Pusat Tenaga Malaysia

Sustainable Energy Development

A Unique Policy Development Outside Europe: The Example of Malaysia

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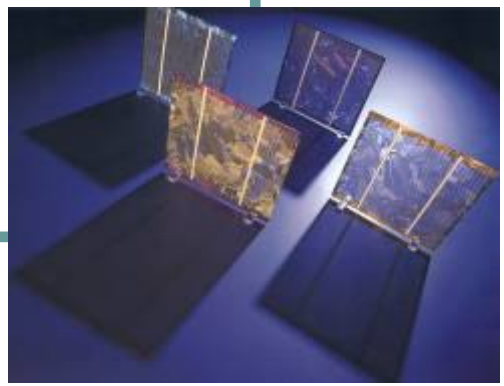
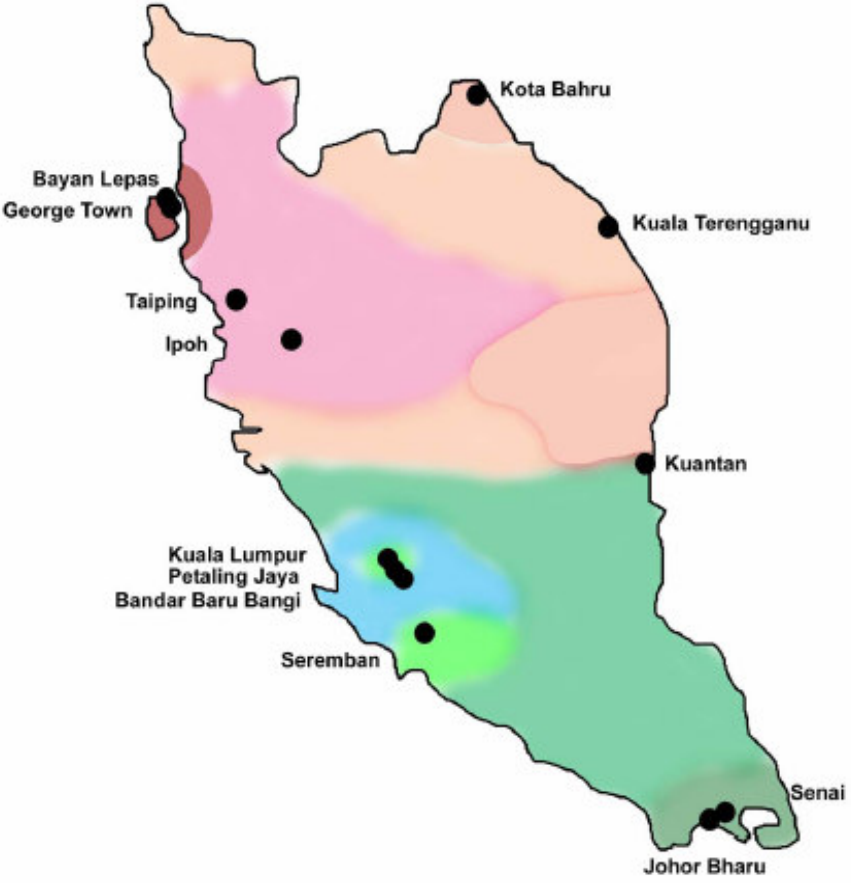
MBIPV Project
Malaysia Energy Centre (PTM)



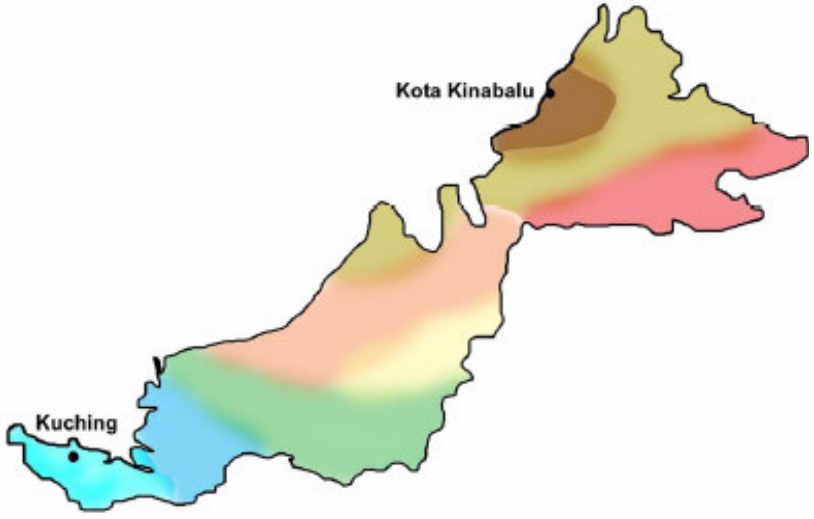
Base 801957 (R02595) 11-98

Potential of Solar Power in Malaysia



Malaysia:

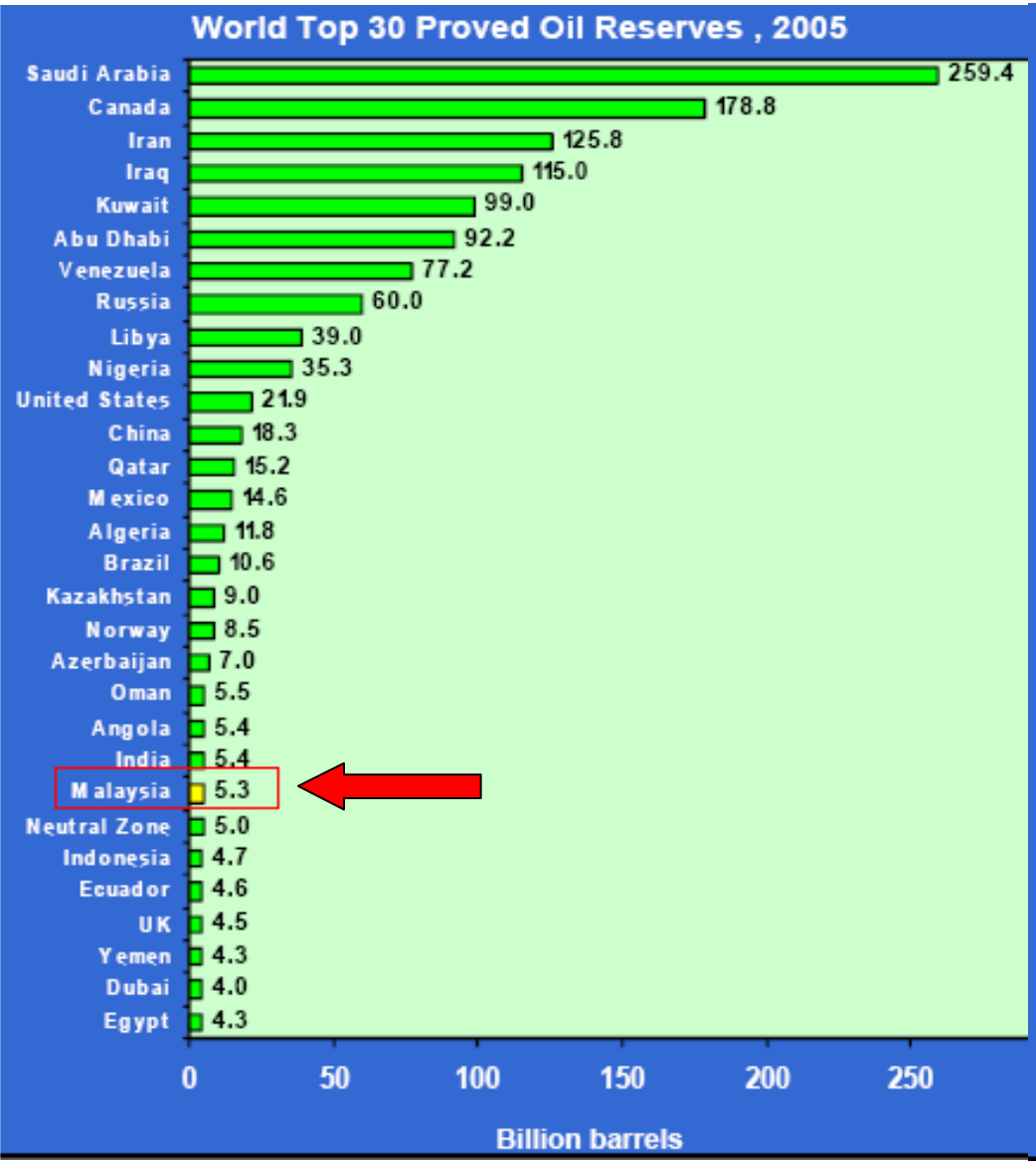
- Total electricity consumed in 2005 = 85 TWh
- Total land area = 328,550 km2
- Average irradiance =1,643 kWh/m2/yr
- **If PV is to supply the total electricity, it will occupy only 431 km2 or 0.13% total land area!**

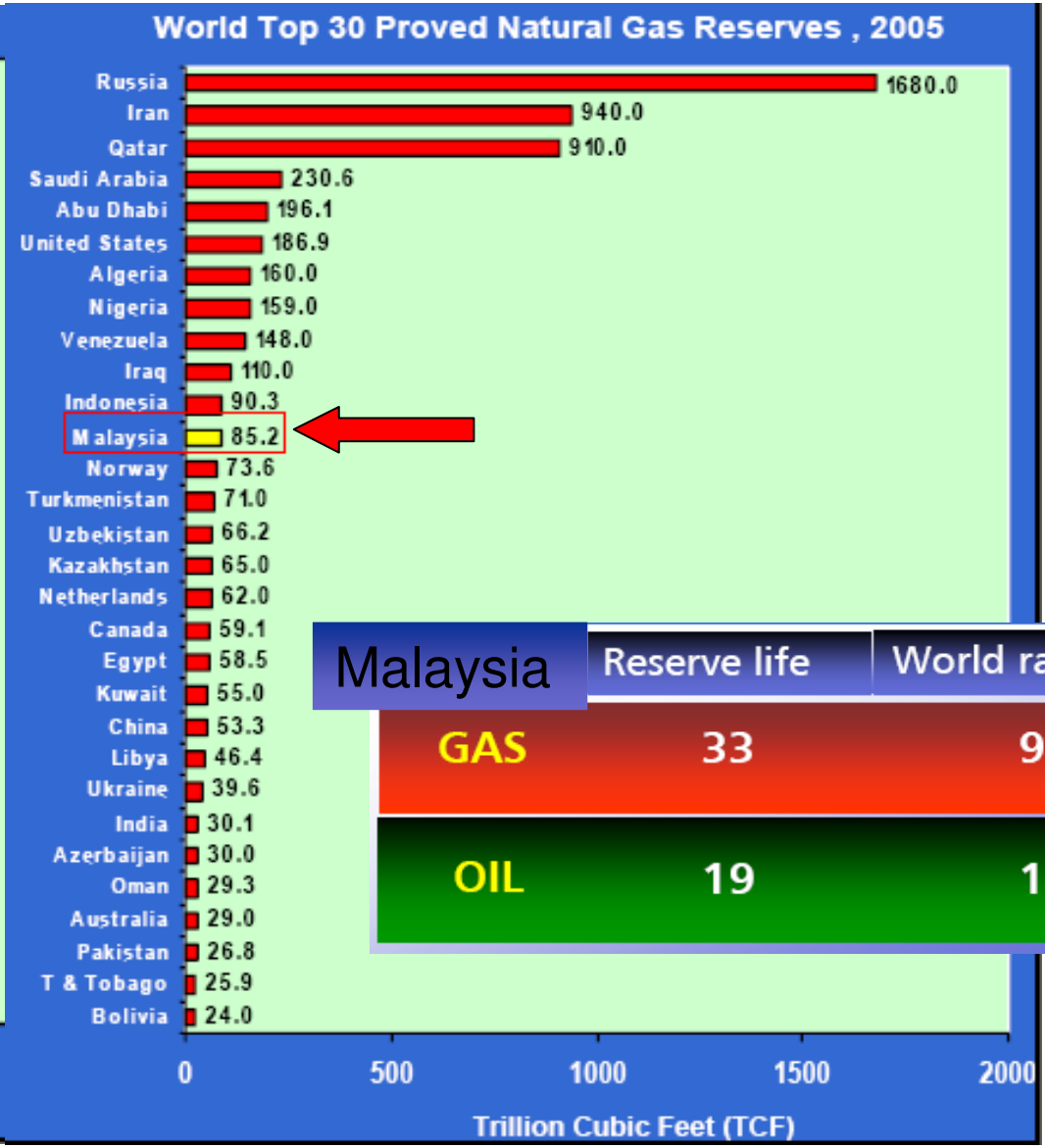


Irradiance (Yearly average value - global)

Kuching	1470 kWh/m2
Bandar Baru Bangi	1487
Kuala Lumpur	1571
Petaling Jaya	1571
Seremban	1572
Kuantan	1601
Johor Bharu	1625
Senai	1629
Kota Bahru	1705
Kuala Terengganu	1714
Ipoh	1739
Taiping	1768
Georg Town	1785
Bayan Lebas	1809
Kota Kinabalu	1900

Malaysia: Net Oil & Gas Exporter





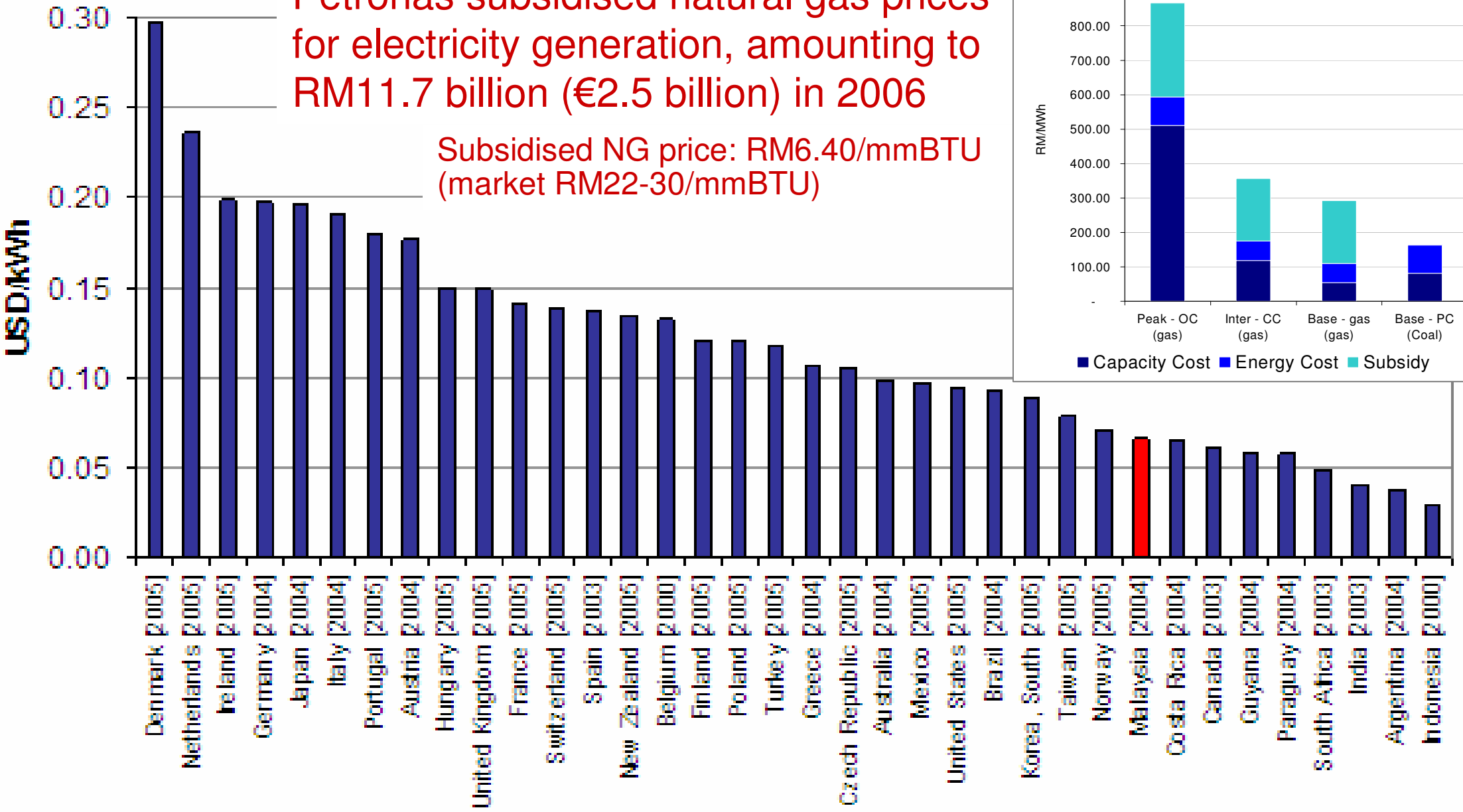
Malaysia	Reserve life	World ranking
GAS	33	9
OIL	19	14

Source: Petronas

Cheap Electricity Price due to Subsidy

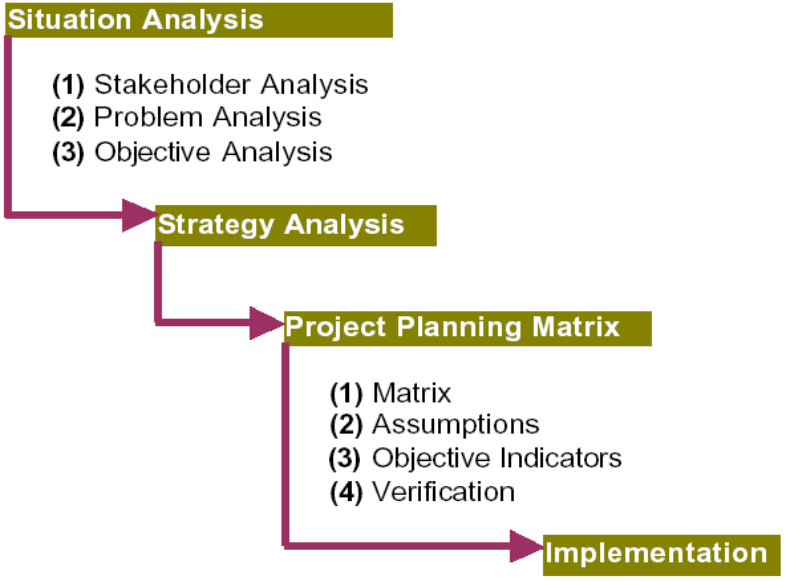
Petronas subsidised natural gas prices for electricity generation, amounting to RM11.7 billion (€2.5 billion) in 2006

Subsidised NG price: RM6.40/mmBTU (market RM22-30/mmBTU)



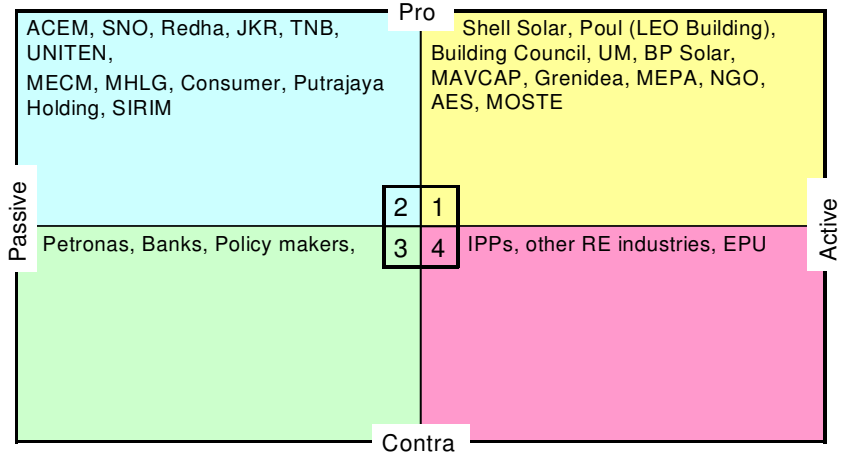
Development of Solar Programme

- 2 LFA (Logical Framework Analysis) workshops
- 1 stakeholders seminar
- >200 participants total
- **Stakeholders:** Government, industry, finance, NGOs, R&D, universities, etc.

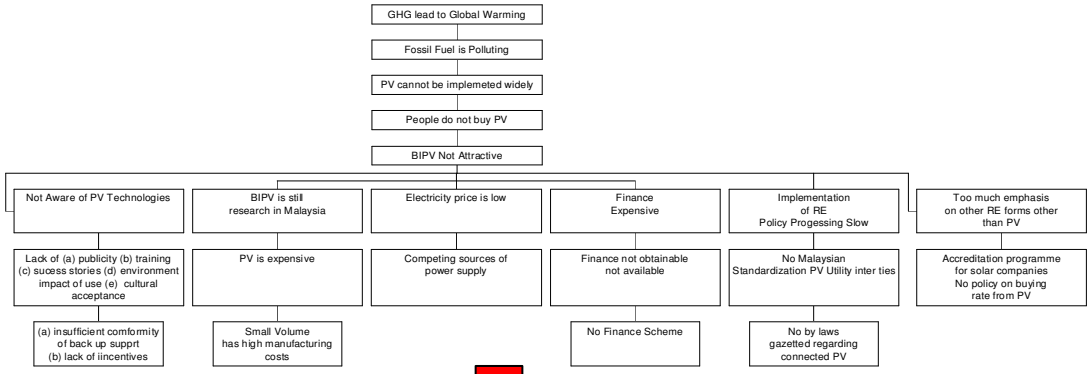


…via Logical Framework Analysis

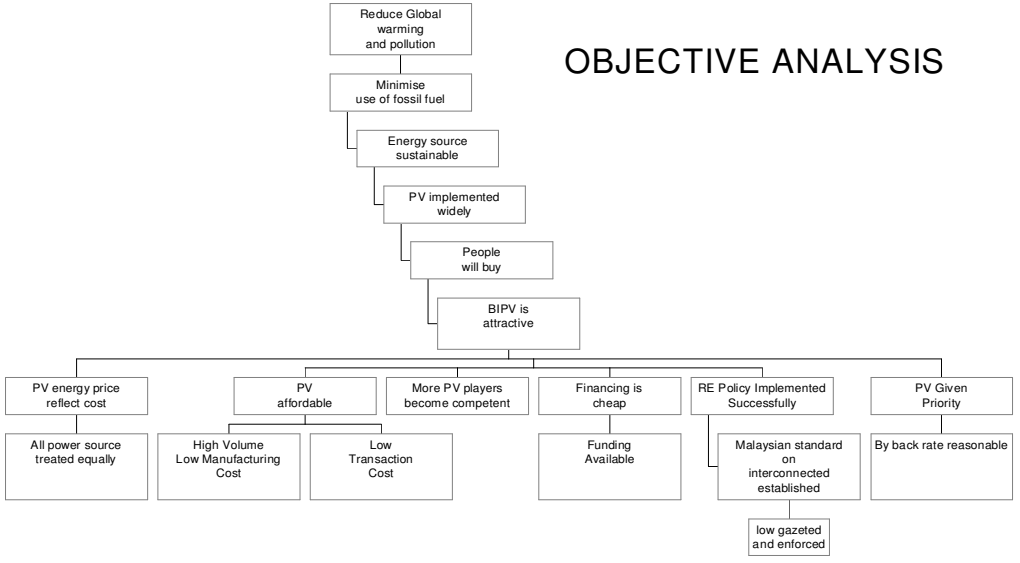
Stakeholder analysis - classification



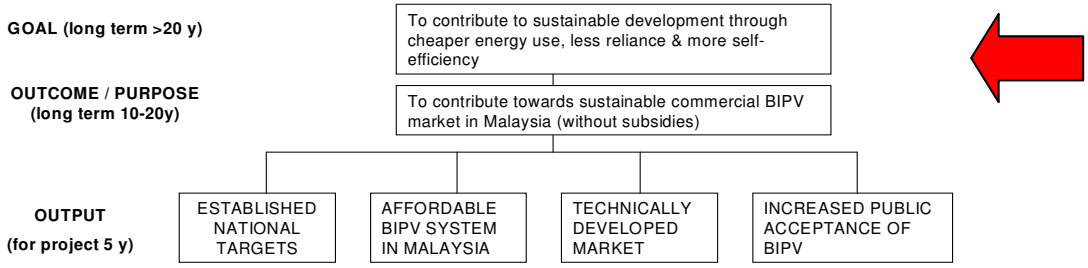
PROBLEM ANALYSIS



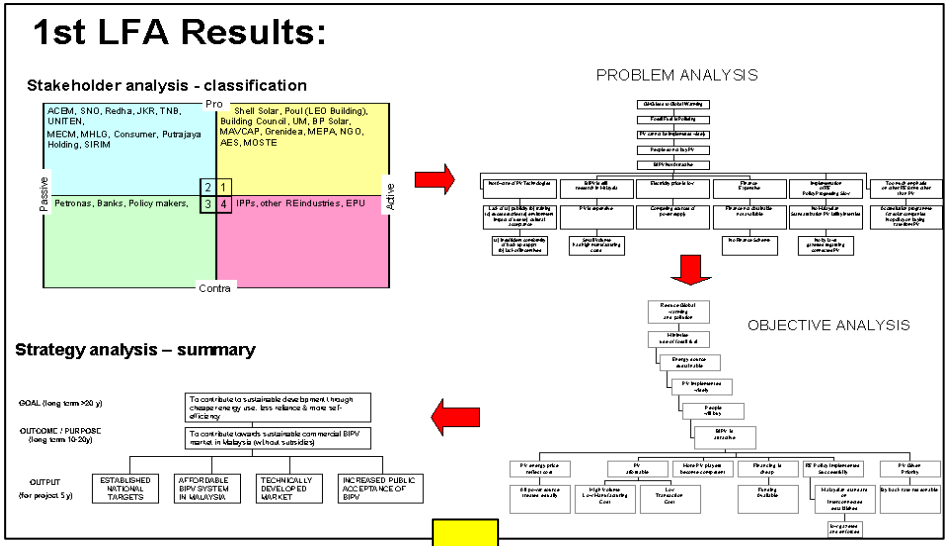
OBJECTIVE ANALYSIS

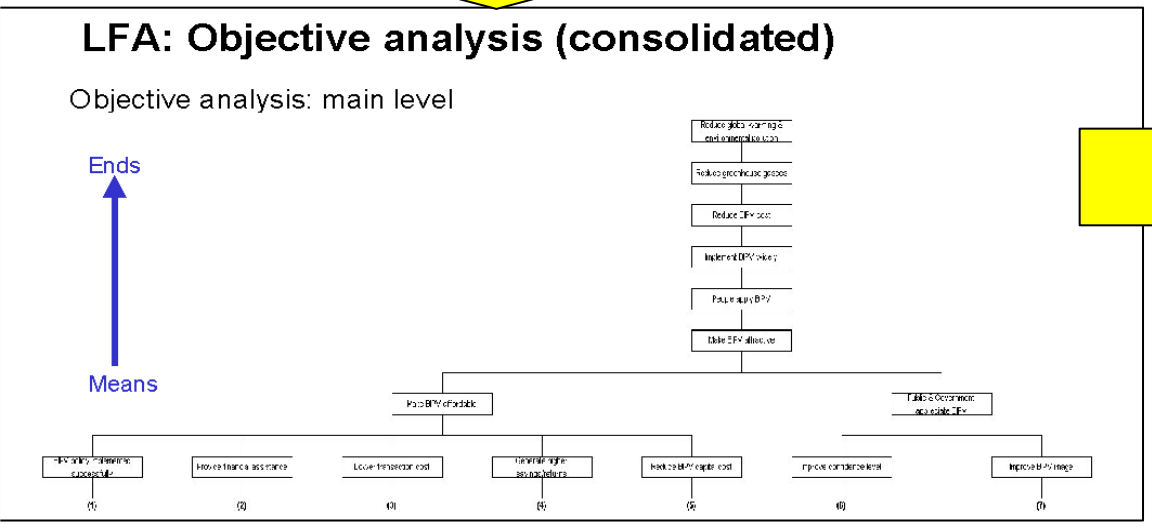


Strategy analysis – summary



…created Comprehensive Programme





Project Planning Matrix

Output 1: Comprehensive BIPV policy framework endorsed			
Output1.1: BIPV framework formulated	Formulate a framework and guidelines for BIPV, encompassing legal and regulatory aspects	Framework developed and recommended by year 1 / adoption by year 2	
	Elaborate a strategic road map on developing a framework Consult with relevant stakeholders Review existing framework to determine contextual relevance to BIPV Evaluate options/which framework to be used to achieve RE targets(look at different models - eg bidding, set target w higher price, create demand locally, obligation to utility, but consumers to pay) Review existing regulatory provisions that may be relevant to BIPV, develop new regulatory provisions for BIPV Stress test the draft framework (on the demo project) Obtain feedback of stakeholders on outcomes of stress test for purposes of finetuning	Stakeholders (Steering Committee members) meet twice a year to ratify the outcome of the working group : working group meet once a month; Total consensus by stakeholders on framework - acceptance based on empirical data Passed the stress test (workability- time and cost efficiency; absence of bottleneck issues; user-friendliness; transparency)	Minutes of the stakeholders meeting; Reports from stress test
Output 1.2: Awareness level of decision makers on BIPV raised	Evaluate the understanding and perception of decision makers on BIPV	Press reports about ministerial statements favourable to BIPV (x per year) Number of policy statements by MECM on BIPV(x per year)	MECM policy statements, speeches etc
	Develop capacity building programmes targeted to the decision makers		
	Organize study tours to relevant success stories	Once a year study tour to 3 @ 4 countries per technical study tour from year x onwards	Field trip report
Output 1.3: Studies carried out on the benefits of BIPV	Undertake a costing analysis		
	Study the spin-off effect for the industry		
	(Follow up on the development of CDM)		
	Undertake a costing analysis		
	Review existing policy and learn lessons from SREP	All studies are accepted by MECM/EPU within 8 months of completion	
	Elaborate a strategic road map on developing a framework	Monthly monitoring of project progress	Progress report
	Analyze socio-economic impact of BIPV		
	Disseminate the results of the studies (through seminar, workshops, roadshow…)		
Output 1.4: International fora held to raise high level profile of BIPV	Host an international forum on BIPV in Malaysia	Conference held once every two years from first year onwards Number of participants	Proceedings
Output 1.5 One stop information center (virtual) established to manage the database and coordinate information and policy related capacity building exercises	Establish database for energy information on BIPV, and create awareness on its existence and services	Established by end Yr 1; fully operational by end Yr 2 Frequency of use of database (x log-ins per month, increase of 10% each year, starting yr 2) At least x% of users are decision/policy makers At least x% of reasons of use of database are policy related	Electronically track usage/user identification

MBIPV Project (2005 - 2010)
Objective: To reduce GHG emission by reducing long-term cost of BIPV technology via development of a sustainable BIPV market

Component 1:
BIPV information services, awareness and capacity building programme

Component 2:
BIPV market enhancement & infrastructure development programme

Component 3:
BIPV policies and financing mechanisms programme

Component 4:
BIPV industry development and technology localisation programme

Targets:
330% increased of BIPV capacity against baseline
20% reduction of BIPV unit cost from baseline
BIPV Programme in 10th Malaysia Plan (10MP)

Post MBIPV Project: Sustainable & widespread BIPV applications, National BIPV programme with 30% annual BIPV growth and further cost reduction

C2: financial & technical support

C1, **C2**: quality installations (ISP accredited training)

C4: quality products,

C1: quality services

C1: consumer awareness & appreciation

C3: grid access, net-meter, license

C2: monitoring

C1: policy makers

C3: RE-FIT (future)

BIPV Showcase: Office

PTM-ZEO (zero energy office): 92 kWp

System A: 47.28kWp (polycrystalline)

System C: 11.6kWp (glass-glass, mono)

System B: 6.08kWp (amorphous)

System D: 27kWp (monocrystalline)

BIPV Showcase: University

Monash University (Malaysia)

7.36 kWp amorphous thin-film

BIPV Showcase: Residential Homes

Multiple BIPV bungalows at Precinct 16, Putrajaya by Senandung Budiman S/B

BIPV Demonstration: Private Buildings

SURIA 1000: Public Programme

Results to date:

(For 1st and 2nd Calls)

- 30 houses
- 151.98 kWp total (vs 100 kWp)
- RM 2,049,123 of rebate
- RM 2,025,383 of public contributions (50%)

Recipients of 2nd Call for SURIA 1000

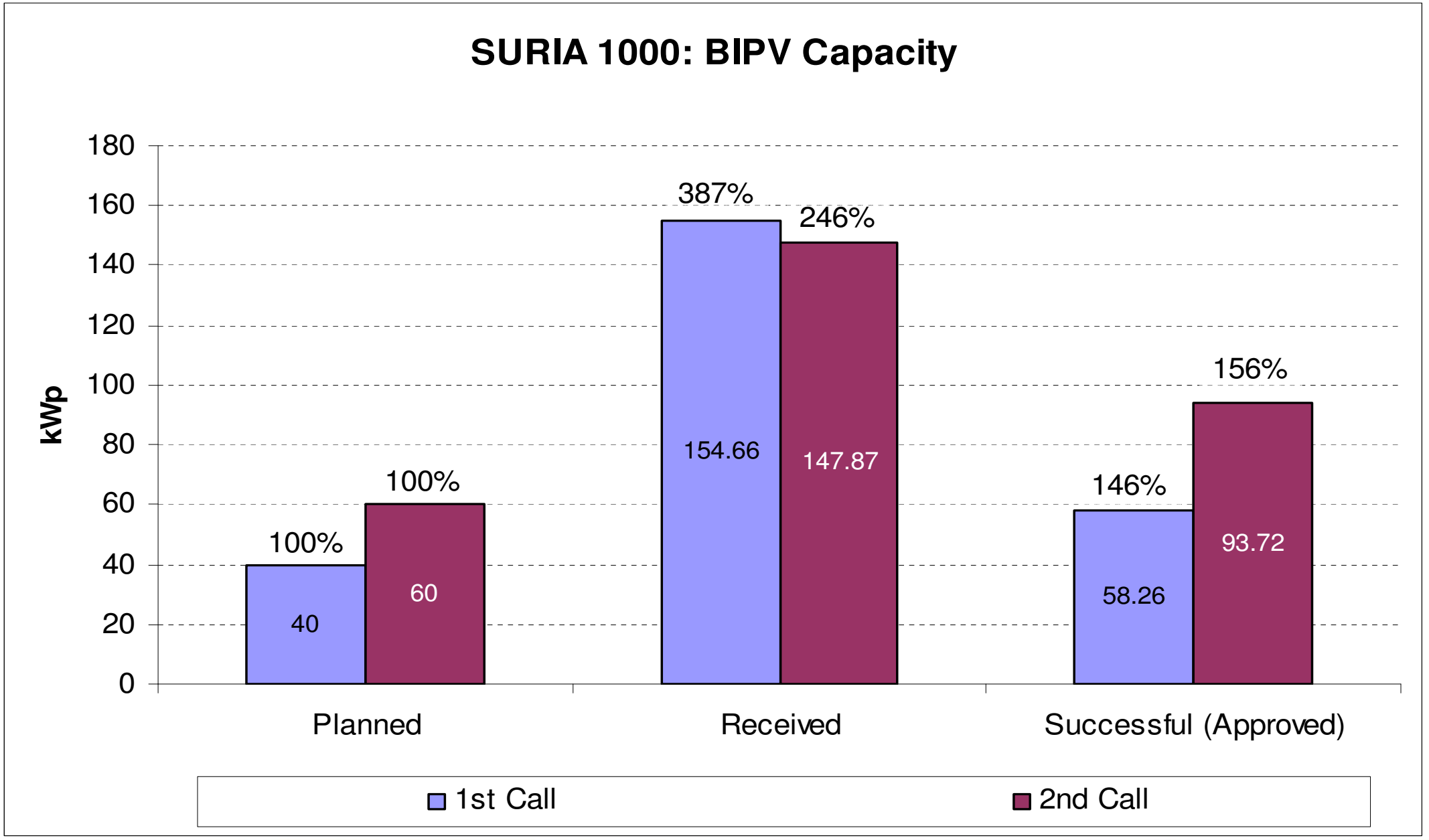
Applicant's name	IC/ Passport No	Location	kWp
Mak Siew Fong	530311-05-XXXX	Saujana Impian, Kajang	9.975
Lew Sew Yee@ Liew Sew Yee	470915-08-XXXX	Ipoh, Perak	9.975
Christine Chin Siew Lin	610225-71-XXXX	Gombak, Selangor	9.975
Dr Mohamed Ishak Syed Ahmad	460103-10-XXXX	Ayer Keroh, Melaka	9.975
Bruce Sho Umemoto	610526-91-XXXX	Desa Sri Hartamas, Kuala Lumpur	8.1
Lim Eng Keong	540812-02-XXXX	Bukit Rimau, Shah Alam	6.3
Mohammad Faiz Mohammad Azmi	630306-71-XXXX	Jalan Kent 1, Kuala Lumpur	4.95
Dr Suthananthan a/l Kanthaswamy	520522-05-XXXX	Bukit Beruang, Melaka	4.725
Dato Ir Dr Abu Bakar Jaafar	491020-04-XXXX	Shah Alam, Selangor	4.725
Sharuddin Abdul Raffar	551122-10-XXXX	Salak Tinggi Sepang, Selangor	4.2
Faizal Parish Abdullah	7611XXXX (UK)	Sungai Buloh, Selangor	4.2
Tunku Ahmad Burhanuddin	611124-04-XXXX	Mukim Batu, Kuala Lumpur	4.2
Yamin Vong Ngiam Ming	550107-10-XXXX	Kota Damansara, Petaling Jaya	3.15
Ar Tay Kiam Seng	430826-01-XXXX	Bangsar, Kuala Lumpur	3.15
Prof. Fatimah Md Yusoff	550226-03-XXXX	Bandar Baru Bangi, Selangor	3.06
Abdullah Mohd Noor	470912-13-XXXX	Kota Damansara, Petaling Jaya	3.06

Recipients of 1st Call for SURIA 1000

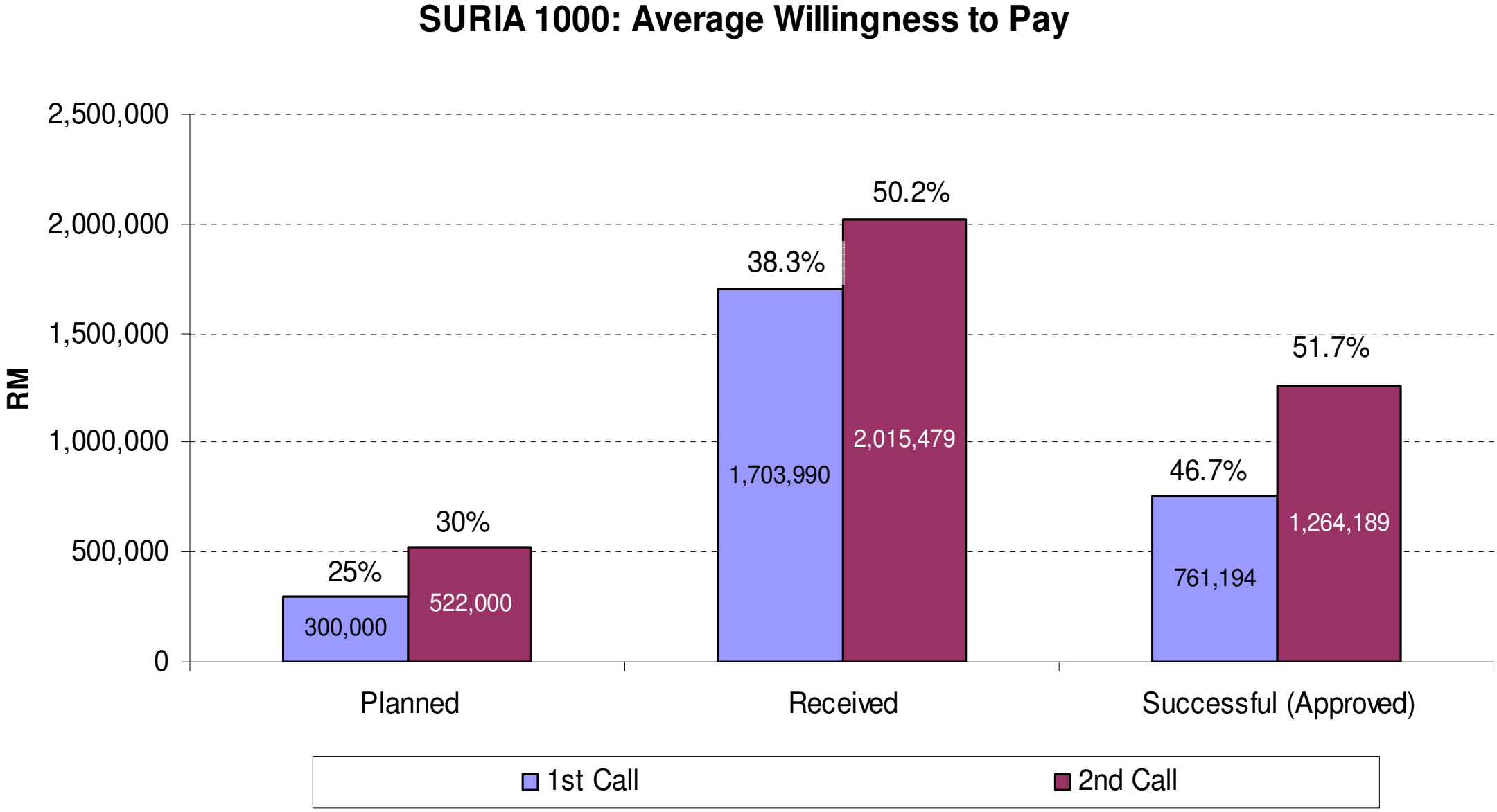
Applicant's name	IC/ Passport No	Location	Capacity (kWp)
Tan Teow Keat (Mr)	581125-07-5355	Seri Kembangan, Selangor	4.900
Mohd Talhar Abdu Rahman (Mr)	400923-01-5159	Johor Bahru, Johor	4.860
Harry Boswell (Mr)	706238431	Ayer Keroh, Melaka	4.800
Hishamudin Ubaidula (Mr)	551117-71-5271	Kuala Lumpur	4.800
Ng Kam Weng (Mr)	541018-08-5439	Shah Alam, Selangor	4.800
Tan Chee Seong (Mr)	611231-05-5619	Puchong, Selangor	4.800
Tan Vait Leong (Mr)	550713-07-5077	Timur Laut, Pulau Pinang	4.725
Nik Fadzrina Nik Hussain (Mdm)	740313-03-5970	Bentong, Pahang	4.200
Philip Tan Chee Lin (Ir. Dr.)	441115-10-5333	Kuala Lumpur	4.200
Wong Chee Kin (Mr)	611102-07-5293	Johor Bahru, Johor	3.780
Ng Yong Hua (Mdm)	512840872	Skudai, Johor	3.240
Paul David Mi lott (Mr)	701928302	Kuala Lumpur	3.150
Lau Keat Hoo (Mr)	620206-07-5639	Sungai Bu oh, Selangor	3.000
S. Kannan V Krishna (Ir. Dr.)	460722-71-5073	Kuala Lumpur	3.000

- 3rd Call: 90 kWp
- 4th Call: 120 kWp
- 5th Call: 140 kWp
- 6th Call: 160 kWp
- 7th Call: 180 kWp
- Suria for Developer: 340 kWp

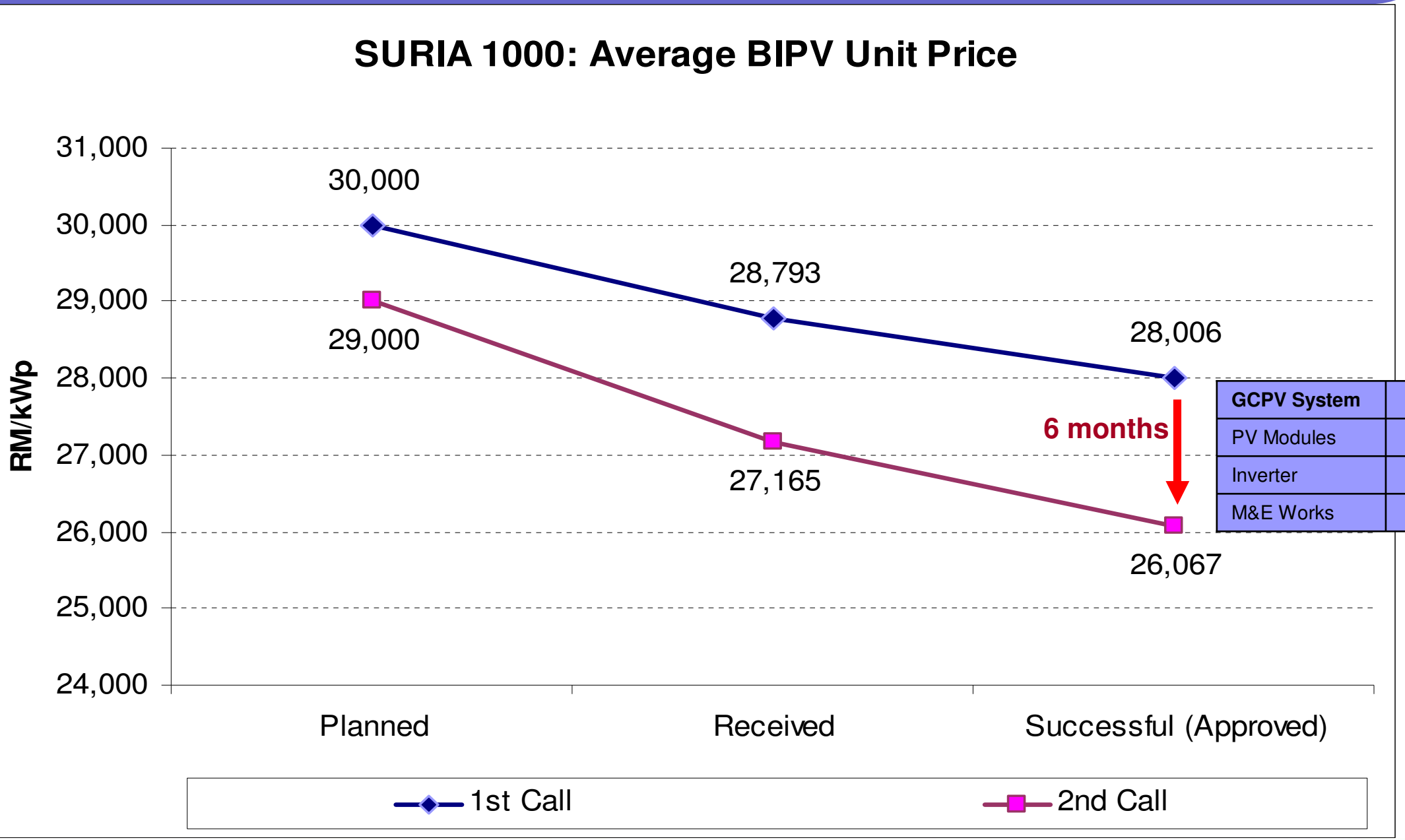
Capacity Impact



SURIA 1000: Impact on WTP

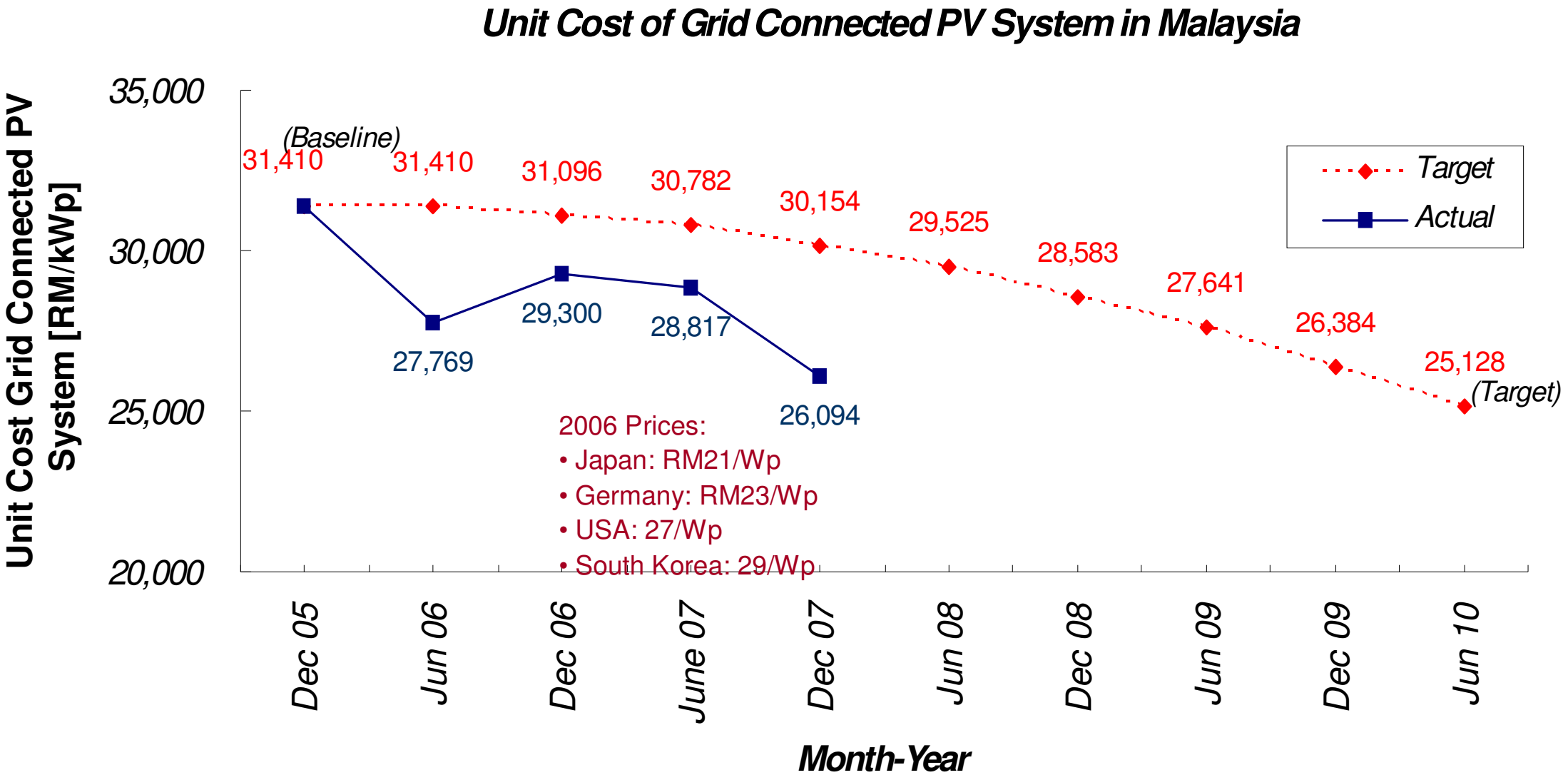


SURIA 1000: Encourages Healthy Competition



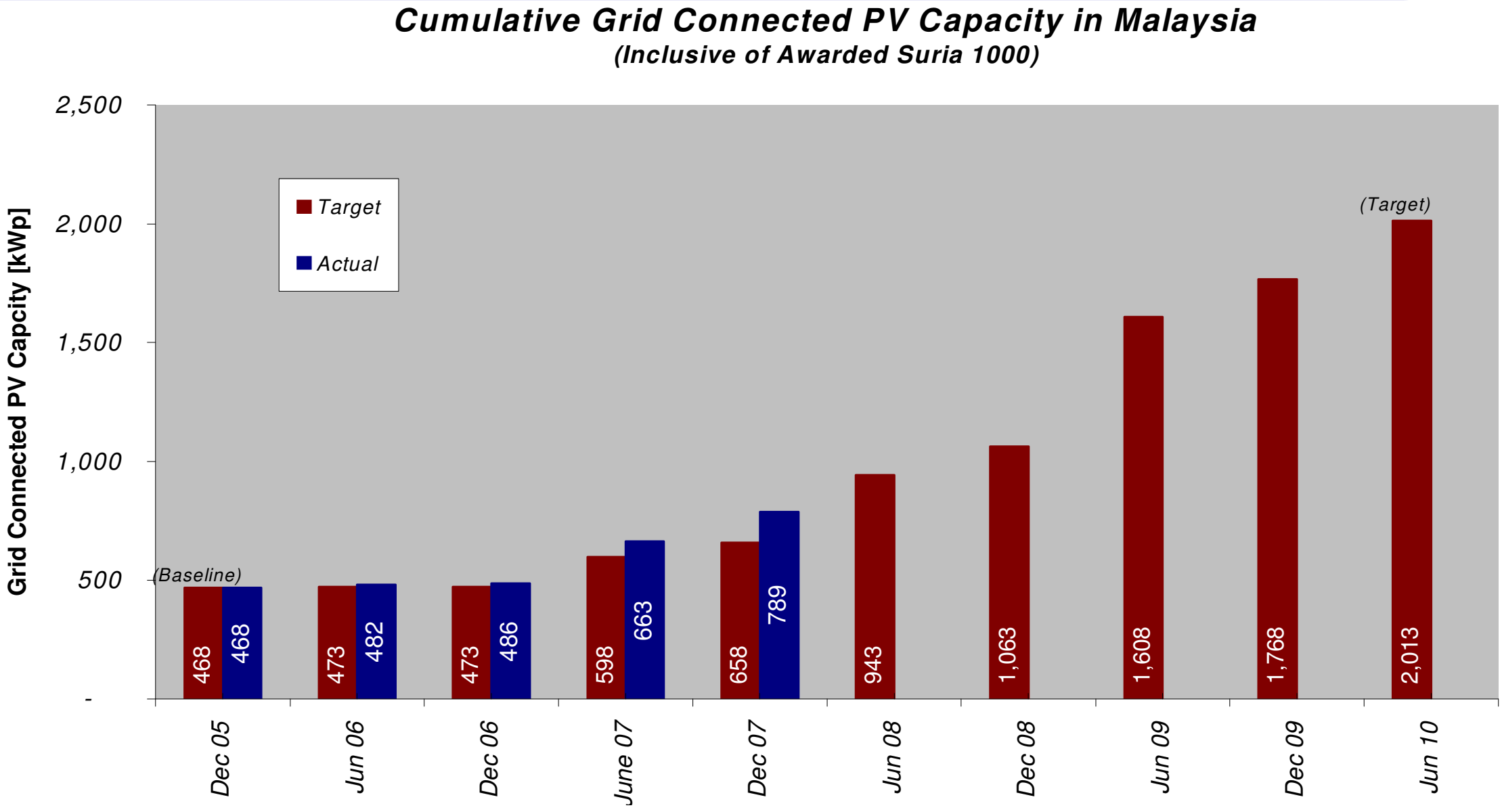
GCPV System	-7%
PV Modules	-11%
Inverter	-15%
M&E Works	+10%

Impact of Programme: Cost Reduction > Target



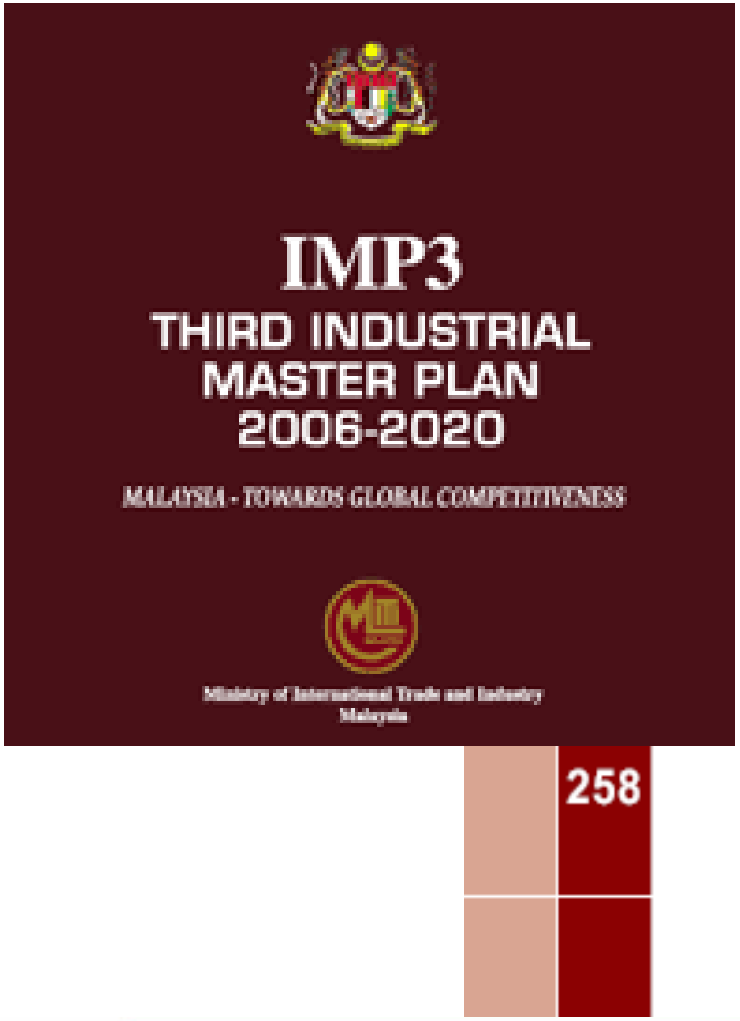
Status (31/12/2007): RM26,094/kWp ±5%

Impact: Progressive Increased of kWp



Status (31/12/2007): 789 kWp (inclusive awarded SURIA 1000)

Impact: PV Technology in IMP-3



- IMP-3 launched by Prime Minister on 19th August 2006
- IMP-3: 15-year industry development plan (2006 to 2020)

8.50 The new applications of electronics will generate growth in the up-market segment in electrical appliances. Manufacturers have incorporated new features, utilising programmable logic controller integrated circuits into their products, such as smart rice cookers, blenders, ovens, vacuum cleaners, washing machines, refrigerators and air-conditioners, to attract buyers who prefer trendy and fashionable products. A new growth area in this product category will be solar powered energy, utilising photovoltaic technology. The market for solar powered products has registered significant growth of 30 per cent per annum during the last seven years. This growth momentum is expected to continue within the next five years. In 2005, worldwide sales of photovoltaic cells and modules totalled US$10 billion and are expected to reach US$38 billion by 2010.

8.51 In 2005, the Government launched the Malaysian Building Integrated Photovoltaic project, aimed at intensifying the usage of solar energy as an alternative source of electricity. There are opportunities to attract investments in photovoltaic fabricated wafers, cells, modules, power management system, junction boxes, photovoltaic wires, connectors, mounting metal structures and inverters.

Incentive to PV & Equipment Manufacturers

- Special tax incentive
- Special land & infrastructure packages
- Reliable, good quality and low cost supply of electricity & water
- Location between East and West with good political stability
- Established wafer & media storage manufacturers with highly skilled labours and excellent value chain support
- First Solar (663 MW in Kulim), aluminum frames supply, equipment manufacturing & clean room equipment

Malaysian Industrial Development Authority (MIDA)

Block 4, Plaza Sentral, Jalan Stesen Sentral 5, Kuala Lumpur Sentral, 50470 Kuala Lumpur, Malaysia

Tel : 603-2267 3633, Fax : 603-2274 7970

Email : promotion@mida.gov.my

Website: http://www.mida.gov.my

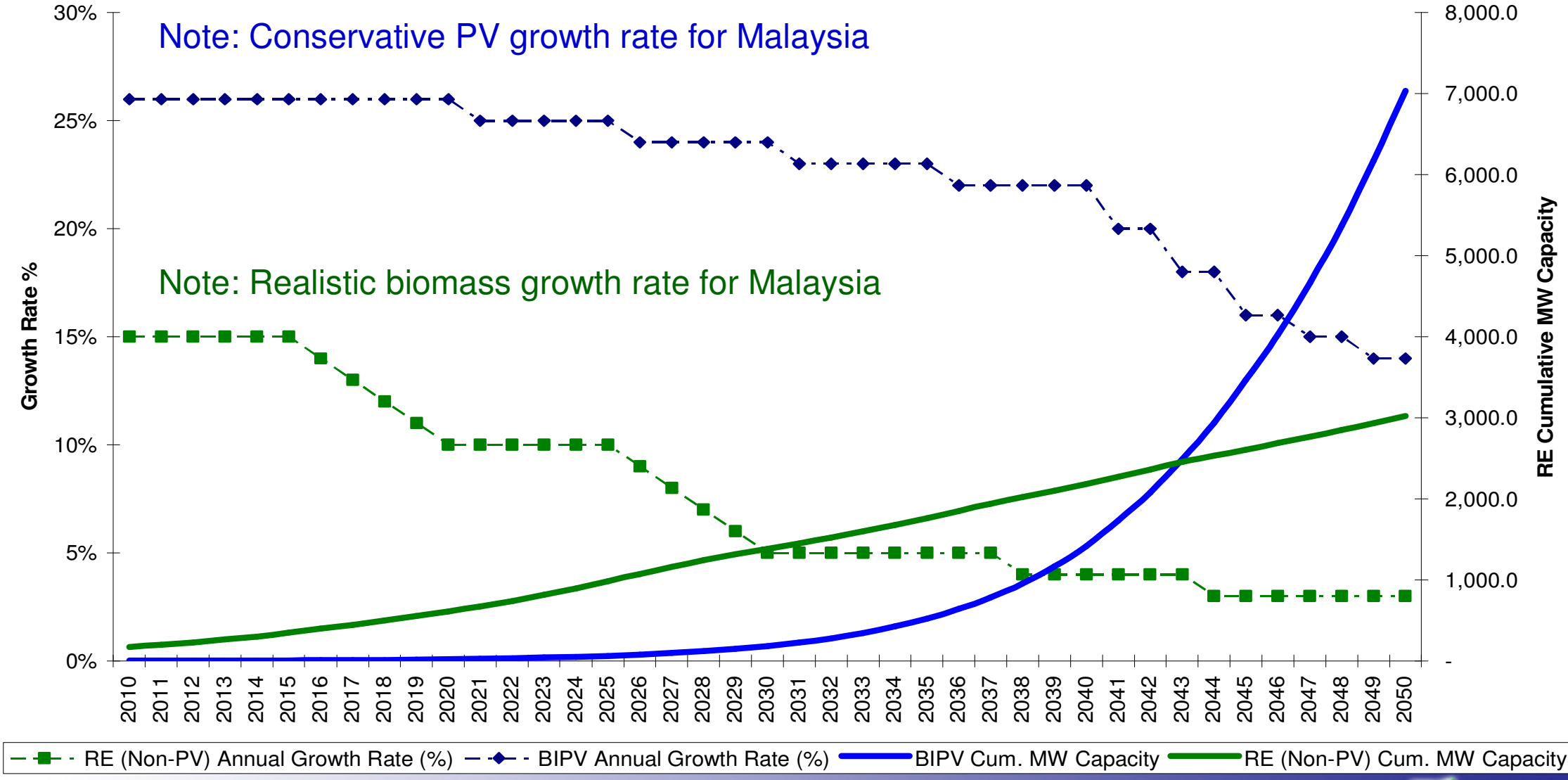
MBIPV Project: Lessons Learned

- Challenges:
  - Developing country: competition for fund, regulated electricity price
  - Oil/gas net-exporting country: subsidised electricity, cheaper to use fossil fuel based energy
- Development programme (policy):
  - Creates umbrella to prepare market (public, industry, policy makers)
  - Strengthen public acceptance & industry readiness
  - Stimulates competitive system prices in the market
  - Encourages higher public willingness to pay
  - Leads to transition from capital based incentive to performance based incentive (RE-FIT)
- MBIPV fund: RM19.6 million

Capital based (MBIPV)	Performance based
1545 kWp	653 kWp
50% grant	For 21 years at RM1.30/kWh

Success in MBIPV today builds confidence towards long-term solar target & RE-FIT

Market Potential of RE Power Generation Capacity, based on Corresponding Annual Growth Rate



Thank You

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