

Kinetic Hydropower

a SMART approach towards
distributed generation



🐟 Kinetic hydropower is easy.

- Kinetic turbines create energy from flowing water.
- They do not require any head; this means infrastructure costs are minimized and systems can be installed even in remote areas at low costs.
- The energy output depends on the velocity of the stream and does vary with variations in the stream.



🐟 SMART's unique kinetic hydropower plant

Output

250 – 5000 W

Dimensions

Length: 3130 mm
Width: 1600 mm
Height: 2010 mm

Rotational
Speed

90 – 230 rpm

Weight

380 kg

Number of roter
blades

3

Rotor-Ø

1000 mm

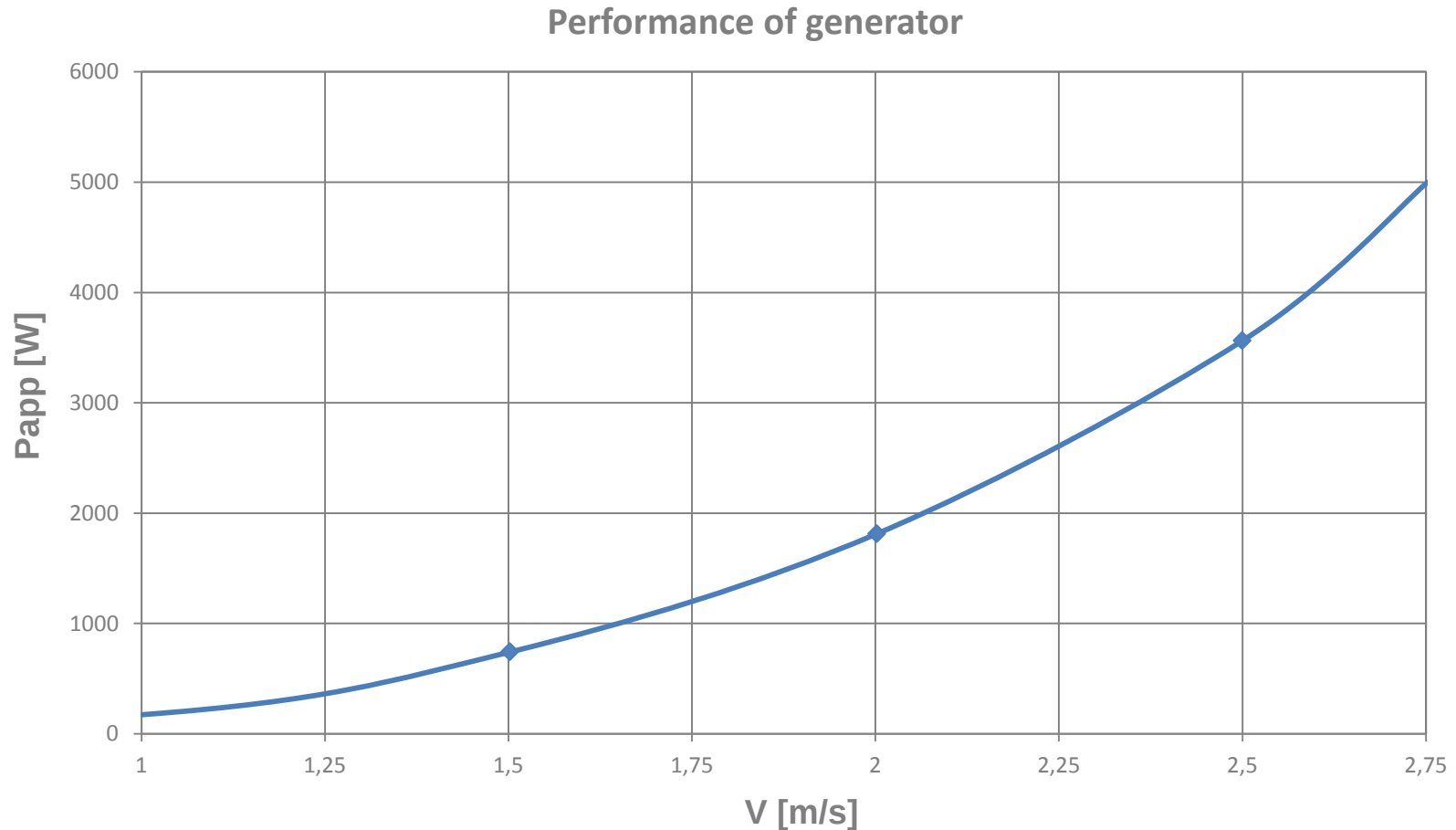


SMART HYDRO POWER

🐟 Easy to install, operate and maintain



🐟 Output per turbine depends on velocity



The power curve is tested in SVA * Potsdam. Results may vary in natural rivers & canals.
Curve was measured at the generator output.

* Schiffbau- Versuchsanstalt

🐟 Standard modules up to 25 kW per site

- Standardized module with turbine, PV-panels, diesel back up, installation material, batteries and electrical cabinet
- SMART micro grid with intelligent load management
- Larger installations require customized solutions

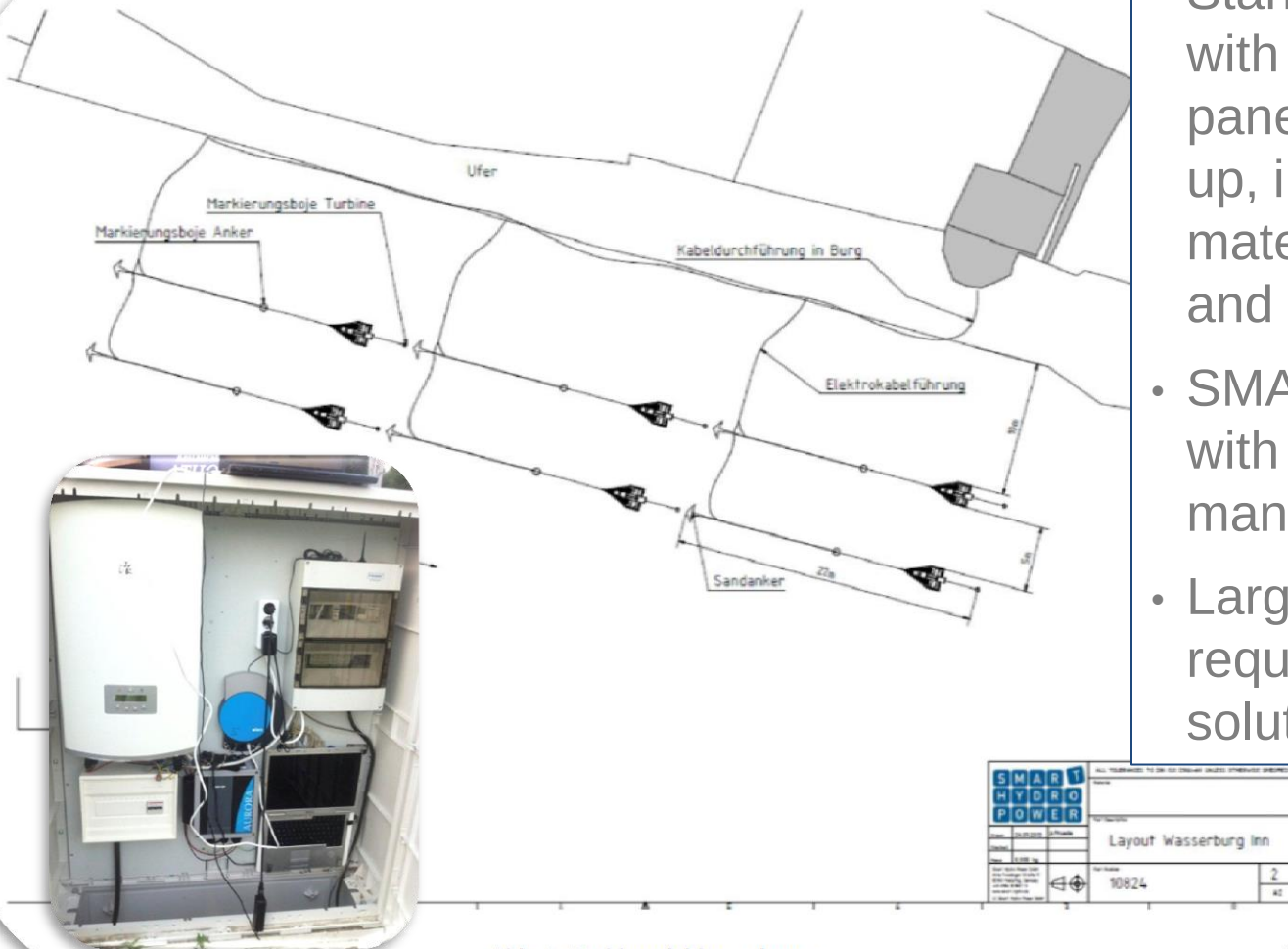


Abb. 5: Turbinenfeldanordnung

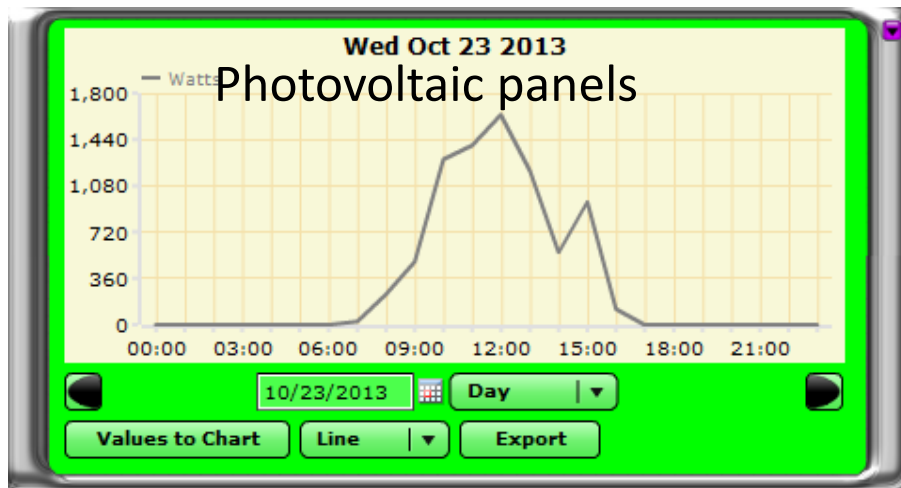
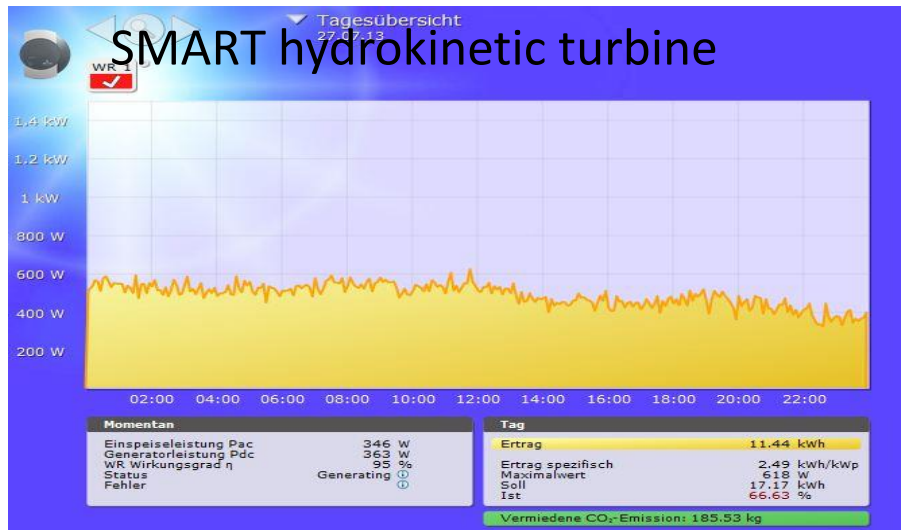
🐟 Hybrid plant: combine hydro, PV and diesel

Hydro – PV system (Colombia)

- Demand Profile: Daytime peak by workshop
- Minimization of battery bank compared with PV only system
- Diesel as back up in case batteries are low and no generation available
- System can work with different load profiles or as UPS system (uninterrupted power supply)



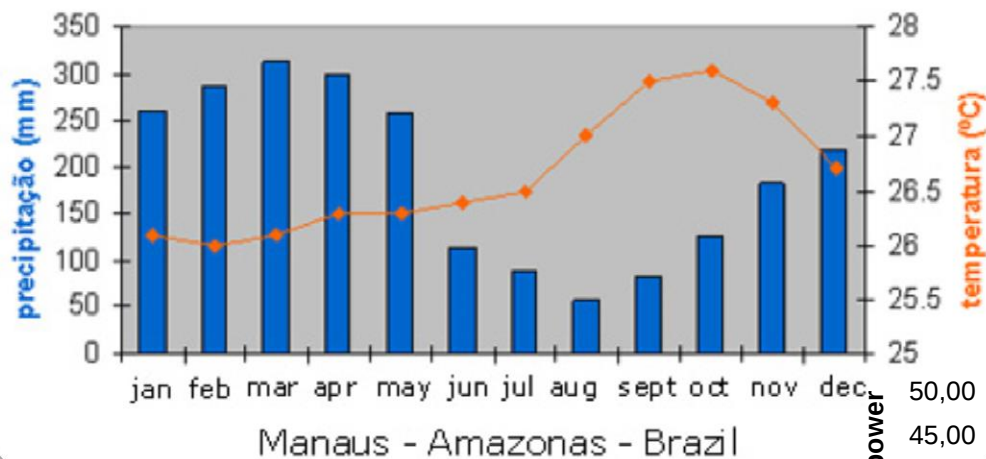
🐟 Hybrid plant meets rural demand curve



- Hydrokinetic turbine delivers base load for residential usage
- Photovoltaic available at peak working hours for workshop or agricultural activities
- Hybrid plant minimizes need for battery storage and required generation capacity

🐟 PV-hydro: Complementary during the year

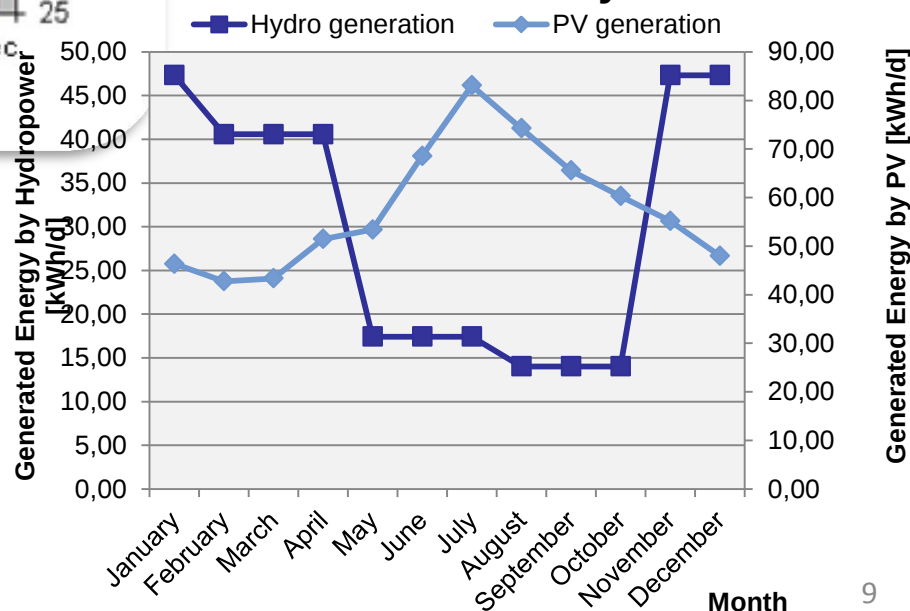
Temperature and Precipitation Chart (Yearly)



Rain and sun are «complementary» during the year

100% availability and baseload during the year

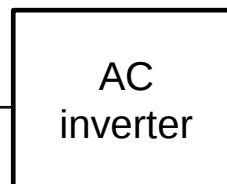
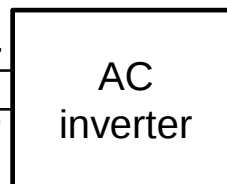
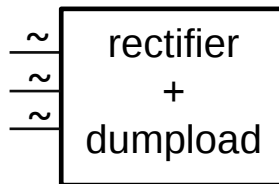
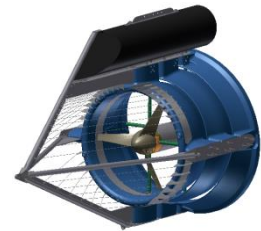
Generation PV and Hydro



🐟 Off grid system with three sources

Hybrid system:

- Turbine + PV
- Diesel Generator (or grid connected for UPS)
- 100 % availability



~ 220 V

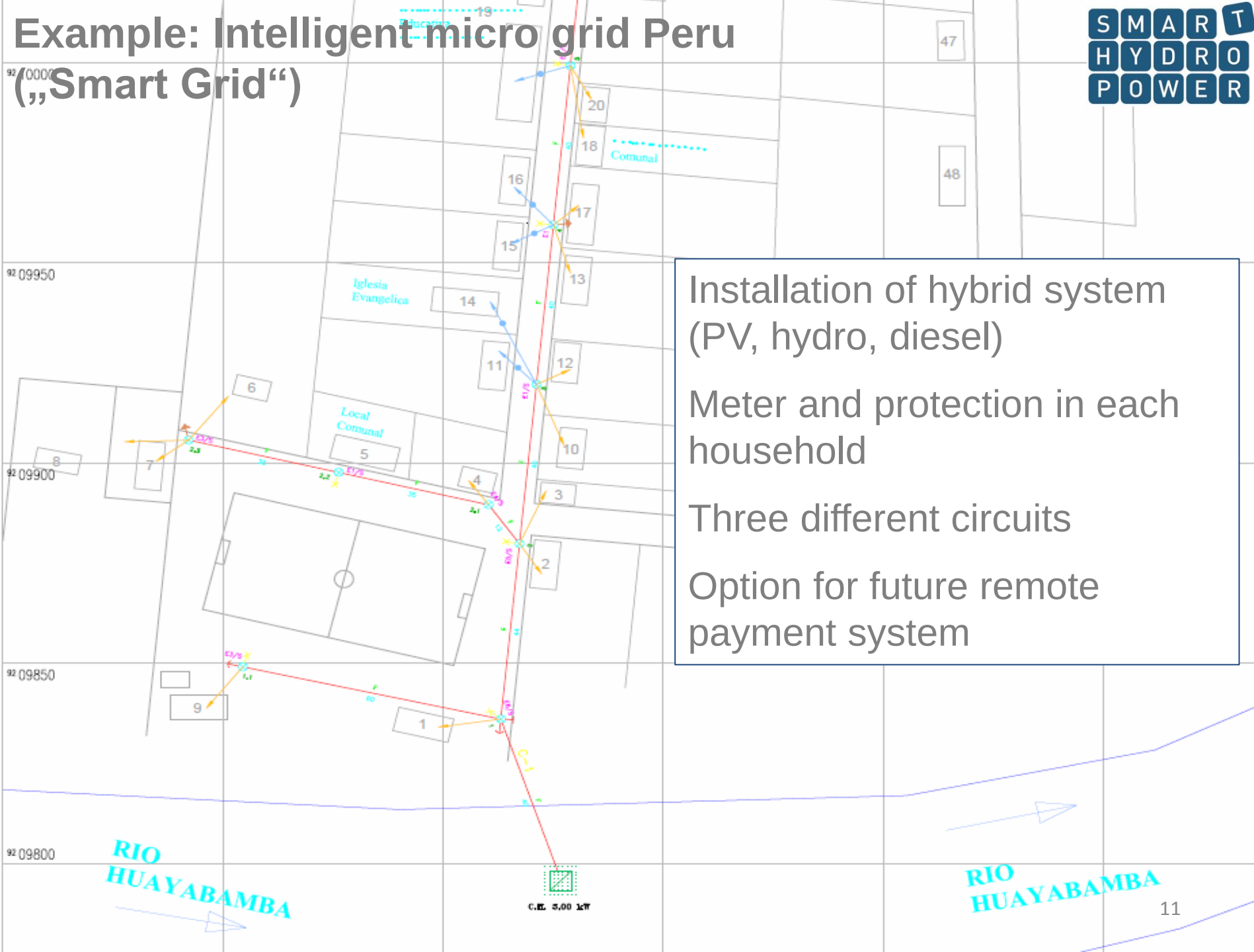


Loads



Example: Intelligent micro grid Peru

(„Smart Grid“)



Installation of hybrid system
(PV, hydro, diesel)

Meter and protection in each
household

Three different circuits

Option for future remote
payment system

🐟 Rural utilities: power, water & telecom

Applications

- Supply to telecommunication masts (incl. cell phone charging station and internet)
- Local businesses (agriculture, fishery)
- Rural electrification
- Water treatment
- Temporary Working camps



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The Company



Mission: Development, production and commercialization of affordable and environmentally-friendly kinetic micro hydropower systems.

- Founded in 2010,
- Based in Feldafing near Munich, Germany
- Promoted by the Bavarian Ministry for Commerce
- Recognized as one of the 10 most innovative German start up companies
- Internationally-renowned partners

Smart Hydro Power GmbH, Germany
Smart Hydro Power (Nig.) Ltd., Abuja



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