to the economic growth of T&T, when one considers the revenue generated from exports, the considerable potential for growth, as well as direct and indirect employment created by virtue of manufacturing strength.

On account of job creation and over the last five years, the CSO indicates that the manufacturing sector has consistently employed in excess of 50,000 persons, with average employment levels of 9% of the labour force. This represents the third highest percentage as far as employment by sector is concerned.

In addition, given the circular flow of income, economic activity in the manufacturing sector has a positive, multiplier effect on the economy, as producers of local commodities increase investment, which spurs development of new industries, additional jobs and greater expenditure in the economy.

T&T's manufacturing sector strength is attributable, in no small measure, to its fossil fuel reserves and, by extension, its powerful energy sector. Traditionally driven by crude oil production and exports, the mainstay of the local economy is natural gas, and the foreign revenues derived from exports both regionally, and extra-regionally, in particular to the United States.

Local manufacturers therefore have access to relatively inexpensive energy to power industrial production. Electricity costs per kilowatt hour are lower than that of virtually all of its Caricom counterparts, which gives the sector a tremendous competitive advantage in the region.

21st century industrial policy for the Trinidad and Tobago economy must not, however, continue to be driven by imprudent reliance on fossil fuel energy and its attendant vagaries. Heavily characteristic of the global oil and natural gas are wide ranging price fluctuations, as was evidenced by the global economic crisis of 2008 – 2009. T&T, with its relatively insignificant global contribution to oil and natural gas supplies, is a price taker.

In this context and given the structure of its economy, T&T has made itself vulnerable to exogenous shocks by basing its projected expenditure and revenues on the global price of fossil fuels. As the economy seeks to surge forward in the post recessionary environment, there remains no affirmative action, from a legislation and policy implementation standpoint, towards the creation of alternate & renewable energy industries locally.

The manufacturing sector will be sustained by an appropriate balance between the existent fossil fuel sector, along with the building of renewable energy industries, the use of energy efficient technologies and methods of production designed to minimize waste. The ultimate goal is to initiate, groom and develop local companies into ‘Green businesses.’

In this regard, the Trinidad and Tobago Manufacturers’ Association (TTMA) envisions Trinidad and Tobago as a regional hub for Green Manufacturing, given its considerable economic

advantages and low energy costs, which makes it well poised to invest heavily in cleaner, more efficient production.

A critical starting point is the creation of the legislative, policy and institutional framework that will serve as the backbone upon which a sustainable manufacturing sector will be built.

TTMA believes that there is need for a clear policy & legislative framework that outlines:

1. The role of sustainable manufacturing in national development.
2. The specific renewable energy options and industries earmarked for development.
3. The timetable for implementation.
4. The infrastructural framework that would give rise to these industries.
5. The incentives to manufacturers / potential entrepreneurs.
6. The changes to legislation that will mandate producers to utilize renewable energy in production and become energy efficient.

TTMA has initiated a process of dialogue with the government, towards the development of Renewable Energy industries locally. In its Position Paper on Renewable Energy development, TTMA noted that,

‘With consideration for the various renewable energy alternatives, the Solar Photovoltaic (PV) industry holds the greatest potential for development locally. The current nature of the global PV market, the local abundance of natural gas (a major input into the solar module development process), the revenue generating capacity, and the business and job opportunities that it creates

certainly lend credence to this assertion. To thrust it into reality, Trinidad and Tobago will need an aggressive PV development strategy, starting with its inclusion into the Vision 2020 development framework.'

Several points can be highlighted here. Firstly, as identified in point 1 above, any decisions taken at the governmental level to develop renewable energy industries must be placed within the wider context of its role in the development of a country. As far as sustainable manufacturing through renewable energy technologies is concerned, TTMA understands the important role that this ought to play as far as mitigating the effects of climate change is concerned.

As a result, the harmonization of T&T's climate change policy, along with new industrial policies on sustainable manufacturing through cleaner, more efficient energy sources, will allow the enhancement of local industries in a manner that is environmentally sustainable. Policy should go further to outline the specific renewable options that are to be earmarked for development. TTMA asserts that, of the various renewable energy options available, the Solar Photovoltaic industry offers tremendous potential for revenue and employment at each stage of the value chain.

Sustainable manufacturing can therefore be driven, in part, by the creation of an aggressive Photovoltaic development strategy. The rapid growth of the PV market within recent history strongly indicates the leading role that the Solar PV industry has played as far as the production and use of renewable energy technologies are concerned. Once supported by policy, the benefits that are expected to accrue to Trinidad and Tobago over the next ten years provide the

justification for considerable public and private sector investment. The following table outlines solar industry projections to the year 2020:

Solar Industry Variables	2020 Projections
PV Module Output	2,000MWp
Silicon Output	20,000 tons (3 plants)
PV Manufacturing Jobs	7,000
Revenues	2,000 million US\$ / yr
Land Area requirement	200ha
CAPEX	500 mm US\$/yr
Gas Consumption	50 mm scfd
Electricity Consumption	330MW

Table extracted from the November 2006 UTT / R&D report entitled, 'Building a Photovoltaic Industry in Trinidad and Tobago.'

The table above shows a possible industry input-output scenario – revenues to 2020 would be in the region of US \$2bn per annum, which would place Trinidad and Tobago well on its way to supplementing natural gas as its main revenue earner. The projection to the year 2050 reveals that revenues from this industry would exceed US\$ 5bn per annum.

In particular and with direct reference to downstream industrial development, there are four steps in the solar photovoltaic value chain viz.:

1. Refining of sand into silicon
2. Growing solar crystals from the silica and slicing into wafers
3. PV cell manufacturing
4. Module assembly and installation of PV systems.

With these four distinct steps in the process, there are opportunities for the manufacturing of, inter alia: solar wafers, solar cells, modules, glass and substrate, as well as electrical distribution component development. Within the manufacturing sector, there are firms in the sub-sectors of Assembly-type & related industries, construction and transportation that represent the base level capacity for the manufacturing and distribution of PV components. With the right legislative environment, sufficient investment and incentives, it is expected that new industries across the value chain will emerge.

Added to this is our strong natural gas industry – gas is required for the conversion of sand to silicon, and T&T would do well to use natural gas in a process of progressively balancing fossil fuel dependence with solar energy development.

The utilization of solar energy will gradually introduce greater balance, if not completely replace, the use of fossil fuels as the primary energy source for production. Not only is solar energy cleaner, but there is also the distinct possibility of excess energy being generated in residential and commercial grid connected systems. The end result of such processes would be cleaner goods and services that are more locally, regionally and internationally competitive.

A major obstacle to movement in this direction in T&T is the low energy cost environment within which producers operate. Despite the prospects of long term competitiveness and efficiency, there simply is no incentive for manufacturers to invest in cleaner energy initiatives in the short term. The private sector concern would fundamentally be the payback period i.e., the length of time that will elapse before returns on investment can be seen.

Policy must therefore go further to outline the benefits that will accrue to manufacturers who invest in the production and / or consumption of renewable energy in manufacturing. As indicated earlier, residential or commercial use of solar energy in grid connected systems allows the users to add the excess energy generated to the national electricity grid. Thus, the granting of credits to users who add to the grid will act as an incentive for wider use of Solar PV, and stimulate the growth of the industry.

Other incentives include tax breaks for investing in Green Manufacturing or Renewable Energy Research and Development, removal of the natural gas subsidy to discourage the use of fossil fuel energy and the leasing of land space for solar energy plants to local companies.

Legislation will mandate producers to change the very relaxed approach that encourages production inefficiency. Given the right incentives, with adequate public investment and renewable energy infrastructure in place, prudent legislation ought to stipulate annual reductions in carbon emissions and energy use, in accordance with the national climate change policy. Prior to the setting of these legislated goals, the government should conduct quantitative research across the manufacturing sector to ascertain emission reduction and energy conservation levels that are attainable. Appropriate penalties for breeches in the law should not be so harsh as to

discourage manufacturers from continuing their operations, but rather serve as motivation for full compliance in the future, leading to production efficiency.

The compelling force for Green Manufacturing will therefore be the right combination of policy and legislation, incorporating incentives, Research and Development, public investment and penalties that lend themselves to future sustainability.

Ultimately, no business can ignore the big picture - Climate Change. The recent Copenhagen Accord, drafted on December 18th 2009 and signed by Brazil, China, India, South Africa, the United States and other countries, entailed agreement that “deep cuts in global emissions are required according to sciencewith a view to reduce global emissions by 50 per cent in 2050 below 1990 levels, taking into account the right to equitable access to atmospheric space.”

With T&T’s manufacturing sector accounting for over 30% of national energy consumption and generating roughly one quarter of its carbon emissions, the case for greater manufacturing sector energy efficiency is abundantly clear. In this vein, Trinidad and Tobago has the potential, opportunity and responsibility to play a leading role in Green Manufacturing for the benefit of the wider Caribbean.

As Green Manufacturers begins to emerge, assuming the right policy, regulatory and infrastructural conditions are created, legislation can go further to mandate the deposit of a fixed percentage of manufacturing sector driven energy savings into a national renewable energy fund. This would be established for the growth of the renewable sector and facilitate ongoing Research and Development, new investment and institutional development.

The T&T Green Fund has been in existence for several years now and is accessible to non-governmental and community based organizations engaged in activities related to environmental conservation and protection. TTMA recommends that the mandate and scope of this fund should be reviewed, in line with the suggested renewable energy fund above, while continuing to embrace the groups that currently benefit from its existence.

TTMA looks forward with deep optimism that regional partnerships for the sustained growth of manufacturing, by developing strong renewable industries, can serve as a vital pillar towards our development as a region. TTMA has been, and remains committed to the forging of regional partnerships to aid in fulfilling our regional energy needs and, more importantly, preserve our natural resources for generations to come.