



Renewable Energy for Urban Application: Case Study- Surabaya

Elieser Tarigan, PhD.



**Center for Renewable Energy Studies
UNIVERSITAS SURABAYA
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Outlines

- Urban Energy Facts
- What to Expect from Renewable Energy
- Renewable Energy Types
- Obstacles to the Use of Renewable Energy in Urban Areas
- Case Study: Solar Electricity for a house hold in Surabaya
- Conclussions and Rekomendation Steps for Advancing Renewable Energy in the Cities



Urban Energy Consumption Facts

- More than 70% of energy consumed and over 70% of the greenhouse gas emissions from human activities in Cities
- Cities cover 2% of the world's land mass but account for 70% of global Gross Domestic Product (GDP).



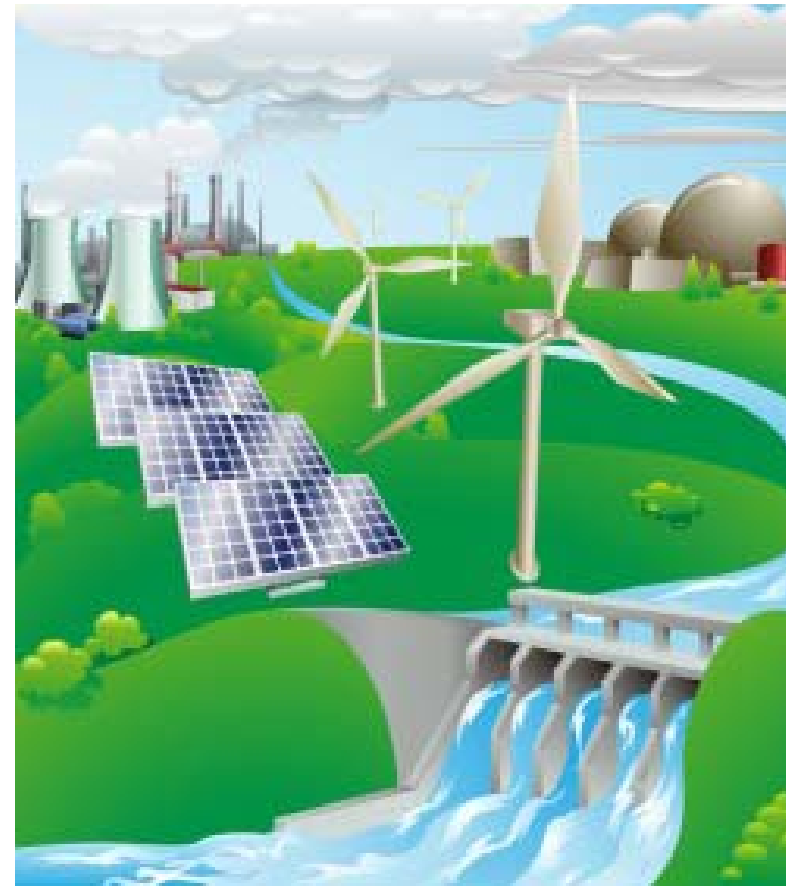
What to Expect from Renewable Energy

- A cleaner, healthier environment through improved local air quality and reduced greenhouse gas (GHG) emissions.
- Greater energy security.
- A greener economy and expansion in availability of green jobs.
- Local industrial development.
- Trade and export opportunities.
- Urban renewal.
- Regional development.
- A safer, more secure, cleaner, reliable and more efficient energy system.

Renewable Energy Types (T):

According *UU NO. 30/2007 TENTANG ENERGI*

- T1. Geothermal
- T2. Hydropower
- T3. Bioenergy
- T4. Solar Energy
- T5. Wind
- T6. Oceanic Energy
 - Wave
 - Tydal
 - OTEC





Obstacles to the Use of Renewable Energy in Urban Areas

- **Policy and Institutional Obstacles**
- **Financial Obstacles**
- **Technology Obstacles**



Policy and Institutional Obstacles

- Complex and/or unclear local permitting requirements.
- Restrictions on utility interconnection of renewable energy power generation units.
- Lack of sufficient inspectors and permitting authorities experienced with RE systems in urban applications.
- Lack of “certified” renewable energy
- Difficulty for private power developers to sell power generated to the grid
- Protection of contracts and intellectual property.
- Existing electricity laws that can be counter productive.



Financial Obstacles

- Higher upfront costs of Renewable Energy
- Fossil Fuel Subsidies
- Capital Market Constraints
- Import Duties on Renewable Energy Components, Products and Materials
- Reluctance of Traditional Sources of Project Financing
- Value Added Taxes (VAT)
- Lack of Tax Credits for Domestic Capital Equipment and Services
- Lack of Fast-Track Project Approval Mechanisms
- Limited City Government Investments in Renewable Energy Facilities
- Lack of or Inadequate High Technology Investment Programs
- Lack of Integrated Supply Chains



Technology Obstacles

- **Lack of Resource Assessments**
- **Availibility of Land**
- Lack of consumer knowledge
- ..etc for Each Resouces-Specific Obstacles



Case Study:

Solar Electricity for a house hold in Surabaya

Basic electricity need (loads) :

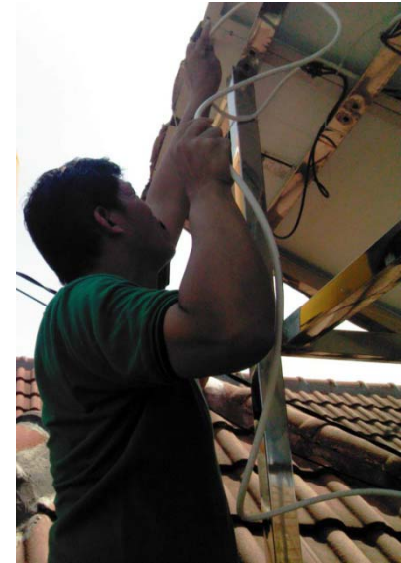
- Lighting using CFL Lamps
 - Terrace ,2 sets @ 9W run 6 h/day
 - Living room, 2 sets @ 13W run 8 h/day
 - Kitchen, 1 sets 13 Watt runs 8 h/day
 - Bath room, 1 set 9 Watt runs 4 h/day
 - Bed rooms, 3 sets @ 9 Watt run 5 h/day
 - Others lighting, 36 Wh/day
- Cooling fan 2 sets @ 35W runs for 6 h/day
- TV 60 W, runs 5 h/day
- Rice cooker 300W runs, 1,5 h/day
- Refrigerator 1 set 55W run 24 h/day
- Other needs 100Wh/day



Case Study:

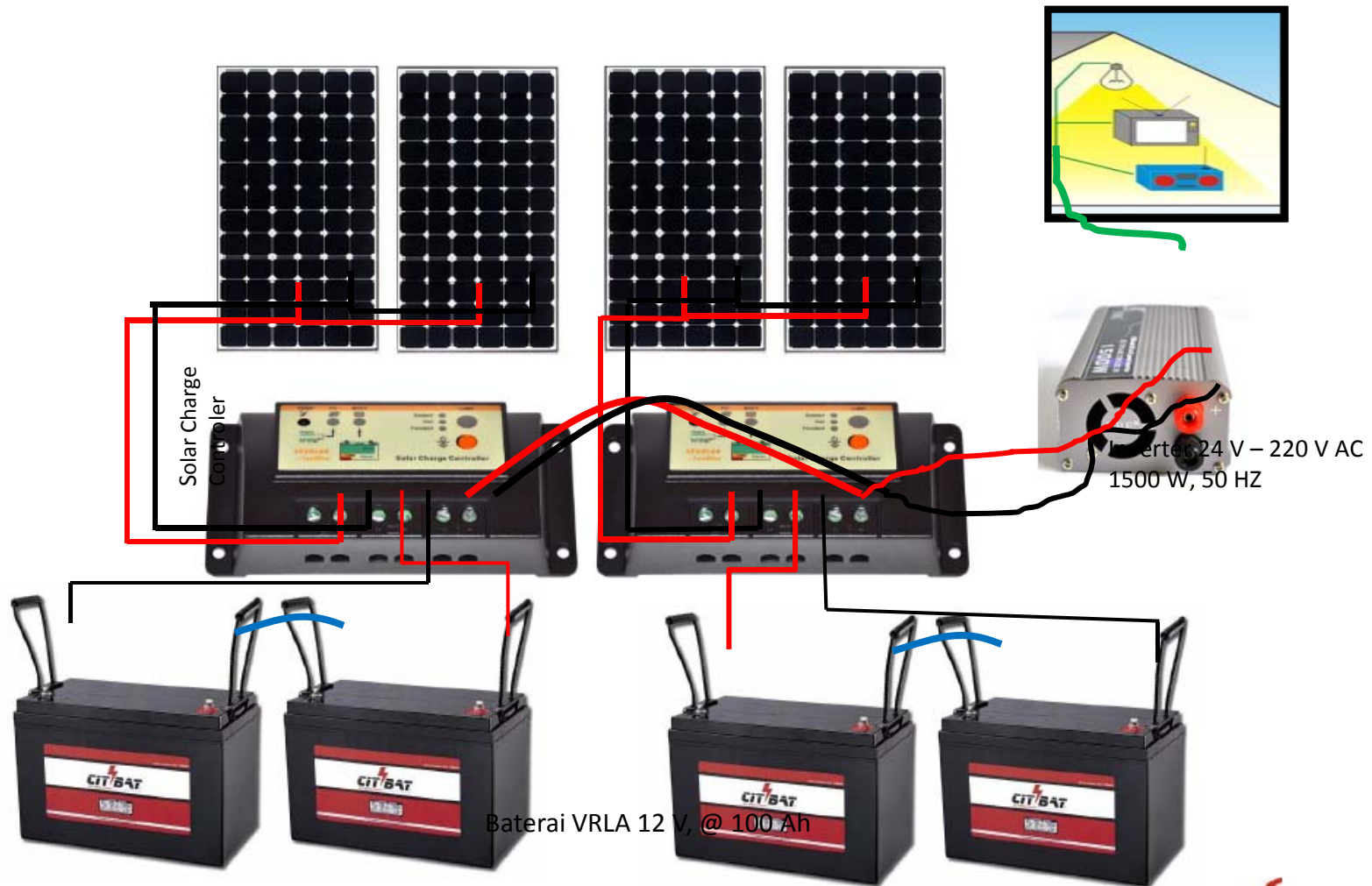
Solar Electricity for a house hold

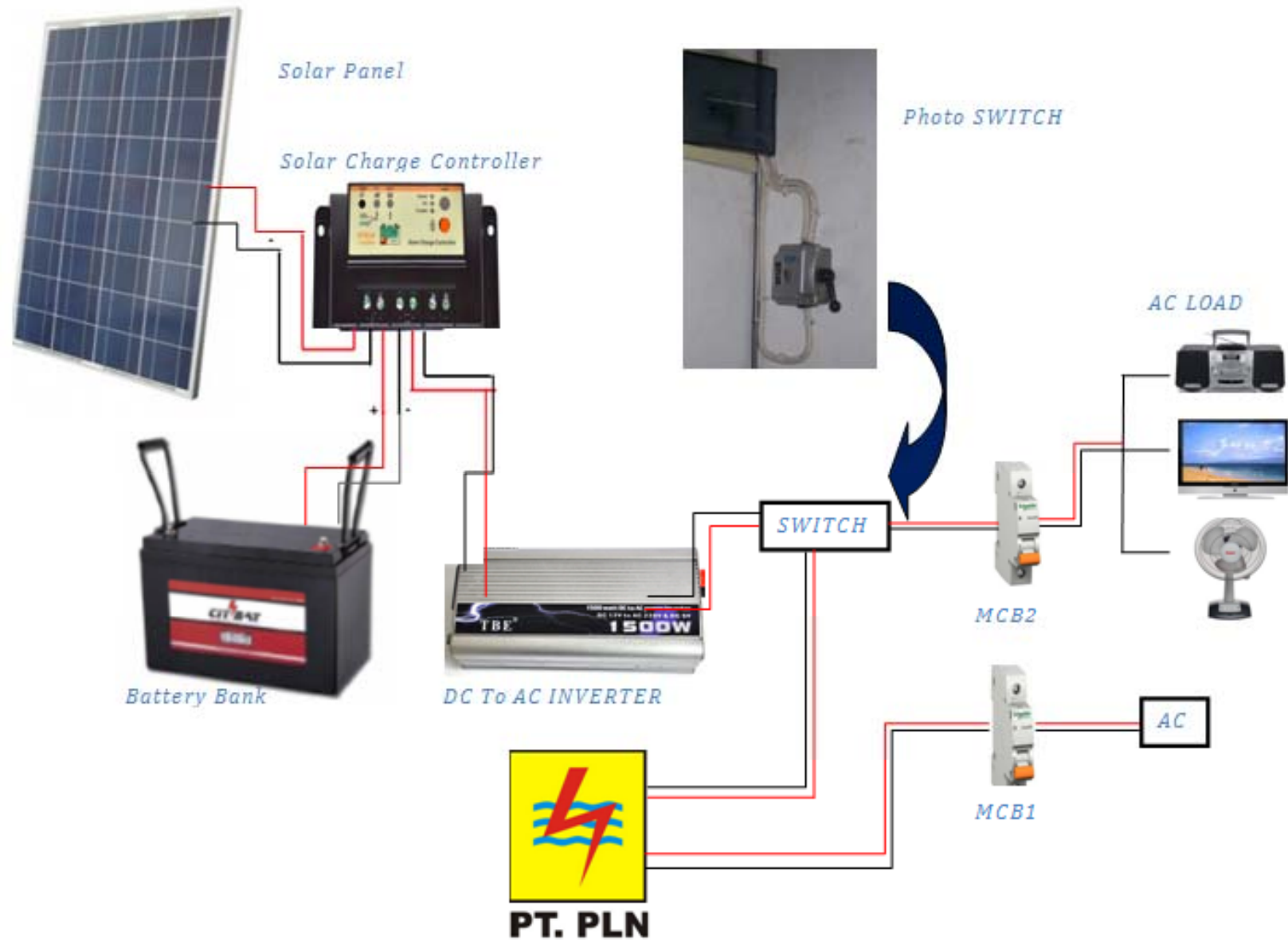
- Primary electricity needs 3,2 kWh/day
- A 800 Wp Solar Panels
- 2 Sets 20A Solar Charge Controler
- 4 sets of 100 Ah, 12V Batterai
- 1500W DC-AC inverters
- Using existing cabling network (grid)



Panel Surya @ 200WP, 24V

Beban listrik AC









Some Experience from the case study

- Solar radiation relatively high in Surabaya, 4,8 kWh/day.m²
- Grid tied (net metering) should be better in efficiency and energy gain, but there has not been any policy
- Lack of availability of the system components locally
- Properly setting and operation is necessary
→ need basic knowledge
- People Responses: “agree but not trust”



- Utilization of solar energy for house hold for sustainability
- Need policies on small solar system
 - Grid tie policy
 - Feed in tariff
- Encouraging RESCOs business
- Training basic knowledges for users
- Public socialization and education



Conclusions and Recommendation Steps for Advancing Renewable Energy in the Cities

- 1. Understand What Renewable Energy Means to our City*
- 2. Make a Commitment to Renewable Energy*
- 3. Initiate a Plan of Action*
- 4. Build an Effective Policy Framework*
- 5. Establish Rules and Regulations*
- 6. Address Technical Issues*
- 7. Provide Access to Financing*
- 8. Launch a Renewable Energy Awareness Campaign*
- 9. Strengthen Local Capacity*
- 10. Lead by Action*



*Thank
You*