



4th EU - Philippines Meeting on Energy Electricity for a Better Life

**How Worldwide Energy Developments support
Access to Sustainable Energy**

– Keynote Address

**Christoph Menke (Prof. Dr. – Ing.)
Strategic Advisor to EU ASEP**

Manila, October 7, 2016



Framework for Access to Sustainable Energy

- **Economic development** is a requirement for **Peace**, but Peace is needed for economic development as well
- **Reliable & affordable electricity** is one of the key **preconditions** to economic development for rural communities
- Thanks to advances in energy technologies **new possibilities are finally available**
- **Off-grid electricity** sector is receiving a new worldwide push
- **Sustainability** of energy access programs needs **more than technology: new business models**, which are available due to new information/communication (IC) technologies.



4 Clean Energies - Disruptive Technology Trends

- **Solar Photovoltaic (PV)** costs fell dramatically in the last years and will continue to fall further!
 - Germany: by 80% in 10 years
 - World's lowest bid: Abu Dhabi, 09/2016: 1,16 PHP/kWh for 350 MWp
- **Energy Storage Technologies** seem to follow the learning curve of PV module costs
- **Electrical Vehicles (EV)** are entering the markets
- **Self driving cars** and **shared mobility concepts** start
 - Will lead to massive “Clean Disruption” of energy and transportation sector by 2020 -2030



Worldwide Energy Transition

- **Investments in renewable power** have outplayed conventional power by capacity additions since 2012
 - No indication that this trend will reverse due to continued dramatic cost reduction, especially of PV
- **PV Market** will grow rapidly: **US: > 10 GW PV** under construction; **China: until 2020 > 135 GW** planned
- **Energy storage** is becoming competitive very soon!
- **Consequences:**
 - **Disruption** of existing power generation!
 - **Change** of electricity markets
 - Emergence of **new business models**/market participants



European Energy Transition

- Most European countries are turning to **renewables in a substantial scale** and prepare for more due to:
 - **Development of costs** of technologies
 - **Economic development** (GDP contribution; Jobs/MWh)
 - **Energy Security** aspects
 - **GHG impacts**
- Renewable electricity generation **EU is at 29% of total gen.**
- Increasing share of vRE (Wind and PV)
 - **Denmark** > 42% of total electricity generated from wind
 - **Germany** > 29% RE generation (> 6% from PV)



Energy Transition in the Philippines

- **Generation from RE is still at 30%**
- **Successful start of the RE Law implementation**
- **Development of private sector** in renewable energy market
- **Cost reduction of recent RE systems** due to learning curve
- **Upcoming task:** Getting **flexibility** into the **existing power system** to realize **lowest system costs** in the long run!
- **Necessary Measures:**
 - Increase **flexibility options on supply and demand side**
 - Need to **adopt grid management**
 - **Improve forecasting** supply and demand to **reduce reserve power**
 - **Improve power planning** and integrate different parts
 - **Adapt electricity market** to cope with requirements



Energy Challenges in the Philippines - 1

- **Electricity supply** is still partially **below demand**
- **Rapid economic development** requires more power!
 - 2015 > 4,6% demand growth => 821 MW
- **Energy Efficiency** is good compared to other ASEAN countries, but lot remains to be done => **National EE Road Map**
- **How to satisfy demand ?** in light of:
 - **Lowest costs/kWh** now and in the future?
 - **Energy security** (Reliability, imports, price predictability)
 - **Worldwide RE power technology developments** and their impact on power markets, especially PV?
 - **Access to climate fund** but with implied **carbon emission restrictions?**



New approach to Energy issue?

- Three Ss for Power
 - Stable (reliable)
 - Sustainable
 - “Sulit” (value for money)
- **Reduce burden** to consumers and businesses
- **Support rural development** through rural electrification
- Focus on **Mindanao** and especially **ARMM**
- **Excellent**, but in the decision taken now, we need to consider the **long term implications** of the decisions
- We shall consider the **impact of worldwide “paradigm change” in energy technologies** and their implication



Energy Challenges in the Philippines - 2

The country is at a **cross-roads**:

- More **conventional power and/or** more **renewables**?
How much is too much from Coal, Gas and RE?
- Adopting to **new paradigm requirements** (flexibility, distributed generation, batteries and smart grids) **or** continue existing pathway for how long?
- What are the **consequences in the near & in the far future** if we move is too late, too little?
- Who will cover the **costs of stranded investments or power plants** that can not operate anymore because they are **not flexible**?
- How do we **distribute the transition costs** fair and socially acceptable?
- Who **shall pay** for the **learning** and the **transition costs**?



Challenges in Rural Electrification

- Currently **89.6% of households (HH)** are energized
- Until end of 2017 **additional 800,000 HH** are targeted
- 300,000 HH can be connected to the grid
- 500,000 HH will be served by off-grid systems
 - **Stand-alone systems** (e.g. household-level solar systems)
 - **Micro-grids** which are mainly powered by diesel generators
- **Cost to operate diesel grids** are high and lead to a burden to the consumer through UC-ME



Special focus: Mindanao

- Most of the **un-energized households** are located **in remote off-grid and/or conflict affected areas** in Mindanao
 - where 26% of households are still without electricity
- Even where access to electricity exists **frequent power cuts/brown outs** hamper economic development!
- **Peace and Electricity are both needed** to support economic development for Mindanao



Changes in technology & business models can jumpstart access to sustainable energy

- **PV Systems on Solar Home level** are reliable and affordable
- **Batteries & charge controllers** finally work
- **PV Hybrid systems & Mini Grids** are reliable and cost effective!
- **IC technologies and mobile internet** offers opportunities for better management of systems
 - **Technology:** Maintenance and service
 - **Business operation:** Prepaid systems & mobile payment
- **Productive use of electricity** has wider opportunities
 - **Internet based** business
 - **Mobile banking**, etc.
- **EE technologies** are ready: LED, Efficient appliances, etc.



ASEP – Objective and Setup

To

- generate more electricity from renewable energy,
- increase efficiency of energy use,
- and increase access for the poor to affordable, disaster resilient energy.

ASEP's three Components:

- (1) Technical Assistance and Capacity Building**
- (2) World Bank – managed Investment Support**
- (3) Call for Proposals for Pro-Poor and Climate-Resilient Innovative Energy Solutions**



Opportunity: ASEP testing the way forward

- 60 Mio EUR to establish sustainable ways of providing **electricity** for socio-economic development to underserved and poor households
 - **Solar Home Systems** via the PV Mainstream (WB managed)
 - **Hybridization of existing diesel** mini grids (EU managed)
 - **Renewable based mini-grids** for unserved communities (EU)
 - **TA and capacity building** to DOE, NEA and ECs to plan, implement and monitor the electrification program
- Expected **output** of ASEP is, beside concrete electrification numbers, to **develop and confirm viable business models and success factors** for sustainable energy access and services



The future is bright - Electricity for a Better Life is now finally possible

Reasons

- **Key technologies are now finally ready** for use (PV, batteries, controller, LEDs, ICT, etc.)
- **Innovative business solutions exist** and are proven
- **Private sector is willing to invest** into off-grid solutions, if:
 - **Policies are predictable and reliable**
 - **Regulation is adequate and supportive**
 - **Administrative requirements are minimized**
- **Financing** is available at **acceptable costs** (WACC)
- **Energy Efficiency is built in** through modern technologies



The future is bright

- Electricity for a Better Life

*Thank you very much for
your kind attention!*



Christoph Menke (Prof. Dr.- Ing.)
Menke@fh-trier.de