



Centre for Energy and  
Environmental Markets

**UNSW**  
THE UNIVERSITY OF NEW SOUTH WALES  
SYDNEY • AUSTRALIA



## Progress on the UNSW's ADRA EFCC 011 Research Project

CEEM Workshop, R2063 Quad UNSW, Sydney 14 November 2008

*Maria Retnanestri*

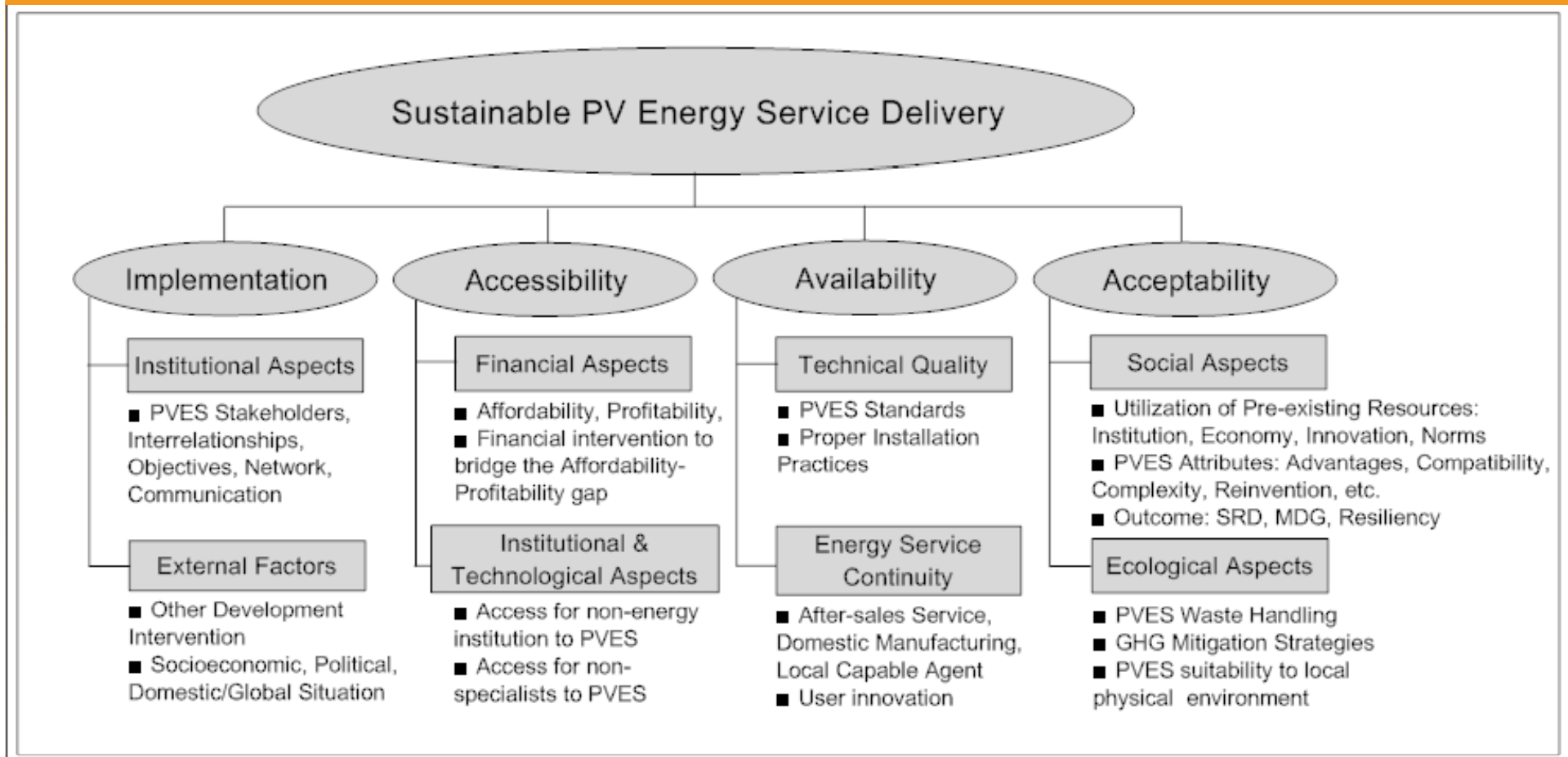
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# ADRA EFCC 011: Overcoming Barriers to Renewable Energy in Rural Indonesia by Community Capacity Building using the I3A Framework

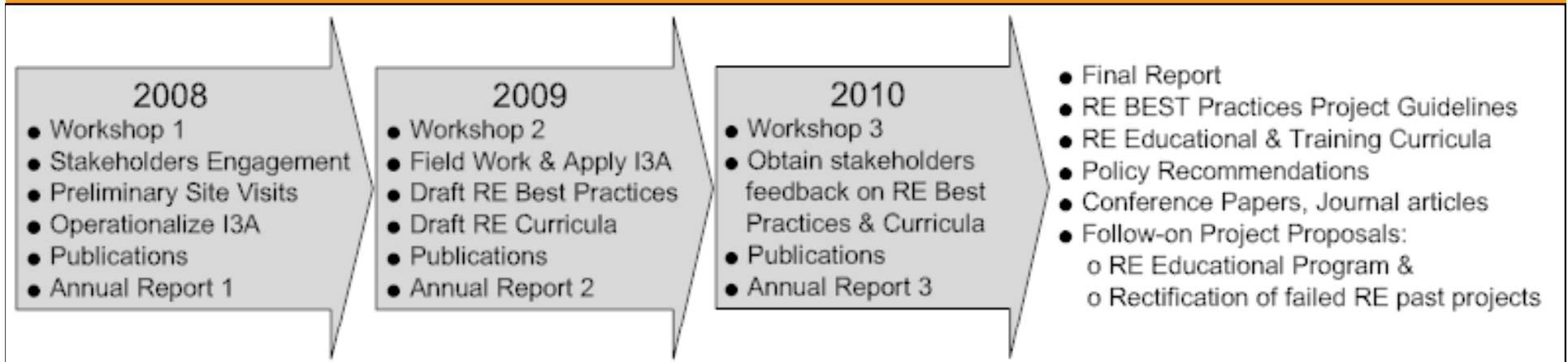
- **The Australian Development Research Award (ADRA)** "are designed to attract quality research that informs policy development and increases the general stock of knowledge around development issues " (<http://www.ais.gov.au/research/awards.cfm>)
- **Key Research Questions:**
  - Why some renewable energy projects succeed while others fail to facilitate sustainable rural development in developing countries
  - Identify & disseminate ways to overcome barriers to renewable energy in rural Indonesia by community capacity building
- **Research Team:**
  - Prof. Hugh Outhred, Dr. Maria Retnanestri, Dr. Stephen Healy, Dr. Muriel Watt, Ms. Long Seng To (PhD Candidate). *In addition, Tevita Tukunga will undertake a related PhD project for Tonga, commencing in 2009.*
- **Funding:**
  - Australian Development Research Award (ADRA): AU\$ 310,000 over 3 years
  - BP Solar, e8, Azet Corporation, STTNAS Jogjakarta (In-kind & cash)
- **Projects and activities:**
  - Interdisciplinary research project involving Australian & Indonesian collaborators
  - Fieldworks, workshops, seminars and public lectures in Indonesia & Australia
  - Development of best practice project guidelines, educational curriculum, training materials, papers, journal articles, policy recommendations, proposals for renewable energy education and proposals for rectifying failed past projects

# The I3A Sustainable PV Energy Service Delivery Framework



I3A Framework: An **implementation** that maintains PV energy service **accessibility** (financial, institutional, technological), **availability** (technological, institutional) and **acceptability** (social, ecological), considering the hardware, software and orgware aspects of PV energy service delivery during & beyond initial PV project life

# The ADRA Research Project Activities & Timeline, Progress to Date



## ■ 2008:

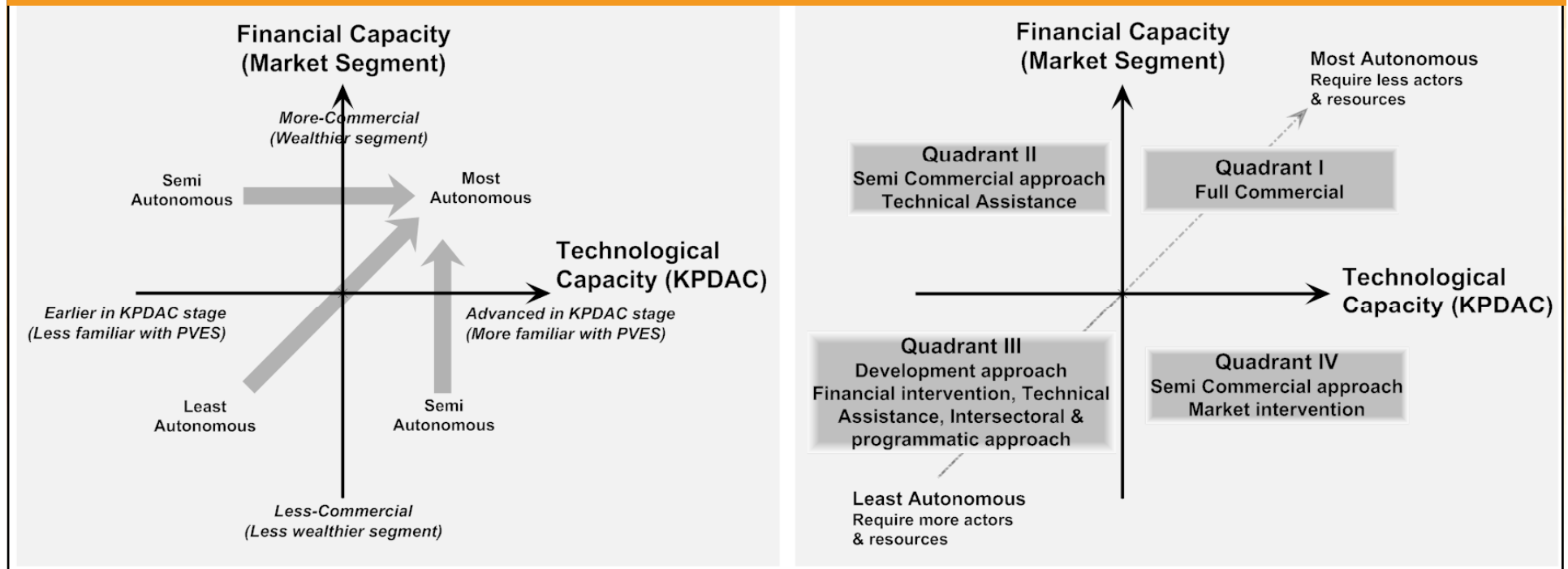
- 12-15 July 2008: Meetings with the Indonesian collaborators
- 15 July 2008: DGEEU Jakarta Office – PV Workshop in Jakarta & Launch of 10 kWp grid-connected PV at the DGEEU office. The workshop was jointly funded by ADRA & three PV companies: Azet (Jakarta), Mitsui & Kaneka (Japan).
- Publications: ISESAP papers, public lectures, seminars
- Capacity Building: Support for 2 reps of BPPT & STTNAS (Indonesia) to attend ISESAP 08 Conference
- 1st annual report due 11 February 2009

## ■ 2009:

- 19-20 January 2009: Workshop on Renewable Energy & Sustainable Development in Indonesia – Past Experience – Future Challenges. This workshop will be jointly funded by ADRA & e8 ([www.e8.org](http://www.e8.org))
- April 2009: Renewable Energy Study tour for 35 students & lecturers of STTNAS Jogjakarta College, jointly funded by ADRA, BP Solar Australia & STTNAS
- July 2009: Seminar – report on the outcome of the STTNAS RE study tour
- Launch of Center for Renewable Energy & Energy Efficiency Studies, STTNAS

# Accessibility: Equitable Access to PV

## *PV Autonomy as a function of Financial & Technological capacities*



**PV Autonomy** as a function of Financial & Technological capacities, viewed as a necessary condition for users to actively participate in the PV social system/network/orgware

Facilitators need to be aware of each rural community's economic standing & PV technological capability to promote user autonomy effectively, and to achieve the most desirable state (most autonomous):

- **Quadrant 1:** Most autonomous (investment & PV familiarity)
- **Quadrant 2&4:** Semi to more autonomous
- **Quadrant 3:** Least autonomous (require more actors & financial supports)



# Off-grid PV Applications in Indonesia: *Some positive findings*



Aceh, February 2005

Photo: Mambruk Energy International

## **PV & socioeconomic improvement:**

Improved access to clean water, better quality of lighting, access to telecommunications & infotainment, rural job creation; which altogether can improve HDI, reduce HPI and improve energy security

## **PV use in the disaster risk management, community resiliency, sovereignty & energy security context:**

**1&3. Aceh (2005):** PV for street lighting, lighting at refugee barracks & communications

**2.** PV installed in a village located near the Indonesian-Malaysian border

**4. NTT (1992):** PV for communications after the Maumere tsunami



Photo: Azet Surya Lestari

Photo: Claus Dauselt



## Off-grid PV Applications in Indonesia: *Some Issues*



Photo: Courtesy of Azet Surya Lestari



Bjarnegard 2006

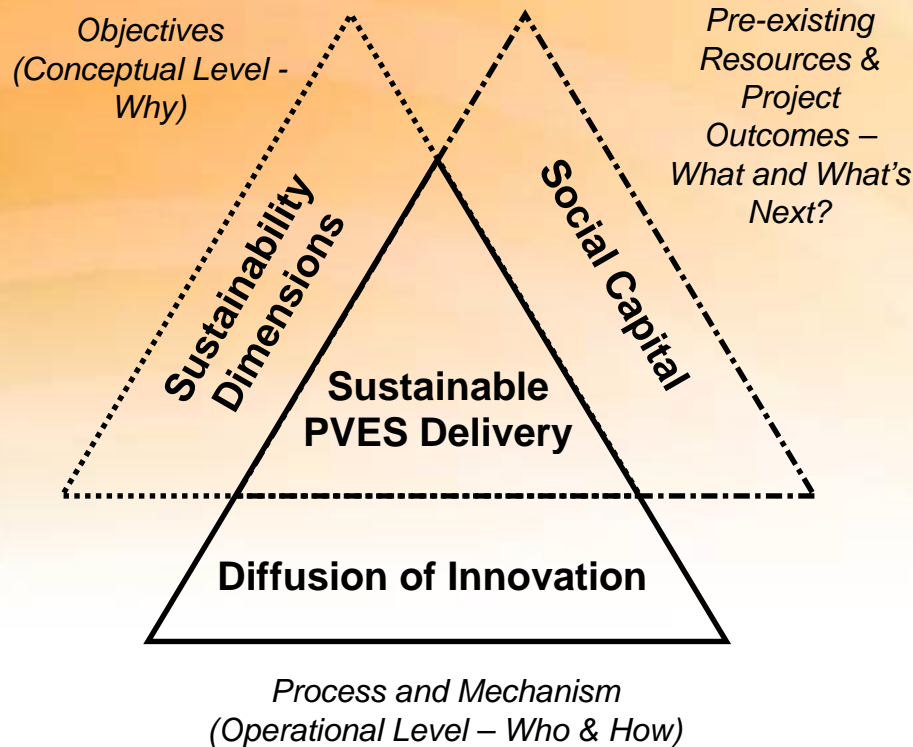


Photo: Courtesy of Claus Dauselt

**Beyond project life:** Lack of adequate after sales service infrastructure, users “disconnected” from technology, externally derived problems on rural communities, social fragmentation, inadequate PV waste handling

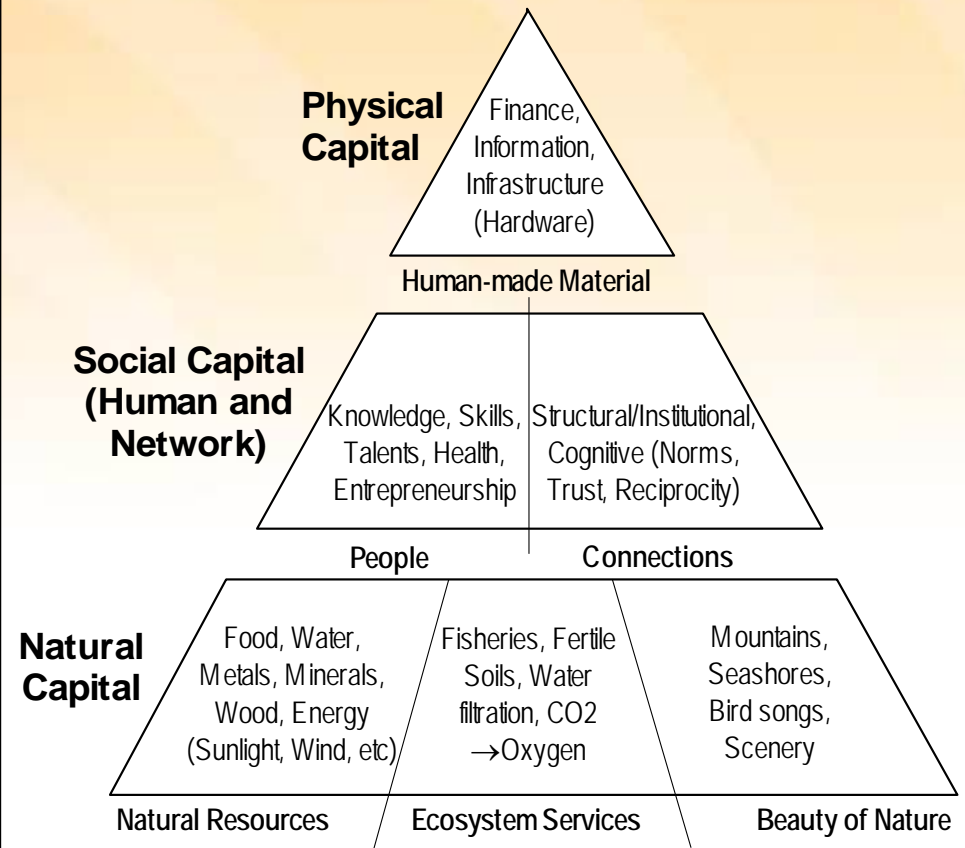
# Conceptual background to the I3A Framework

*PV in the nexus of Sustainable Development, Diffusion of Innovation & Social Capital*



**Diffusion of Innovation:** “The process in which an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 2003, p5).

## Community Capital / Resources



Reproduced from Hart, 1998, with some modifications.