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BUILDING AND CONSTRUCTION AUTHORITY
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EXECUTIVE SUMMARY

The Singapore economy staged an exceptional strong recovery in the first half of 2010 following the 1.3% contraction of GDP growth last year as a result of the global financial crisis. All major economic sectors turned in positive growths in the first half of this year, in particular the manufacturing sector. Likewise, the construction sector also expanded by around 11% during the same period, underpinned by the growth momentum in public sector construction activities. Nevertheless, amid concern on the sovereign debt problem and weak financial sector in many advanced economies, downside risks to the global recovery have intensified. The Ministry of Trade and Industry has therefore expected the Singapore economy to grow at a slower pace in the second half. Together with the strong growth in the first half of 2010, the Singapore's GDP growth forecast for the full year of 2010 is projected to reach around 15%.

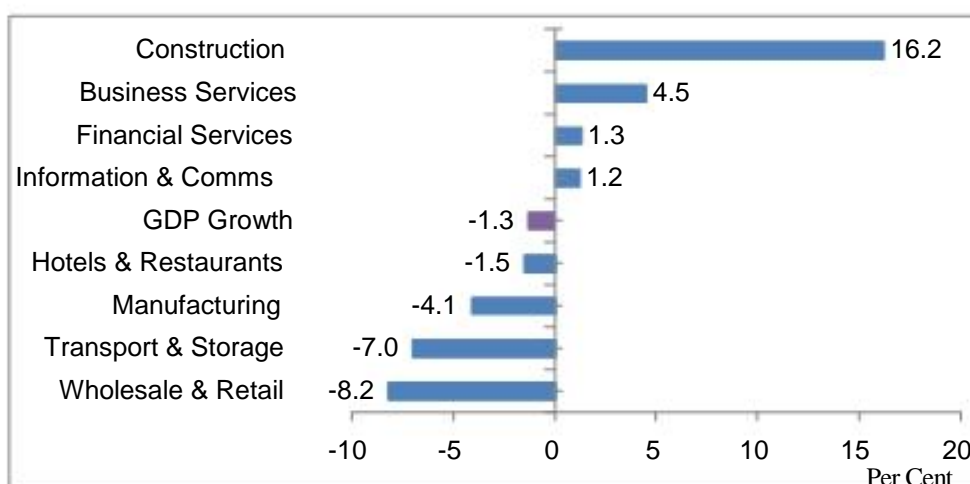
Total construction demand in 2009 dropped to \$21 billion from the record high of \$35.7 billion in 2008, with the continual strong public sector construction demand contributing 64% to the industry's demand. On the other hand, total private sector construction demand was weakened significantly owing to the global financial debacle, particularly during the first half of 2009. Boosted by the buoyant economic growth in the first half of this year and a strong rebound in construction demand from the private sector, total construction demand is on track to reach the projected \$21 billion to \$27 billion in 2010.

2.1 Macro Economic Review and Outlook

2.1.1 Overview of the Singapore Economy in 2009¹

In 2009, the Singapore economy contracted by 1.3% (Chart 2.1.1), down from a 1.8% growth in 2008. The construction sector continued to lead the growth with a 16.2% expansion, following a 20.1% growth in 2008. The service producing industries contracted by 1.4%, compared to an expansion of 4.8% in 2008. This was due to a contraction of all major services sectors, with the exception of business and financial services, information & communications and the other services sector. The manufacturing sector contracted by 4.1% in 2009, similar to the contraction of 4.2% in 2008. Other sectors also contracted, ranging from 1.5% for hotels & restaurants to 8.2% for wholesale & retails trade.

Chart 2.1.1: GDP and Sectoral Growth Rates in 2009



2.1.2 Economy in the First Half of 2010¹

The Singapore economy expanded remarkably by about 18% year-on-year in the first half of 2010, underpinned by the broad-based growths across all key economic sectors, particularly the manufacturing sector. While the private sector construction activities moderated due to the weakened private sector construction orders in 2009, the fall was largely offset by the strengthened public sector construction activities, which led to about 11% year-on-year expansion of the construction sector in the first half of 2010.

Despite the strong growth in the first half of 2010, the Ministry of Trade and Industry (MTI) views that the growth momentum may not continue into the second half of the year amidst slower pace of global economic recovery. Nevertheless, MTI expects the growth of Singapore economy to remain healthy and maintains its economic growth forecast for 2010 at around 15%.

¹ Source: Economic Survey of Singapore, 2009 and second quarter 2010, Ministry of Trade and Industry Singapore.

2 Main Economic Indicators

| Year | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---------|---------|---------|---------|---------|
| GDP and Components | | | | | |
| GDP at real prices (Base Year=2005) (S\$Million) | 208,764 | 226,803 | 246,162 | 250,550 | 247,334 |
| GDP at current market prices (S\$Million) | 208,764 | 230,509 | 266,405 | 273,537 | 265,058 |
| GDP growth (%) | 10.4 | 8.6 | 8.5 | 1.8 | -1.3 |
| Manufacturing sector (Base Year=2005) (S\$Million) | 53,464 | 59,838 | 63,393 | 60,739 | 58,227 |
| % growth | 9.5 | 11.9 | 5.9 | -4.2 | -4.1 |
| Wholesale & Retail Trade Sector (Base Year=2005) (S\$Million) | 34,441 | 37,674 | 40,765 | 42,035 | 38,592 |
| % growth | 9.6 | 9.4 | 8.2 | 3.1 | -8.2 |
| Transport & Storage Sector (Base Year=2005) (S\$Million) | 20,797 | 22,136 | 23,604 | 24,116 | 22,433 |
| % growth | 6.6 | 6.4 | 6.6 | 2.2 | -7.0 |
| Financial Services (Base Year=2005) (S\$Million) | 21,379 | 24,004 | 27,406 | 28,973 | 29,342 |
| % growth | 8.9 | 12.3 | 14.2 | 5.7 | 1.3 |
| Business Services (Base Year=2005) (S\$Million) | 20,799 | 22,636 | 25,782 | 28,193 | 29,459 |
| % growth | 8.2 | 8.8 | 13.9 | 9.4 | 4.5 |
| Construction sector (Base Year=2005) (S\$Million) | 6,275 | 6,439 | 7,514 | 9,024 | 10,486 |
| % growth | 0.8 | 2.6 | 16.7 | 20.1 | 16.2 |
| Demographic Indicators | | | | | |
| Population – Singapore Residents ¹ (‘000) | 3,467.8 | 3,525.9 | 3,583.1 | 3,642.7 | 3,733.9 |
| Population growth rate (%) | 1.6 | 1.7 | 1.6 | 1.7 | 2.5 |
| Total labour force (‘000) | 2,367.3 | 2,594.1 | 2,710.3 | 2,939.9 | 3,030.0 |
| Labour force growth rate (%) | 1.1 | 9.6 | 4.5 | 8.5 | 3.1 |
| Unemployment rate (%) – Seasonally adjusted as in June | 3.3 | 2.7 | 2.3 | 2.2 | 3.2 |
| Financial Indicators | | | | | |
| Savings deposits (%) (Average quotes from 10 leading banks) | 0.26 | 0.25 | 0.25 | 0.22 | 0.15 |
| Prime lending rates (%) (Average quotes from 10 leading banks) | 5.30 | 5.33 | 5.33 | 5.38 | 5.38 |
| Changes in consumer price index (Base period = 2009, % change over previous year) | 0.5 | 1.0 | 2.1 | 6.6 | 0.6 |
| Annual average exchange rate with \$US (S\$ Per US\$) | 1.66 | 1.59 | 1.51 | 1.41 | 1.45 |

Sources: Singapore Department of Statistics, Ministry of Trade and Industry and Ministry of Manpower Singapore.

¹Singapore resident population comprises Singapore citizens and permanent residents.

2.2 External Trade

2.2.1 Annual Imports and Exports

In 2009, Singapore's total trade declined by 19% to \$747 billion, compared to the previous year's \$928 billion as a result of global financial crisis. This decline in total trade was the largest since records started in 1964, and it brought the level of total trade in 2009 below that of 2006 (Table 2.2.1). Despite the slowdown in both imports and exports, the trade balance in 2009 still registered a positive growth of about 35%.

Nevertheless, the external trade has turned around since early 2010, with both imports and exports improving significantly with year-on-year growths of 27% and 29% respectively during the second quarter of this year.

Table 2.2.1: External Trade at Current Prices

| | 2006 | 2007 | 2008 | 2009 |
|--------------------------------------|----------------|----------------|----------------|----------------|
| Total Trade (S\$Million) | 810,483 | 846,607 | 927,655 | 747,417 |
| Balance Of Trade (S\$Million) | 52,635 | 54,648 | 25,870 | 34,819 |
| Imports (S\$Million) | 378,924 | 395,980 | 450,893 | 356,299 |
| <i>Y-O-Y Percentage Change (%)</i> | 14 | 5 | 14 | -21 |
| Exports (S\$Million) | 431,559 | 450,628 | 476,762 | 391,118 |
| <i>Y-O-Y Percentage Change (%)</i> | 13 | 4 | 6 | -18 |

Source: International Enterprise Singapore

2.2.2 Major External Trading Partners in 2009

In 2009, both import and export volumes with most external trading partners dropped, owing to the global economic slowdown (Table 2.2.2). Total trade volume with US, Europe and Asia dropped by 23%, 15% and 20% year-on-year respectively in 2009. Asia remained the largest trading partner, contributing 71% of total exports and 66% of total imports.

Table 2.2.2: External Major Trading Partners

| Region/Country | Exports 2009 | | Imports 2009 | | Trade Balance 2009 |
|--|-----------------|--------------------------------|-----------------|--------------------------------|-----------------------|
| | S\$Million | % Change Over Previous Year | S\$Million | % Change Over Previous Year | S\$Million |
| Total | 391,118 | -18 | 356,299 | -21 | 34,819 |
| <u>Selected</u> <u>Region/Country</u> | | | | | |
| United States | 25,485 | -24 | 41,436 | -22 | -15,950 |
| Europe | 40,660 | -22 | 60,379 | -10 | -19,719 |
| Australia | 15,317 | -22 | 5,804 | -10 | 9,513 |
| Asia, of which | 278,060 | -17 | 235,455 | -24 | 42,606 |
| China | 38,125 | -13 | 37,585 | -21 | 540 |
| Hong Kong | 45,274 | -9 | 3,894 | -21 | 41,379 |
| Taiwan | 12,600 | -6 | 18,577 | -20 | -5,977 |
| Japan | 17,804 | -24 | 27,148 | -26 | -9,343 |
| Korea, Republic of | 18,219 | 5 | 20,339 | -20 | -2,119 |
| India | 13,429 | -20 | 8,157 | -32 | 5,273 |
| Indonesia | 37,858 | -25 | 20,659 | -17 | 17,199 |
| Malaysia | 44,809 | -22 | 41,336 | -23 | 3,472 |
| Thailand | 14,613 | -21 | 11,907 | -25 | 2,706 |
| Vietnam | 10,114 | -18 | 3,299 | -2 | 6,814 |

Source: International Enterprise Singapore

2.2.3 Major External Trading Commodities in 2009

In 2009, the largest non-oil imported commodities were machinery & transport equipment (which comprised mainly of electronics and non-electronics products), constituting 48% of total imports. Furthermore, the machinery & transport equipment also contributed significantly to the total exports, accounting for 52%, followed by oil products (20%) and chemicals & chemical products (12%) (Table 2.2.3).

Table 2.2.3: Imports and Exports By Commodity At Current Prices

| | Exports 2009 | | Imports 2009 | |
|-------------------------------------|-----------------|-----------------------------------|-----------------|--------------------------------|
| | S\$ Mil | % Change Over Previous Year | S\$ Mil | % Change Over Previous Year |
| TOTAL | 391,118 | -18 | 356,299 | -21 |
| Oil | 78,398 | -32 | 89,001 | -31 |
| Non-Oil | 312,720 | -13 | 267,299 | -17 |
| Food, Beverages & Tobacco | 7,543 | -4 | 10,798 | -6 |
| Crude Materials | 2,266 | -26 | 3,593 | 7 |
| Animal & Vegetable Oils | 593 | -33 | 705 | -31 |
| Chemicals & Chemical Products | 46,598 | -4 | 21,444 | -10 |
| Manufactured Goods | 16,836 | -25 | 26,079 | -26 |
| Machinery & Transport Equipment | 203,295 | -16 | 170,767 | -19 |
| Miscellaneous Manufactured Articles | 27,502 | -8 | 24,810 | -15 |
| Miscellaneous Transaction Articles | 8,089 | 33 | 9,103 | 12 |

Source: International Enterprise Singapore

3.1 Overview of the Construction Industry (Table 3.1)

3.1.1 Construction Demand Review for 2009

The construction demand² dropped from the peak of \$35.7 billion in 2008 to \$21 billion in 2009. The private sector construction demand in 2009 was weakened significantly by the effects of the global financial crisis, particularly during the first half of 2009. This, fortunately, was mitigated by the continued strong public sector construction demand which contributed 64% to the overall demand in 2009, led by various major civil engineering projects.

Public Sector

Total public sector construction demand in 2009 slowed down slightly from the record high of \$15.5 billion in 2008 to \$13.5 billion, due to moderation in residential and institutional building construction demand which traditionally dominated the building construction in this sector.

Public residential construction demand dropped to \$2.8 billion in 2009, due to a slowdown in new public housing construction. Institutional construction demand also softened to \$2.4 billion owing to slower school rebuilding/improving programme. In contrast, public civil engineering construction reached a new historical high of \$8.1 billion in 2009, fuelled by major contracts awarded for the MRT Downtown Line Stage 2, Marina Coastal Expressway (Marina Wharf), Jurong Rock Cavern (Phase 1), and International Cruise Terminal (Marine Structures).

Private Sector

The effects of global financial crisis which started in September 2008 and the subsequent Singapore economic recession wore down market confidence, resulting in a sharp drop in private sector construction demand from \$20.2 billion in 2008 to \$7.5 billion in 2009.

Residential construction demand dropped by almost half to \$3.5 billion as developers tread with caution amid looming uncertainty particularly during early 2009. Likewise, commercial construction demand shrank from a high of \$8.3 billion in 2008 to \$1.2 billion, battered by declines in occupancy rates and rental values as well as high statistical base in 2008 on account of the major construction contracts awarded for the development of the two Integrated Resorts and the Marina Bay Financial Centre.

² Construction demand is measured by total value of construction contracts awarded. All construction demand figures in this paper exclude reclamation projects.

The weak manufacturing output in the first half of 2009 dampened demand for industrial space. Industrial construction demand thus turned soft on the back of challenged economic environment, falling to \$1.5 billion in 2009.

3.1.2 Construction Demand Forecast for 2010

Based on feedback from developers and public sector agencies on their development plans as well as the performance up till September 2010, total construction demand is on track to reach the projected \$21 billion to \$27 billion in 2010.

About 45% or \$9.1 billion to \$12.1 billion of the total expected industry demand in 2010 is expected to be contributed by the public sector. The private sector demand is expected to be more upbeat than the preceding year's level, amounting to between \$11.9 billion and \$15.0 billion, bolstered by the turnaround in market sentiment in response to improved economic fundamentals.

Residential Construction Demand

Public Housing

To meet the growing public housing demand due to higher population, public residential construction demand is projected to increase to between \$2.8 billion and \$3.2 billion in 2010. Lift Upgrading Programme, Home Improvement Programme and Neighbourhood Renewal Programme are anticipated to collectively contribute to about \$1 billion to construction demand.

Private Housing

In response to the Government's recent cooling measures and the uncertainty triggered by the Eurozone debt crisis, most developers have turned more cautious in future construction investment. Nevertheless, the robust government land sales in the early part of the year and the strong economic growth have strengthened market confidence and led to a rebound in new residential construction demand. Private residential construction demand is projected to almost double to between \$6.2 billion and \$6.7 billion in 2010, with many major condominium developments around the island.

Commercial Construction Demand

Total commercial construction demand is expected to increase to between \$2.0 billion and \$3.9 billion in 2010 in response to buoyant office space demand as a result of rental pick up and capital value appreciation amidst improving business environment. Furthermore, the revival in visitor arrivals and improvement in consumer confidence lifted overall market sentiment which prompted a number of new retail as well as hotel developments.

Industrial Construction Demand

The improved manufacturing output and the brighter market outlook are likely to encourage industrialists to expand their foothold as Singapore economy bounces back. Total industrial construction demand in 2010 is anticipated to increase to between \$3.0 billion and \$3.3 billion. The construction of the first Liquefied Natural Gas (LNG) terminal by the Energy Market Authority (EMA) and industrial facilities at Seletar Aerospace Park by JTC Corporation are likely to propel the public industrial construction demand to a high level of close to \$1 billion. Private industrial construction demand is projected to reach between \$2.0 billion and \$2.3 billion with support from various Engineering, Procurement and Construction (EPC) contracts.

Institutional & Other Building Construction Demand

Total institutional & other building construction demand is forecast to remain firm in 2010, ranging between \$4.0 billion and \$5.8 billion. MOE is expected to beef up their upgrading programme for existing schools and building both new primary and secondary schools in 2010. Further support to this category also comes from the development of the Singapore Sports Hub, campus expansion of various Institutes of Higher Learning (IHLs) and development of new healthcare facilities in both public and private sectors.

Civil Engineering Construction Demand

Civil engineering construction demand is expected to be lower in 2010 at between \$3.0 billion and \$4.2 billion, as compared to close to \$9 billion per annum in the last two years. The lower demand was mainly due to re-scheduling of some rail projects to next year. Nevertheless, several strategic projects remained on track to proceed this year to expand Singapore's road networks and infrastructure. These included widening of Keppel Viaduct, interchange at TPE and road connection to Seletar/Sengkang and Common Services Tunnel Phase 3B at Marina Bay.

Table 3.1: Breakdown of Construction Demand
Contracts Awarded by Sector and Type of Work (2002 to 2010*)
(excluding Reclamation Works)

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 Forecast (in \$b) | |
|------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------------------|---------------|
| Total | 14,486.55 | 10,018.35 | 10,287.38 | 11,456.15 | 16,796.69 | 24,459.88 | 35,684.05 | 21,007.23 | 21.0 | - 27.0 |
| Building Work | 11,082.28 | 8,691.57 | 7,503.90 | 9,762.50 | 14,877.86 | 21,453.79 | 27,065.86 | 12,240.28 | 18.0 | - 22.9 |
| Residential | 3,611.82 | 2,993.96 | 3,863.48 | 3,724.02 | 5,298.38 | 7,361.04 | 11,073.60 | 6,297.57 | 9.1 | - 9.9 |
| Commercial | 1,249.78 | 536.08 | 1,128.01 | 1,009.01 | 2,372.71 | 5,230.25 | 8,455.54 | 1,290.18 | 2.0 | - 3.9 |
| Industrial | 2,441.80 | 2,046.18 | 1,046.75 | 3,119.07 | 5,510.63 | 6,967.52 | 3,741.10 | 1,712.94 | 3.0 | - 3.3 |
| Institutional & Others | 3,778.88 | 3,115.35 | 1,465.66 | 1,910.40 | 1,696.14 | 1,894.98 | 3,795.62 | 2,939.59 | 4.0 | - 5.8 |
| Civil Engineering Work | 3,404.27 | 1,326.78 | 2,783.48 | 1,693.65 | 1,918.83 | 3,006.09 | 8,618.19 | 8,766.95 | 3.0 | - 4.2 |

Source : BCA as at 21 July 2010
* forecast

3.2 Construction Companies

The total number of companies registered under BCA Contractors Registry has been on an uptrend and reached 8,578 firms by end June 2010. Of these, 66 firms were A1 contractors with unlimited tendering limit for public sector projects.

Table 3.2: Trend of Registered Contractor

| Year (calendar) | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010* |
|-------------------------------|------|------|------|------|------|------|------|-------|
| No. of registered contractors | 4739 | 5167 | 5621 | 5942 | 6346 | 7021 | 7975 | 8578 |

Note: Firm with multiple workheads registered is considered as a single registered entity. *No. of registered contractors as at 30 June 2010

3.3 Construction Manpower

Growth momentum of construction employment has started to slow down since beginning of 2010, in tandem with the lower construction output amidst moderated construction demand since 2009. According to the latest employment statistics released by MOM, construction employment grew by 1,600 in the first half of 2010 to 386,700 as at June 2010. This brings total employment gains in the construction sector since 2007 to a significant 131,200 jobs.

3.4 Productivity

Due to the strengthened construction activities in 2009, the labour productivity of the construction sector (in terms of value-added per employee) improved by 3.2% in 2009. Likewise, the site productivity for overall building construction increased slightly from 2.65 manday per square metre in FY2008 to 2.62 manday per square metre in FY2009.

Table 3.4.1: % Change in Labour Productivity in Construction Sector

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---------------------|------|------|------|------|------|------|
| Construction Sector | -0.4 | 0 | -3.5 | 4.3 | -0.8 | 3.2 |

Note : Based on Gross Value Added at 2005 Basic Prices

Source: Singapore Department of Statistics

Table 3.4.2: Average Manpower Usage, Manday per Sqm

| Type of Project | FY2005 | FY2006 | FY2007 | FY2008 | FY2009 |
|----------------------------------|--------|--------|--------|--------|--------|
| Public Housing (HDB Projects) | 1.68 | 1.60 | 1.59 | 2.22 | 2.20 |
| Private Residential (landed) | 5.38 | 5.33 | 5.32 | 5.21 | 5.22 |
| Private Residential (non-landed) | 3.34 | 3.13 | 3.15 | 3.27 | 3.15 |
| Commercial | 3.04 | 2.73 | 2.74 | 3.02 | 3.03 |
| Industrial | 2.04 | 2.02 | 2.00 | 2.01 | 1.98 |
| Institutional | 2.22 | 2.10 | 2.11 | 2.18 | 2.20 |
| Overall Average | 2.56 | 2.55 | 2.55 | 2.65 | 2.62 |

Source: Building and Construction Authority

3.5 Construction Costs

3.5.1 Tender Price Index

BCA Building Works Tender Price Index³ decreased by 15.6% year-on-year in 2009. The downward trend, following an unprecedented aggravation of the global financial crisis, was largely contributed by the decline of major construction material prices such as concrete, reinforcement, steelwork as well as considerable fall in prices of mechanical and electrical components. The decline in the construction costs had moderated towards the second half of 2009 as concrete and reinforcement prices stabilized.

In tandem with the economic recovery and improved construction market, BCA's TPI reversed the downtrend and has increased by about 2% since bottoming out in fourth quarter of 2009. Generally, the construction tendering market remains competitive.

3.5.2 Average Construction Material Prices

Concrete

Despite the rising volume of construction activities, demand for ready-mixed concrete softened by 2% in 2009, likely due to the lower volume of building structural works as a result of the near completion of a number of large building projects (Table 3.5.2a). On the other hand, the demand

³ BCA TPI excludes piling works, sub-structure works and mechanical & electrical works as these cost items are either project specific or not feasible to compile due to lack of data.

for cement in 2009 rose by 7%. The import sources for cement in 2009 were Japan (55%), Malaysia (24%), Taiwan (14%), Thailand (6%), and China (1%).

The average market price for Grade 35 pump ready-mixed concrete reduced by about 24% year-on-year to \$93 per cubic metre in Dec 2009. Similarly, the average market price for cement (bulk) was at \$93 per tonne in Dec 2009, down by 22% compared to Dec 2008.

The estimated demands for cement and ready-mixed concrete are expected to decrease by 9% and 7% respectively this year in view of the projected reduction in on-site construction activity.

Reinforcement Bars (Rebars)

Demand for rebars in 2009 declined by about 23% to 1.03 million tonnes as suppliers slowed down their stocking up amidst economic uncertainty and steel price volatility particularly in the first half of 2009 (Table 3.5.2a). The key import sources in 2009 included Turkey (38%), Malaysia (22%), Korea (16%) and other countries like Taiwan, China and Japan etc. For 2010, the demand for rebars is projected to soften by another 3% in tandem with the likely moderation in construction output.

With the reduction in global steel demand, average market prices of rebar⁴ continued to drop from \$861.5 per tonne in Jan 2009 to about \$719 per tonne by mid-year, then rebounded to about \$790 per tonne in Aug/Sep before softening again to \$722 per tonne in Dec 2009. Looking ahead, higher scrap and iron ore prices coupled with mills' output control are likely to strengthen steel prices in 2010, which have already increased to around \$840 per tonne in Oct this year.

3.5.3 Construction Industry Salaries and Wages

In tandem with the slowdown in manpower demand growth in 2009, construction professionals such as engineers and associate professionals and technicians enjoyed smaller increases of wages last year (Table 3.5.3b). Compared to most other economic sectors, the average monthly earnings per employee in the construction industry remained relatively low (Table 3.5.3c).

⁴ The prices refer to 16mm to 32mm High Tensile rebar and are based fixed price supply contracts with contract period 6 months or less.

Table 3.5.3a: Basic Construction Materials

| Demand | | | | | | |
|-----------------------|---------------------------|-------------|--|-------------|----------------------------------|-------------|
| Year | Cement (Mil tonnes) | % Change | Ready-Mixed Concrete (Mil m ³) | % Change | Steel Bars (Mil tonnes) | % Change |
| 2008 | 4.55 | | 9.96 | | 1.33 | |
| 2009 | 4.84 | 7% | 9.75 | -2% | 1.03 | -23% |
| 2010(F) | 4.40 | -9% | 9.10 | -7% | 1.0 | -3% |
| Current Market Prices | | | | | | |
| Year | Cement (S\$ per tonne) | % Change | Ready-Mixed Concrete (S\$ per m ³) | % Change | Steel Bars (S\$ per tonne) | % Change |
| Dec 2008 | \$120.40 | | \$121.90 | | \$861.5 * | |
| Dec 2009 | \$93.40 | -22% | \$93.30 | -24% | \$722.5 | -16% |
| Sep 2010 | \$88.60 | -5% | \$ 92.30 # | NA | \$834.6 | 16% |

F: Forecast

*Based on Jan 2009 price

From Jan 2010 onwards, the market prices of ready mixed concrete are based on Grade 40 Pump instead of Grade 35 Pump previously.

Table 3.5.3b: Mean Monthly Gross Wages in Construction

| Category | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|-------|-------|-------|-------|-------|
| Professionals (S\$/month) | 3,155 | 3,237 | 3,400 | 3,737 | 3,871 |
| Associate Professionals and Technicians (S\$/month) | 2,565 | 2,646 | 2,736 | 2,808 | 2,830 |

Source: Report on Wages in Singapore, various years, Ministry of Manpower

Table 3.5.3c: Average Monthly Earnings Per Employee (S\$ per month)

| Industry | 2005 | 2006 | 2007 | 2008 | 2009 |
|---------------------------------------|--------------|--------------|--------------|--------------|--------------|
| Average | 3,444 | 3,554 | 3,773 | 3,977 | 3,872 |
| Manufacturing | 3,495 | 3,618 | 3,764 | 3,955 | 3,966 |
| Construction | 2,513 | 2,517 | 2,646 | 2,861 | 2,948 |
| Wholesale and Retail Trade | 3,017 | 3,101 | 3,262 | 3,441 | 3,418 |
| Transport and Storage | 3,507 | 3,525 | 3,797 | 3,989 | 3,914 |
| Hotels & Restaurants | 1,360 | 1,381 | 1,442 | 1,504 | 1,463 |
| Information & Communications | 4,553 | 4,745 | 5,018 | 5,304 | 5,253 |
| Financial Services | 5,949 | 6,291 | 6,768 | 7,153 | 6,890 |
| Retail Estate and Leasing Services | 2,732 | 3,053 | 3,355 | 3,513 | 3,273 |
| Community, Social & Personal Services | 3,704 | 3,831 | 4,074 | 4,168 | 3,857 |

Source: Yearbook of Statistics Singapore, 2009.

3.6 Conclusion

Following an exceptional strong expansion in the first half, the growth momentum of the Singapore economy began to show signs of moderating in the middle of 2010. Nevertheless, economists at the Monetary Authority of Singapore (MAS) expect the level of economy activity to remain high across a board of industries but it could ease further in the near term. For 2010 as a whole, MTI expects Singapore's GDP to be on track to grow by around 15% while in 2011, Singapore economy will continue to expand but at a more sustainable rate at 4% to 6% in line with its growth potential.

Given the resilience in the Singapore economy and the relatively sanguine regional economic outlook, the construction demand in Singapore is expected to remain healthy over the next few years. Based on BCA's last projection, the average construction demand in 2011 to 2012 is likely to sustain at between \$18 billion and \$25 billion per annum⁵. Public sector construction demand, in particular civil engineering projects, is expected to be one of the key drivers to industry construction demand at least over the medium-term, in view that the Government has already lined up a number of new MRT lines and road projects for implementation over the next ten years.

⁵ This forecast will be fine-tuned again in January 2011.

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THEME PAPER

TOWARDS A SUSTAINABLE BUILT ENVIRONMENT IN SINGAPORE

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EXECUTIVE SUMMARY

Singapore is a small city-state with limited natural resources and growing needs. Given the highly urbanised environment of Singapore, sustainable development and a sustainable built environment is necessary. The country's minimally available resources have to be used prudently, pragmatically and with an eye on the future.

Sustainable Development starts from sustainable planning. In Singapore, the Urban Redevelopment Authority is in charge of all planning functions for the physical development of Singapore. As Singapore's planning and conservation authority, URA takes a long-term, comprehensive and integrated planning approach, in order to balance competing land use needs, ensure sustainable growth and a good quality of life.

The Building and Construction Authority (BCA) of Singapore champions sustainability in the built environment. This paper focuses on the Masterplans, policies, initiatives and fiscal instruments set in place by BCA in its efforts in delivering a sustainable built environment in Singapore.

In relation to housing, whilst the policy instruments set in place by BCA will be applicable for private residential homes and projects, the Housing and Development Board (HDB) of Singapore is the government authority responsible for the development of sustainable public housing. To address housing more specifically, this paper describes HDB's three main sustainable public housing initiatives to exemplify the government's commitment towards a sustainable built environment in Singapore.

INTRODUCTION

Singapore had humble beginnings as an obscure fishing village, and a small island at the end of a peninsula. Due to its strategic location on the major sea routes, Singapore developed as an entrepot port and a city under the colonial rule. Upon its independence in 1965, Singapore had to survive on its own with great constraints. Singapore then was a small country with limited natural resources like oil, water and land, poor infrastructure, little industrial know-how, domestic capital and foreign investment.

Singapore's journey of creating a sustainable built environment thus began in the very early days of our urban development. For Singapore, sustainable development is not an option, but a necessity.

SUSTAINABLE PLANNING FOR SINGAPORE

Long-term sustainable planning for a small city-state such as Singapore requires the prudent formulation and execution of policies to ensure efficient land and resource use, adequate and affordable public housing and sound infrastructural development. In Singapore, the Urban Redevelopment Authority (URA) is in charge of all planning functions for the physical development of Singapore, including the conservation of land and buildings.

Concept Plan

As Singapore's planning and conservation authority, URA takes a long-term, comprehensive and integrated planning approach, in order to balance the various competing land use needs, ensure sustainable growth and a good quality of life. With this approach, URA maps out Singapore's development directions for the next 40 to 50 years in a Concept Plan. The Concept Plan takes into consideration all major land use demands such as housing, industry and commerce, recreation and nature areas, transport and utility infrastructure, as well as defence requirements, and represents Singapore's planning strategies to make best use of its finite land resources. The Concept Plan, reviewed every 10 years, ensures there is sufficient land to meet anticipated population and economic growth, and provide a good living environment.

Master Plan

A Master Plan translates the broad strategies of the Concept Plan into detailed plans to guide Singapore's medium term development for the next 10 to 15 years. The Master Plan, reviewed every 5 years, is a statutory land use plan showing the permissible land use and density for every

parcel of land in Singapore. Planning approval is required for development projects from both the private and public sectors. This ensures that developments in Singapore are carried out in an orderly manner and in accordance with the intentions stipulated in the Master Plan.

Together, the Concept Plan and Master Plan provide a comprehensive, forward-looking and integrated planning framework for sustainable development. Prudent land use planning has enabled Singapore to enjoy strong economic growth and social cohesion, and ensures that sufficient land is safeguarded to support continued economic progress and future development.

See Appendix A and B for more details on the latest Concept Plan and Master Plan in Singapore respectively.

SUSTAINABLE BUILT ENVIRONMENT IN SINGAPORE

Given the highly urbanised environment in Singapore with a 5 million population and land area of about 700 square kilometres, there is a need to develop and promote an environmentally sustainable built environment. Our buildings have been shown to consume about a third of the national end-use electricity and are the second largest electricity consumer, after the industrial sector. Hence, the adoption and promotion of green buildings is vital towards a sustainable built environment.

Under the umbrella of the Ministry of National Development, besides the Urban Redevelopment Authority that plans for Singapore's physical development in a sustainable manner, there are two other agencies instrumental in the implementation of sustainable development in Singapore - the Building and Construction Authority (BCA) and the Housing and Development Board (HDB).

BCA is the agency that regulates and develops Singapore's construction industry and takes the lead in ensuring sustainability in the built environment in Singapore, whilst HDB is Singapore's public housing authority, responsible for creating sustainable towns and quality homes for more than 80 per cent of Singaporeans.

BCA'S LEAD IN PROMOTING ENVIRONMENTAL SUSTAINABILITY

In 2005, BCA introduced Singapore's green building rating system, the BCA Green Mark. It is a unique green building rating system developed specifically for the tropical climate to improve energy efficiency, water conservation, indoor environmental quality and waste minimisation in buildings.

The BCA Green Mark scheme is an initiative to drive Singapore's construction industry towards more environment-friendly buildings. It is intended to promote sustainability in the built environment and raise environmental awareness amongst developers, designers and builders when they start project conceptualisation and design, as well as during construction.

The BCA Green Mark provides a meaningful differentiation of buildings in the real estate market. It is a benchmarking scheme which incorporates internationally recognised best practices in environmental design and performance. This can have a positive effect on corporate image, leasing and possibly, resale value of buildings. Green Mark buildings can have reduced potential environmental impact, reduced water and energy bills, as well as an improved indoor environmental quality for a healthy and productive workplace.

The BCA Green Mark has 5 key assessment criteria looking at Energy Efficiency, Water Efficiency, Environmental Protection, Indoor Environmental Quality and Other Green Features. The rating system has 4 rating levels, namely, Certified, Gold, Gold^{PLUS} and Platinum, each level corresponding to higher energy efficiency levels to be attained above the current building codes in Singapore.

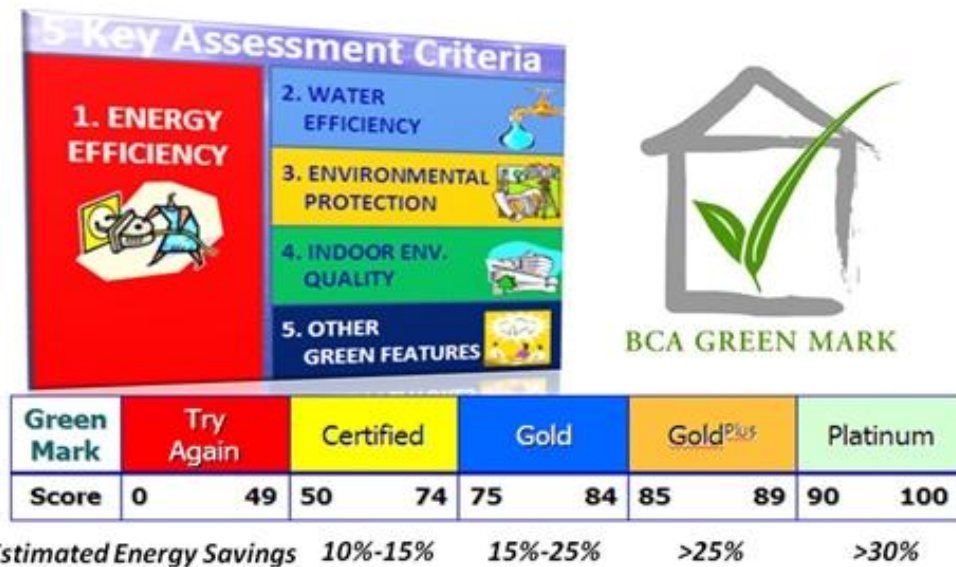


Diagram 1. BCA Green Mark Assessment Criteria, Scoring and Rating levels.

Since 2005, BCA Green Mark has been developed to have separate criteria for new residential buildings, new non-residential buildings, existing buildings, office interiors, landed houses, new and existing parks, infrastructure and district. The BCA Green Mark for new buildings has also undergone several reviews to keep it relevant and with more stringent performance levels. The latest is currently the Green Mark version 3, with version 4 coming into effect on 1 December 2010.

GREEN BUILDING MASTERPLAN IN SINGAPORE

To champion sustainability in the built environment, BCA formulated the Green Building Masterplan which focused both on new buildings and those undergoing major retrofitting, and also on the existing building stock. The Masterplan has 6 strategic thrusts, as shown in the following diagram:



Diagram 2. Six strategic thrusts under BCA's Green Building Masterplan

Strategic Thrust 1 - Public Sector Taking the Lead

New Buildings and those undergoing major retrofitting

Under the first strategic thrust, the Singapore Government made the commitment in 2009 to require all new public sector buildings and those undergoing major retrofitting works to achieve the highest Green Mark accolade, the Green Mark Platinum award. All new government land sales in strategic growth locations are also required to attain higher Green Mark standards as part of the land sales conditions.

Existing Buildings

Besides new buildings, the Government also committed to having all large existing buildings owned by government agencies to attain the Green Mark Gold^{PLUS} standard by 2020.

Strategic Thrust 2 - Spurring the Private Sector

Under the second strategic thrust, the Singapore Government set aside substantial incentives for the private sector. These incentives signified the government's commitment to green the built environment and its focus to target both the new and existing building stock in Singapore in order to step up efforts in delivering a sustainable built environment.

New Buildings and those undergoing major retrofitting

When green buildings were still relatively new in 2006, a S\$20 million Green Mark Incentive Scheme was introduced by BCA to influence the private sector towards realising green buildings. The scheme offered direct monetary incentives to developers that achieve a green building rating above the basic Certified level. Incentives were consequently given to the architects and M&E engineers as well for their green building design.

In 2009, to further encourage private developers to achieve outstanding design, quality and sustainability objectives in their new buildings and reconstruction projects, BCA and URA collaborated to offer bonus Gross Floor Area (or GFA) to developers as an incentive for every new buildings that attains higher tier Green Mark ratings (i.e. Green Mark Gold^{PLUS} and Platinum rating levels).

Existing Buildings

In addition to the above, BCA launched a S\$100 million incentive scheme in 2009 to jumpstart the greening of the existing buildings in the private sector. This scheme is aimed at helping building owners overcome the initial capital cost in upgrading their buildings and encouraging the owners to undertake retrofitting works that would improve energy efficiency in their buildings.

These incentives for the new and existing buildings are applicable for private residential buildings.

Strategic Thrust 3 - Furthering the Development of Green Building Technology

Under the third strategic thrust, a S\$50 million R&D Research Fund was committed by the Ministry of National Development in 2007 to spur research into developing more viable and cost-effective green building technologies and energy efficiency solutions.

In addition, to support energy efficiency improvements in retrofitting works, BCA developed a Zero Energy Building (ZEB) as a showcase and a test bed for various green building technologies. It is the region's first zero energy building retrofitted from an existing building and demonstrates what can be done to retrofit an existing building to achieve the net zero energy target.

The ZEB was built and launched in October 2009 at the BCA Academy (BCAA) and has functions including a library, offices and meeting rooms. After one year of operation, the ZEB@BCAA has performed better than it was designed, going beyond net zero to achieve greater energy production than consumption.

Strategic Thrust 4 - Building Industry Capabilities through Training

With the green building initiatives set out, it is necessary to ensure an adequate supply of green building professionals and develop the industry's capabilities. BCA estimated that about 18,000 to 20,000 green building professionals will be needed within the next ten years. This will include upgrading of existing personnel and bringing in new entrants for this high growth area to develop a highly skilled 'green collar' workforce.

To support this goal, BCA's training arm, the BCA Academy, has mapped out a comprehensive framework of training programmes and is already conducting a large number of training courses and programmes to develop capability in green building design and sustainable development.

Besides short specialist courses like the Green Mark Manager (GMM) course and the more specialised Green Mark Professional (GMP) course, there are also a number of specialist diploma and diploma programmes available for the working professionals, managers and technicians. Examples are the Specialist Diploma programmes in Facility and Energy Management, the Diploma in Mechanical Engineering (Green Building Technology) and one of the latest additions in 2010, the Diploma in Electrical Engineering and Clean Energy.

There are also graduate and postgraduate degrees for the professionals. For example, there is the Master of Science in Sustainable Building Design, a collaboration between the University of Nottingham and BCA, which is a first of its kind in Singapore. Also, a Master of Science in Facility and Environment Management in partnership with the University College London, as well as the Bachelor of Science Honours degree in Integrated Events and Sustainable Facilities Management, a joint development between BCA, UniSIM and the Singapore Polytechnic.

Besides these, seminars and Executive Development Programmes are also conducted to build up Singapore's expertise and capabilities in the area of green building.

Strategic Thrust 5 - Profiling Singapore and Raising Awareness

Besides the engagement of the industry stakeholders through platforms like breakfast talks for CEOs and the formation of an International Panel of Experts (IPE) on Sustainability of the Built Environment, a wide range of promotional activities have also been planned and undertaken to raise awareness and promote green buildings to the industry and community at large. These activities are introduced through schools, shopping malls, public transport and the mass media.

To reach out to the general public and consumers, a Green Mark portal website (www.greenmark.sg) was launched; advertisements were placed in the newspaper, and even on transport mediums like buses and Mass Rapid Transits (MRTs). In addition, consumer video clips were distributed; road shows and a roving exhibition at various shopping malls were also held. The latest roving Green Building exhibition was held in a heartland shopping mall on November 11 to November 14, 2010.

Besides these, BCA has been actively reaching out to the younger generation as well through a number of green competitions in schools.

Strategic Thrust 6 - Imposing Minimum Standards

The sixth and final strategic thrust focuses on the regulatory front.

New Buildings and those undergoing major retrofitting

In April 2008, a significant milestone was achieved in Singapore's commitment and road towards a sustainable built environment with the introduction of a minimum standard on the environmental sustainability for buildings. The Building Control Act was amended to require all new buildings and

major retrofitting projects above 2,000 square metres Gross Floor Area (GFA) to attain a mandatory Green Mark rating at the Certified level.

Existing Buildings

A phased approach to greening the existing building stock was mapped out after studying implementation approaches of other advanced countries. The Singapore Government has announced earlier in 2010 that building owners of existing buildings will be required to submit their annual energy consumption data. This will enable energy consumption patterns for different building types to be known. Minimum energy efficiency levels of existing building are being considered for the next phase.

SUCCESS OF THE GREEN BUILDING MASTERPLAN IN SINGAPORE

Since the launch of the Green Building Masterplan, there has been a significant transformation in Singapore's new building projects. From having only 17 Green Mark building projects each year in 2005 and 2006, the number increased to 96 in 2007, 120 in 2008 and now, a total of more than 500 Green Mark building projects in 2010. In terms of floor area, over 20 million square metres, or close to 10% of buildings, are now certified under the Green Mark scheme.

INTER-MINISTERIAL COMMITTEE ON SUSTAINABLE DEVELOPMENT (IMCSD)

In 2008, a high level Inter-Ministerial Committee on Sustainable Development (IMCSD) was formed in Singapore. The Committee was co-chaired by the Minister for National Development, Mr Mah Bow Tan, and the Minister for the Environment and Water Resources, Dr Yaacob Ibrahim, and tasked to formulate a national framework and strategy for Singapore's long-term sustainable development.

Amongst the key recommendations made relating to the built environment were targets to have by 2030, 80% of all the buildings in Singapore attain at least the BCA Green Mark Certified level and the overall energy efficiency improve by 35% from the 2005 level. The policy instruments under the Green Building Masterplan were also formulated and aimed at achieving these targets set by the IMCSD by 2030.

SUSTAINABLE PUBLIC HOUSING INITIATIVES IN SINGAPORE

Besides the policy instruments set out by BCA which are applicable for private housing, there are notable public housing initiatives in Singapore, undertaken by HDB, the public housing authority in Singapore. These initiatives are also examples of the public sector taking the lead towards a sustainable built environment, specifically for public housing.

1. Eco-Modernisation

For the past 50 years, HDB has been building public housing in fulfilling its role of housing a nation. To date, HDB has developed a total of 23 towns and close to 1 million flats. However, rejuvenation becomes increasingly important to ensure the sustainability of these existing towns, not only in response to changing demographics and maintaining the quality of the living environment, but also to ensure that they do not over-consume resources because of inefficiency and technology inferiority. An Eco-Modernisation programme was thus formulated to modernise HDB's stock of more than 900,000 residential flats to become more environmentally friendly.

This programme to convert the existing stock of flats from 'Grey to Green' aims at enhancing existing HDB precincts with eco-friendly features, including the introduction of energy efficient solutions, more durable materials and technologies to reduce maintenance cost.

A pilot study was conducted in 2008 where a series of energy efficient measures were introduced to the common areas of two existing precincts and a 30% reduction in energy consumption was achieved. In tandem with the eco-modernisation programme, HDB also worked with the Town Councils to conduct a 5-year re-lamping exercise, involving the replacement of existing lamps to a more energy efficient T5 and high-power compact fluorescent lamp (HPCFL). This exercise translates into an annual savings of S\$18 million in energy cost.

The eco-modernisation programme thus forms a key component in creating a Live-in Laboratory where new eco-friendly solutions can be retrofitted into existing estates that can achieve both environmental sustainability and cost-effective maintenance. Technologies such as light-emitting diode (LED) lighting for general lighting at HDB common areas, energy regenerative lift systems and thermal insulating paints are examples that can be introduced into the existing towns. Modular extensive and vertical greenery solutions can also help to achieve both an aesthetically pleasing environment and one that has a comparably lower overall ambient temperature than an estate

without such green solutions. In addition to current efforts, HDB aims to introduce about 90,000m² more green roof area in the existing estates.

Besides these measures to reduce energy consumption, HDB is actively looking at the generation of clean and renewable energy to meet energy demands. HDB's energy production currently amounts to 150kWp in 2 existing precincts, with an aim to reach 3.1MWp in 28 other existing precincts and 2 new precincts by 2015. The combined efforts of eco-modernisation and clean and renewable energy such as solar power generation will enable HDB to move closer towards its goal of achieving net-zero energy usage in the common areas of the estates.

2. Eco-Precinct

In 2007, HDB unveiled its plans to develop its first eco-precinct, Treelodge@Punggol. With ecofriendly features that embrace nature and adopt green technologies, the precinct aims to create a green living environment and increase awareness towards environment sustainability.

The residential development incorporates a range of green technologies and innovations for effective energy, water and waste management. These include north-south orientation of the buildings, solar panels to generate lighting for common areas, centralised recyclable refuse chutes and a rainwater collection system. Intensified greenery at the eco-deck, vertical greening along the columns of the residential blocks, and green roofs at the roof decks are introduced to help cool down the ambient temperature, while beautifying the precinct environment. In addition, there is a well-shaded jogging path for residents, exercise stations for the elderly and a children's playground made from recycled materials.

| Eco-friendly features | Where | Purpose |
|----------------------------------|--|--|
| Solar photovoltaic panels | All blocks | Tap on the solar energy to power common area lightings |
| Energy efficient light fittings | Common areas, corridors and within the lifts | Reduce energy consumption |
| Motion sensors | Staircase core and all car-park levels | On-demand lighting to minimise energy usage |
| Rainwater harvesting | All blocks | Collection of rainwater for washing of common areas and for watering the plants (water conservation) |
| Dedicated recycling refuse chute | All blocks | Provides ease and convenience for residents to recycle their waste |

Table 1. List of eco-friendly features in the Treelodge@Punggol Eco-Precinct (extracted from IES Journal article)

These various features collectively help to create a new eco-conscious group of residents and allow the community to experience a distinctive eco-lifestyle by promoting green and healthy living in a more sustainable environment.



Diagram 3. Architectural perspective of the Treelodge@Punggol Eco-Precinct
(extracted from HDB website)

3. Punggol Eco-Town

In the development of the next generation of eco-friendly homes, a high-signature eco-town will be developed in Punggol within the east-west corridor along the Punggol Waterway. The Punggol ecotown will serve as an Integrated Laboratory for HDB to develop and test-bed sustainable and innovative solutions.

Punggol new town was first announced in 1996, with the town given the term 'Punggol 21', to highlight the new planning concepts adopted for the town in the new millennium. Some of these concepts include developing the town with smaller and more intimate estates with common greens, a wide range of high-quality housing, an integrated transportation system and a continuous waterfront promenade. With plans to dam up the two rivers bordering the town to form freshwater reservoirs, a landscaped waterway that reinforced Punggol's vision as a waterfront town can be constructed, thereby also creating opportunities for HDB to provide waterfront residential living along the 4.2-km east-west corridor in Punggol with the theme of 'Green Living by the Waters'.

In promoting the concept of 'Green Living by the Waters' in Punggol, more environmentally friendly buildings will be built by tapping on the elements of nature, such as sun, rain and wind, to aid in the future planning and design of Punggol Town. HDB will also aim for higher tier Green Mark ratings for new developments along the waterway. Punggol residents will be encouraged to opt for clean commuting (e.g. bicycles, electric vehicles, and car-sharing services) through physical provisions like cycling paths, charging stations at the car parks and designated spaces for car-sharing services in the estates.

Considering the scale of the development planned for Punggol eco-town, large-scale experimentation and test-bedding of emerging green technologies and urban solutions (in areas such as energy, water, resource and waste management, and maintenance optimisation) can be carried out, thereby creating 'integrated laboratories' for urban solutions in the estate. Such test-bedding efforts will not only build up local technical capabilities and expertise for these emerging technologies but also lower the implementation costs due to the economies of scale that can be achieved in the Punggol estate.

Eventually, HDB hopes to lower the implementation cost of these solutions and to replicate them to other developments in Singapore once these solutions have been tested and proven to be feasible and cost effective.



Diagram 4. Architectural perspective of the Punggol Eco-Town with waterfront residential living (extracted from Ministry of National Development website)

CONCLUSION

As a small city-state with limited natural resources and growing needs, sustainable development is not an option, but a necessity. Given the highly urbanised environment of Singapore, there is a need to develop an environmentally sustainable built environment.

Besides sustainable planning by the Urban Redevelopment Authority of Singapore, the Building and Construction Authority of Singapore takes the lead in ensuring sustainability in the development of the built environment including private residential homes whilst the Housing and Development Board is the government authority focusing on sustainable public housing.

Dedicated government efforts are required in the prudent formulation and execution of sound policies towards a sustainable built environment including housing. These are exemplified in Singapore by the policy instruments set in place under the Green Building Masterplan, as well as commitments made by the Singapore Government in its administration of the industry, especially with regards to the targets set and fiscal incentives offered. The public housing programmes like ecomodernisation, eco-town and eco-precinct are also examples of Singapore's commitment towards sustainability in the public housing.

Globally, Sustainable Development is no longer an option. It has now become an absolute need and the way forward. The efforts made in Singapore may not have a significant impact on the environmental sustainability of the world. Nonetheless, it is a step forward and part of the contribution as a region. The creation of a sustainable built environment for all is an attainable goal, but a concerted effort needs to be made by all stakeholders in the industry to ensure a better built environment for the future.

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SINGAPORE CONCEPT PLAN 2001

With information from the URA website, www.ura.gov.sg.

The Concept Plan is a broad, strategic, long term land use and transportation plan updated once every 10 years to guide Singapore's physical development. The first Concept Plan was developed in 1971 and it guided the development of one of the world's best airports - the Singapore Changi International Airport, as well as the Mass Rapid Transit System (MRT).

The latest Concept Plan 2001 maps out Singapore's vision for the next 40 to 50 years. It is based on a population scenario of 5.5 million. The Concept Plan 2001 was put together after extensive public consultation through focus groups, internet feedback, public dialogues and exhibition.

With about 700 square kilometres, the main challenge in planning for Singapore is the scarcity of land. Demand for land will continue to increase as the economy grows and population expands. Besides land for housing, industry and recreation, there is a need to ensure there is sufficient land for infrastructure needs, water catchment and military uses.

With Singapore's land constraints in mind, a high quality of living can still be ensured. The Concept Plan will provide a variety of housing choices and a comfortable living environment for all. In addition, more green spaces will be made accessible and there will be greater recreational choices.

The Concept Plan also includes initiatives to be flexible and responsive to the needs of businesses, to support value-added industries, and to provide for the growth of Singapore in an international business hub.

Key Proposals in Concept Plan 2011

The vision set out in the Concept Plan 2001 is to develop Singapore into a thriving world-class city in the 21st century. The seven key proposals represent the key thrusts of Concept Plan 2001 for housing, recreation, business, infrastructure and identity. They are:

1. Providing more new homes in familiar places
2. Introducing more high-rise city living
3. Offering more choices for recreation
4. Allowing greater flexibility for businesses
5. Establishing a global business centre
6. Building an extensive rail network
7. Focusing on identity

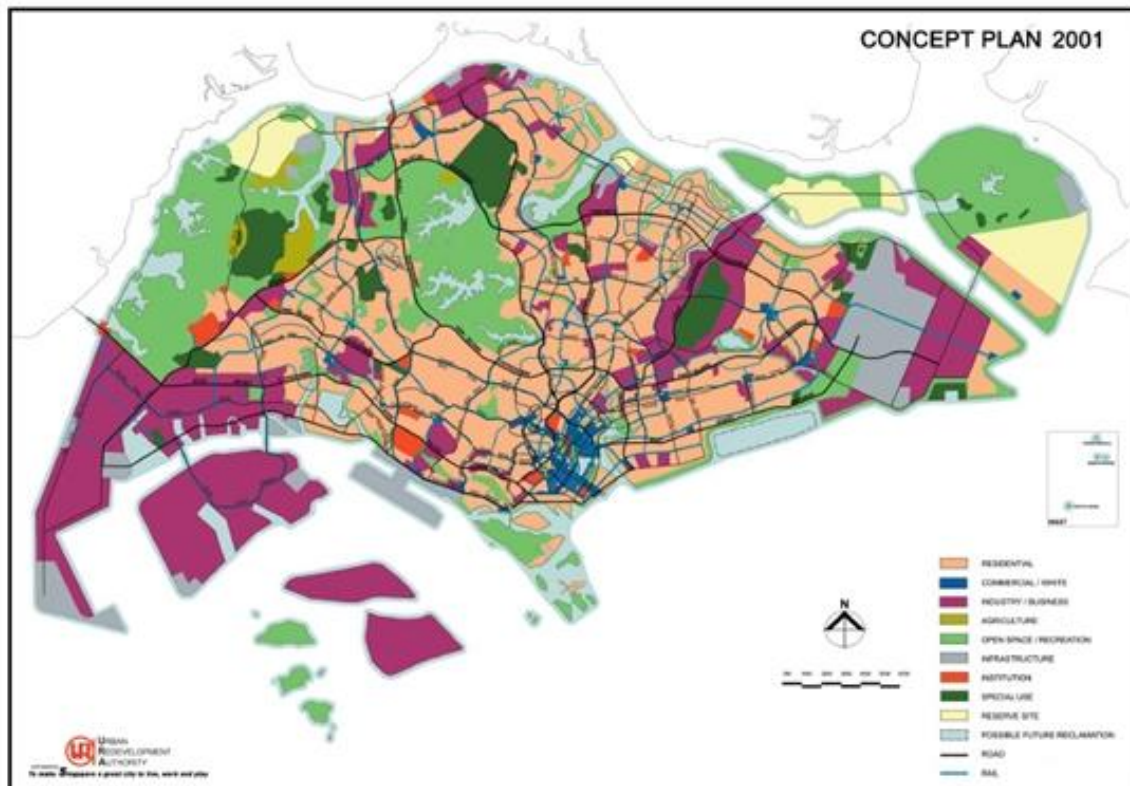
The Concept Plan 2001 aims to provide more new homes in established areas. This will help to foster community bonds and rejuvenate existing towns. For those who prefer to live in a new area, one or two new towns will be developed in future. More homes will be built in the city, increasing the live-in population from the current 3% to 7%. This will build up a critical mass of population in the Central Area and add more buzz to the city.

For recreation, there will be more accessible green spaces, sporting and cultural facilities. The Concept Plan aims to almost double the amount of green space to 4,500 ha. Access to the Central Water Catchment will be enhanced for low-impact recreational uses, such as cycling and hiking. The Concept Plan 2001 plans to keep existing nature areas in their rustic state for as long as possible.

For businesses, the zoning system will be revised to allow greater flexibility through the creation of new Business zones which categorize industrial and business activities according to their impact on the environment and a new 'White' zone which will allow most uses except pollutive use.

The Concept Plan 2001 plans for a global financial hub by concentrating the majority of financial and services sectors within the Central Area. The transport system will also be enhanced, with the existing 93km of rail lines increased to about 500km in future.

A new focus of the Concept Plan 2001 is identity. More of our built heritage will be conserved to enhance the character of places. Where possible, landmarks and natural features will be integrated as part of new towns and developments.



REVIEW OF CONCEPT PLAN

The Urban Redevelopment Authority (URA) is embarking on the review of the Concept Plan and currently seeking public views. The present review is scheduled to be completed in 2011.

The Concept Plan 2011 (CP 2011) will give Singaporeans and others a look into Singapore's future in terms of the economic development opportunities, good quality living environment, an inclusive society where the needs of the population are taken care of and a sustainable Singapore that balances growth with responsible environmental management.

With limited land in Singapore, carefully planning is needed to meet the various land use needs in Singapore's limited space. As Singapore continues to grow and develop, the CP2011 will play a vital role in balancing the various land use needs to ensure sustainable growth for Singapore over the long term.

SINGAPORE MASTER PLAN 2008

With information from the URA website, www.ura.gov.sg.

The Master Plan is the statutory land use plan which guides Singapore's development in the medium term over the next 10 to 15 years. It is reviewed every five years and translates the broad long-term strategies of the Concept Plan into detailed plans to guide development. The Master Plan shows the permissible land use and density for developments in Singapore.

Like the Concept Plan, the Master Plan is a collaborative effort between agencies to ensure that plans meet immediate economic and social needs while maintaining a good quality living environment.

The Master Plan is one of the most important tools used to shape Singapore's physical development. Many proposals put forth in the Master Plan have been realised by the private and public sectors. Examples are the transformation of Singapore River and the development of new commercial centres.

The broad strategies from the mid-term review of the Concept Plan have been translated into the Master Plan 2008 which will guide Singapore's physical development for the next 10 to 15 years.

Building on the strategies identified in the mid-term review, Master Plan 2008 has four key thrusts:

1. A Home of Choice

The Master Plan 2008 aims to continue to enhance Singapore as a liveable city. Singaporeans can look forward to more quality living environments, with a wide choice of housing locations and types.

New towns will be further developed to build up their critical mass, alongside supporting amenities. There will be new housing choices for those who want to live in familiar places. Mature towns will be rejuvenated with new generation housing and amenities. Other housing estates will also be upgraded with new facilities through schemes such as the Home Improvement Programme and Neighbourhood Renewal Programme.

To offer city-living choices and capitalise on opportunities offered by the Sports Hub and the waterfront, a new mixed-use lifestyle precinct will be developed.

In tandem with the growing population, the island-wide rail network will be expanded with new rail lines. The road network will also be improved.

2. A Magnet for Business

To strengthen Singapore as a distinctive global business hub, the Master Plan 2008 will continue to offer a choice of attractive business locations, supported by amenities and infrastructure to meet the different needs of business.

Within the city centre, new growth areas will be developed as strategic gateways to the city centre. Commercial hubs will also be developed outside the city centre to offer alternatives for businesses and provide jobs closer to homes. Decentralisation of commercial hubs has the following benefits:

- To help spread business activities outside the city, creating mixed-use destinations that inject vibrancy and foster rejuvenation in these areas;

- To offer attractive alternative business locations outside the city in areas well-served by mass rapid transit networks and expressways, and supported by large population catchments and complementary business clusters;
- To provide jobs closer to homes to achieve better job distribution island-wide. It is a sustainable approach to reducing congestion with less commuting to the city;
- The decentralisation strategy will focus on building up two commercial hubs.

3. An Exciting Playground

URA's new leisure plan includes new parks and additional park connectors. There will be new water activities in selected rivers and reservoirs, as well as new sporting facilities and arts and event spaces. New enhancements will be made to current nightlife scenes to offer new night activities. Plans are also in the pipeline to boost more recreational experiences.

4. A Place to Cherish

The Master Plan 2008 also recognises that identity and heritage are important elements that make Singapore home. Through URA's conservation efforts, more than 6,800 buildings have been conserved and 55 monuments protected island-wide.

In Master Plan 2003, activity nodes had been identified and recognised as part of the Identity Plan. Plans were made to retain and enhance these activity nodes by recognising existing trades and activities, developing urban design guidelines, and improving their physical environment. Since Master Plan 2003, selected areas continue to be enhanced through Environmental Improvement Projects. The improvement works serve to help to enhance these places for all to enjoy.

In rejuvenating older HDB towns, efforts will also be made to retain some of the heritage, memories and identity that residents associate with the area.