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**OPENING REMARKS BY DR TONY TAN KENG YAM,  
CHAIRMAN OF THE NATIONAL RESEARCH FOUNDATION,  
AT THE WATER LEADERS SUMMIT PLENARY FORUM, ON  
“GOOD GOVERNANCE, SUSTAINABLE CITIES” TO BE HELD  
ON 24 JUNE 2008, 11.15 AM AT SUNTEC BALLROOM LEVEL 2**

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Mr Chairman

Excellencies

Distinguished guests

Ladies and Gentlemen

The world is witnessing the largest wave of rural-to-urban migration in human history.

This wave of urban migration is on a scale much faster and larger than the first wave of urban migration which began in Europe and North America in the 18th century.

By the end of this year, for the first time in history, more than half of the world's population will reside in urban areas.

Most of the growth in urban areas has been and will be in developing countries, particularly in Asia.

By 2030, many analysts project that the towns and cities of the developing world will make up more than four-fifths of the total population.

### URBANISATION IN ASIA

Rapid urbanisation is a prevalent feature in Asian countries.

For the period from 1950 to 2000, Asia experienced a higher average annual rate of urbanisation as compared to the world and the trend is expected to continue going forward.

The average annual rate of urbanisation in Asia from 2000 to 2030 is expected to be 1.23%, higher than the world's average annual rate of urbanisation of 0.81%.

As a result of this rapid rate of urbanisation, Asia's percentage of urban population is projected to increase from 38% in 2004 to 54% by 2030.

By 2030, the urban population living in Asia will be around 2.6 billion people.

The urban density of many Asian cities far exceeds those of Western countries.

I'll just cite one example.

Twenty-five years ago, China had about 220 cities.

Today, China has more than 660 cities.

It is projected that, in less than a decade, more than half of the Chinese population, some 870 million people, will be urbanites.

Four hundred million people will become new urban dwellers.

Assuming that new cities will be built to accommodate these populations; this would translate to some 40 new mega-cities, each equivalent to the size of Beijing today!

### IMPACT OF URBANISATION

The magnitude of the impact of urbanisation varies from country to country, but major challenges of urbanisation include infrastructure needs, higher demand for resources and unfortunately, degradation of the environment.

Demand for infrastructure has increased dramatically in response to the high rates of urbanisation in Asia.

The rapid increase in urban population places substantial strains on current infrastructure.

There are significant needs for the maintenance and upgrading of existing infrastructure, as well as the building of new infrastructure.

These infrastructure needs range from mass housing and transport to sanitation and healthcare facilities.

Environment degradation in Asia is exacerbated by the higher demand for resources.

Air pollution due to increasing ownership of automobiles, industrialisation and power generation, as well as inadequate waste disposal is an example of short term environment degradation.

In the long run, higher energy usage will lead to increased carbon dioxide emissions, where the contribution by emerging Asia is projected to increase from 17% of the world's total carbon dioxide emissions to more than one-third by 2015.

The challenges arising from urbanisation are closely intertwined.

A multi-pronged approach to addressing the challenges is necessary including strong political commitment, technology development, and greater private participation in financing.

Private financing solutions will be needed to meet infrastructure needs and to ensure sustainability of urban development through funding of clean technology solutions.

## SUSTAINABLE URBAN DEVELOPMENT

Urban sustainable development encompasses managing a whole spectrum of areas – water, waste, land use, pollution, energy and carbon emissions.

To begin with, judicious urban planning establishes the framework in which cities can implement sustainable development.

New technologies, developed through extensive research, act as powerful multipliers in the provision of sustainable development.

Research in the area of energy is mainly focused on developing clean power resources that can supply cities with this crucial resource without further degrading the environment.

As for water, overuse and pollution have reduced the already limited supply for growing urban populations.

A plethora of technological solutions have emerged to answer these problems.

They range from desalination of brackish/saline water to the recycling of used water using advanced membrane technology.

Other innovative urban solutions are also necessary for the management of transportation, sewerage, housing and healthcare systems.

## MEETING WATER AND ENERGY NEEDS

Drinkable water is central to the survival and growth of all societies.

According to the UN Taskforce on Water, only about 1% of the Earth's natural water supply is fresh water and about one-sixth of the world's population still lacks access to clean water.

With this inadequacy of clean water, as populations and economic activities grow, many cities will face water scarcity and limitations to economic development.

There is increasing interest in water solutions such as recycling and desalination.

Cognizant of the danger of running out of sufficient water resources, significant resources have been poured into research into these new technologies.

In April 2006, the Singapore National Research Foundation announced that it was launching a S\$500 million Programme to finance research in the area of Environmental and Water Technologies (EWT) including developing Singapore as a global hydro-hub by the year 2015.

These investments have yielded dramatic reductions in the cost of water from the recycling of used water and desalination through the use of advanced membrane technology.

In the last decade, we have seen the cost of a cubic meter of water for reclaimed used water and desalination fall from some US\$0.80 and US\$1.50 to US\$0.20 and US\$0.50 respectively.

That is not by a few percentage points, but by several orders of magnitude.

These technologies have broadened the possible sources for water-scare nations, such as Singapore, to provide this critical resource to its people.

Singapore utilises advanced membrane technologies to treat effluent from our water reclamation plants to produce high grade reclaimed water, which as PM has said, called NEWater.

Singapore's four NEWater plants produce some 50 million gallons per day of reclaimed water.

A fifth NEWater plant, currently being constructed, will produce an additional 50 million gallons per day of reclaimed water when this is completed in 2010.

Singapore is also building a desalination plant using seawater reverse osmosis (SWRO) membrane technology which can supply a maximum of 30 million gallons per day of drinking water.

This brings Singapore closer to the target of eventually having non-conventional sources of water making up at least 30% of Singapore's water needs.

Since the implementation of Singapore's Clean Water initiative in 2006, the environmental and water industry has seen extensive collaboration between the public sector, industry partners and research institutions both locally and abroad.

Global companies have also displayed their commitment and trust through their investments here in Singapore.

Some examples include the setting up of the Siemens R&D centre, the Singapore-Delft Water Alliance (which is a collaboration between Delft Hydraulics, the PUB and the National University of Singapore) and a new research centre by General Electric.

A spectrum of water treatment and membrane companies are also carrying out a number of test-bedding projects at our water treatment plants, hoping to prove and refine their new technologies.

Among the various renewable energy options, technology developments in solar energy merit attention.

Heavy investment in research and development around the world has meant that the technology for solar energy is developing at a rapid pace.

Photovoltaic production has been doubling every two years since 2002, making it the world's fastest-growing energy technology.

In Singapore, the government is committing S\$350 million for research and development, test-bedding and pilot projects in Clean Energy.

This includes the National Research Foundation's S\$170 million initiative to promote Clean Energy as a new focus area as part of the existing EWT strategic programme.

Part of this initiative is the S\$50 million Clean Energy Research Programme (CERP) launched in October last year to accelerate research and developments efforts to support the growth of the Clean Energy industry in Singapore.

CERP is a competitive funding initiative, aimed at supporting both upstream and downstream interdisciplinary and commercially-relevant R&D efforts through a project funding approach.

Economic viability has always been the bugbear of renewable energy sources like solar power.

However, prudent investment in research has facilitated creative answers to previously intractable dilemmas.

Currently energy derived from the sun costs approximately 2-3 times the price of conventional energy.

Nonetheless, Erik Thorsen, CEO and President of Renewable Energy Corporation ASA (REC) in Norway, a market leader in solar energy, predicted that grid parity, the point at which photovoltaic electricity is equal to or cheaper than grid power in fossil fuels will be achieved in many markets by 2010.

REC has decided to build an integrated solar manufacturing plant in Singapore which is slated to be the world's largest and costing S\$6.3 billion.

Oerlikon Solar, based in Switzerland and a leading supplier of equipment for making thin-film solar cells, chose Singapore to site its Asian manufacturing and R&D hub.

In addition, major solar players like SolarWorld, Conergy and Solar-Fabrik have also set up their regional headquarters in Singapore.

## CONCLUSION

Ladies and gentlemen, urbanisation brings about a host of challenges in the areas of infrastructure, resources and the environment.

Countries must ensure sustainable development that will benefit all its citizens through the proper provision of infrastructure and the development of clean technologies.

This can be facilitated through strong government commitment, the development of capital markets, increased international co-operation and investment in Research and Development in clean technologies.

The problems are vast and difficult, but given commitment and determination, they will be solved.

Thank you.

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