

Case Study on Economic Benefits of Singapore Standard (SS) 530: 2006 - Code of Practice for Energy Efficiency Standard for Building Services and Equipment

Contributed by SPRING Singapore

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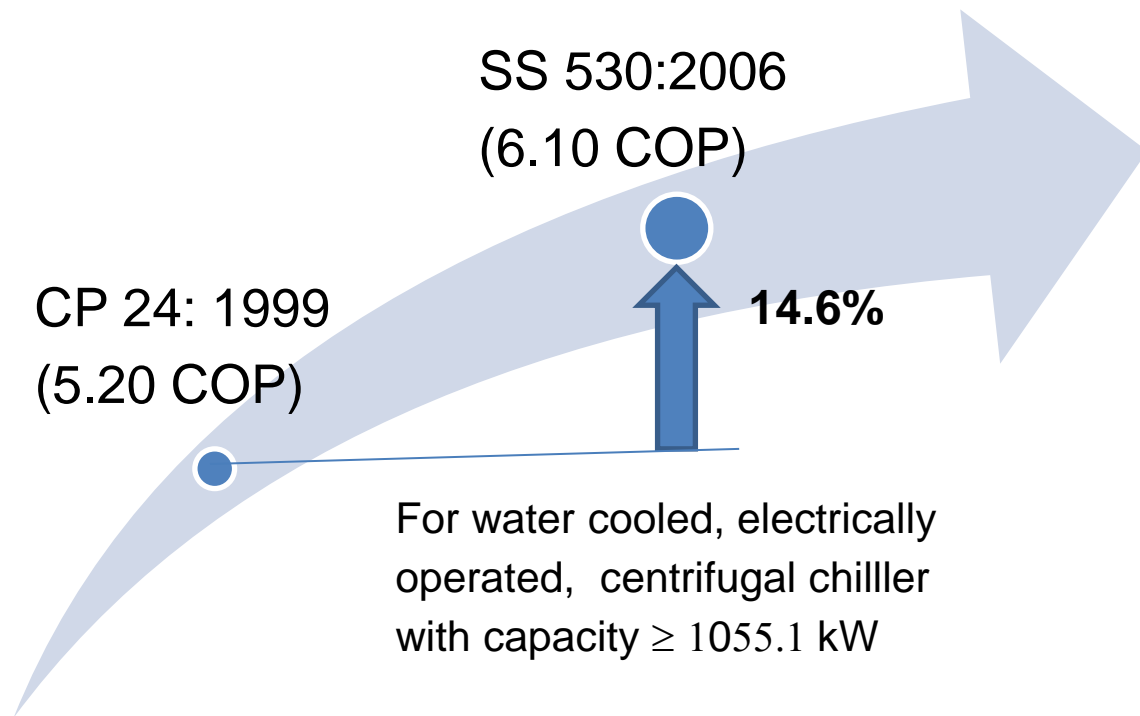
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Scope: Setting the Minimum Energy Efficiency Performance Requirements of Equipment and Systems Used in Buildings

- ✓ Promote sustainable design & operation of building services and equipments
- ✓ Applicable to both new and old buildings
- ✓ Support National Building & Construction Authority (BCA) Green Mark Programme to improve energy efficiency and reduce carbon footprint
 - Launched in January 2005 as 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 among developers, designers and builders when they start project conceptualisation and design, as well as during construction

Case study focused on chiller as it consumes 30% – 50% of energy usage in buildings



Notes:

- COP: Coefficient of Cooling Performance – The ratio of the rate of heat removal to the rate of energy input
- SS 530: 2006 is comparable to ASHRAE 90.1. (2004) standard which is used as the national reference benchmark in US and many other countries around the world.
- The COP in SS 530 will be revised in 2013 to be comparable to the ASHRAE 90.1. (2010)

Company Selected & Case Study Project Team

Company

City Developments Ltd

- City Square Mall, approximately 800,000 sq ft gross floor area



Project Team

Dr Lim Lan Yuan	Chairman of Technical Committee on Building Maintenance and Management (Team Leader)
Mr Vincent Low	Vice-President, G-Energy Global Pte Ltd, Singapore (Deputy Team Leader)
Mr Anthony Goh	Deputy General Manager, City Developments Limited (Member)
Ms Barbara Bok	Manager, SPRING Singapore (Member)
Mr Nicholas Huang	Manager, SPRING Singapore (Member)
Mr Reinhard Weissinger	ISO Central Secretariat (Advisor)

Calculations on the Economic Benefits of SS 530 for City Square Mall

	CP 24	SS 530
Minimum chiller efficiency (kW/RT)	0.676	0.577
Total Energy Consumption (kWh/year)	7,945,028	6,781,481
4th Qtr 2012 Tariff Rate (\$/kWh)	\$ 0.2752/ kWh (Taken from SP Services Pte Ltd)	
Electricity Bill (\$/year)	2,186,472	1,866,264
Annual Electrical Savings (based on SS 530)	NA	\$320,208

Notes:

- *Minimum chiller efficiency = 12 / (COP X 3.412)*
- *Total Energy Consumption = Minimum chiller efficiency x Hourly energy consumption (2,300 RT) x No. of operating hours (5,110 hours)*

Economic Impact of SS 530 at City Square Mall

A. Planning	D. Procurement	C. Installation	D. Monitoring /Review	E. Usage & Maintenance 
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The most relevant business function impacted by SS 530

Due to higher minimum energy efficiency performance requirements in SS 530

- ✓ \$320,000 of annual savings in electricity bills
- ✓ ROI of > 400% in the first year (Additional costs of installing a chiller that meets SS 530 requirements is \$60,000)

Case study showed that economic impact of SS530 is significant

- Minimum annual energy savings of \$320,000 for City Square Mall
- The actual savings achieved is higher than \$320,000 as the energy efficiency of the chiller is higher the minimum energy efficiency performance requirements
- The standard has been implemented in more than 1,000 commercial and residential buildings in Singapore



Thank You