

Smart Systems for Solar Power

REMOTE OFF-GRID IMPLEMENTATION: EXAMPLES

Agenda

- 1. Company
- 2. Hybrid technology
- 3. Five steps to successful implementation



1. IBC Solar – a company with a tradition

- ▣ More than 30 years of experience and know-how
- ▣ 440 highly-qualified and motivated employees in 11 countries
- ▣ More than 2.4 GW in more than 140,000 reliable PV systems world-wide
- ▣ PV project developer - EPC
(engineering, procurement & construction)
- ▣ Distributor for all PV system components
(one-stop-shop)



2. Hybrid technology

Hybrid – combination of technologies

▣ Benefits of hybrid system solutions

- Redundancy
- Flexibility & modularity
- Hybrid solutions of renewable energy resources
- Connection of available resources
- PV hybrid solution with diesel generator
- Save money by saving diesel
- Decrease your CO₂ footprint



Source: envergate, diverse

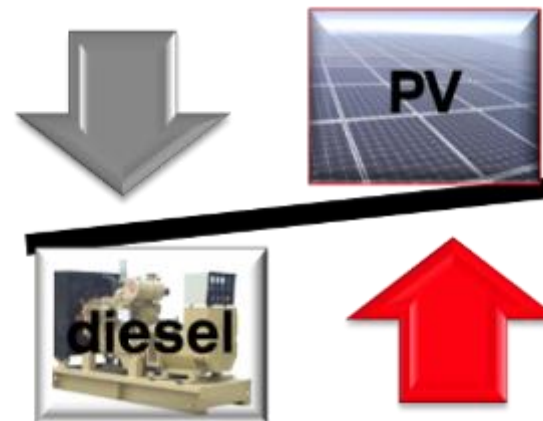


Source: Cummins

2. Hybrid technology

Customized solutions for PV hybrid system solutions

■ PV for covering day time demand peaks

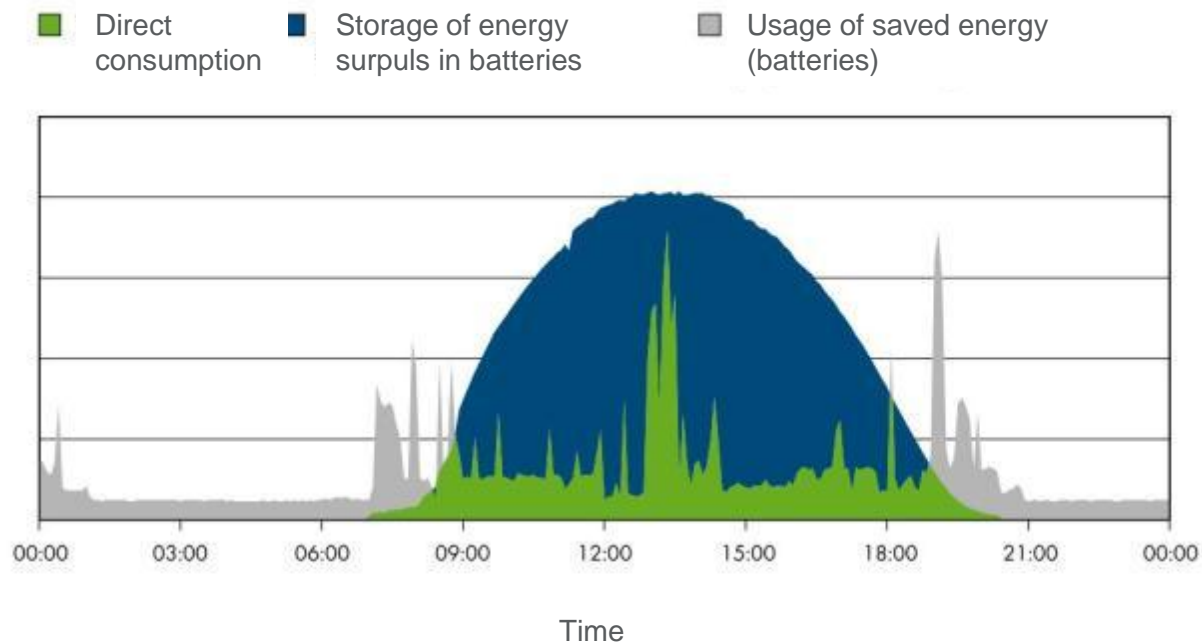


Source: SMA

2. Hybrid technology

Customized solutions for PV hybrid system solutions

- PV for covering day time main demand, incl. battery
(diesel as redundant source - back up)



Source: SMA

3. FIVE STEPS TO SUCCESSFUL IMPLEMENTATION



STEP 1 CUSTOMER REQUIREMENTS



step 1 – customer requirements

Rural electrification challenges

■ Technical challenges

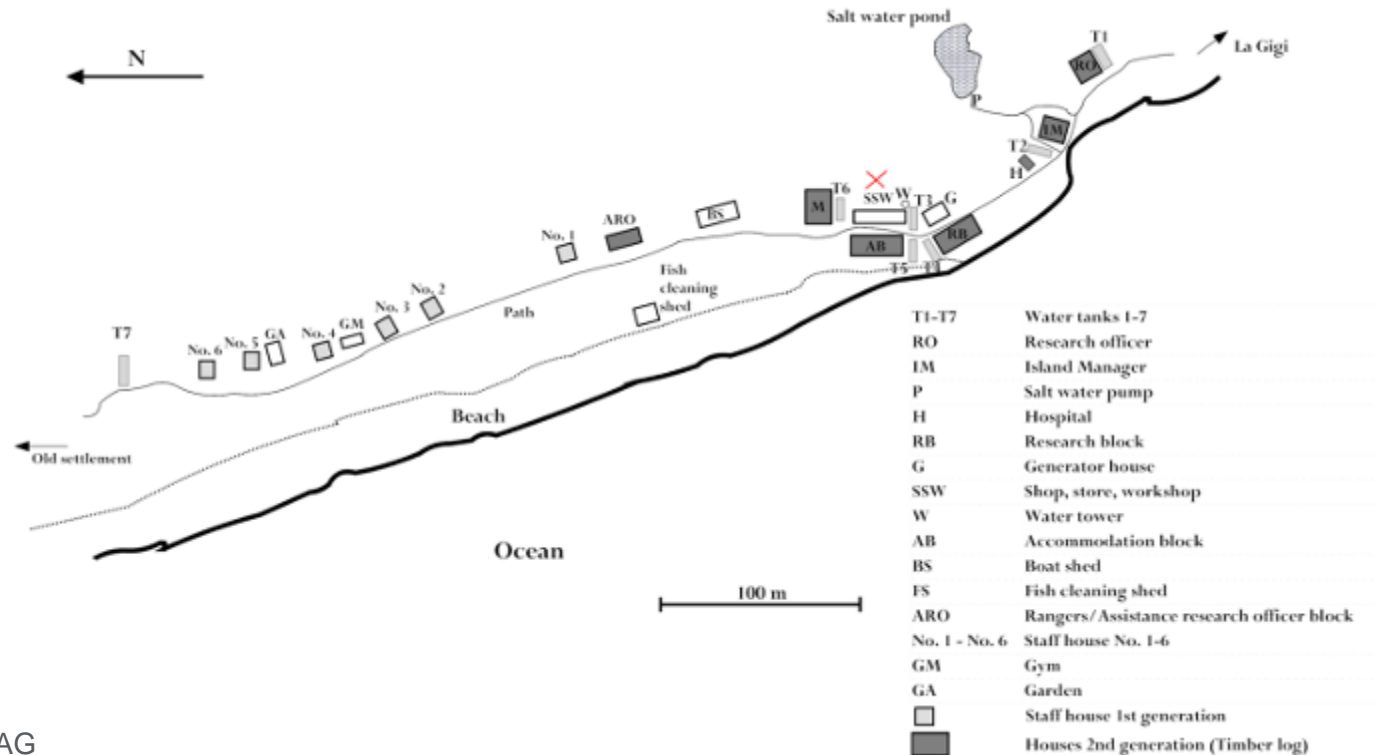
- Balanced system
- System controlling
- System maintenance – long term

■ Commercial challenges

- Regulation of property rights
- Project financing
- Customer settlement system
- Low power generation costs
- Operator model (e.g. private public partnership PPP)

step 1 – customer requirements

Location – as is analysis – load demand



Source: IBC Solar AG

step 1 – customer requirements

Location – as is analysis – e.g. diesel consumption



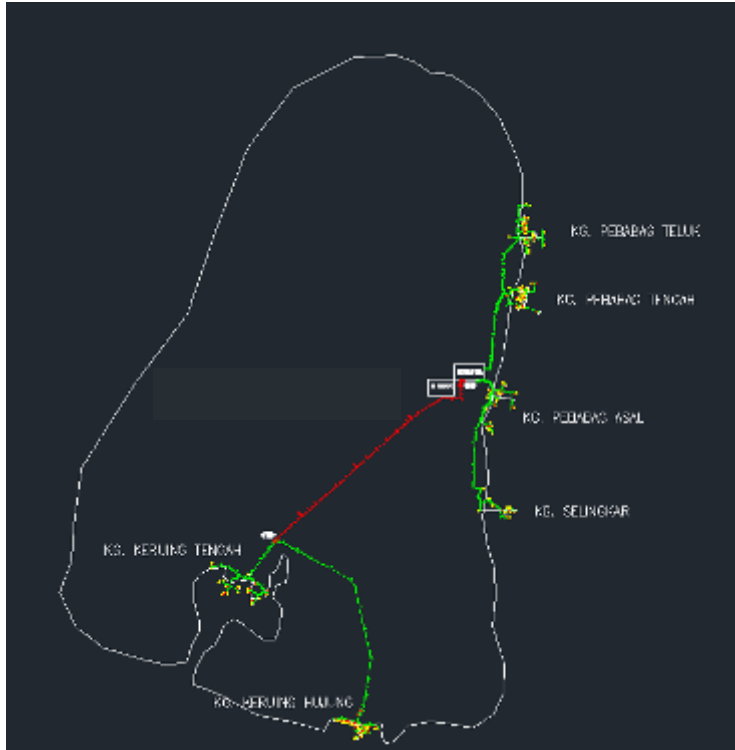
Source: IBC Solar AG

STEP **2** ENGINEERING & DESIGN



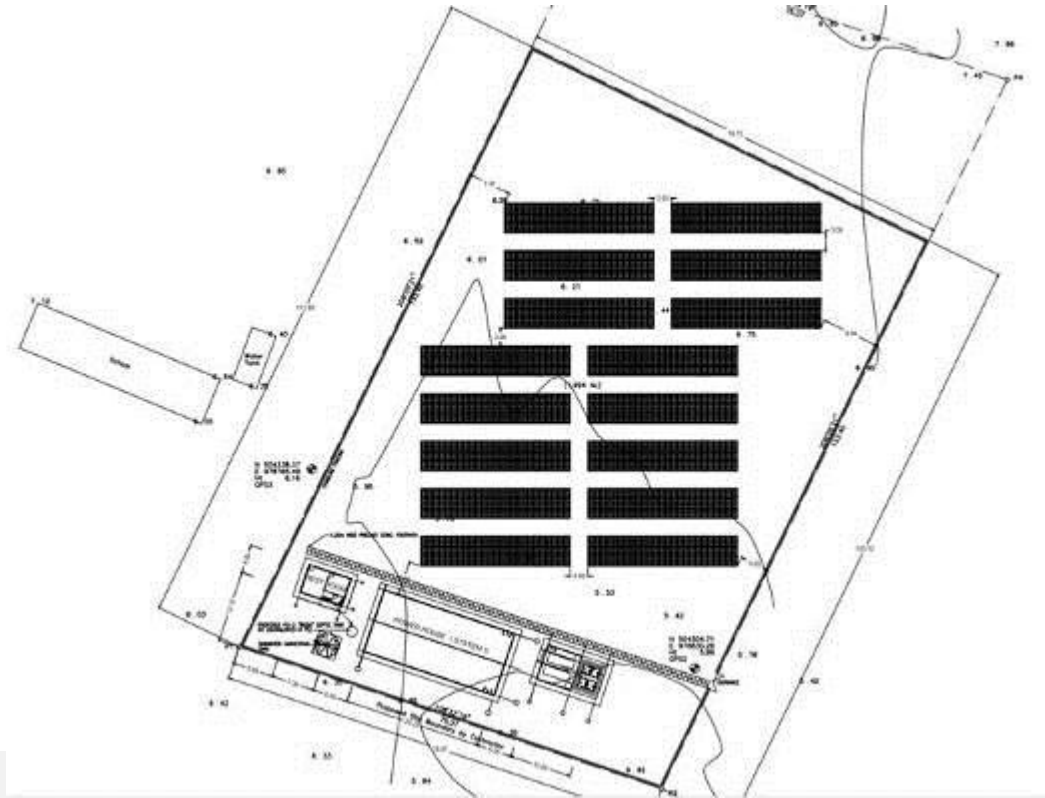
step **2** engineering & design

▣ Distribution map – 11kV



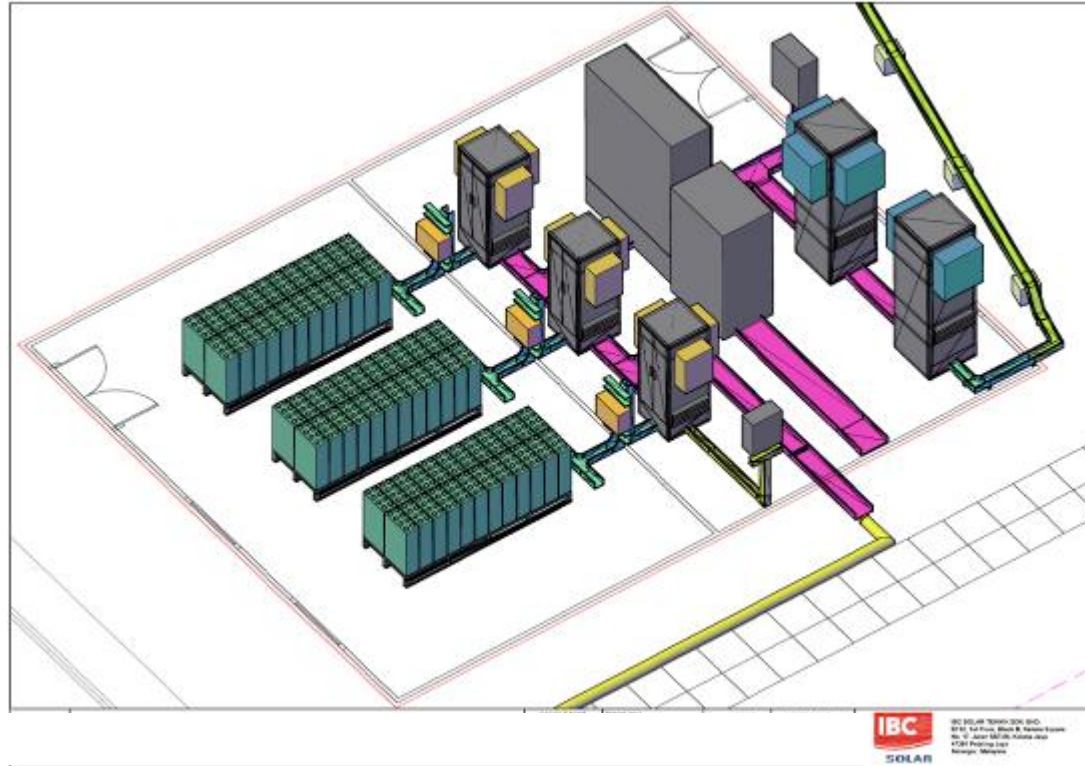
step 2 engineering & design

▣ Design of PV array



step **2** engineering & design

▣▣ Design of powerhouse



STEP **3** PROCUREMENT OF QUALITY PRODUCTS



step **3** - procurement of quality products

■ For each project – the right components

- Photovoltaic components

- > Module
- > Inverter
- > Charger
- > Battery
- > Cable & accessoires
- > Mounting systems



Source: IBC Solar AG

STEP 4 CONSTRUCTION & COMMISSIONING



step 4 - construction & commissioning

Implementation



Source: IBC Solar AG

step 4 - construction & commissioning

Implementation



Source: IBC Solar AG

step 4 - construction & commissioning

■ Malaysia - village power supply - 276kWp – 2 x 250KVA diesel – 1,2MWh batteries



Source: IBC Solar AG

step 4 - construction & commissioning

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Malaysia - village power supply - **276kWp** – 2 x 250KVA Diesel – 1,2MWh Batteries



Source: IBC Solar AG



step 4 - construction & commissioning

■ ■ Malaysia - village power supply - 276kWp – 2 x 250KVA Diesel – 1,2MWh batteries



Source: IBC Solar AG

step 4 - construction & commissioning



- PV-diesel-hybrid system - Malaysia
- Hybridsystem for small villages

- > Location: Malaysia
- > Commissioning: 2012-2013
- > Features / Application: Hybrid system
- > for energy supply of villages
- > Effective power: 276 kWp



Source: IBC Solar AG

STEP 5

TRAINING & MONITORING & MAINTENANCE



step 5 - training & monitoring & maintenance

On site training

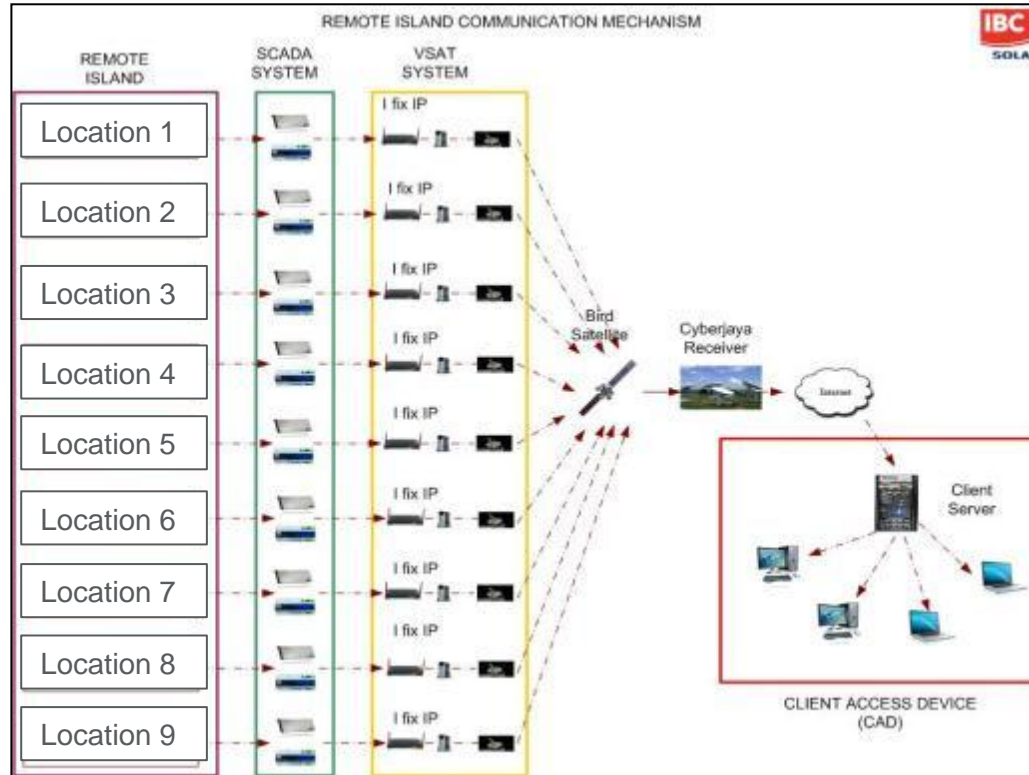


Source: IBC Solar AG



step 5 - training & monitoring & maintenance

Remote monitoring, operation & maintenance by locals

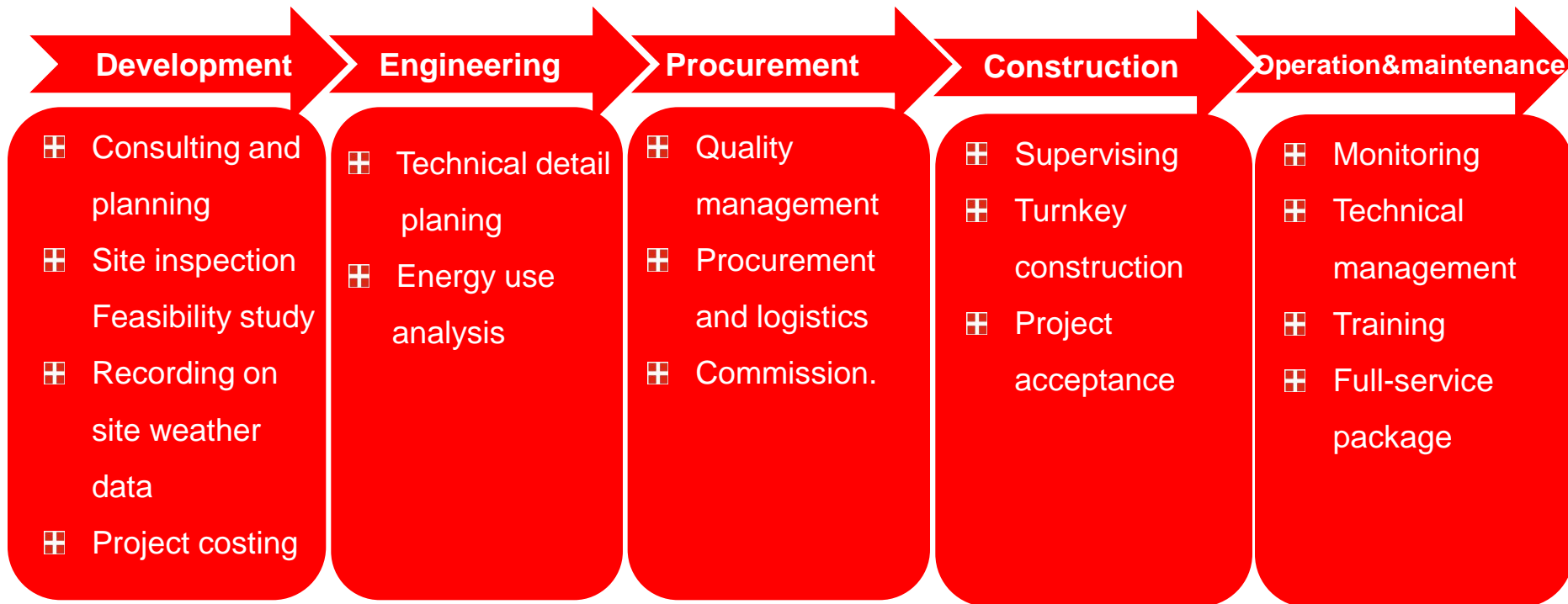


Source: IBC Solar AG

IBC Solar AG- hybrid power supply

- individual system design within **5** steps

Our capabilities: Planning and implementing off-grid projects



IBC SOLAR AG

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