RE2SC

Renewable Energy to (2) Smart City

Integration of Solar Rooftops in Smart Cities Environment

Venue: The Capitol Hotel
Raj Bhavan Road,
Bangalore – 560 001

Date: 14th February 2017

iPLON®
The Infranet Company

On the path to Post Carbon Economy

Smart Solar Plants: Integrated in Smart Cities Environment

Tuesday, February 14, 2017	
09:30 - 10:00	Registration
10:00 - 10:15	Welcome address, Overview of Presentations Mr. Victor Thamburaj, CEO, iPLON GmbH
10:15 - 10:45	Germany commitment to Climate change and Smart Cities in India Ms. Andrea Christ, Deputy Consul General, Consulate General of the Federal Republic of Germany, Bengaluru
10:45 - 11:15	Smart grid solutions in Schwaebisch Hall / Germany as part of Smart city Mr. Abhijit : International sales iPLON Germany / Director iPLON India
11:15 - 11:45	Coffee break & Networking
11:45 - 12:15	Demo: Solar Rooftop Monitoring System for better O&M through Data Analytics in smart city environment Mr. Krishna, O&M Vice President, iPLON India Private Ltd.
12:15 - 12:45	iPLON's products for the Indian Market and experience of commissioning 1 GW+ projects Mr. Victor Thamburaj, CEO, iPLON GmbH
12:45 - 13:15	Smart Grid trend in India (KA): Typical Tenders, Requirements and Strategy Mr. Gowrishankar Ramanan, Business Development Lead, iPLON India Private Ltd.
13:15 - 14:00	Lunch
14:00 - 14:30	Demo: Solar Utility scale Monitoring System for better O&M through Data Analytics Lessons learnt from 1GW plants in India Mr. Krishna, O&M Vice President, iPLON India Private Ltd.
14:30 - 15:00	Grid Stability, Forecasting, SLDC for Utility scale plants Mr. Gowrishankar Ramanan, Business Development Lead, iPLON India Private Ltd.
15:00 - 15:30	Stadtwerke Gandhigram: A model for a Smart University Mr. Abhijit : International sales iPLON Germany / Director iPLON India - Renewable Energy - Water Management - Waste Management - E-Mobility - Air Conditioning Systems
15:30 - 16:00	Best practices: Solar Cluster and smart grid association Germany Mr. Victor Thamburaj, CEO, iPLON GmbH
16:00	Announcement of next Workshop and Closing with Tea Mr. Gowrishankar Ramanan, Business Development Lead, iPLON India Private Ltd.


stadtwerke
Schwäbisch Hall GmbH


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SchwäbischHall


iPLON®
India Pvt Ltd.,


M+
SOLAR


GANDHIGRAM RURAL INSTITUTE DEEMED UNIVERSITY


Solarstromanlagen
Würtemberger GmbH


WELSPUN


BayWa r.e.
renewable energy


eFüßle

Smart City Schwäbisch Hall

Victor Thamburaj, CEO, iPLON GmbH

Abhijit Singh Sachdeva, International Sales

iPLON Germany / Director iPLON India

3 Things

- Smart City Schwaebisch Hall
- Stadtwerke: The heart of any Smart City
- In India: The next big wave !

SchwäbischHall

SchwäbischHall

KFW DEG

The European Energy Award® is a programme for planning and implementing energy and climate protection policy goals and measures in municipalities.

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SMART CITY DEFINITION (EU)

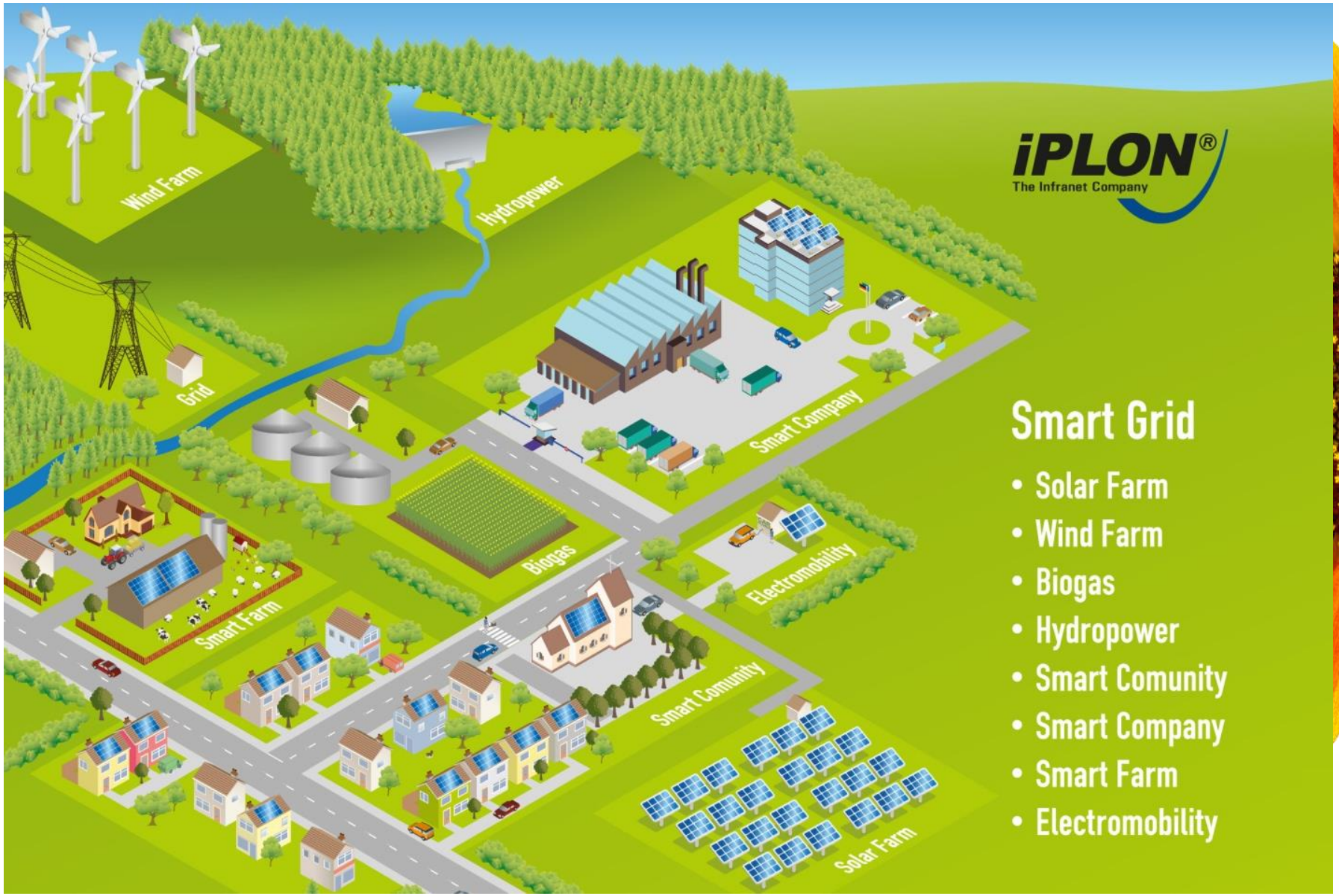
ENVIRONMENT	Reduction of CO2 emissions; Use of renewable energy sources, monitoring on energy consumptions
LIVING	Co-working, Cultural initiatives, Living-Lab, crowdsourcing co-design
MOBILITY	Development of technologies to improve urban mobility, low envoronmental impact
GOVERNANCE	Starting of processes for the involvment of citizens about topics of public rilevance
ECONOMY	Cooperation among public and private actors, developmento of social incubators and of small and medium enterprises
PEOPLE	Sharing of data, security and protection of sources, networking and comunication

Basic Utilities is a municipal task

- Secure access to basic public services such as water, energy, cooling and heating as well as waste water treatment are pre-requisites for normal living standards
- Responsibility rests with the Local Community to ensure these basics for the people of the community
- Hence, this is a local task and can be best managed locally

“Stadtwerke” as a municipal company

- The municipally-owned Utility company “Stadtwerke” is an important body to guarantee these public provisions
- The local community has a direct influence on the profitability, the objective and efficiency of the local energy supply
- Coordination is handled locally (people know which door to knock to solve their problems)
- Value remains regional !!


iPLON®
The Infranet Company
Wind Farm
Hydropower
Grid
Smart Company
Biogas
Electromobility
Smart Farm
Smart Comunity
Solar Farm
Smart Grid
• Solar Farm
• Wind Farm
• Biogas
• Hydropower
• Smart Comunity
• Smart Company
• Smart Farm
• Electromobility

stadtwerke
Schwäbisch Hall GmbH

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KFW DEG

Stadtwerke info

electricity
350 GWh/a

natural gas
1.458 Mio. kWh/a Handel

water
2.7 Million m3/a

thermal energy
130 GWh/a

indoor/outdoor
swimming 700.000
people in 2015

parking for
2000 cars

Stadtwerke Schwäbisch Hall GmbH

ca. 500 Mitarbeiter, davon
16 Auszubildende
262 Mio. € Umsatz

260 Mio. € turnover
more than 6 Mio.€ profit/a

Energiedienstleistungen:
Contracting
Sherpa: ca. 600.000 Kunden
Zählerfernauslesung und EDM
Prozessführung von
technischen Anlagen

Facility-Management
224 Stationen
18.900 Datenpunkte

Kraftwerke:
48 BHKW-Module
1 GuD-Kraftwerk
6 Biomasse-KWK-Anlagen
3 Holzheizwerke
6 Wasserkraftwerke
2 Windkraftanlagen

126 Mio. kWh/a Strom
aus Eigenerzeugung

RE Energy

PV Power Plant	53.1	MW
Hydro Power:	2.5	MW
Windpower:	27.8	MW
Biowaste:	27,0	MW

Power plants Grid Schwäbisch Hall (renewable Energy 100 MW (>100 %)

emergency power system (EPS): a total of 7 MW

combined heat and power (CHP): a total of 21 MW

wind power: a total of 28 MW

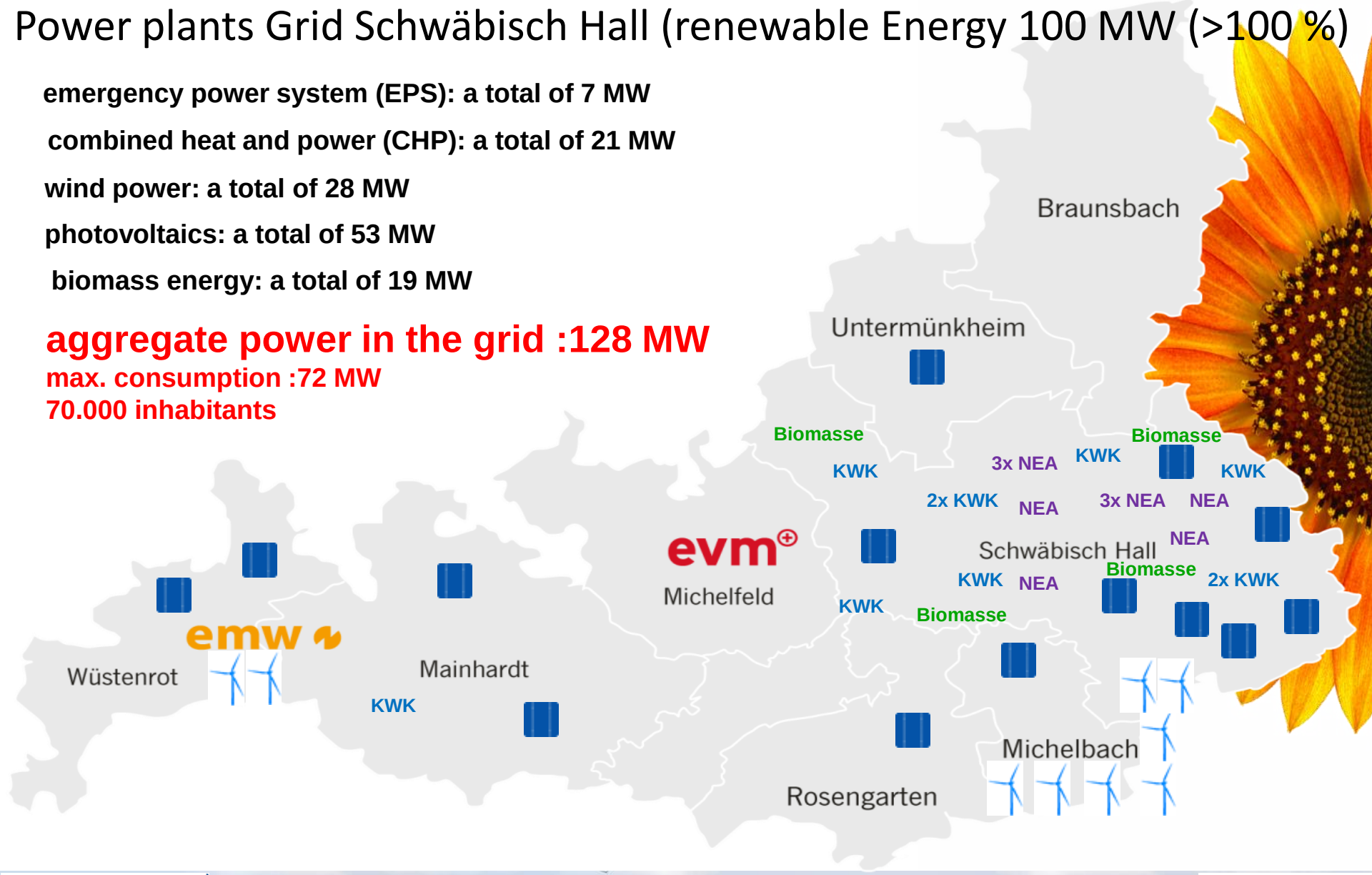
photovoltaics: a total of 53 MW

biomass energy: a total of 19 MW

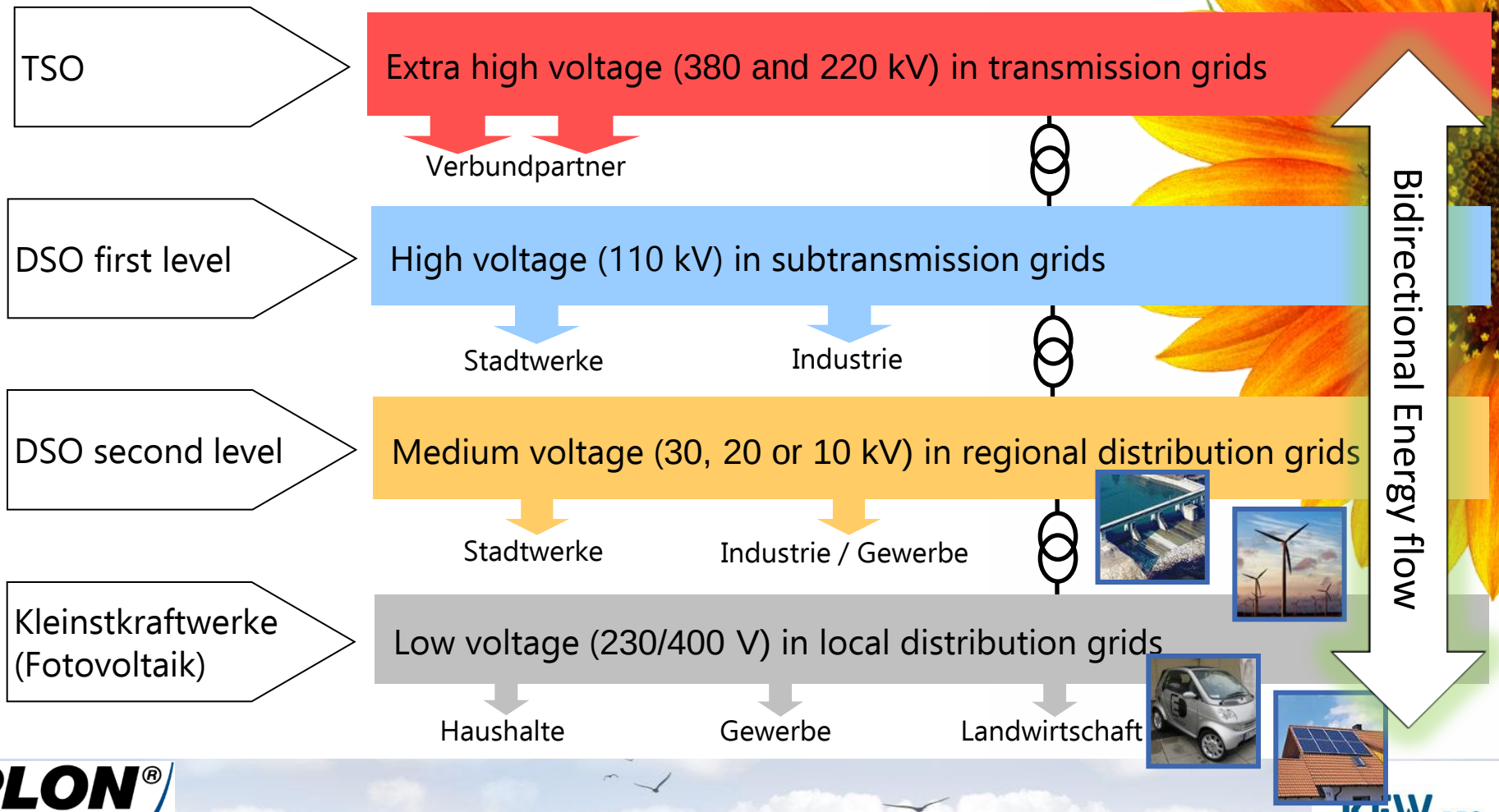
aggregate power in the grid :128 MW

max. consumption :72 MW

70.000 inhabitants



Energy flow between different voltage levels with renewables



PV generation

Bio-mass generation

Wind energy generation

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Captive Power

Micro Hydro generation

Energy Storage

Scalable battery system

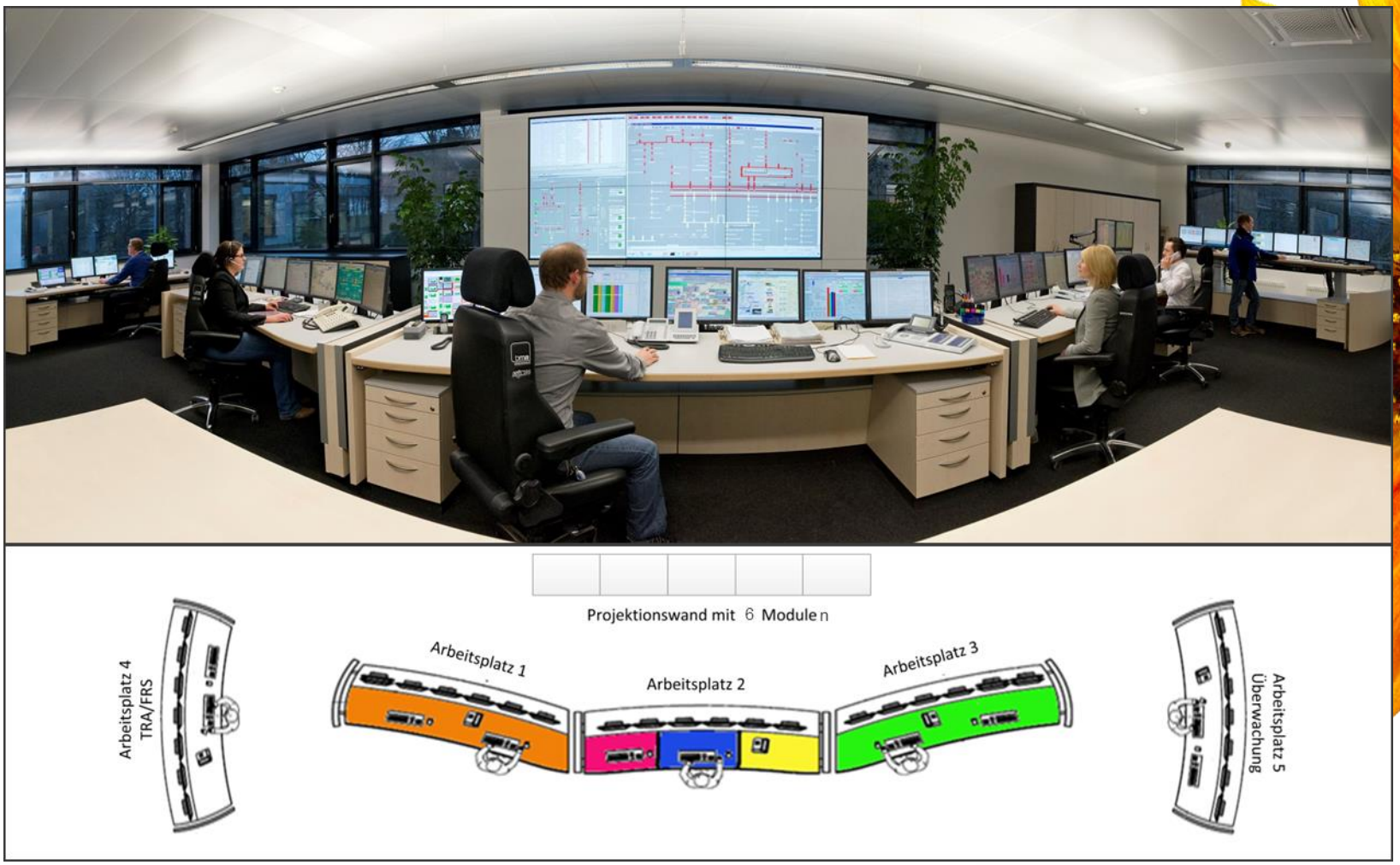
- Voltages can be determined from the number of series-connected modules

E-mobility

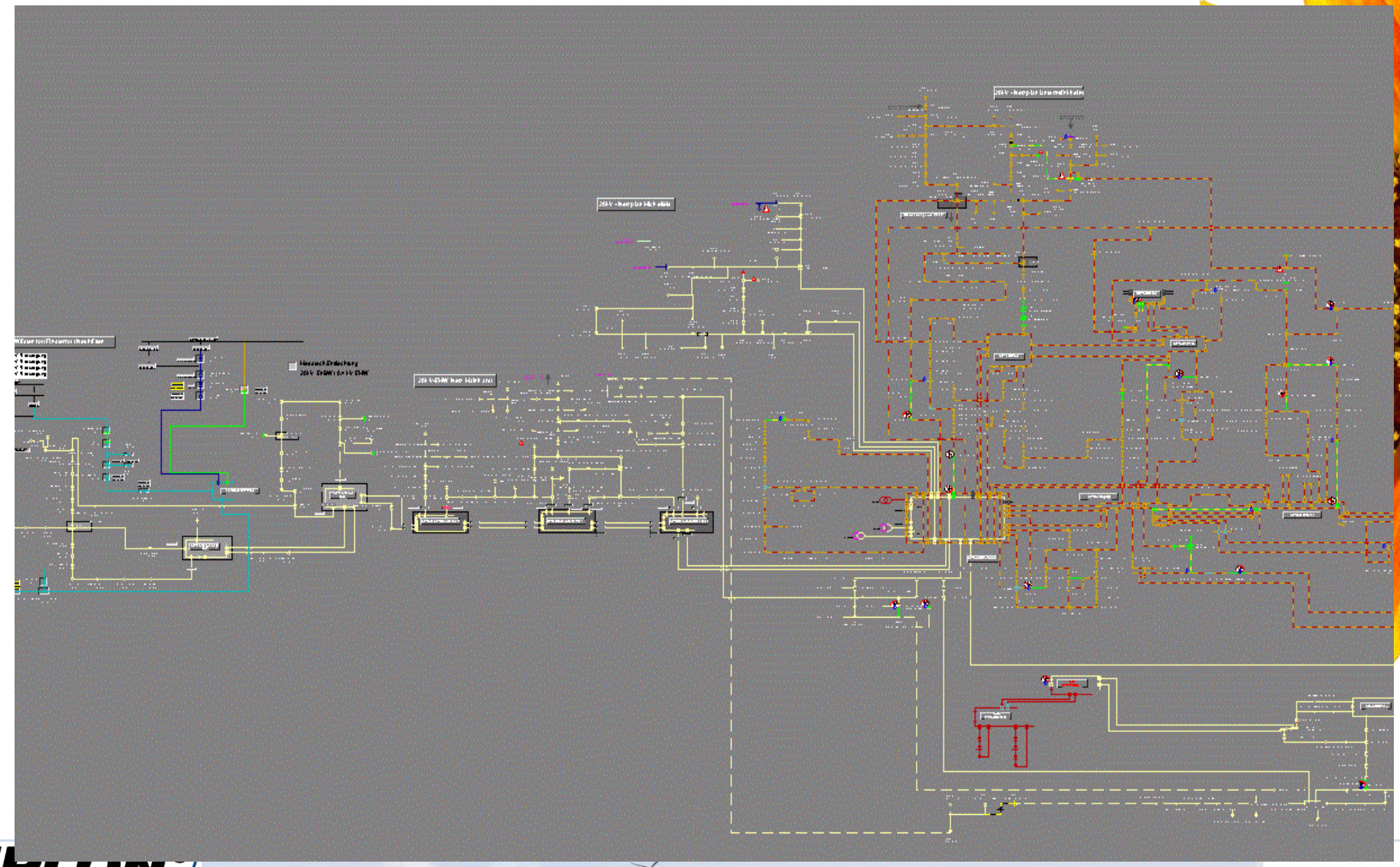
Smart city

CHP with Hot Water storage

Multi utility control room at Stadtwerke Schwäbisch Hall

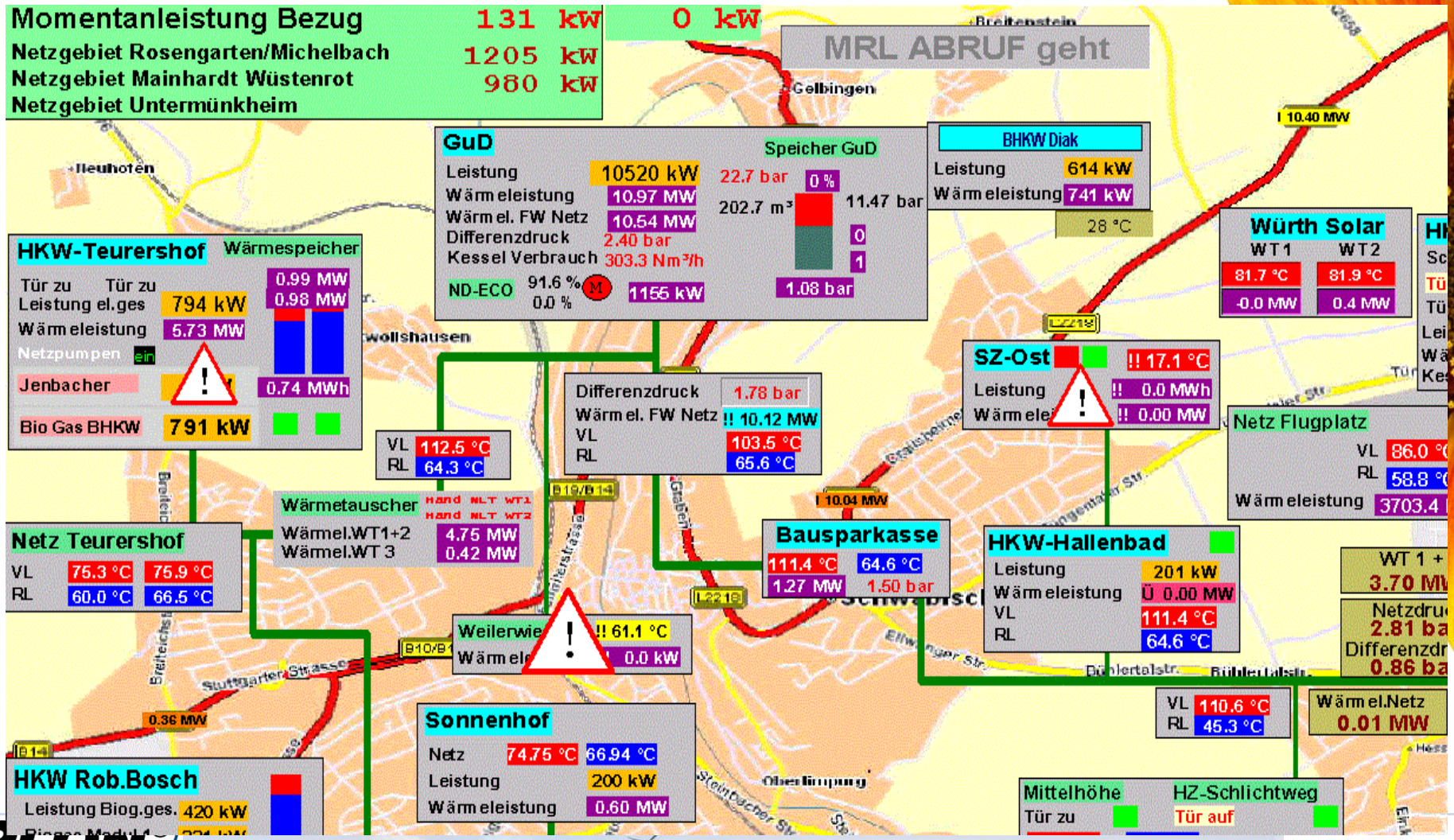


Electrical Grid



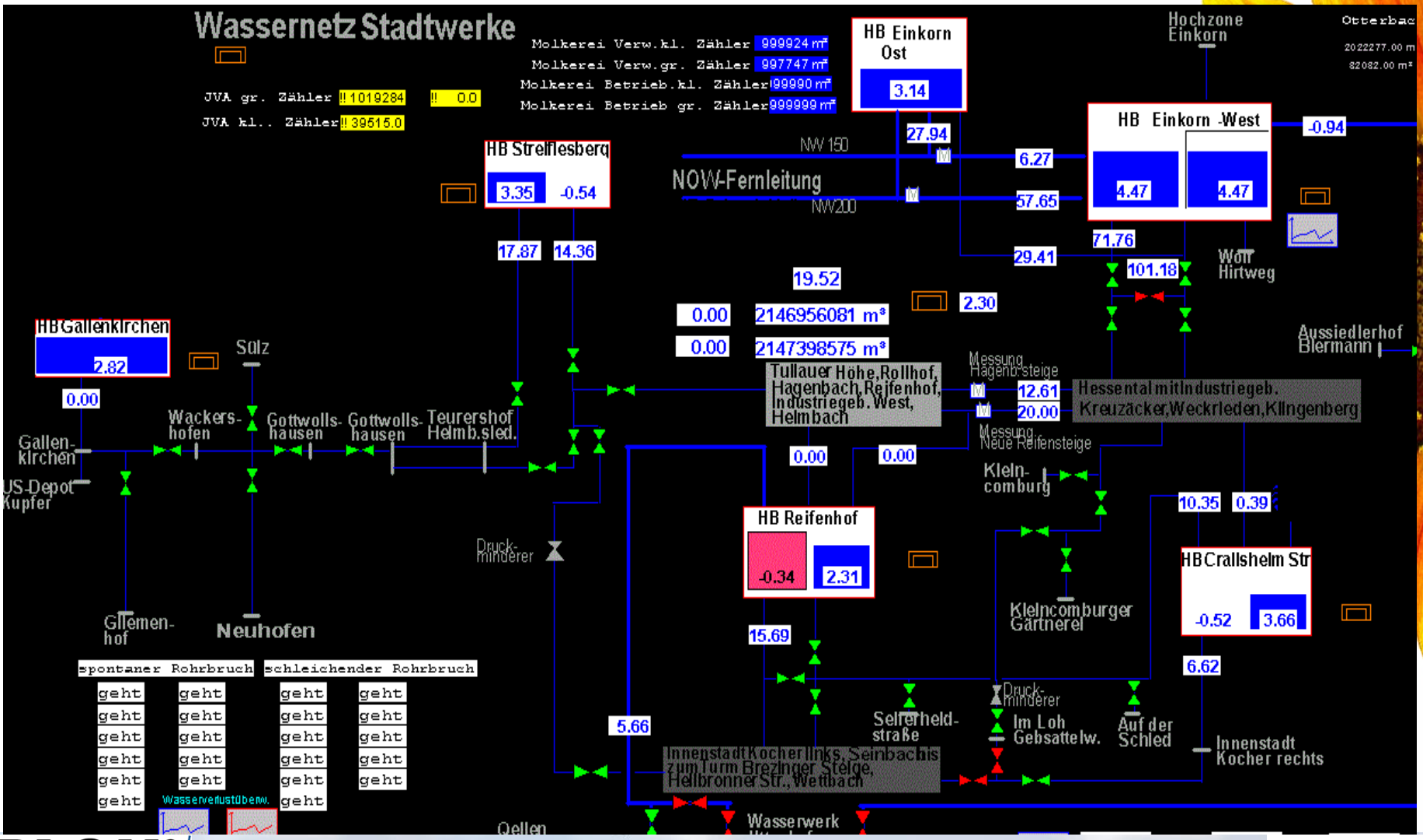
Heat grid

The distance is about 15000 m, a hospital and big buildings are connected to the grid (cooling and heating), cooling with adsorption in the facilities



Grid with water storage; water grid control;

Chlorine dioxide management



Smart Parking

Swimming pool, Sauna: Temperature management

Smart grid – the future of grids

- phase shifter
- adjustable transformers
- batteries
- integration of electric cars
- photovoltaic power plants
- smart meters
- windparks

- grids as „ living“ cells
- we need a cell manager
- we all need companys like

Service customers department Grid Control Engineering

1 Ahrtahlwerke
2 Energieversorgung Mainhardt/Wüstenrot
3 Stadtwerke Olching
4 Energieversorgung Ottobrunn
5 Stadtwerke Bretten
6 Stadtwerke Buchen
7 Stadtwerke Eberbach
8 Stadtwerke Eutin
9 Stadtwerke Heidenheim
10 Stadtwerke Magstadt
11 Stadtwerke Mühlacker
12 Stadtwerke Murrhardt
13 Stadtwerke Neustadt in Holstein
14 Energie-Rhein-Sieg
15 Stadtwerke Schwäbisch Hall
16 Stadtwerke Sindelfingen
17 Gemeindewerke Stockelsdorf
18 Vereinigte Stadtwerke Netz
19 Stadtwerke Oldenburg in Holstein
20 Energieversorgung Michelfeld

“India”

- Provision of Basic Utilities to people is the Next big Wave
  - Huge demand : (850 Million under the age of 35)
  - Energy, water, mobility, waste management and climate (Cooling) needed
  - (Stadtwerke-focus and deliverables)
- Smart city (Smarter village), RE, PV, Smart grid, Micro grid, Storage, e-mobility
  - Market for Stadtwerkes in India
  - India : 100 smart city : germany 1000 Stadtwerke (350000 jobs in TN)
- Focus on one region (Tamil Nadu, Chennai, Coimbatore, Gandhigram)
  - Dezentral: small is beautiful!
- SME-Netzwerk BW-TN makes sense !!!
  - Platform/Framework : SME in Chennai/ Tamil Nadu (re2tn.org)
- Implementation / activities
  - 2016/2017
  - Workshop Chennai / Solar Cluster in TN / Intersolar 2017 (Munich)
  - Visit 15 member team Chennai/Gandhigram to Smart City Schwaebish hall

Why Stadtwerke (The Indian Context)?

- The best Surfboard for the Next Big Wave!
- Because it supports creation of high quality rural jobs
- Makes use of clean and renewable energy (Grid stability issues)
- Leads to Smart Cities but Smarter VILLAGES
- Basic utilities for all (Energy and Water)
- Focusses on Decentralization leading to transparency and independence
- It is the Future of Utilities Management
- Peak Oil; Climate Change

Gandhigram Rural Institute

Mission: Providing knowledge support to rural sector to usher in a self-reliant, self-sufficient and self-governed society

- The place fondly named ‘Gandhigram’ was inaugurated by Mahatma Gandhi on 7th October 1947
- Devoted followers of Mahatma Gandhi founded the Gandhigram Rural Institute in 1956
- Built on 207 acres of land, mostly donated by the villagers with the hope that their children will get education and employment
- 3500 students today, 85% from the Rural background
- University focussed on rural higher education programmes
- Funded by the Ministry of Human Resource Development, Government of India

Rural Energy Center

To establish a model "energy village" with renewable energy & energy conservation technologies

- Set-up in 1998
- Runs a 2-year M.Tech RE course
- Renewable Energy Planning for Villages
- KW scale rooftop off-grid plants
- Energy Auditing
- Renewable Energy Lab

- 20 students in each year
- 7 of them working at iPLON

SmartGridsBW
Energien intelligent vernetzen.

Solar Cluster Baden-Württemberg

Platform / Framework
BW –TN Network

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KFW DEG

SOLAR CLUSTER BW

Network of around 40 Baden-Württemberg companies and research facilities from all parts of the solar value chain

Research & Development

Politik & Society

Poer Supply &
Network operators

Industry & Trade

Solar Cluster Baden-Württemberg

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KFW DEG

Fit for „India-BW“ Netzwerk re2tn

SchwäbischHall

stadtwerke Schwäbisch Hall GmbH

Solar Cluster Baden-Württemberg

bw-i Baden-Württemberg International

Lufft a passion for precision

KACO new energy.

Solarstromanlagen Württemberger GmbH

ESTEC Embedded System Technology

Mounting systems for solar technology K2 systems

EnWi GmbH & Co KG Leistung für Zukunft

next solar make it happen.

VR Bank Schwäbisch Hall-Crailsheim eG

DCS

KUEHNE+NAGEL

KUHN water experts – world wide

Easy Smart Grid

manz passion for efficiency

??????

iPLON® The Infranet Company

KFW DEG

R&D Development

Training

Project Developer/ Engineering

EPC/ Plant Constructors

Assembly Equipment

Assembly Systems

Mounting systems for solar technology

System Solutions

Inverter

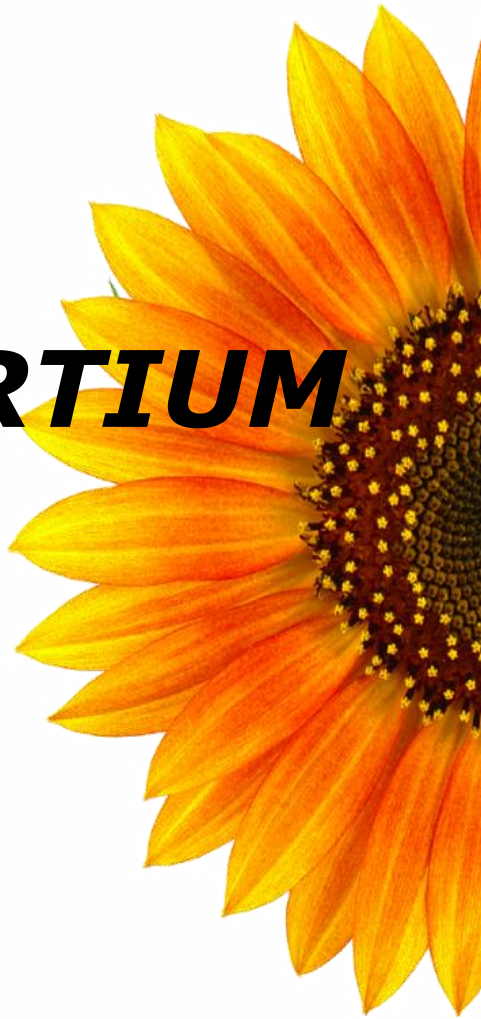
Grid Transformer

Battery/ Storage

Monitoring/ O&M

Associations

SMART GRID CONSORTIUM - BW



SmartGridsBW
Energien intelligent vernetzen.

iPLON®
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KFW DEG

- Smart City
- Associations
- TSO Transfer/ Network Operators
- Multi Utility Companies
- Smart Grid
- Universities
- R&D

Flughafen Stuttgart · IHK Industrie- und Handelskammer Karlsruhe · IHK Region Stuttgart · STADTMANNHEIM

SchwäbischHall

Solar Cluster Baden-Württemberg · Steinbeis Transferzentren · ZSW

terranets bw · TRANSNET BW

MVV Energie · Netze BW · SWE Stadtwerke Esslingen · Stadtwerke Schorndorf

stadtwerke Schwäbisch Hall GmbH

BOSCH Invented for life · bridging IT · FICHTNER · HORIX Powermanagement · ids · ING 3E Energie Effizienz Erneuerbar · VENIOS Uniting IT and Energy

iPLON The Infranet Company

h_da Hochschule Darmstadt University of Applied Sciences · Hochschule Offenburg University of Applied Sciences · Universität Stuttgart · KIT Karlsruher Institut für Technologie

FZI · Fraunhofer IAO · Fraunhofer ISE

iPLON The Infranet Company

SmartGridsBW KEW Energien intelligent vernetzen.

Utility Companies

Town Schwabish Hall

Baden Wurttemberg

Smart Grid Baden Wurttemberg

Thank you

iPLON - Products

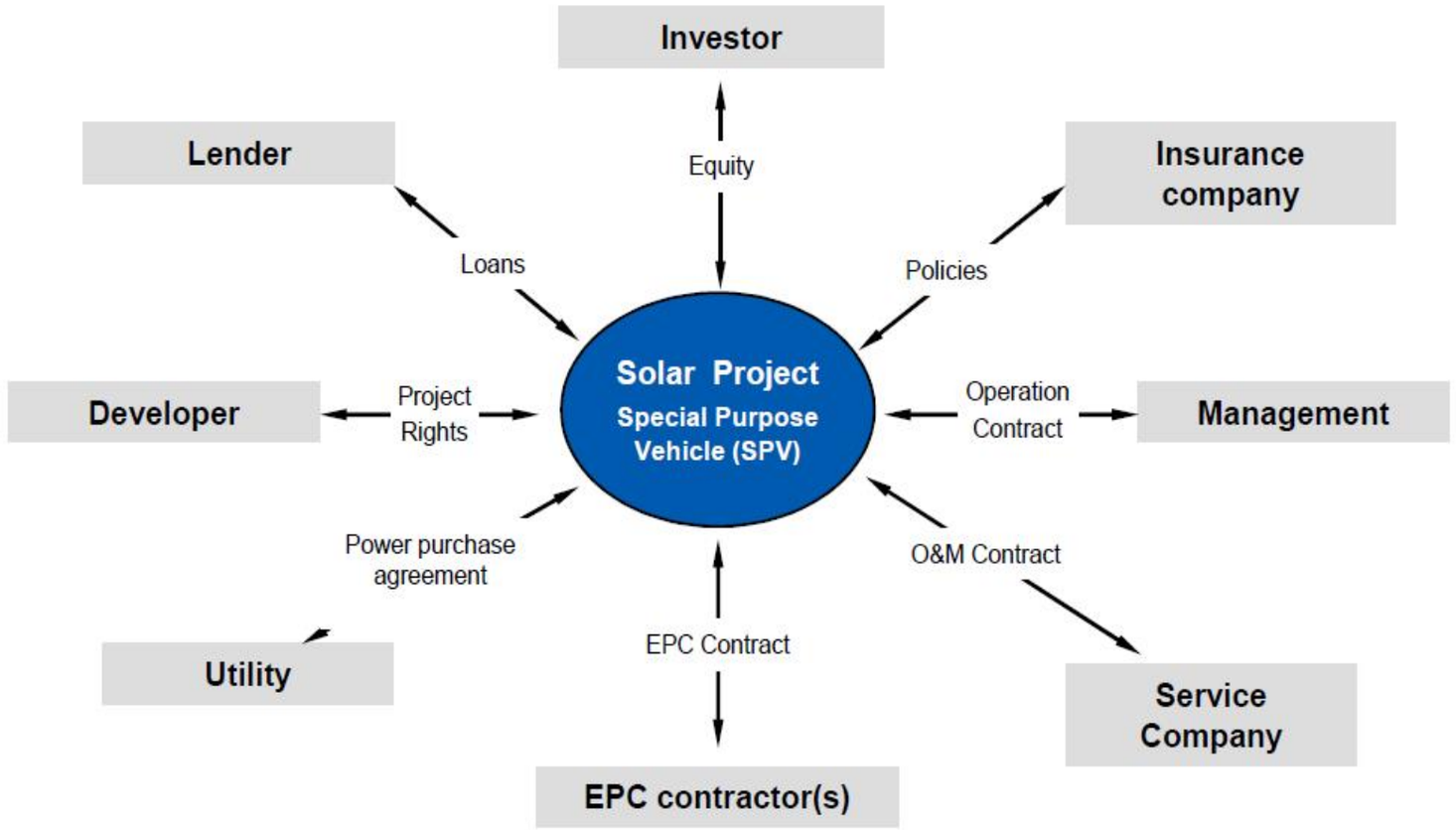
2017

Overview

- Cloud based Internet Portal
- Android , smartphone apps
- SCADA systems (local and remote)
- Hardware
  - iGate
  - iBOX (Value, standard,Premium)
  - Wetherstation (value , standard , Premium)
  - Magic Box (value , Standard , Premium)
- M2M connectivity
  - DSL
  - GPRS
  - Vodphone SIM card

FICHTNER

PV Due Diligence Services – Typical Project Structure



Objectives:

- Implementation of a **long life** power plants with **high energy** yield and **availability**
- **Proper and safe operation** complying with the relevant requirements
- Low cost, high **return on investment**

Operation & Maintenance is Our Passion and Core Business

iPLON Germany

Project Developer

iPLON India

INTERNET CLOUD

EPC

Panel Cleaning

Weather Monitoring Station

String Monitoring Units

Inverter & LT Panel

Transformer & HT Switchgear

Control Room, SCADA, CRP,HT Panels, Auxiliary Power

Perimeter Security

Abstract model of power plant

Stakeholders

Monitoring (Scada)

O&M System

Control System

Presentation of Data

Solar Business logic

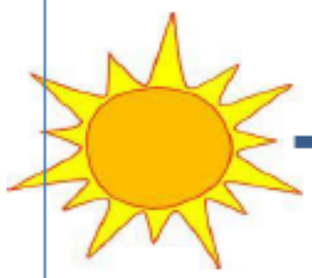
Data Communication View

Process View

Energy flow diagram in one inverter room

Daily	Weekly	Monthly	Yearly

Total Solar Energy
(IX_TSE)



PV Modules
IX_TDCE

SMU
IX_SMU XX_ TDCE

SMU 1
.
.
.
SMU 10

SMU 11
.
.
.
SMU 10

IX_TDCE

Inverter

Inverter 1

Inverter 2

IX_OACE

Transformer

BXX_ACEE
BXX_ACEI
BXX_AXE

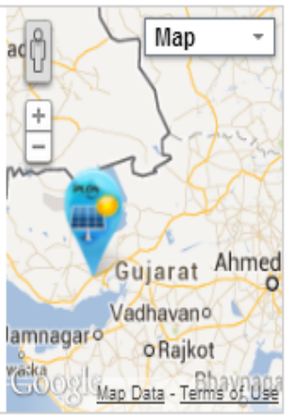
Energy Meter

- Alarm
- ANJAR
  - Overview
  - System View
  - Management
  - Documentation
  - Inverter Room A1
  - Inverter Room A2
  - Inverter Room A3
  - Inverter Room A4
  - Inverter Room A5
- Charanka
- Phagi-RREC
- Sivaganga
- L&T Campus
- iPLON Soiling Loss
- Neemuch
- Administration
- RREC Overview
- Charanka Overview
- RREC Weather Station
- Charanka Weather Station
- RREC Energy Meters
- RREC Plant View
- Charanka Screen
- Welspun Screen

Plant Overview

Plant Information

Installed Capacity	5013 kWp
Latitude	23.112
Longitude	70.023
Location	Anjar,Gujarat
Date Of Commissioning	27-Jan-2012
Total Energy Generation	12943.82 MWh



Clock

19, Jun 2013
(GMT+05:30) Chennai, Kolkata, Mumbai, New Delhi

Performance

Today Yield 2.5 MWh

June 441.12 MWh

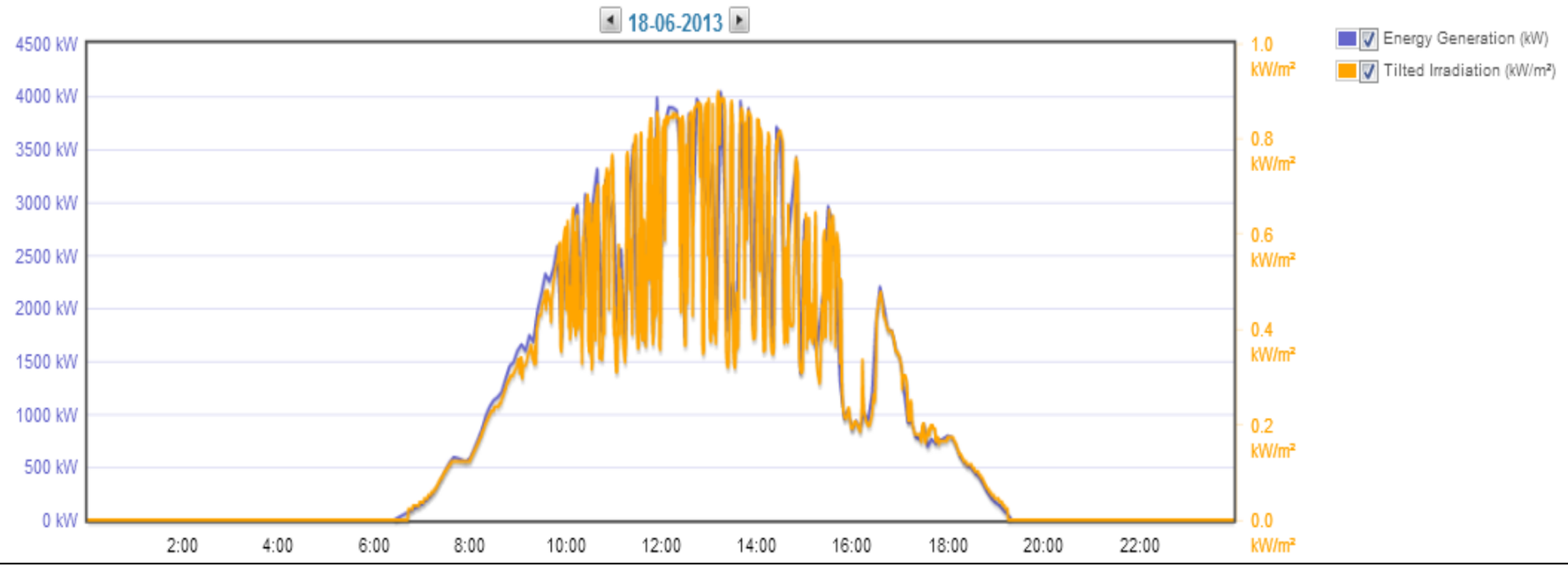
Environmental

Tilted Irrad
0.58 kW/m²

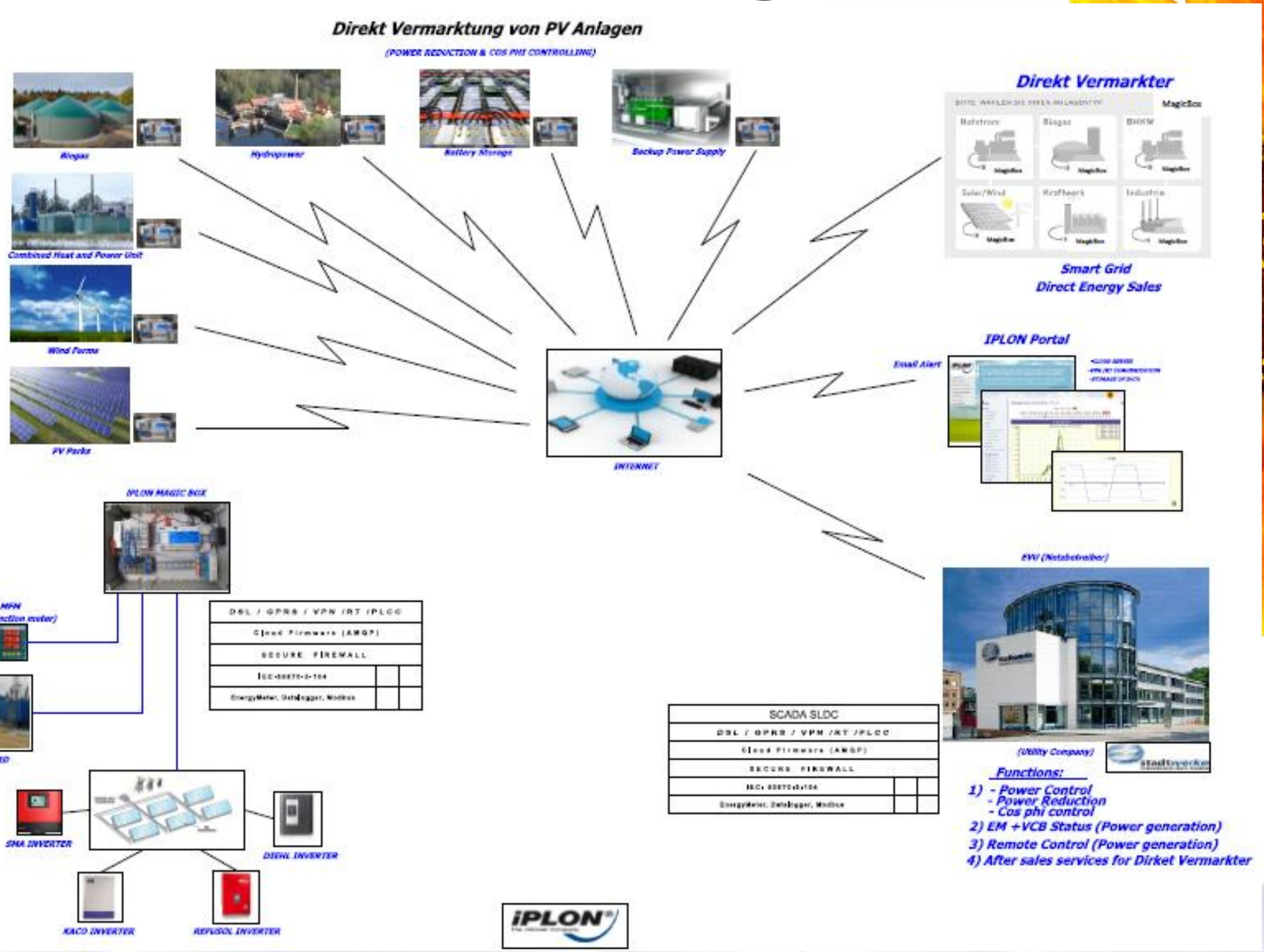
Savings
6860.22 Kgs

Energy Generation

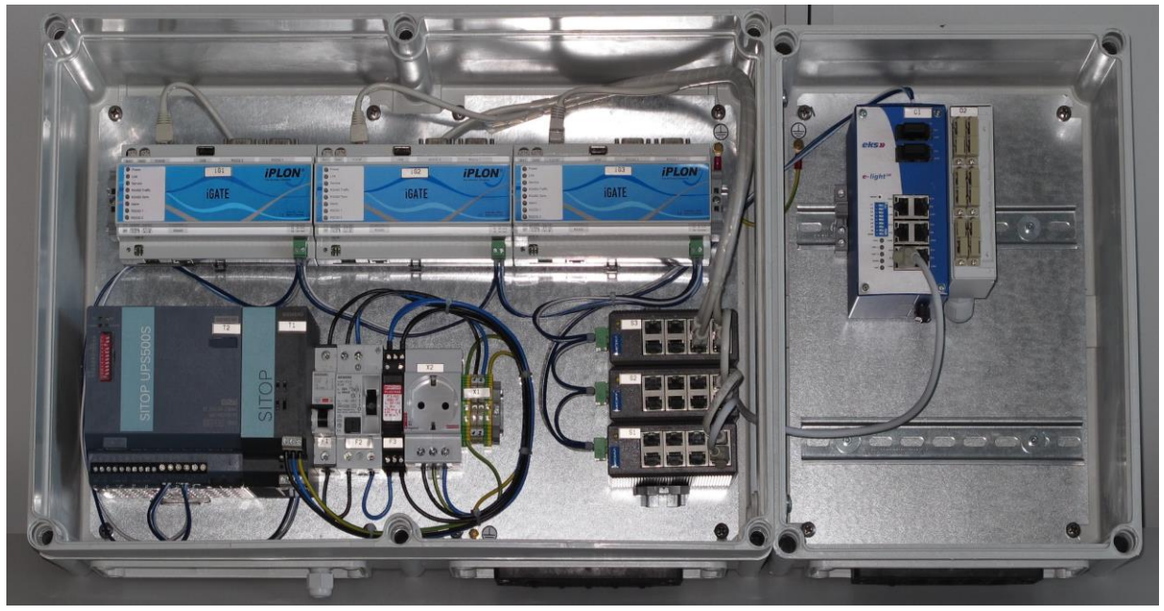
Day | Week | Month | Year



iPLON – “Magic Box”



Main Room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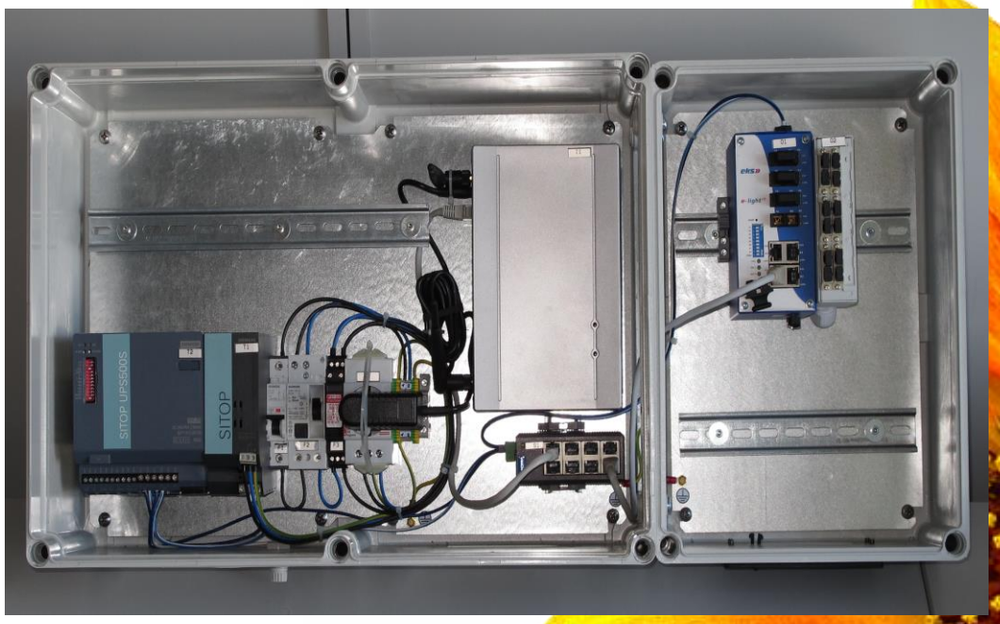
iGATE
SITOP UPS500S
SITOP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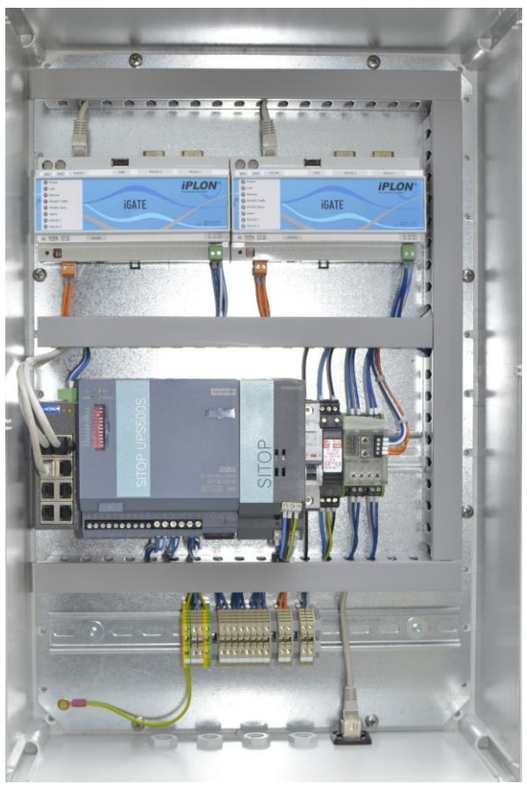
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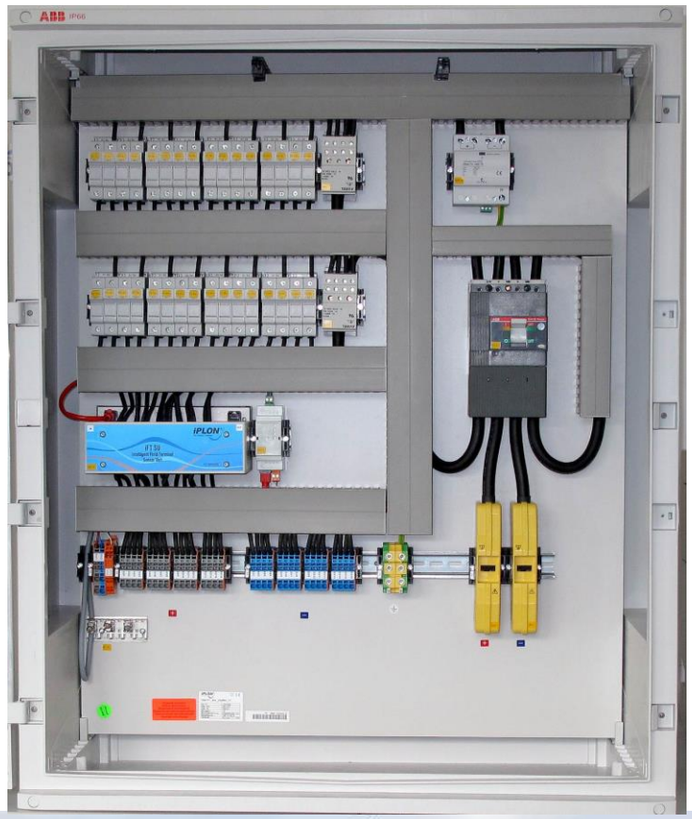
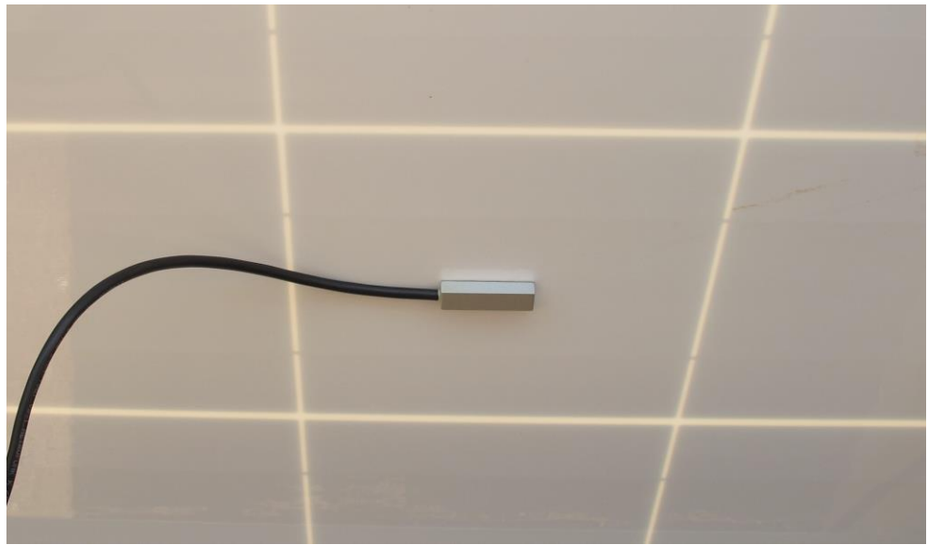
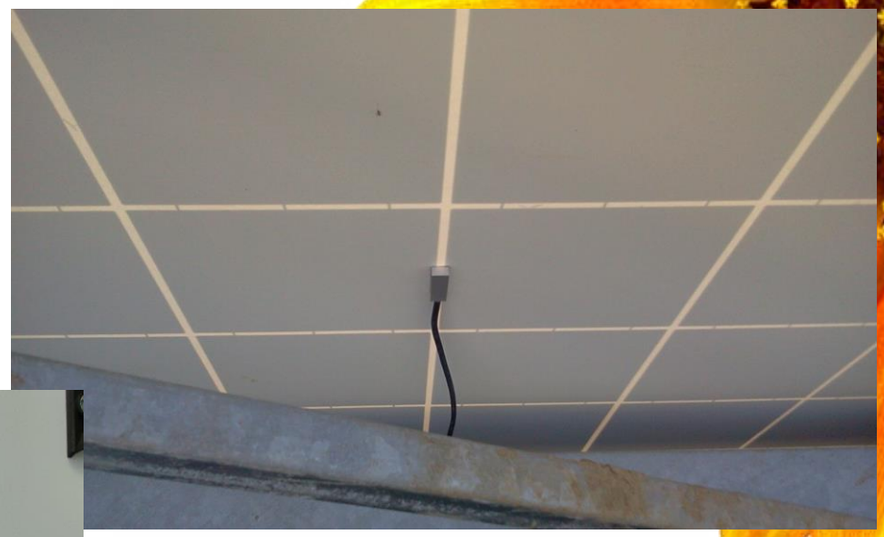


ABB IP66
iPLON



Measurement

Irradiation sensor



Module Temperature

Energy Metering


D
E1


M+W GROUP
String connecting box

Temperature and Movement sensors

- Installed in all rooms
- Movement sensor PS 230V AC
- Temperature sensor PS 24V DC

Weather Station Value Line

For the calculation of the Performance Ratio the Irradiation (W/m2), the ambient temperature and the module surface temperature are needed.

Interfaces

- **Lonworks (field devices)**
- **O&M Handheld Terminal**
- **24 V DC Aux. Supply**

Functionality

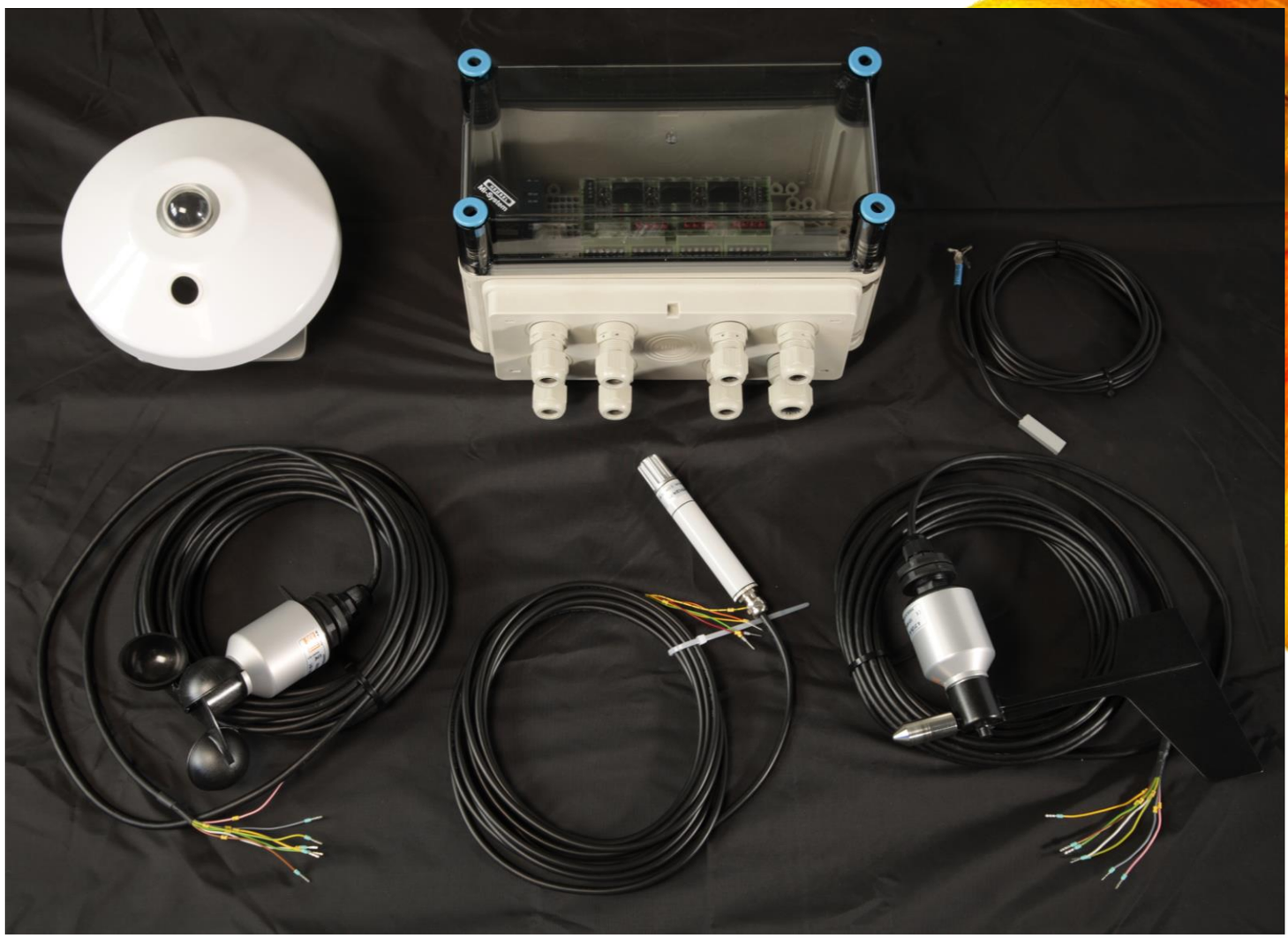
- **Irradiation (silizium) sensor**
- **Module surface temperature**
- **Ambient temperature sensor**
- **I/O Module (Lonworks) for connection to control room or inverter room**

Weather Station Standard

For the calculation of the Performance Ratio the Irradiation (W/m2), the ambient temperature and the module surface temperature are needed. In this version the wind speed and wind direction sensors are also included.

Interfaces

- **Lonworks (field devices)**
- **O&M Handheld Terminal**
- **24 V DC Aux. supply**



Functionality

- **Irradiation (Pyranometer) sensor**
- **Module surface temperature**
- **Ambient temperature sensor**
- **Wind speed sensor**
- **Wind direction sensor**
- **I/O Module (Lonworks) for connection to control room or inverter room**

Weather Station Premium

This is the Premium version of sensors and for connection to control room or inverter room cabinets.

Interfaces

- **Lonworks (field devices)**
- **O&M Handheld Terminal**
- **24 V DC Aux. Supply**

Functionality

- **Irradiation (Pyranometer) sensor: 2 Qty**
- **Irradiation sensor (silicium)**
- **Module surface temperature**
- **Ambient temperature sensor**
- **Wind speed sensor**
- **Wind direction sensor**
- **I/O Module (Lonworks) for connection to control room or inverter room**

Weather Station Extended

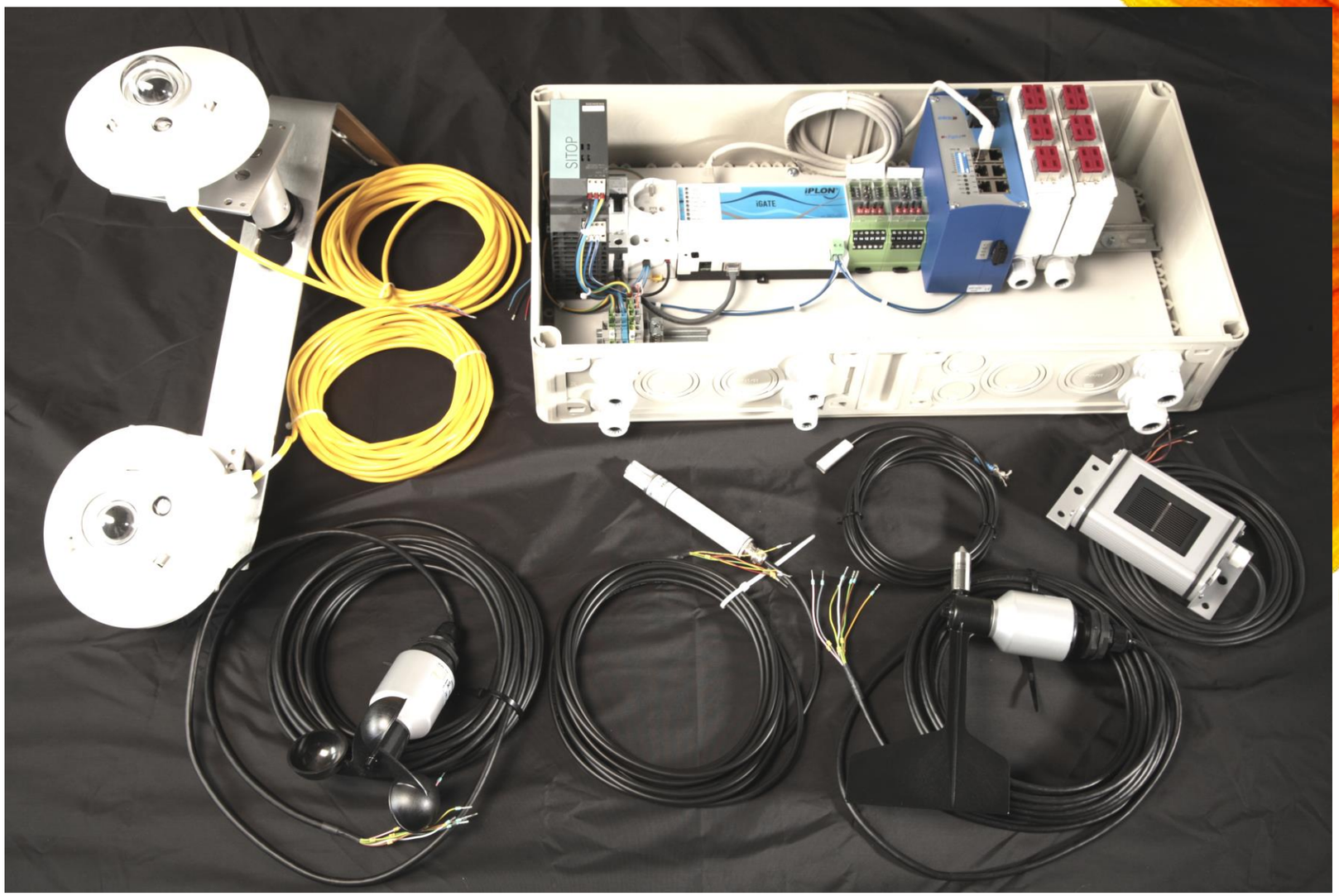
This is the extended version of sensors and for stations, which are very far from the control room.

Interfaces

- **Fiber optical connection, datalogger, power supply and Lonworks (field devices)**
- **O&M Handheld Terminal**
- **230 V AC Aux. supply**

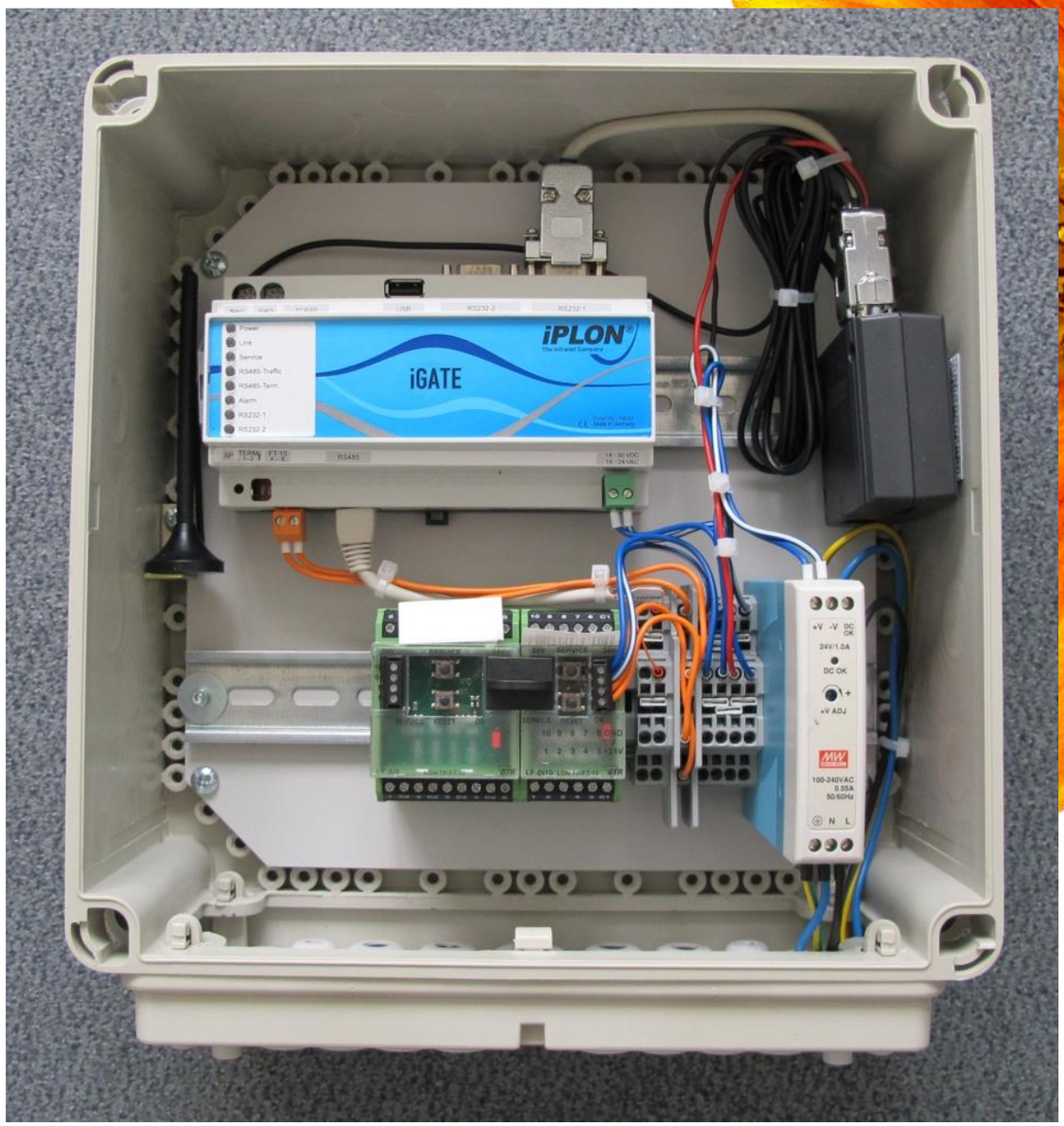
Functionality

- **Irradiation (Pyranometer) sensor: 2 Qty**
- **Irradiation sensor (silicium)**
- **Module surface temperature**
- **Ambient temperature sensor**
- **Wind speed sensor**
- **Wind direction sensor**
- **I/O Module (Lonworks) for connection to control room or inverter room**



iWeatherstation-Box 18810

- Pyranometer
- Ambient Temp
- Module surface Temp
- Windspeed
- Wind direction



iGATE

Abstract: The iGATE is intended for OEM-customers. Plant manufacturers and other control cabinet manufacturers can buy the most important parts from iPLON and implement them in their cabinets. All connection schemes and installation documentation is supplied by iPLON.

OUTLINE

- **ARM9 RISC architecture (32-Bit) Linux system with 64 Mbyte Flash and 64 Mbyte RAM**
- **Interfaces: RS485 (optocoupler), LonWorks FTT10A, 2x RS232C, Ethernet, USB (HOST)**
- **TCP/IP: 10/100 MBit Datarate**
- **8 LED, Service pin, DIP switches**
- **Dimensions: 156 mm x 86 mm x 58 mm (l x w x h) DIN Rail**
- **Feed-in: 24 V DC / 300 mA**

iGATE, modem, rod antenna

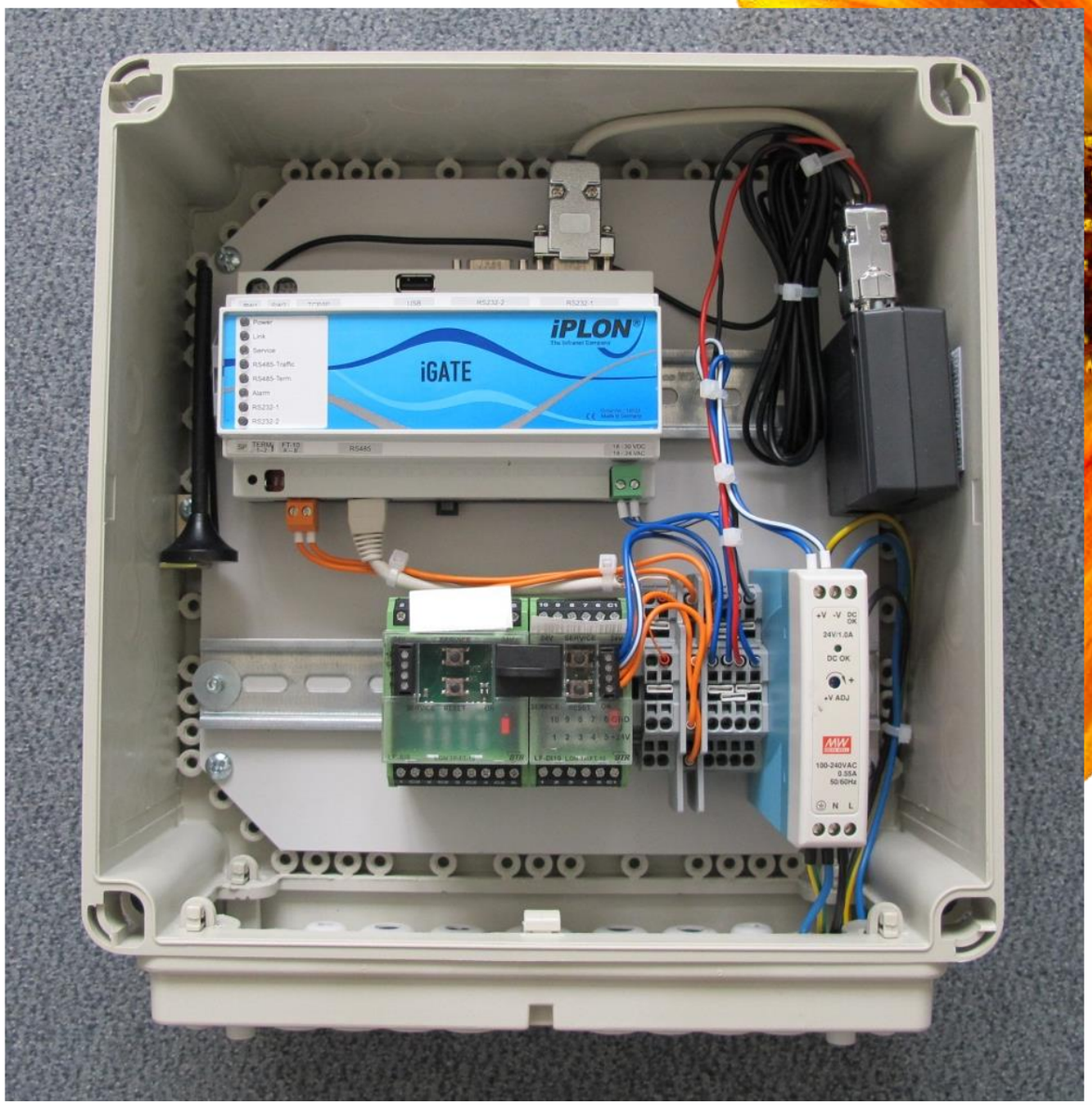
Kit for housing in other enclosures

OEM Version

- **iGate**
- **Modem with special cable**
- **Rod antenna**

iRooftop-Box 18710

- **Inverters Interface**
- **Energy meter Interface**
- **Weatherstation Interface**



iBox_PP_1 MWp

Intelligent_Power Plant_1 MWp Cabinet

Overview

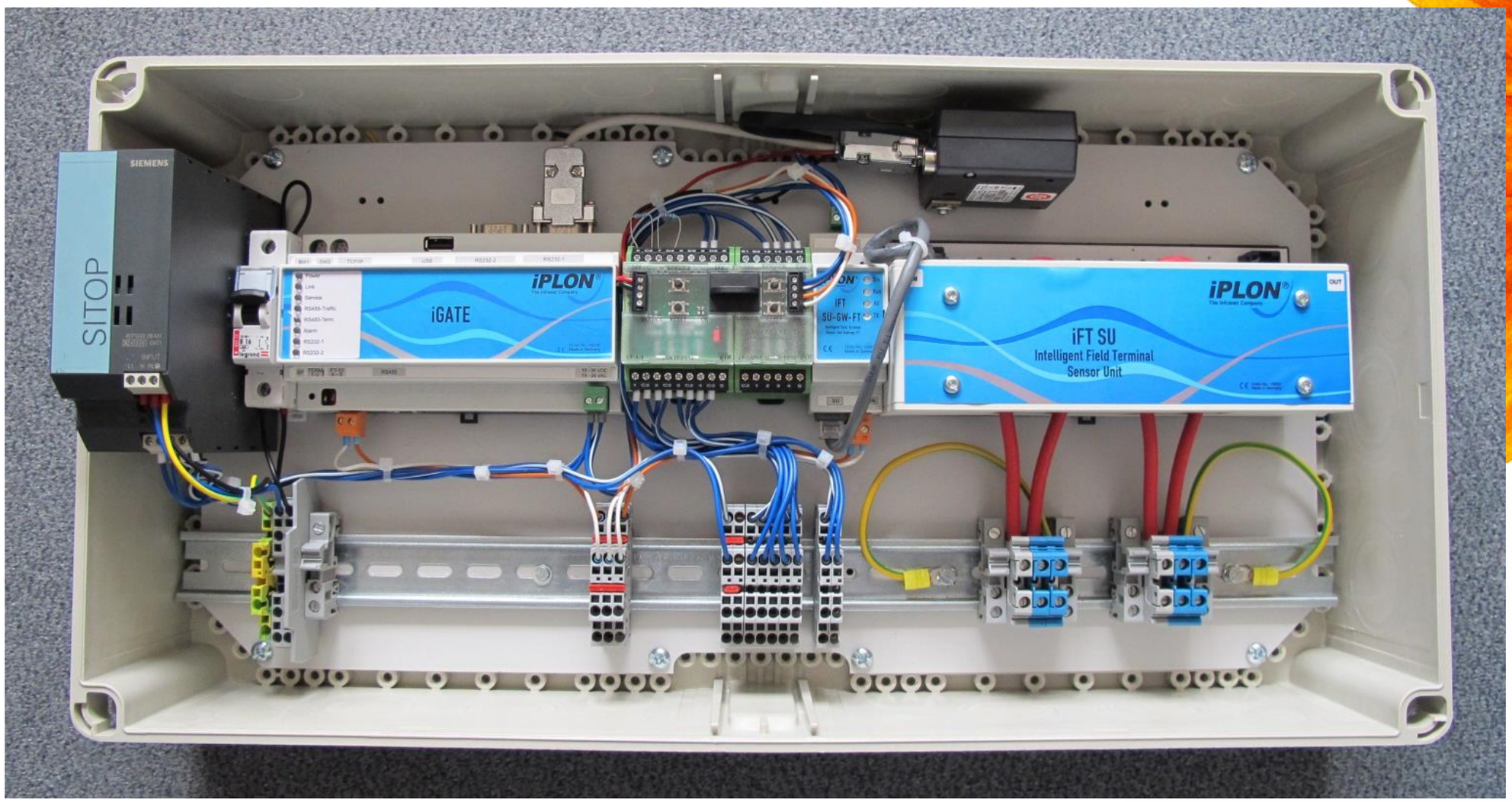
- **Inverter and array box independent solution (Dual Modbus Master)**
- **Based on ISO/IEC standards 14908**
- **24 V DC power supply to the iPLON weather station controller**
- **Inverter interfaces: RS485 and Ethernet (see inverter list)**
- **Easy diagnostic via LED in data loggers**
- **Connection to handheld Control Terminal**
- **IP 65 enclosure**
- **Connection to GPRS modems**
- **Connection external PC (Ethernet) for SCADA applications**
- **Protection circuits**

Optional

- **Connection for RS485 meters (secure)**
- **Connection for external RS485 dataloggers via ModBus-Hub (weather stations)**
- **Connections to internet routers**

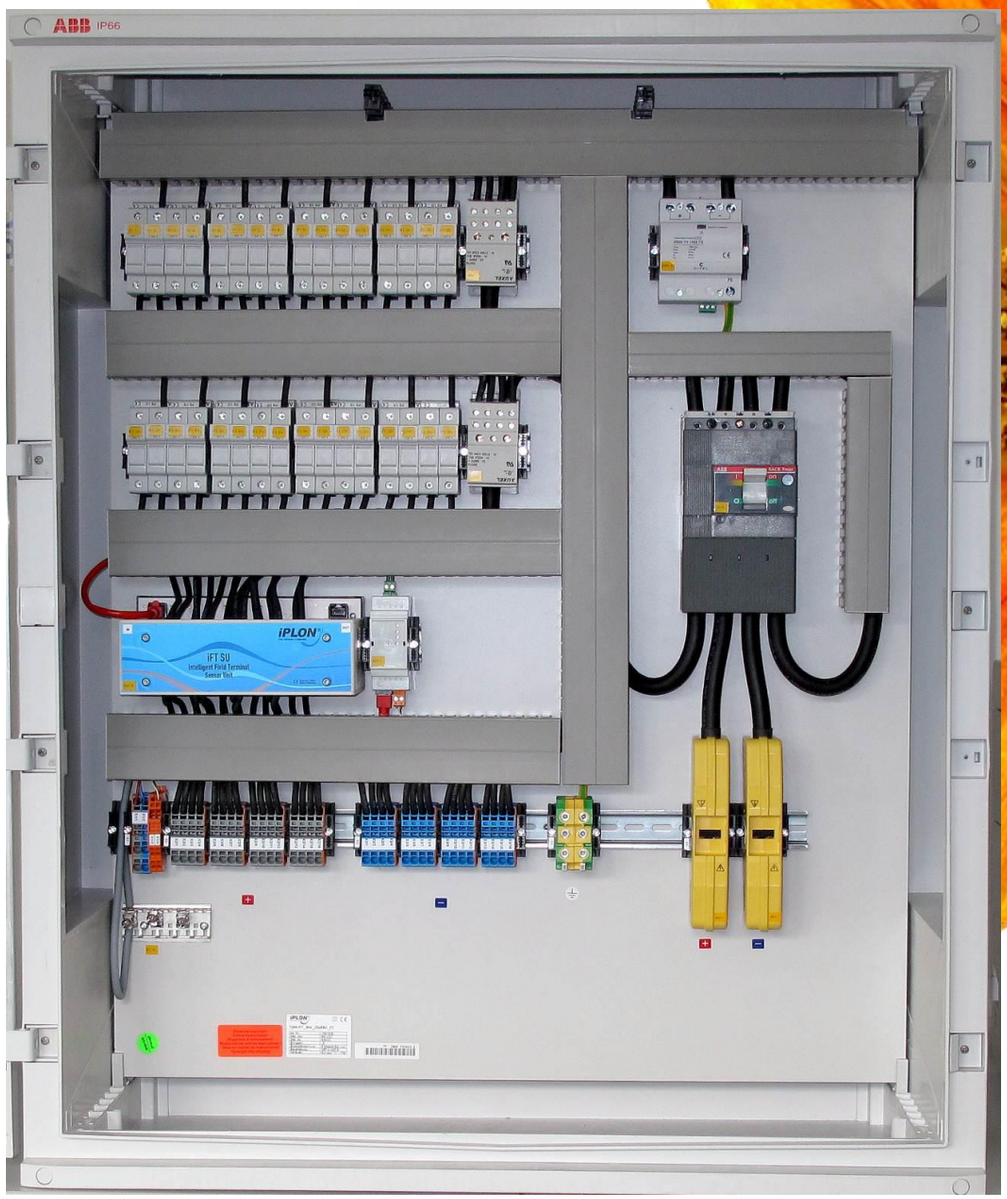
iSoiling Loss-Box 18610

Soiling Loss $= (1-(I_{sc} / I_{scr})*K_1*K_2) * 100\%$



Intelligent Field Terminal

iFT_O_160_16_12_8 – Outdoor_160 A_16 strings_12 A per fuse_8 channels



Overview

- Decentral DC string Monitoring of PV Solarfarms
- Inverter independent solution
- Based on ISO/IEC standards 14908
- Low DC losses as the DC current is not interrupted during the measurement of the current (NO shunt losses)
- As the current is not interrupted, no blow up of electronic PCB boards
- Scalable in number of current channels (Daisy chain)
- Flexible in connection of numer of strings per channel
- Easy diagnostic per LED in current sensor
- A PV current terminal can be used to measure and configure the unit
- Field string box can handle 160 A DC 1000 V
- The ABB switch can switch the DC current under load
- 95 mm2 Screw Terminal for 250 A
- IP66 enclosure

Optional

- DC Voltage measurement
- Temperature and humidity measurement
- Irradiation and module temperature measurement
- Heating of box

Intelligent Management Terminal

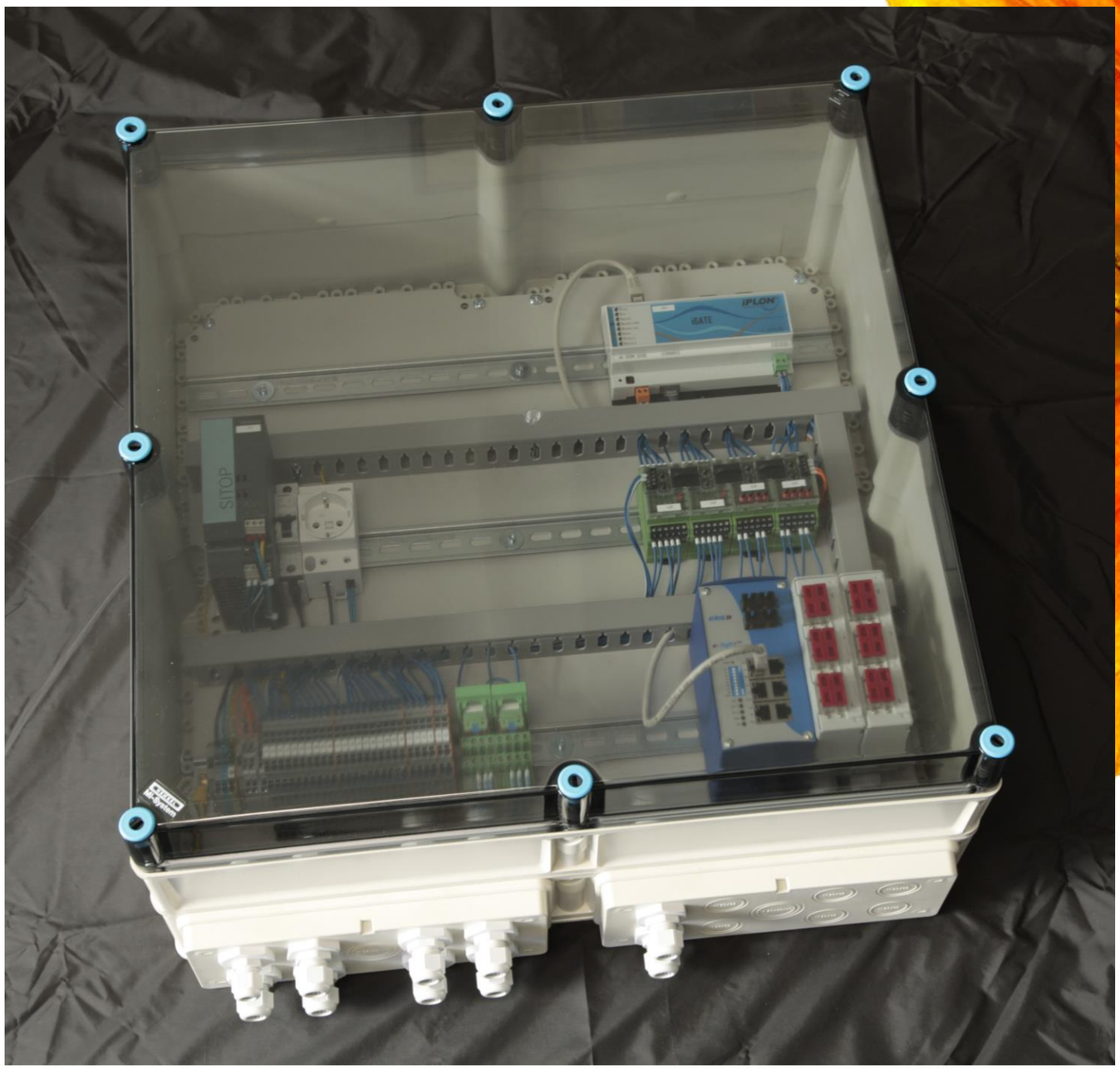
Overview

- Connection to Internet (DSL, UMTS, GPRS)
- Internal Internet Router (LANCOM)
- Based on ISO/IEG Standard 14909
- The iAT is connected to the iMT
- 10 iAT are connected to 1 iMT
- Internal 24 V DC power supply
- Easy diagnostics per LED in dataloggers
- Connection to handheld control terminal
- Connection to iAT through fiber optics
- Connection to LOCAL SCADA
- Connection to HT panels
- Connection to Switchyard panels
- Connection to energy meters in control room
- iP65 enclosure

Intelligent Automation Terminal

Overview

- Inverter and array box independent solution
- Based on ISO/IEC standards 14908
- 24 V DC power supply to the field array boxes
- Inverter interfaces: RS485 and Ethernet (see inverter list)
- Easy diagnostic via LED in data loggers
- Connection to handheld Control Terminal
- Connection to iMT (intelligent Management Terminal) via fiber optics
- IP 65 enclosure
- Connection for 2 RS485 meters
- Connection to inverters
- Connection to string boxes
- Connection to LT panel
- Connection to HT panel
- Connection to Transformer I/O



iGridControl-Box 18510 (Value)

Grid stability system

- Power reduction
  - 100 %, 60%, 30%, 0%
  - 1 min reaction time
- Powerfactor correction
  - Cosphi 1,00, 0,99, 0,98, 0,97, 0,96

iPLON Magic Box Standard

The iPLON Magic Box is the interface between the PV plant (rooftop or Power Plant) and the Energy Utility Company. It is based on the technical specifications of the German requirements of BDEW. The control of the PV plant is achieved by the active control of the inverters used in the plant. The system can be used for new plants but also be integrated in existing Power plants.

- **iGATE Datalogger (IEC 60870-5-101/104)**
- **Connectivity to cloud based system and SLDCs with DSL, GPRS, VPN, RT, PLCC**
- **I/O system**
- **Supports Modbus, TCP/IP, LON**

Functions

- **Interface between the RTU of the SLDC and the power plant**
- **Signal conditioning of the power reduction and the reactive power factor correction of the plant**
- **Control configuration with the built in web user interface**
- **Easy to use in new plants and existing plants**
- **Remote access for O&M activities**
- **Power factor correction at the grid connectivity point (HAT) side**
- **Logic to use with the direct seller of the energy (Direktvermarkter): this is the new standard in Germany**

iPLON Magic Box Premium

The iPLON Magic Box is the interface between the PV plant (rooftop or Power Plant) and the Energy Utility Company. It is based on the technical specifications of the German requirements of BDEW. The control of the PV plant is achieved by the active control of the inverters used in the plant. The system can be used for new plants but also be integrated in existing Power plants.

- **iGATE Datalogger (IEC 60870-5-101/104**
- **Connectivity to cloud based system and SLDCs with DSL, GPRS, VPN, RT, PLCC**
- **Firewall**
- **Scalable I/O system**
- **Time synchronisation through GPS (opt.)**
- **Supports Modbus, TCP/IP, LON**

Functions

- **Interface between the RTU of the SLDC and the power plant**
- **Signal conditioning of the power reduction and the reactive power factor correction of the plant**
- **Control configuration with the built in web user interface**
- **Easy to use in new plants and existing plants**
- **Remote access for O&M activities**
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- **Logic to use with the direct seller of the energy (Direktvermarkter): this is the new standard in Germany**

Thank You!

www.iplon.de

www.youtube.com/user/iPLONChannel

iPLON Rooftop projects

Maritim, Hamburg, 972,7 kWp

Klafs, Schwäbisch Hall,114 kWp

Schwieberdingen, 760 kWp

Carport,

1 MWp PV Projekt Stadion Dortmund

Technical Details:

7.800 CIGS modules
168 x single MPP Tracker
6 x 140kW Inverter

DC switch for fire security!

PV roof installation in Germany

100 kWp roof top:
450 x ITS module 220Wp
4 x 10kW Kostal inverter
1 x 65kW MW Inverter
4 x string box with
4 MPP trackers each

100 kWp roof top:
550 x Sovello module 190Wp
2 x 65kW MW Inverter
5 x string box with
4 MPP trackers each

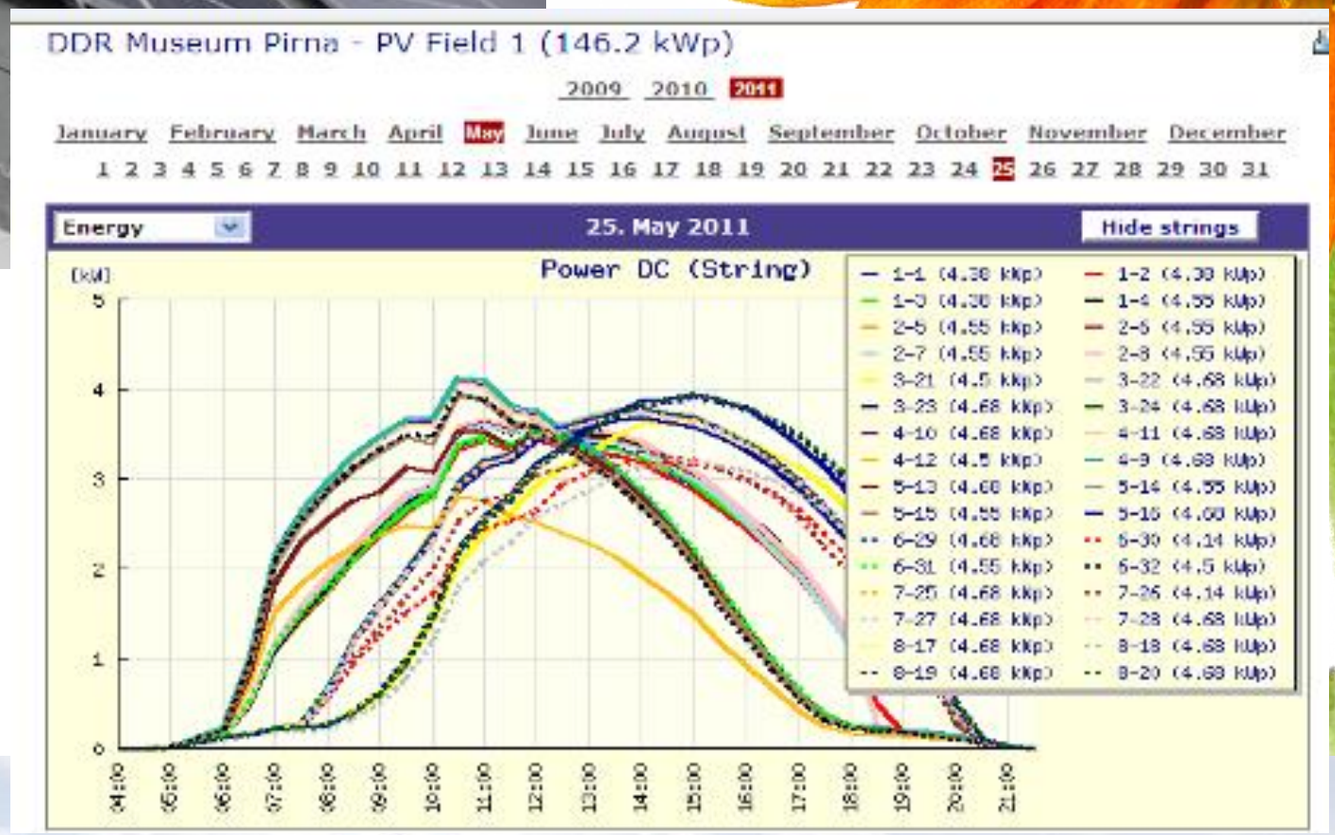
PV roof installation in Germany

200 kWp roof top:
640 x Sovello module 190Wp
4 x 65kW MW Inverter
2 x 4 string box with
4 MPP trackers each

200 kWp roof top:

360 x CIGS module 70Wp
1.000 x ASI Kaneka 70Wp
526 x Multi silicon Sovello 190Wp

Single String Monitoring with different Orientation!



With a single MPP tracking You will see at the diagram the different single MPP point of the different module strings!

Building Integrated Facade PV System Solibro with 120kWp

Thank You!

www.iplon.de

www.youtube.com/user/iPLONChannel

Installation Patterns

PV Installation

- Poly-
- kristallines
- Silicon
- 4,8kWp

Installation der Solarmodule

- CIGS-Thinfilm
- 4,6 kWp

Roof integrated PV system

- 1,2 kWp CIGS
- Inn roof system

Private PV System

This PV system with

50m² area

produced the

Energy what a private

House in Germany

needs per year .

5 kWp PV power

=

5.000 kWh energy / year

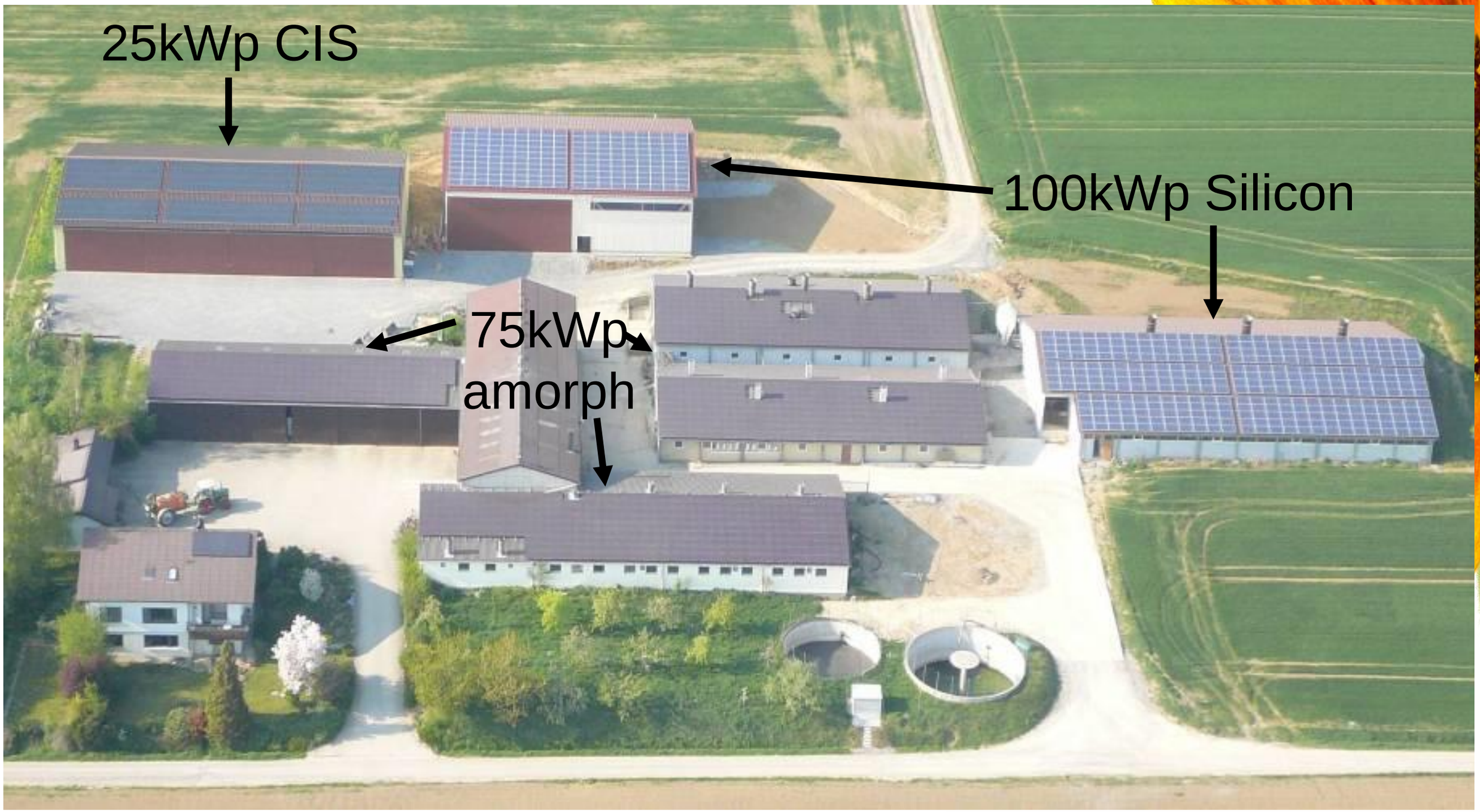
In South Italy the same

modules produced

7.000 kWh el. Energy per year!

Flat roof installation 340 kWp

200kWp with different module technologies

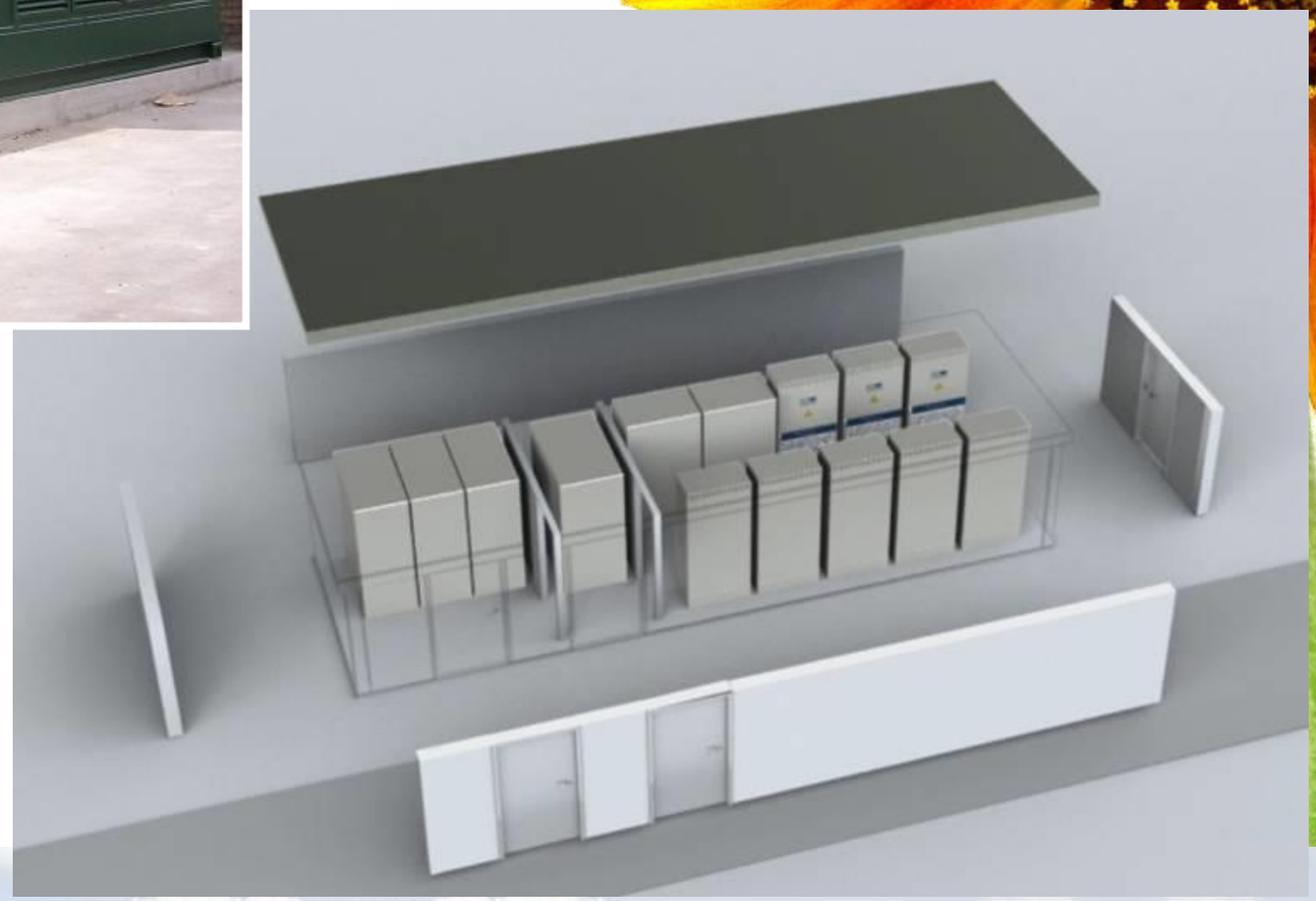


Installation: 2001: 25kWp CIGS **2003:** 75kWp amorph Silicon **2010:** 100kWp EFG silicon **2011:** 30kWp Silicon

700 kWp PV roof installation in Germany

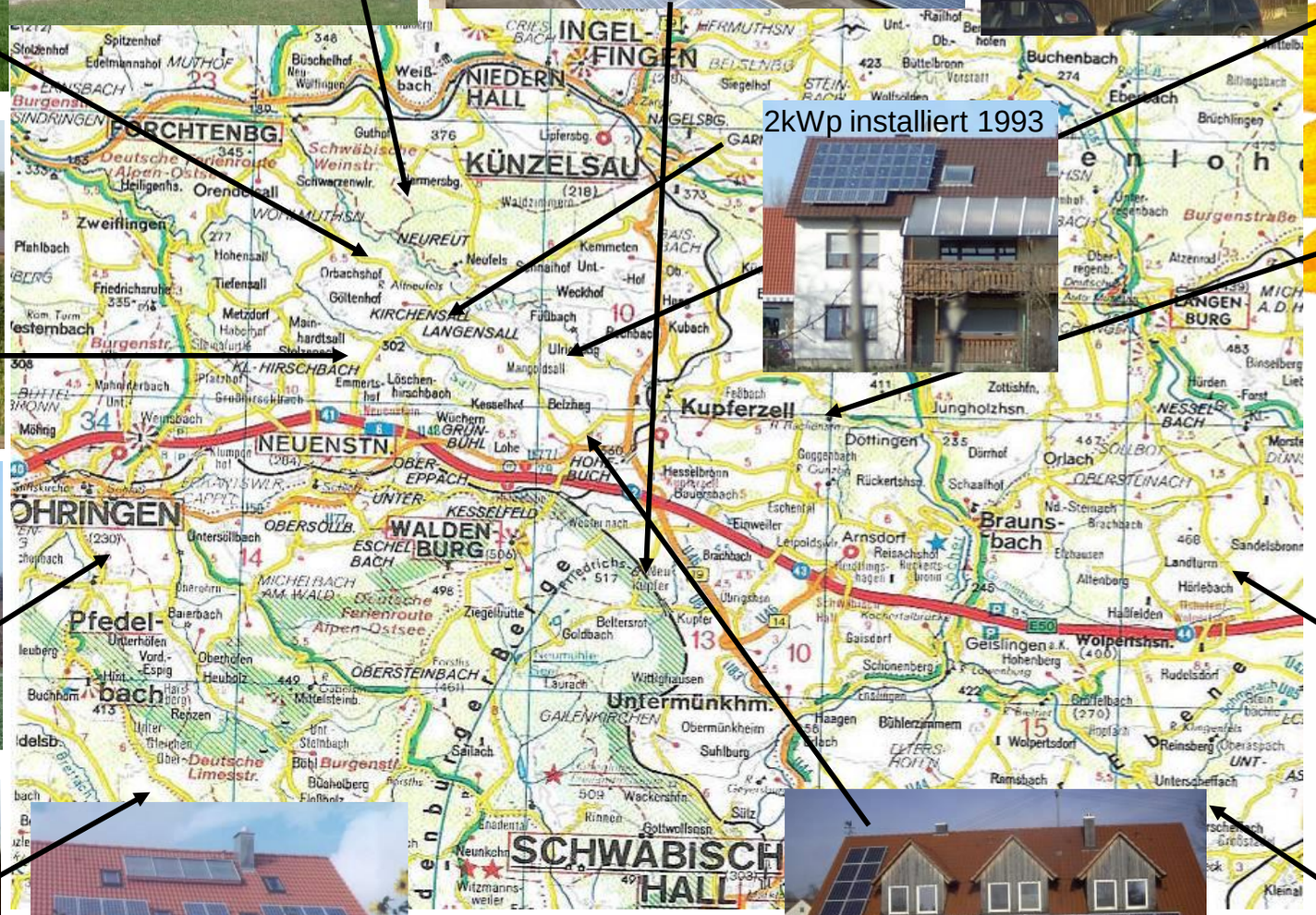
140kWp Pergola in the Netherland

1 MWp M+W Inverter Station



Special Solution Grid Inverter parallel to a Diesel Engine

Old References



6,3kWp

2,0kWp

270kWp

5kWp

PV Car Port Combination:

Special Solutions Solar Tracker

PV tracker. The modules follow the sun from east to west full automatic. The output energy of the modules will be app. 30% higher.

Example Applications

Smart Cities Trend in India (KA): Tenders, Requirements and Strategy

February 14, 2017

Gowrishankar Ramanan
iPLON India

Agenda

1. Smart City – Concepts
2. Smart City Mission
3. Smart Cities – **KA**

ILLUSTRATIVE LIST

Smart Solutions

E-Governance and Citizen Services

1. Public Information, Grievance Redressal
2. Electronic Service Delivery
3. Citizen Engagement
4. Citizens - City's Eyes and Ears
5. Video Crime Monitoring

Waste Management

6. Waste to Energy & fuel
7. Waste to Compost
8. Waste Water to be Treated
9. Recycling and Reduction of C&D Waste

Water Management

10. Smart Meters & Management
11. Leakage Identification, Preventive Maint.
12. Water Quality Monitoring

Energy Management

13. Smart Meters & Management
14. Renewable Sources of Energy
15. Energy Efficient & Green Buildings

Urban Mobility

16. Smart Parking
17. Intelligent Traffic Management
18. Integrated Multi-Modal Transport

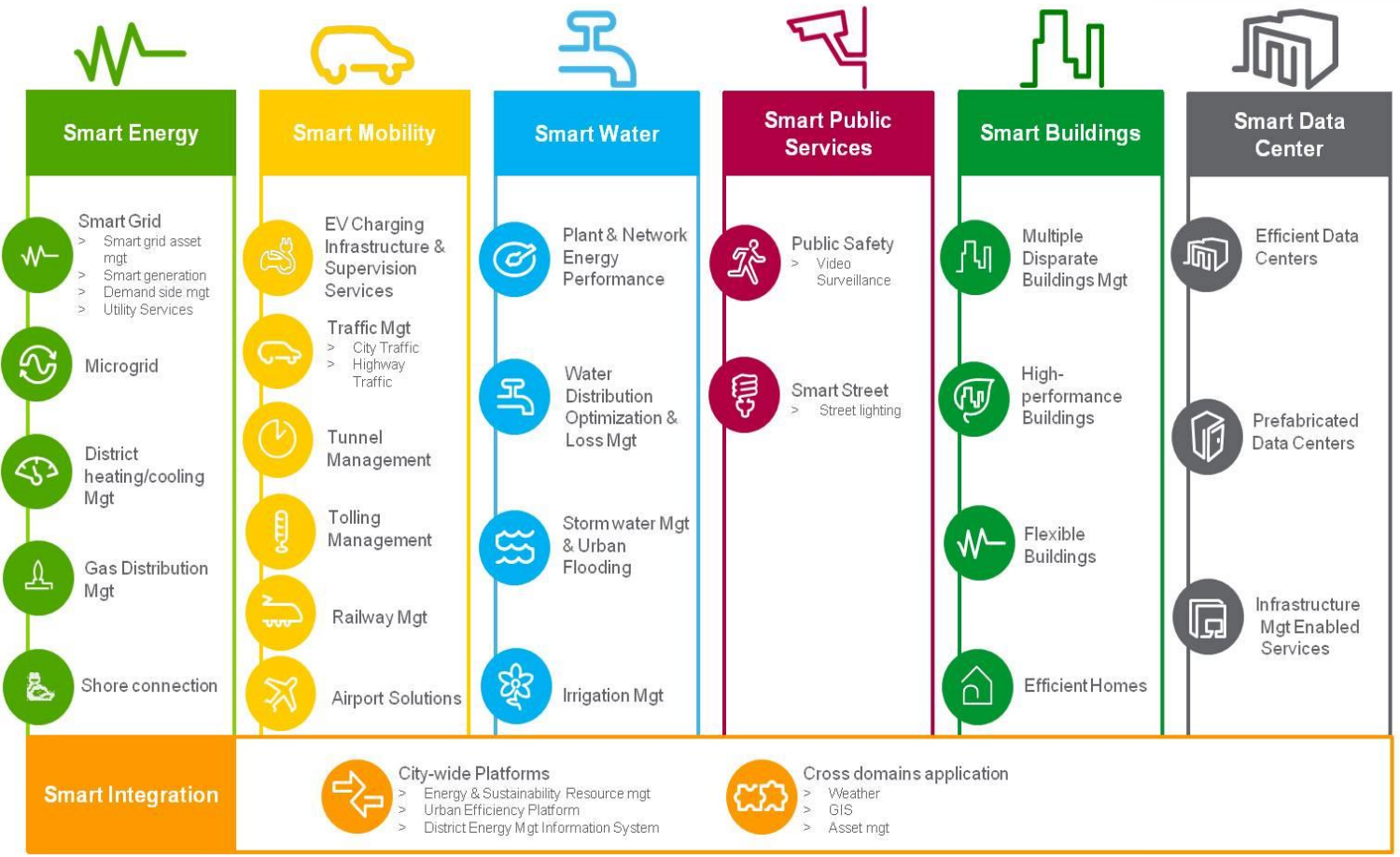
Others

19. Tele-Medicine & Tele Education
20. Incubation/Trade Facilitation Centers
21. Skill Development Centers

http://smartcities.gov.in/

A City that welcomes Immigrants – Smart City

Smart City



IT – Principal Infrastructure

Smart Cities Mission

- 25th of June, 2015
- GoI initiated (MoUD)
  - AMRUT (Atal Mission for Rejuvenation and Urban Transformation)
- 100 cities (109*) – Citizen friendly & sustainable by 2020
- ₹980 billion (~US $15 billion)
  - Develop 100 smart cities
  - Rejuvenate 500 other cities

MODI'S 'SMART' VISION TAKES SHAPE

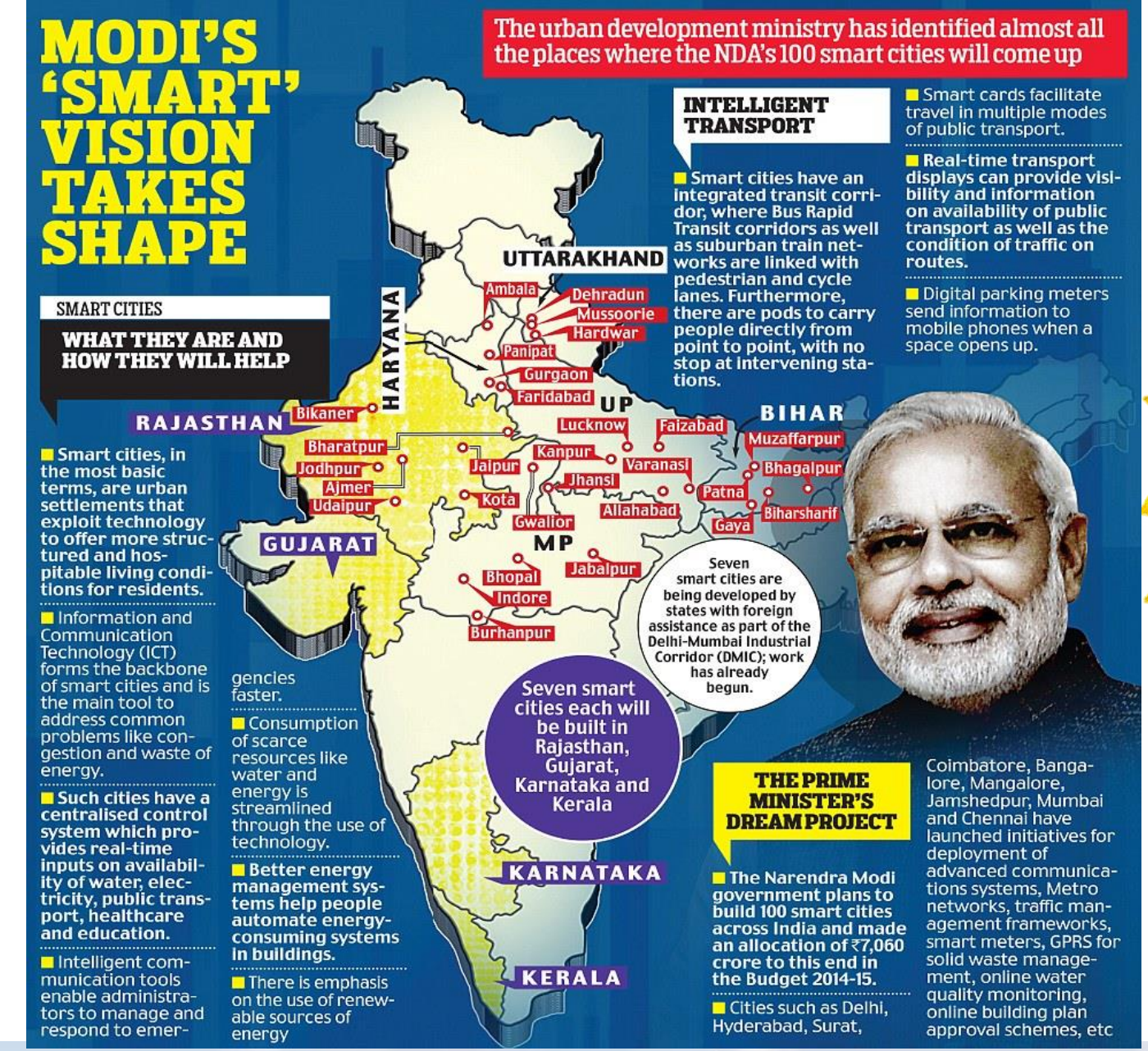
The urban development ministry has identified almost all the places where the NDA's 100 smart cities will come up

SMART CITIES
WHAT THEY ARE AND HOW THEY WILL HELP

- Smart cities, in the most basic terms, are urban settlements that exploit technology to offer more structured and hospitable living conditions for residents.
- Information and Communication Technology (ICT) forms the backbone of smart cities and is the main tool to address common problems like congestion and waste of energy.
- **Such cities have a centralised control system which provides real-time inputs on availability of water, electricity, public transport, healthcare and education.**
- Intelligent communication tools enable administrators to manage and respond to emergencies faster.
- Consumption of scarce resources like water and energy is streamlined through the use of technology.
- **Better energy management systems help people automate energy-consuming systems in buildings.**
- There is emphasis on the use of renewable sources of energy

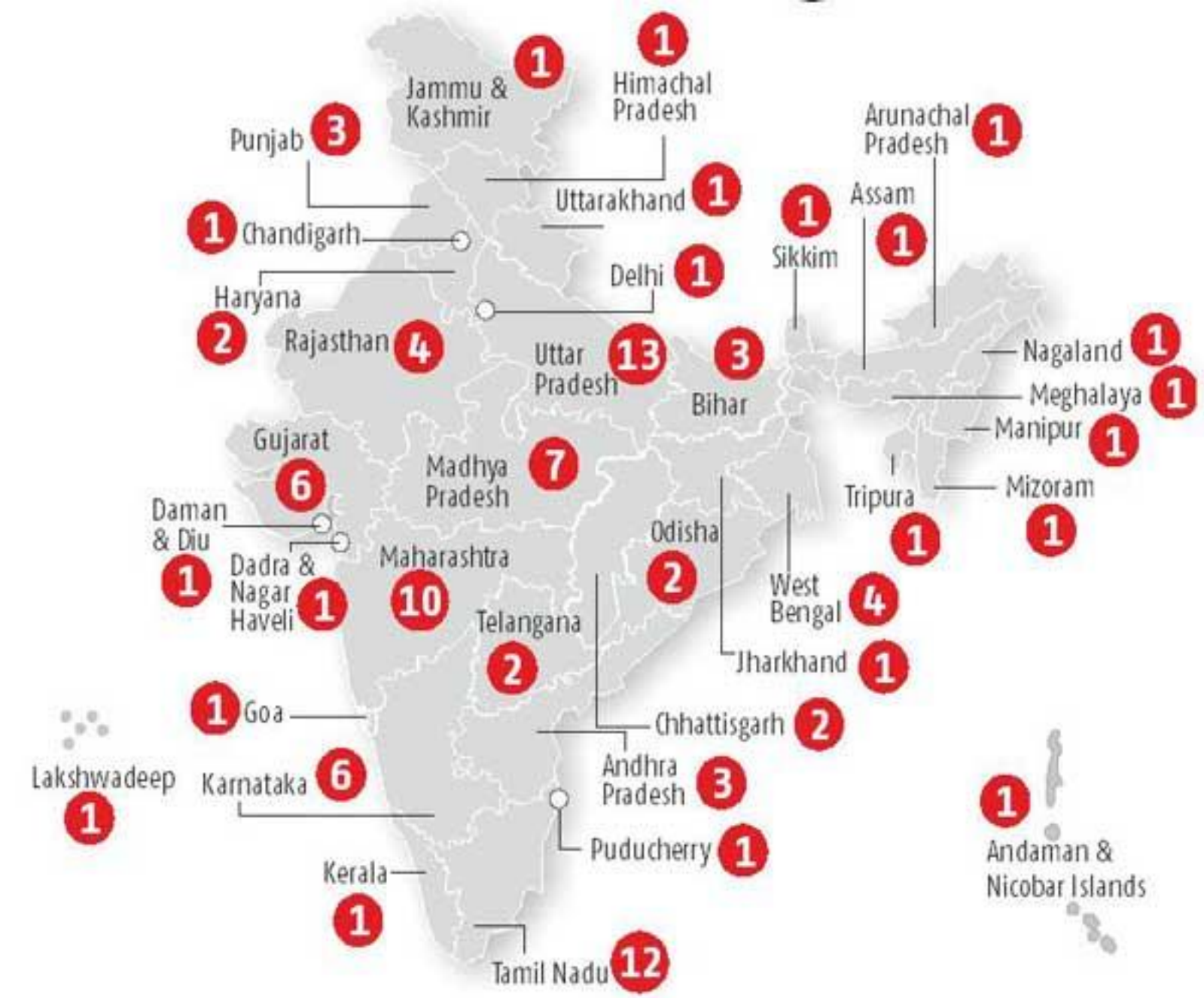
INTELLIGENT TRANSPORT

- Smart cities have an integrated transit corridor, where Bus Rapid Transit corridors as well as suburban train networks are linked with pedestrian and cycle lanes. Furthermore, there are pods to carry people directly from point to point, with no stop at intervening stations.
- Smart cards facilitate travel in multiple modes of public transport.
- **Real-time transport displays can provide visibility and information on availability of public transport as well as the condition of traffic on routes.**
- Digital parking meters send information to mobile phones when a space opens up.

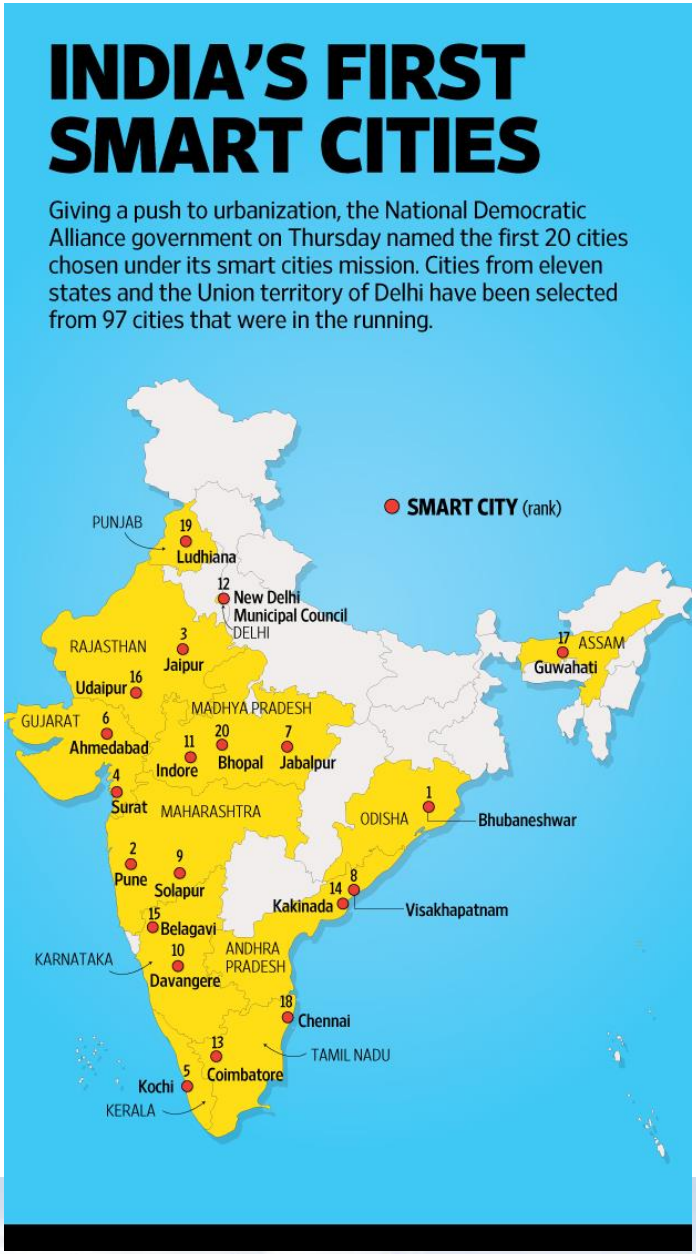


THE PRIME MINISTER'S DREAM PROJECT

- **The Narendra Modi government plans to build 100 smart cities across India and made an allocation of ₹7,060 crore to this end in the Budget 2014-15.**
- Cities such as Delhi, Hyderabad, Surat, Coimbatore, Bangalore, Mangalore, Jamshedpur, Mumbai and Chennai have launched initiatives for deployment of advanced communications systems, Metro networks, traffic management frameworks, smart meters, GPRS for solid waste management, online water quality monitoring, online building plan approval schemes, etc


Jammu & Kashmir 1
Himachal Pradesh 1
Punjab 3
Uttarakhand 1
Chandigarh 1
Haryana 2
Delhi 1
Rajasthan 4
Uttar Pradesh 13
Bihar 3
Sikkim 1
Arunachal Pradesh 1
Assam 1
Nagaland 1
Meghalaya 1
Manipur 1
Tripura 1
Mizoram 1
Gujarat 6
Madhya Pradesh 7
Daman & Diu 1
Dadra & Nagar Haveli 1
Maharashtra 10
Odisha 2
West Bengal 4
Jharkhand 1
Telangana 2
Goa 1
Chhattisgarh 2
Andhra Pradesh 3
Lakshwadeep 1
Karnataka 6
Puducherry 1
Andaman & Nicobar Islands 1
Kerala 1
Tamil Nadu 12

Smart Cities – Phase I



1 – Bhubaneshwar

2 – Pune

4 – Surat

10 – Davangere

15 – Belagavi

13 – Coimbatore

18 - Chennai

Smart Cities - KA

- Mangaluru
- Belagavi
- Shivamogga
- Hubbali-Dharwad
- Tumakuru
- Davanagere

Namma Bengaluru… ?

Will the IT capital make it to smart city list?

The city lost by a mere 0.5 points to make it to the coveted list in the nation last June.

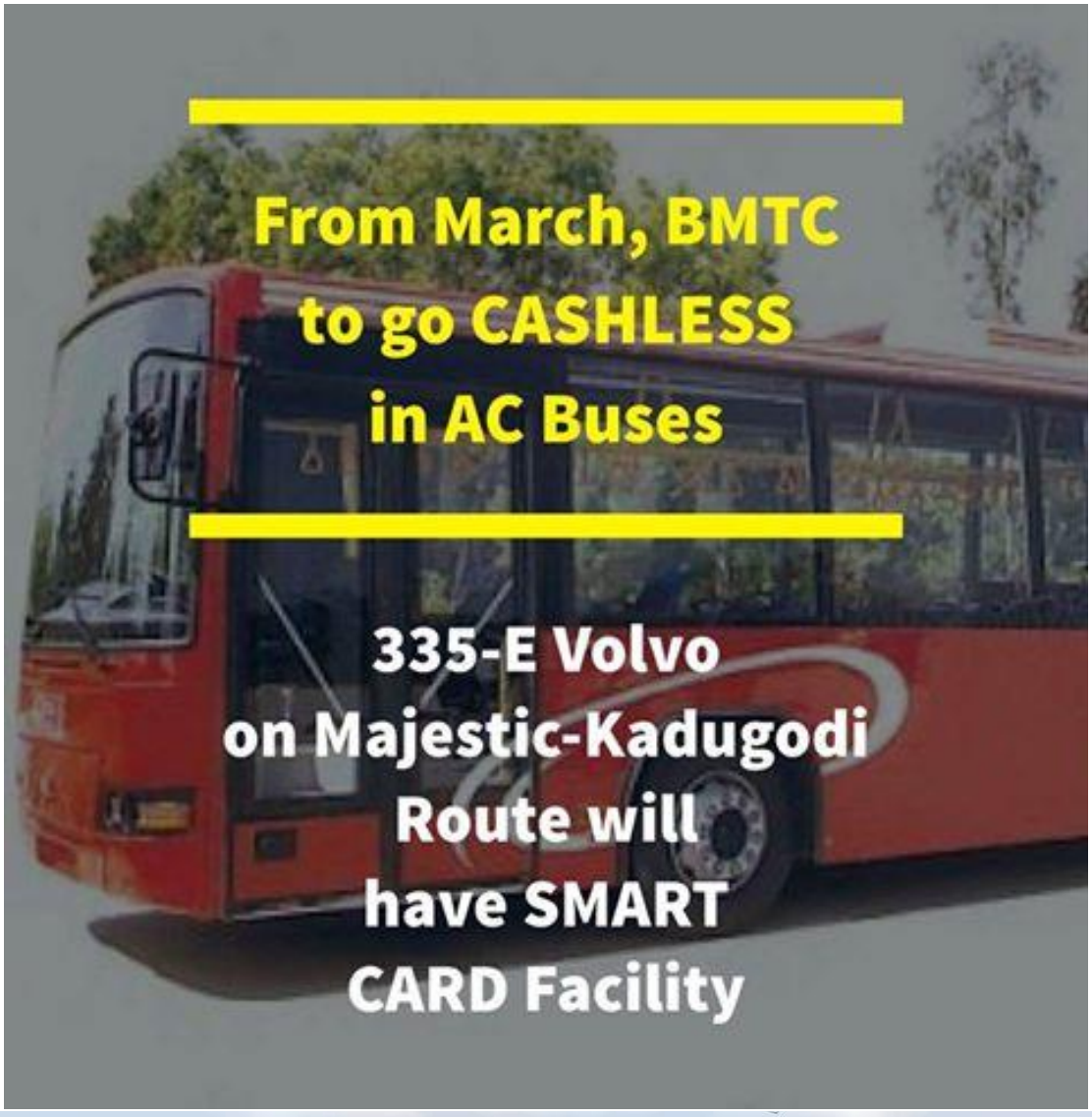
Nolan Pinto | Posted by Shraddha Jandial
Bengaluru, January 17, 2017 | UPDATED 21:10 IST

A+ A-

- Whitefield
- ₹ 200 Cr. every year for the next 5 years

Will we make it in June 2017…?

The Start …


From March, BMTC
to go CASHLESS
in AC Buses
335-E Volvo
on Majestic-Kadugodi
Route will
have SMART
CARD Facility

Karnataka to pump Rs.1, 188 Cr for smart cities this year

Posted by **Elets News Network (ENN)** on January 28, 2017

in Featured, Infrastructure, News, Smart Cities, Urban Planning

Karnataka government will release a fund of Rs. 1,188 crore for the smart city mission this year, announced the state Governor Vajubhai Vala at the Republic Day celebrations held at Bengaluru.

"Karnataka had been the torch-bearer of the development agenda of the country and my government is striving hard to take the state to a greater heights in its pursuit to make India a great powerhouse,"said Vajubhai Vala.

Last year the state government has spent Rs.776 crore for developing six smart cities across the state. These cities are Mangaluru, Belagavi, Shivamogga, Hubballi-Dharwad, Tumakuru and Davanagere. Karnataka has also commissioned new projects like 'Power to all by 2020' to reduce deficiency of power. The state has also strengthened transmission work to increase the additional generation capacity of 3657 MW.

In his republic speech, Vala also said Karnataka received Rs. 1.40 lakh crores in investment till September, 2016 which created 15 lakh employment opportunities in the state. He further added that Karnataka will continue to lead the country in IT and BT sectors

Consultants for KA

The same for AP, TS, Goa

6 more working in associations and partnerships …

PPP Projects

- 11 PPP ~ ₹ 935.9 Cr – Implementation
- *21 PPP ~ ₹ 2622.2 Cr – Tendering process*
- **Belagavi:** City Gas distribution through piped network - ₹ 172.8 Cr

Belagavi

- 2nd in overall Exports (KA)
- Tier 2
- Houses 488,157
- 99.6 sq. km
- Unemployment (~6%)
- Only ~ 9% have access to laptop with internet

Projects in Belagavi

- 69 projects

- Gas, Electricity, Water, Waste Management, Health, Transport, Traffic, Public Amenities, etc.

- Energy efficiency & RE
  - Solar Rooftop = 30 MW ~ ₹ 195 Cr
  - Wind = 30 MW ~ ₹ 186 Cr
  - LED street lighting

- Smart metering of water = ₹ 53 Cr
- Smart metering of electricity = ₹ 51.5 Cr

- Battery operated rickshaw

Davanagere

- 6th largest city (KA)
- "Village of lakes"
- *Manchester of KA*
- Tier 3
- Houses 434,971
- 77.2 sq. km
- Unemployment (~3.6%)
- Only ~ 5% have access to laptop with internet

AREA BASED PROPOSAL

SMART NETWORK

- SMART MOBILITY
- SMART INFRASTRUCTURE
- SMART ENERGY
- SMART TECHNOLOGY
- SMART WASTE MANAGEMENT

Projects in Davanagere

- 11 projects
- GPS & RFID based Solid Waste Management System
- Dedicated footpath & Cycle Tracks
- Underground drainage facility: ~ ₹ 162 Cr
- Solar Rooftop: ~ ₹ 9.4 Cr
- Intelligent Urban Mobility System & Secure Environment: ~ ₹ 460 Cr

Projects in Tumakuru, Mangaluru

Tumakuru

- 44 projects
- Rooftop solar – Govt. & industries (~15 MW)
- Smart Metering – Water & Energy distribution
- Smart parking

Mangaluru

- 65 projects
- Smart Energy Meters – (Res)
- Solar LED street lights
- Solar and Recreational Island: ~ ₹ 86.8 Cr
- Installation of rooftop solar on Govt. buildings ~ 50 MW

Germany Decided to Provide Smart City Solutions for Smart Cities Project

October 6, 2016 Pradeep Kumar Smart Cities News

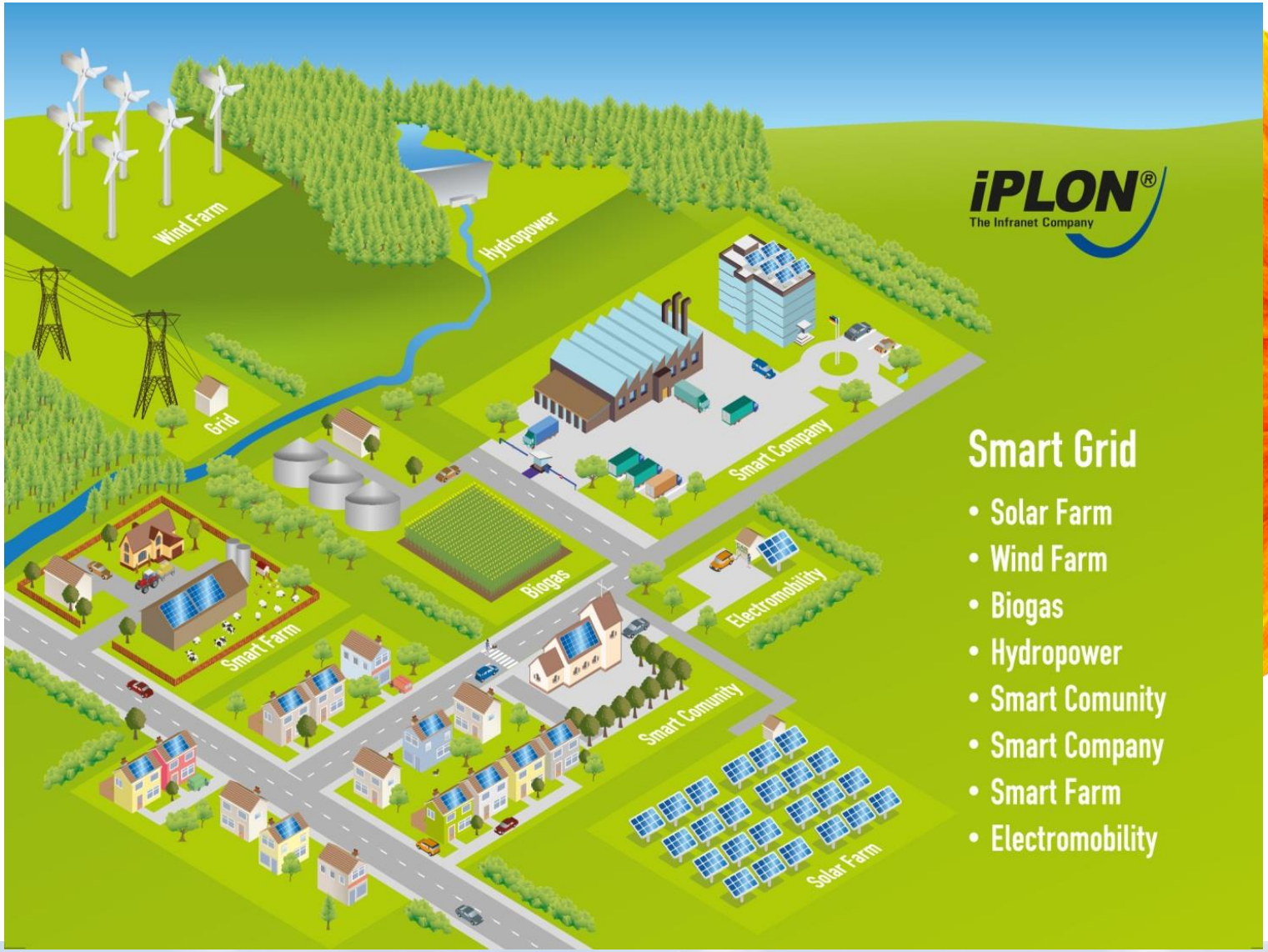
As per the published news, the German smart city solutions firms decided to provide its support, services, and products to develop Hyderabad as a smart city along with Bhubaneswar, Kochi and Coimbatore cities.

According to the German Ambassador to India Martin Ney, the German Consul General in Chennai Achim Fabig will lead the delegation to Hyderabad to present their smart city solutions to develop Hyderabad as a smart city.

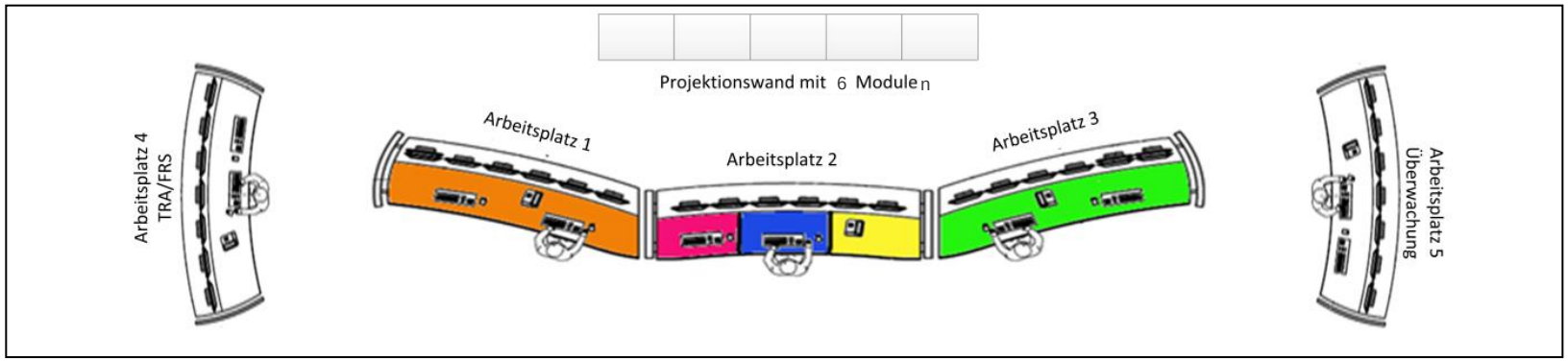
However, he had taken the companies to the three cities under the Centre's Smart City Project in July. Ambassador said the idea of the bringing the companies to Hyderabad was discussed during his meeting with Chief Minister K.Chandrasekhar Rao on Tuesday.

He said that the German Companies have over 40 years of experience in providing clean energy, water treatment, waste water treatment, solid waste management as well as urban mobility solutions. Mr. Ney had informed the press reports after announcing Cyient founder BVR Mohan Reddy's appointment as honorary consul of Germany in Hyderabad.

Smart Grid


iPLON®
The Infranet Company
Wind Farm
Hydropower
Grid
Smart Company
Biogas
Electromobility
Smart Farm
Smart Comunity
Solar Farm
Smart Grid
• Solar Farm
• Wind Farm
• Biogas
• Hydropower
• Smart Comunity
• Smart Company
• Smart Farm
• Electromobility

Multi utility control room at Stadtwerke Schwäbisch Hall



iPLON®
The Infranet Company

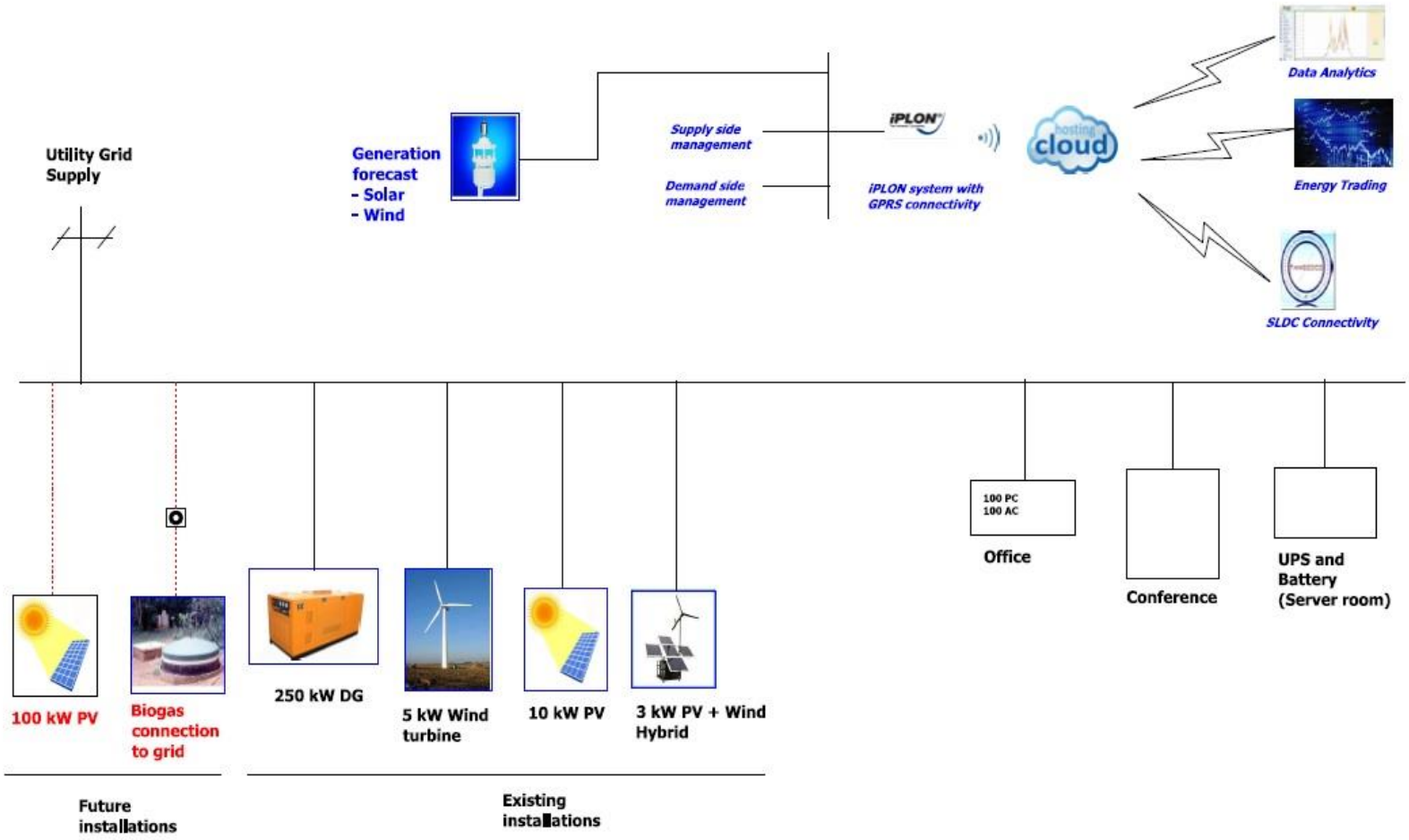
Thank You

Grid Stability, Forecasting, and SLDC for Utility Scale Plants

February 14, 2017

Gowrishankar Ramanan
iPLON India

Logical View : iPLON Architectural Diagram



Smart Grid

Smart Grids can transform the existing grid into a more efficient, reliable, safe and enable address sector challenges. “Smarter Power Grid “

- System (Generation, Transmission, Distribution) with an advanced two-way communications system
- Enables real-time monitoring and control
- Provide greater visibility and transparency
- Consequently, enables cost reduction and efficiency improvement

What Smart Grid does?

Decentralization of Generating sources

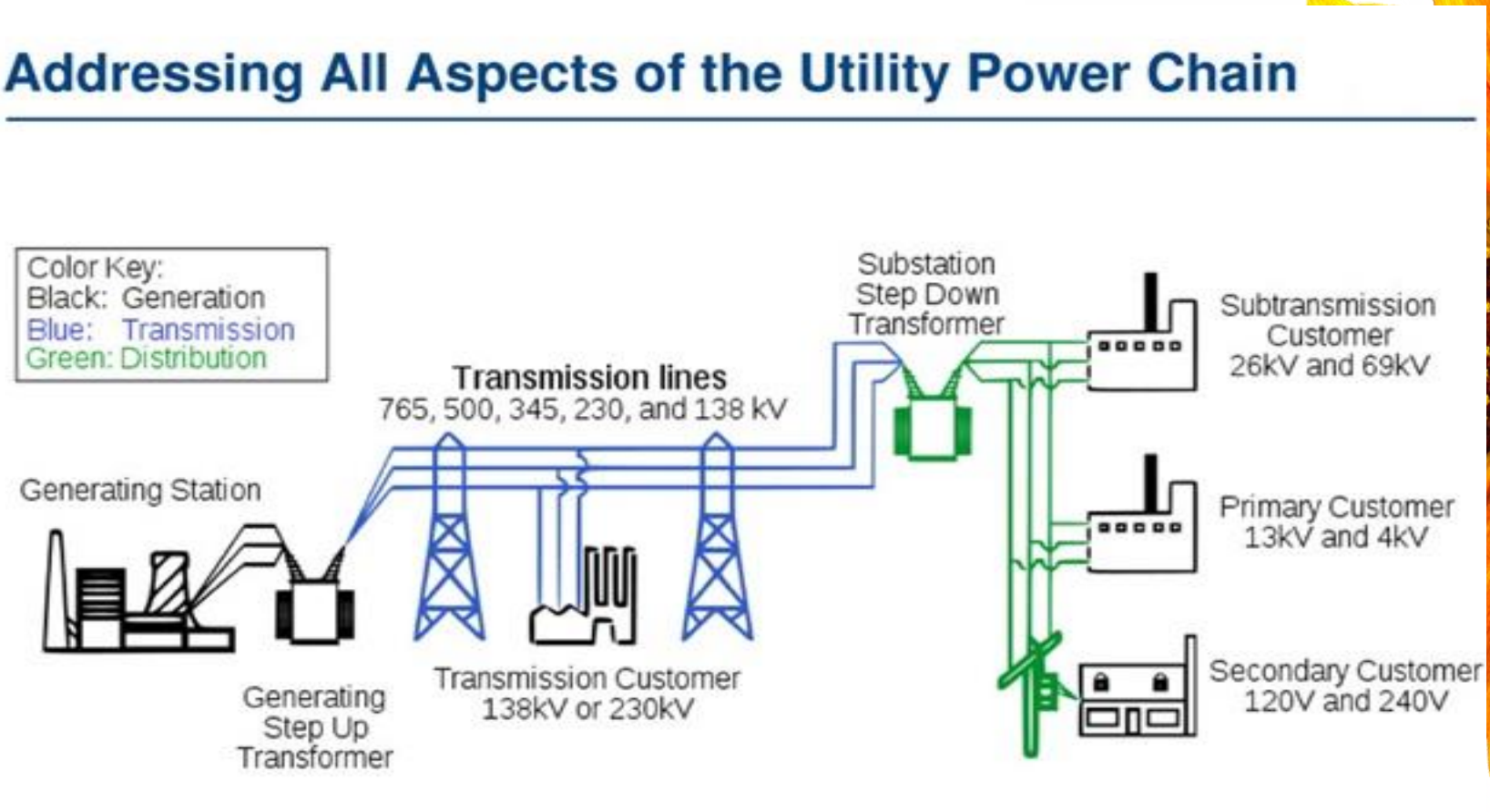
Integration of all sources of Energy, especially Renewables

Continuous monitoring & feedback from the network

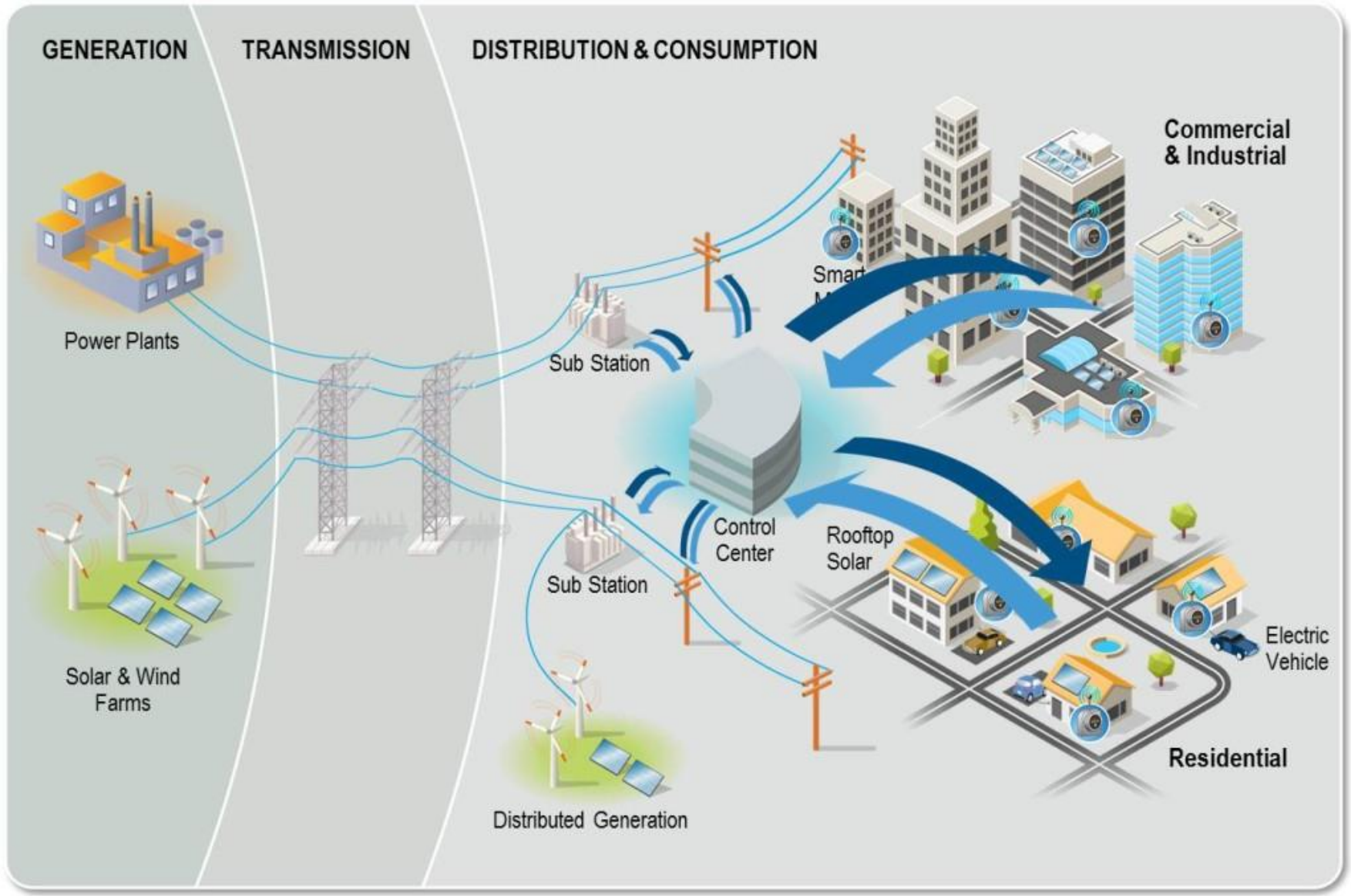
Faults anticipation and helps faults prevention

Two way communication b/w utilities & customers

Present Electrical Value Chain



Smart Electrical Value Chain



Issues for RE into Grid

- Intermittent & variable nature of renewables impose instability issues on the grid

- Implementation of transmission network matching with the RE Generation

- Technical issues like Reactive power management to match its variation in its generation pattern and load pattern

- Challenges related to power evacuation and inconsistencies in tariff norms among the states for wind power

Mitigating measures for Grid Issues

- Need for the wide area monitoring systems to monitor and control the generation from Renewable Energy sources like Solar PV, Wind, etc. for
  - Quick operation in solving grid Issues
  - Managing both generation and Load side

Key Areas for RE development in India

- Decentralized Multi-Utility Company
- Operation & Maintenance
- Grid Stability Solutions

Smart meter

Mechanic Meter

- Manual metering
- Progressive rates

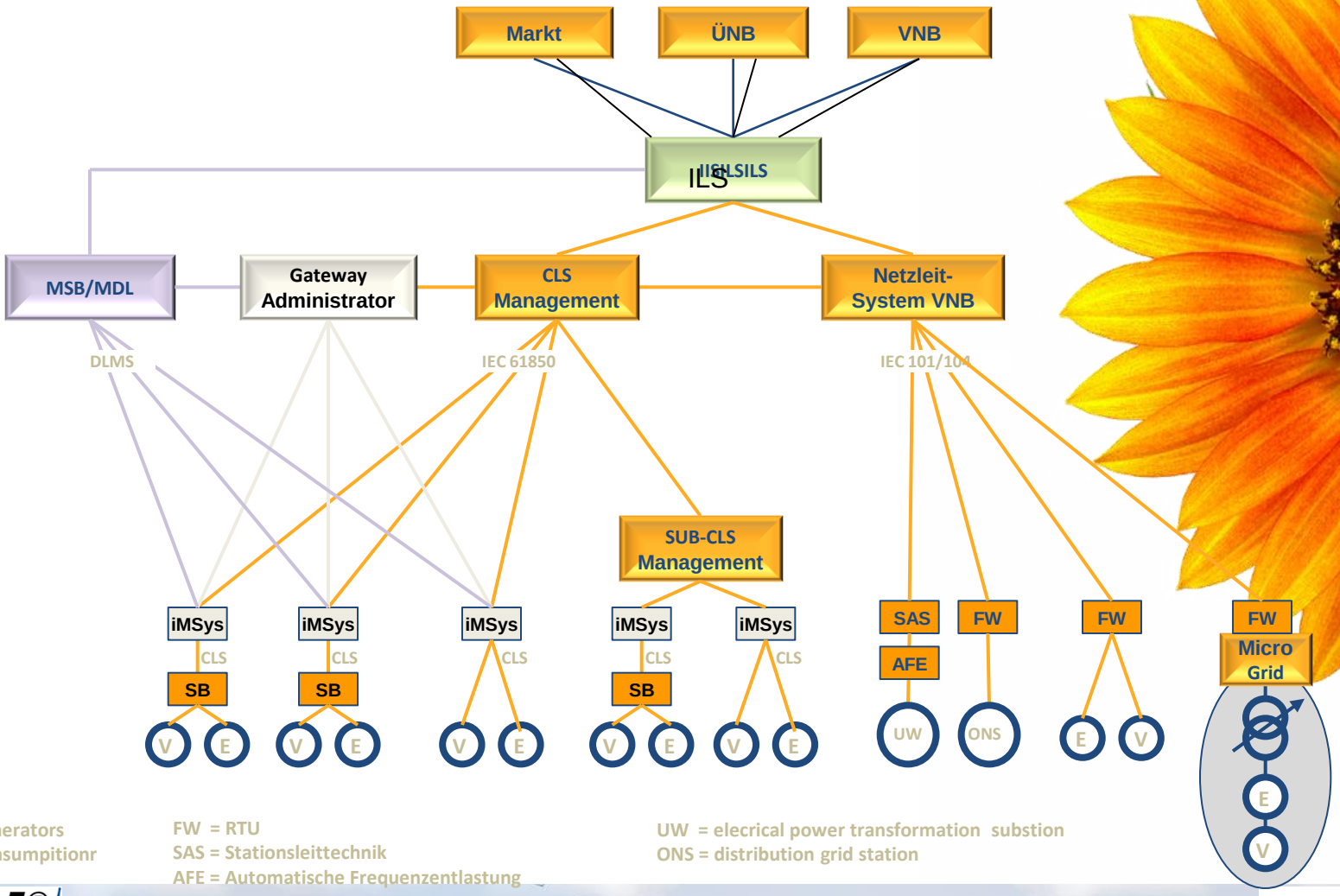
Electronic Meter

- Manual metering
- TOU
- Firmware upgrading

Smart Meter

- Remote recording
- Dynamic electricity price
- Real-time info.
- Remote controlling
- Quality monitoring
- Event feedback
- Remote firmware upgrading

Smart Meter for Grid Stability



E = Generators
V = Consumptionr

FW = RTU
SAS = Stationsleittechnik
AFE = Automatische Frequenzentlastung

UW = elecrical power transformation substion
ONS = distribution grid station

iPLON® The Infranet Company

KFW DEG

Grid Stability 1 Voltage Regulation with Transformers

benefit

+ prove technology

+ low maintenance

+ save money

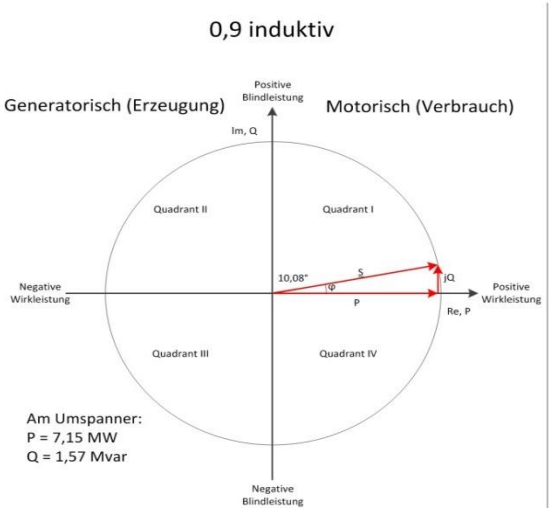
handicap:

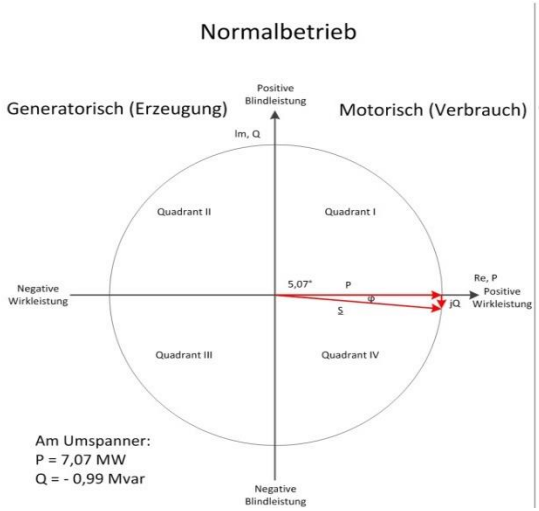
- expencive (3:1)

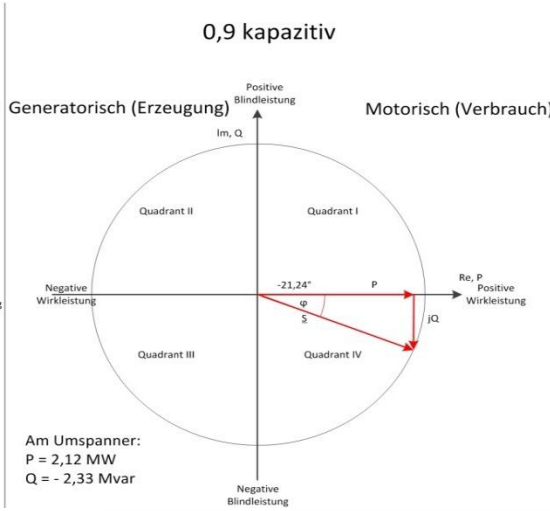
GRIDCON® Transformer (Trafo) & iTAP® (Regeleinheit)
von Maschinenfabrik Reinhausen GmbH
Quelle: MR GmbH

Grid Stability 2 Phase Shifter

Verbraucherzählpfeilsystem (4 - Quadranten)
2. Oktober 2015

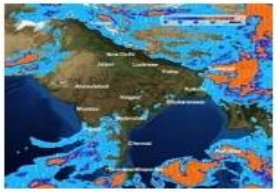






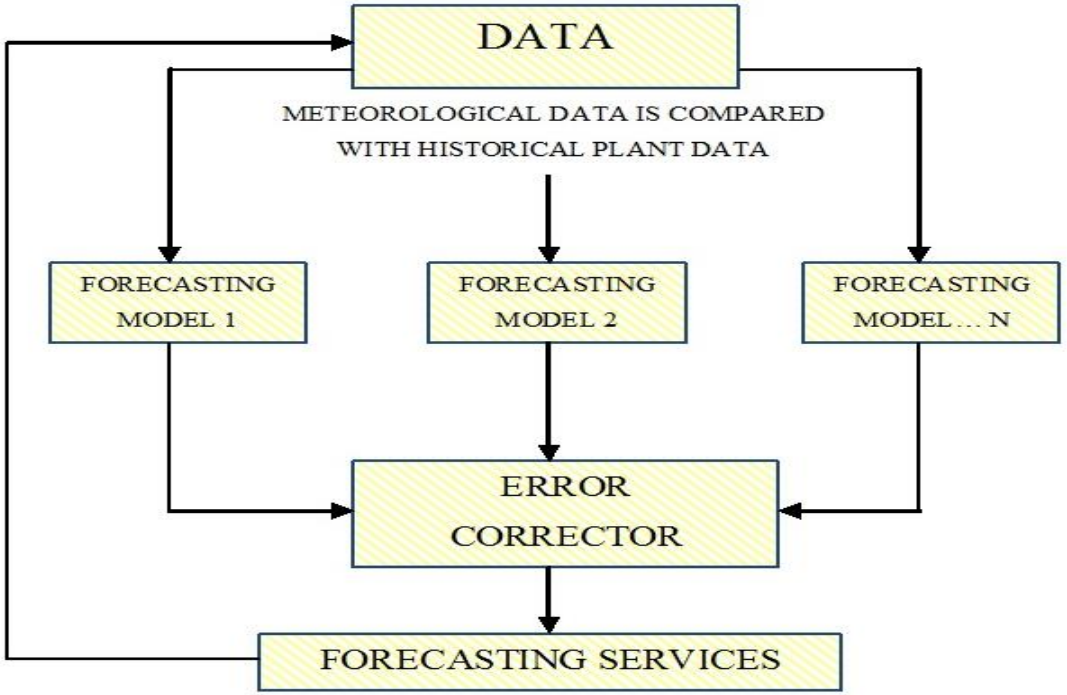
Solar Energy Forecasting

- There are various models like Numerical weather predictions, Statistical techniques etc that are involved in Energy forecasting.
- The major parameters involved for prediction includes:
  - Weather Data: Irradiation
  - Orientation Tilt
  - Historical, Real time Generation data
  - Installed capacity
  - Location



NUMERICAL WEATHER PREDICTION MODEL

WEATHER STATION



Forecasting Regulations

- There are 16 regulations per day that sums up the final forecast output.

- The regulations include Forecasting & Scheduling, calculation of deviations, penalty and payment conditions.

- The deviations and penalty are in the process of getting finalized for each state.

What is IEC 60870 ?

- IEC 60870 set of standards which define systems used for telecontrol (SCADA) in electrical engineering and power system automation applications.
- IEC 60870 standards are developed by IEC Technical Committee 57 (Working Group 03)
- For controlling electric power transmission grids and other geographically widespread control systems.
- Use of standardized protocols, equipment from many different suppliers can be made to interoperate.

IEC 60870-5 Protocol Standards

- IEC 60870-5-101
  - Telecontrol tasks (serial communication)
- IEC 60870-5-102
  - Meter Count
- IEC 60870-5-103
  - Protection data disposal (within a switchgear)
- IEC 60870-5-104
  - Telecontrol tasks in IP networks (Network access for IEC 60870-5-101 using standard transport profiles)

SLDC in India

Apex Body to ensure integrated operation of the Power system in a State

Responsible for optimum scheduling and dispatch of electricity within a state in accordance with the contracts entered into with the licensees or the generation companies operating in that State.

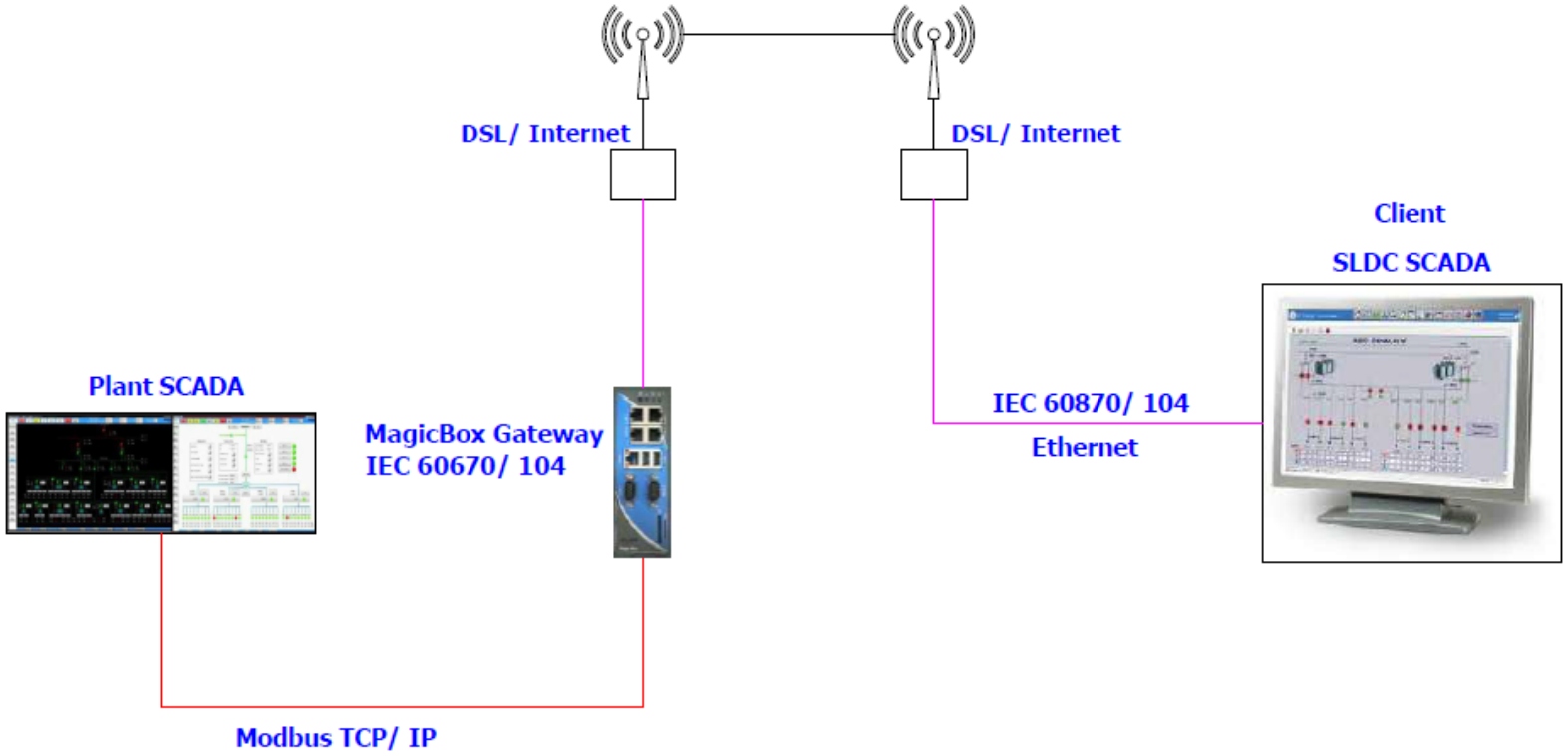
SLDC in India

Monitor grid operation

Keep accounts of the quantity of electricity transmitted through State Grid

real time operation for grid control and dispatch of electricity within the State in accordance with the grid standards and state grid code

Exercise supervision and control over the inter-state transmission system


DSL/ Internet
DSL/ Internet
Client
SLDC SCADA
Plant SCADA
MagicBox Gateway
IEC 60670/ 104
IEC 60870/ 104
Ethernet
Modbus TCP/ IP

iPLON – Magic Box

Communication between SLDC and Power Plant

iPLON Magic Box Standard

The iPLON Magic Box is the interface between the PV plant (rooftop or Power Plant) and the Energy Utility Company. It is based on the technical specifications of the German requirements of BDEW. The control of the PV plant is achieved by the active control of the inverters used in the plant. The system can be used for new plants but also be integrated in existing Power plants.

- **iGATE Datalogger (IEC 60870-5-101/104)**
- **Connectivity to cloud based system and SLDCs with DSL, GPRS, VPN, RT, PLCC**
- **I/O system**
- **Supports Modbus, TCP/IP, LON**

Functions

- **Interface between the RTU of the SLDC and the power plant**
- **Signal conditioning of the power reduction and the reactive power factor correction of the plant**
- **Control configuration with the built in web user interface**
- **Easy to use in new plants and existing plants**
- **Remote access for O&M activities**
- **Power factor correction at the grid connectivity point (HAT) side**
- **Logic to use with the direct seller of the energy (Direktvermarkter): this is the new standard in Germany**

Advantages of iPLON – “Magic Box”

- Control unit for decentralized energy production
- Realtime information out of the energy production
- Portable, Compact, Scalable.
- Wind, solar, hydro power, diesel engine, storage systems etc.
- Active control of Energy output, Cos Phi, forecast
- Successfully Integrated with GE, Siemens, Alstom Systems

IEC 60870 Interoperability

Network configuration

☒ Point-to-point

☐ Multipoint-party line

☐ Multiple point-to-point

☐ Multipoint-star

Transmission speed (control direction)

Unbalanced interchange circuit V.24/V.28 Standard		Unbalanced interchange circuit V.24/V.28 Recommended if >1200 bit/s		Balanced interchange circuit X.24/X.27	
☐	100 bit/s	☐	2400 bit/s	☐	2400 bit/s
☐	200 bit/s	☐	4800 bit/s	☐	4800 bit/s
☒	300 bit/s	☒	9600 bit/s	☐	9600 bit/s
☒	600 bit/s	☐	19200 bit/s		
☐	1200 bit/s	☐	38400 bit/s		
☐	2400 bit/s	☐	56000 bit/s		
☐	4800 bit/s	☐	64000 bit/s		

SLDC in TAMILNADU

SLDC (Chennai) – SS (Kanchi)

Thank You!

www.iplon.de
www.iplon.in
www.re2tn.org
www.youtube.com/user/iPLONChannel

Stadtwerke Gandhigram

"Be the change you want to see in the world."

- Mahatma Gandhi

Abhijit Singh Sachdeva

iPLON India Pvt Ltd.

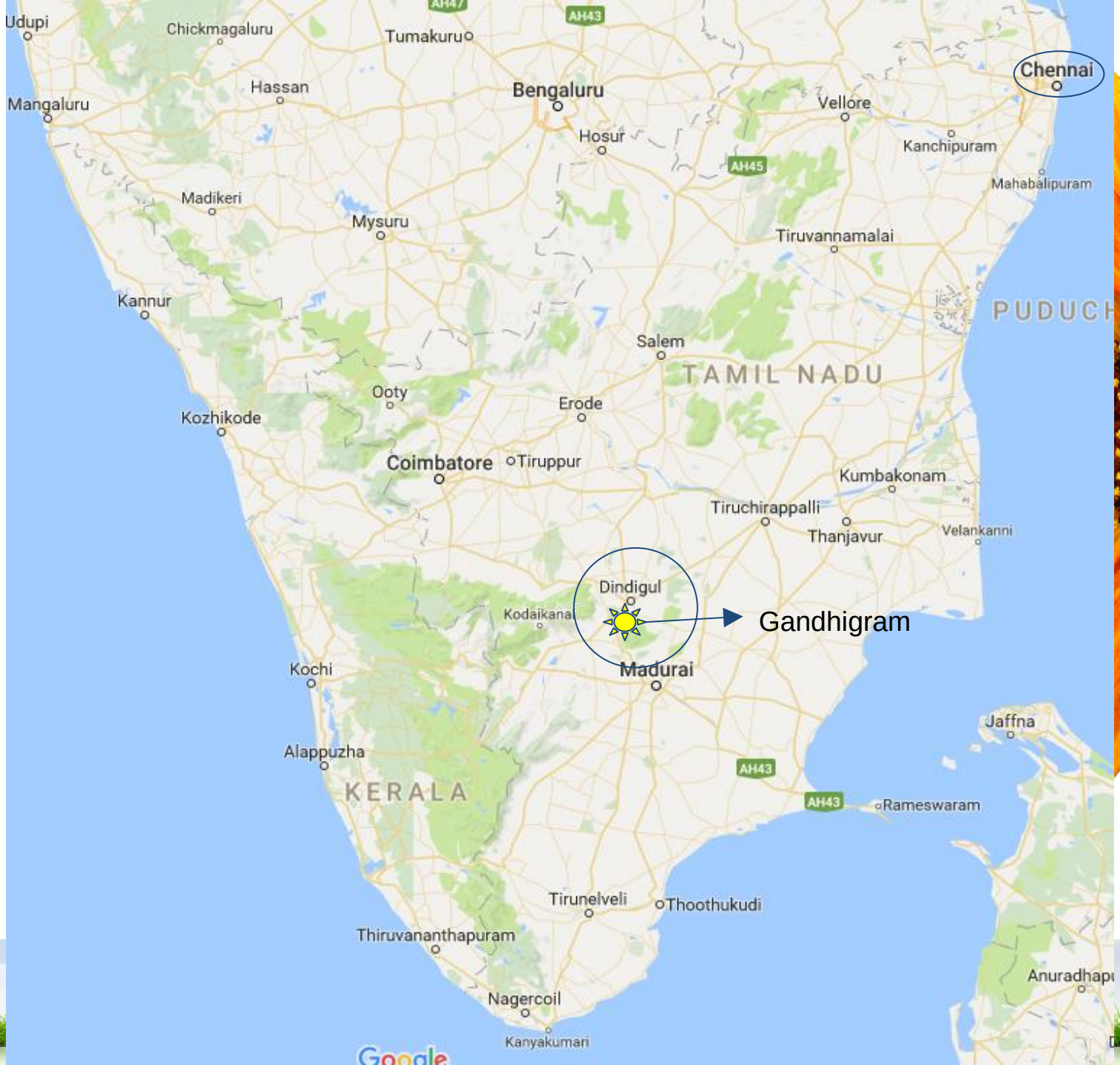
Agenda

- Reaching Gandhigram
- Gandhigram Rural Institute
- Rural Energy center

- Stadtwerke Gandhigram
    a. Renewable Energy/Energy Efficiency
    b. Water Management
    c. Waste Management
    d. E-Mobility
    e. Efficient Cooling Systems

- MOU | Commitment for Stadtwerke Gandhigram
- More Pictures


Kabul
کابل
Islamabad
اسلام آباد
JAMMU AND KASHMIR
QINGHA
HIMACHAL PRADESH
Lahore
لاہور
Chandigarh
TIBET
PUNJAB
UTTARAKHAND
Pakistan
HARYANA
New Delhi
UTTAR PRADESH
Nepal
ARUNACHAL PRADESH
Kathmandu
काठमाडौं
SIKKIM
Bhutan
RAJASTHAN
Lucknow
ASSAM
NAGALAND
BIHAR
MEGHALAYA
MANIPUR
Bangladesh
MADHYA PRADESH
JHARKHAND
TRIPURA
GUJARAT
Ahmedabad
India
WEST BENGAL
MIZORAM
CHHATTISGARH
Surat
Myanma
(Burma)
ODISHA
MAHARASHTRA
Naypyitaw
နေပြည်တော်
Mumbai
TELANGANA
Hyderabad
GOA
KARNATAKA
ANDHRA PRADESH
Bengaluru
Chennai
Bay of Bengal
Mysuru
TAMIL NADU
Andaman Sea
Kochi
KERALA
Google
Sri Lanka
Map data ©2016 Google
Tern

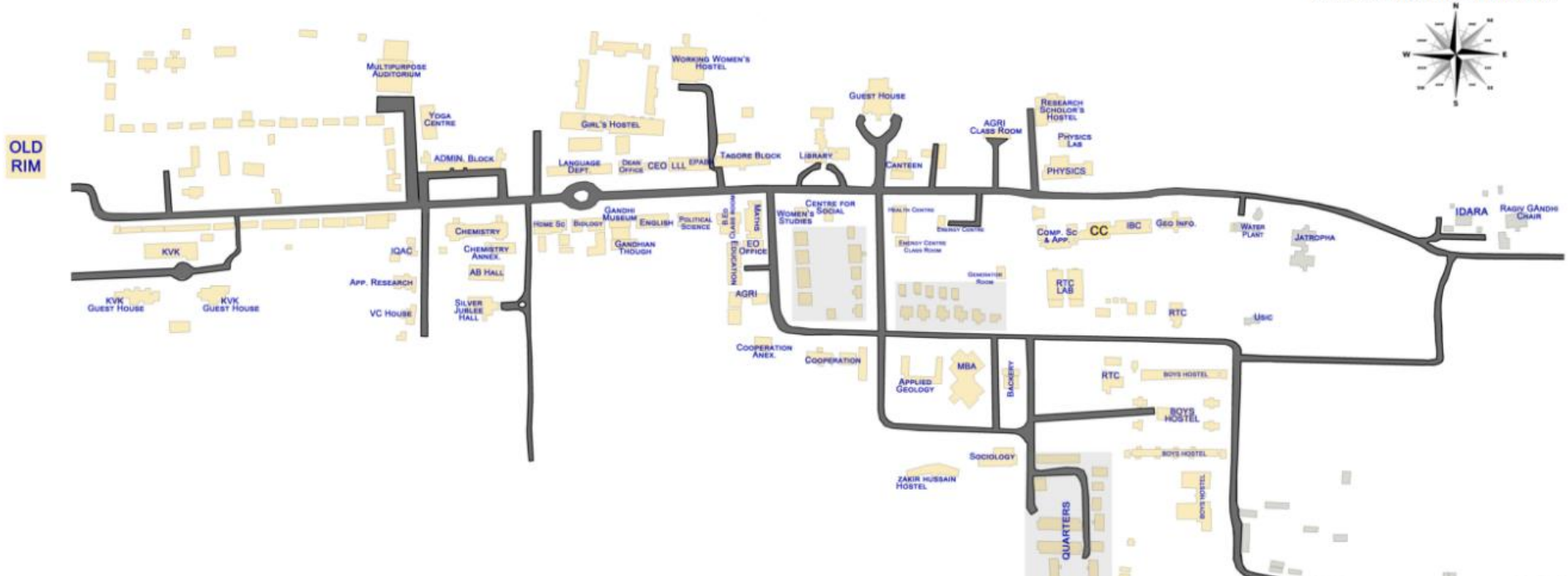

Udupi
Chickmagaluru
Tumakuru
AH47
AH43
Chennai
Hassan
Bengaluru
Vellore
Mangaluru
Hosur
Kanchipuram
AH45
Mahabalipuram
Madikeri
Mysuru
Tiruvannamalai
Kannur
PUDUCH
Salem
TAMIL NADU
Ooty
Erode
Kozhikode
Coimbatore
Tiruppur
Kumbakonam
Tiruchirappalli
Thanjavur
Velankanni
Dindigul
Kodaikanal
Gandhigram
Kochi
Madurai
Jaffna
Alappuzha
KERALA
AH43
AH43
Rameswaram
Tirunelveli
Thoothukudi
Thiruvananthapuram
Anuradhapu
Nagercoil
Kanyakumari
Google

Gandhigram Rural Institute

Mission: Providing knowledge support to rural sector to usher in a self-reliant, self-sufficient and self-governed society

- The place fondly named ‘Gandhigram’ was inaugurated by Mahatma Gandhi on 7th October 1947
- Devoted followers of Mahatma Gandhi founded the Gandhigram Rural Institute in 1956
- Built on 207 acres of land, mostly donated by the villagers with the hope that their children will get education and employment
- 3500 students today, 85% from the Rural background
- University focussed on rural higher education programmes
- Funded by the Ministry of Human Resource Development, Government of India

On mouse click Zoom in the Map



Rural Energy Center

To establish a model "energy village" with renewable energy & energy conservation technologies

- Set-up in 1998
- Runs a 2-year M.Tech RE course
- Renewable Energy Planning for Villages
- KW scale rooftop off-grid plants
- Energy Auditing
- Renewable Energy Lab

- 20 students in each year
- 7 of them working at iPLON


RURAL ENERGY CENTRE

Stadtwerke Gandhigram

5 Focus areas:

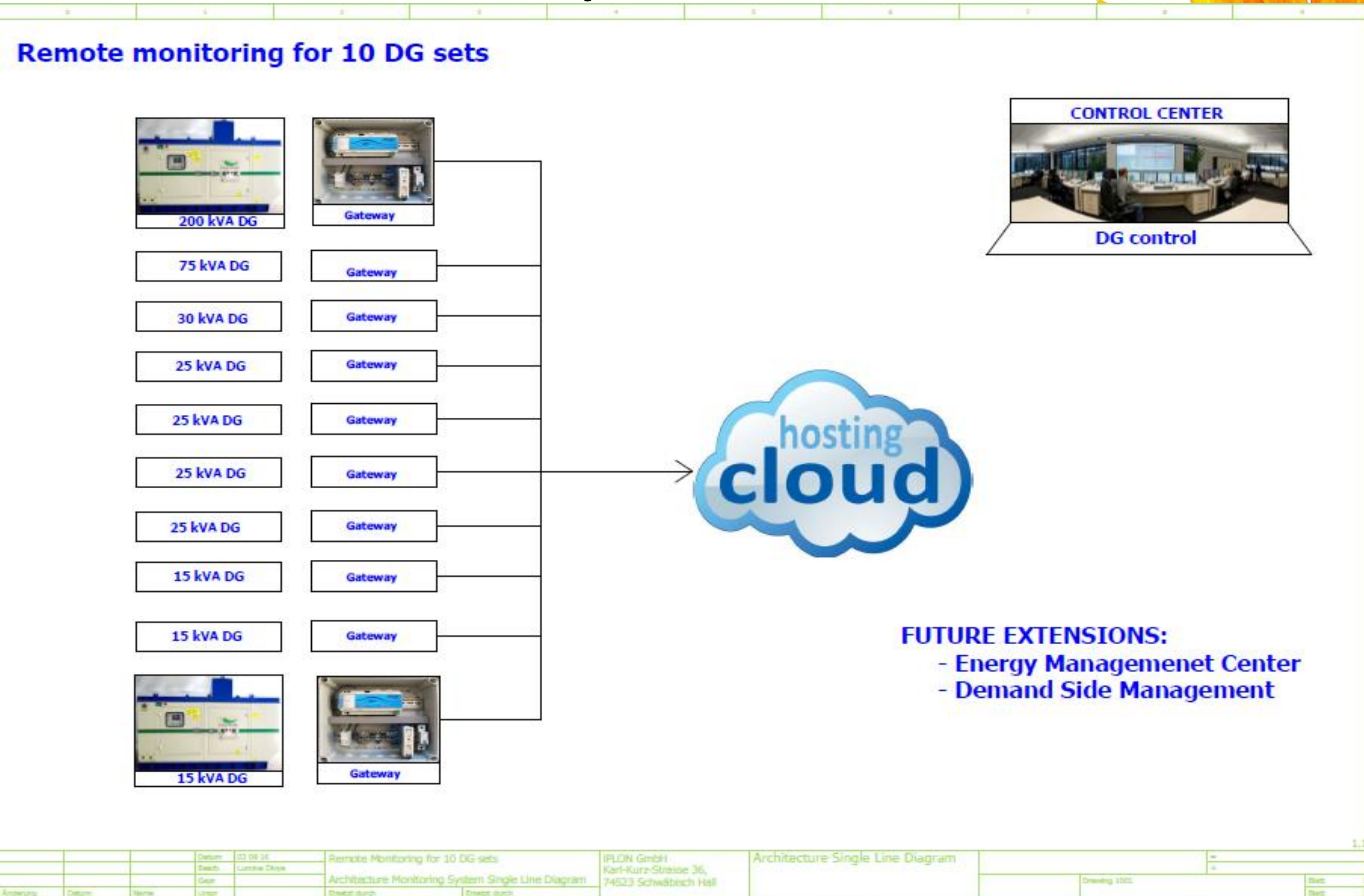
- Renewable Energy / Energy Efficiency
- Water Management
- Waste Management
- E-Mobility
- Efficient Cooling Systems

"An ounce of practice is worth more than tons of preaching"

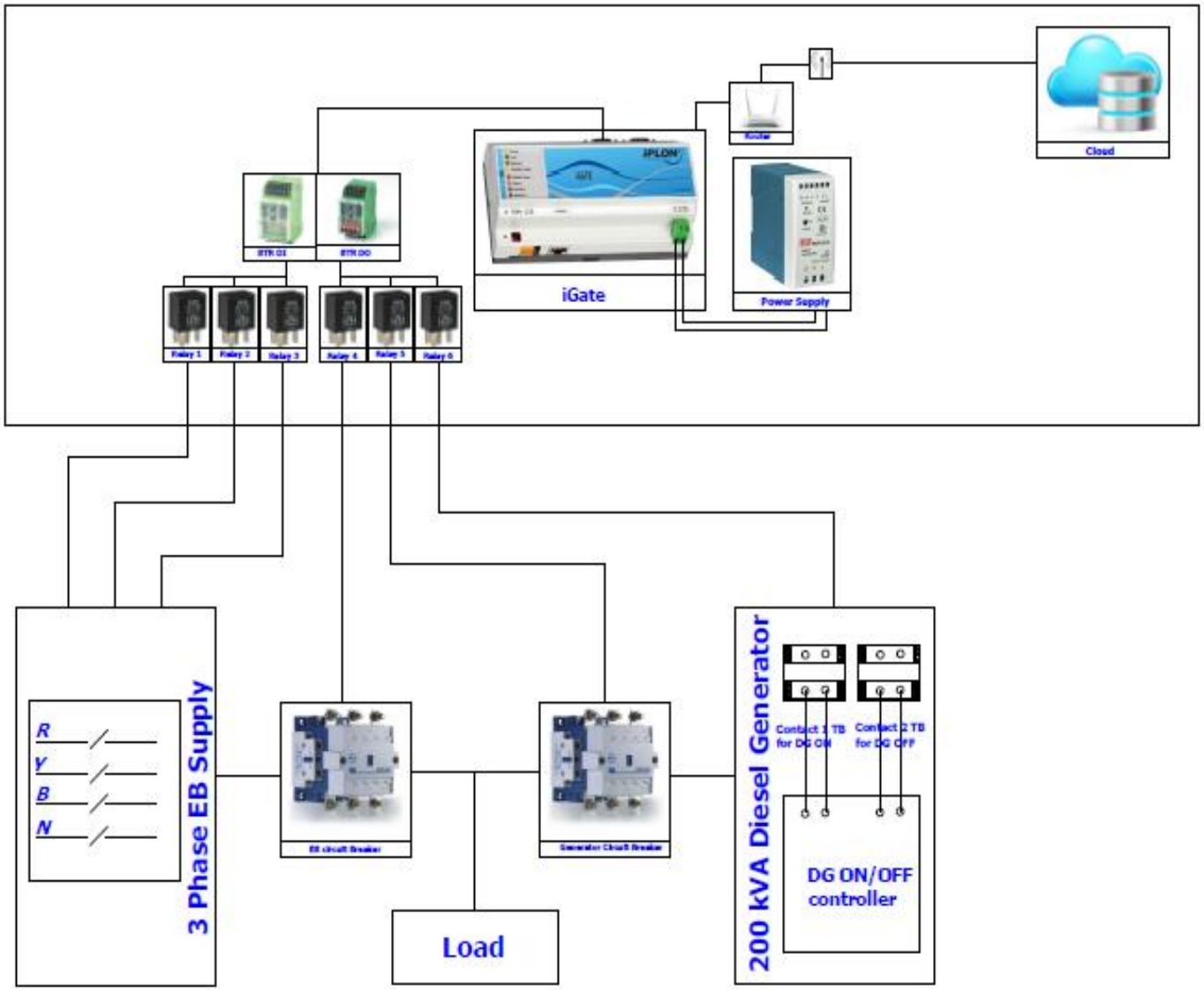
Mahatma Gandhi

Renewable Energy / Energy Efficiency

1. Diesel Generator Control System



Remote Control of Diesel Generator in GRI

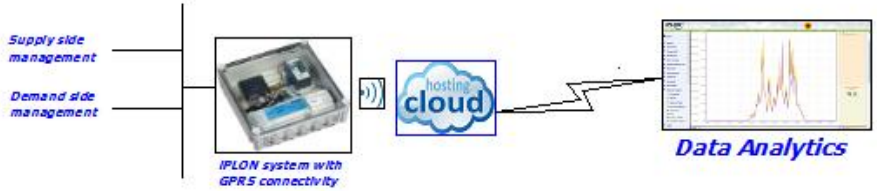


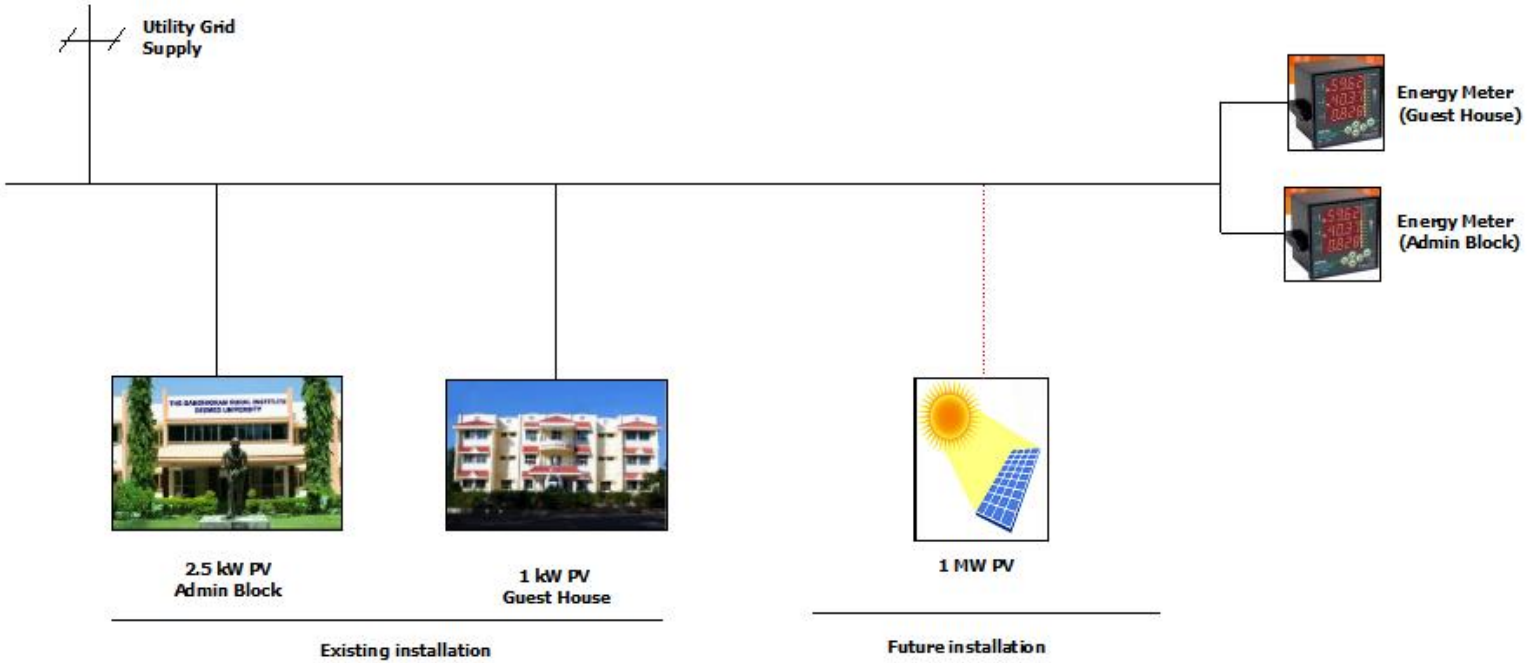
			Datum	20.09.16	Remote Control of Diesel Generator	IPLON GmbH Karl-Kurz-Straße 36, 74523 Schwäbisch Hall	Architecture Single Line Diagram	
			Bearb.	Lumine Dinya				
			Gepr.		Architecture Monitoring System Single Line Diagram			Drawing: 1001
Änderung	Datum	Name	Urspr.		Ersetzt durch	Ersetzt durch		

2. 1 MW Solar Plant (RESCO Model)

3. 110/22kV Substation

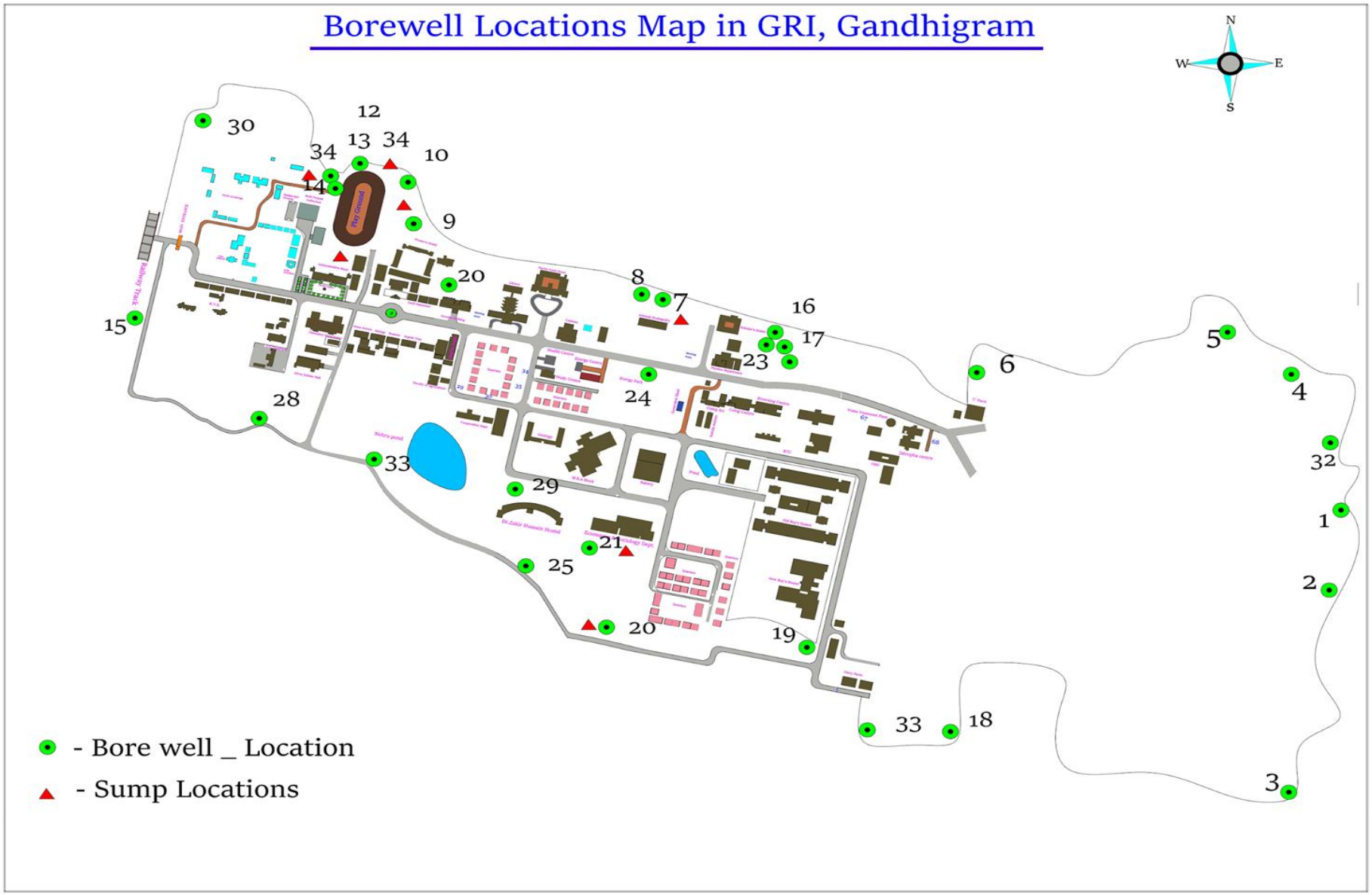
Logical View : Gandhigram Rural Institute





			Datum	11.08.16	Gandhigram Rural Institute - Deemed University	IPLON GmbH Karl-Kurz-Strasse 36, 74523 Schwäbisch Hall	Architecture Single Line Diagram	1.1
			Bearb.	Lumine Divya				
			Gepr.					
Änderung	Datum	Name	Urspr.		Ersetzt durch	Ersatz durch	Drawing 1001	Blatt 1 / Blatt 1

Water Management



- No of borewells : 35
- Depth of borewell : 1200ft depth
- Requirement : 400,000 lit/day
- Amount pumped : 300,000 lit/day
- Girls and Boys Hostel : 100,000 lit/day/hostel
- RO plant capacity : 16,000 litres

Water Treatment Plant


TANK-B
TANK-A

Next Steps

- Mindset for Water management
- Get women from the local community involved as they are more interested to solve the water problems
- Water grid inside the campus (Pipelines)
- Finding the water leakages (equipment)
- Check topology for water pressure

- Study on water recycling at the Girls and Boys Hostel (Agriculture activities on hold because of Water shortage)
- Study on rain water harvesting possibilities
- Sewage Treatment Plant (1 for the campus)

Waste Management

1. Biogas Plant


"GREEN GAS"
1. MODEL : COMMERCIAL
2. BIOGAS OUTPUT - 20 TO 25 m³/DAY
3. LPG EQUIVALENT - 10 TO 12.5 KG/DAY
4. CO OFFSET - 86,232 TO 95,813 KG/YEAR
5. FOOD WASTE - 150 TO 200 KG/DAY
RECYCLE WASTE! SAVE FUEL! SAVE ENVIRONMENT!
DISPONSING FOOD, VEGETABLE, GARDEN WASTE ETC. IS NO MORE A PROBLEM. THIS MACHINE WILL CONVERT ALL THE BIO-DEGRADABLE WASTER INTO USEFUL RENEWABLE ENERGY CALLED "BIOGAS" WHICH CAN BE USED FOR COOKING/POWER GENERATION AND PRODUCTION OF ORGANIC MANURE, USING ANAEROBIC DECOMPOSITION PROCESS.
WHAT ELESE CAN YOU EXPECT FROM WASTE??
CONTACT : GREEN CONNECT
203/62, OPP.SUKRA FANCY, PAARAI VATTAM, ALAGAPURAM, SALEM - 636 013
Web : www. greenconnect.in, Email : greenconnectindia@gmail.com
greenconnect,Salem
Cell : 081246-45694

- Works on the principle of Anaerobic digestion
- Used for cooking purpose in ladies hostel
- Waste consumption: 150 – 200 kg/Day
- Slurry is used for growing energy crops
- CO2 offset level: 86,232 to 95,813 kg/year

E-Mobility

1. Solar Powered Passenger Autorickshaw


(SOLAR STILL)

2. E-Bus


THE GANDHIGRAM RURAL INSTITUTE
MHRD - GOVERNMENT OF INDIA
SPEEDWAYS ELECTRIC
VEHICLE FOR THE DIFFERENTLY ABLED

E-Mobility Possibilities

- Solar Car-ports
- E-Bikes
- Production of Solar Rickshaws

Efficient Cooling Systems

Analysis Phase: What makes more sense?

- Central or De-central?
- Automatic temperature control (Building Automation)
- Consumption Pattern

MOU | Commitment for Stadtwerke Gandhigram

More pictures..

Historical Trend	Gandhian Proposal
1. Multiplication of wants	Limitation of wants.
2. Diffusion of large scale technology	Large scale technology in a few sectors coexisting with small-scale technology and handicrafts in others.
3. Mass Production	Small scale production,except in a few sectors where mass production is unavoidable.
4. Centralisation of economic power	Limited state ownership, widespread village ownership and trusteeship.
5. Rapid urbanisation	Self-governing village republic,self-sufficient in basic needs.
6. Inequality (ameliorated by progressive taxation and social insurance)	Equality of wages and concessions made by Gram panchayat as per nature of the work.
7. Increasing specialization	Universal physical labour.





iPLON


iPLON
WORKSHOP ON
SMART GRID PROJECTS
16th August 2016
Rural Energy Centre
The Gandhigram Rural Institute - Deemed University

Thank you for your attention

Abhijit Singh Sachdeva
iPLON India Pvt. Ltd
abhijit@iplon.de
www.iplon.de. www.iplon.in
www.re2tn.org

Gandhigram website:
http://www.ruraluniv.ac.in/

Ba Wü Solar cluster + Smart grid

iPLON's commitment and the German-Indian Platform

Victor Thamburaj

CEO, iPLON GmbH

iPLON®
The Infranet Company


iPLON®
The Infranet Company
Wind Farm
Hydropower
Grid
Smart Company
Biogas
Electromobility
Smart Farm
Smart Community
Solar Farm
Smart Grid
• Solar Farm
• Wind Farm
• Biogas
• Hydropower
• Smart Comunity
• Smart Company
• Smart Farm
• Electromobility

SchwäbischHall

SchwäbischHall

Solar Cluster Baden-Württemberg

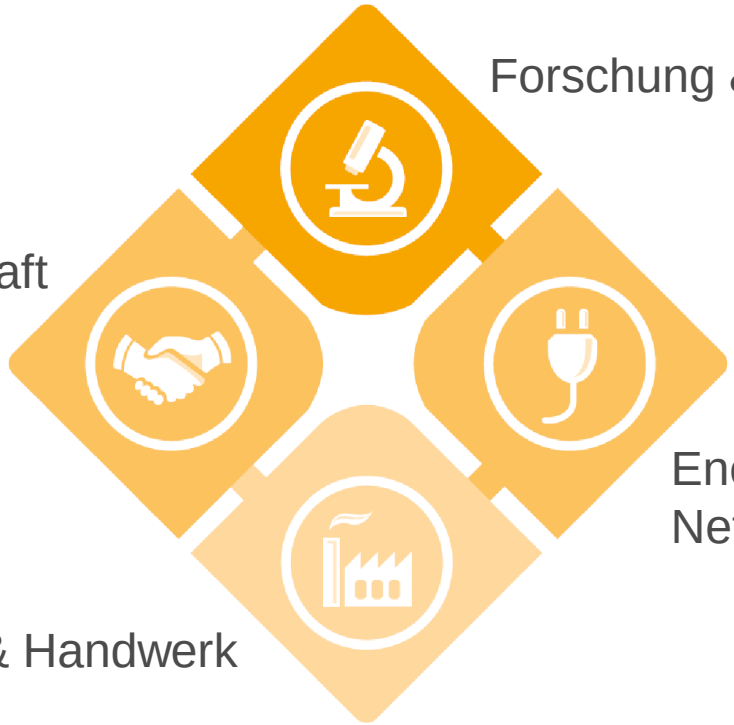
SmartGridsBW
Energien intelligent vernetzen.

Platform / Framework
BW –TN Network

iPLON®
The Infranet Company

SOLAR CLUSTER BW

Zusammenschluss von rund 40 baden-württembergischen Unternehmen und Forschungseinrichtungen aus allen Teilen der solaren Wertschöpfungskette



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Solar Cluster
Baden-Württemberg

iPLON® The Infranet Company

Solar Cluster Baden-Württemberg

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Baden-Württemberg

SMART GRID CONSORTIUM - BW

iPLON®
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Smart City

Associations

TSO Transfer/ Network Operators

Multi Utility Companies

Smart Grid

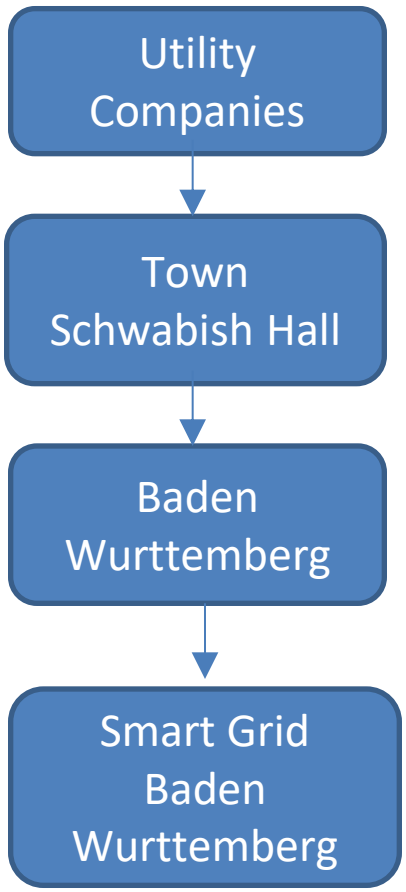
Universities

R&D

SchwäbischHall

iPLON® The Infranet Company

SmartGridsBW
Energien intelligent vernetzen.



MVV Energie

Netze BW

SWE Stadtwerke Esslingen

Stadtwerke Schorndorf

SchwäbischHall

VKU Verband kommunaler Unternehmen e.V.

manz passion for efficiency

Mounting systems for solar technology

K2 systems

KIT Karlsruher Institut für Technologie

Fraunhofer ISE

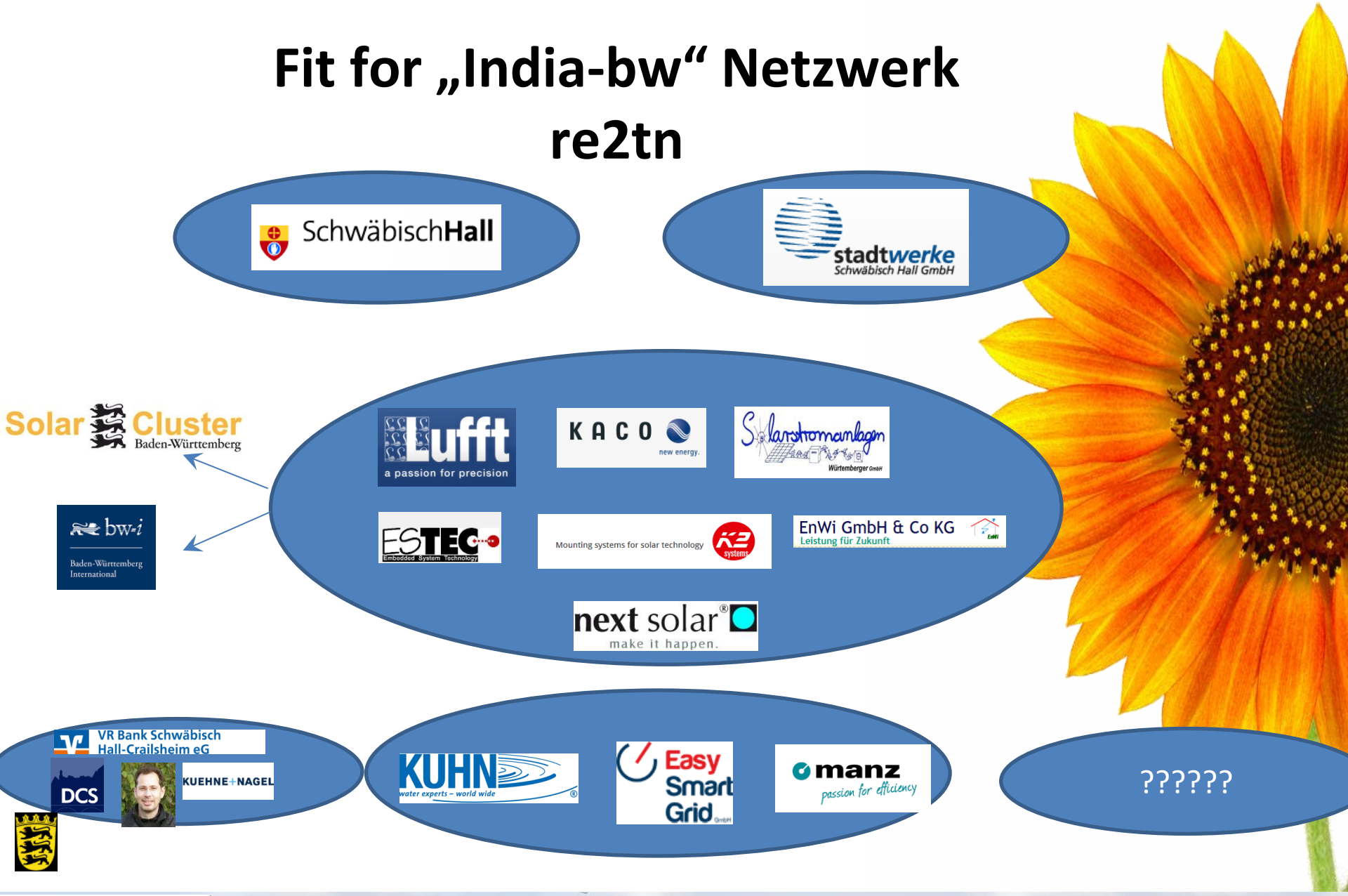
BOSCH Technik fürs Leben

ids

VENIOS Uniting IT and Energy

iPLON® The Infranet Company

Fit for „India-bw“ Netzwerk re2tn




I ♥ CHENNAI
VOLTAS
A TATA Product

iPLON®
The Infranet Company

Next Steps

2016

- 17. Nov. : Stuttgart Solar Cluster : Chances/Risks in India
- 24. Nov.: Chennai : Smart City SHA / Chennai /Gandhigram
- 28. Nov.: Stuttgart : Solarbranchentag : Solar Cluster

2017

- 22.-29. Jan. : Winfried Kretschmann in Pune und Bangalore
- Mitte March: OB Pelgrim in Chennai/ Gandhigram
- April : Solar-Cluster -Team in Chennai / Gandhigram
- Juni : Gandhigram-Team in Schwaebisch Hall
- Juni : Intersolar 2017 München

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