A way towards cleaner energy and energy efficiency – A Singaporean perspective

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About SERIS

The Solar Energy Research Institute of Singapore (SERIS) is the **largest solar energy R&D organisation in ASEAN**, based in Singapore. SERIS is equipped with **world class technical facilities** and provides **industry expertise** from solar cells, modules to systems as well as **project management & financial services**. One of our core focus areas is **Quality Assurance of PV installations and Asset Management** along a PV project's life cycle, covering the following aspects:

- ❑ Technical & Financial Feasibility
- ❑ Yield projections of PV systems
- ❑ Owner/Banker's Engineer Services
- ❑ Due diligence services
- ❑ PV system design and evaluation
- ❑ Quality control for PV Modules & Systems
- ❑ Real-time monitoring (irradiance, PV system performance)

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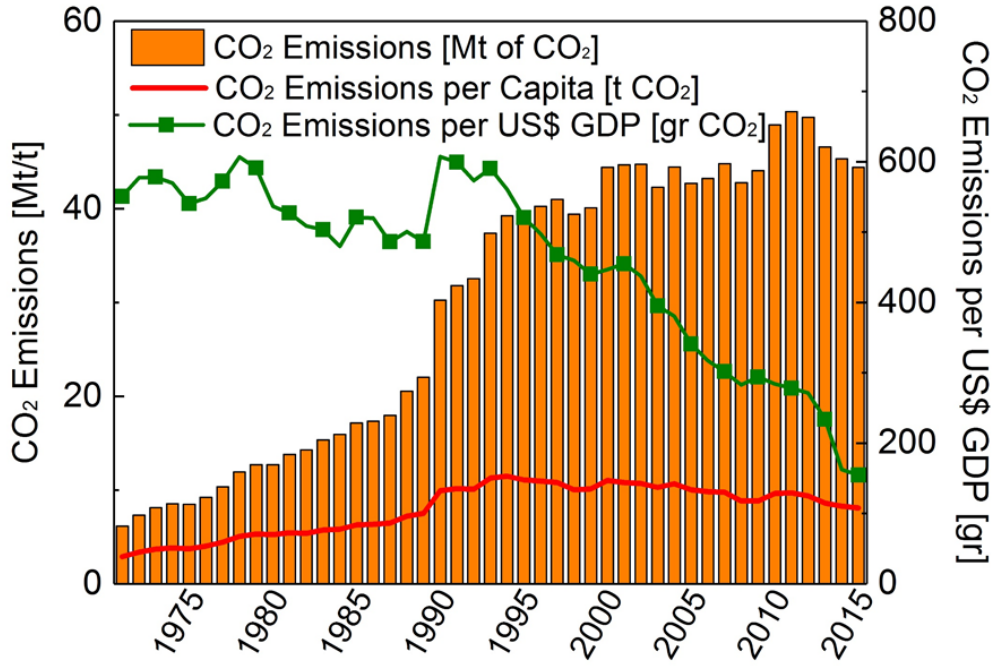
How Singapore can make a difference

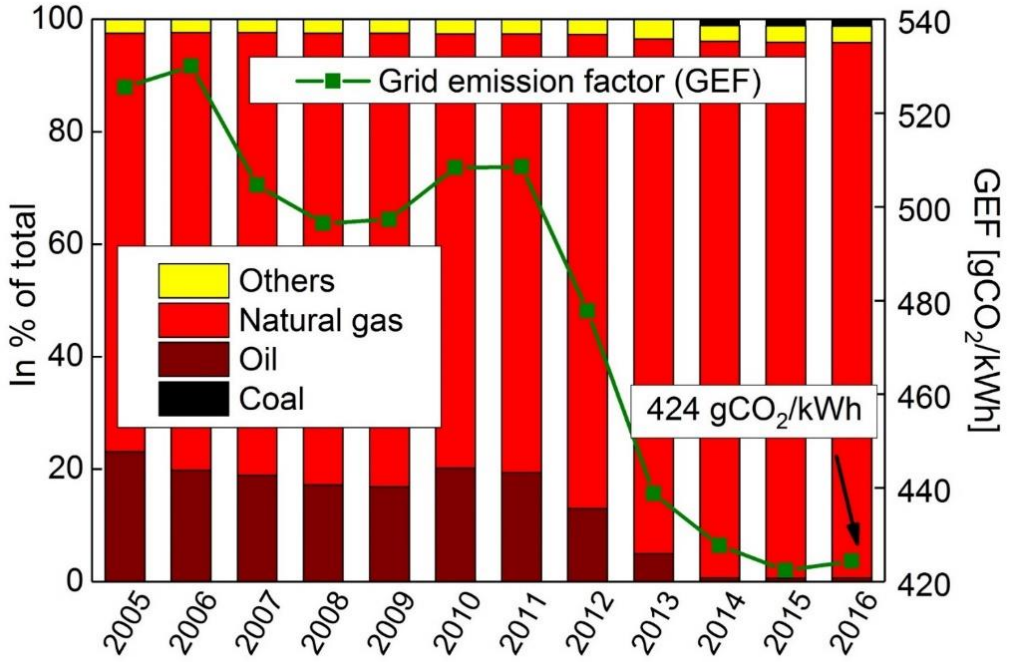
Two key pillars: energy efficiency & solar energy

CO_2 emission trend:



- Singapore ranks well in terms of intensity but less favourable in terms of capita*

Conventional energy optimized:



- Solar energy is the most abundant available renewable energy source for Singapore

Data source: IEA Key World Energy Statistics, 2017, EMA, *126th out of 141 countries vs 25th

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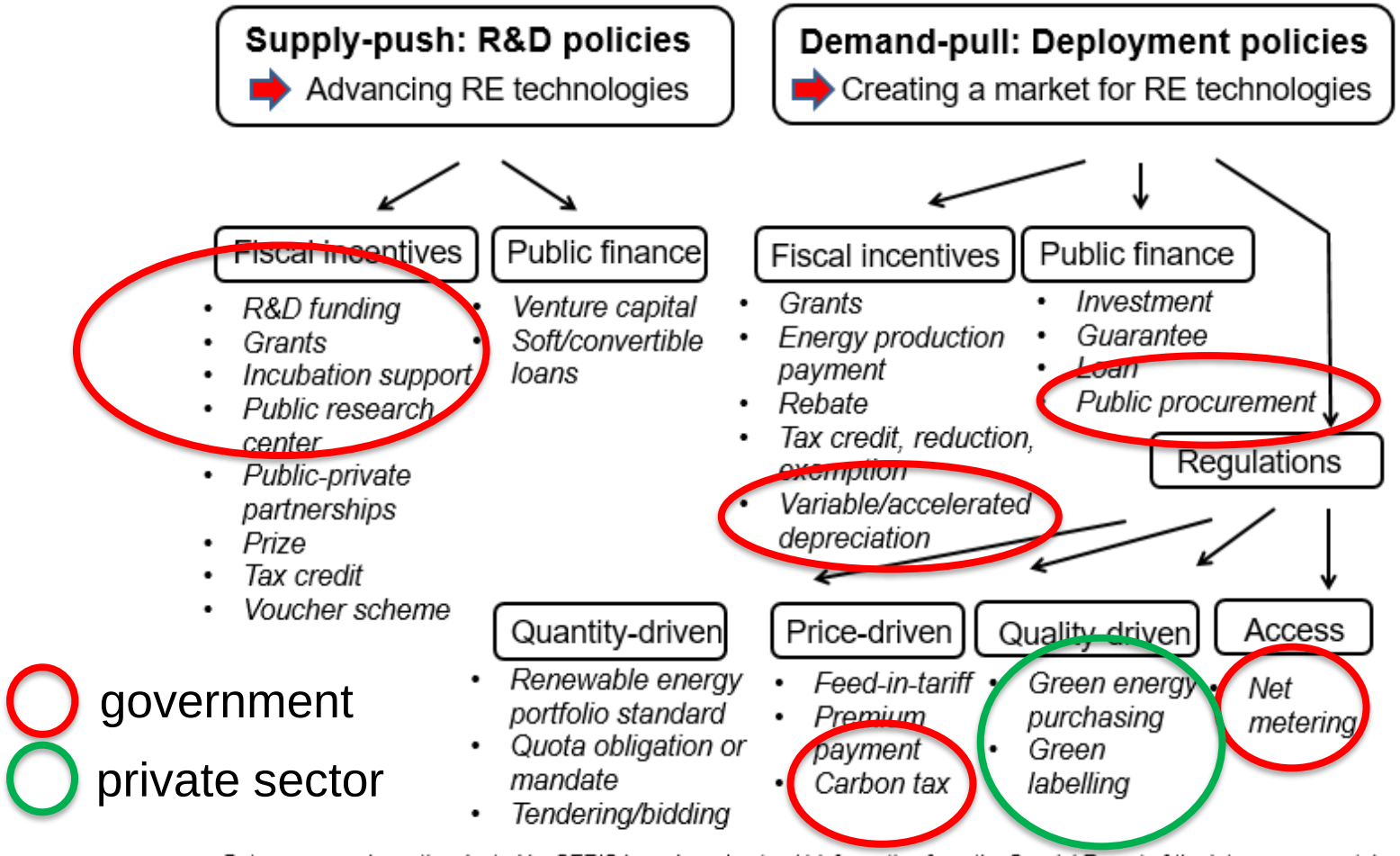
Singapore's policy approach

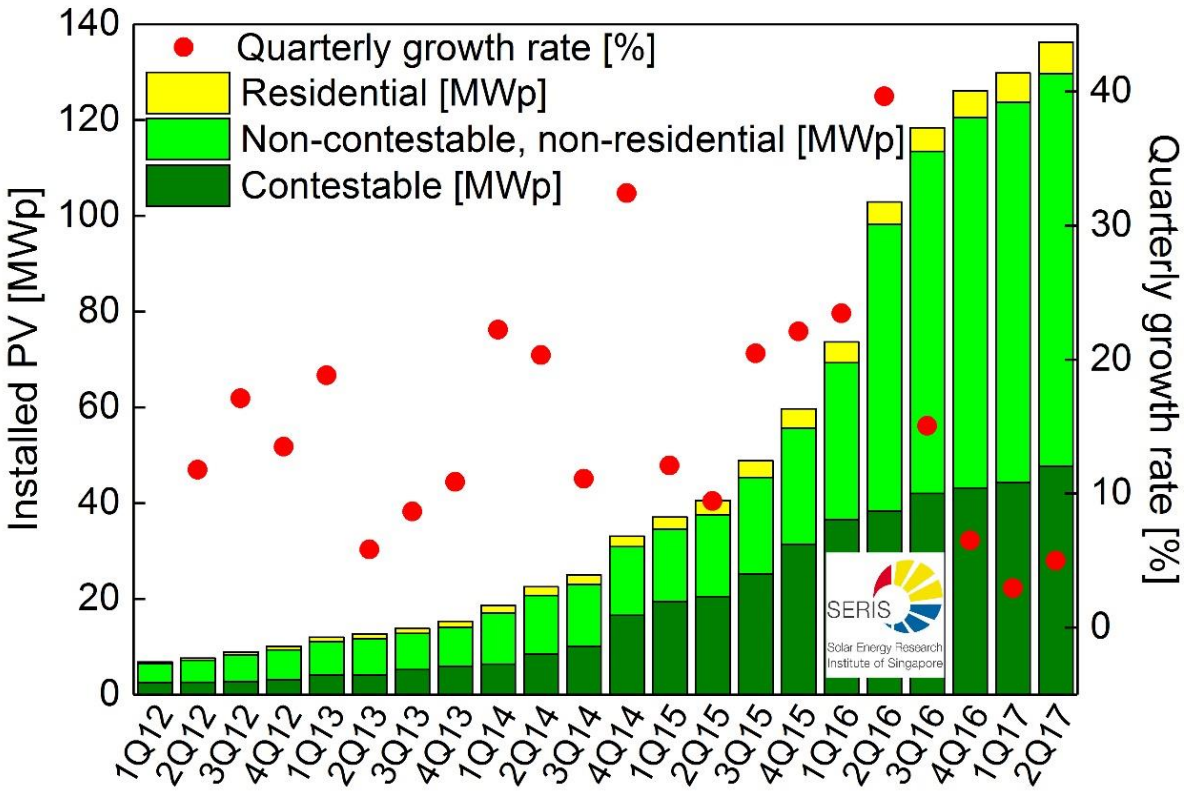
While there are no direct subsidies, there is indirect support…



Data source: schematic adopted by SERIS based on chapter 11 information from the Special Report of the Intergovernmental Panel on Climate Change on Renewable Energy Sources and Climate Change Mitigation.

Driver: government installations

Goal: > 1 GW_p beyond 2020, long-term potential: > 5 GW_p



Mostly government (non-liberalised)

Mostly private (liberalised)

- Early years adoption accelerated via the Solar Capabilities Scheme (SCS) which provided up to 30% capital expenditure funding
- Private sector adoption lagging behind due to challenging economic viability conditions

Data source: EMA

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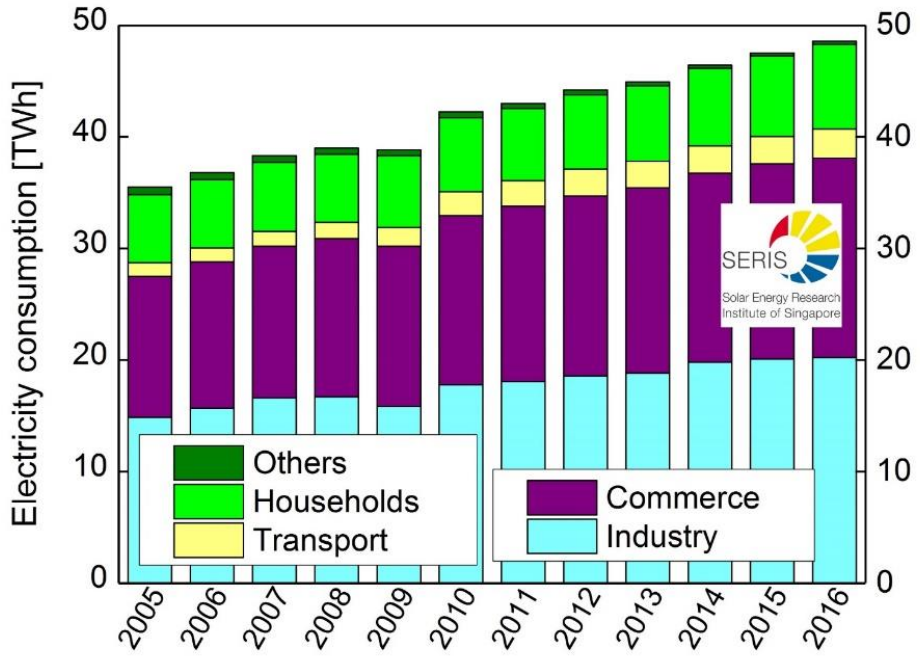
Energy efficiency focus

Largest energy efficiency potential: industry and commercial sector

Electricity consumption mix:



- Electricity demand growth remains in-line with economic growth*

Actions taken:

2005: Green Mark Scheme by BCA

- by 2030 at least 80% of commercial & residential buildings should be green-mark certified

2007: E²PO established

- multi-agency committee to improve energy efficiency in Singapore

2013/2017: Energy Conservation Act

- large power consumers to register with NEA for reporting energy usage and carbon emissions

Data source: EMA, *average over last five years: electricity demand 2.5%, GDP 2.8%, BCA = Building and Construction Authority, E²PO = Energy Efficiency Programme Office, NEA = National Environmental Agency

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Examples of financing support in energy efficiency

1) Industrial and manufacturing facilities:

The Energy Efficiency Financing Programme, introduced by EDB, partnering with SDCL Asia, in order to provide:

- Upfront capital to invest in energy efficiency facilities
- Tailor-made sharing mechanisms of energy savings
- Risk transfer: procurement and construction risk taken by SDCL

The Energy Efficiency Fund (E2F), launched by NEA providing up to 50% co-funding for industrials to review the design of new facilities and do energy assessment, plus up to 30% capital financing

2) Buildings:

The Building Retrofit Energy Efficiency Financing (BREEF) Scheme, provided by BCA to offer financing to offset upfront costs through a performance contract arrangement

EDB = Economic Development Board, SDCL Asia = Sustainable Development Capital (Asia) Limited, BCA = Building and Construction Authority, NEA = National Environmental Agency

Thank you for your attention!

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More information at www.seris.sg
www.solar-repository.sg

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