IPLON iBox Solution
Rooftops

Mr. Carlos Valencia, Senior Systems Manager,
iPLON

Date : 27th May 2016

Agenda

- Rooftop Projects
- Products
- Service

Rooftops Germnany

- About 1.5 million photovoltaic systems
- From this 1 million are rooftops

Maritim, Hamburg, 972,7 kWp

Carport,

PV roof installation in Germany

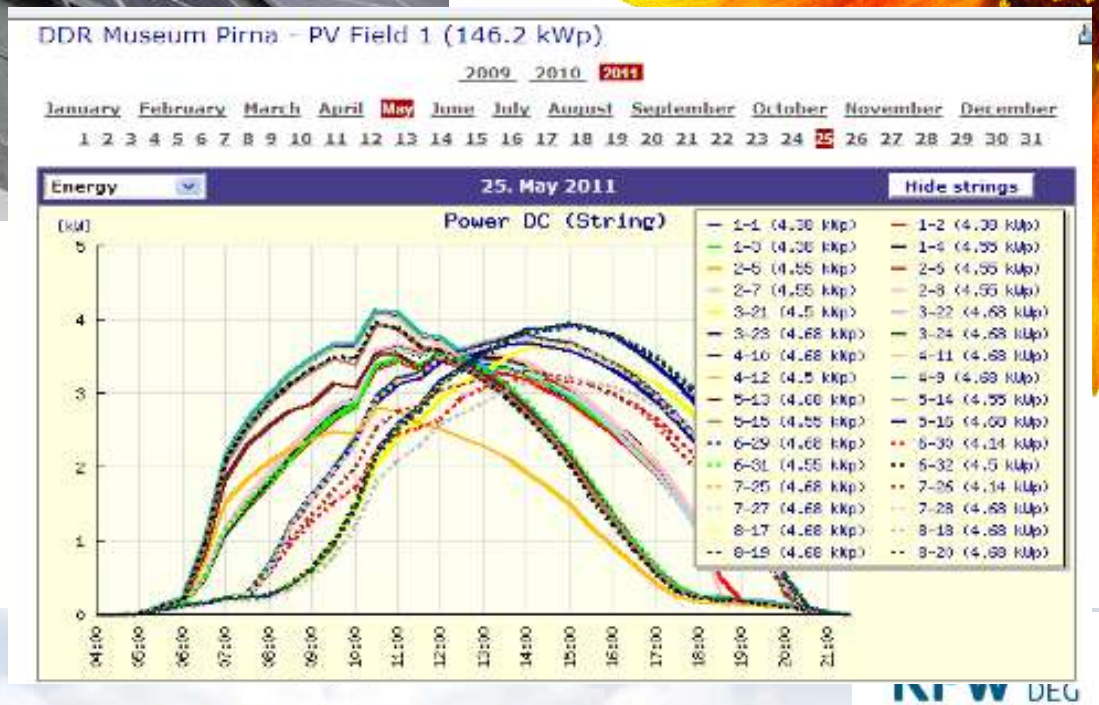
100 kWp roof top:
450 x ITS module 220Wp
4 x 10kW Kostal inverter
1 x 65kW MW Inverter
4 x string box with
4 MPP trackers each

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

Combination with Greenhouse and PV System

Building up of Greenhouse combination have to be done with the knowledge of a lager Greenhouse builder and the Information about the goods who will be produced inside!

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!

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Special Solution Grid Inverter parallel to a Diesel Engine

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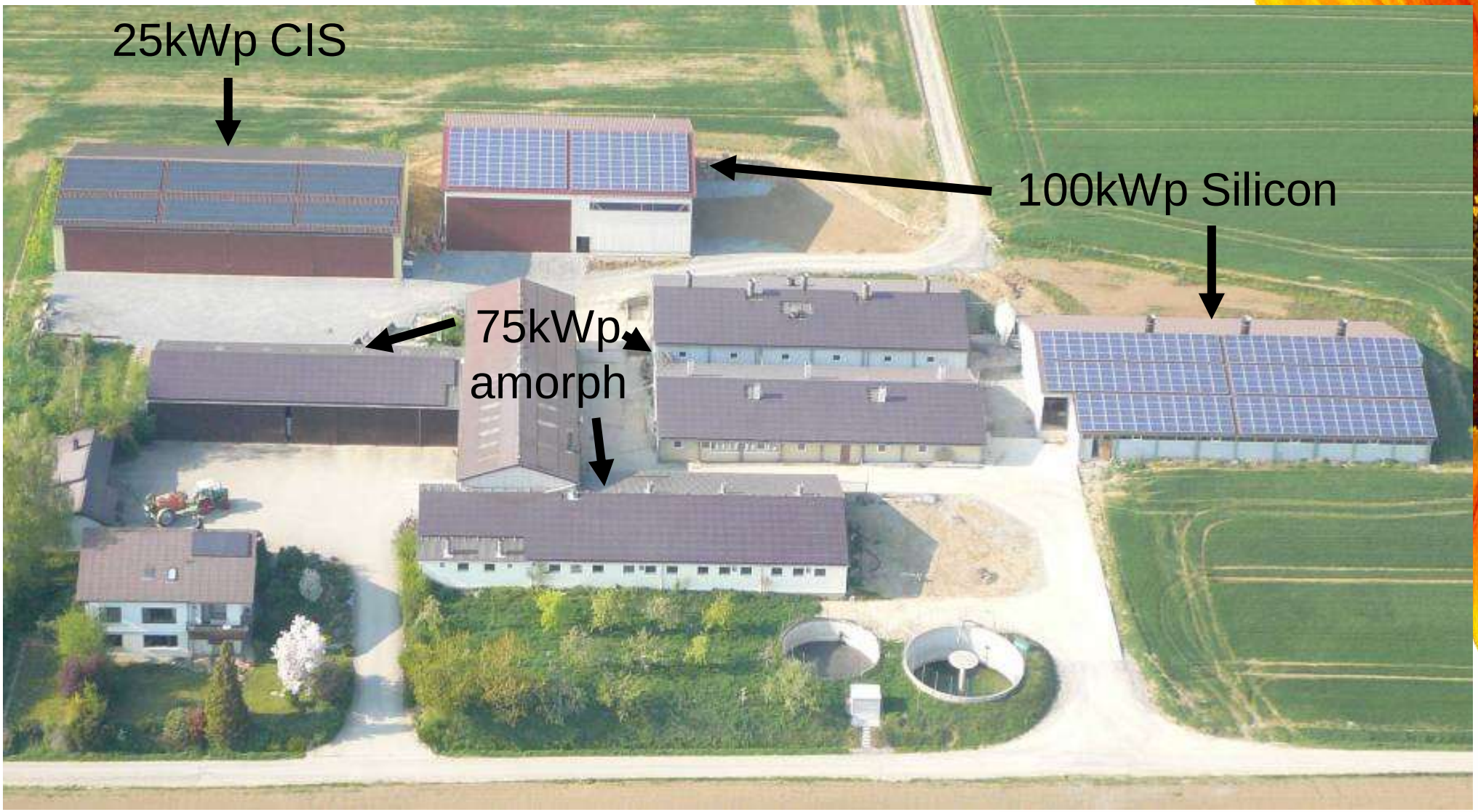
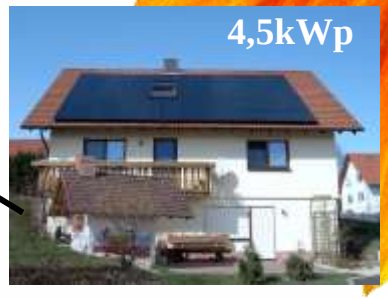
200kWp with different module technologies



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

Old References



140kWp Pergola in the Netherland

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!

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iRooftop-Box 18710

- Inverters Interface
- Energy meter Interface
- Weatherstation Interface

iGridControl-Box 18510 (Value)

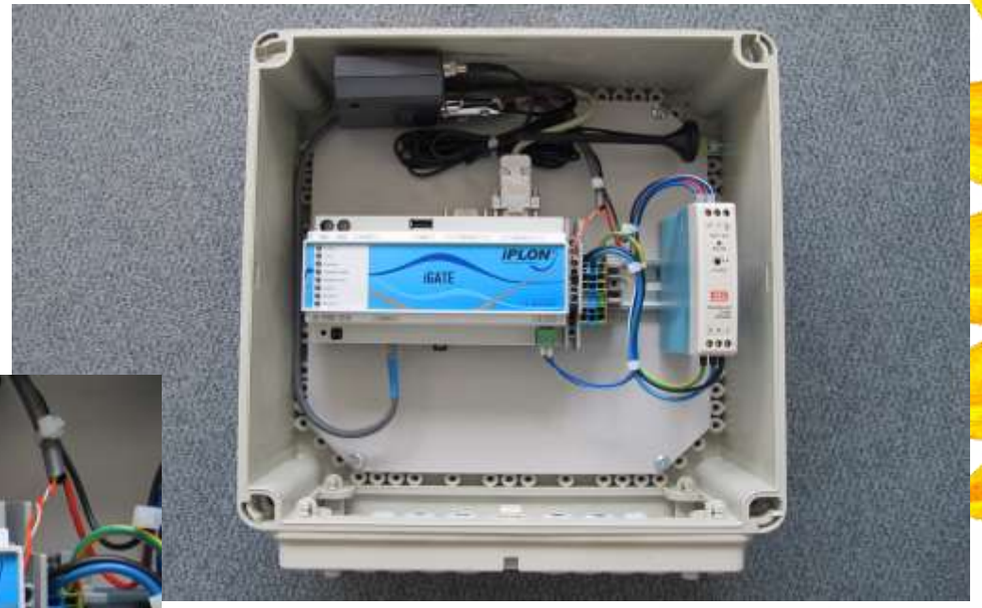
Grid stability system

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

Thank You!

www.iplon.de
www.youtube.com/user/iPLONChannel

iPLON – Rooftop Solutions
May 27th, 2016



Offering solutions for Solar Rooftop Plants

- **Making Contact**
- **Typical enquiry: ‚1-liner‘**
- **Non-precise offer: ‚Price budget‘**
- **iPLON questionnaire: ‚Complex stuff no one likes‘ ;)**
- **Customer project details**
- **Official offer**
- **Customer Purchase Order**
- **Engineering, Production, Delivery and Commissioning Workflow**

Hi Abhijit, Thanks for reverting. To start off with we require your solutions for a 200 kWp rooftop installation. Please advise detailed technical and commercial solution for the same.

Details required by us to make a technical offer

Device details

- **Inverters**
- **Energy Meter**
- **String Monitoring Unit**
- **Weather Sensors**

Plant details

- **Plant Layout**
- **Internet Connection**
- **Site Location**
- **MNRE Certificate**
- **Delivery time**

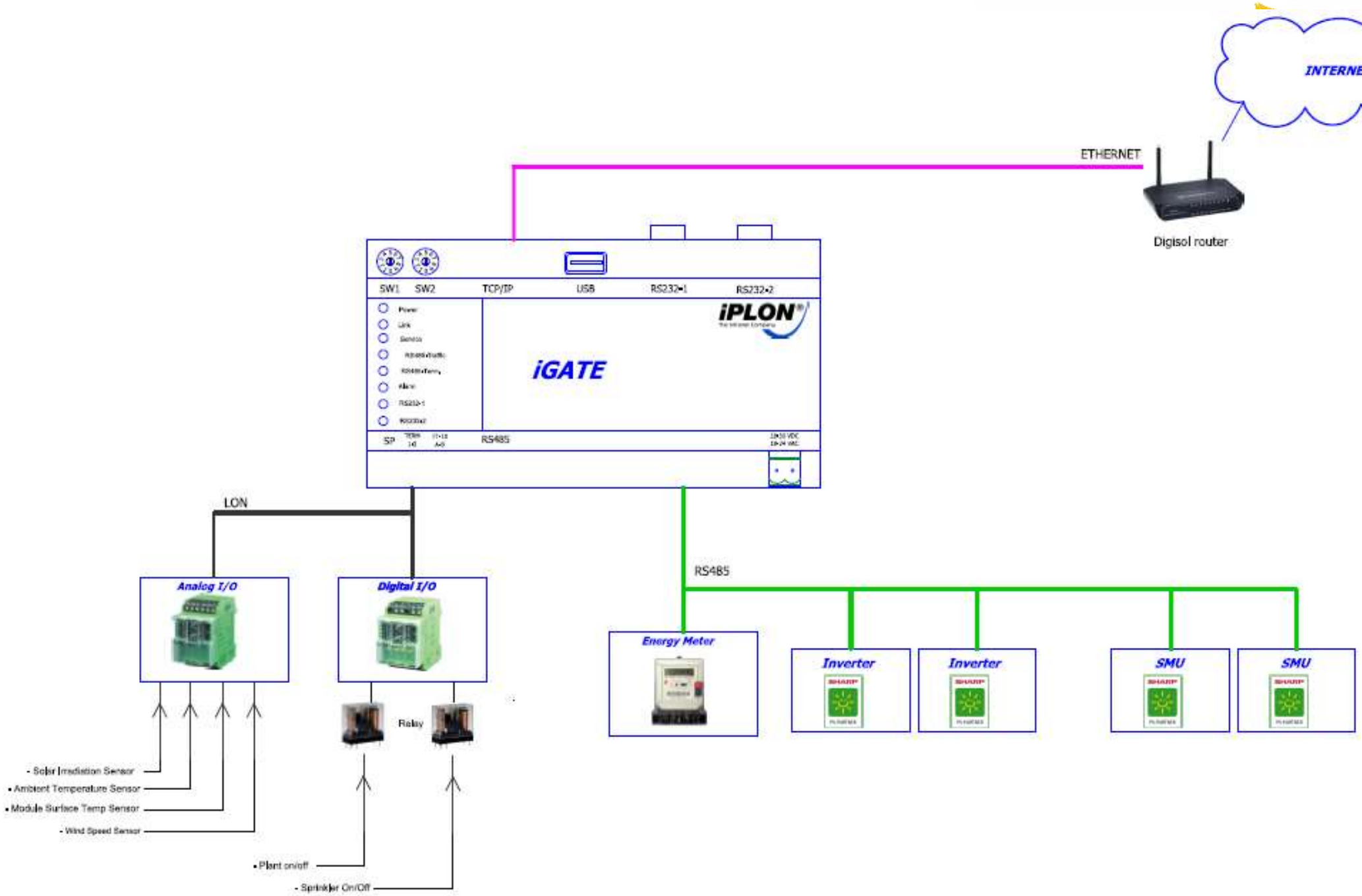
Device Details:

- 1) Inverters: Make and quantity- SMA (STP 60 x 3 nos.)
- 2) Energy Meter: Make and quantity (1 no. ?) (Schneider; 01)
- 3) String Combiner Monitoring Boxes (if applicable): Make and quantity (Make yet to be decided; Qty- 03 nos.)
- 4) Weather Sensors :- Shall iPLON also offer this. For rooftops we have M&T Ingenieurburo make sensors (Irradiation, module temp, ambient temp and wind speed) with an RS485 output. If you are procuring sensors separately then please mention make and type (output signal) (Please quote for your sensors)

Other details:

- 1) Plant layout: So that we can check if all devices are nearby (cable length RS485) (Max. distance between devices shall be of 25 mtrs.)
- 2) Internet connection: Do you have a DSL connection on-site or should we supply a GPRS router (DSL connection available)
- 3) Site location: nearest railway station (Gurgaon, Haryana)
- 4) Do you also have a MNRE certificate for customs duty exemption ? (Yes)
- 5) When is the Delivery time? (Mid- April)

We shall be able to make a good offer with these details. Looking forward to the same.

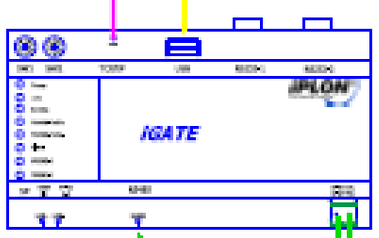

INTERNET
ETHERNET
Digisol router
SW1
SW2
TCP/IP
USB
RS232-1
RS232-2
iPLON
iGATE
RS485
LON
RS485
Analog I/O
Digital I/O
Energy Meter
Inverter
Inverter
SMU
SMU
Relay
- Solar Irradiation Sensor
- Ambient Temperature Sensor
- Module Surface Temp Sensor
- Wind Speed Sensor
- Plant on/off
- Sprinkler On/Off

DSL internet Line

iBOX

Ethernet Cable

USB Cable

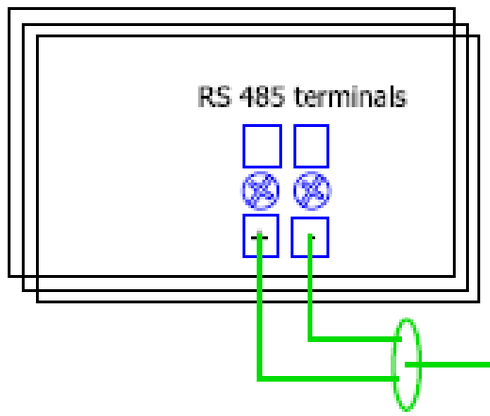


RS485 - Serial converter

RS485

RS485

Refusol inverters 1,2 and 3



Conzerv EM 6400

Trinity SMU

			Date	13.05.2014		iPLON GmbH	iBox Standard roof top solution		iPLON GE iGridControl
			Editor	Bharath					
			appr.						Page
Change	Date	Name	origin		Replaced by	Replaced by			Page

Why do we ask for the device details?

- **Mode of communication**
- **Communication Protocol**
- **Output Signal type**
- **Engineering & configuration efforts**

= No. of field inputs and their properties

Need for Plant details?

- **Understanding nature of the site: single roof, distributed roofs, distance between devices etc.**
- **Which GPRS network works well**
- **Customs Duty exemption possibility**

= Offering a solution that will work

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Fax: +49-(0)791-93060-60
E-Mail: calec@iplon.de
http://www.iplon.de

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From: Abhijit Singh Sachdeva — Direct No.: +91 9884845897

To: [redacted]
Solar Business
[redacted]
Pune — Date : 30.01.2016

Tel Nr: [redacted]

Number of Pages: 4

Offer Number: Offer_[redacted]_500kW_Chennai.V1.0
Captive [redacted] PV plant monitoring system

Dear Mr. [redacted],

With respect to your enquiry dated 18.01.2016 and our discussion at your office on 28th January, regarding the requirement for iPLON's Web based monitoring for your 500kW Solar PV project, we take this opportunity to present our offer which includes our delivery and payment conditions.

Location – [redacted]
Segment – [redacted] PV Plant (Captive)

ITEM 1 : Supply	Price
Monitoring system iAT (to be placed in 500kW Control Room) - iGate Datalogger - 24V Power supply - EasySync- 2 no. (2 RS485 ports) - BTR 4 Analog Input card (0-10V): Connection with environmental sensors - - Connection to Bonfiglioli Inverter: 1 no. (Modbus RS485) - Connection to Conzerv 6200 Energy meter: 1 no. (Modbus RS485) - Connection to Trinity Touch SMUs: 4 Nos. (Modbus RS485) - Build in an IP 55 Hensel Box: ready with all terminals. - Engineering	[redacted]
TOTAL	[redacted]
(Prices quoted are Ex-works Schwaebisch Hall, Germany) (Prices are exclusive of customs & taxes. Will be charged as per actuals)	

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ITEM 2 : Services	Price
On-site commissioning charges - Plant located in Chennai - - - Configuration and testing of web-portal: 1 week - Handover and training	[redacted]
Web-portal rental & maintenance charges - Charges applicable from 2nd year - 'Per year' price quoted	[redacted]

Scope of Customer:
1. Mounting and Installation of iPLON Cabinet & weather sensors
2. Supply of Power Supply, RS485 cables, Ethernet and Fiber Optic cables
3. Power Supply, RS485, sensor cable, FO and Ethernet cable laying

Terms & conditions:

1. Taxes & Duties:

Item 1.0: Customs Duty of 23% is applicable as extra. However, if MNRE Certificate is produced by customer, Customs duty is reduced to 5.15% (customer to pay as per actuals during entry of shipment at Indian port)

Item 2.0 Service Tax of 14% will be charged as extra

2. Transportation & Insurance Charges:

Extra (at actuals)

3. Payment Terms:

Item 1.0 60% with order confirmation
40% with delivery (material dispatch from Germany: against Air Way Bill)
Payment period for all payments: 7 days after Invoice

Item 2.0 50% with delivery of items on-site
50% with acceptance of work

4. Purchase Order:

Item 1.0: iPLON GmbH (Germany)
Item 2.0: iPLON India Pvt Ltd (Chennai)

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5. Delivery of items:

Item 1.0: Approx. 4-5 Weeks (After Order confirmation)

6. Warranty:

Item 1.0: 1 year from the date of delivery of items on-site

7. Offer Validity:

30 days

Frame conditions

- Customer to provide MNRE certificate for Duty exemption
- Access to Internet portal for 1 year
- iPLON payment and delivery conditions
- 5 years cooperation contract (delivery of hard- and software and services)
- A mutual and confidential cooperation
- Additional engineering and services will be charged separately
- Customer to provide device communication protocol mapping details to iPLON free of charge in case iPLON already does not have them
- All issues, problems which occur due to mistakes not done by iPLON will be charged to the customer separately
- Taxes, shipping, handling, insurance, VAT, customs duty and other charges, if occurring, will be charged separately

This offer is based on the frame conditions mentioned above and valid for 14 days from issue. According to the timescale mentioned above, the order has to be placed in sufficient time, to ensure on time delivery.

The charging of additional services will be done immediately as the services occur. The payment period is 7 days net.

Commissioning to begin as per project status and the feedback from Customer

This offer is for all the parts named above. Individual purchase of single parts is not possible.

More efforts and work which are needed due to incomplete or wrong data and information will be charged additionally. For the unlikely event of changes in the supply chain of iPLON, iPLON will address these issues openly to the customer.

Please feel free to get in touch with us if more clarification or additional services are needed.

Inverter compatibility

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The following products are compatible with the iPLON Monitoring and Control System and are currently being used:

- M+W
- EFFEKTA
- Sunways
- LTi
- REFU Sol
- Diehl AKO
- KOSTAL
- Würth Solergy (Solar Star)
- SolarMax
- Fronius
- SMA
- KACO new energy
- SoluTronic
- Emerson
- Voltwerk
- Danfoss
- Power one
- Bonfiglioli
- Sharp
- ABB
-

The number of compatible products is growing constantly.

Rev. 3.1 / 6/2012

Energy Meter compatibility

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The following products are compatible with the iPLON Monitoring and Control System and are currently being used:

- Echelon (Power line)
- Secure (elite +)
- Conzerv (Schneider)
- L&T ER300P
- ISKRA
- Kamstrup
- Gossen Metrawatt
- ABB Delta +
- Camille Bauer
- Wallaby MK6E

The number of compatible products is growing constantly.

Weather Sensors

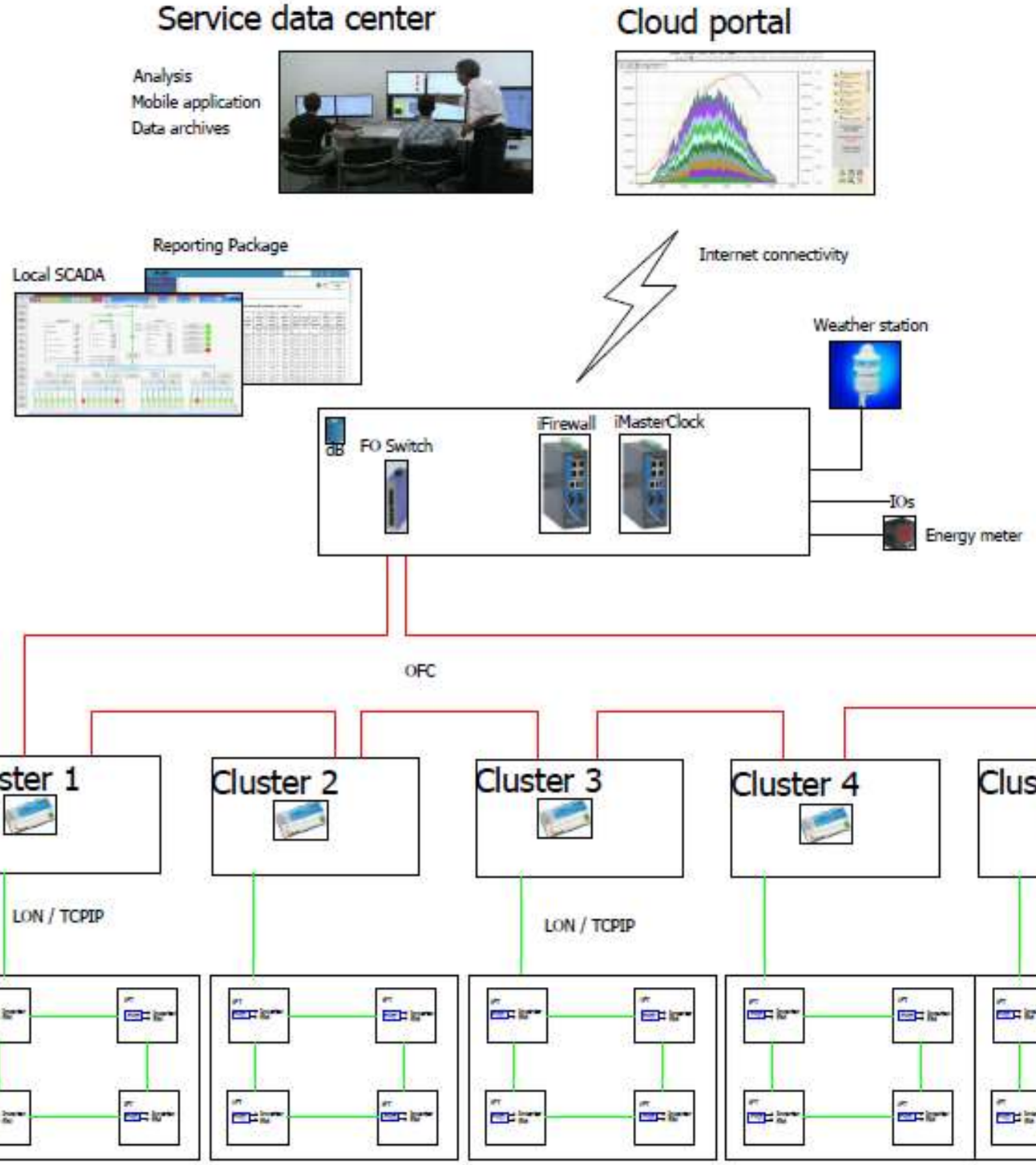
SMARTGRID INFRASTRUCTURE AND SERVICES

Cloud Level

Management Level

Automation Level

Field Level



+INHV1.e

			Datum	26.01.2016	Smartgrid Infrastructure and Services	iPLON GmbH Kurt-Kurz-Strasse 36, 74523 Schwäbisch Hall	Architecture Single Line Diagram	1.1
			Bearb.	Bharath				
			Gepr.		Architecture Single Line Diagram			
Änderung	Datum	Name	Urspr.		Ersetzt durch	Ersetzt durch	Drawing 1001	Blatt 1

25.01.2018

500 kW - [redacted]

Ethernet
RS485
FO

BLOCK - D
SMCB D1
INV 7 | 60K
Rooftop
Ground

BLOCK - B
SMU B1
SMCB_B1
INV 4 | 25K
INV 5 | 60K
MCB-2 | EM
Rooftop
Ground

BLOCK - C
SMCB_C1
INV 6 | 60K
Panel D | EM
Rooftop

BLOCK - E
SMCB | E1
SMCB | E2
SMCB | E3
INV 8 | 60K
INV 9 | 60K
INV 10 | 60K
Panel C | EM

SENSORS
iGate
LON
BTR
GPRS
iMT
E-S
PS
FO SWITCH
M-C
INVERTER MANAGER
LIU

BLOCK - A
SMU_A1
INV 1
INV 2
INV 3
MCB-1 | EM
Rooftop
1st Floor
iGate
E-S
PS
M-C
M-C
IAT BLOCK A
LIU

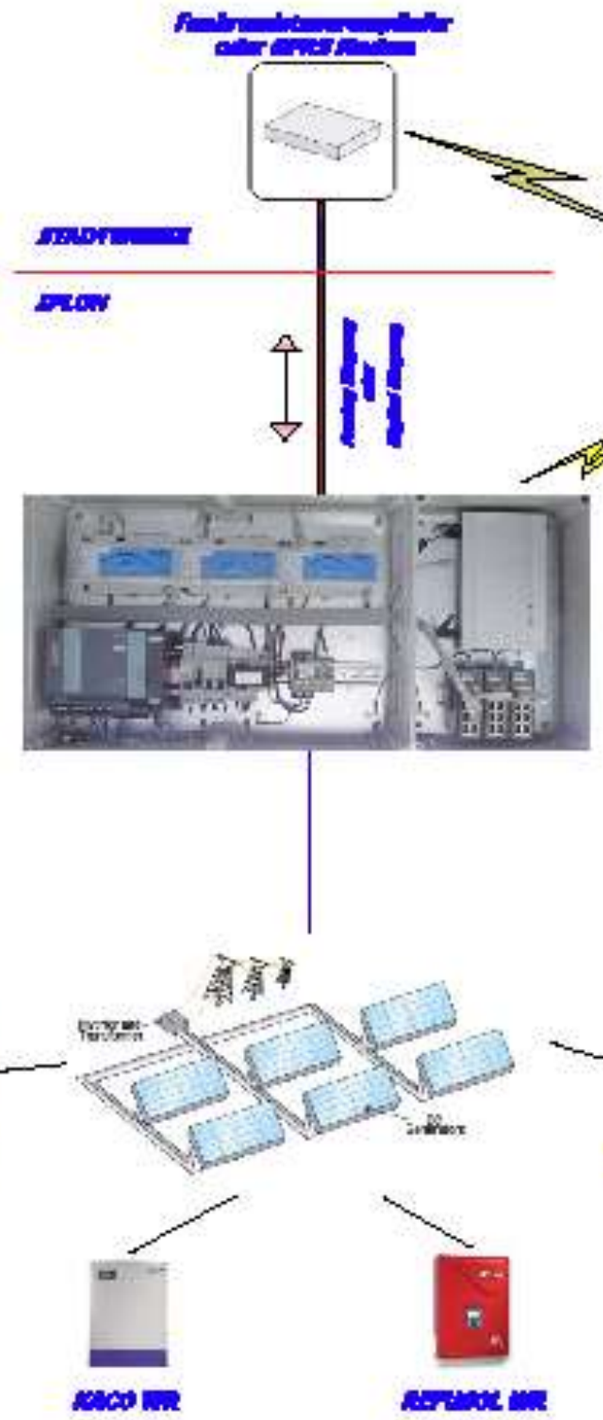
iGate
E-S
PS
M-C
M-C
IAT BLOCK B
LIU

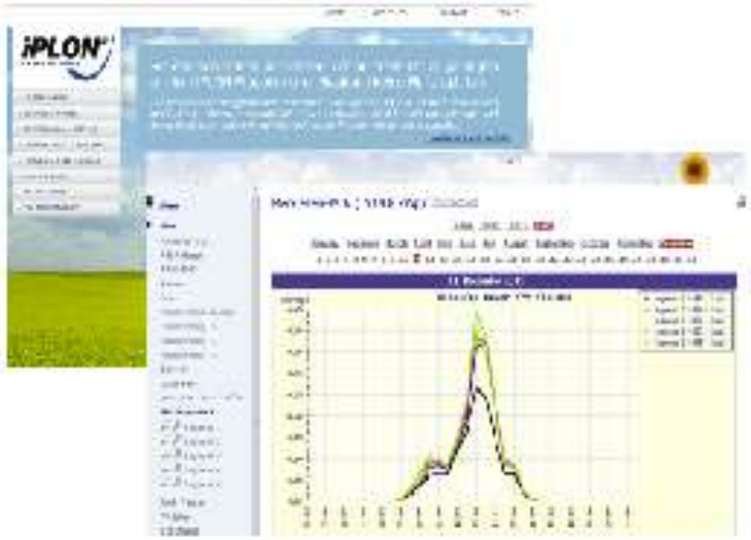
Smart Control Functions

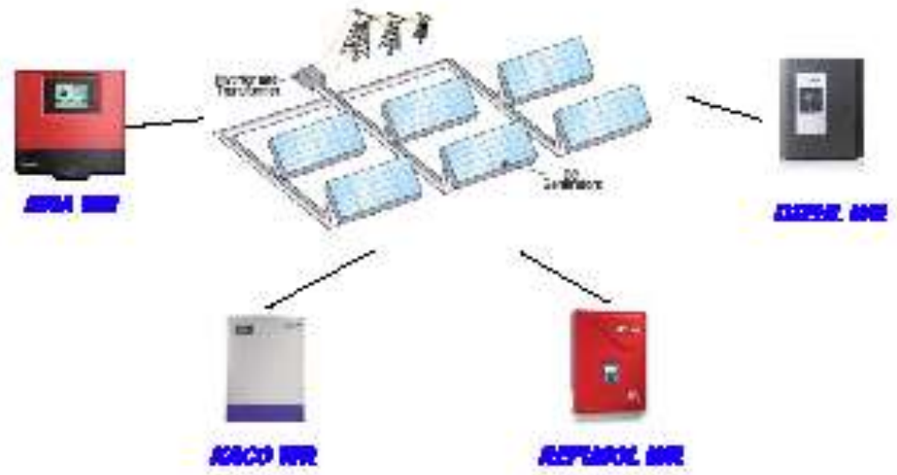
- **Zero Evacuation**
- **Fuel Save system (Solar-Diesel Hybrid)**
- **Smart Storage System**
- **Supply side management**
- **SMART METERING::SMART GRID::SMART CITY!!!**

LEISTUNGSREDUZIERUNG UND COS PHI STEUERN

(10 kW-PV Anlage)







iPLON MagicBox

Thank You!

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Weather Stations and Environmental Sensors for Rooftop Projects

27 May 2016

Mr. Sreenath C, Ms. Lumine Divya A

Business Development Team

iPLON(India)

Overview

- Relevance of Weather Monitoring station
- Introduction to various Measuring techniques
- Digital Silicon Irradiance Sensor
- External Temperature Sensor
- Wind speed Sensor

Relevance of Weather Monitoring Stations

- Energy output is directly related to ambient conditions like
  - Amount of sunlight (Irradiation)
  - PV Module temperature
  - Ambient temperature

Parameters needed to be measured

Irradiation sensor

External Temperature sensor

Wind Sensors

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Irradiation Sensor

- Make: IngenIeurbüro
- Principle: short-circuit current is proportional to irradiance
- Build out of a mono-crystalline solar cell connected to a shunt
- Calculated values of irradiance and temperature are given on to a RS485 port

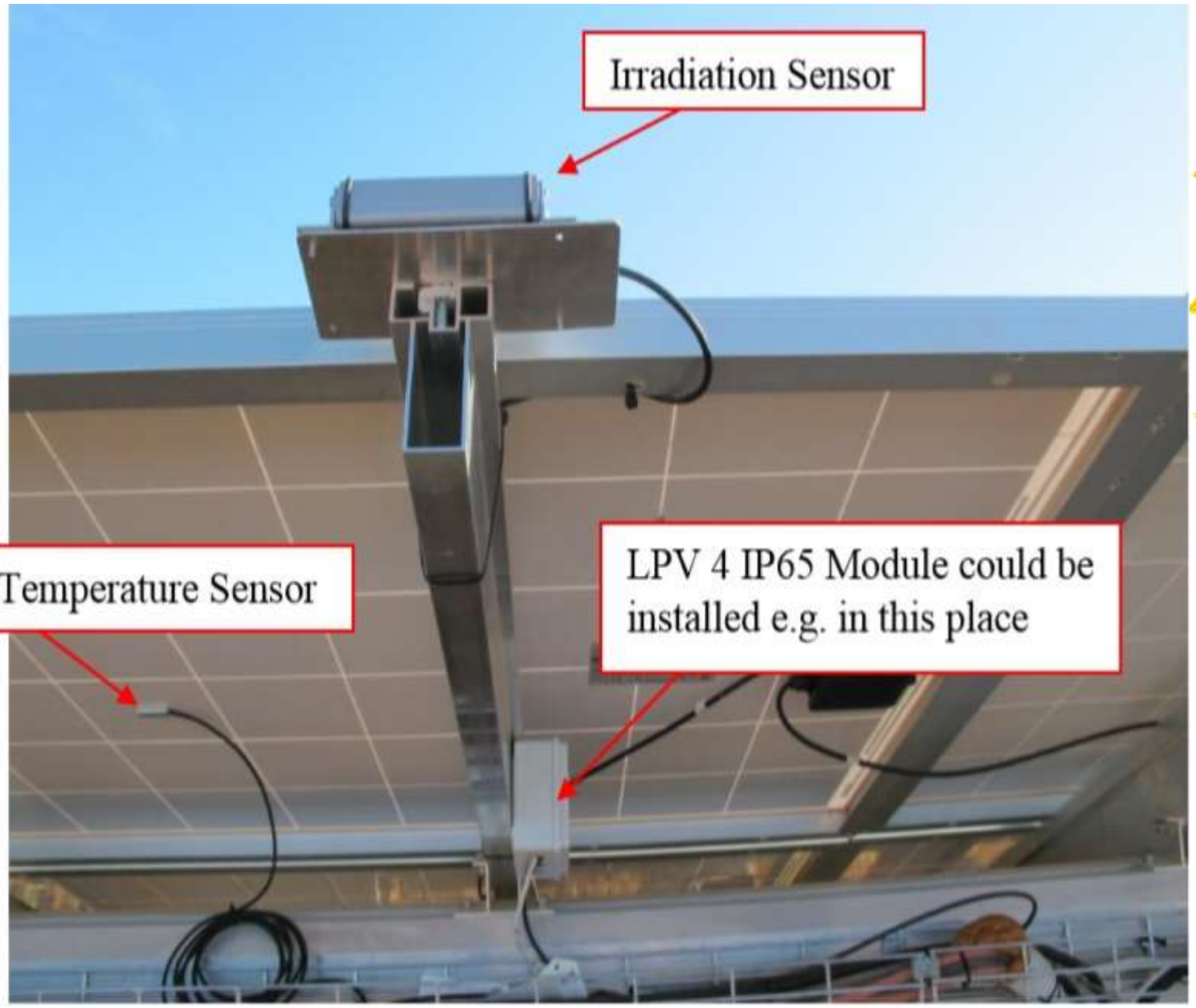
Operating range of -20° C to 70° C

IP 65 protection

Power supply: 12 to 28 V DC

Accuracy : ±5%

Installation

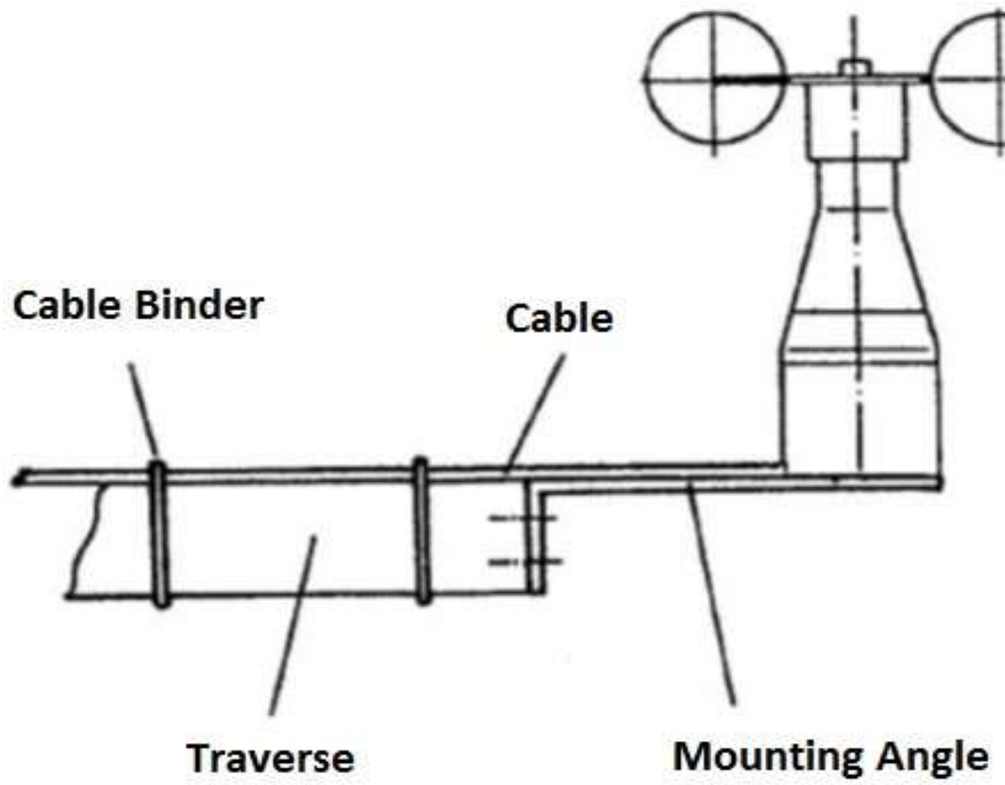

Irradiation Sensor
Moudule Temperature Sensor
LPV 4 IP65 Module could be installed e.g. in this place

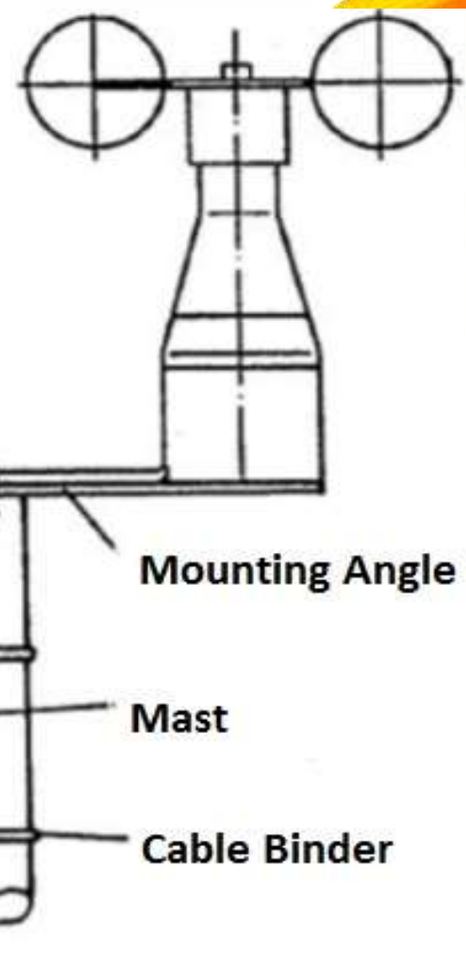
External Temperature Sensor

- Make: Ingenieurbüro
- Sensor type: Pt1000 1/3 class B
- Temperature range: -40 to +85˚ C
- Protection: IP67

Wind Speed Sensor

- Cup star anemometer
- Range: 0 - 40 m/s
- Signal: 2.3 Hz/(m/s)
- Accuracy: 0.5 m/s or 5% of reading





Lufft WS504 PV Monitoring Sensor

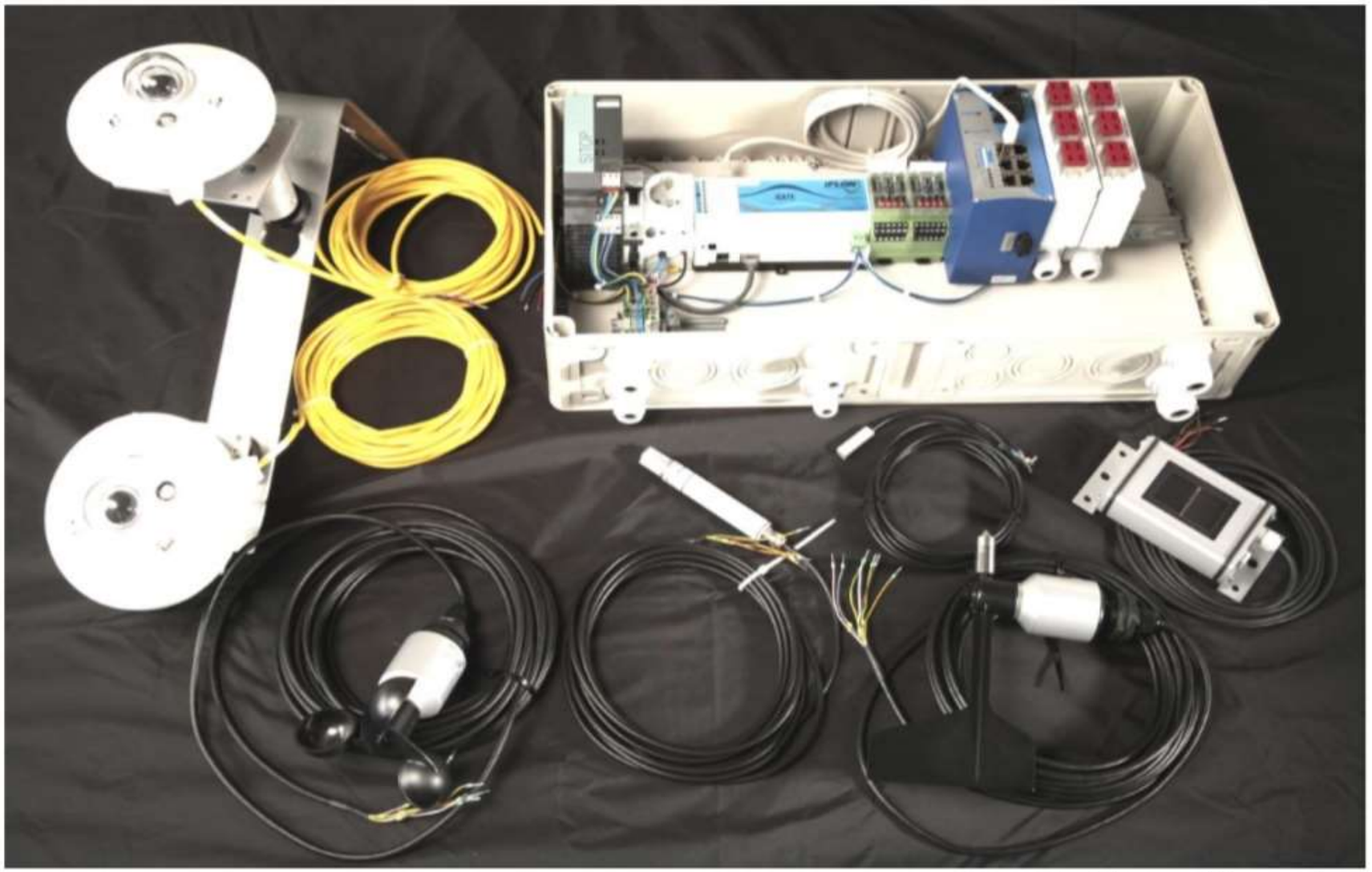
- Global radiation: Thermopile pyranometer
- Temperature: Thermistor (NTC) in a ventilated radiation shield according to WMO standard)
- Wind: Ultrasonic
- Precipitation: Doppler-Radar
- Humidity, air pressure: Capacitive sensors

Weather Station Value line 15010

- For calculation of the PR (Performance Ratio) the Irradiation (W/m^2), the ambient temperature and the Module surface temperature are needed

Weather Station Extended 15013

- Extended version of sensors and for stations, which are very far from the control room



Thank You!

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Project Management, Commissioning, Stakeholders, and Network Building

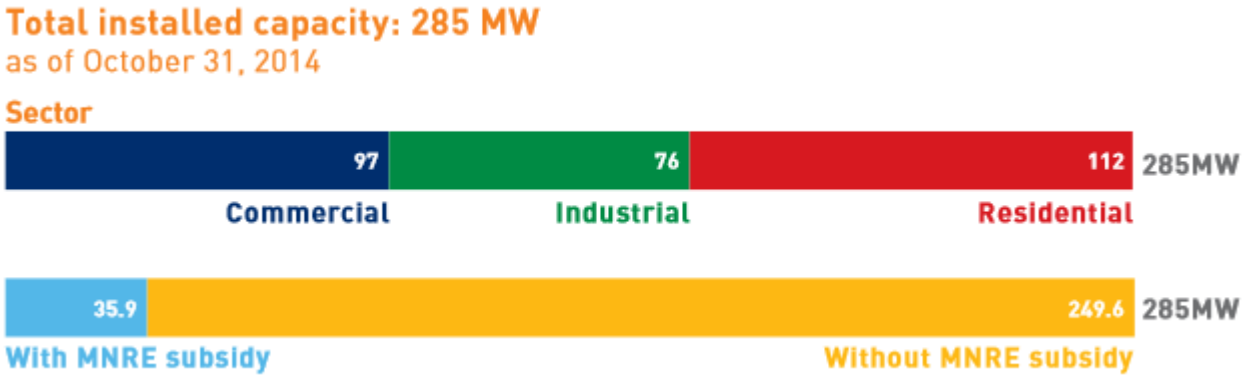
Gowrishankar Ramanan

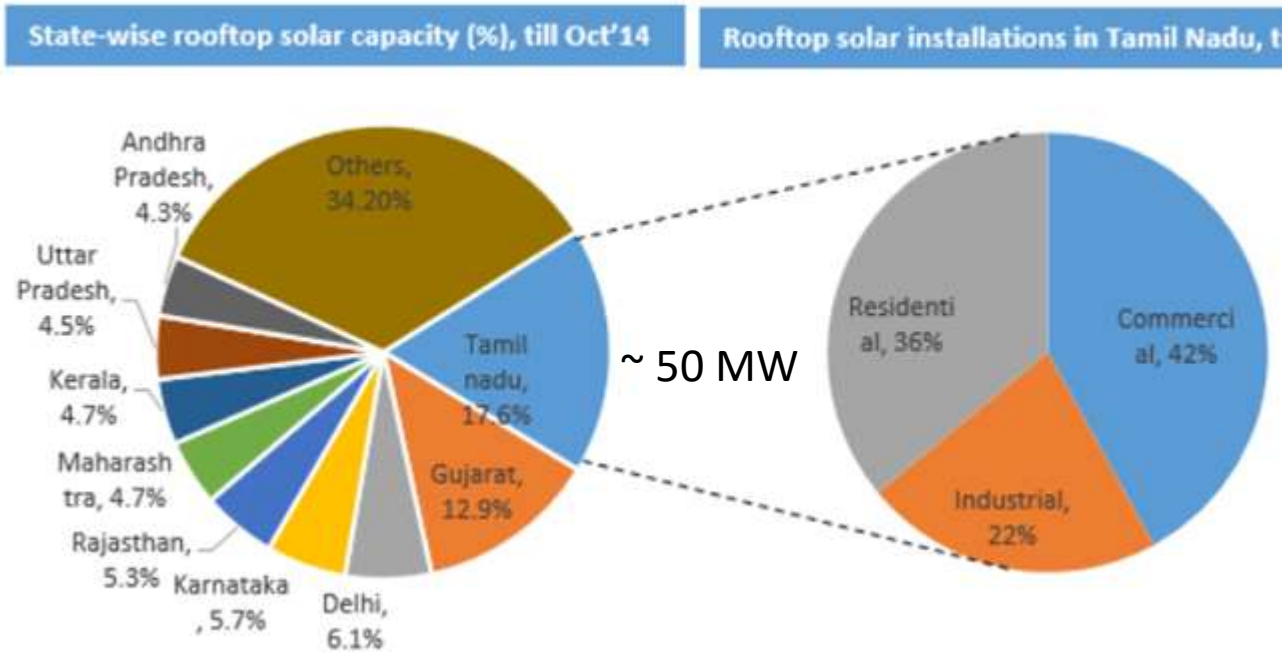
May 27, 2016

iPLON® The Infranet Company

KFW DEG

Tamil Nadu's solar market





Source: Bridge to India

India's Tamil Nadu Could Become a Renewable Energy Powerhouse

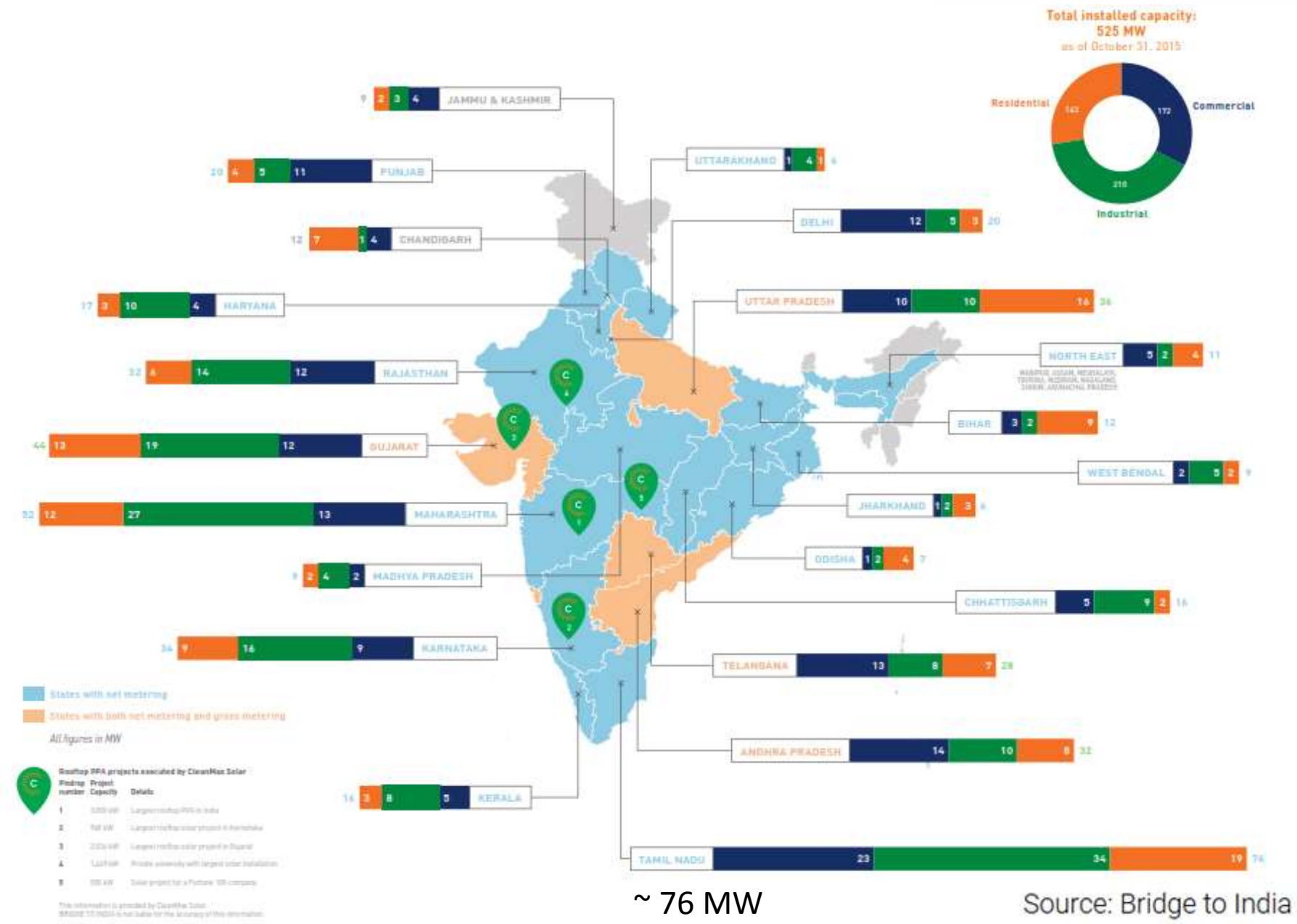
by Deepak Sriram Krishnan - February 27, 2015

This blog post originally appeared on Insights.

Solar empowers residential, commercial, and industrial consumers to lock in power prices below grid averages. Photo by Intel Free Press/Flickr.

Tamil Nadu, India's sixth-most populous state, has emerged as a major hub for renewable energy over the last decade. More than one-third of its installed capacity—about 8,000 megawatts—now comes from renewable energy sources like wind and solar.

Still, the state's clean energy markets can go further—research shows that Tamil Nadu's renewable energy potential is close to 680 gigawatts (GW), 85 times its current installed capacity and comparable with the U.S. fossil fuel power plant capacity (781 GW) in 2012. Harnessing local renewable energy resources could yield important economic development benefits for the state; but government, industry and the utility will first need to work together to address some key challenges.



~ 76 MW

Source: Bridge to India

Project Management

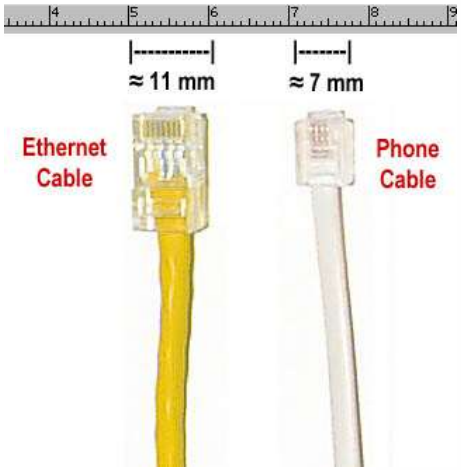
Device Details

- Make & Model
- Number of Devices
- Communication Protocol Details
  - Baud rate
  - Parity

- Inverter ?
- SMU ?
- Energy Meter?
- Weather Station
- Output: 4-20 mA / 0-10 V / RS485

Project Requirements

- Internet Details
  - GPRS ?
  - DSL ?
- GPRS
  - Sim Card Provider
- DSL
  - IP Address Details



Portal Requirements

- Plant Capacity
- Plant Name & Address
- Date of Commissioning
- Module Type & Capacity
- Tilt Angel
- Orientation
- Area
- String Details

Plant Overview

Plant Information

Installed Capacity	Client information – Confidential
Latitude	13.0389
Longitude	80.1906
Location	Royapettah, Chennai
Date Of Commissioning	29-April-2016
Total Energy Generation	Client information – Confidential

Technical Data

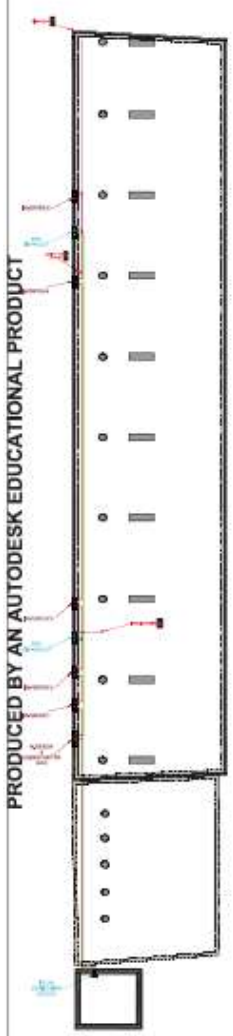
Module	Poly crystalline
Inverter	Delta RPI-M20A
Tilt Angle	11^{0}
Orientation	South
Area	240 m^2

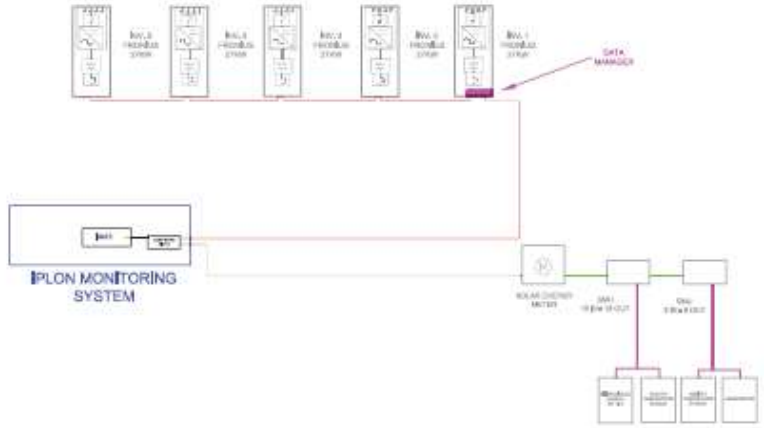
Internal Processes

- Architecture Design
- Assembly
- Software Configuration
- Testing with Simulation
- Delivery to Site

iPLON focus: ON-Time Delivery, with ZERO defects

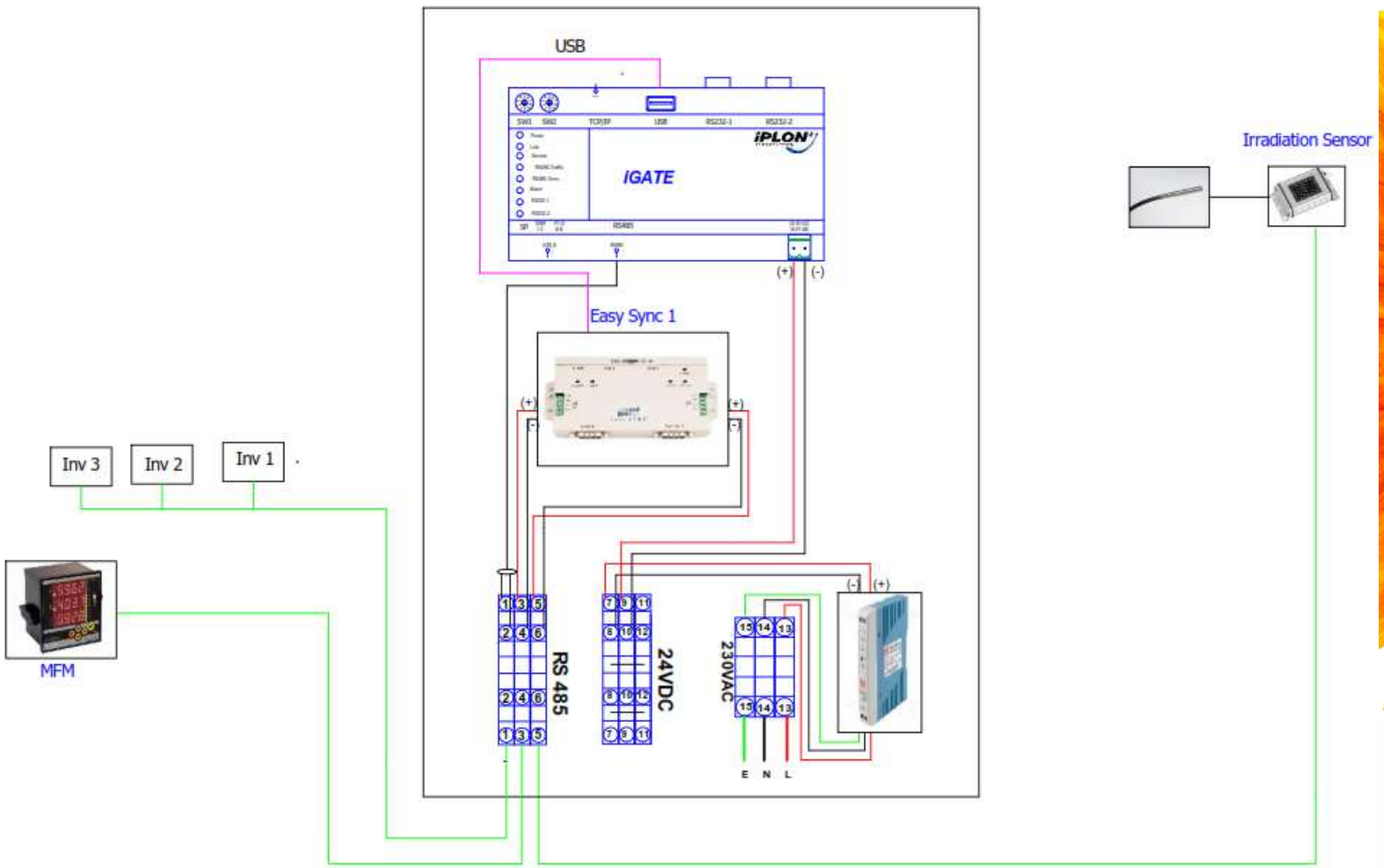
Architecture

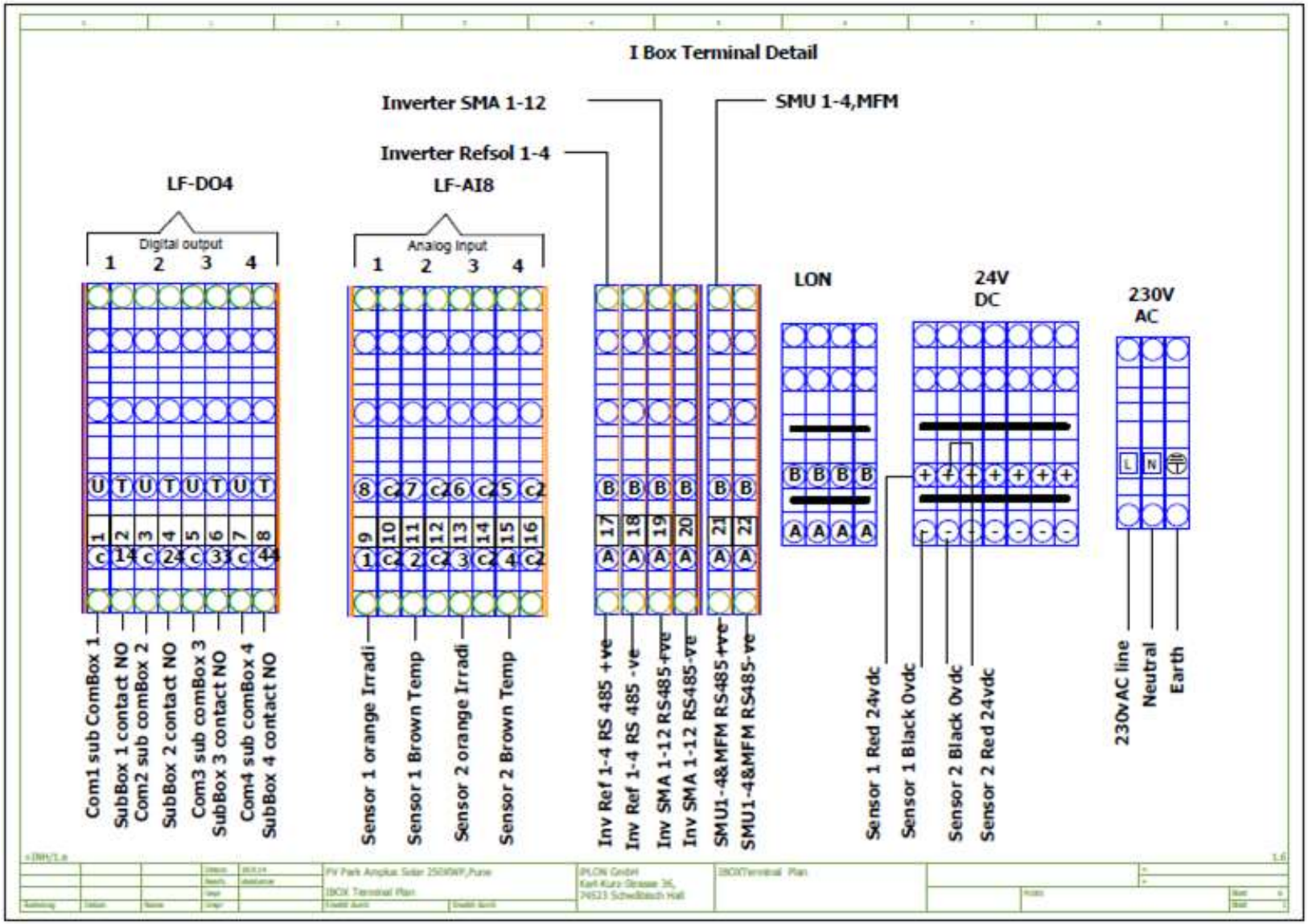




1. SENSOR'S : SENSOR'S ARE CONNECTED TO THE TWO SMU'S.
2. SOLAR INVERTERS : ALL FIVE FRONIUS INVERTERS (27KW) ARE CONNECTED TO EACH OTHER VIA CAT6 CABLE IN A DAISY CHAIN CONFIGURATION.
3. STRING MONITORING BOX : STRING MONITORING BOX ARE CONNECTED TOGETHER IN A DAISY CHAIN CONFIGURATION.
4. ENERGY METER : DAISY CHAIN CONFIGURATION. FROM SMU IS CONNECTED TO THE ENERGY METER WHICH GOES TO THE EASYSYNC IN THE IBOX.
5. IPLON WEB-MONITORING BOX : A HIGH SPEED INTERNET CABLE IS CONNECTED TO THE IPLON FOR FEATCHING THE DATA TO THE WEB-PORTAL.

Architecture Diagram





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KFW DEG

Assembly

Software Configuration

- Flash the iGate
- Assign ID & IP Address
- Configure Internet
  - DSL
  - GPRS
- Configure Inverter / SMU / Energy Meter / Weather Station

Testing with Simulation

- Simulate the values for field devices
  - Inverter
  - SMU
  - Energy Meter
- Connect Sensors & Validate the data
- Internet Connectivity
- Data Validation in Portal

Installation & Commissioning

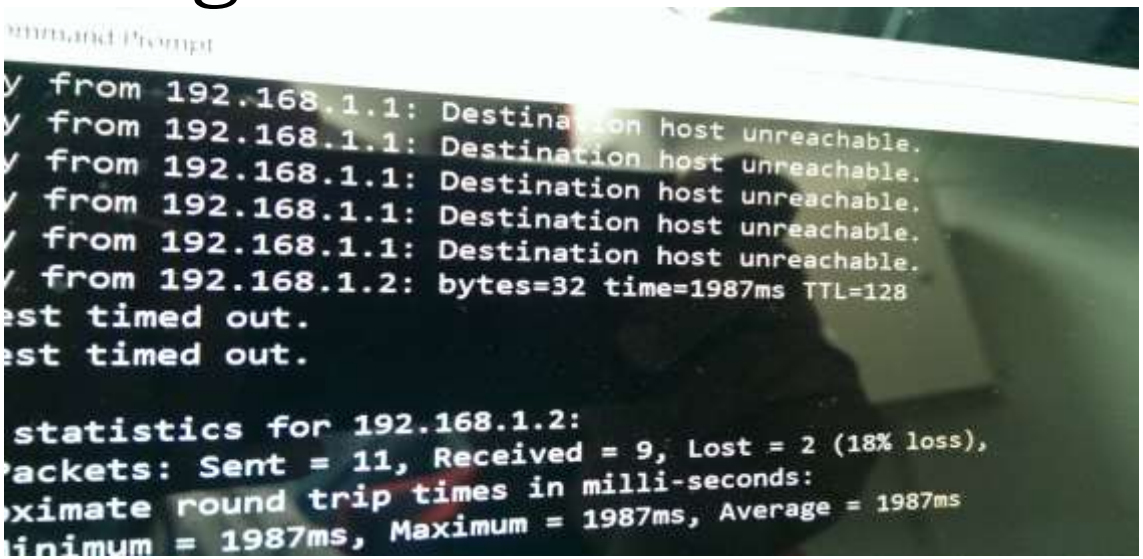
Before

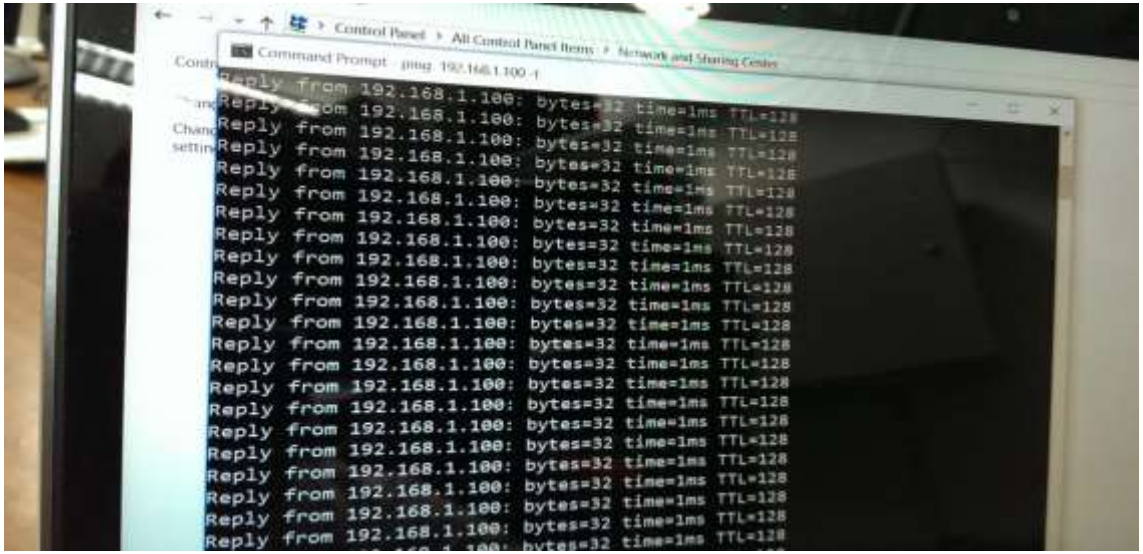
After

Commissioning

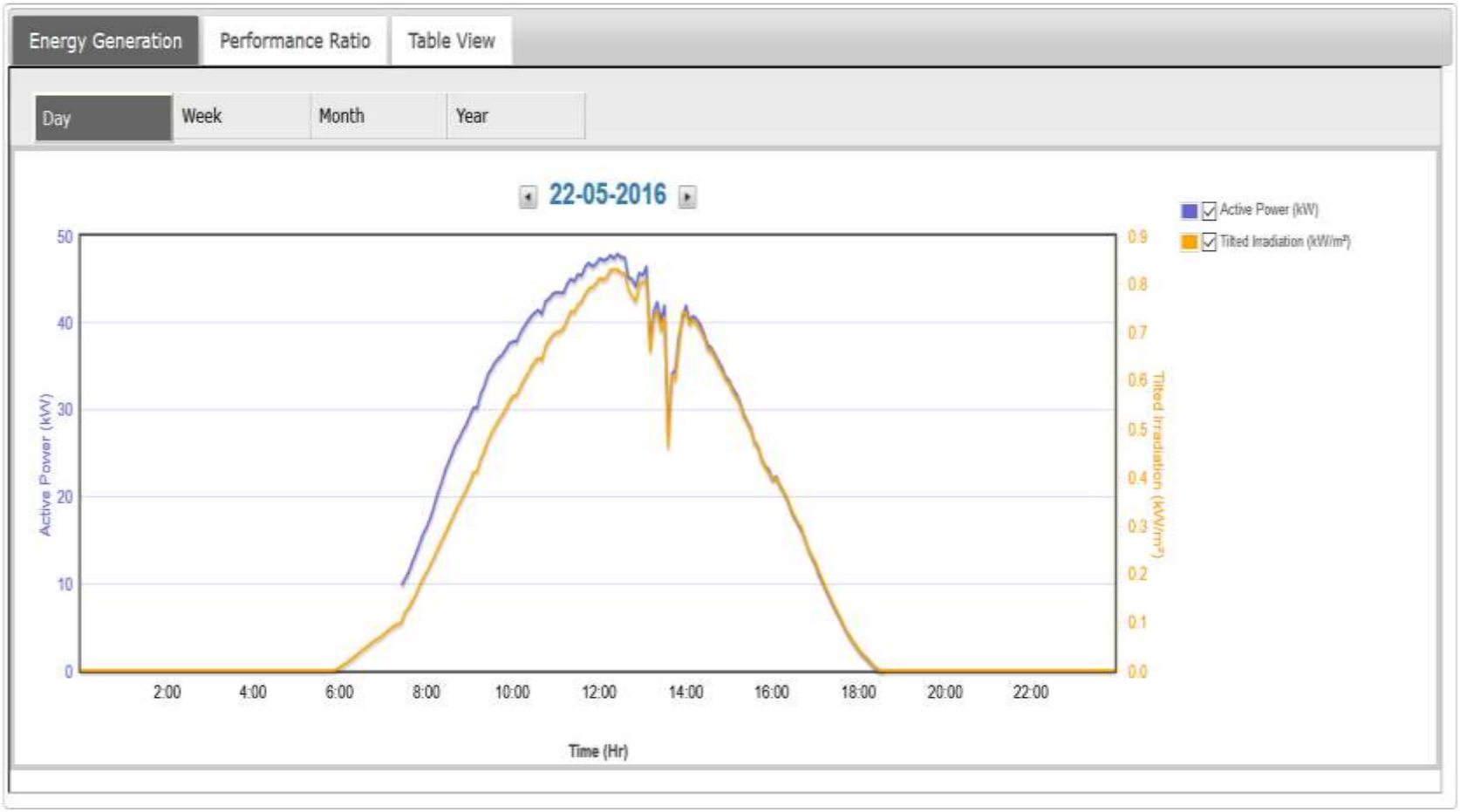
- Schedule
- Skills
- Tools
  - Laptop
  - Internet
  - Required Software
  - Multimeter, TCP Cable, Screw Set

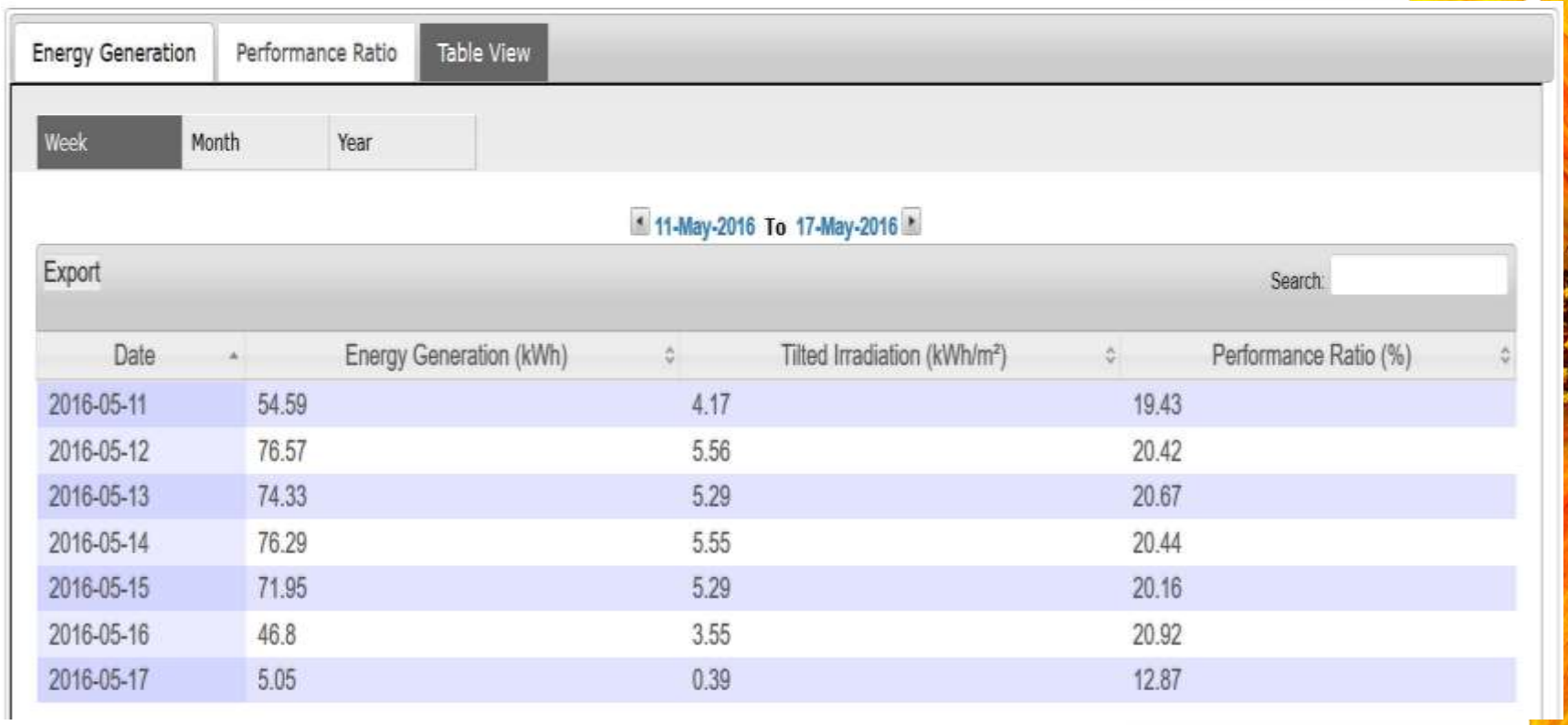
Configuration on-site





Portal


Energy Generation
Performance Ratio
Table View
Day
Week
Month
Year
22-05-2016
Active Power (kW)
Tilted Irradiation (kW/m²)
Active Power (kW)
Tilted Irradiation (kW/m²)
Time (Hr)
0
10
20
30
40
50
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00



What's the problem??

Some features of the portal

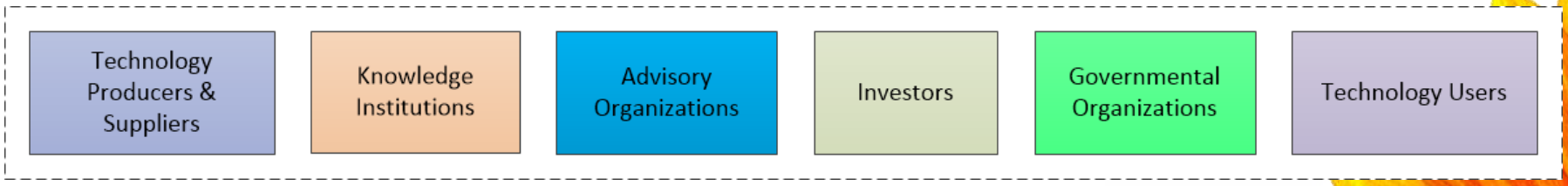
- Inverter graphs and data
- Weather station graphs and data
- Energy generated graphs and data

- PR
- Daily, weekly, monthly, and yearly wise comparison
- CO_2 savings

- ALARM filtering!

Compatible with different inverter makes, various plant data in ONE-SINGLE platform!

Stakeholders



Stakeholders	Roles/Functions
Technology producers & suppliers	Prime movers of the solar industry Manufacture/assemble products
Knowledge Institutions	R&D activities Capacity building programmes
Advisory Organizations	Technical & Policy assistance to the Government Organize training facilities
Investors	Rupee term loans to renewable energy projects
Governmental Organizations	Regulate the tariff of the generated power Generation & distribution of electricity
Consumers	Adoption of technology, disseminating awareness

Other factors to be considered

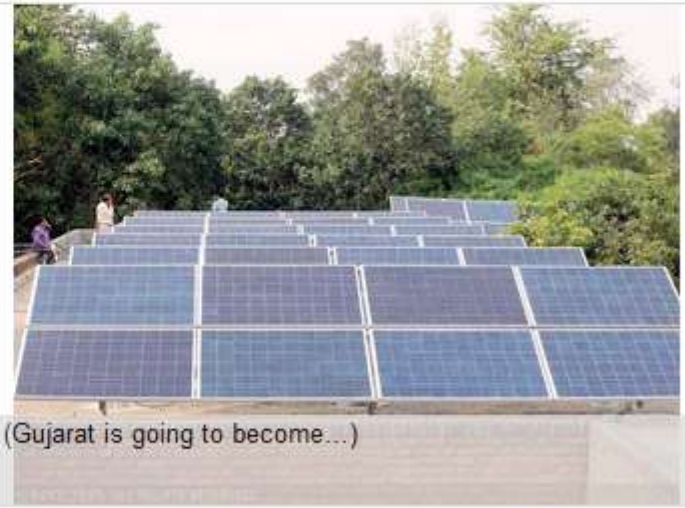
- Safety certificate required for above 10kW
- 3rd party sale of electricity
- Excise duty, import duty
- MNRE certificate
- Prevention of the spread of DC arcing

Gujarat farmers to be roped in to tap solar energy

PTI Aug 17, 2015, 09.56AM IST

Tags: solar energy | Saurabh Patel | Gujarat State Electricity Corporation Limited | Gujarat Power Corporation Limited

AHMEDABAD: Gujarat is going to become the first state in the country to launch 'Agro-Solar policy' under which farmers will be roped in to tap energy from sun which will also help them earn additional income from power generation companies, according to officials.


(Gujarat is going to become...)

According to officials in Gujarat Energy Research and Management Institute (GERMI), farmers and power generation companies will be in a win-win situation with generation of solar energy in agricultural fields.

GERMI Director Prof T Harinarayana told PTI that the state-run companies will set up Solar Photo Voltaic (SPV) plants in different farms fields and experiments were conducted in different agricultural universities in the state.

CHENNAI, February 15, 2016

Updated: February 15, 2016 08:31 IST

Solar energy system must for special buildings in cities, towns

K. MANIKANDAN
R. SRIKANTH

The developer has to use a minimum of one-third of the terrace area for installing solar photovoltaic cells. File photo The Hindu

The Housing and Urban Development Department issued a Government Order to this effect recently.

Feb 2016

- 4th Feb: 'Final DEG meeting'
- 18th Feb: 'Rooftop workshop'

Mar - Aug 2016

- Training programmes for EPC's
- Workshops in Madurai, Coimbatore, Dindigul
- Hands-on experience: Workshops in collaboration with Universities

Sep - Dec 2016

- Road shows & Workshops on 'Smart Grid' and 'Smart City'
- Chennai, Bangalore, Delhi, Mumbai

Know-how

In Zukunft werden „smarte" Lösungen immer wichtiger. Eine der Herausforderungen, denen wir uns schon heute stellen, ist die Zusammenführung diskontinuierlicher Energieproduktion aus regenerativen Quellen mit der dynamischen Energieabnahme von Wohngebäuden, öffentlichen Einrichtungen und Industrie.
Smart Grids, also intelligente Stromnetze, werden in Zukunft elektrische Energie aus Wind- und Wasserkraft, aus Photovoltaik- und Biogasanlagen auf der Grundlage intelligenter Regelungsalgorithmen zusammenführen und damit die lokale Energieerzeugung enger an die Bedürfnisse von lokalen Verbrauchern ankoppeln.
Wir bei IPLON entwickeln bereits heute die Lösungen für die Herausforderungen von morgen.

Smart solutions will become more and more important in the near future. At IPLON we accept the dare to bring together both, discontinuous energy production from renewable sources and dynamic energy consumption by homes, public administration and the industry sector.
We think that the grid of the future should be smart and should combine energy from wind- and hydropower, from solar power systems and from biogas plants by using inteligent control systems. By doing so, local energy production and local energy consumption can go hand in hand.
We at IPLON develop today the solutions for the challenges of tomorrow.

www.iplon.de

www.iplon.in

www.re2tn.org

www.youtube.com/user/iPLONChannel

Best Practices

Smart City

Mr. Carlos Valencia, Senior Plant Managment, iPLON

Date : 27th May 2016

Best Practice Renewable Energy

stadtwerke Schwäbisch Hall GmbH

SchwäbischHall

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

Smart city

http://smartcities.gov.in/

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

Smart City

SchwäbischHall

Smart city

SchwäbischHall

iPLON® The Infranet Company

KFW DEG

Smart city

Smart city

iPLON®
The Infranet Company

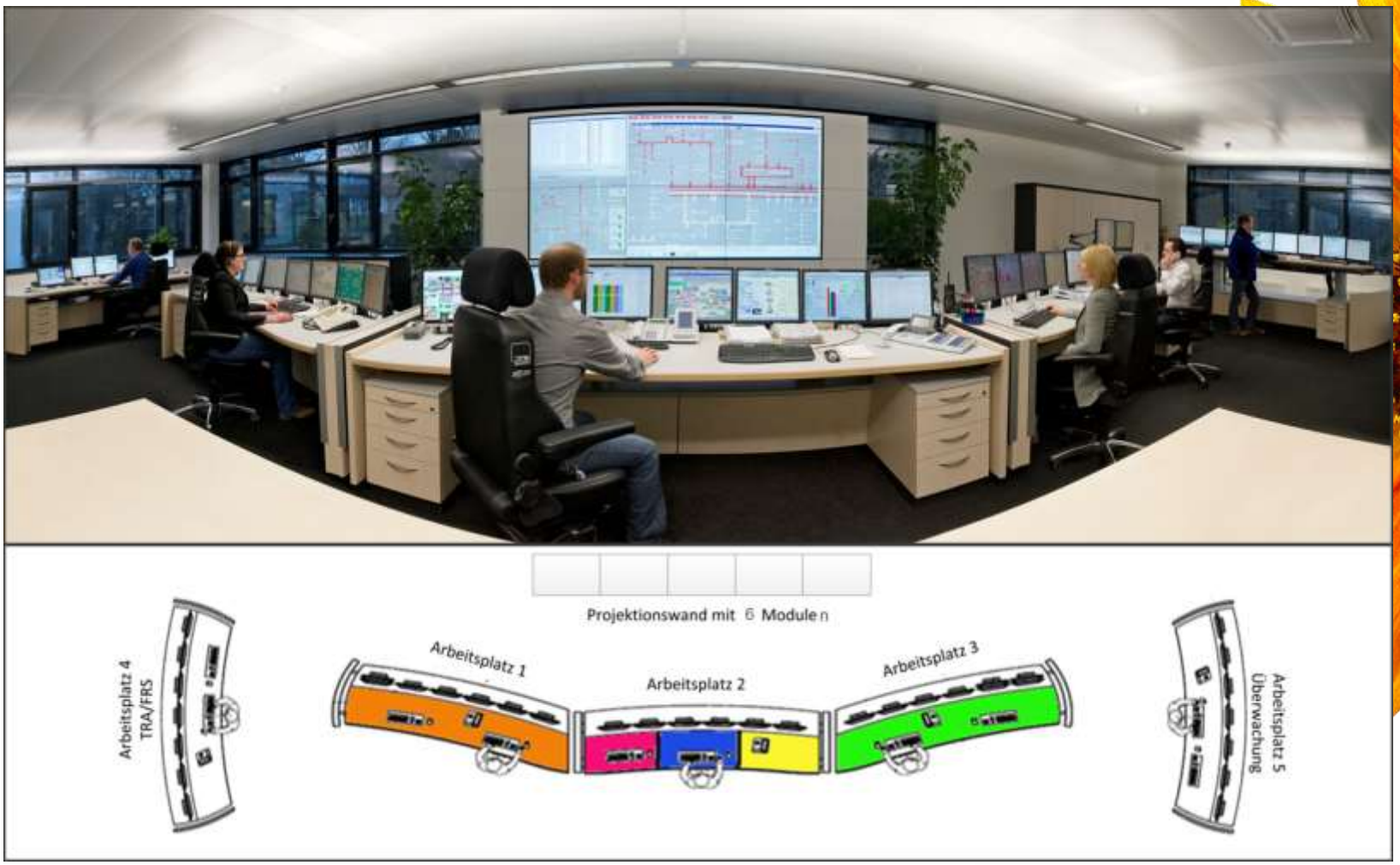
KFW DEG

Smart city

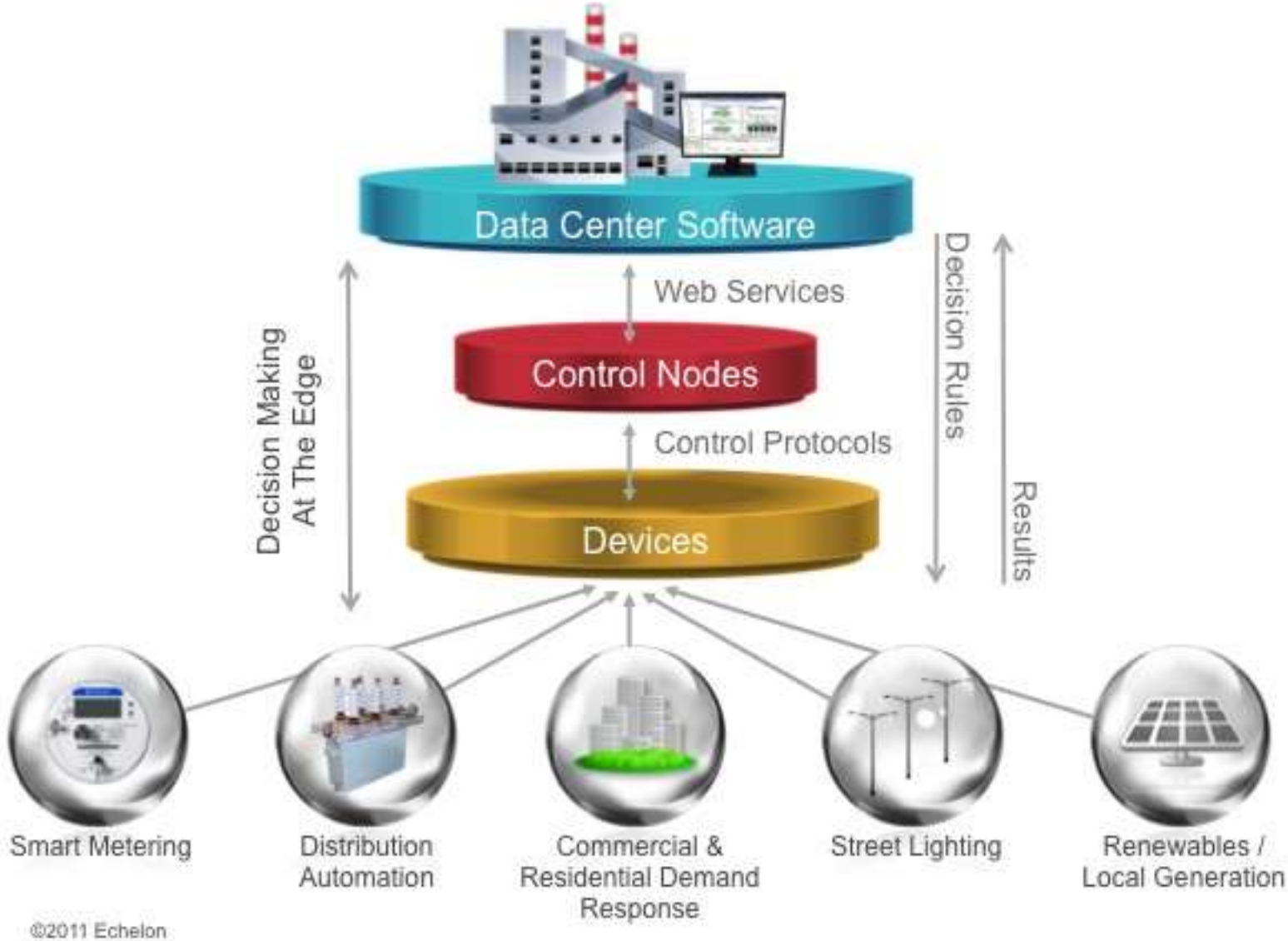
Multi utility control room at Stadtwerke Schwäbisch Hall

stadtwerke
Schwäbisch Hall GmbH

Multi utility control room at Stadtwerke Schwäbisch Hall



Smart Grid Energy Control Network



Smart meter

Mechanic Meter

- Manual metering
- Progressive rates

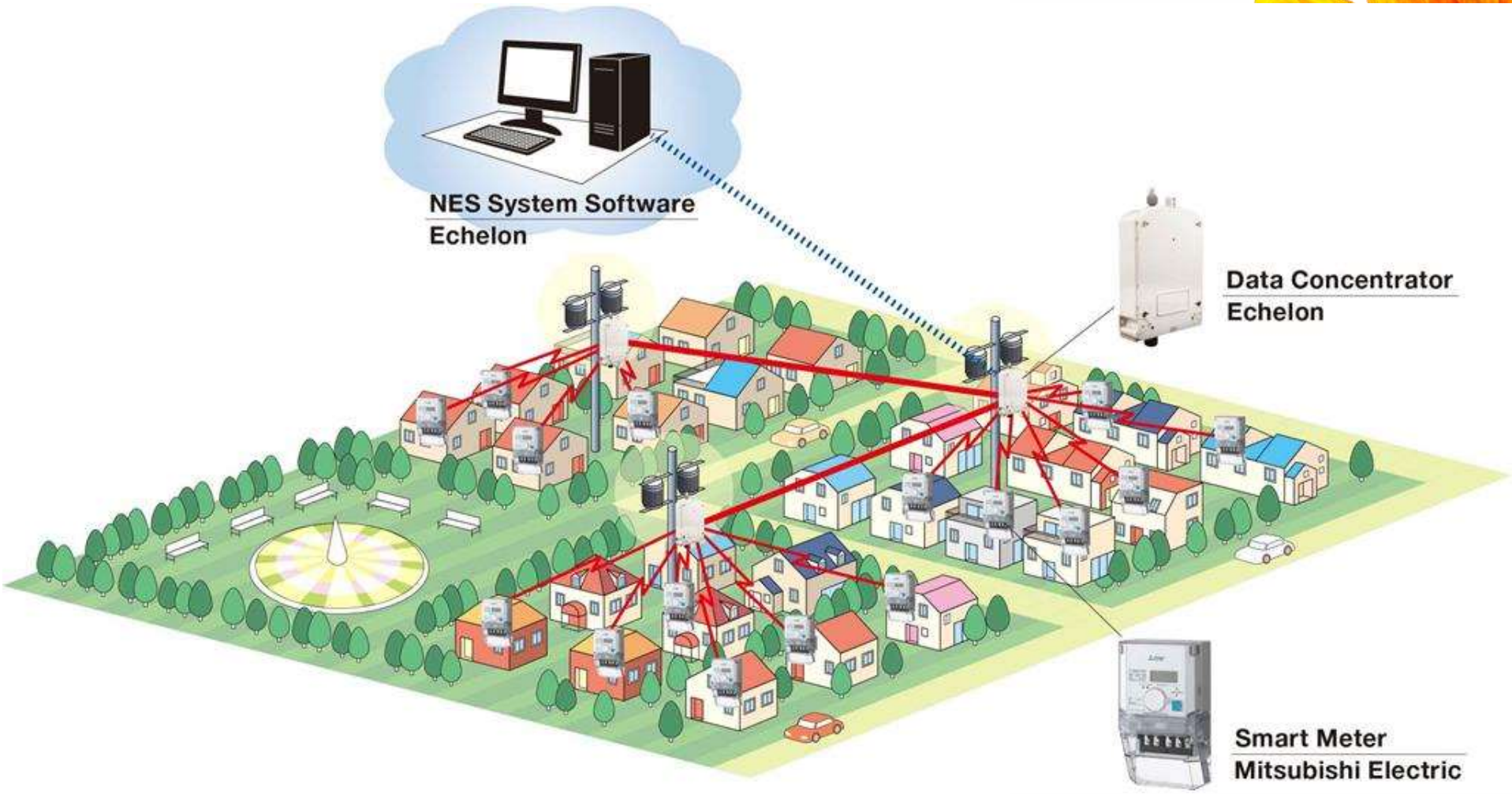
Electronic Meter

- 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

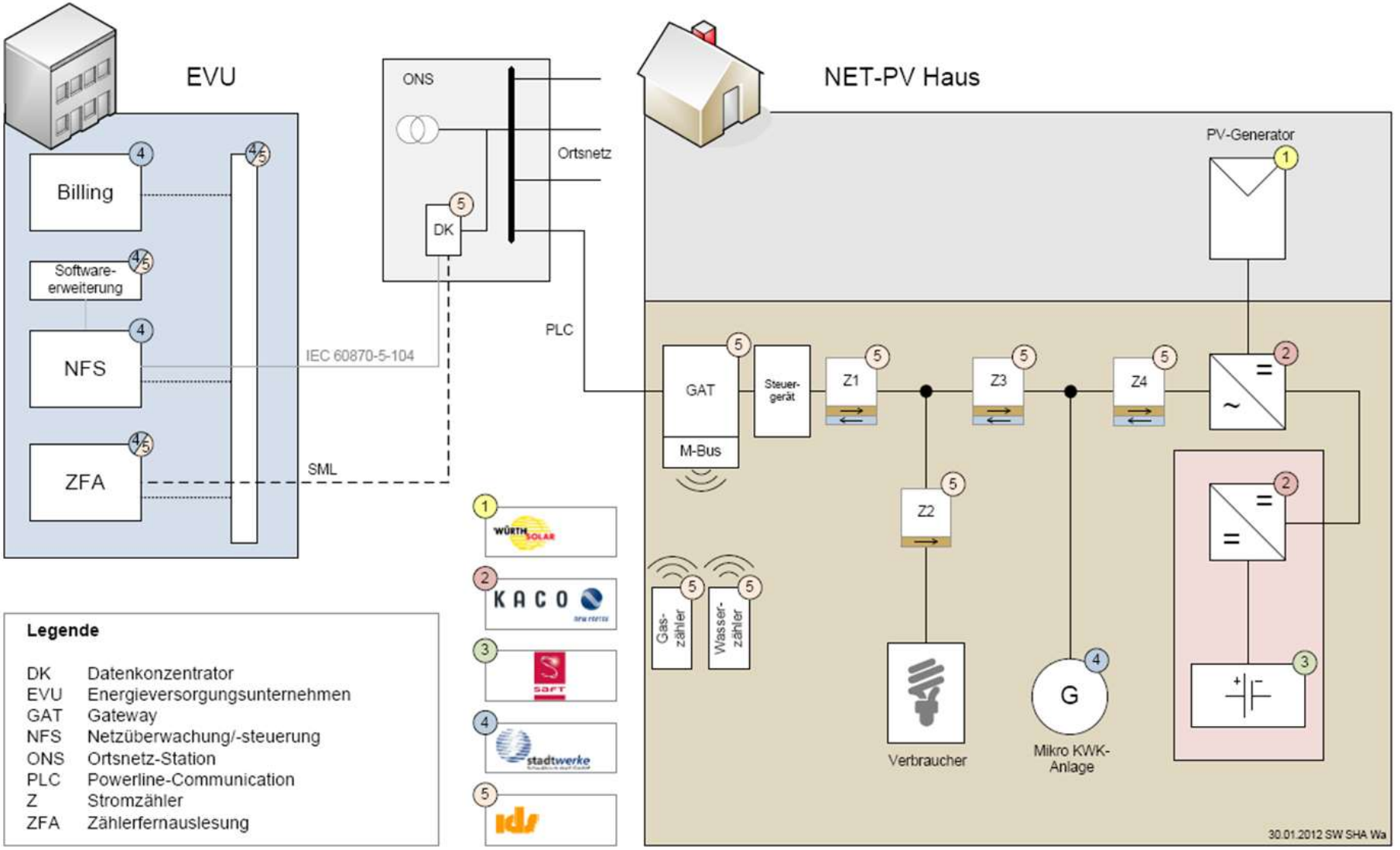

NES System Software
Echelon
Data Concentrator
Echelon
Smart Meter
Mitsubishi Electric

Storage (Li Ion Battery : 2*1 MW)

Scalable battery system

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

NET-PV (Captive and storage)



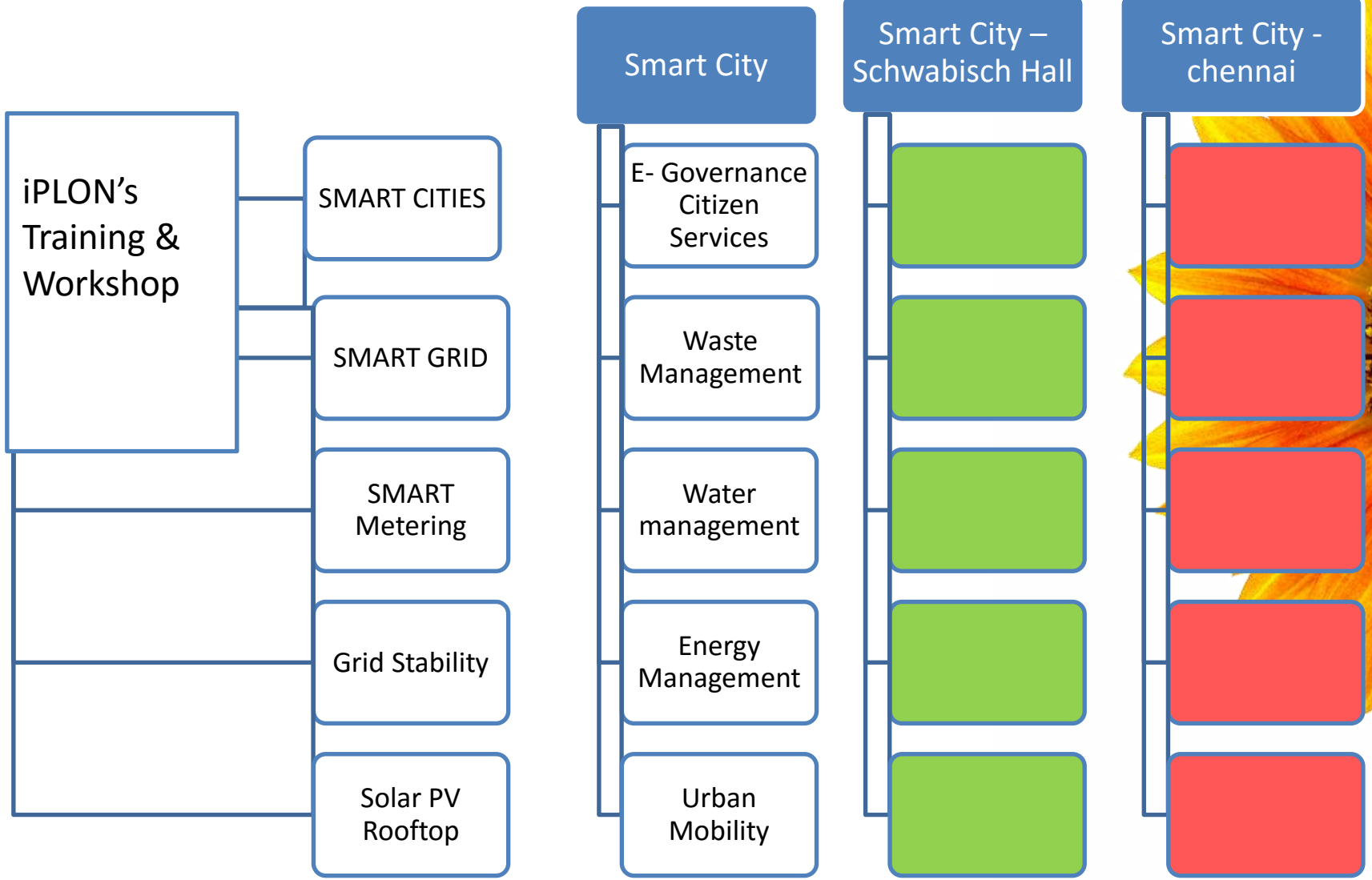
Legende

DK	Datenkonzentrator
EVU	Energieversorgungsunternehmen
GAT	Gateway
NFS	Netzüberwachung/-steuerung
ONS	Ortsnetz-Station
PLC	Powerline-Communication
Z	Stromzähler
ZFA	Zählerfernauslesung

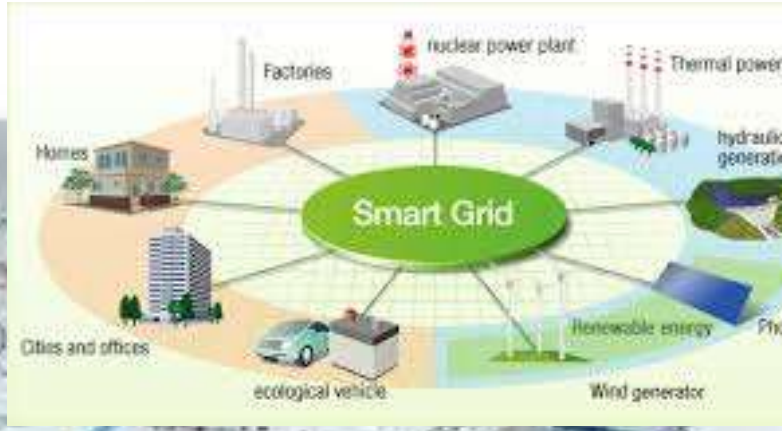
Benchmarking Tamilnadu & Germany

Country	Area	Per person Consump-tion	Number of Utility Companies	Population
Germany	357,021km^2	7081 kWh/year	> 800	80,767,000
Tamilnadu, India	130,058 km^2	684 kWh/year	1	72,138,958

Overview of Smart Cities



Thank you



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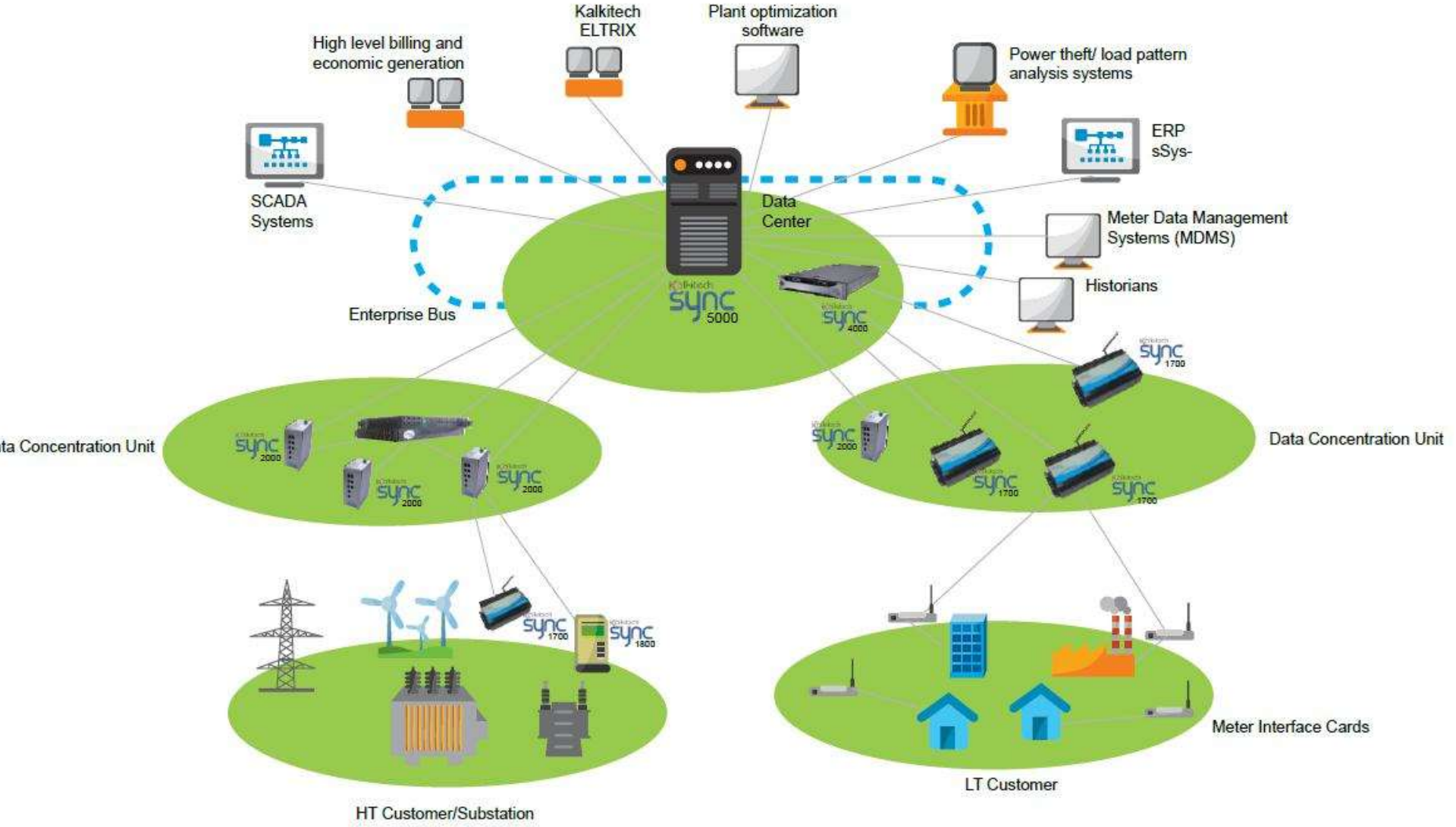
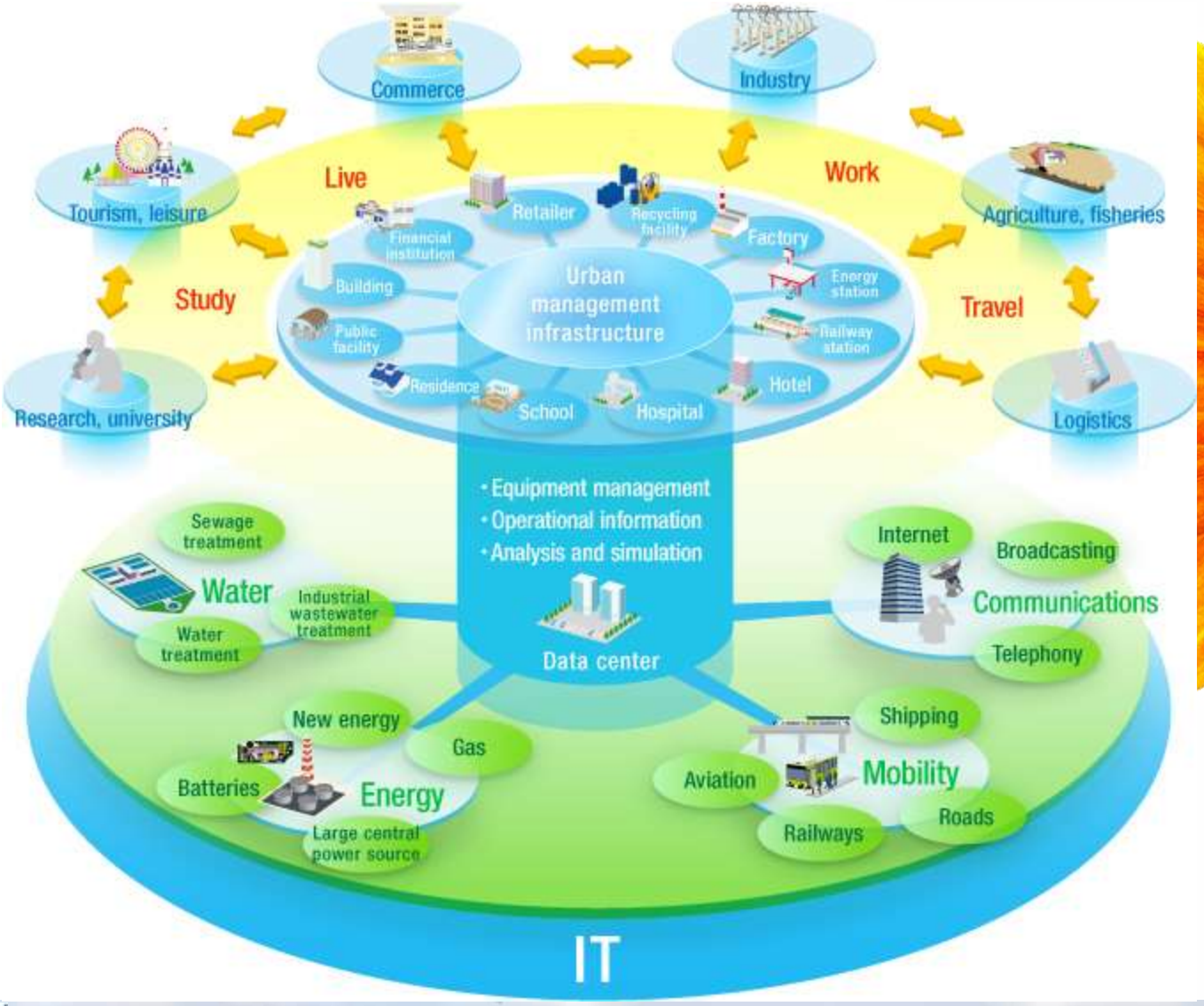
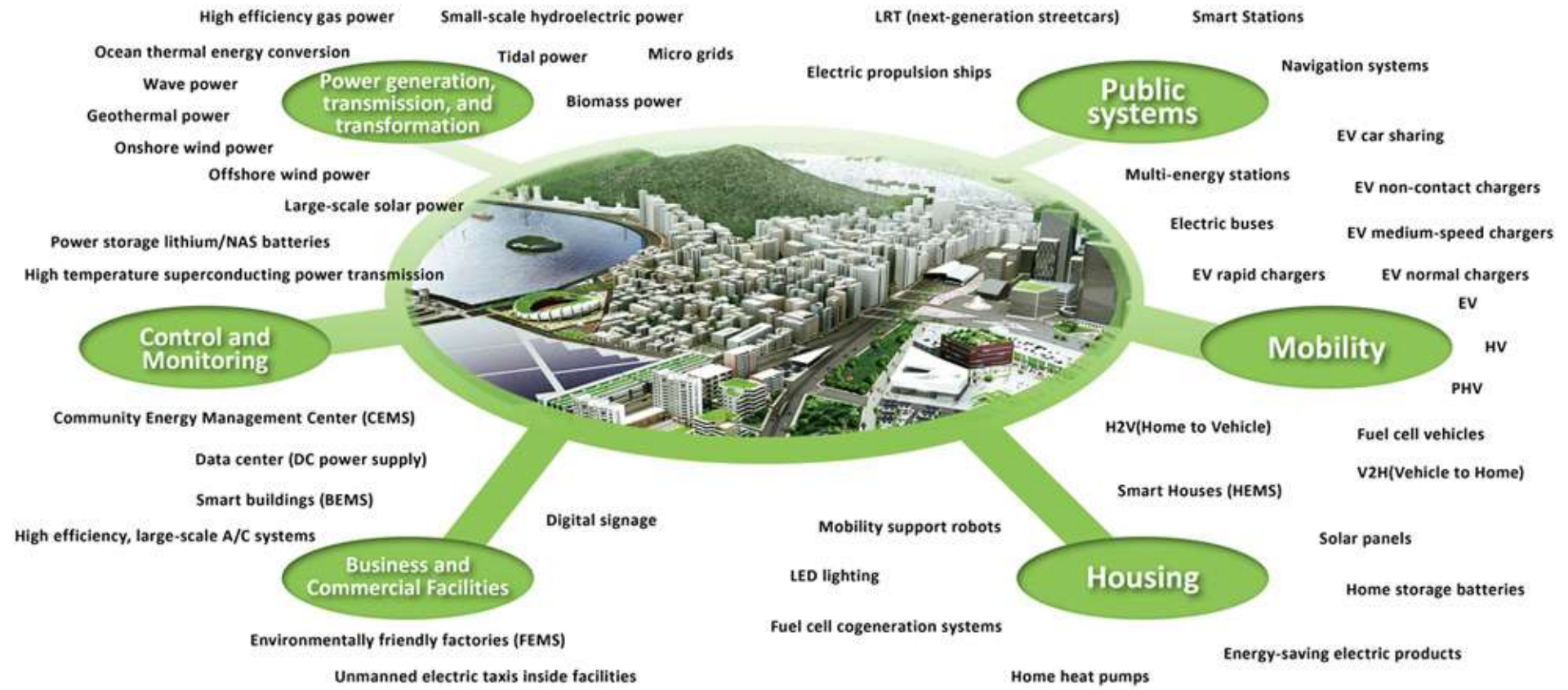
KFW DEG


Kalkitech
ELTRIX
Plant optimization
software
High level billing and
economic generation
Power theft/ load pattern
analysis systems
ERP
sSys-
SCADA
Systems
Data
Center
Meter Data Management
Systems (MDMS)
Historians
Enterprise Bus
sync 5000
sync 4000
sync 1700
sync 2000
sync 1800
Data Concentration Unit
Meter Interface Cards
LT Customer
HT Customer/Substation


Commerce
Industry
Tourism, leisure
Live
Work
Agriculture, fisheries
Retailer
Recycling facility
Financial institution
Factory
Building
Energy station
Urban management infrastructure
Public facility
Railway station
Residence
School
Hospital
Hotel
Study
Travel
Research, university
Logistics
• Equipment management
• Operational information
• Analysis and simulation
Data center
Sewage treatment
Water
Industrial wastewater treatment
Water treatment
Internet
Broadcasting
Communications
Telephony
New energy
Gas
Batteries
Energy
Large central power source
Shipping
Aviation
Mobility
Railways
Roads
IT


High efficiency gas power
Small-scale hydroelectric power
Ocean thermal energy conversion
Tidal power
Micro grids
Wave power
Power generation, transmission, and transformation
Biomass power
Geothermal power
Onshore wind power
Offshore wind power
Large-scale solar power
Power storage lithium/NAS batteries
High temperature superconducting power transmission
Control and Monitoring
Community Energy Management Center (CEMS)
Data center (DC power supply)
Smart buildings (BEMS)
High efficiency, large-scale A/C systems
Digital signage
Business and Commercial Facilities
Environmentally friendly factories (FEMS)
Unmanned electric taxis inside facilities
LRT (next-generation streetcars)
Smart Stations
Electric propulsion ships
Navigation systems
Public systems
EV car sharing
Multi-energy stations
EV non-contact chargers
Electric buses
EV medium-speed chargers
EV rapid chargers
EV normal chargers
EV
Mobility
HV
PHV
H2V(Home to Vehicle)
Fuel cell vehicles
V2H(Vehicle to Home)
Smart Houses (HEMS)
Mobility support robots
Solar panels
LED lighting
Housing
Home storage batteries
Fuel cell cogeneration systems
Energy-saving electric products
Home heat pumps

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
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PEOPLE	Sharing of data, security and protection of sources, networking and comunication

Roadmap

DEG_PPP

RE2TN

Post carbon society

„post Carbon Nadu“

- Demonstrators
- Training in RE
- Network building

- Rural Decentral RE Generation
- Smart grids ; smart Chennai
- Multi utility company
- Investments in TN

Need your support

Stackholders

iPLON India

Welspun Ampsolar

TÜV