Financing Renewable Energy Use in Indonesia
A CASE OF SOLAR PV

R.M. Soedjono Respati
Indonesian PV Business Association and Indonesian Renewable Energy Society
(APSURYA -IRES/METI)

THE CHALLENGES & OPORTUNITIES

1. Electricity supply is seriously lacking in some regions, particularly beyond Java and Bali.
2. Indonesia has abundant renewable energy resources
3. PLN capability for the development and maintenance of rural electricity systems is limited;
4. Indonesia has more than 20 million un-electrified households (48% of the total);
5. Electricity tariffs have increased dramatically during the last 3 years and will continue to rise in the future, though some minor downward "correction" may occur because of the world oil price temporary decline during recent months.
6. Consumer locations are in many cases so spread out, resulting in relatively high sales costs, but this problem is generally overcome by involving 'local entrepreneur'
7. SHS /PV is relatively expensive for rural people, but at least one state bank (BRI) is wiling to provide micro credit to specific target consumer. There are also various sources of finance available and untapped for PV deployment
8. The 2007 Energy Bill mandates Regional Government to use local and renewable energies in providing electricity to local population. Solar PV is the only renewable energy sourced electricity available in ALL regions, and therefore the immediate choice for providing quick solution to electrification in rural and remote areas.

THE CHALLENGES &OPPORTUNITIES

10. Solar cell prices, with exception during the last 3-4 years due to silicon supply problems, are showing a decreasing trend over the last 2 decades and will continue to decrease in the future that will make Solar PV increasingly competitive. This has been due to significant expansions of production capacity among established manufacturer and additional production capacity established by newcomers.
11. Solar technology is progressing reasonably well offering higher efficiency and nearing a breakthrough in using alternative non silicon raw materials. Increasing number manufacturers are gradually shifting their product mix toward producing more thin film technology based solar cells and modules, which are lower in price.
12. The government has established a rather ambitious target for renewable energy use in the national energy mix (20% RE in the energy mix by 2025, including 800 MW for Solar PV) and currently allow increasing budget during the last 3 years.
13. Financial institutions' involvement in funding the RE development is still very limited
14. Large corporations are adopting Corporate Social Responsibilities (CSR) and Community Development activities, where providing electricity to rural communities is a likely and important option.
15. Despite global financial crisis, international funders are looking for opportunities to finance renewable energy projects mostly bundled with carbon trading opportunity.
16. Indonesia still yet to introduce 'grid connected' PV systems and other variants of PV applications such as Building Integrated PV (BIPV) despite its abundance of solar power resources.
17. Indonesia is still lacking far behind its neighbouring countries in developing PV manufacturing capabilities

THE ROAD AHEAD

- Worldwide Solar PV use is continuously increasing from 9.2 GW in 2007 to over 900 GW 2030, with around 1,300 TWh of energy produced by the systems installed. This would contribute to total global consumption of electricity around 4-7%. (*)
- Government sets 20% of total national energy mix to be accounted for the use of Renewable Energy, of which 0.5% to total will be Solar PV (800-1000 mW)(**) by 2025
- Such an (now considered) ambitious target can only be achieved by having strong and effective policies to support the development of PV industry by creating effective amounts of demand and financial support systems.
- Indonesia policy makers needs to change their paradigm of seeing solar energy (PV in particular) only as a 'complementary' or 'temporary' solution toward national electrification, and join the global community to creatively and innovatively use solar energy to mitigate dependence on and use of fossil energies and battle the global warming.
- The country needs effective financing strategy to stimulate the demand site and support the supply side of the solar PV equation, in order to achieve or even to surpass the target.

(*) Solar Generation 5, EAP/Green Peace 2008

(**) BPPEN 2005-2005

FINANCING MODELS
PV FOR RURAL ELECTRIFICATION
The Government Budget

- Governments purchase the PV Systems from local (mostly non-dedicated PV company) 'dealer' by tender, in which not always the lowest bidder or the best quality is the winner.
- Users are selected by the government based on data provided by the lower level (district or village) administration-- they get it free of charge.
- System price is (usually) marked up with transportation, installation and other related costs.
- System quality control and the availability of after sales service in the rural areas are seriously lacking.
- Number of Systems installed (purchased) is highly dependent on the government budget on rural electrification (PV is mostly put at low priority in the government budget system, due to lack of awareness in the systems capabilities and other merits)
- System capacity distributed is marginal (entry level) which make it barely adequate to meet the basic electricity need of typical household in modern time -- hence it doesn't give the required impacts on the development program.

FINANCING MODELS
PV FOR RURAL ELECTRIFICATION
BRI Consumer Micro Credit Scheme

- Amount of Credit provided is maximum IDR 4 million per unit of system with 50Wp module (entry level), but allow customer apply higher credit for larger PV capacity (100 – 200 Wp systems)
- Credit tenor is maximum 36 months
- Charged (flat) commercial interest rate (currently about 15%/year)
- No extra collateral is required from the PV users, but systems will be pulled back in case of default, for which Dealers provide "buyback" guarantee for systems pulled back.
- Offered initially in selected region (S. Sumatra and S. Sulawesi) but eventually extended to more regions where BRI is operating.

0THER PROPOSED FINANCING OPTIONS

Semi-Commercial Micro Credit Scheme

THE STAKEHOLDERS :

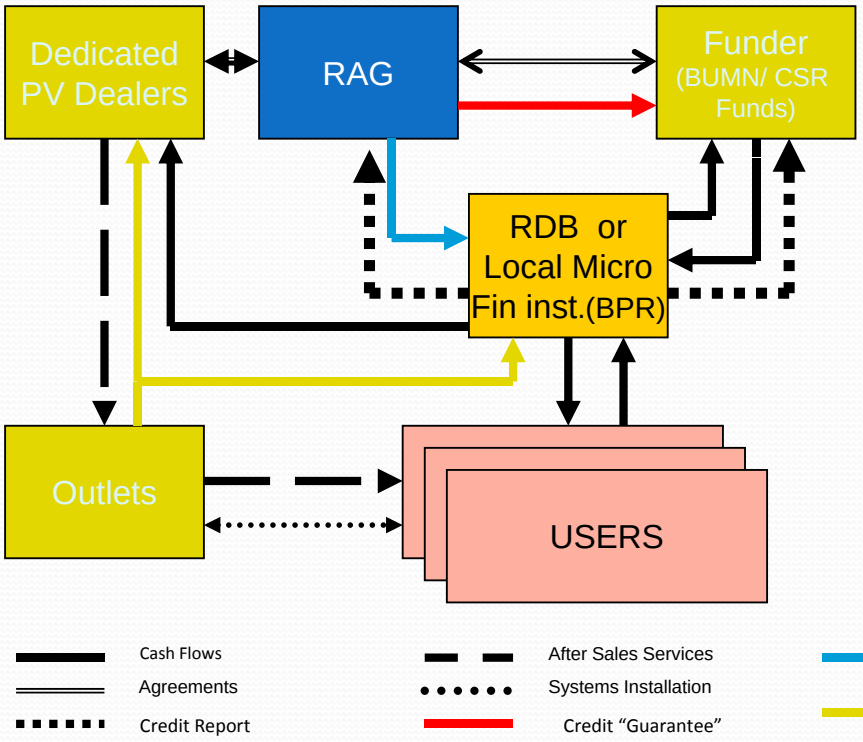
1. REGIONAL AUTONOMOUS GOVERNMENTS
2. BUMN / CSR FUNDS ADMINISTRATOR,
3. REGIONAL DEVELOPMENT BANKS
4. PV DEALERS/SUPPLIERS
5. THE RURAL PV USERS

SEMI COMMERCIAL MICRO CREDIT SCHEME

STAKEHOLDERS' ROLES

- The Local Government
  - Provide accurate information on the potential location and population group requiring PV systems
  - Determine the number and priority scale of PV systems utilization.
  - Allocate budget for rural electrification using PV applications
  - Invite BUMN and Private Companies to provide funding assistance
  - Provide relevant support to the program implementation down the line
  - Provide financial guarantee for full repayment of the micro credit provided by BUMN/Funder
  - Assign, where required, RGB or private financial institutions (BPR/COOPERATIVES) to administer the credit scheme
- The Funder (CSR FUNDS ADMINISTRATORS)
  - Provide the funding required (e.g. using special funds reserved from their net profit allowed by the government)
  - Determine the credit conditions and set up the administration of the credit together with the local government and/or the local financial institutions assigned by the government.
  - Provide the credit directly to the users or through local financial institutions or selected local PV Outlets (including the credit collection function) or enter into agreement with RGB/BPR for credit administration.
- The PV Dealers
  - Provide quality PV Systems demanded by the "selected market"
  - Provide effective distribution systems and technical supports and other after installation services
  - Provide adequate product/system warranty
- The Local Financial Institutions (RGB /BPR/COOPERTIVES)
  - Channel and administer the credit scheme , expected to deploy their own sources to increase impact
  - Collect the credit payments from the PV users.
- The Users
  - Purchase the Systems using the credit offered
  - Demand system /component warranty and other After Sales Services from the dealers
  - Payback the credit on time
  - Maintain the systems according to the dealer's instructions

SEMI COMMERCIAL CREDIT SCHEME MODEL
(FOR RURAL ELECTRIFICATION)

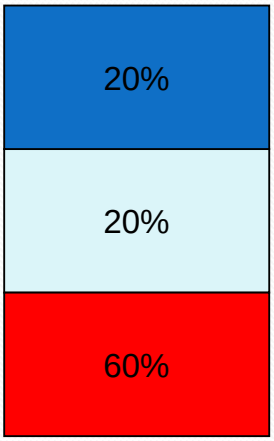


"IDEAL" PRICING FOR SOLAR HOME SYSTEMS

ON THE AVERAGE "ENERGY BUDGET" OF RURALCOMMUNITIES

PV COMMERCIAL PRICE

USD 500/ 50 Wp



GOVERNMENT FUND (INCENTIVES)

INTERNATIONAL AID PROGRAMS

SHS USERS

"Ideal" Micro Credit Scheme: DP 25%, Tenor 4-5 Yrs (Max), Interest Rate max 15%, Installment IDR 100,000-150,000/month which is equivalent to customers energy budget.

THE URBAN AND INDURSTRIAL USE OF PV

PLAUSIBLE CAUSES AND JUSTIFICATIONS

- Aimed at reducing 10 -20% use of grid electricity. Utility Company would reduce its dependence on fossil energies.
- Getting less dependent on grid electricity, especially in areas where the electrical grid connection is less dependable.
- Contribute to global efforts in battling the climate change effects
- Avoiding payment of higher /premium electricity, at the same time encourage consumers to meet their power needs partly by buying 'clean' energy.

THE URBAN AND INDUSTRIAL USE OF PV

TECHNICAL SOLUTIONS

- OFF GRID SYSTEMS
  - In parallel /complimentary or hybrid with other sources
  - Requires power bank (storage) system
  - No PPA required
- ISOLATED (MINOR) GRID SYSTEM
  - Hybrid systems , combining with other energy sources (wind, bio-diesel)
  - Limited power storage system
  - Run by local administration or in cooperation with utility co.
- ON GRID (GRID-CONNECTED) SYSTEMS
  - System is part of the grid electricity services
  - No power storage system required
  - System Developers (households or institutions) sells excessive power to the Utility Company against regulated tariffs.
  - Simple PPA required

THE URBAN USE OF PV

FINANCING SOLUTION

- OFF-GRID AND GRID CONNECTED SYSTEMS
  - Credit worthy developers (middle-up level of individuals or institutions/organizations) will find their own ways to the local banking systems . (potential need between 500 -2000Wp systems and typical system would cost between USD 8-10 per Wp -Off Grid, or USD 10-12/Wp- On Grid)
  - Less credit worthy developers require some sort of assistance in getting the finance for the system acquisition (potential need between 250-500Wp systems). Supportive financing facilities may come from government fund (subsidies), or from international institutions such as GEF, Bilateral Aid Funds etc.

THE URBAN USE OF PV

FINANCING SOLUTIONS

- INCENTIVE SYSTEMS
  - Rebate to purchasing price
  - Tax credits and exemptions
  - Feed In Tariff at more than one to one basis with at least over 15 years validity. FIT can be based on 'economic' value of PV electricity per kWh. (in Indonesia IDR 2500-3000/kWh under current price condition)
- WHERE DO THESE INCENTIVES MONEY COME FROM?
  - Free falling fuel subsidies to fossil energy
  - New business development stimulus
  - Carbon credits under CDM
  - International /Bilateral Aid Programs

CONCLUDING REMARKS

- Establishing the right system for financing the dissemination of Solar PV systems in the rural regions is the foundation for success. The financing system must be applied to support the development of a healthy and commercially based distribution system. Financing system must be aimed at providing the rural people with facility that would enable them to purchase the PV systems within their known average "energy budget".

- The financing facilities should also cover the 'supply side' of the PV business equation. It should provide dedicated vendors, system integrators and local component manufacturers with means to make their operations viable and worthwhile to sustain.

- The financing efforts should involve specially dedicated financial institutions which have built their reputation in providing consumer credits to rural communities, and mainstream institutions if the PV systems are marketed and distributed to urban community.

- The dissemination of PV without requiring some sort of reasonable compensation from the users will not only spoil the commercialization process of the PV industry, it would also handicap the PV technology's own reputation in providing alternative electricity to the rural communities.

- Successful installation of PV systems and administration of credits provided to consumers in rural area must be followed by the establishment of an effective after sales services system made available by a commercially based PV industry. This would not only warrant the consumer loan repayments, if applicable, but also would help keep the PV system reputation high among the users.

CONCLUDING REMARKS

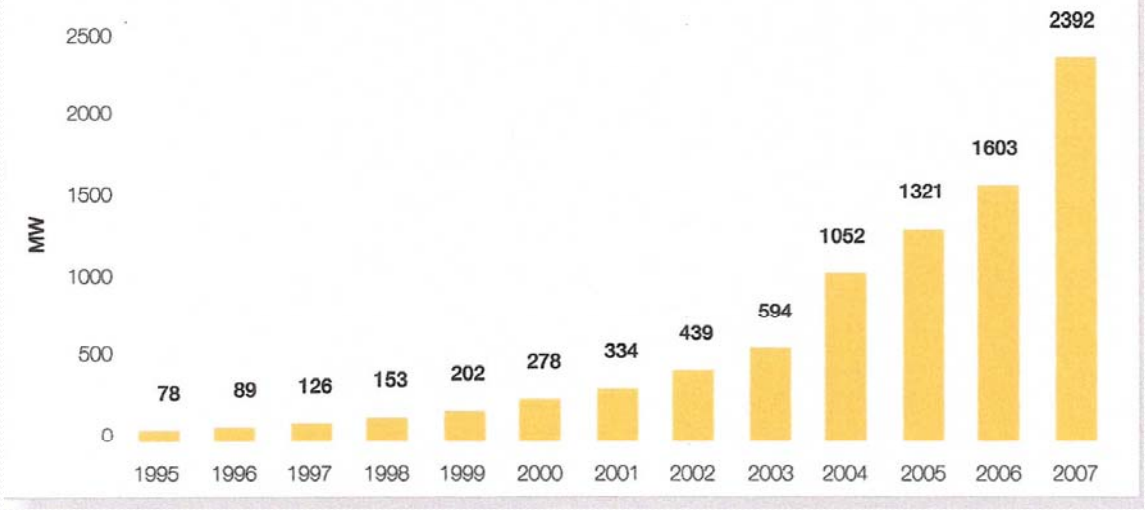
- The regional autonomous governments, under the new Energy Bill of 2007 must develop their serious commitment and concrete initiatives to create affordable financing facilities, in collaboration with existing financial institutions and with smart use of CSR project funds , in order to make a great impact on rural electrification using renewable energies

- To sustain the effective use of PV for rural electrification, the system must be distributed based on commercial principle and mechanism. A dedicated aid program like the GEF/World Bank Program for Solar Home Systems would greatly benefit the country in further developing a healthy and sustainable PV industry. Such program must be implemented long enough to get the real impact on the development of the industry and the utilization of PV as an alternative to the conventional energy.

- Financial institution specially dedicated to renewable energy development such as "Green Funds" are likely needed to focus on the financing of strategic renewable energies, and to give a greater impact to the growth in the "supply sides", by financing industrial activities that could potentially push the price of the PV Systems further down and become affordable to greater number of people.

- To induce the private sector, including the financial institutions, entering into solar energy business in a big way, the government should allow the demand sector to grow significantly by introducing 'on grid or grid connected' solar PV systems in urban and industrial areas. The needed incentives can come from various sources without essentially putting an extra burden to the state budget.

Figure 2.2: Global annual PV market



Source: Solar Generation 5, 2008, EAP-Green Peace

Table 3.1: Solar Generation scenario results for global PV market up to 2030

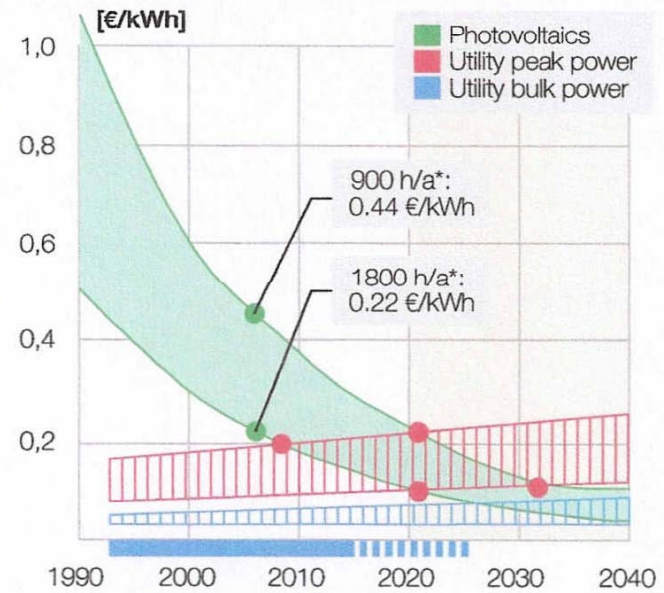
	Current situation	Scenarios		
	2007	2010	2020	2030
Advanced Scenario				
Annual Installations in GW	2.4	6.9	56	281
Accumulated Capacity GW	9.2	25.4	278	1,864
Electricity Production in TWh	10	29	362	2,646
PV Contribution to electricity consumption - reference scenario (IEA)	0.07%	0.16%	2.05%	8.90%
PV Contribution to electricity consumption - alternative scenario	0.07%	0.20%	2.18%	13.79%
Grid connected people / households / people living on PV in Million	5.5	18	198	1,280
Off grid connected people in Million	14	32	757	3,216
Employment in thousand people	119	333	2,343	9,967
Market value in Billion €	13	30	139	454
Annual CO_2 savings in Mt	6	17	217	1,588
Cumulative carbon savings in Mt	27	65	976	8,953
Moderate Scenario				
Annual Installations in GW	2.4	5.3	35	105
Accumulated Capacity GW	9.2	21.6	211	912
Electricity Production in TWh	10	24	283	1,291
PV Contribution to electricity consumption - reference scenario (IEA)	0.07%	0.14%	1.20%	4.34%
PV Contribution to electricity consumption - alternative scenario	0.07%	0.17%	1.70%	6.73%
Grid connected people / households / people living on PV in Million	5,5	14	136	564
Off grid connected people in Million	14	59	837	2,023
Employment in thousand people	119	252	1,462	3,718
Market value in Billion €	13	24	94	204
Annual CO_2 savings in Mt	6	15	170	775
Cumulative carbon savings in Mt	27	61	839	5,333

Table 4.1: Expected PV generation costs for roof-top systems at different locations

	Sunshine hours	2007	2010	2020	2030
Berlin	900	0.44 €	0.35 €	0.20 €	0.13 €
Paris	1,000	0.39 €	0.31 €	0.18 €	0.12 €
Washington	1,200	0.33 €	0.26 €	0.15 €	0.10 €
Hong Kong	1,300	0.30 €	0.24 €	0.14 €	0.09 €
Sydney/Buenos Aires/ Bombay/Madrid	1,400	0.28 €	0.22 €	0.13 €	0.08 €
Bangkok	1,600	0.25 €	0.20 €	0.11 €	0.07 €
Los Angeles/Dubai	1,800	0.22 €	0.17 €	0.10 €	0.07 €

Note: The calculation method has been changed from the previous edition of 'Solar Generation'.

Figure 4.1: Development of utility prices and PV generation costs



*h/a: Hours of sun per annum
900 h/a corresponds to northern countries of Europe
1800 h/a corresponds to southern countries of Europe

Note: The blue band indicates that market support programmes will be necessary until about 2020 in some markets.

Figure 3.3: Annual PV installations by application

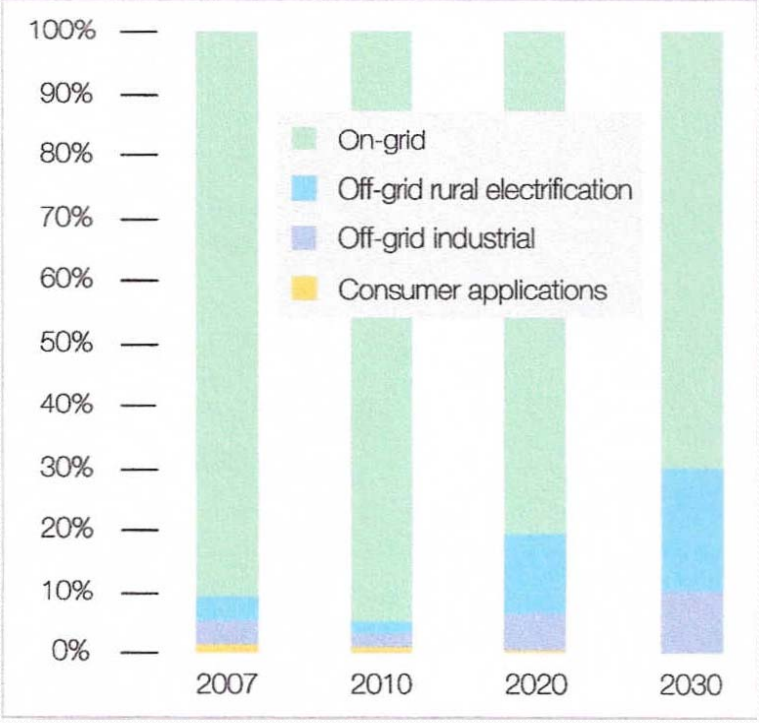
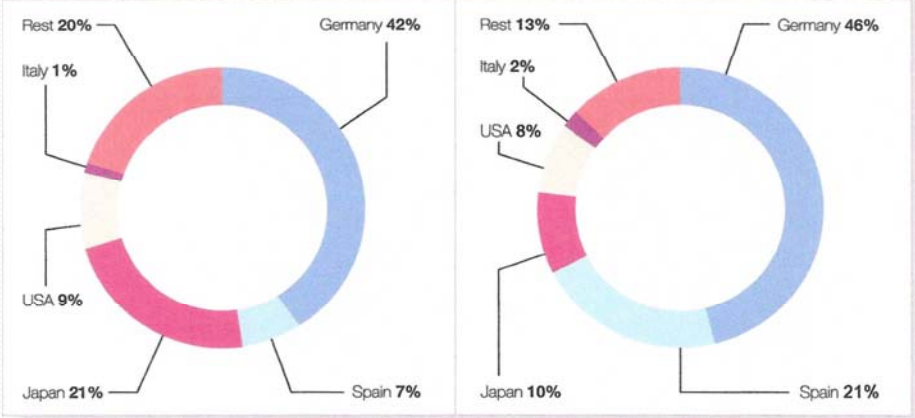


Figure 2.3: Top 5 PV country markets



Top 5 Total installed capacity 2007 (MW)		Top 5 New capacity 2007 (MW)	
Germany	3,800	Germany	1,100
Spain	632	Spain	512
Japan	1,938	Japan	230
USA	814	USA	190
Italy	100	Italy	50
		Rest	310

Figure 3.4: Annual PV installations by regional share

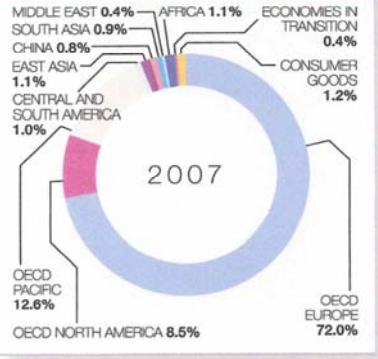
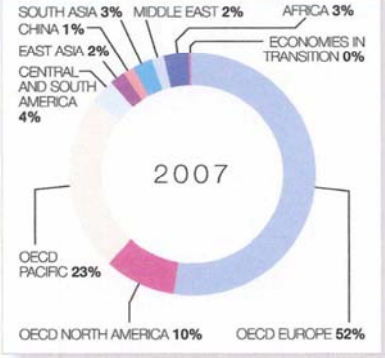
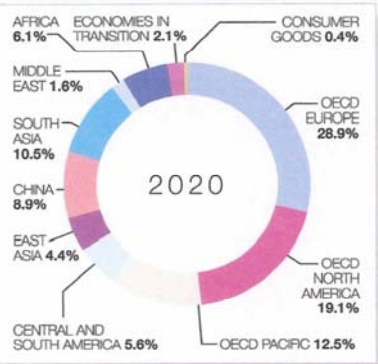
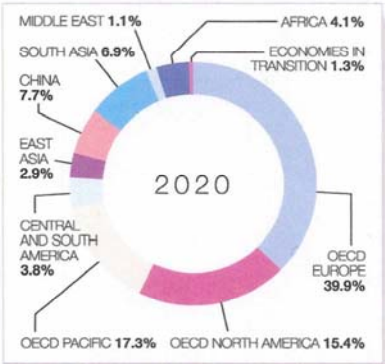


Figure 3.5: Cumulative PV installations by regional share







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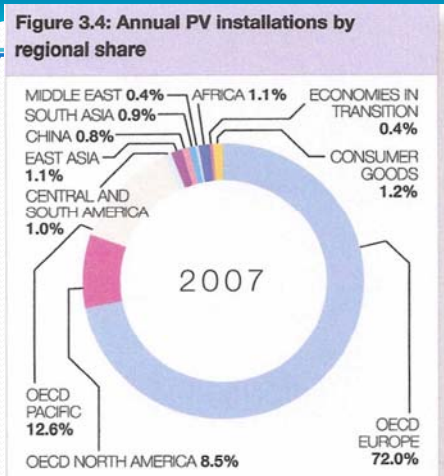

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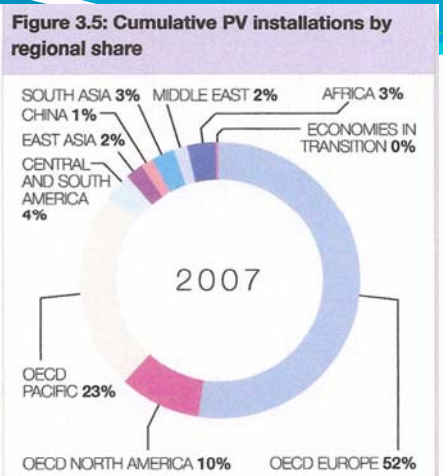

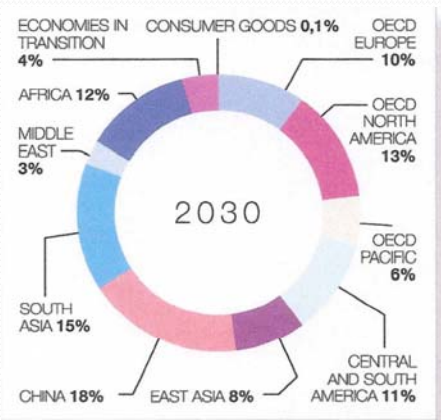

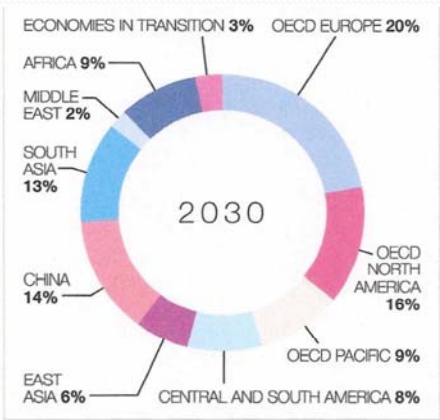

INDONESIAN RENEWABLE ENERGY SOCIETY

APSURYA
Indonesian PV Business Association

THANK YOU FOR YOUR ATTENTION