



Off Grid Electrification Options for Remote Regions in APEC Economies

Fengyan Zhang
Xiamen University

Sep 10, 2018, Chiang Mai, Thailand

Off Grid Electrification Options for Remote Regions in APEC Economies

Milestone1: On site visit three APEC economies, and investigate the current off grid electricity supply situation, the cost, problems and obstacles of providing electricity, and to assess the technology and economical advantages of adopting solar, battery, DC and microgrid.

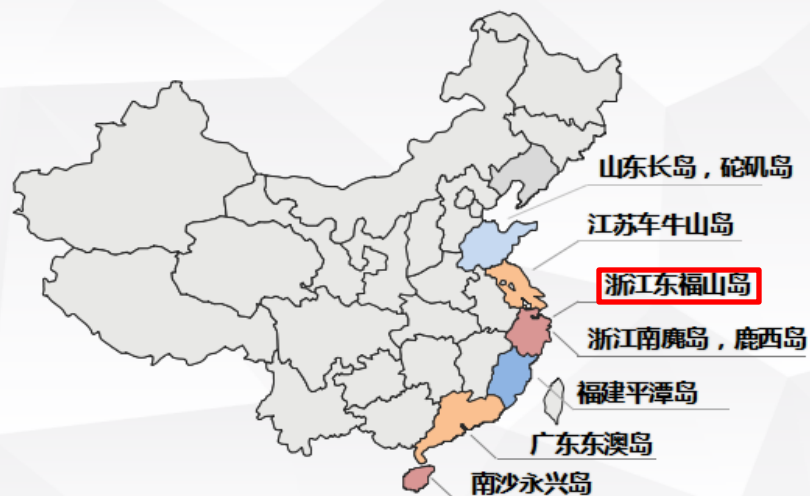
Milestone2: 1 day workshop: one day workshop to facilitate in-depth discussions, sharing ideas and developing strategies to implement solar, battery, DC and microgrid in these regions..

Onsite Visit 1: Dong Fu Shan Island in China



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国内主要示范海岛微电网分布



On-Site visit 2: Ollague, Chile



CE-FCFM, Universidad de Chile



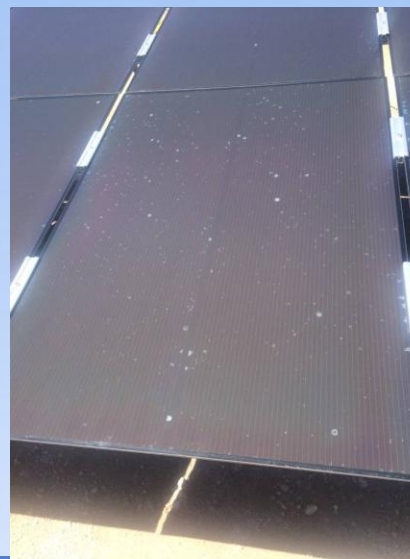
Local School Status



Microgrid: Solar +Storage+ Generator



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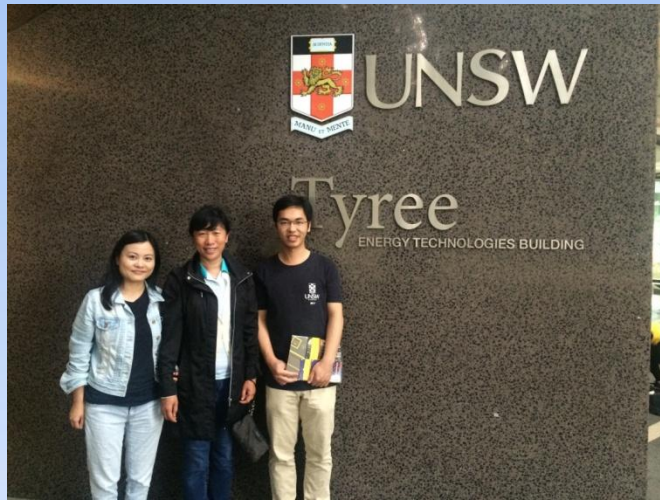
Solar panel
degradation
due to harsh
environment



Problems Encountered

- Remote off grid region often has harsh environment which add more challenges to technology and maintains
- On going maintains is necessary, locally trained maintain team is a must
- On going Government funding is necessary, one time research grant often cause lapse of maintains and even abandoning of the facility
- Private companies need to assess the investment and return ratio because it is usually small demand and high cost, pocketed, unstable and hard to collect money from the local residence

On-Site visit 3: Australia



University of New South Wales



CSIRO | Energy

Commonwealth Scientific and Industrial Research Organization



Techno-Economic framework for Resilient and Sustainable Electrification

Gather and thoroughly study practices and experiences with rural electrification efforts in developing countries worldwide and particularly LMIC partners of the project, Malaysia and China, as well as our external project partner Chile

Develop a quantitative understanding of the role of novel DER in providing hybrid energy network *sustainability as well as resilience to natural hazards, particularly in rural and isolated regions in developing countries, considering also* their ease of deployment and scalability.

- THE UNIVERSITY OF MANCHESTER UK
(University of Melbourne, Australia)
- THE UNIVERSITY OF NEWCASTLE, UK
- UNIVERSITI TEKNIKAL MALAYSIA MELAKA, Malaysia
- XIAMEN UNIVERSITY, China

New Collaborations and Projects 2:



RESEARCH, DEMONSTRATION, AND COMMERCIALISATION OF DC MICROGRID TECHNOLOGIES



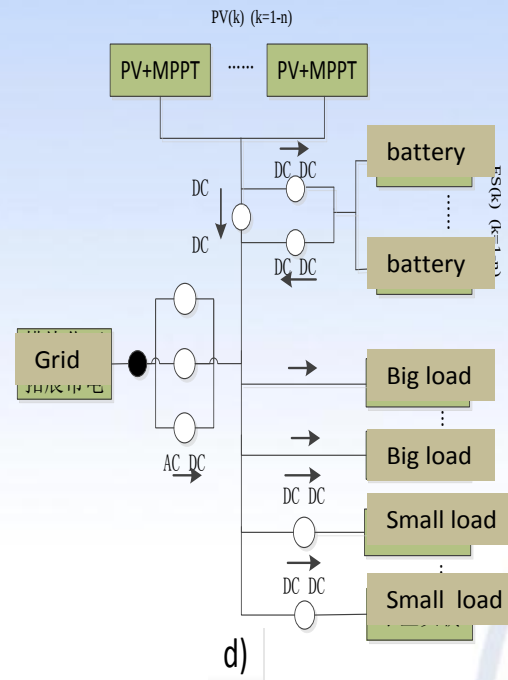
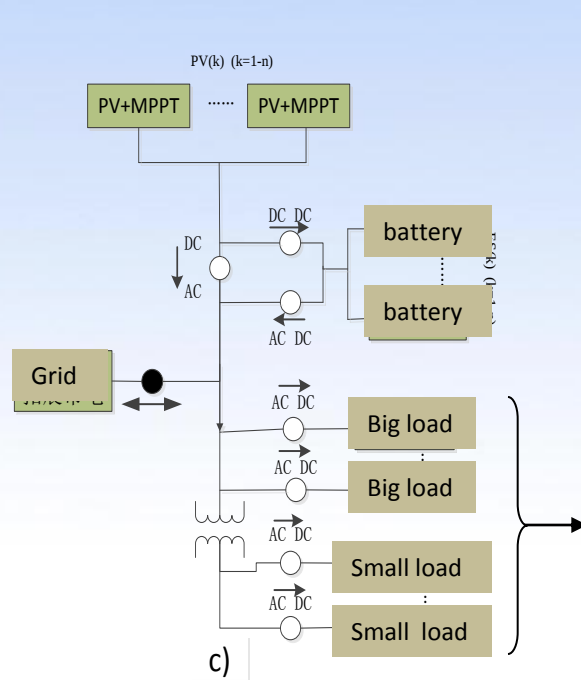
1. ASTON UNIVERSITY (ASTON), UK,
2. TECHNISCHE UNIVERSITEIT DELFT (TU DELFT), Netherlands,
3. HERIOT-WATT UNIVERSITY (HWU), United Kingdom,
4. CSEM CENTRE SUISSE D'ELECTRONIQUE ET DE MICROTECHNIQUE SA - RECHERCHE ET DEVELOPPEMENT (CSEM), Switzerland,
5. DIRECT CURRENT B.V. (DCBV), Netherlands

6. ZHEJIANG UNIVERSITY (ZJU), China.
7. XIAMEN UNIVERSITY (XIAMEN UNIVERSITY), China.
8. HEFEI UNIVERSITY OF TECHNOLOGY (Hefei University of Technology), China.
9. UNIVERSITY OF WATERLOO (University of Waterloo), Canada.

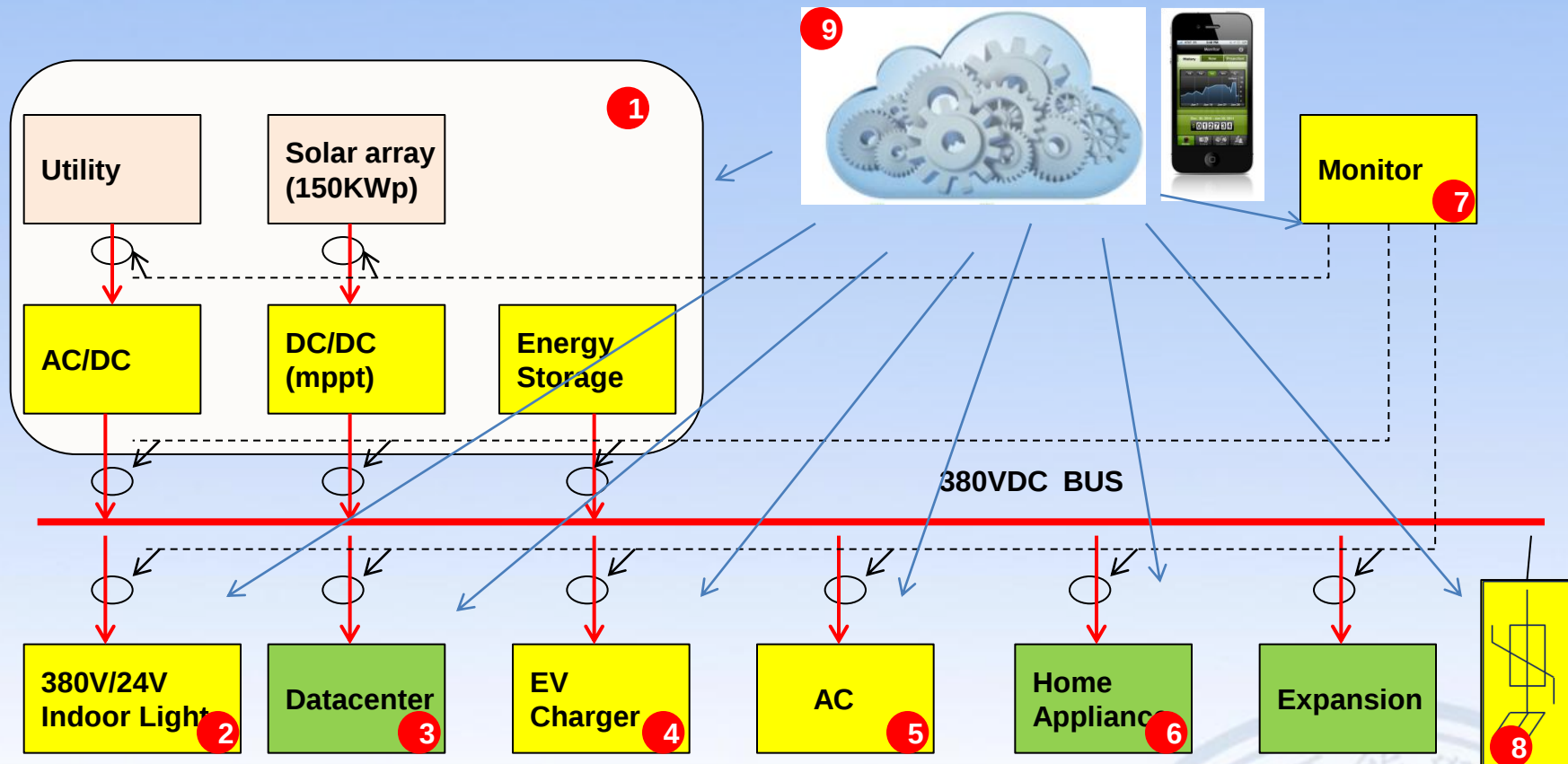
Net Zero Energy Building Feasibility Study

DC microgrid and distributed energy storage for building

- XIAMEN UNIVERSITY, China
- Qinghua University, China
- LBNL USA



DC Microgrid at Xiamen University



- 1. AC/DC, MPPT and Energy Storage
- 2. Indoor DC lighting
- 3. Data Center
- 4. EV Charger

- 5. Air Conditioning
- 6. Home and Office Appliance
- 7. 9. System Monitor and Control
- 8. System Safety

DC Load- LED Lighting, AC and EV Charging



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24V DC LED light



380V DC Air Condition

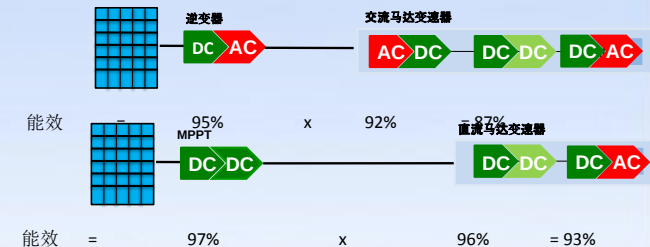
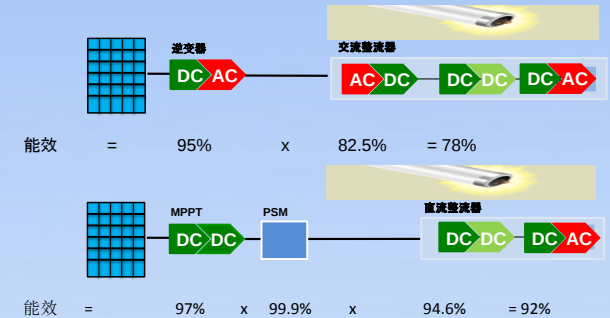


380V EV Charging Station

Solar DC Microgrid at Xiamen University

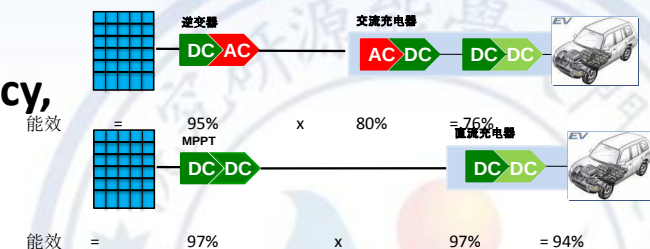


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Advantages of DC microgrid vs. AC microgrid:

- More reliable, lower cost, fewer component, higher efficiency, especially suitable for off grid region
- Less available DC appliances and supply



Xiamen--Geological Location



YAHOO-TRAVEL

XIAMEN, traditionally known in the West as Amoy, is a surprisingly pretty city, its streets and buildings, attractive shopping arcades and bustling seafront boasting a nineteenth-century European flavor.



Xiamen

- Special Economic Zone,
- Economic growth rate exceeded 15%
- Population reaching 3.53 million



Founded in 1921,
One of China's higher-level
universities “211 Project” and the
“985 Project”.
Recognized as one of the most
beautiful universities in China.

School of Energy

38,000 full-time students on campus,
20,575 undergraduates,
15,590 master students,
2,567 doctoral students,
2500 international students



1,150,000 m²
翔安校区鸟瞰图

Thank You!



Welcome to APEC Workshop!

