ECONOMIC SUSTAINABILITY

In the mid-1960’s, Singapore, as a young and small post colonial country, faced with key issues like massive unemployment & economic survival

Industrialization was necessary then to
- reduce economic dependence on the declining entrepot trade
- create jobs for its rapidly growing population

Singapore’s economic survival depended on its ability to
- attract investors
- satisfy investor needs well and quickly

Source: JTC Corp
For cities to survive & thrive, it is important for the cities to not only be ecologically sustainable but economically sustainable.

In land-scarce Singapore ... New urban solutions had to be designed & implemented.

Sources: JTC Corp, JURONG Consultants
For cities to survive, it is also necessary for them to be able to **innovate, evolve, adapt & respond** to ever changing economic demands in order to stay **relevant**.

Sources: JTC Corp, JURONG Consultants
**MOVING UP THE INDUSTRIAL VALUE CHAIN**

- **90s**: Technology Intensive
- **80s**: Capital Intensive
- **70s**: Skills Intensive
- **60s**: Labour Intensive

Sources: JTC Corp, JURONG Consultants

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**MOVING UP THE INDUSTRIAL VALUE CHAIN**

- **2000s**: Knowledge Intensive

Sources: JTC, JURONG Consultants
EVOLUTION OF INDUSTRIES IN SINGAPORE

Industry Clusters today

- Aerospace
- Marine
- Cleantech
- Biomedical
- Chemicals
- Electronics
- Infocomm
- Media
- high-growth new economy clusters

Sources: MTI, JTC, JURONG Consultants

INDUSTRIAL DEVELOPMENT STRATEGY

- 60’s
  - Develop basic Industrial Facilities, Infrastructures and Amenities
  - Location of Industrial development
    - away from residential areas
  - Heavy industries do not affect the population significantly
INDUSTRIAL DEVELOPMENT STRATEGY

• 70’s & 80’s
  – Clean & Light industries
    • Flatted Factories were developed within residential areas
  – Tapped on workers in residential area to support our industrial activities
  – Minimize travel for workers

INDUSTRIAL DEVELOPMENT STRATEGY

• 90’s
  – R&D focus
  – Mixed Use Development
    • Technology/Science parks created to facilitate research, develop prototype and market reception.
INDUSTRIAL DEVELOPMENT STRATEGY

• Present
  – Knowledge Industries
  – Clustering & Integration
    • Focus in area of Biomedical research, IT & Multi-media development (e.g. Biopolis & Fusionopolis)
  – Work, Live, Play and Learn environment
    • One-north
  – Land use intensification
    • Stacking up ground floor factories
  – Underground Space

IMPACT ON EMPLOYMENT, ECONOMY & ENVIRONMENT

– Low skill labour to knowledge-based manufacturing and service workforce

– GDP per capita of Singapore (as at May 2010)
  in 1970 : S$ 2,832 (US$ 2,166)
  in 2009 : S$ 53,143 (US$ 40,632)

– The industrial landscape has changed from basic low rise industrial plants to clean multi-level smart facilities in green environment.

(source: GDP per capita figures from Singapore Dept of Statistics)
KEY SUCCESS FACTORS

– Ability to identify new industrial economic generators in time
– Ability to adapt to new challenges fast
– Ability to initiate and implement multi-prong, inter-ministerial economic and planning strategies and policies in an integrated, pragmatic and effective approach.
– Ability to develop the necessary infrastructure and facilities to respond to the new requirements quickly.

OUR APPROACH TO SUSTAINABLE DEVELOPMENT

Source: JURONG Consultants
SUSTAINABILITY AT MACRO LEVEL – Jurong Island

CORE CONCEPT OF SUSTAINABILITY
“PLUG & PLAY”
infrastructure system &
LAND USE OPTIMIZATION

ENERGY EFFICIENT FEATURES:

Energy optimization
- Water self-sufficiency via desalination
- Waste-water collection and recycling
- Reduced emissions and improve standards of processing

Total Integration of
- Manpower Development
- Security
- Safety
- R&D

Comprehensive Shared Services - supporting industries like utilities, tankages and maintenance centers

Industrial Ecology

Sources: JTC Corp, JURONG Consultants

SUSTAINABILITY AT SITE LEVEL – Changi BP

CORE CONCEPT: Land Use Maximization

- Efficient Planning of Circulation systems to minimize walking distance
- Integrated Planning of open spaces with built environment

A central intensive landscape spine with secondary landscape connectors formed the backbone of the master plan

A superior alternative to conventional air conditioning

Outsourcing District Cooling System (DCS)

The DCS Plant is capable of generating a cooling capacity of about 30,000 RT, which sufficiently meets the cooling load demand for business space usage of over a million square meters in Gross Floor Area

Sources: JTC Corp, JURONG Consultants
SUSTAINABILITY AT SITE LEVEL – Biopools

- Building Integrated Photovoltaic
- Solar thermal energy for hot water & security lighting
- Water recycling and re-use programs
- Sky gardens plus energy absorption
- Façade Design to minimize heat gain

SUSTAINABILITY STUDY:

Awards:
- Biopools Phase I Green Mark Gold Award
- Biopools Phase II Green Mark Gold Award
- Biopools Phase III Best Architecture Design

Sources: JTC Corp, JURONG Consultants

SUSTAINABILITY AT BUILDING LEVEL - Fusionopolis

CORE CONCEPT: LAND USE OPTIMIZATION

- Iconic development with HIGH-RISE, HIGH-DENSITY & MIXED USE ZONING – Vertical City for IT, Infocomm, Media and Business.
- Serviced Residences
- Apartments
- Shared Conference Rooms
- Retail and F&B Podium
- One-north MRT Station below

Sources: JTC Corp, JURONG Consultants
SUSTAINABILITY AT BUILDING LEVEL - Fusionopolis

PASSIVE DESIGN PRINCIPLES: evolving from the climatic considerations

• Dynamic response to the existing ground contours
• Energy efficient fittings and equipment
• Sky Gardens

ACTIVE DESIGN PRINCIPLES

• Use of innovative Environmental technologies e.g. Photovoltaic Panels
• Use of District Cooling Systems
• Use of pneumatic waste conveyance systems

AWARDS:
• STRUCTURAL STEEL DESIGN AWARDS 2007
• INTERNATIONAL GREEN ROOF LEADERSHIP AWARD 2009

13 lush green public sky garden
Provide visual relief, social interaction spaces and green lungs for environment

Sources: JTC Corp, JURONG Consultants

ECONOMIC GROWTH vs ENVIRONMENT CONSIDERATION

• Mitigation of pollutants
• Strict enforcement of Environmental Rules & Regulation
• Application of industrial value-chain
• Promotion of environmentally friendly materials
Transferability of Industrial Development Strategy

- Clear Industrialization Strategy
- Well-defined Land-Use plan
- Innovative planning, design and development of infrastructures and facilities
- Skills development & training – employability
- Supporting industries
- Simple & transparent processes for investors
- Apply sustainability as basic planning & design tool

CONCLUSION

*It is important for cities to be both ecologically & economically sustainable in order for them to provide their people with a means of livelihood within a clean, green & healthy living environment*
Thank You

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