RE2TN

Renewable Energy to (2) Tamil Nadu

Smart Solar Rooftops: Integrated in Smart Cities Environment

Venue: Raintree Hotel

636, Anna Salai,

Teynampet, Chennai – 600 035

Date: 18th October 2016

iPLON®
The Infranet Company

On the path to Post Carbon Economy

Smart Solar Rooftops: Integrated in Smart Cities Environment

Tuesday, October 18, 2016	
09:30 - 10:00	Registration
10:00 - 10:15	Welcome address, Overview of Presentations Ms. Lumine Divya, Business Development Team, iPLON India Private Ltd
10:15 - 11:00	Design of Solar Rooftop Plants Mr. Christoph Wuertemberger, CEO, Solarstromanlagen GmbH
11:00 - 11:30	Coffee break & Networking
11:30 - 12:15	Smart grid solutions in Schwaebisch Hall / Germany as part of Smart city Mr. Christoph Wuertemberger, CEO, Solarstromanlagen GmbH
12:15 - 13:00	Smart Grid trend in India: Typical Tenders, Requirements and Strategy Ms. Aarthy Vigneshwari, Business Development Team, iPLON India Private Ltd.
13:00 - 14:00	Lunch
14:00 - 14:30	Demo: Solar Rooftop Monitoring System for better O&M through Data Analytics Mr. Krishna, O&M Vice President, iPLON India Private Ltd.
14:30 - 15:00	Grid Stability and Hybrid solutions for Rooftop Projects Mr. Gowrishankar, Business Development Lead, iPLON India Private Ltd.
15:00 - 15:30	Stadtwerke Gandhigram: A model for a Smart University Ms. Lumine Divya, Business Development Team, iPLON India Private Ltd.
15:30 - 16:00	Best practices: Solar /Hybrid Rooftops in Germany and Storage Solutions Mr. Christoph Wuertemberger, CEO, Solarstromanlagen GmbH
16:00 - 16:30	Announcement of next Workshop and Closing with Tea Ms. Lumine Divya, Business Development Team, iPLON India Private Ltd


Solarstromanlagen
Würtemberger GmbH


iPLON®
The Infranet Company


stadtwerke
Schwäbisch Hall GmbH


GANDHIGRAM RURAL INSTITUTE DEEMED UNIVERSITY


iPLON®
India Pvt Ltd.,


M+
SOLAR


WELSPUN

Design of Solar Roof top PV System

23 Years Photovoltaik in Germany

Who I am !

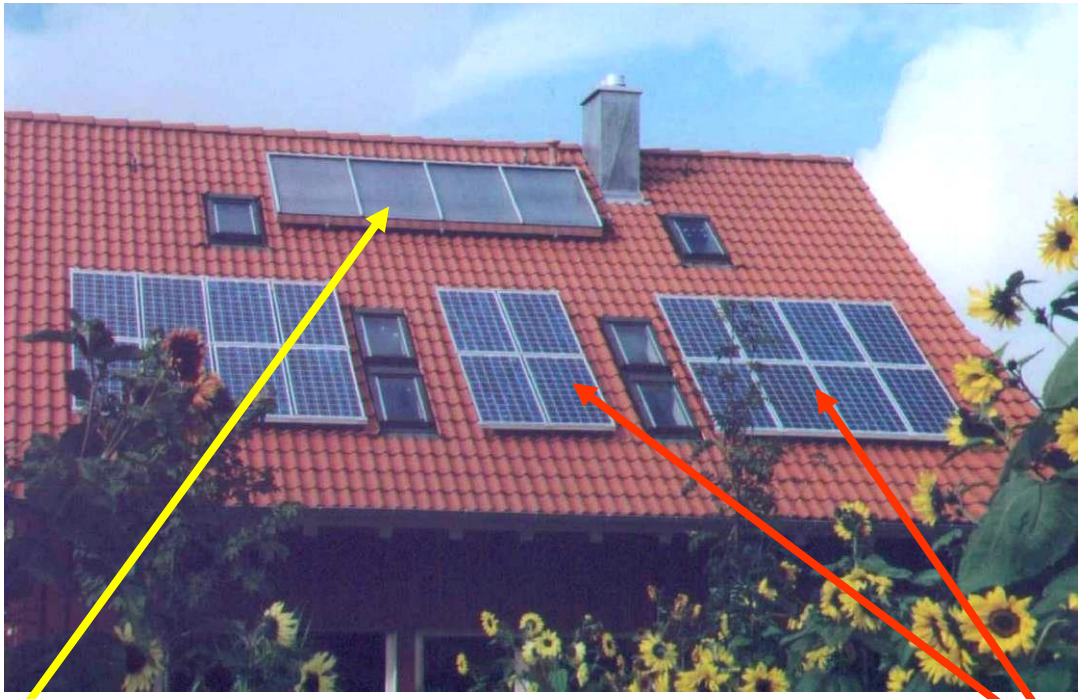
Christoph Würtemberger

C_Wuertemberger@t-online.de

Work History:

1991	Start with Solar Home System
1993	Build up my first Grid Cobbled System in Germany
1994	Installation of a stand alone PV system in my private house.
1996	Start at the Wuerth Electronic Group with photovoltaic activity
1999	Wuerth Solar is starting
2000	Start Training Programs in India
2001	Start Training Programs in Brazil
2007	Start activity of **AKADEMIE E3**
2008	Start MW Zander
2010	Start MW Solar
2012	PV expert with TüV certification PV Consultant for different companies

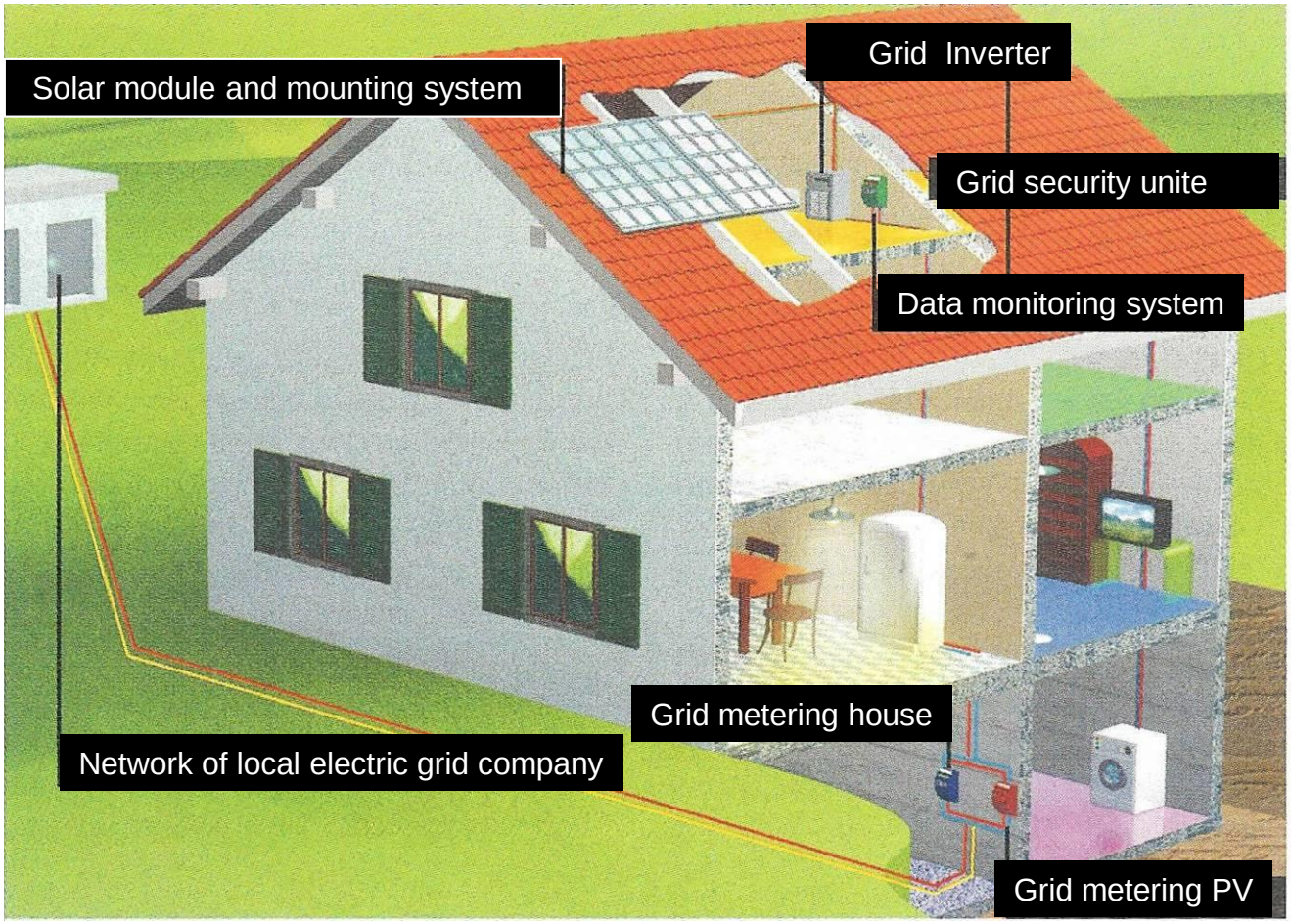
Different Sun Energy Technologies:



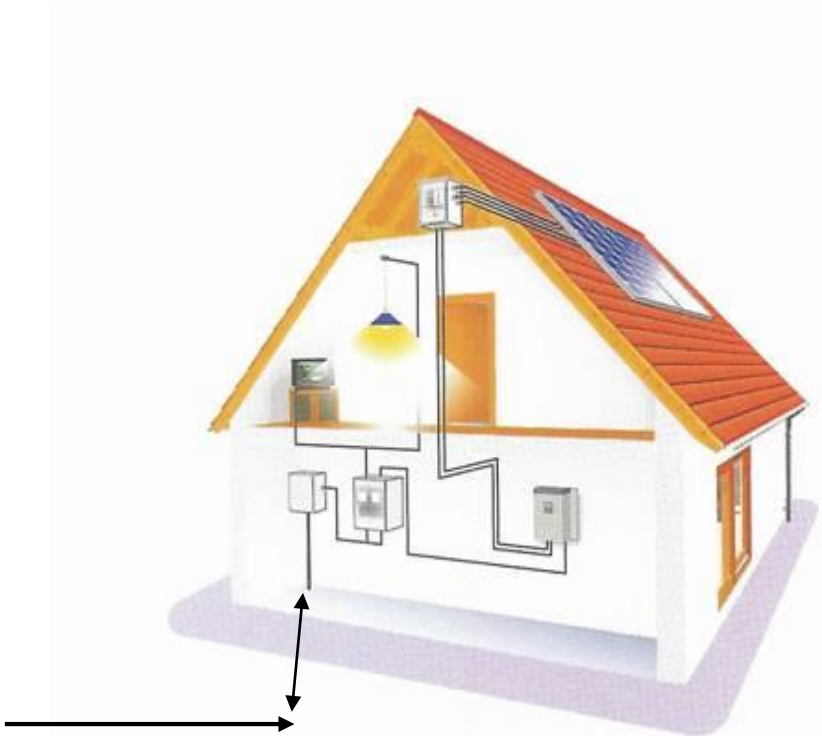
Solar Thermal
to produce hot water
from the sun light.

Photovoltaik
to produce electric energy
from the sun light.

Function of grid coubbling:



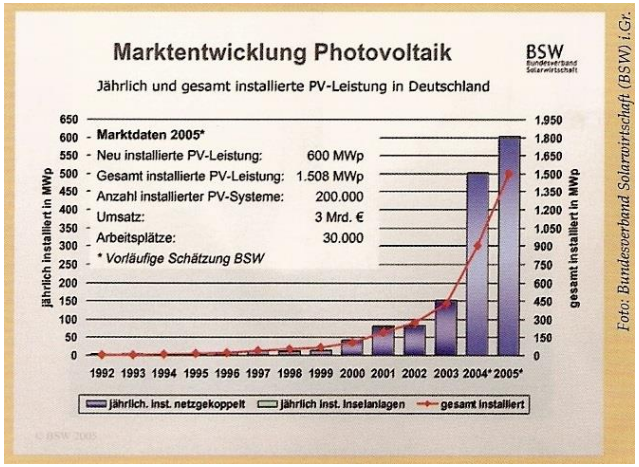
Different use of photovoltaic energy



Grid Cobbling : Without battery to Store energy

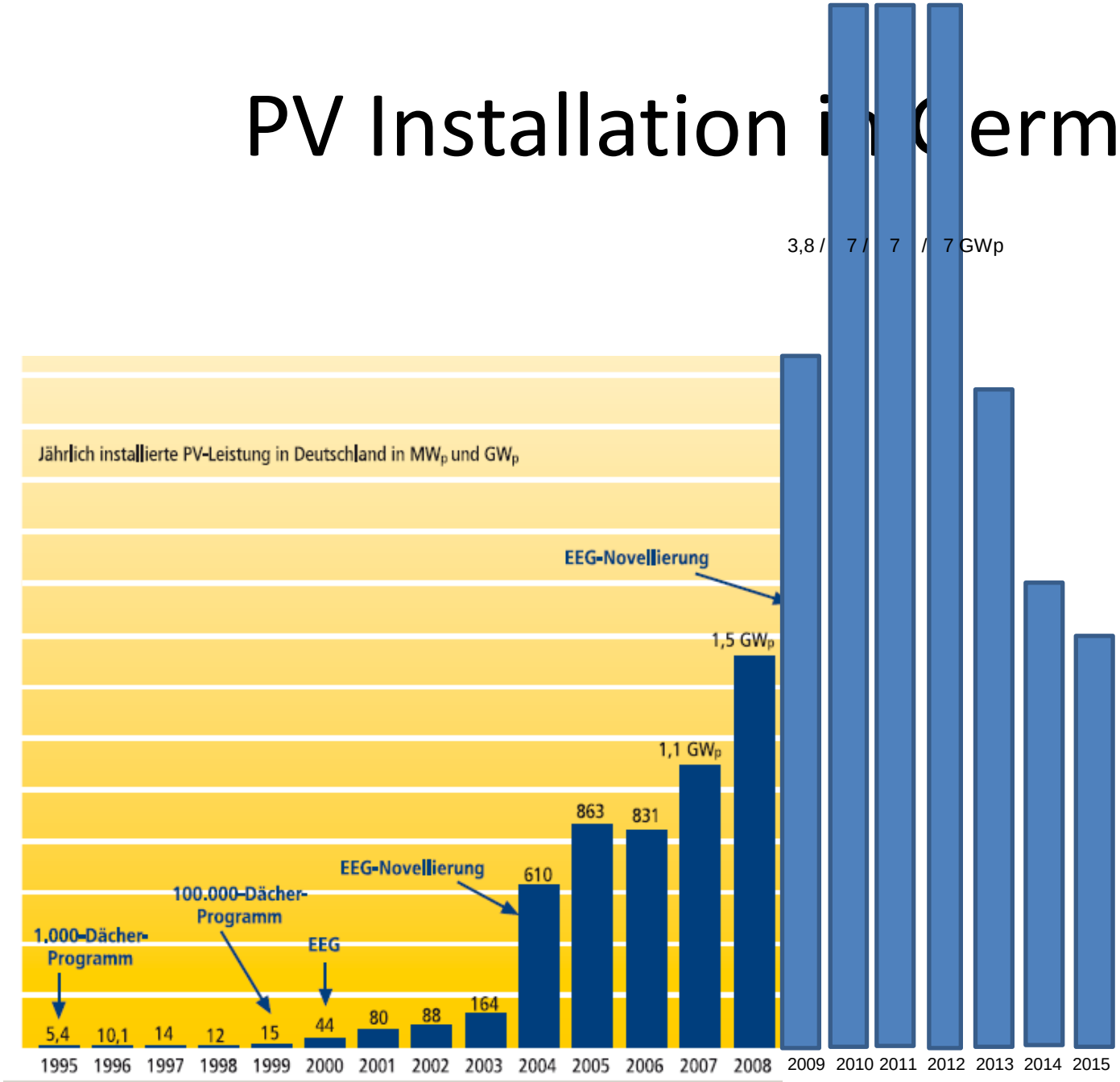
Stand Alone System: Where no electric grid is available !

History of the grid cobbled market in Germany



The market of grid coupled system grow up in the last 5 years very soon. Here the German government started a Market programme that each kWh energy from a PV system get a Feed in tarif for 20 years.
This is profitable in Germany.
End of the year 2015 we have in Germany 38,000MWp modules installed for grid cobbling systems

PV Installation in Germany



More than **38 GWp** PV power was installed in Germany till end of 2015

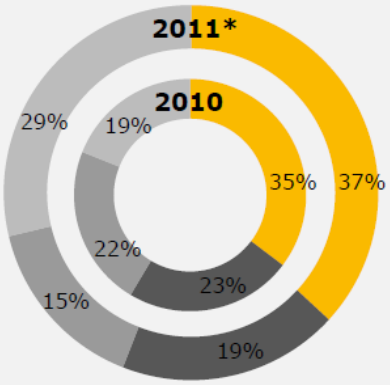
PV Installation in Germany

The German PV Market: Installations per Segment

GERMANY TRADE & INVEST

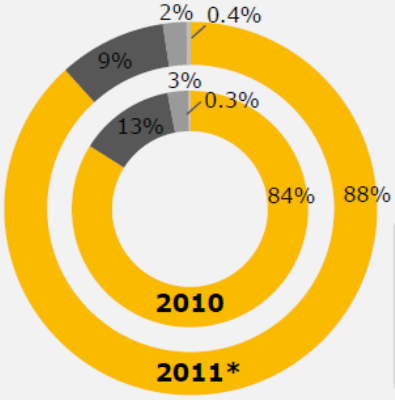
Systems ≤ 30kWp are dominating the market:
their share increased from 35% to 37% (2010 vs. 2011 Jan.-Sept.)

Installed capacity



TOTAL:
2011*:
3.4 GWp
2010:
7.4 GWp

Number of PV systems installed



TOTAL:
2011*:
128,528 systems
2010:
249,845 systems

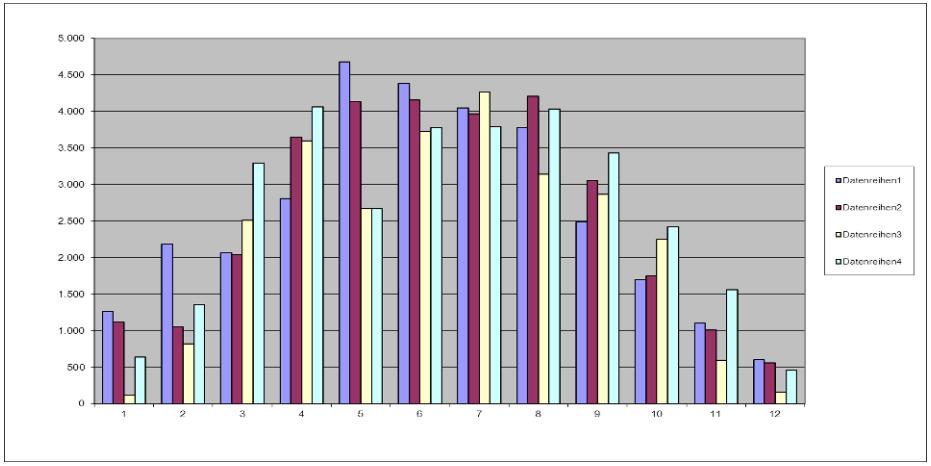
Up to 30kWp | 30 - 100kWp | 100kWp – 1MWp | Over 1MWp




Roof-top share: 85% of volume in 2010 **BIPV** share: 0.044% of volume in 2009

Sources: Federal Network Agency 2011; Images: Solarwatt, BP, Geosol; BMU 2011
Note: *2011 includes installations from January 2011 to end of September 2011; Figures do not sum to 100%, because of rounding

30kWp Roof Top Installation



Energy Production:
2008 – 2011

7,5kWp Roof Top Installation

Components of a grid coubbled system

Module

cable

Modul Fixing System

Grid Inverter

Energy Meter

Different Module Technology

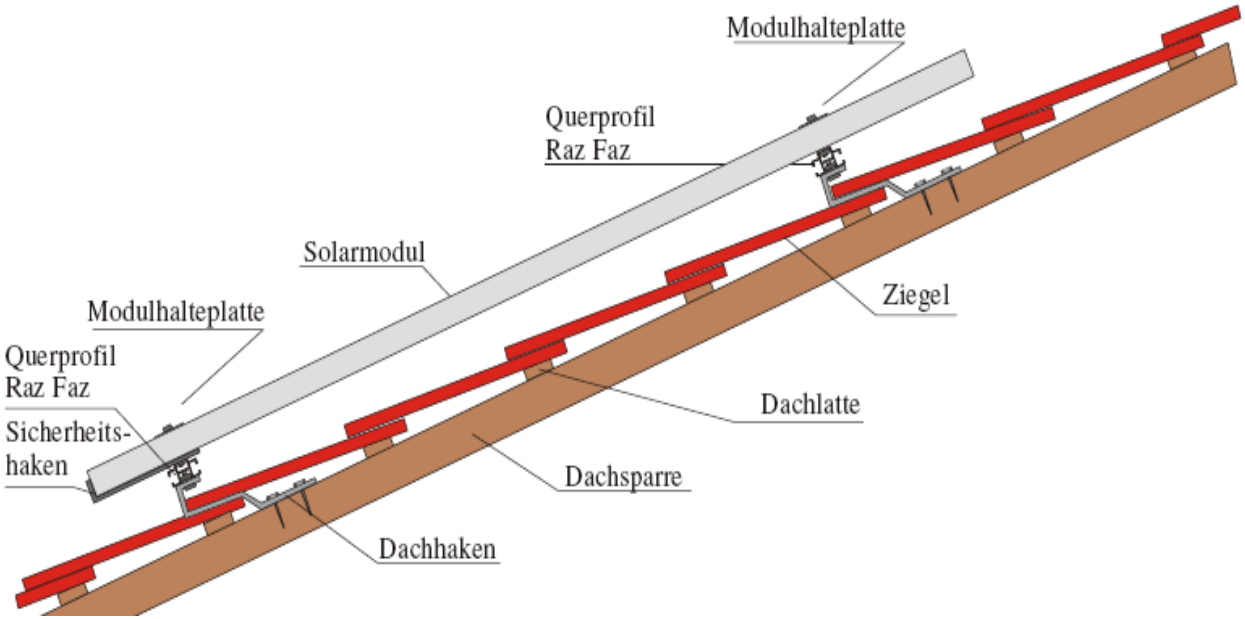
Crystalline Silicon

CIGS

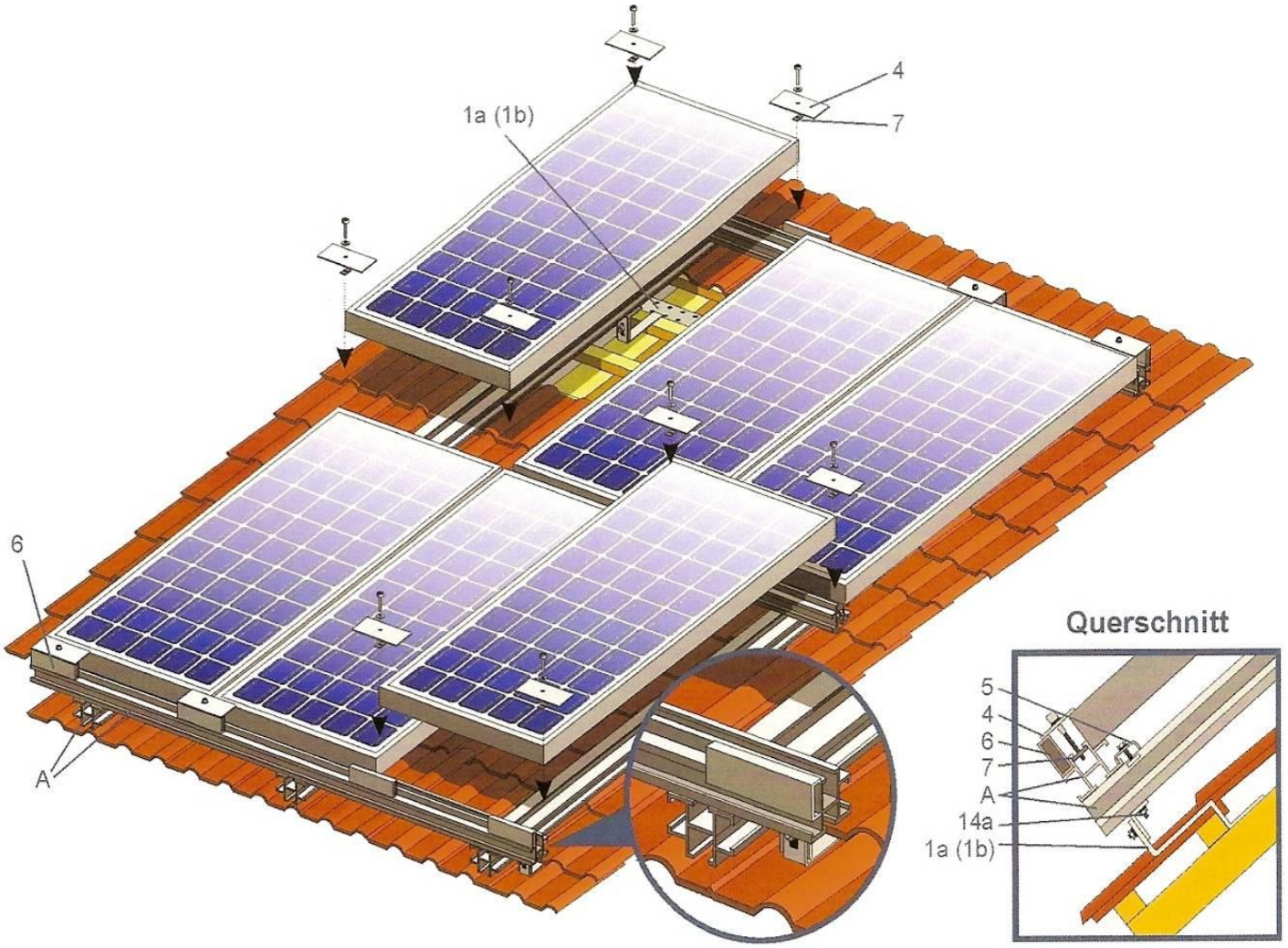
Micro morph Silicon

CdTd

Components of Roof Top Installation



Details of Roof Top Installation



Details of roof installation

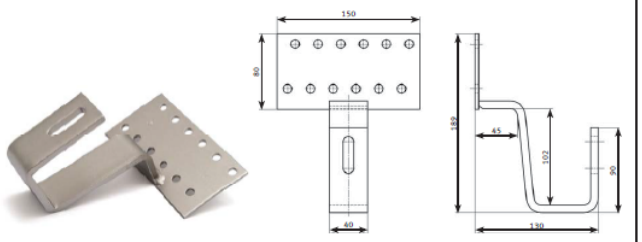
Profil 40 × 40 Standard

Art.-Nr.	Länge	W_y	Gewicht
630P04040S60	6.000	3,65 cm³	1,074 kg/m
630P04040S40	4.500		
130P04040S00	auf Wunschlänge geschnitten (bis 6.000)		

Material: Aluminium, EN AW-6063 T66
Schlitzbreite: 22,4 für die Aufnahme der Hammerkopfschrauben
Durchgangsbreite: 11 unterer Montageschlitz zur Dachbefestigung und oberer Montageschlitz zur Modulklemmung, seitliche Aufnahme für Kreuzverbinder

Profil 40 × 60

Pfannenziegeldachhaken für höhere statische Belastungen



Art.-Nr.	Fußplatte 150 × 80	Langloch
12P114081000	Bohrung Ø 9, versetzt	11

Material Bügel: 8 mm Edelstahl 1.4301
Material Fußplatte: 4 mm Edelstahl 1.4016
Zu verwenden mit Tellerkopfschraube mit T-Drive nach Z-9.1-453

Stockschraube mit Sperrzahnmuttern und EPDM-Dichtgummi

Art.-Nr.	Maße	Außensechskant
112009101400	M10 × 140	ohne
112009101600	M10 × 160	SW7
112009101800	M10 × 180	
112009102000	M10 × 200	
112009102500	M10 × 250	
112009122000	M12 × 200	SW9
112009122500	M12 × 250	
112009123000	M12 × 300	
112009123500	M12 × 350	

Material: Edelstahl 1.4301
Stockschrauben sind sowohl mit einem Holzgewinde (unten) als auch mit einem metrischen Gewinde (oben) versehen. Die Auslieferung erfolgt vormontiert mit EPDM-Dichtring, Mutter und Scheibe sowie zwei Sperrzahnmuttern.
Bauaufsichtliche Zulassung Z-14.4-532, Z-14.4-555, Z-14.4-598, Z-14.4-602, Z-14.4-632

Adapterblech für Stockschrauben- und Gewindestangenbefestigung

Schienenverbinder 4-Loch

Mittelklemme

Art.-Nr.	für Modulhöhen	Schraube
119032300600	30–33	M6 × 20
119032340600	34–38	M6 × 25
119032390600	39–43	M6 × 30
119032440600	44–48	M6 × 35
119032490600	49–50	M6 × 40

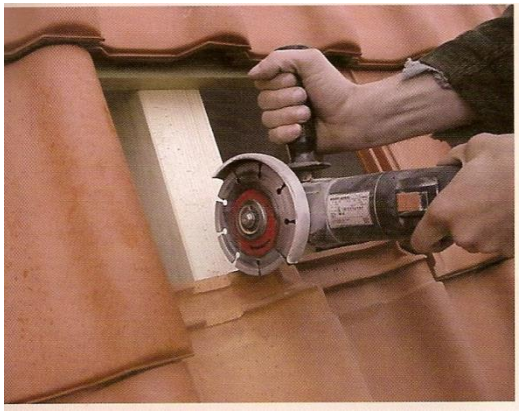
Material: Aluminium, EN AW-6063 T66
Länge der Klemme: 70 mm, Modulabstand 19 mm
Lieferung erfolgt inkl. Gewindeplatte M6 und Zylinderkopfschraube
Weitere Modulhöhen auf Anfrage.

Endklemme mit Zylinderkopfschraube

Art.-Nr.	für Modulhöhe	Art.-Nr.	für Modulhöhe
119022300600	30	119022410600	41
119022340600	34	119022420600	42
119022350600	35	119022430600	43

Details of roof installation

Details of roof installation

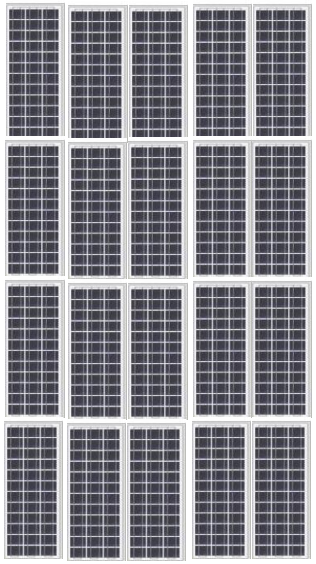


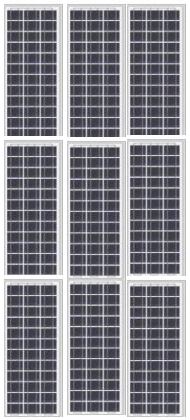
Installation at a house roof

Electric Details of Roof Top Installation

Süd Dach West

Süd Dach Ost





String 1:1 String 1.2

String 2.1

1 x 20 A 1 x 16A

Haus
Verbrauch

KS 5000

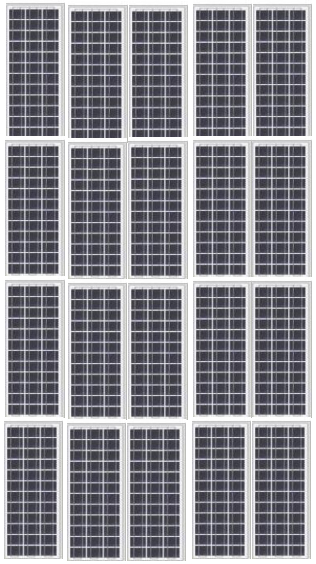
KS 2000

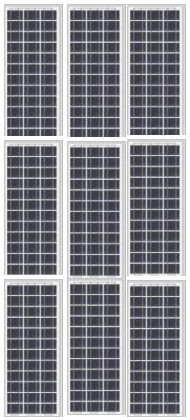
AC IN 1
Grid

Energy flow inside PV System

Süd Dach West

Süd Dach Ost





String 1:1 String 1.2

String 2.1

1 x 20 A 1 x 16A

House Load
500W

KS 5000

KS 2000

1.500W

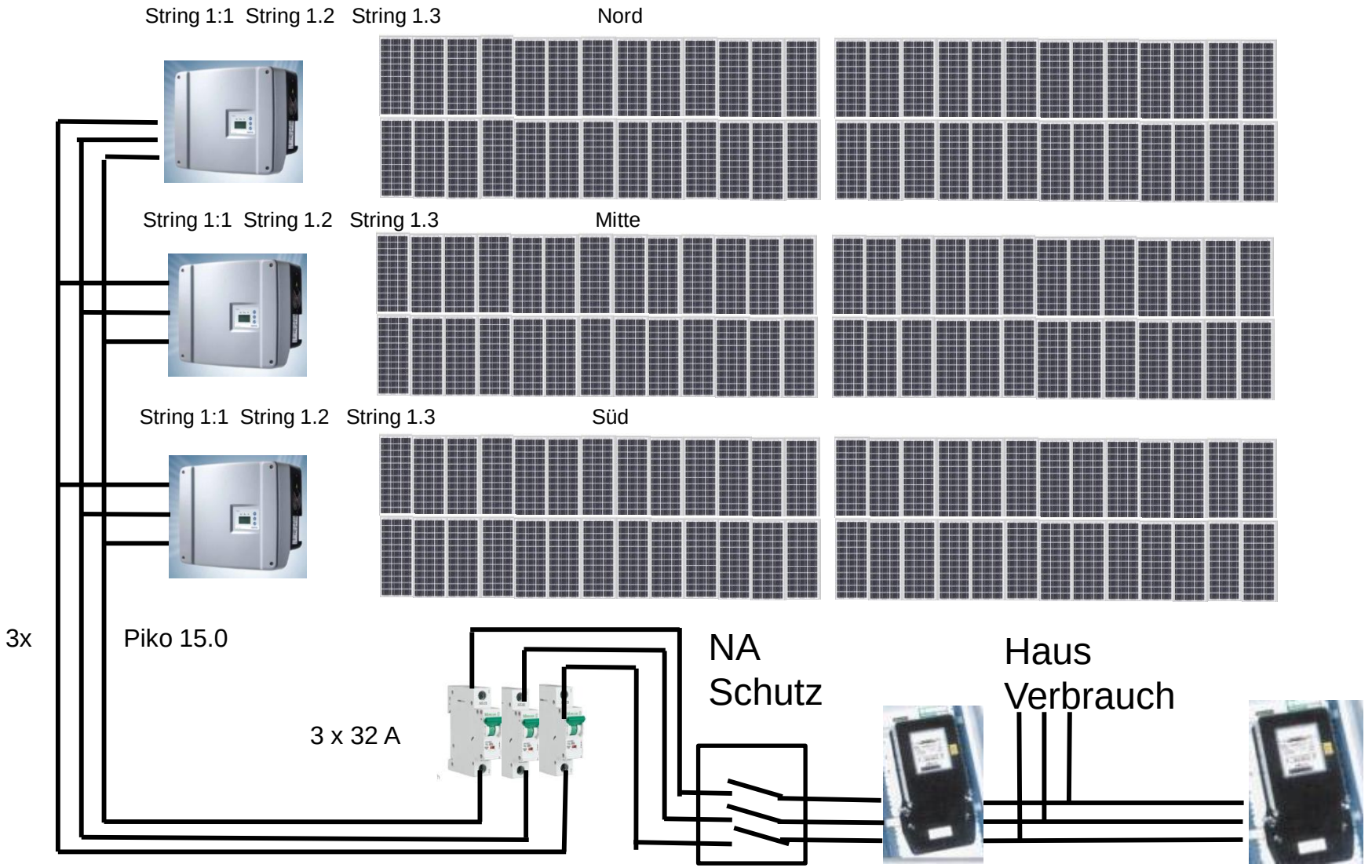
1.000W

Electric Installation
Inside House Network

Solarstromanlagen
Würtemberger GmbH

42 kWp flat Roof Installation

Overfew of electric connection
42 kWp Roof Top 3 phase system



42 kWp Electric Connection

100kWp Roof Installation

Installation: 2002: 30kWp **2005**: 40kWp **2008**: 30kWp First Installation of M+W inverter 2009

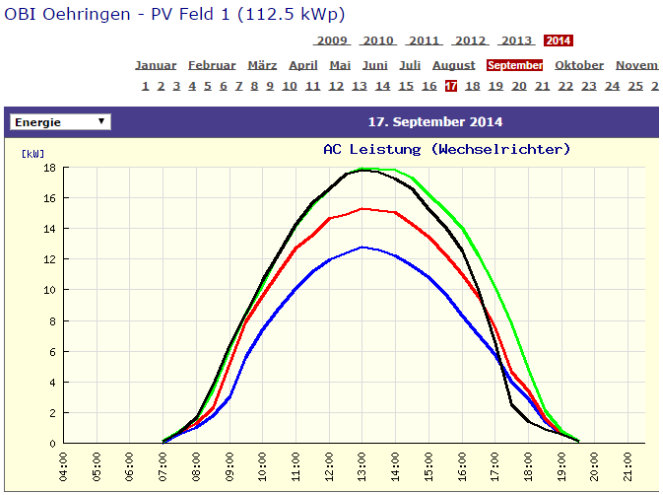
140kWp Pergola in the Netherland

Flat Roof installation 340kWp south Orientation

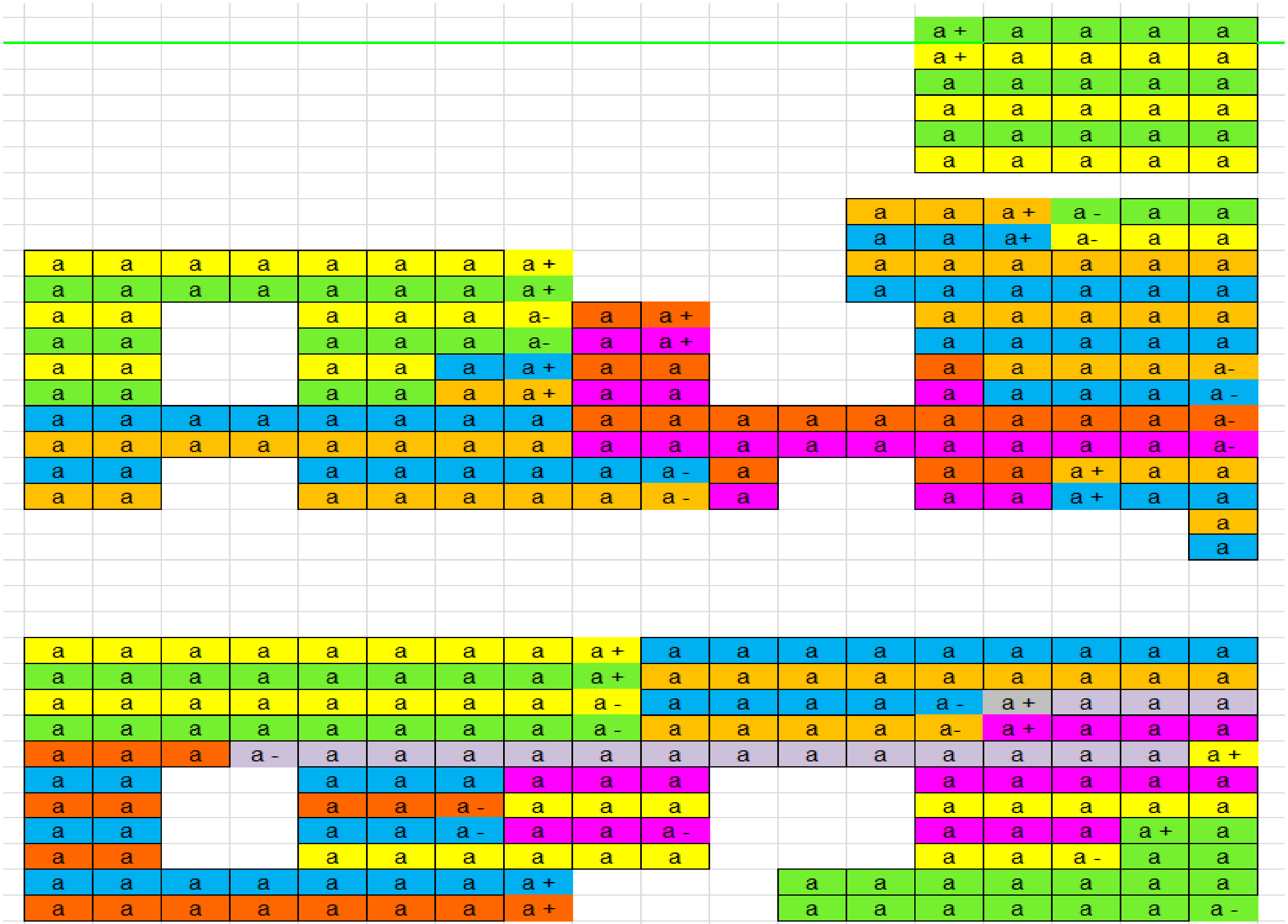
100kWp Flat Roof Installation
East / West Orientation

Mechanic for a 100kWp
Roof top Installation

Electric equipment for an 100kWp installation



100 kWp String plan of an East / West PV Installation with 4x 30kW Inverter



Energy from differnent sources

Im Jahr 2012 deckte die PV mit einer Stromerzeugung von **28 TWh** [BDEW4] rund **5,3%** des Netto-Stromverbrauchs (Endenergie, vgl. Abschnitt 20.8) in Deutschland, geschätzt auf Basis von Zahlen aus [BDEW3], [BDEW4]. Alle Erneuerbaren Energien (EE) zusammengenommen deckten rund **25,8%** des Netto-Stromverbrauchs. Bezogen auf den Brutto-Stromverbrauch Deutschlands liegen die Anteile bei **4,7%** für PV bzw. **23%** für alle EE. An sonnigen Tagen kann PV-Strom zeitweise **30-40%** des momentanen Stromverbrauchs abdecken.

Ende 2012 waren in Deutschland laut Bundesnetzagentur PV-Module mit einer Nennleistung von **32,4 GW** installiert, verteilt auf ca. **1,3 Mio.** Anlagen. Die PV übertrifft mit dieser installierten Leistung alle anderen Kraftwerkstypen in Deutschland.

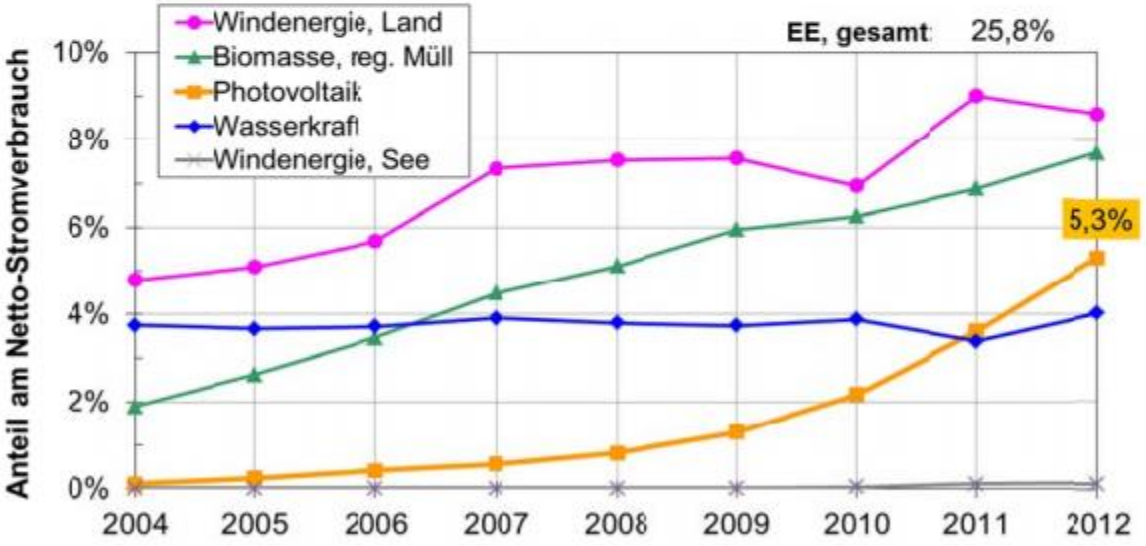


Abbildung 1: Entwicklung des Anteils Erneuerbarer Energien am Netto-Stromverbrauch (Endenergie) in Deutschland, Daten aus [BMWi1], [BDEW3], [BDEW4], [BMU4]

Energy Control Unite

SolarCount - Net - Manager (SHKW Anlagen - neuer Typ)

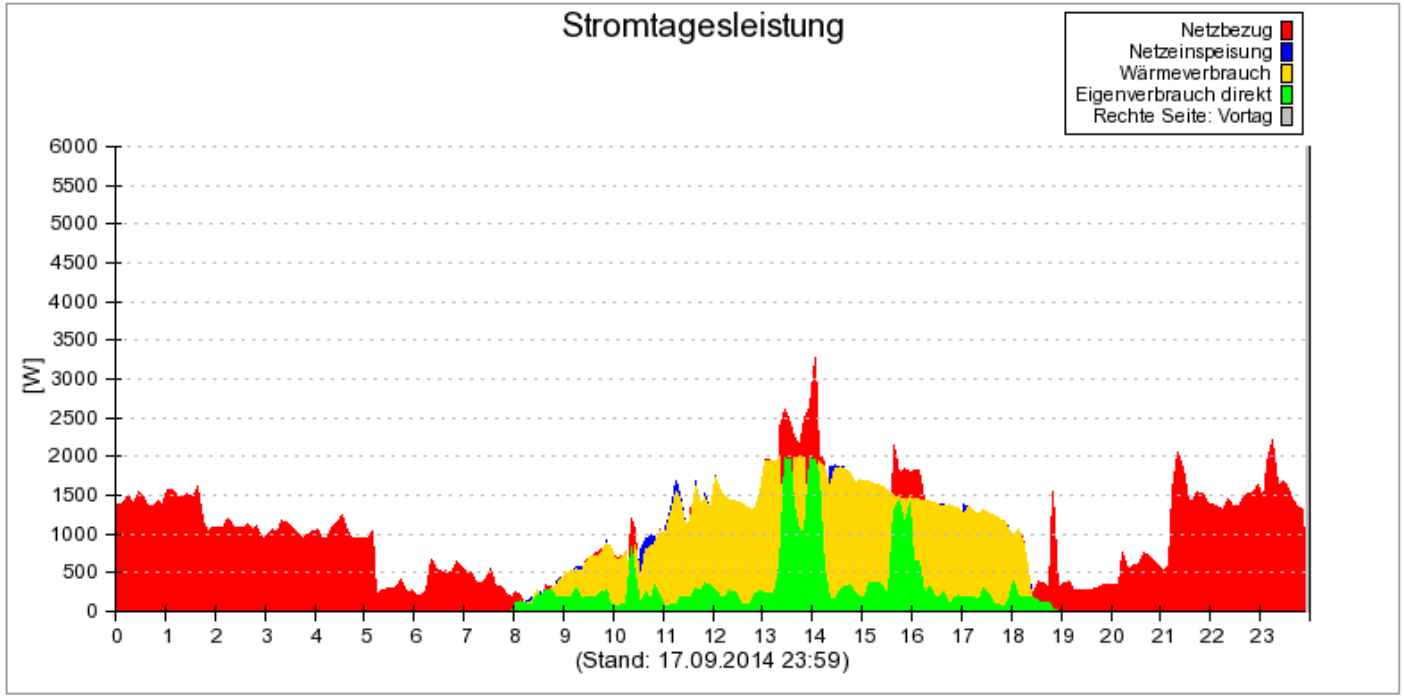
Anzeige der Daten der Anlage Nr. 194-157-180-001

Zurück zur Eingabeseite ...

17.09.2014 ... für die Darstellung der Stromtagesleistung vergangener Tage bitte hier ein Datum eingeben!

Stromtagesleistung | kWh-Monatsdaten | kWh-Jahresdaten | Temperaturverlauf | Tageswerte

Anlagenparameter



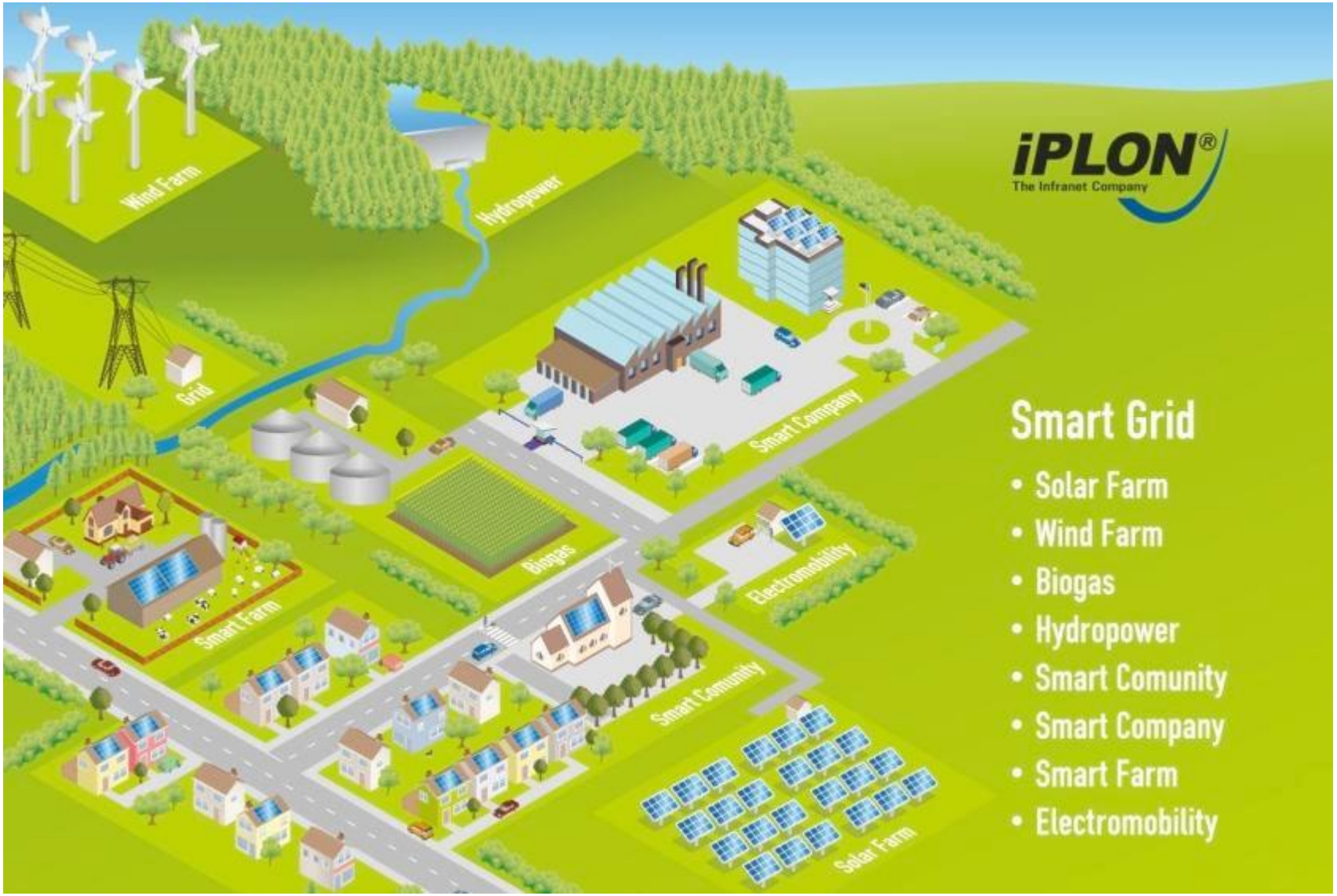
SolarCount.Net 2012...2014

20 years of knowledge in PV

Christoph Würtemberger

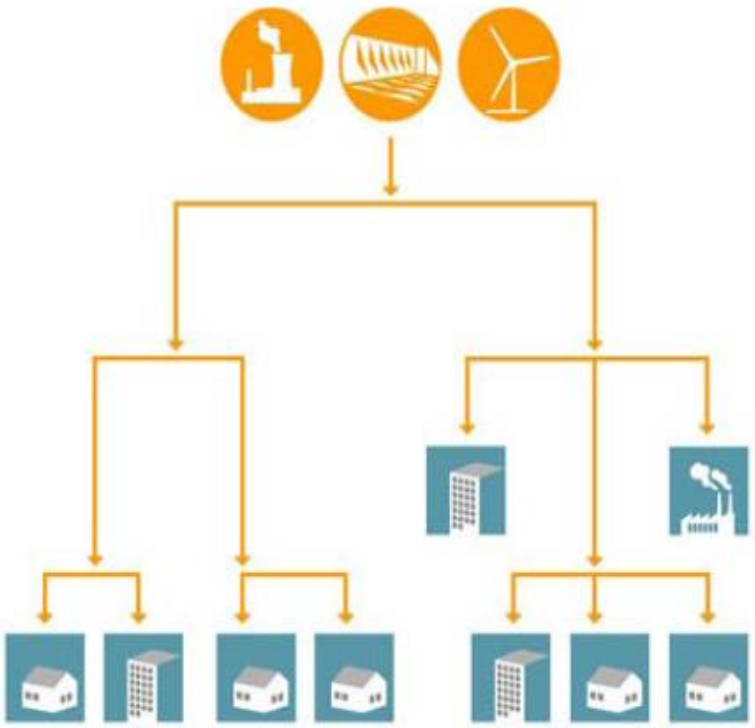
Gutachter für PV Anlagen
74632 Neuenstein
www.Solarstrom-Projekte.de

Smart Grid Solution



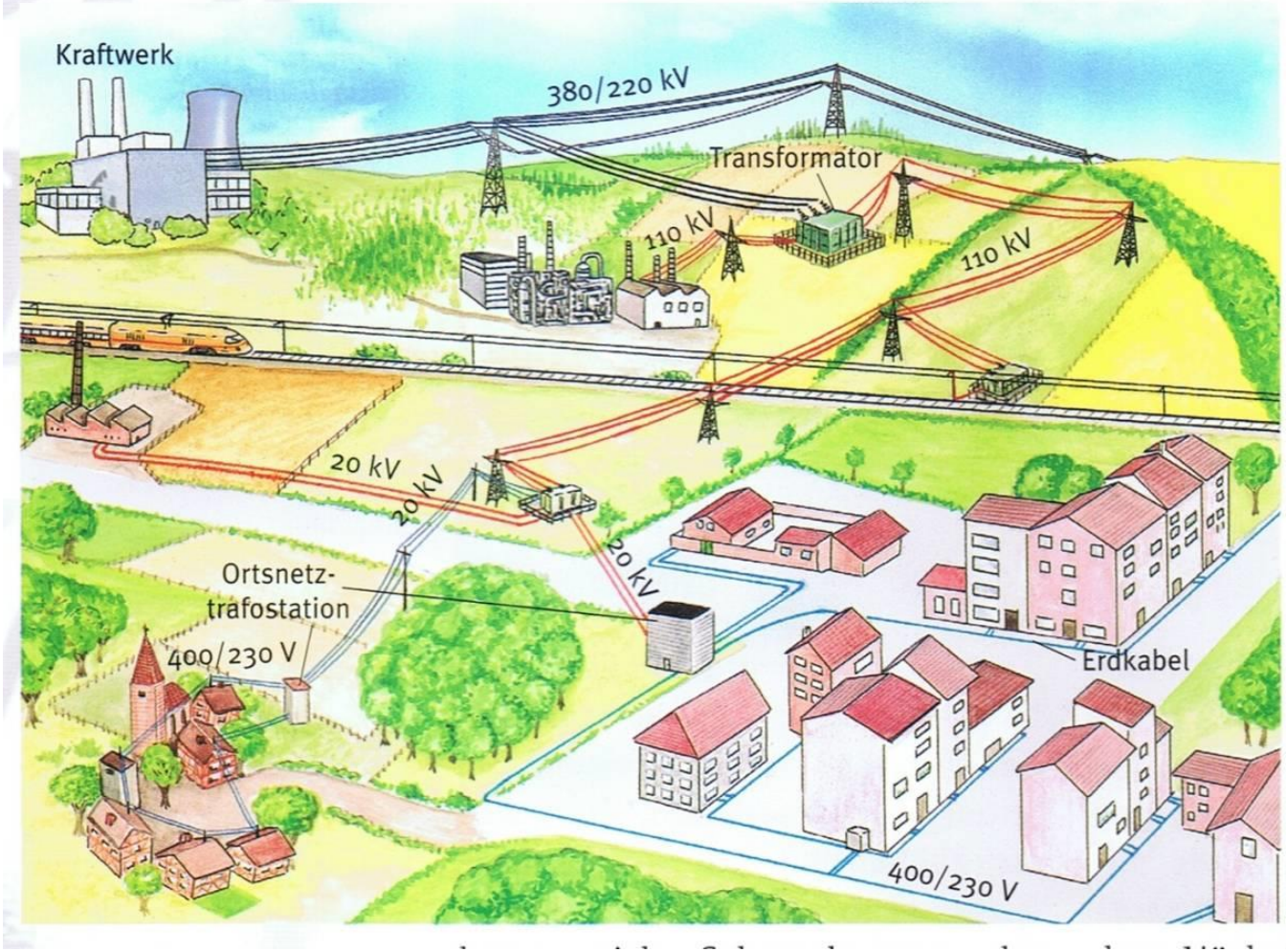
Power Grid today and tomorrow

Today's Typical Power Grids
(Distributed Network)

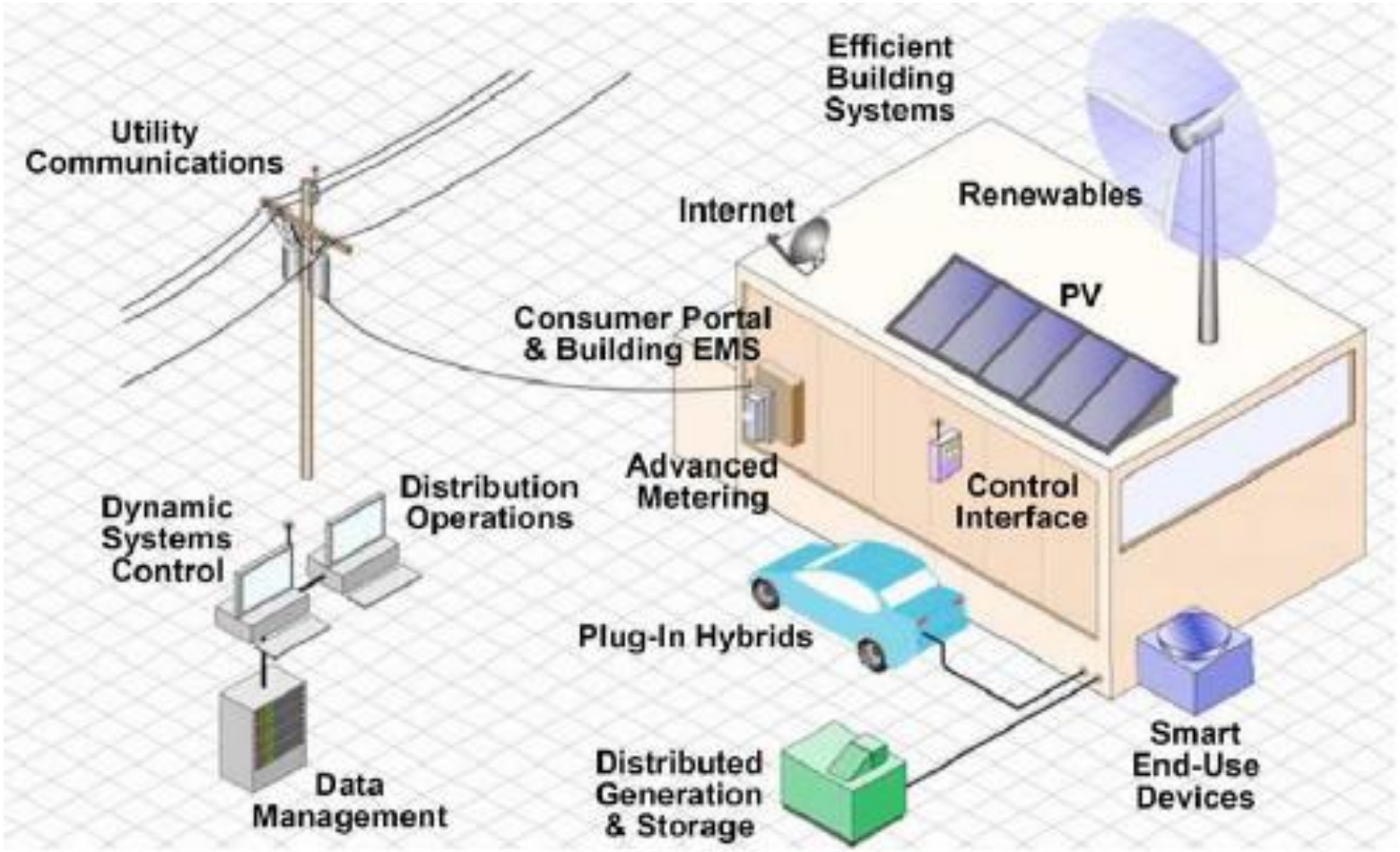


Future Smart Power Grid
(Meshed Network)

Function of the Electric Grid :



Standard Electric Grid in Germany with diffenrent voltage level.


Efficient
Building
Systems
Utility
Communications
Internet
Renewables
PV
Consumer Portal
& Building EMS
Advanced
Metering
Control
Interface
Distribution
Operations
Dynamic
Systems
Control
Plug-In Hybrids
Smart
End-Use
Devices
Distributed
Generation
& Storage
Data
Management

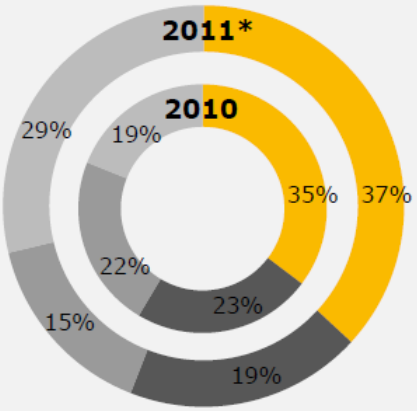
PV Installation in Germany

The German PV Market: Installations per Segment

GERMANY TRADE & INVEST

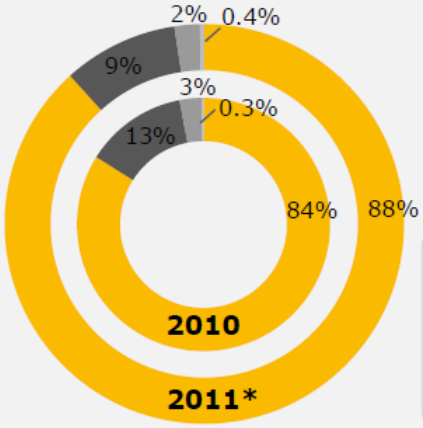
Systems ≤ 30kWp are dominating the market:
their share increased from 35% to 37% (2010 vs. 2011 Jan.-Sept.)

Installed capacity



TOTAL:
2011*:
3.4 GWp
2010:
7.4 GWp

Number of PV systems installed



TOTAL:
2011*:
128,528 systems
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249,845 systems

Up to 30kWp | 30 - 100kWp | 100kWp – 1MWp | Over 1MWp




Roof-top share: 85% of volume in 2010 **BIPV** share: 0.044% of volume in 2009

Sources: Federal Network Agency 2011; Images: Solarwatt, BP, Geosol; BMU 2011
Note: *2011 includes installations from January 2011 to end of September 2011; Figures do not sum to 100%, because of rounding

Owner of PV installation in Germany

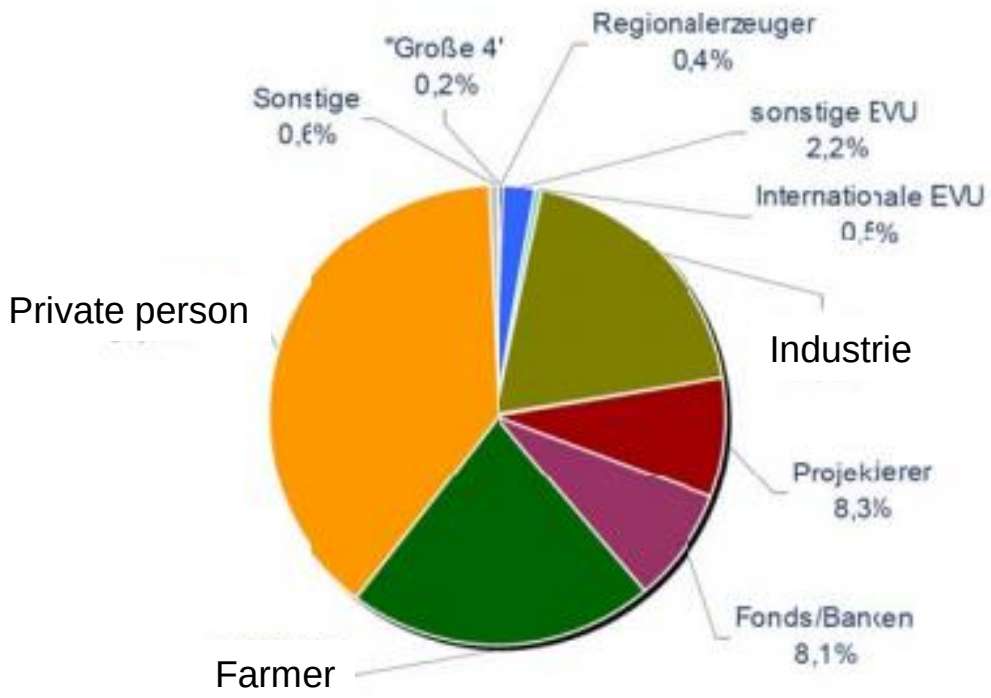


Abbildung 22: Anteile der Eigentümer an der Ende 2010 betriebenen Leistung von Photovoltaikanlagen [trend:research]

End of 2015 more than 1,500,000 differnet installtion of PV will be done in Germany. The average of each installtion is less than 30kWp

10MWp PV Ground Field Installation Germany

Solarstromanlagen
Würtemberger GmbH

6 MWp Park at Italy

12MWp PV Ground Field Installation Kochi Airport

Solarstromanlagen Württemberger GmbH

2 MWp PV Installtion with 32kW String Inverter

Photovoltaik Details of an Ground Field Installation

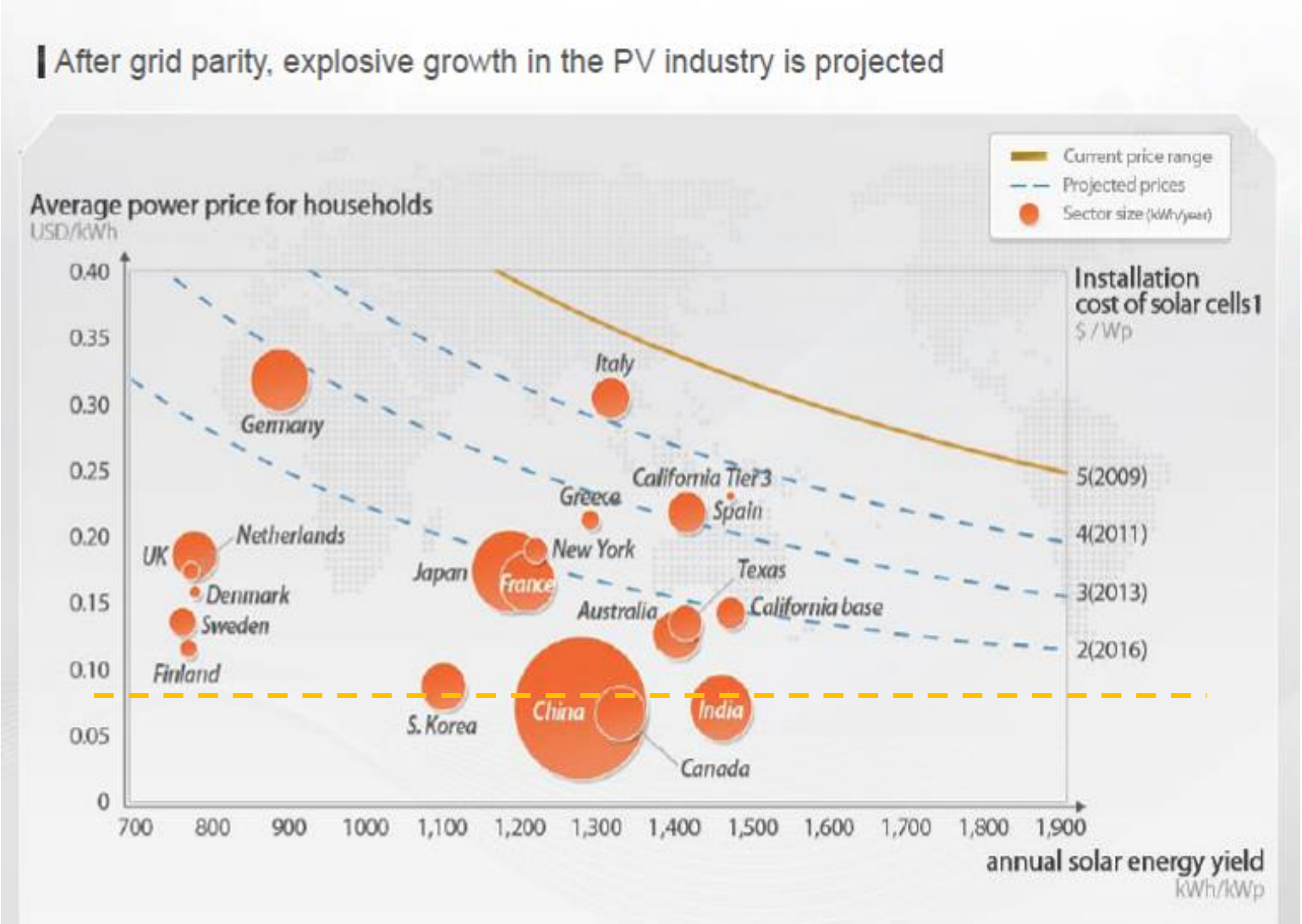
Problems in the local Grid Network

Training programs

Training workshop on photo-voltaic systems in Mithradham Renewable Energy Centre in Kerala, India in October 2002

Training workshop on photovoltaic systems at Marbach with participants from Brazil in July 2001

Grid Parity of PV Energy



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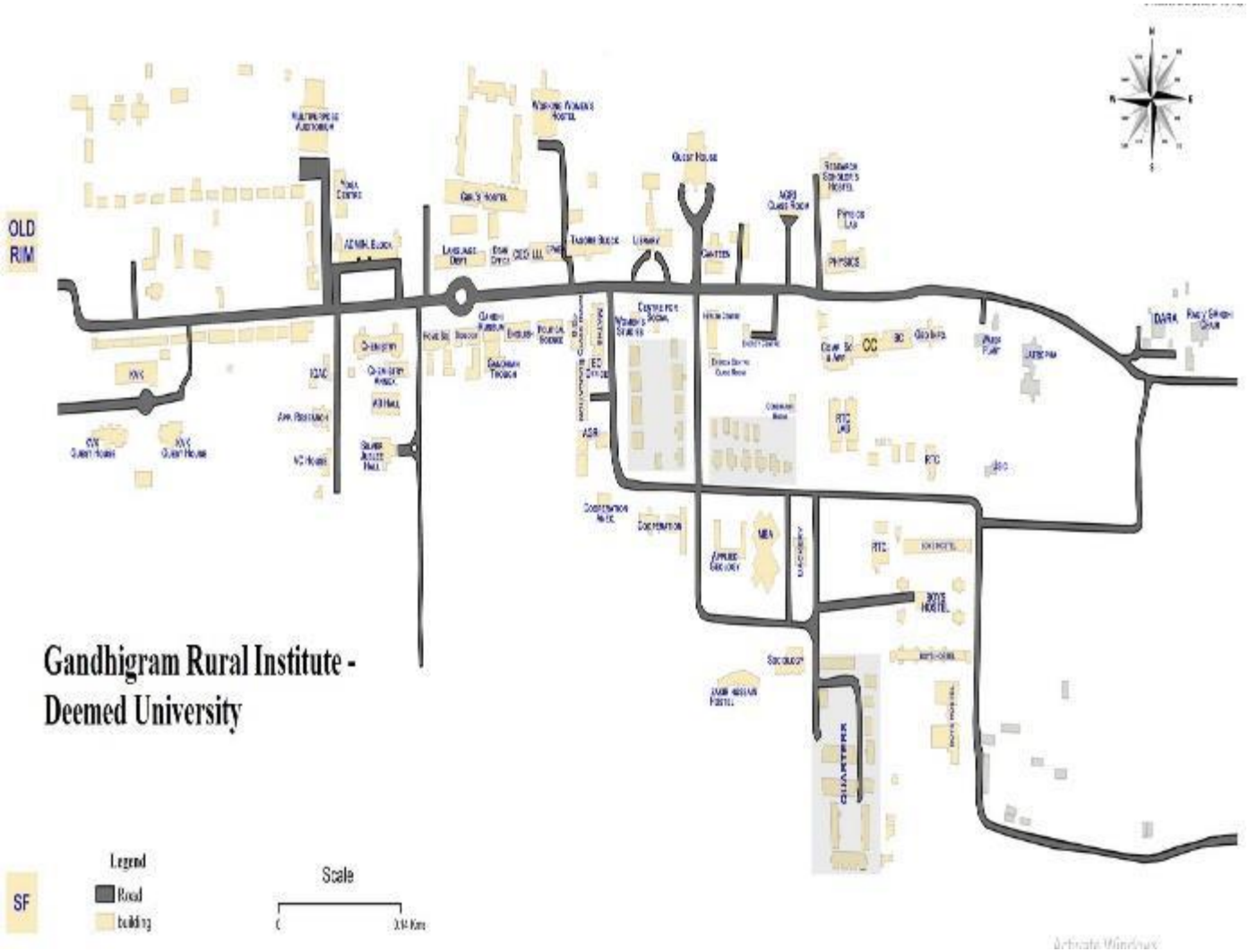
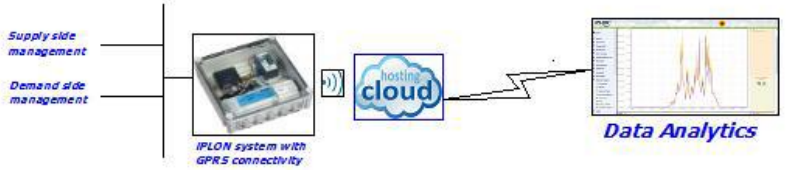
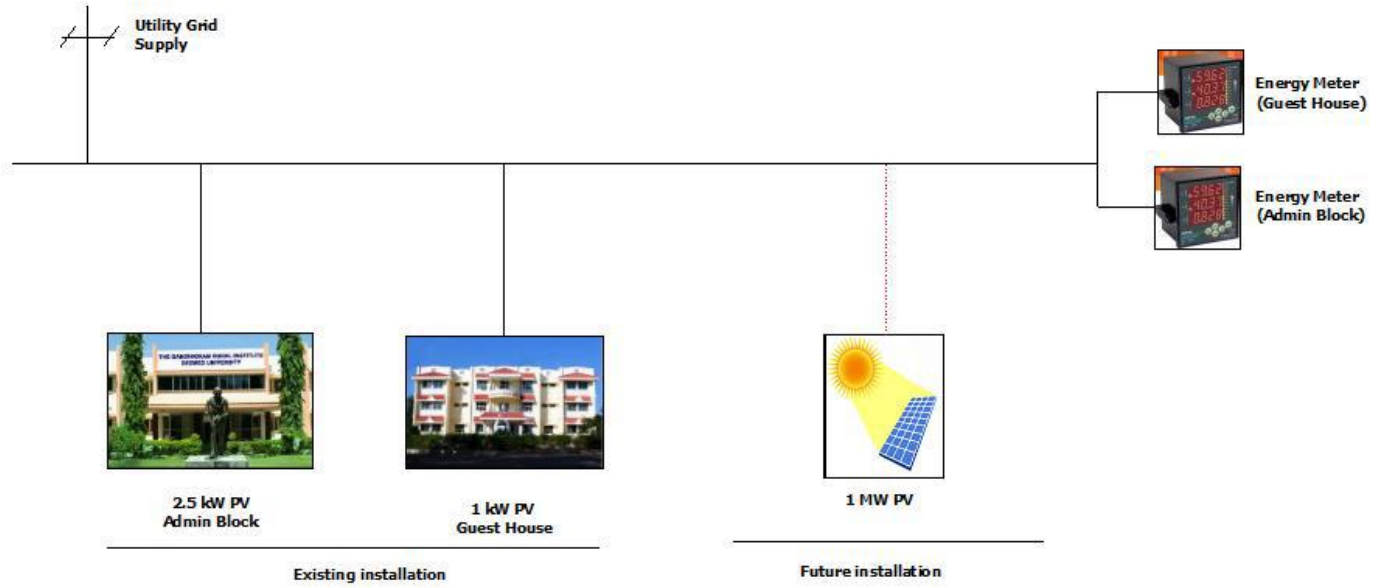


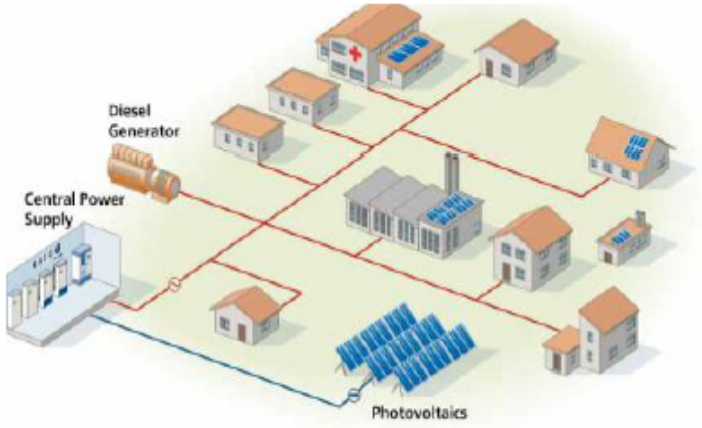
Logical View : Gandhigram Rural Institute





New Hybrid Grid Technology

Example of a hybrid system for research and development



The Fraunhofer ISE research institute and the inverter manufacturer KACO new energy are presently operating and studying a PV / diesel hybrid system in Germany. The system consists of a PV array providing 51 kW (max. output), grid-forming inverter (120 kW), high efficiency charge controllers, a dual battery system which combines the economic efficiency of lead-acid batteries (288 kWh) with the high efficiency and cycle durability of lithium-ion batteries (96 kWh) and intelligent meters which allow new approaches to consumption management. The mini-grid concept is also designed to enable it to be connected to the national electricity grid in the longer term.

An energy management system is connected to the different energy sources and loads in order to ensure that the system works as efficiently and cost-effectively as possible and that the resources used are optimally deployed in energy and economic terms. This device helps to calculate the consumption and controls it via a variable electricity price. For example the energy management system will switch the water pumps on only if there is plenty of cheap energy available.

Source: Fraunhofer ISE

The Indian Power Grid

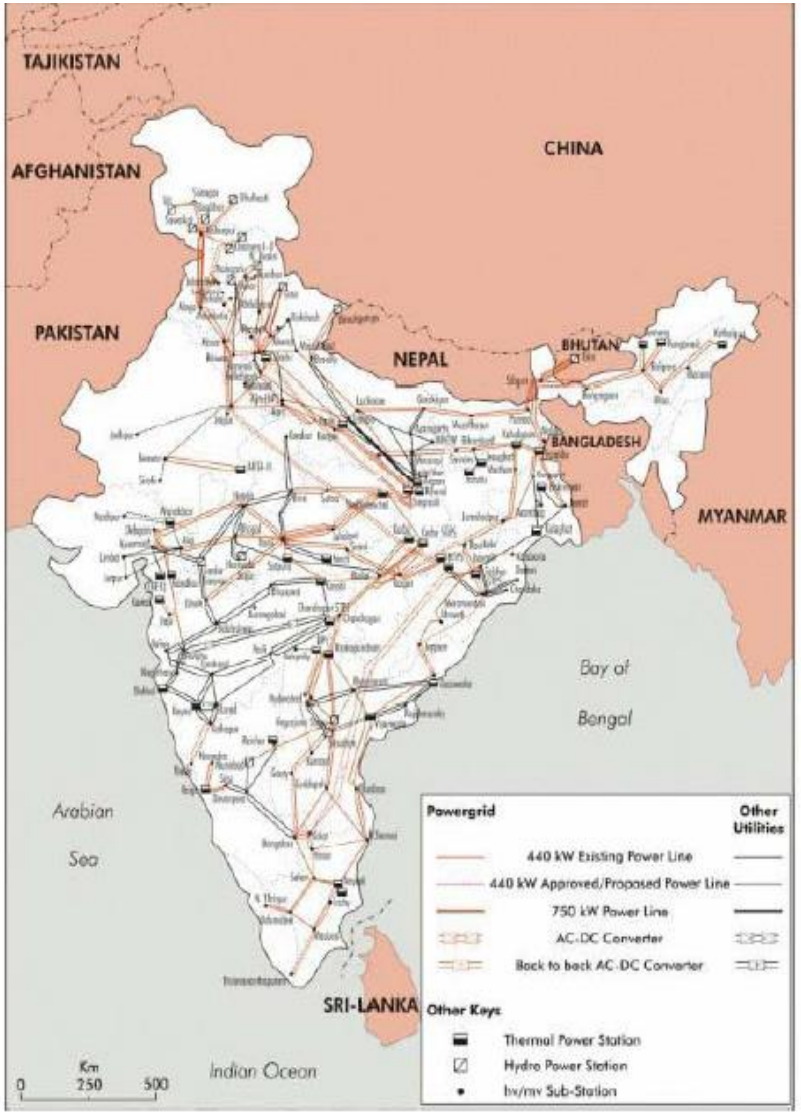
The power grid of India is similar to most other power grids today – **centralised and top-down distributed** (from HV to MV to LV).
Energy is generated mainly in **large power plants**.

The fuel share consists of following:

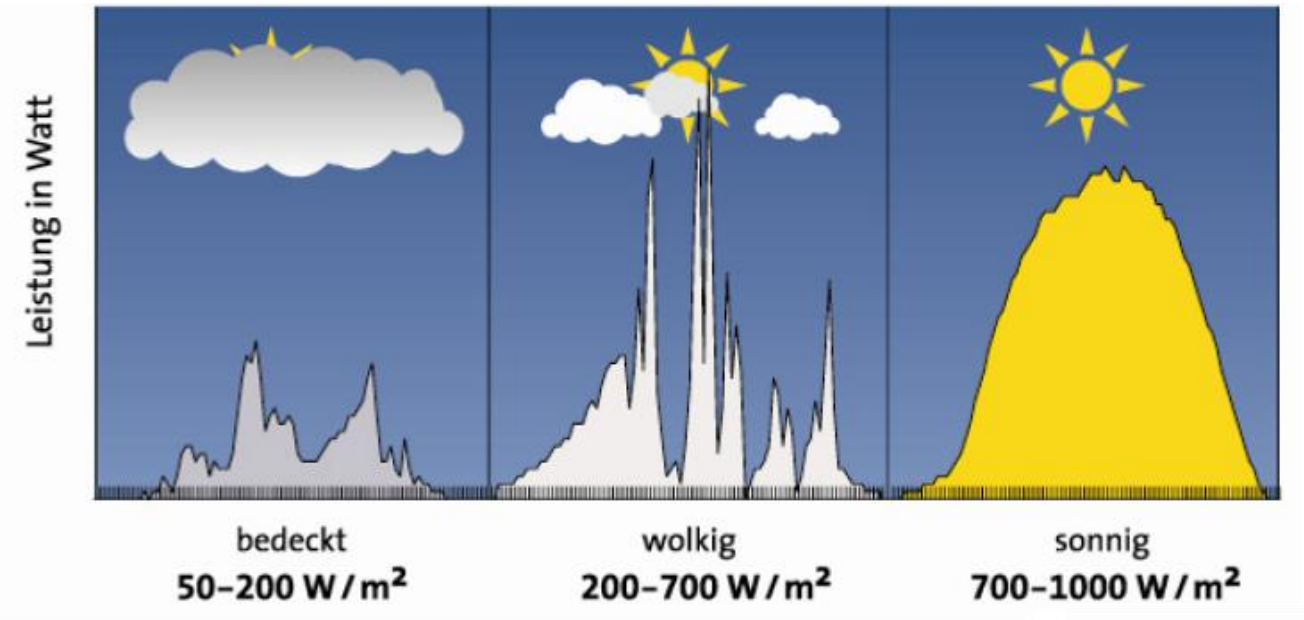
- 60 % Coal
- 20% Hydro Power
- 11% Oil & Gas
- appr. 6% Renewables
- appr. 3% Nuclear

Future approach:

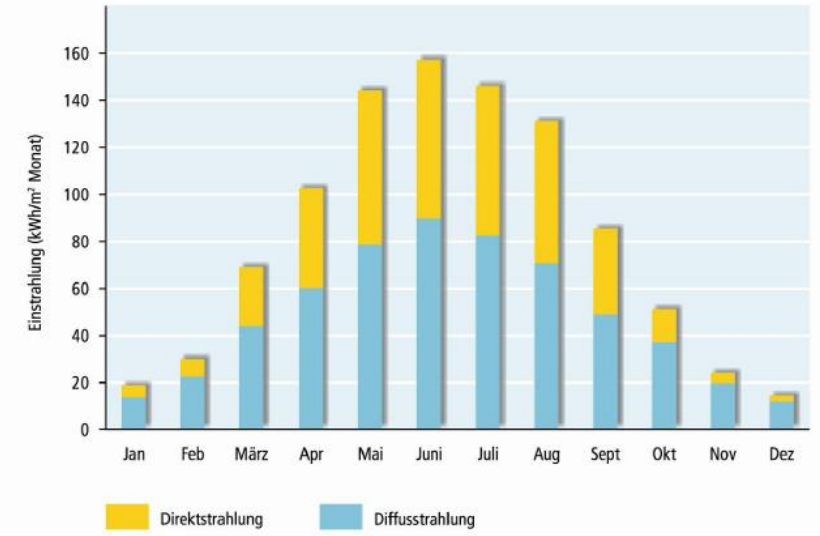
- Fast **growing power demand** needs to be considered and power quality needs to improved
- New and green power plants will be built
- **Renewable Energy** needs to be expanded
- **Energy storages** need to be established due to growing renewable (stochastic) power feed
- Power grid need to be **expanded and upgraded** to meet future needs as higher load transfer, longer distances, decentralisation and design for significant **reduction of losses**



PV energy Production



Different output power at different sun radiation



10kW wind generator for grid connected or stand alone solution :

Windgeschw. in Nabenhöhe (m/s)	Elektrische Leistung (kW)
2,5	0,4
4,0	0,9
5,0	2,3
6,0	3,3
7,0	4,9
8,0	6,7
9,0	8,1
10,0	9,3
11,0	9,8
11,0 – 37,0	9,8

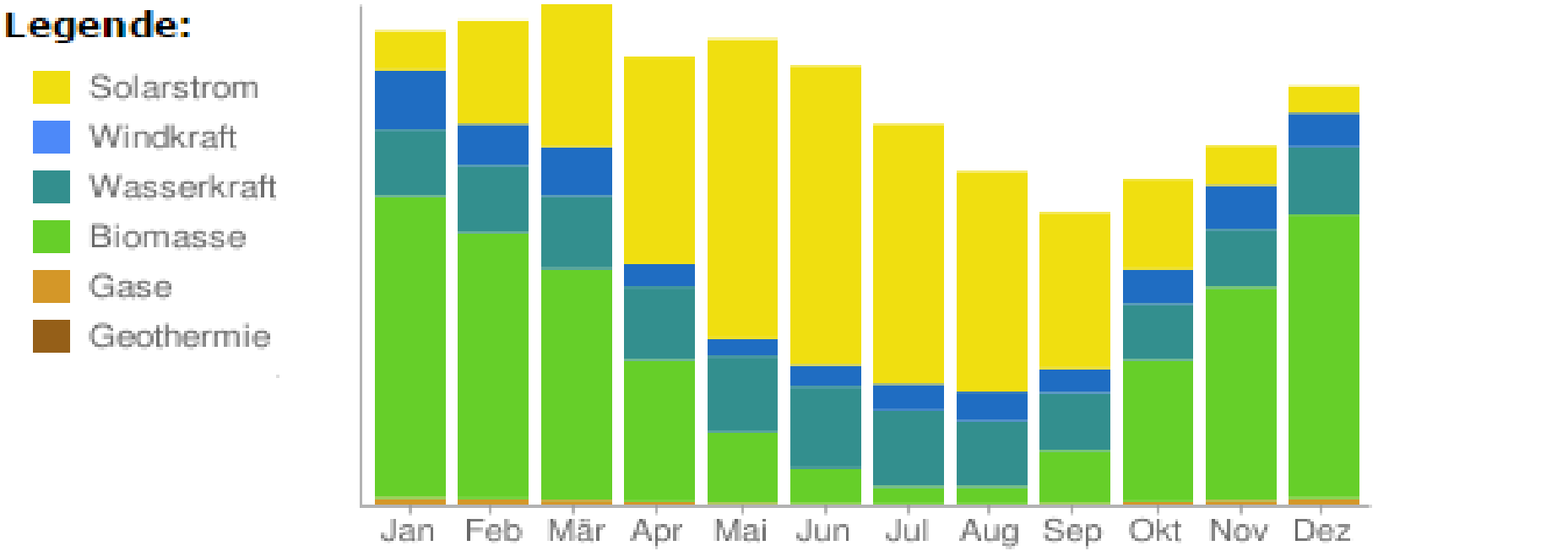
Windgeschw. in Nabenhöhe (m/s)	Jahresenergieertrag (kWh)
5,0	20410
5,5	24780
6,0	29120
6,5	33260
7,0	37240
7,5	42004

Photovoltaik and Wind Power in Germany

Abbildung 29: Monatliche PV- und Windstromproduktion der Jahre 2011-2012 [ISE4]

Overfew of differnet renewable Energy sources over the year in Germany

Genaue Informationen zu der Bedeutung und den Hintergründen dieser Grafik finden Sie in unserer ausführlichen Erläuterung zum Energiemix.



Hydro power system at a small river 7kW output

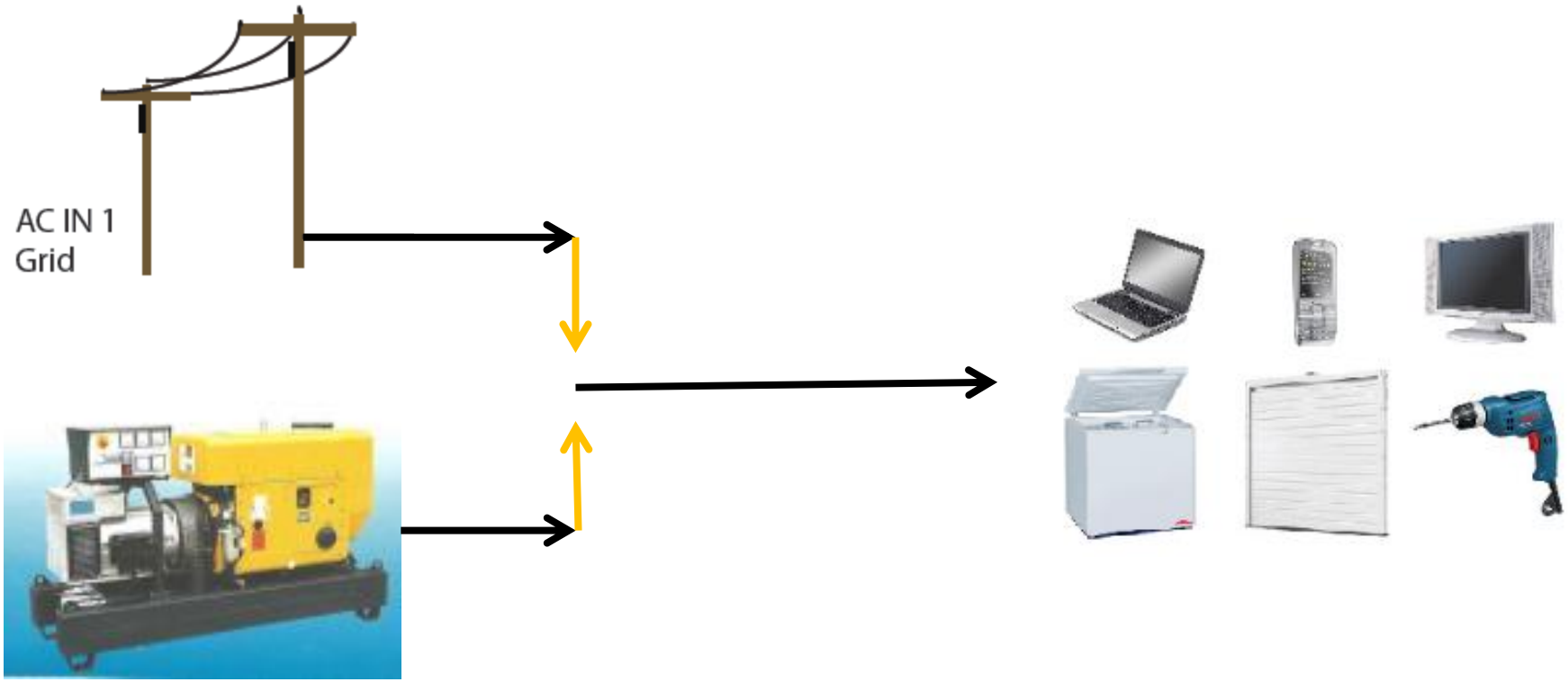
In einem Wasserkraftwerk wird hinter der Staumauer eines Stausees Wasser gestaut. Es fließt durch ein Druckrohr auf Turbinen, die Generatoren antreiben. Das Wasserschloß dient dem Druckausgleich bei plötzlichen Änderungen der Strömungsgeschwindigkeit.

water turbine

AC generator
max. 7kW

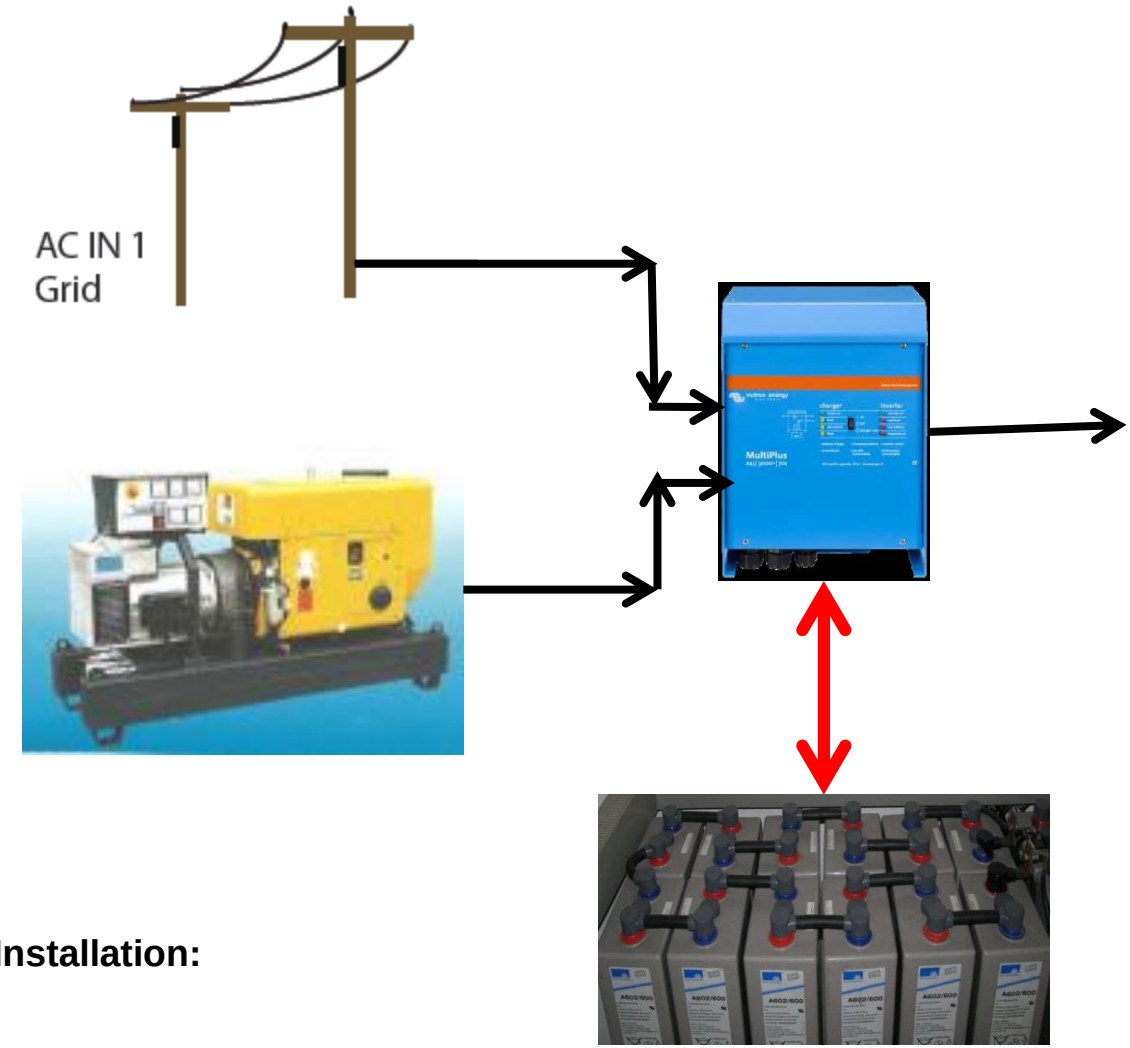
Gandhigram Smart Grid Solution

100kWp Roof top Installation



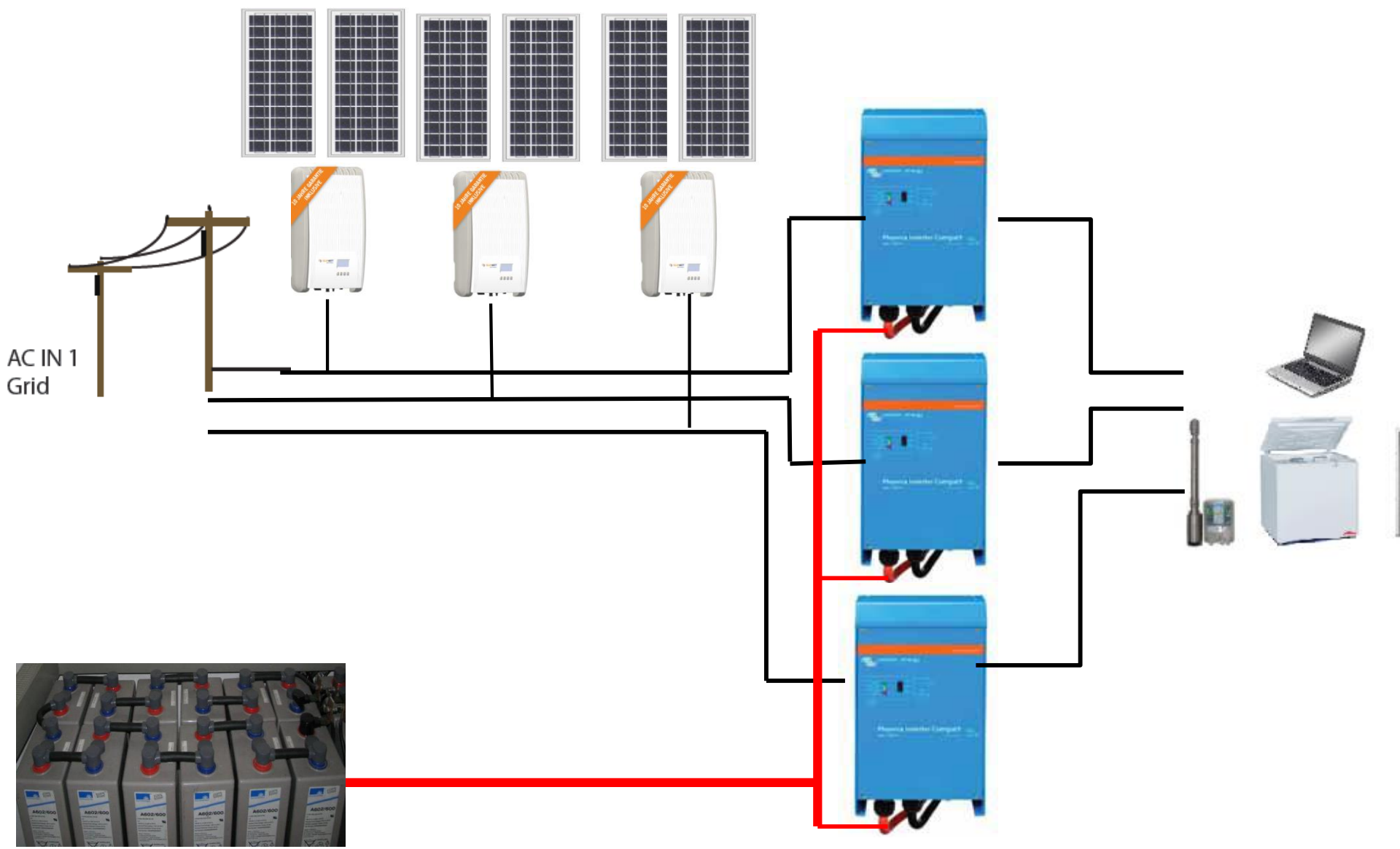
Installation:

100kWp Roof top Installation

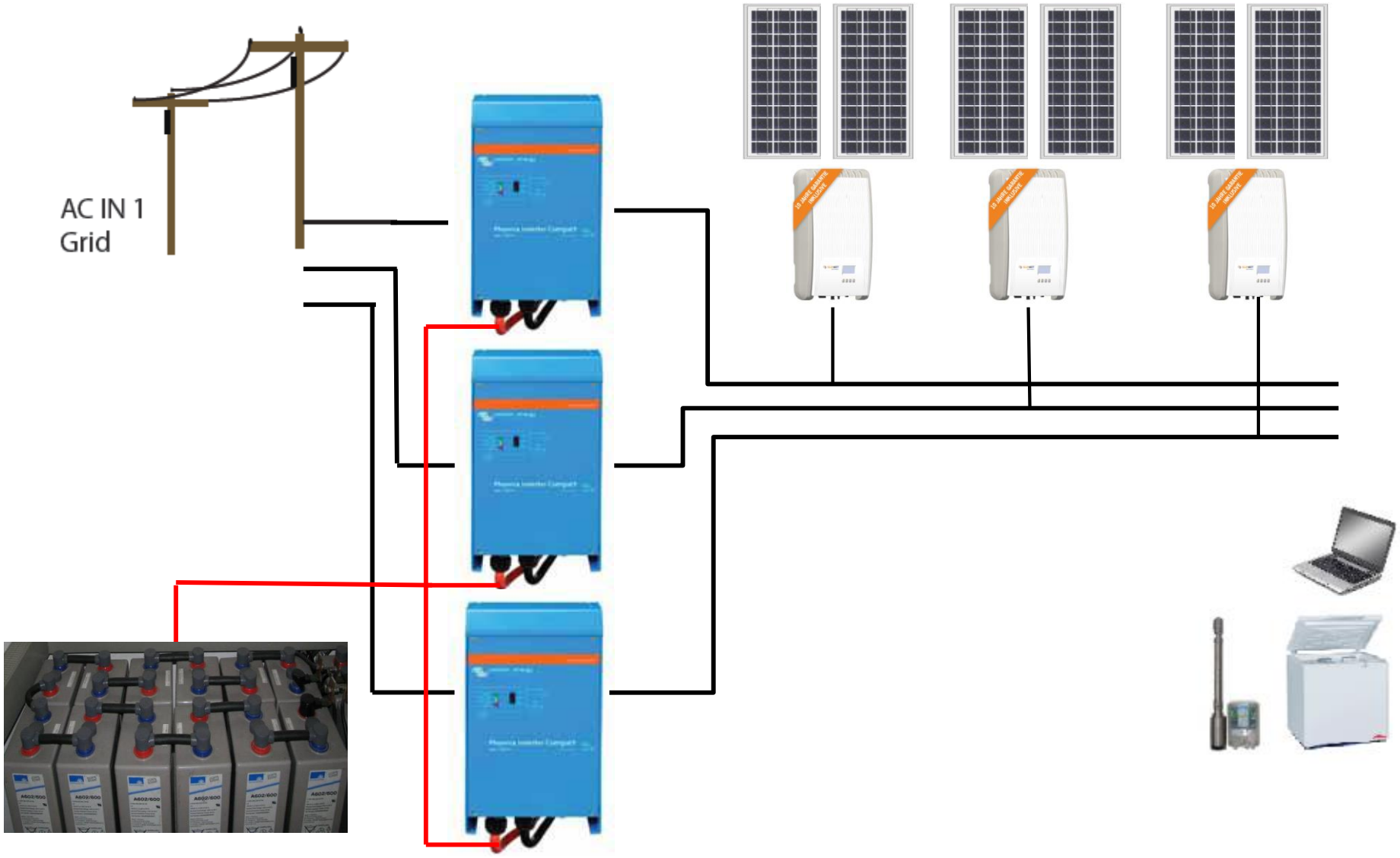


Installation:

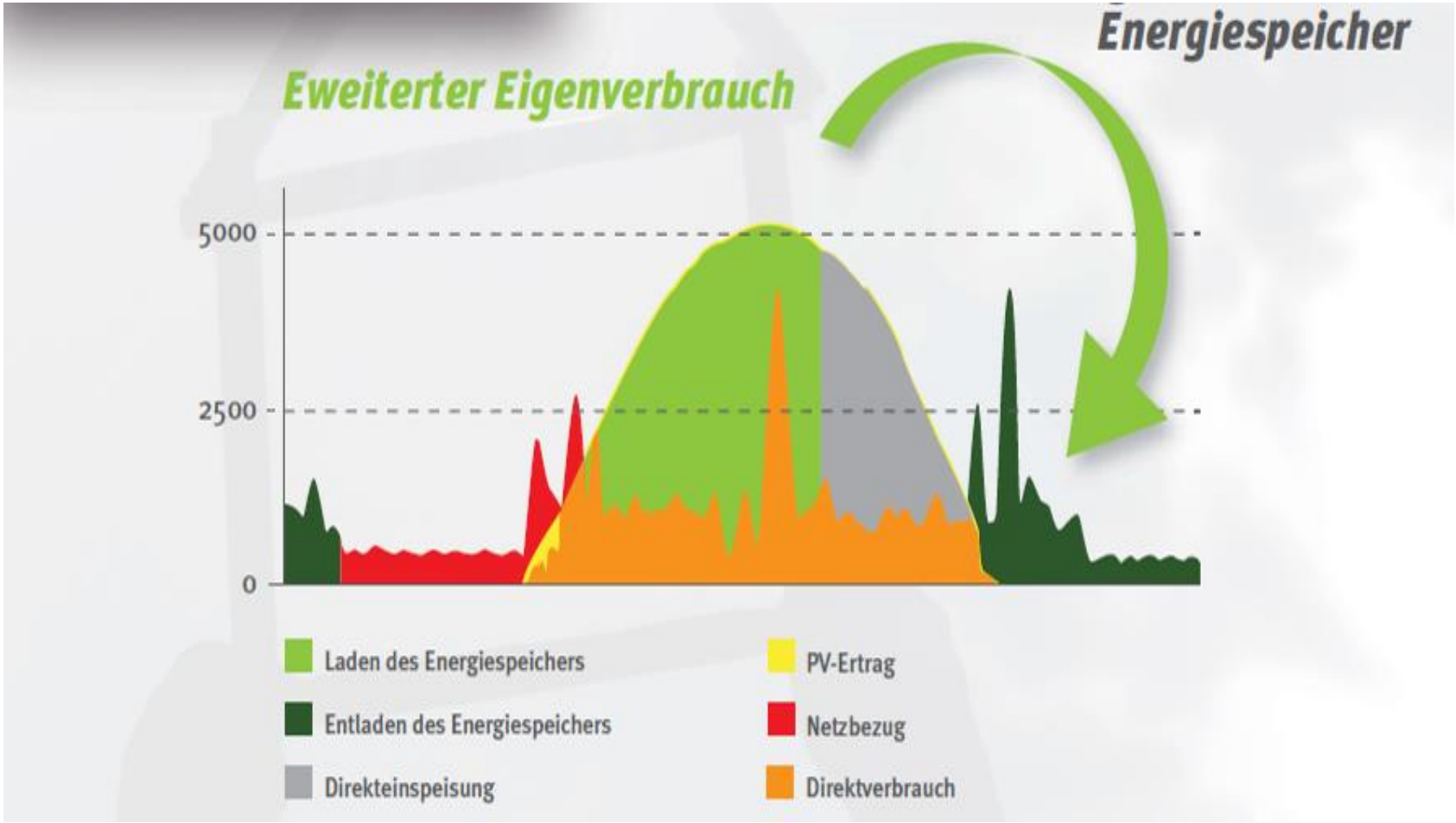
PV Solar with Grid / Backup 15kWp



PV Solar with Grid / Backup 15kWp



PV Energy Production



Photovoltaic with Accu Storage

Solarstromanlagen Würtemberger GmbH

2,5kWp Photovoltaic System
with 24V 90Ah Akku Storage

Photovoltaic Demo System with 600Wh Akku Storage

Photovoltaic grid inverter

Metering System grid

Control Unite

Home Load 230V AC

PV Module

Display Control Unite

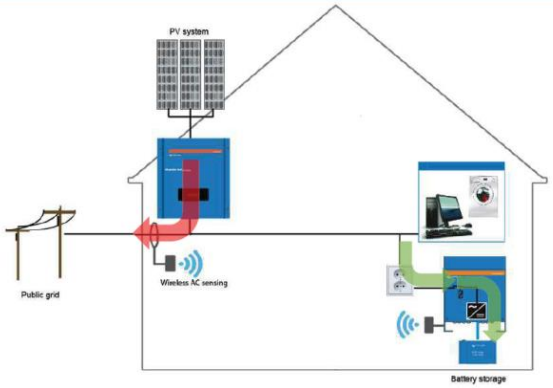
Lithium battery 12V 60Ah

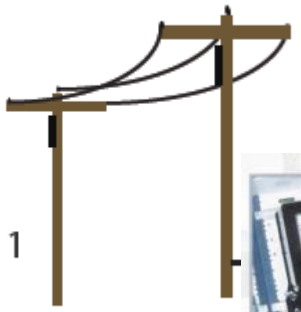
Hybrid Inverter grid / stand alone

PV System with Victron storage Inverter

Solarstromanlagen

Hub-4



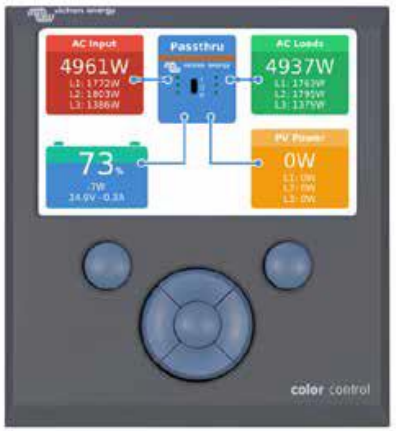


AC IN 1
Grid

USV

24V DC

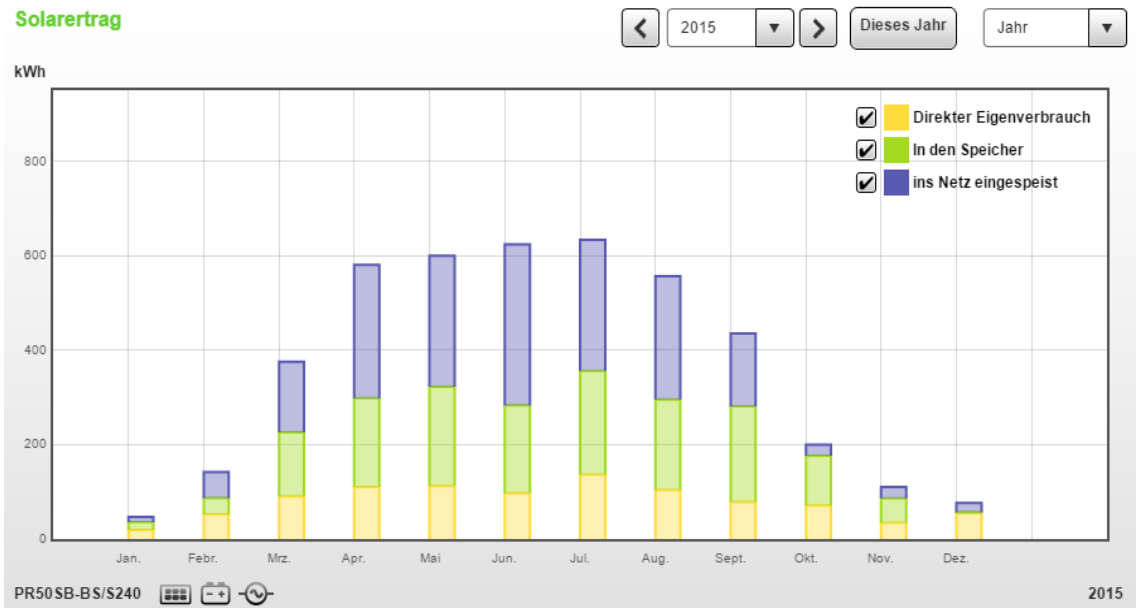
Grid coubbled
Battery system

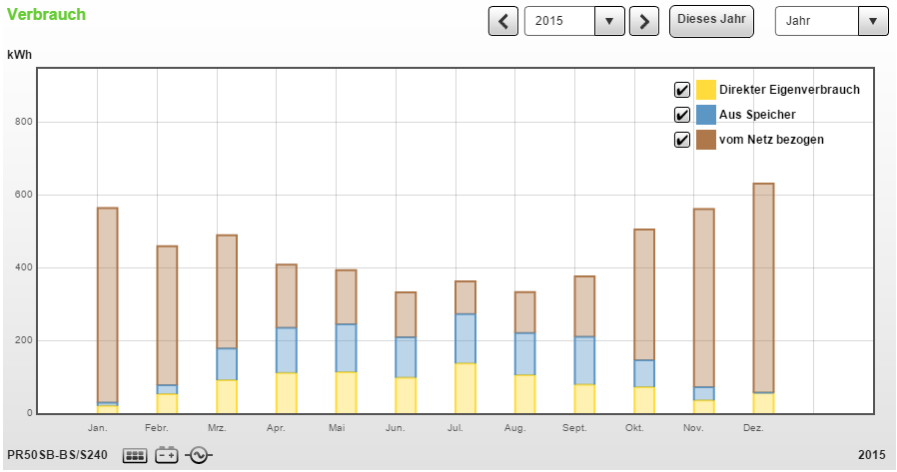


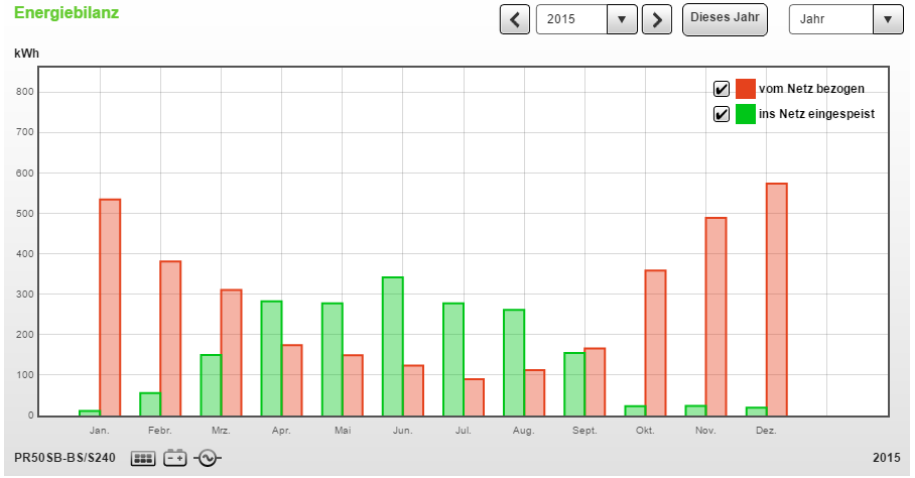
Photovoltaic Grid System with Accu Storage

5kWp Photovoltaic System
24V 690Ah Akku storage System
to use the PV Energy at night

Energy floating inside an storage System



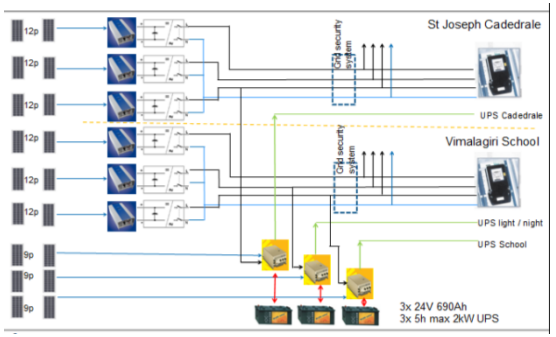




Combination Grid cobbled and stand allone PV in Kerala India

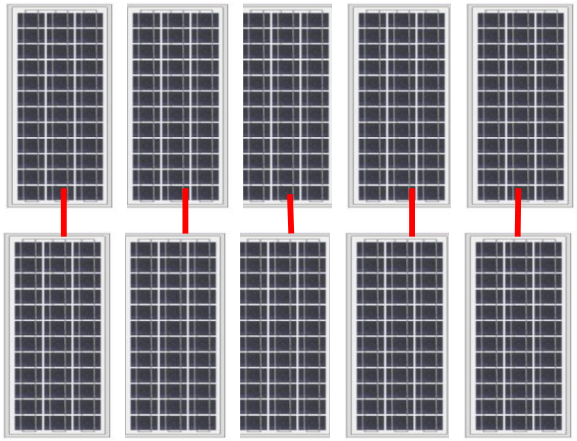
24kWp Grid Cobbled Inverter

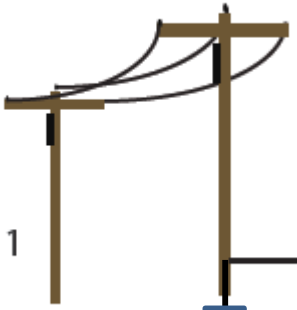
14kWp UPS System

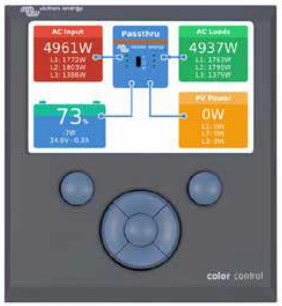


PV DC Accu System

Hub 1



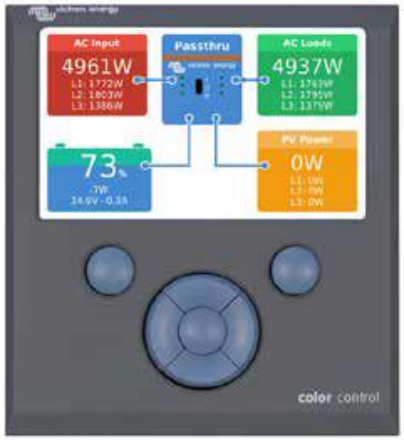


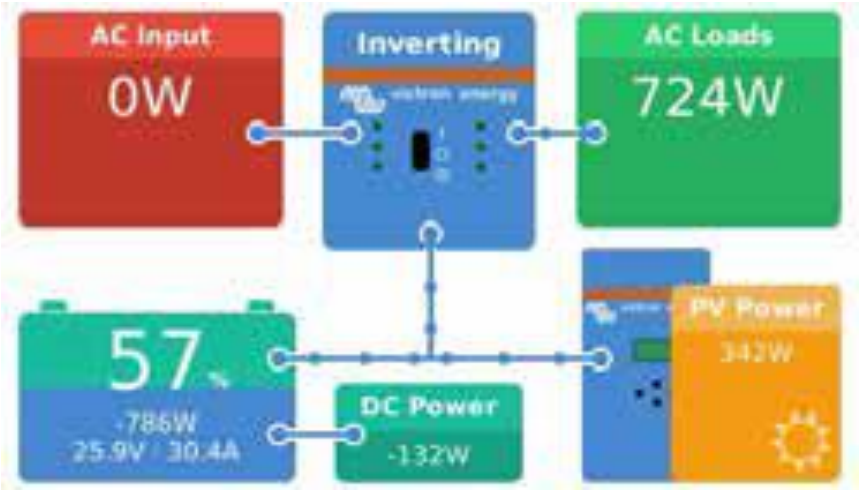


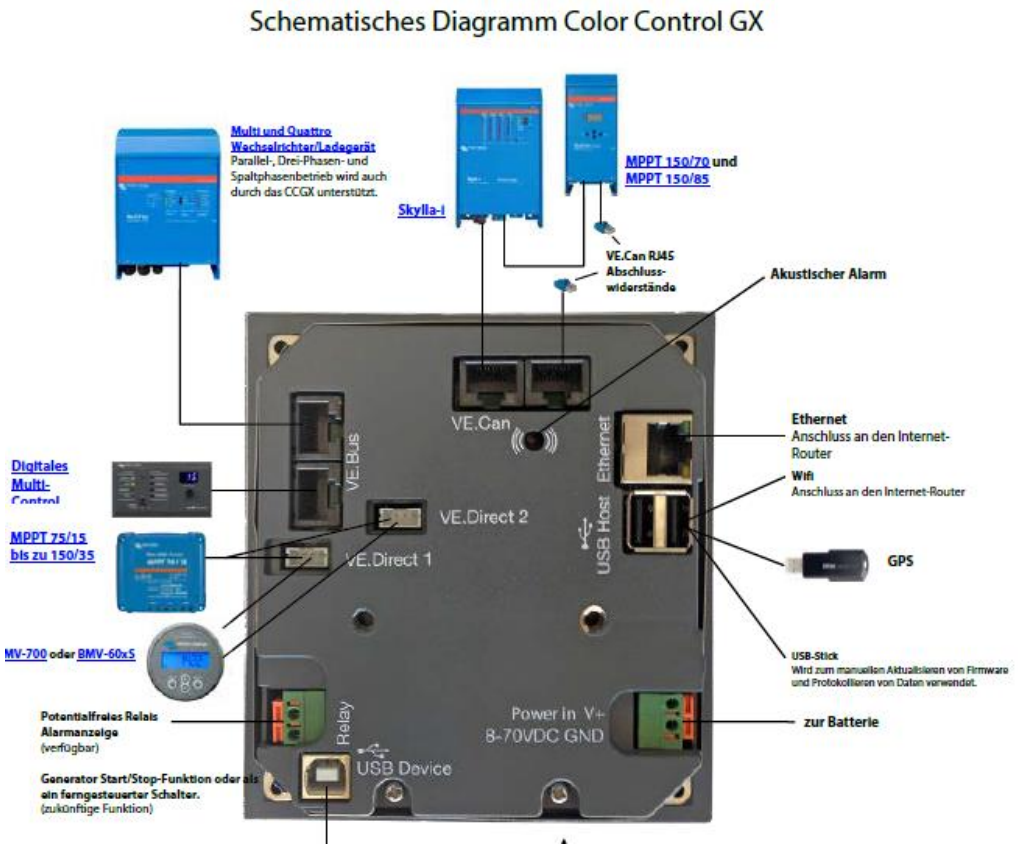
24V DC

Option: Li Fe Accu
24V 100Ah

PV Monitoring System

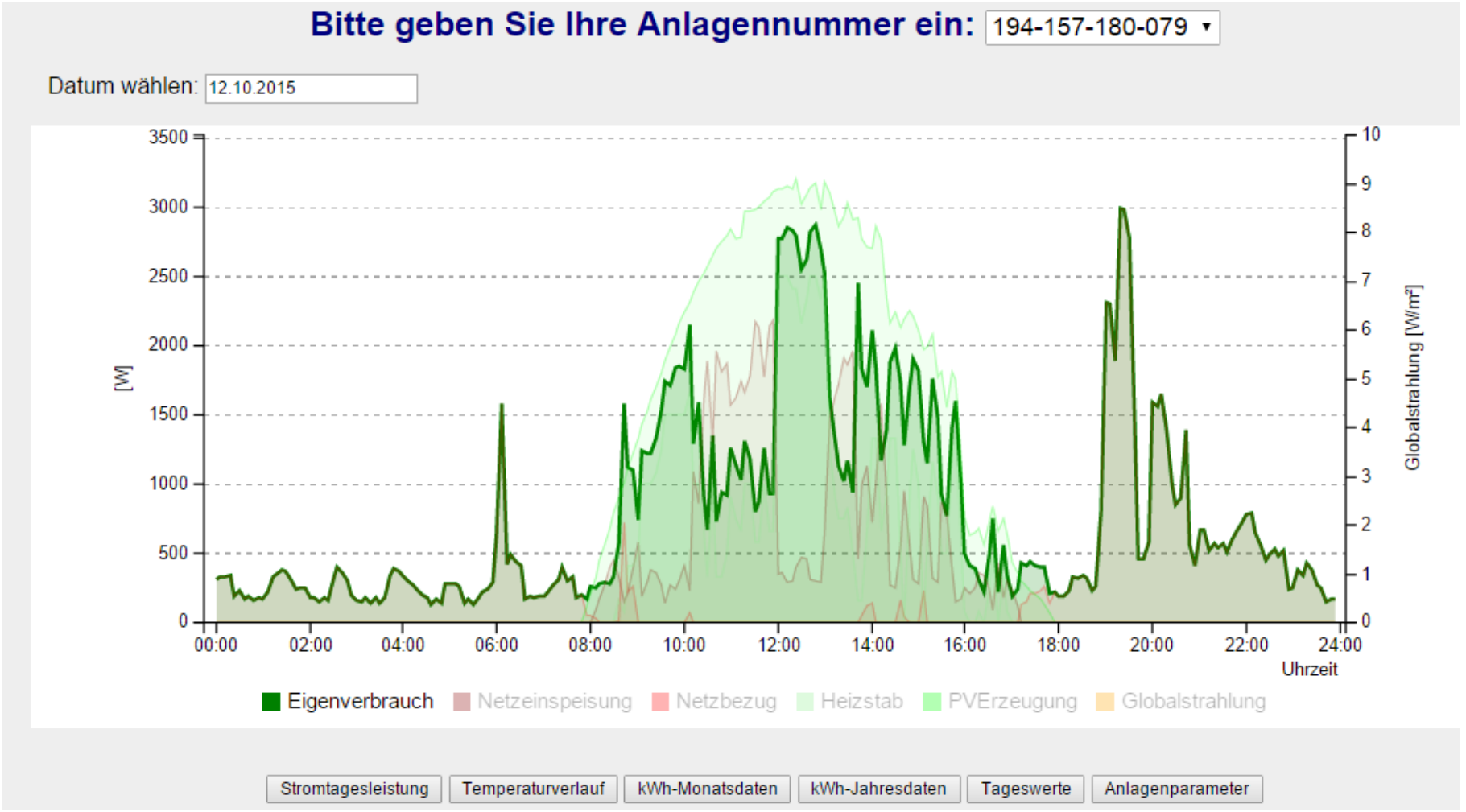






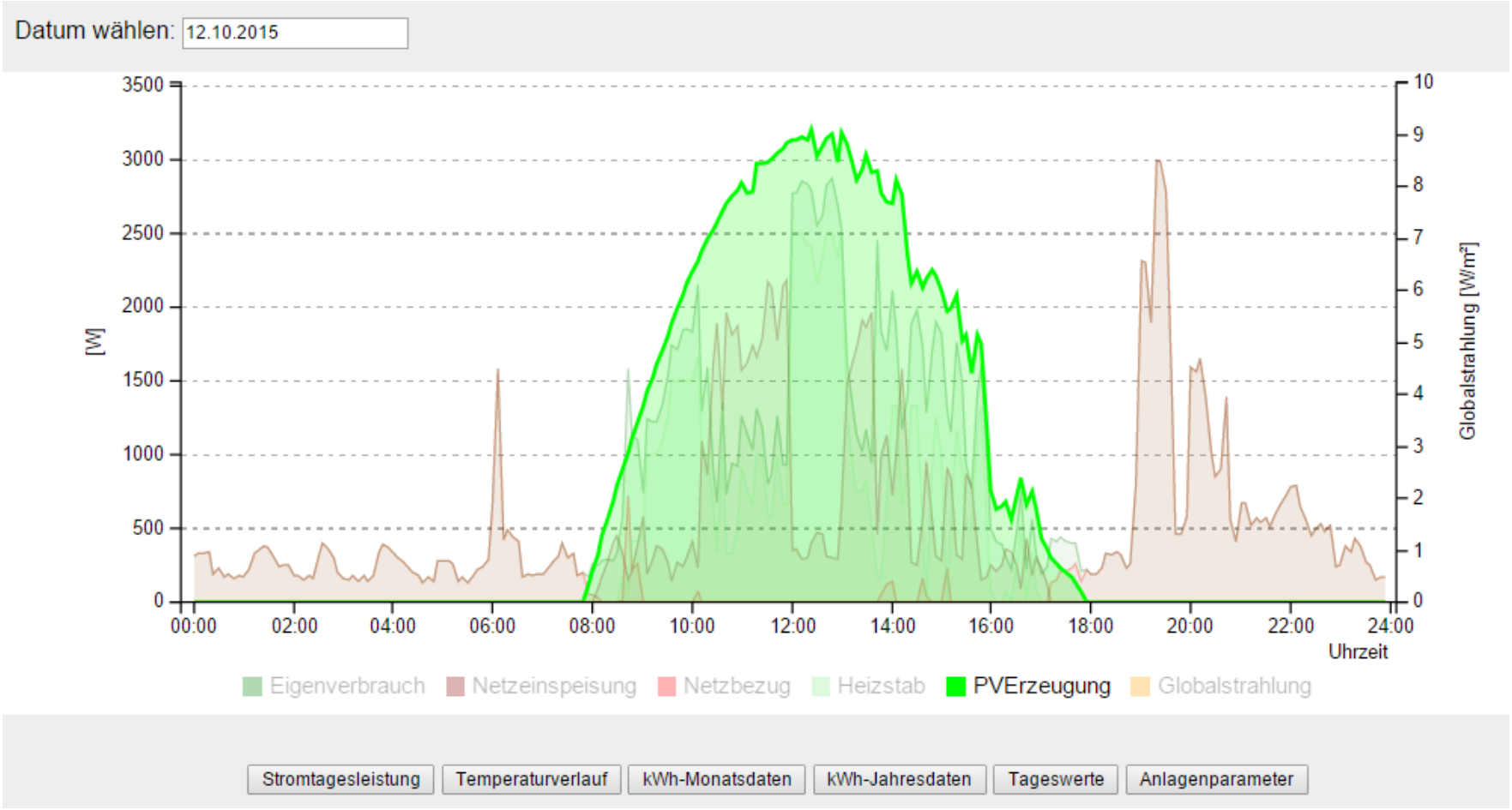
Energy floting per Day

Electric energy Load Profile



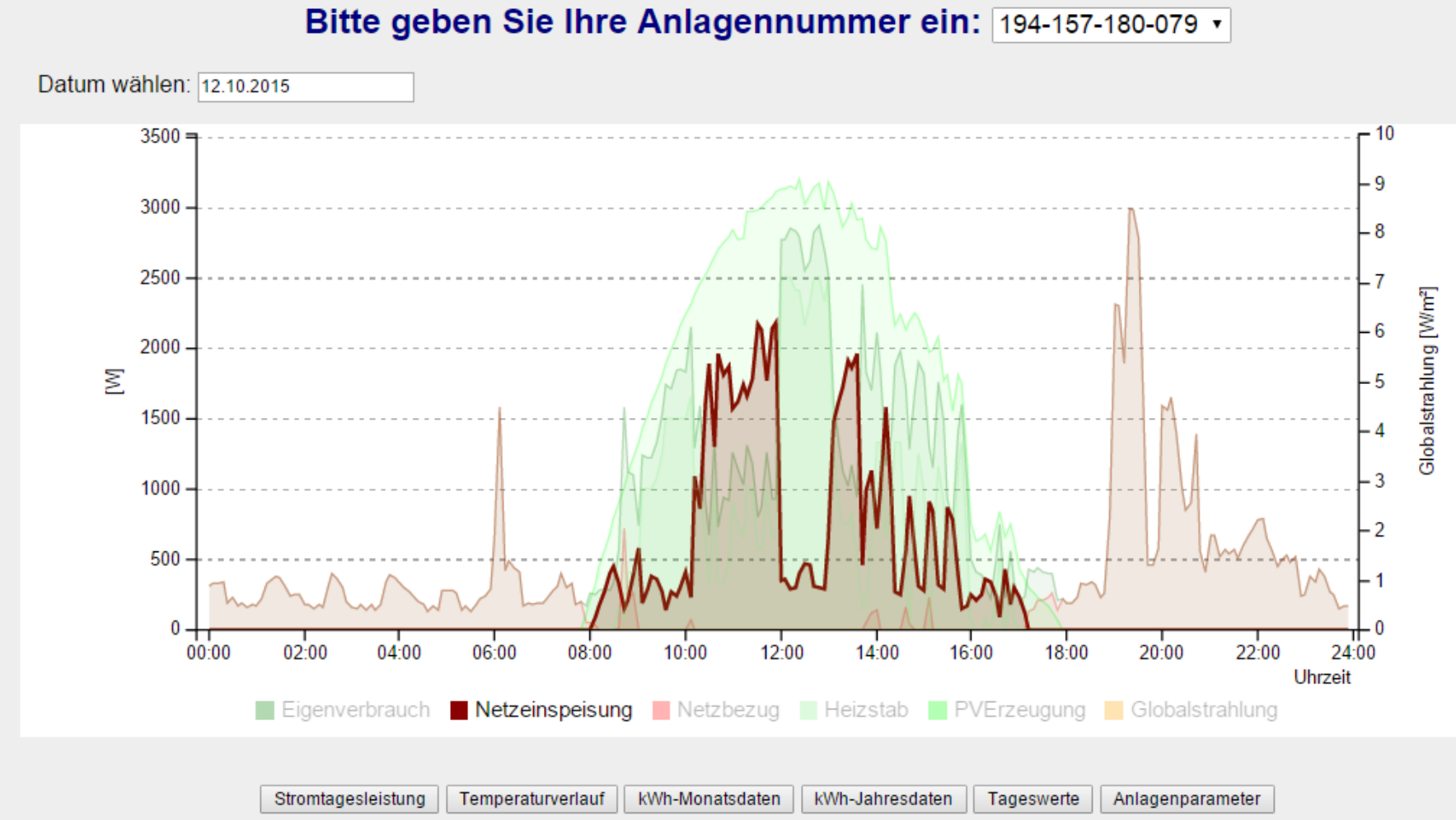
Energy floting per Day

Electric energy from the Sun



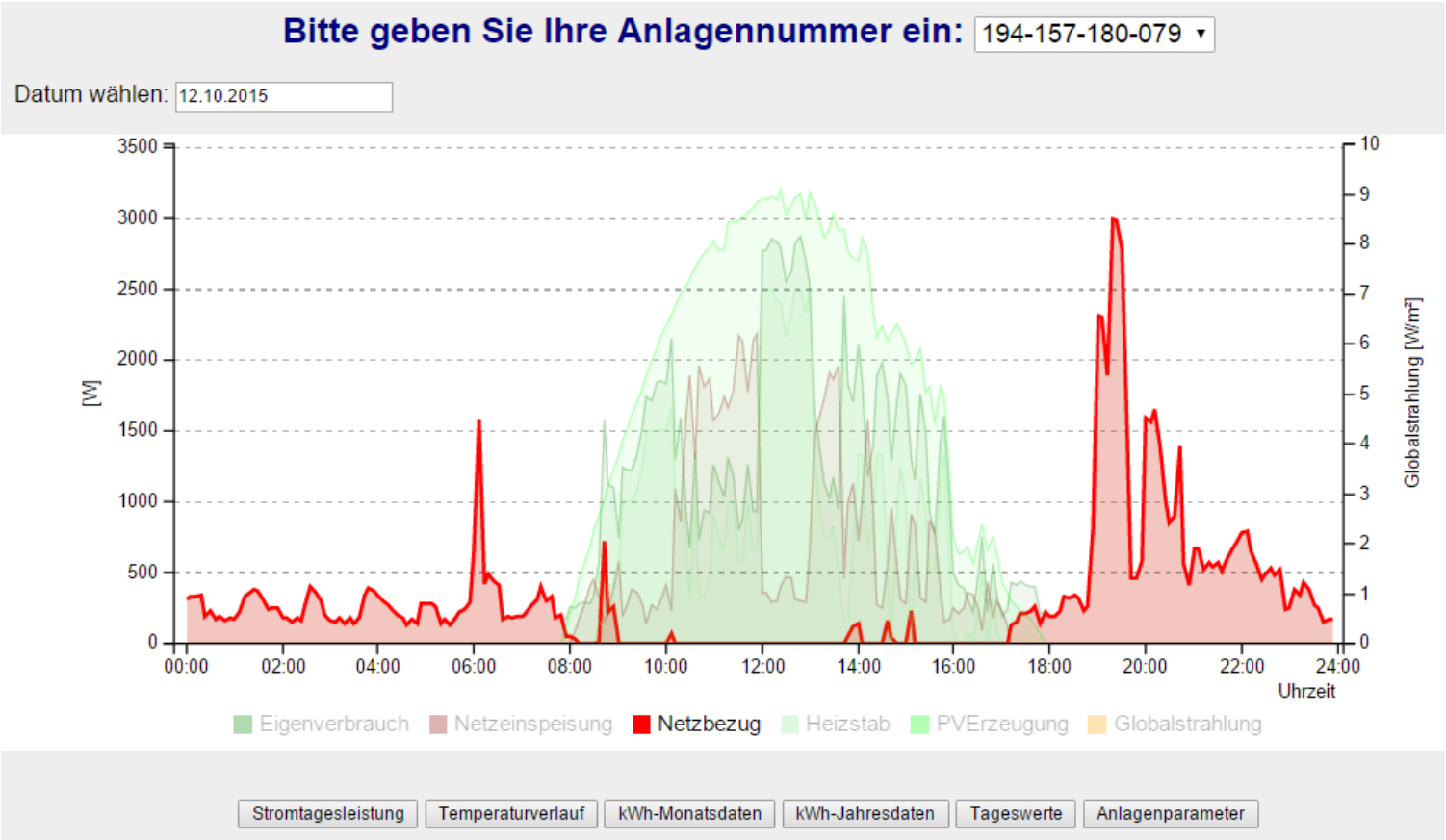
Energy floting per Day

Electric energy to Charge a Accu



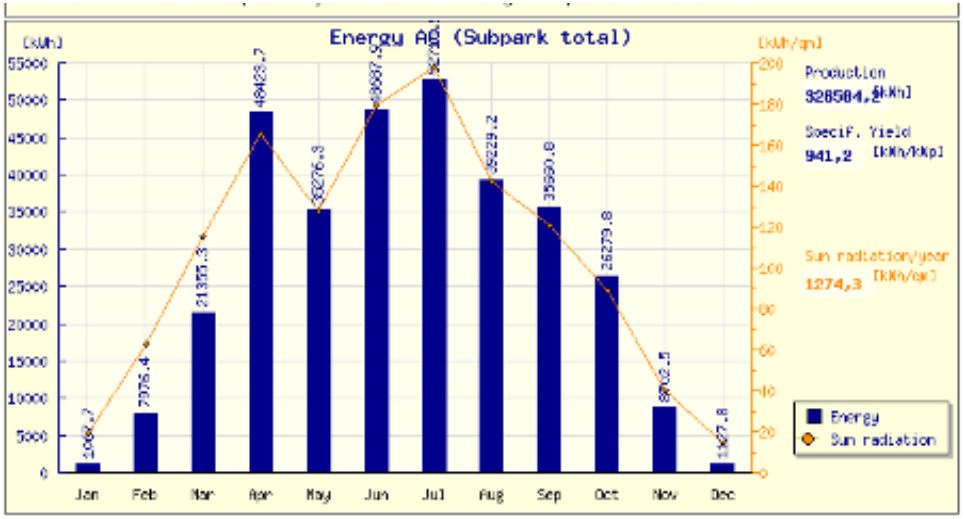
Energy floting per Day

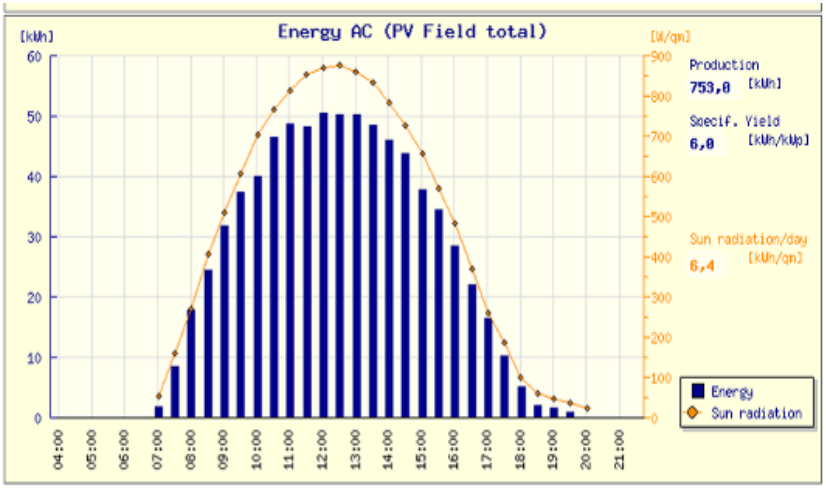
Electric energy from the Grid

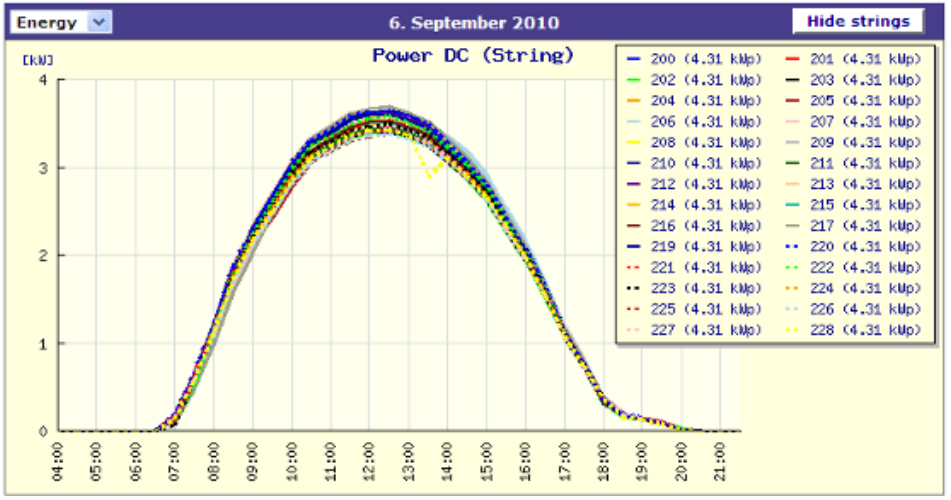


iPLON Monitoring

- Energy Management
- Commercial Services
- Operation
- System Tracking
- Technical Services
- Maintenance







100kWp PV System with wind and Car Charge Station

Solarstromanlagen Würtemberger GmbH

PV System with Car Charge Station

PV Stand allone System
Energy where ever you need it!

16 years Stand Alone PV System in India

Project Mithradham with 5kWp module, 24V 1200Ah battery and a 3 kW sine wave inverter

PV powered Stand alone Systems:

Street Lamp System

Repeater Station

Small Hospitals

Photovoltaik Installation in India

180kWp PV
Stand alone System with
50kWh Accu Storage System

Visability Studdy
PV Hybrid Equipment

500kW Diesel Engin

AC Metering
and Distribution

UPS Inverter

PV field
300kWp

400V / 15kV
Transformer

Battery storage

PV Pump System 2kWp

PV Pump System for portable water at Mail.

If you look for renewable, you look for the future !

More than 23 years know How in Photovoltaic Systems

Eigenverbrauchsanlage mit 7,5kWp

Solarstromanlagen Würtemberger GmbH

Solar Werbeturm mit 5kWp

Eigenverbrauchsanlage mit 100kWp

Netzeinspeisung mit 100kWp

Solarstromanlagen

Solarstromanlagen

Würtemberger GmbH

Christoph Würtemberger

Gutachter für PV Anlagen

74632 Neuenstein

www.Solarstrom-Projekte.de

Smart Grid Trend in India: Typical Tenders, Requirements and Strategy

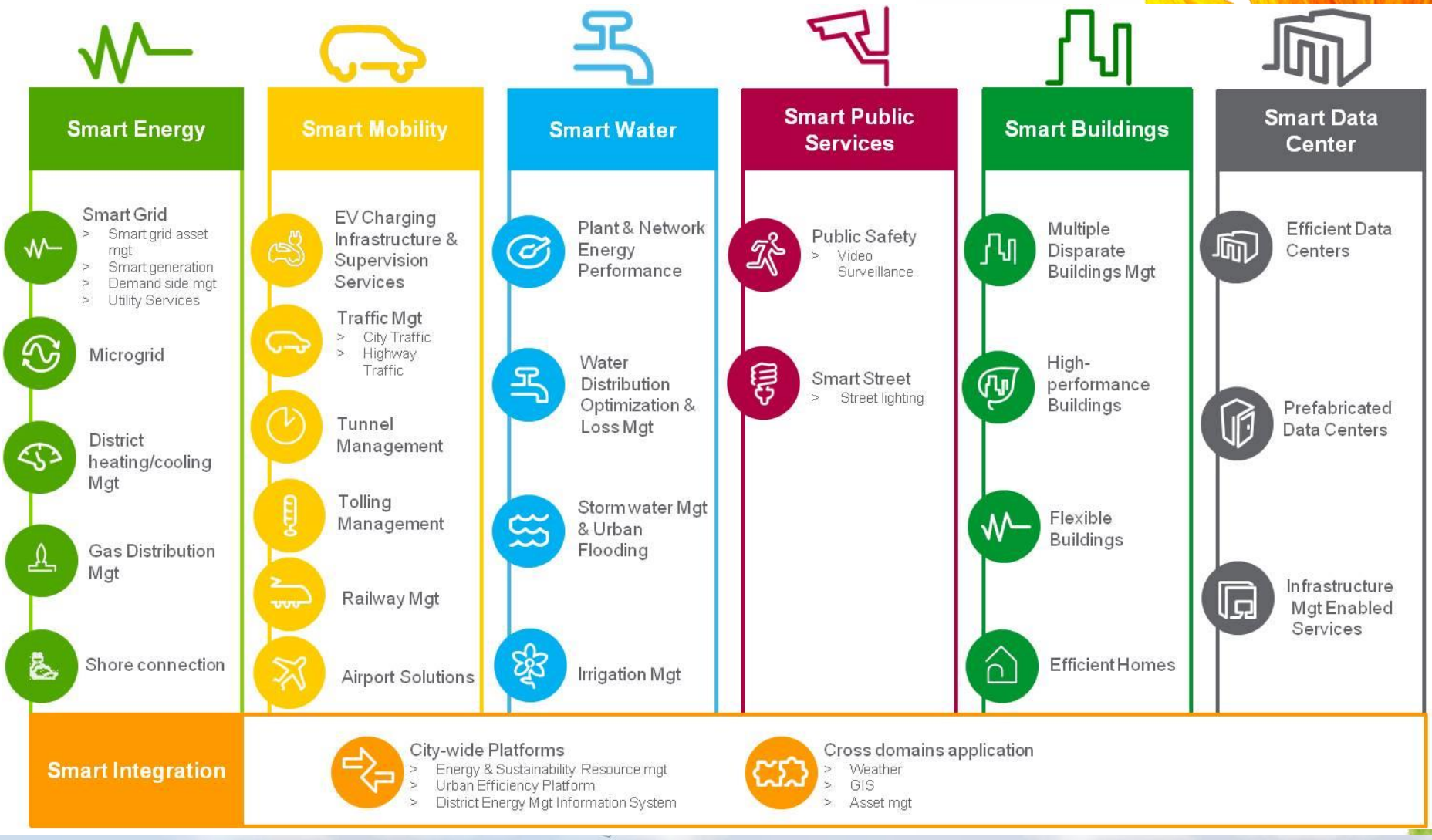
Aarthy Vigneshwari C
iPLON India Team

Content:

Smart City
Smart City Mission
Smart Grid
Pilot Smart Grid Projects: India
News: Present Scenario
Conclusion

Smart City

- A 'smart city' is an urban region that is highly advanced in terms of overall **infrastructure, sustainable real estate, communications and market viability.**
- It is a city where **information technology** is the principal infrastructure and the basis for providing essential services to residents. There are many technological platforms involved, including but not limited to automated sensor networks and data centres.

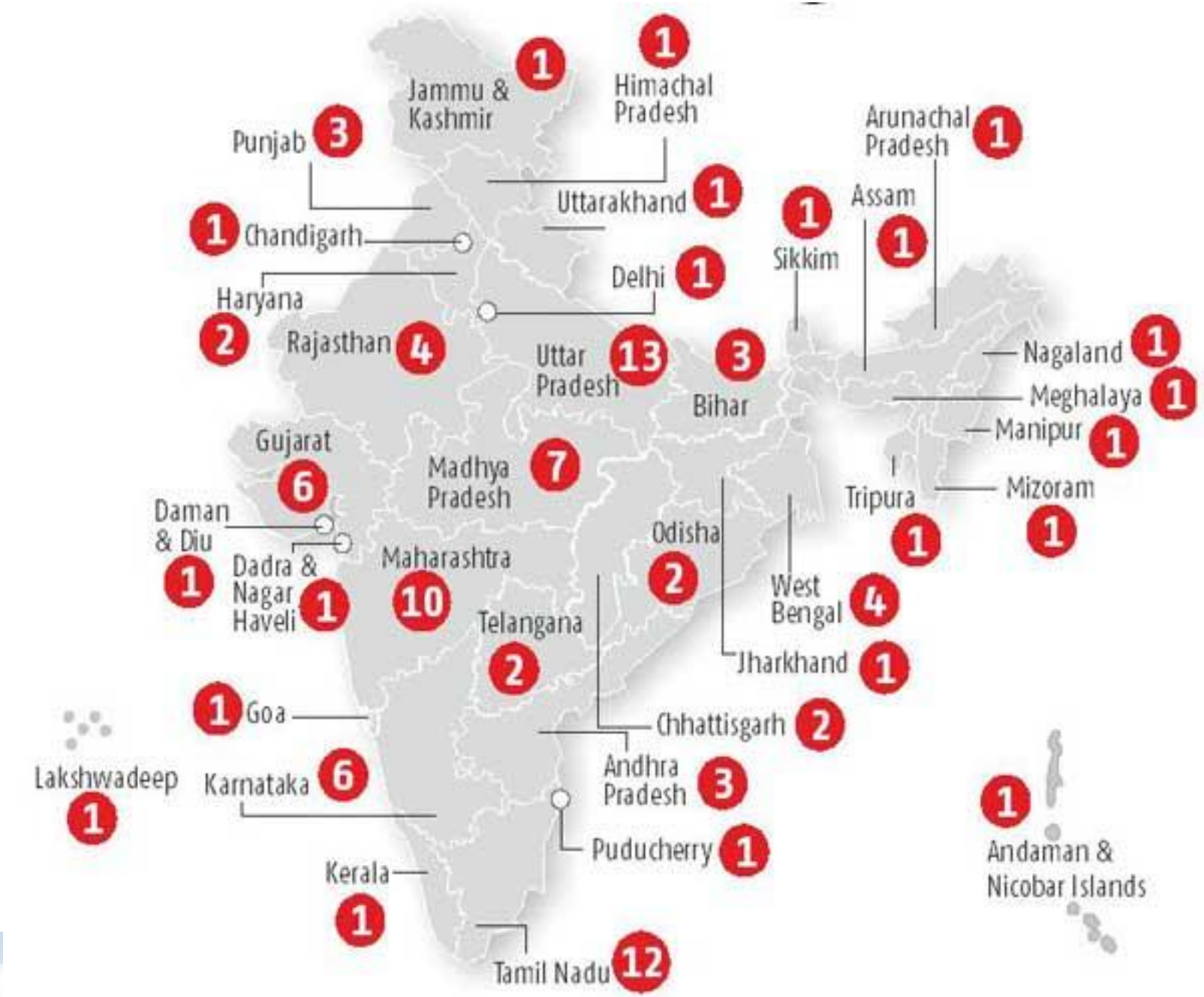

Smart Energy
Smart Grid
> Smart grid asset mgt
> Smart generation
> Demand side mgt
> Utility Services
Microgrid
District heating/cooling Mgt
Gas Distribution Mgt
Shore connection
Smart Mobility
EV Charging Infrastructure & Supervision Services
Traffic Mgt
> City Traffic
> Highway Traffic
Tunnel Management
Tolling Management
Railway Mgt
Airport Solutions
Smart Water
Plant & Network Energy Performance
Water Distribution Optimization & Loss Mgt
Storm water Mgt & Urban Flooding
Irrigation Mgt
Smart Public Services
Public Safety
> Video Surveillance
Smart Street
> Street lighting
Smart Buildings
Multiple Disparate Buildings Mgt
High-performance Buildings
Flexible Buildings
Efficient Homes
Smart Data Center
Efficient Data Centers
Prefabricated Data Centers
Infrastructure Mgt Enabled Services
Smart Integration
City-wide Platforms
> Energy & Sustainability Resource mgt
> Urban Efficiency Platform
> District Energy Mgt Information System
Cross domains application
> Weather
> GIS
> Asset mgt

Smart Cities Mission

- Smart Cities Mission is an urban renewal and retrofitting program by the Government of India with a mission to develop 100 cities (the target has been revised to 109 cities) all over the country making them citizen friendly and sustainable
- A total of ₹980 billion (US$15 billion) has been approved by the Indian Cabinet for development of 100 smart cities and rejuvenation of 500 others.

S. No.	Name of State/UT	Names of Cities Shortlisted
1	Maharashtra	Greater Mumbai, Thane, Kalyan-Dombivali, Navi Mumbai, Nashik, Amravati, Solapur, Nagpur, Pune, Aurangabad
2	West Bengal	New Town Kolkata, Bidhannagar, Durgapur, Haldia
3	Gujarat	Gandhinagar, Ahmedabad, Surat, Vadodara, Rajkot, Dahod
4	Madhya Pradesh	Bhopal, Indore, Gwalior, Jabalpur, Satna, Ujjain, Sagar
5	Tamil Nadu	Coimbatore, Chennai, Madurai, Tiruchirapalli, Vellore, Salem, Erode, Tiruppur, Thanjavur, Tirunelveli, Dindigul, Thoothukudi,
6	Karnataka	Bangalore, Mangaluru, Belagavi, Shivamogga, Hubbali-Dharwad, Tumakuru, Davanagere
7	Kerala	Kochi, Trivandrum
8	Telangana	Warangal, Karimnagar
9	Andhra Pradesh	Vishakhapatnam, Tirupati, Kakinada
10	Uttar Pradesh	Meerut, Moradabad, Aligarh, Saharanpur, Bareilly, Jhansi, Kanpur, Allahabad, Lucknow, Varanasi, Ghaziabad, Agra, Rampur
11	Rajasthan	Jaipur, Udaipur, Ajmer, Kota
12	Punjab	Ludhiana, Jalandhar, Amritsar
13	Bihar	Muzaffarpur, Bhagalpur, Biharsharif
14	Haryana	Karnal, Faridabad
15	Assam	Guwahati
16	Odisha	Bhubaneshwar, Rourkela
17	Himachal Pradesh	Dharamshala
18	Uttarakhand	Dehradun
19	Jharkhand	Ranchi
20	Sikkim	Namchi
21	Manipur	Imphal
22	Andaman and Nicobar Islands	Port Blair
23	Arunachal Pradesh	Pasighat
24	Chandigarh	Chandigarh

25	Chhattisgarh	Raipur, Bilaspur
26	Dadra and Nagar Haveli	Silvassa
27	Daman and Diu	Diu
28	Delhi	New Delhi
29	Goa	Panaji
30	Lakshadweep	Kavaratti
31	Meghalaya	Shillong
32	Mizoram	Aizawl
33	Nagaland	Kohima
34	Puducherry	Oulgaret
35	Tripura	Agartala

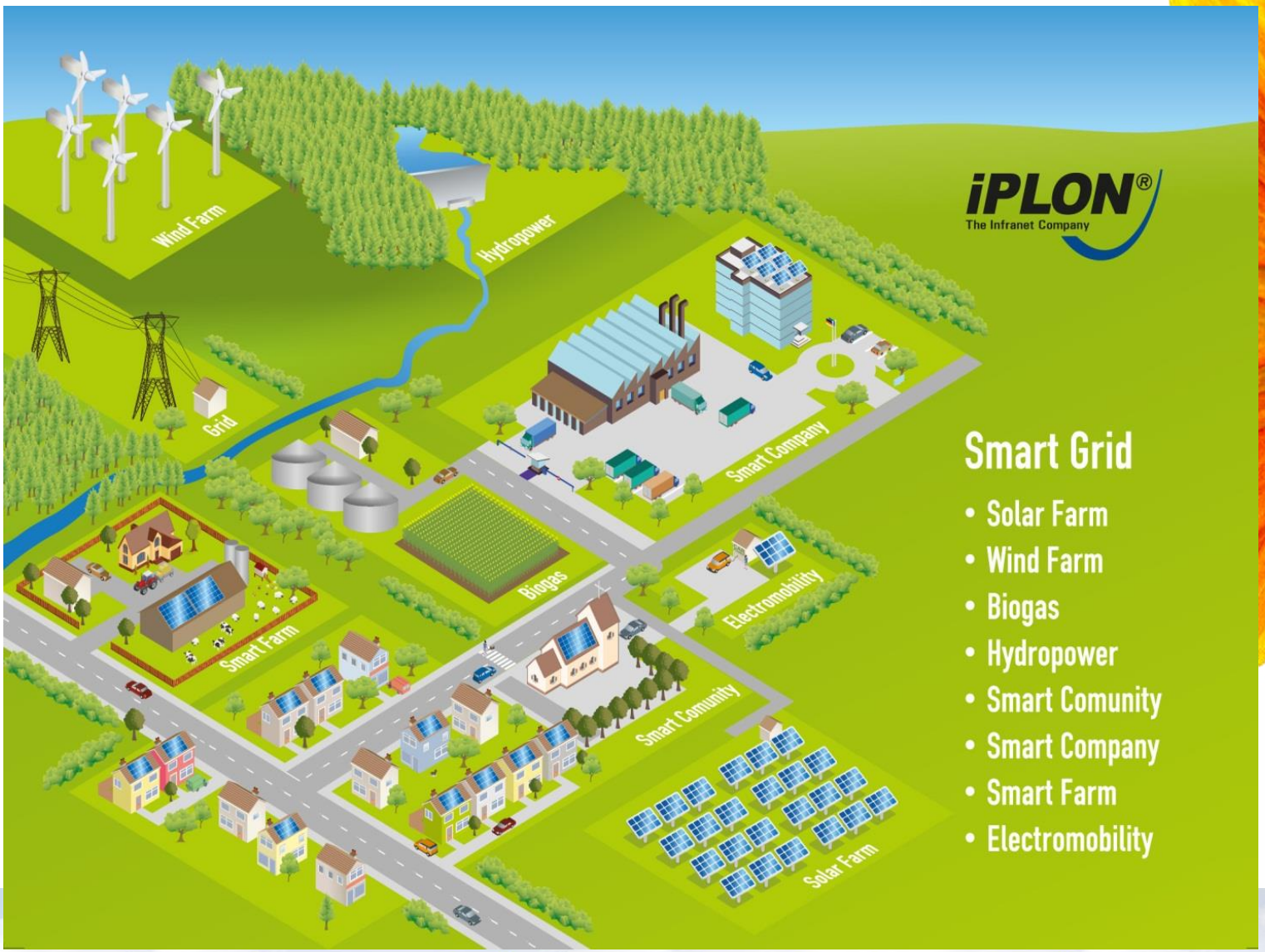

Jammu & Kashmir 1
Himachal Pradesh 1
Punjab 3
Arunachal Pradesh 1
Uttarakhand 1
Assam 1
Chandigarh 1
Sikkim 1
Delhi 1
Haryana 2
Rajasthan 4
Uttar Pradesh 13
Bihar 3
Nagaland 1
Meghalaya 1
Manipur 1
Gujarat 6
Madhya Pradesh 7
Tripura 1
Mizoram 1
Daman & Diu 1
Dadra & Nagar Haveli 1
Maharashtra 10
Odisha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


LUDHIANA
NDMC
JAIPUR
UDAIPUR
AHMEDABAD
INDORE
SURAT
BHOPAL
JABALPUR
GUWAHATI
PUNE
SOLAPUR
BHUBANESWAR
DAVANAGERE
BELAGAVI
VISAKHAPATNAM
KAKINADA
KOCHI
CHENNAI
COIMBATORE

Smart City Area- Based Development: Strategic Components Involved

- Retrofitting
- Redevelopment
- Greenfield development
- Pan- City Development

Smart Grid


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

- The key ingredients of the Smart Grid is to improve the **reliability, efficiency and security** in the ongoing modernization of the electricity delivery infrastructure.
- These parameters can be achieved by the application of **advanced communications and control technologies** and practices .
- The information provided by smart grid systems also **enables customers to make informed choices about the way they manage energy use**.

Why Smart Grid?

- Decentralised Generation: Bridging the Gap between the Generation and Distribution
- Inefficiency in Present Grid Structure
- Step towards Smart Cities.
- “ Assured Electricity Supply” is one of the identified pillars of “smart City – Core Infrastructure”

Grid of Things (GoT)

- "The grid will soon emerge as the "grid of things" like how the internet is evolving as "internet of everything""---Chris Jones, President, Pacific Gas & Electricity, USA

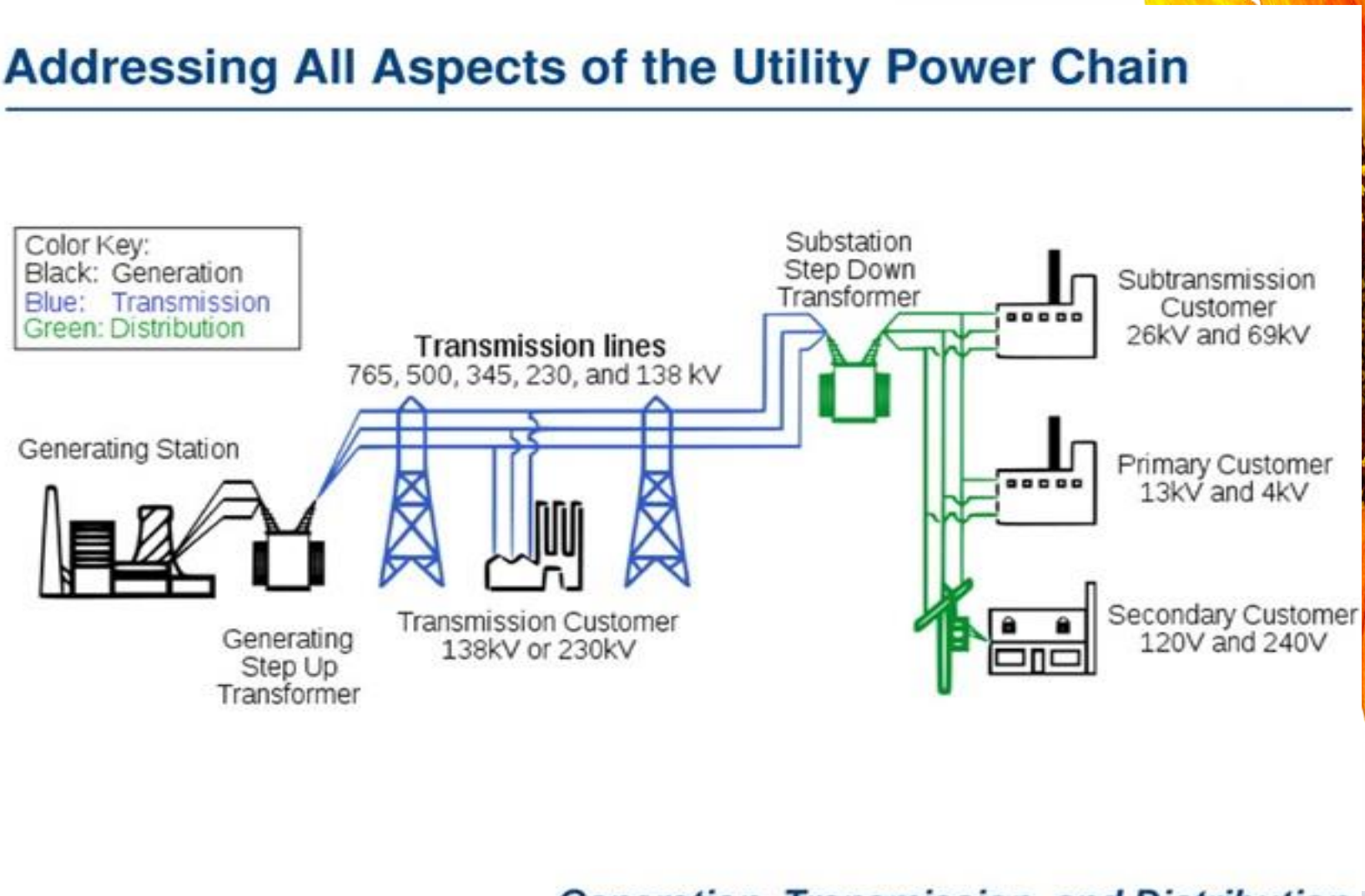
- Traditional Grid
  - Ability to monitor and control power flows in real-time is limited to the HV network.
  - In the LV network, the power system operator has no visibility on who is consuming how much electricity when and where.

- Smart Grid
  - With smart sensors and smart meters connected to computers in the control room, it is possible to remotely monitor and control the flow of electricity in real time to every customer or even to every smart appliances inside a customer's premise.

Smart Grid – Challenges and Opportunities

- Develop Smart Tools and Technologies to Utilize Demand Response, Demand Load Control, and Energy Efficiency
- Expand and Upgrade Infrastructure to Improve Communications and Interconnectivity
- Regulations in Communication, price, cyber security.
- Customer Education
- Create Models to Foster Smart Grid Investment and Inform Regulatory Frameworks
- Deployment of all functionalities of Smart Grid

Present Electrical Value Chain



- Some of the challenges in the Indian power grid are:
  - it is a poorly planned distribution network
  - there is overloading of the system components
  - there is lack of reactive power support and regulation services
  - there is low metering efficiency and bill collection, etc.

Department of Atomic Energy
- Administrative authority over Nuclear Power Corporation (centrally owned nuclear plants)

Ministry of Power
- Administrative authority over centrally owned thermal, hydro generation and POWERGRID
- Administers Elec Act of 2003, Energy Conservation Act 2001

Central Electricity Authority
- Statutory agency that advises the MOP on electricity policy matters

Central Electricity Regulatory Commission (CERC)
- Regulates tariffs of central generators
- Issues licenses to TV licensee and elec traders
- Determines tariffs for inter-state TX
- Sets and enforces grid standards
- Advisor to central govt

State Electricity Regulatory Commission
- Regulates tariffs on state owned, privately owned, or interstate G, T & D
- In reality, limited control and SEBs are still active in policy setting

Generation

Centrally Owned Generation
- National Thermal Power Corp (NTPC), Nuclear Power Corporation (NPC), National Hydro Power Corp (NHPC)

State Owned Generators
(e.g., MAH State Power Generating Compant)

Private generators
(e.g., Reliance, Tata)

Transmission (TX)

POWERGRID CORP
- Centrally owned company that plans and builds TX lines that cross state boundaries and supply power from central generators
- Responsible for establishing regional and national power grids

National Load Despatch Center (NLDC)
- In future will operate regional exchange

Regional Load Despatch Centers - 5 (RLDC's)
- Owned by POWERGRID
- Monitor grid operations and coordinate dispatch with the SLDC

State Owned TX
(e.g., Maharashtra TX Co.)

National Load Despatch Center (NLDC)
- In future will operate regional exchange

State Load Despatch Center - 34 (SLDC)
- Owned by state transmission utilities (STU), or State Electricity Boards (SEB)
- Coordinates dispatch with RLDCs

Sub-Load Despatch Centers - 51 (Sub-LDC)
- Group or district level

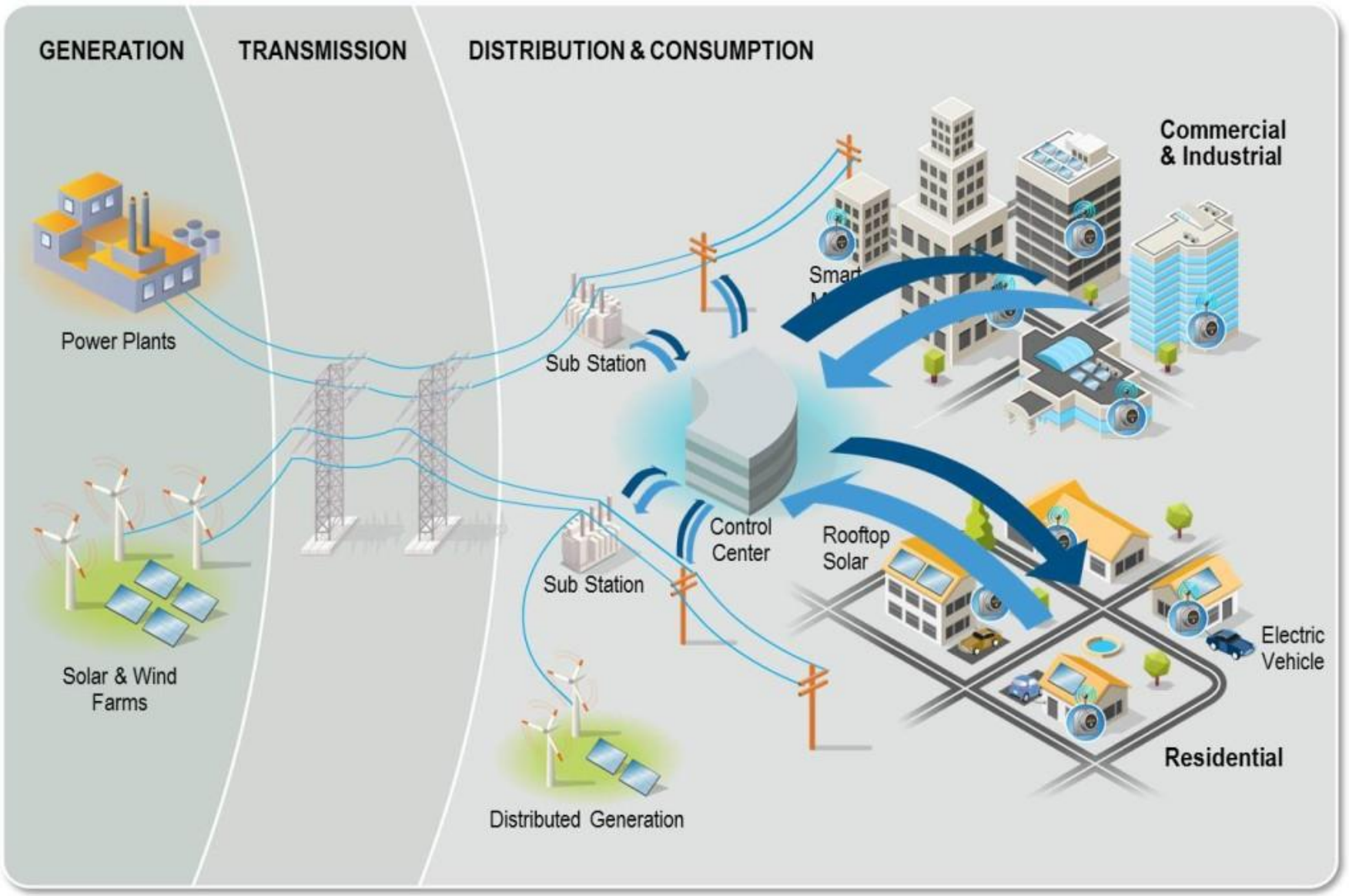
Distribution

State Electricity Boards
- Previously, were the vertically owned state utility
- Current ownership & involvement in tariff setting varies by state
- In Maharashtra, SEB owns G, T&D corporations

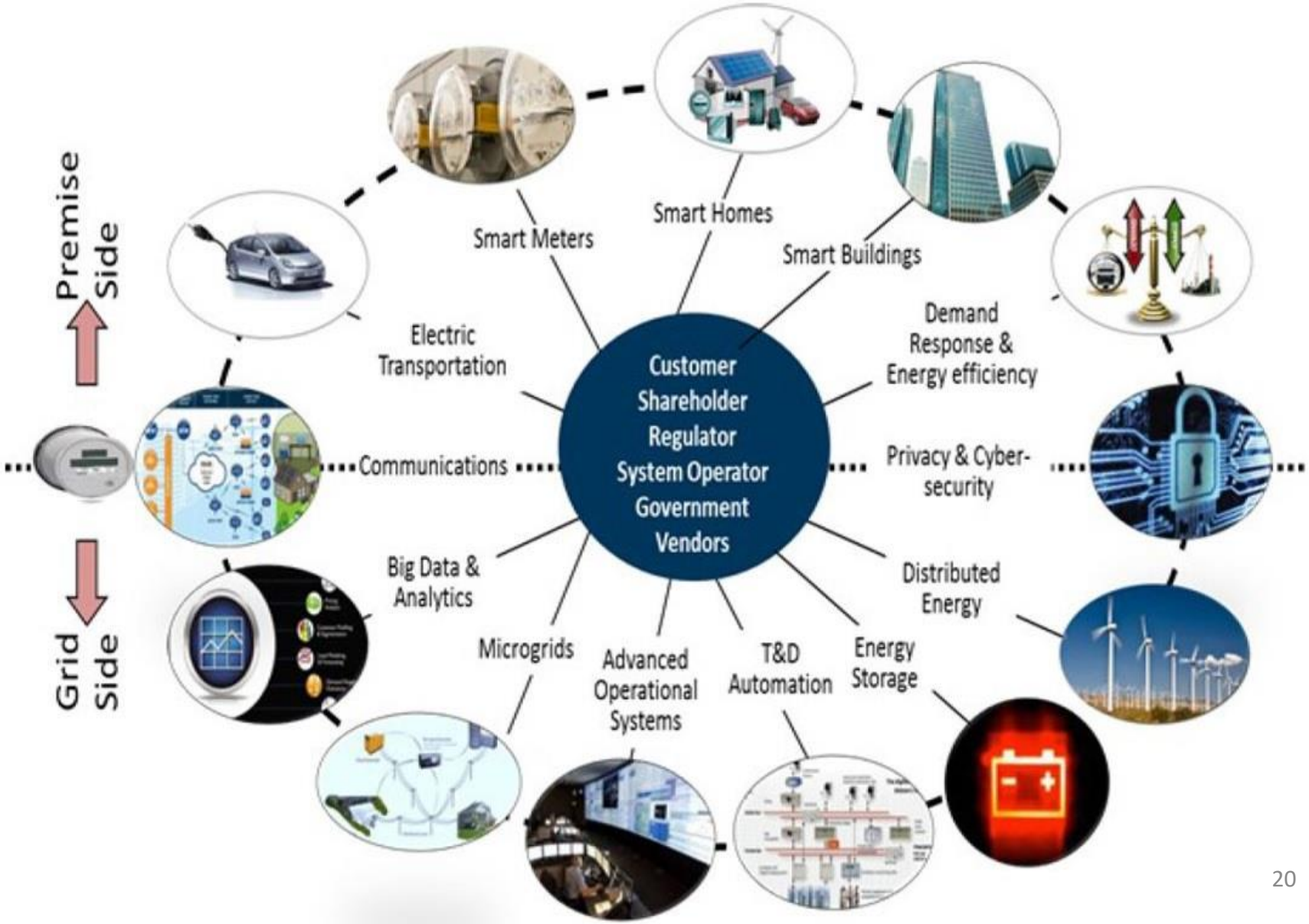
State owned Distribution Companies
(e.g., Maharashtra State Distribution Co.)

Private Distribution Companies or joint state/private owned
(e.g., North Delhi Power Limited)

Smart Electrical Value Chain



Smart Grid- Dimensions



SMART GRID INITIATIVES IN INDIA	REGION/LOCATION OF IMPLEMENTATION	REGION/LOCATION OF IMPLEMENTATION	REGION/LOCATION OF IMPLEMENTATION
Power Grid Corporation of India Limited(PGCIL)	Northern Region (NR-I and NR-II)	PMUs with GPS system, PDC at NRLDC, smart load control, on-line condition monitoring, data communication using fibre link	M/s SEL group
	Western Region (WR-I and WR-II)	Intelligent monitoring and control of the interconnected electric power grid using Wide AreA Monitoring (WAM)	TCS,IIT Mumbai, Tata Power Project funded by CSIR under NMITLI
North Delhi Power Limited (NDPL)	North and West Delhi	SCADA controlled grid station, automatic meter infrastructure, GSM based street lightning, GIS platform with fault management system	Tata Power, GE Smart Grid Technologies and Govt. of Delhi
	North and West Delhi	Development of SGMM, hi-tech automation control and monitoring, integration of grids, improvise market strategy	IBM, IUN Coalition

Pilot Smart Grid Projects In India

S.No	Utility Name	Functionality	Project Cost	No of Consumers	Project Awarded to
1	APDCL, Assam	AMI-R, AMI-I, PLM, OMS, PQM, DG, DSM/DR	29.94 Crs	15,083	M/s Fluentgrid Ltd
2	UHBVN, Haryana	AMI-R, AMI-I, PLM, OMS	20.7 Crs	11,000	M/s Fuji Electric, Japan
3	HPSEB, Himachal Pradesh	AMI-R, PQ, PLM, OMS	19.45 Crs	1,251	M/S Alstom T&D
4	CESC, Mysore	AMI-R, AMI-I, OMS, MG/DG	32.59 Crs	21,824	M/s Enzen Global Solutions (AMI work – M/s Cyan technologies
5	PSPCL, Punjab	AMI-R, AMI-I, PLM	10.11Crs	2,734	M/s Kalkitech

S.No	Utility Name	Functionality	Project Cost	No of Consumers	Project Awarded to
6	TSSPDCL, Telangana	AMI-R, AMI-I, PLM, OMS, PQ	41.82 Crs	11,904	M/s ECIL Hyderabad
7	TSECL, Tripura	AMI-R, AMI-I, PLM	63.43 Crs	42,676	M/s Wipro
8	WBSEDCL, West Bengal	AMI-R, AMI-I, PLM	7.03 Crs	5275	M/s Chemtrols
9	PED, Puducherry	AMI-R, AMI-I	46.11 Crs	34,000	M/s Dongfang Electronics
10	UGVCL, Gujarat	AMI-R, AMI-I, OMS, PLM, PQ	82.70 Crs	22000	Tender Floated
11	CED, Chandigarh	AMI,DTM, SA, Rooftop SPV, IT infra	28.58 Crs	29,433	Tender Closed on 22.09.2016

S.No	Utility Name	Functionality	Project Cost	No of Consumers	Project Awarded to
12	Amaravati, MSEDCL, Maharashtra	AMI, OMS, DR	90.05 Crs	1,48,495	Sanction letter issued
13	Congress Nagar, MSEDCL, Maharashtra	AMI, SCADA, OMS, DR	139.15 Crs	1,25,403	Sanction letter issued

Pilot Smart Grid Project IIT Kanpur: "SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ADVANCED METERING INFRASTRUCTURE (AMI), SYSTEM INTEGRATION (SI) AND HOME AUTOMATION SYSTEMS FOR THE SMART GRID PILOT PROJECT AT IIT KANPUR"

SCADA and Energy Management Systems

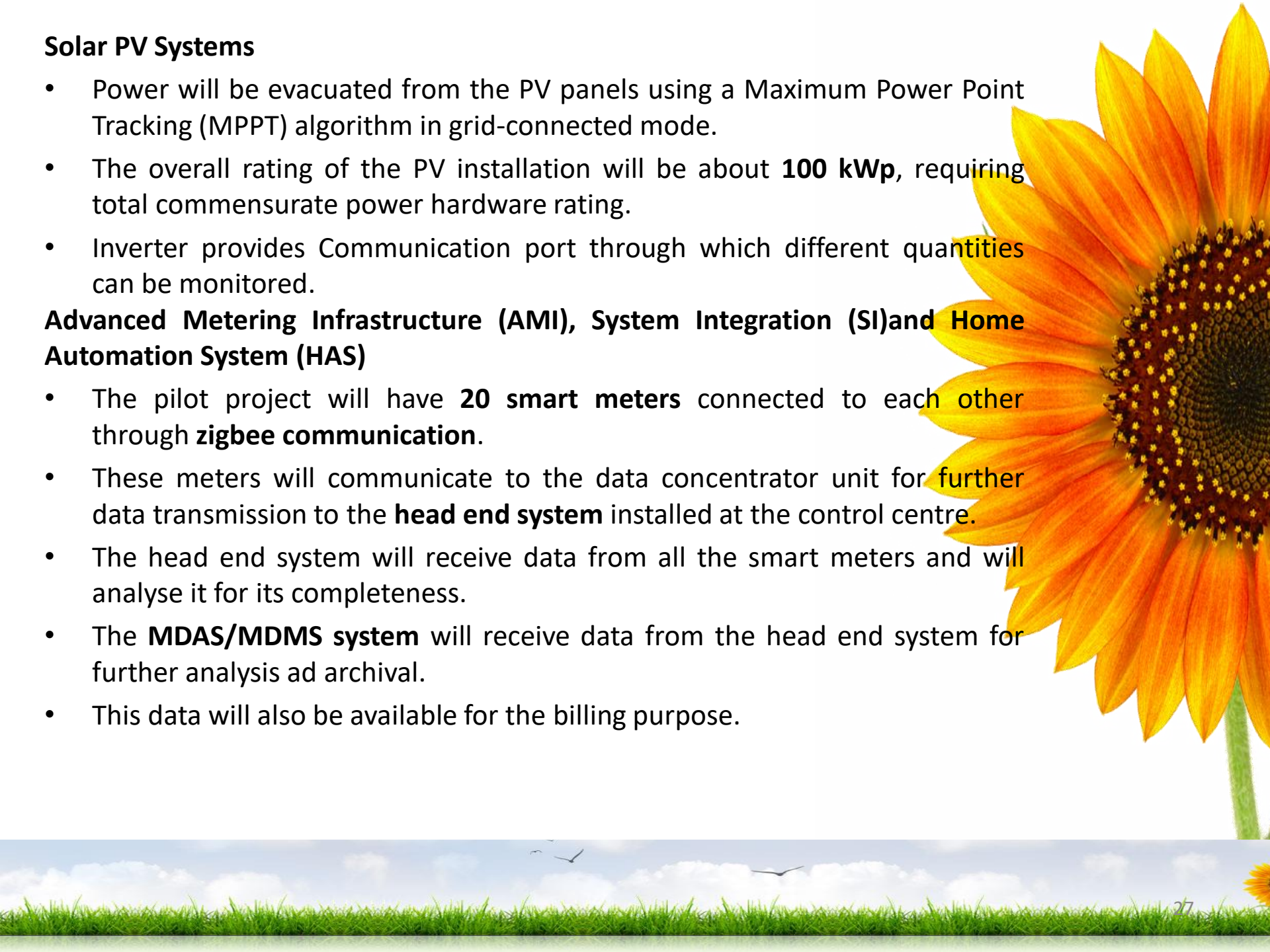
- Supply, installation, testing and commissioning of SCADA and Energy Management System for smart city pilot project will cover the **10 substations of IIT Kanpur** in which one is 33/11 kV and others are 11/440V
- Different communication protocols will be used such as **IEC-61850** and **Common Information Model (CIM)** for interoperability of data and message among various applications.
- **Enterprise Service Bus (ESB)** will serve as the backbone for the data exchange under the smart city pilot.
- Data will be integrated with the AMI data at the control centre and various analytics will run on data collected from both AMI and SCADA system e.g., **demand response analysis, peak load management** etc.

Solar PV Systems

- Power will be evacuated from the PV panels using a Maximum Power Point Tracking (MPPT) algorithm in grid-connected mode.
- The overall rating of the PV installation will be about **100 kWp**, requiring total commensurate power hardware rating.
- Inverter provides Communication port through which different quantities can be monitored.

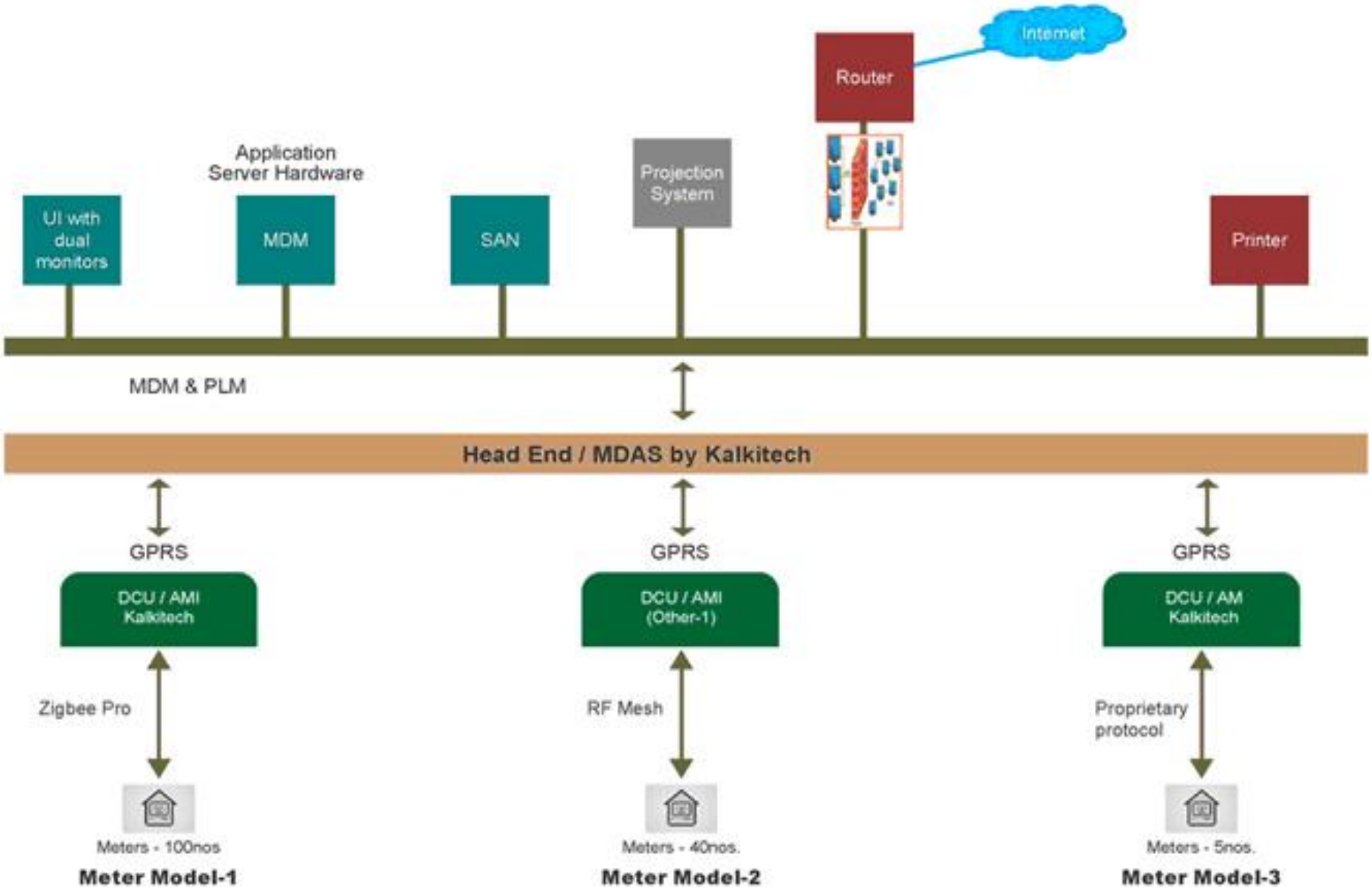
Advanced Metering Infrastructure (AMI), System Integration (SI)and Home Automation System (HAS)

- The pilot project will have **20 smart meters** connected to each other through **zigbee communication**.
- These meters will communicate to the data concentrator unit for further data transmission to the **head end system** installed at the control centre.
- The head end system will receive data from all the smart meters and will analyse it for its completeness.
- The **MDAS/MDMS system** will receive data from the head end system for further analysis ad archival.
- This data will also be available for the billing purpose.



SMART GRID PILOT PROJECT IN PUDUCHERRY

- The **Electricity Department of Puducherry and the Power Grid Corporation of India Ltd (PGCIL)** decided to launch a consumer utility interactive smart grid pilot in the city of Puducherry. The Puducherry smart grid pilot is **India's first smart grid project**, involving installation of smart meters in households, aiming to ultimately cover a total of 87,000 households in Puducherry. About 65 organizations worked together on this project and **Kalkitech** is a key member of this group.
- The pilot project would enable **Advanced Metering Infrastructure (AMI)**/ Smart Metering as well as improve the quality of distribution management system applications.
- The Electricity Department of Government of Puducherry is responsible for the transmission, distribution and retail supply of electricity in **Puducherry, Karaikal, Yanam and Mahe** regions of the Union Territory of Puducherry. It operates an extensive network of power transmission and distribution systems spread across the four regions of the Union Territory.



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The Infranet Company

- Kalkitech installed its **SYNC 1711 LT Metering DCU** with built-in Zigbee modem and GPRS interface to **collect data related to energy consumption, demand and tamper events** from single phase meters in areas with a high density of population. The DCU stores the data collected from each meter and transmits it to the **SYNC 5000 MDAS**, which is a server based meter data head end system compatible with multiple standards based protocols as well as proprietary protocols. The web services interface of SYNC 5000 allows it to transmit billing data to the third party MDM system. The pilot has laid the communication infrastructure in place for deployment of **peak demand reduction program** which is presently under implementation. Real-time identification of tampering and power theft issues from control center has resulted in speedy resolution.

Status of Smart Grid Pilots and NSGM Smart Grid Projects

➢ Smart Grid Pilot Projects

A. Awarded Projects:

1. **CESC, Mysore**
   - **Approved Project Cost: Rs.32.59 Crs, GoI Support: Rs.16.30 Crs, Consultant - POWERGRID**
   - **Additional City Area Division (ACAD), Mysore (21,824 Consumers)**
   - **Adopted Functionalities: AMI-R, AMI-I, OMS, PLM, MG/DG**
   - LoI issued to M/s Enzen Global Solutions on 04.03.2014 at a cost of Rs.32.56 Crs excl. FMS
   - First instalment of Rs.4.07 Crores released to the utility from MoP.
   - 17750 single phase smart meters, 215 DCUs, 62 TMUs, 4 FPIs and 130 HT modems installed.
   - Three phase smart meters tested in CESC lab.
2. **UHBVN, Haryana**
   - **Approved Project Cost: Rs.35.94 Crs, GoI Support: Rs.0 Crs**
   - **Panipat City Sub Division (11,000 Consumers)**
   - **Adopted Functionalities: AMI-R, AMI-I, PLM, OMS**
   - Project is being implemented under grant from NEDO (Japan) by M/s Fuji Electric & Co., Japan.
   - Site survey completed. Engineering for control centre hardware and software completed.
   - Filed testing of smart meters in progress. BIS approval awaited for smart meters.
   - SCADA and AMI applications configured and deployed at HPTI
3. **HPSEB, Himachal Pradesh**
   - **Approved Project Cost: Rs.19.45 Crs, GoI Support: Rs.9.73 Crs, Consultant - POWERGRID**
   - **Kala Amb Industrial Area (1,251 Consumers)**
   - **Adopted Functionalities: AMI-I, OMS, PLM, PQ**
   - Project awarded to M/S Alstom T&D on 28.02.2015 at a total cost of Rs.24.99 Crs inclusive of maintenance charges of Rs.6.42 Crs.
   - First instalment of Rs.2.43 Crores released to the utility from MoP.
   - 1065 smart meters (885 single phase and 180 three phase) installed.
   - Reports of single phase 10-60A, three phase CT-PT/CT/Feeder meters awaited.
   - FAT of control centre hardware and software completed.

7. **TSECL, Tripura**
   - **Approved Project Cost: Rs.63.43 Crs, GoI Support: Rs.31.72 Crs, Consultant - POWERGRID**
   - **Electrical Division No.1, of Agartala town (42,676 Consumers)**
   - **Adopted Functionalities: AMI-R, AMI-I, PLM**
   - Project was awarded to M/s Wipro on 22.09.2015 at a cost of Rs.80.08 Crs inclusive of training and maintenance charges of 16.98 Crs against the MoP approved cost of Rs.63.43 Crs with utility bearing the additional cost.
   - First instalment of Rs. 7.93 Crs released to the Utility from MoP
   - Survey completed. Control centre building made ready.
   - 351 smart meters (319 single phase and 32 three phase) and 4 DCUs installed.
   - Control centre equipment received. FAT documents for applications submitted.
8. **TSSPDCL, Telangana**
   - **Approved Project Cost: Rs.41.82 Crs, GoI Support: 20.91 Crs, Consultant - CPRI**
   - **Jeedimetla Industrial Area (11,904 Consumers)**
   - **Adopted Functionalities: AMI-R, AMI-I, PLM, OMS, PQ**
   - LoI was issued to M/s ECIL, Hyderabad on 28.10.2015 for a contract price of Rs.35.86 Crs.
   - Field survey completed. PoC on one DTR taken up for testing.
   - 28 smart meters (20 single phase, 6 three phase and 2 CT) installed for PoC study.
   - Draft regulations submitted to TSERC on 29.06.2016
9. **PED, Puducherry**
   - **Approved Project Cost: Rs.46.11 Crs, GoI Support: Rs.23.06 Crs, Consultant - POWERGRID**
   - **Division 1 of Puducherry (34,000 Consumers)**
   - **Adopted Functionalities: AMI-R, AMI-I**
   - Project was awarded to M/s Dongfang Electronics, China on 23.05.2016 and agreement signed on 06.07.2016 for a total project cost of Rs.43.91 Crores.
   - Consumer survey started. Engineering documents made ready and are under review.
   - Draft regulations were put up to JERC.

➢ Smart Grid Projects under NSGM

13. CED, Chandigarh

- **Approved Project Cost: Rs.28.58 Crs, GoI Support: Rs.8.6 Crs (@30%)**
- **Smart Grid Project at Sub Division 5 of Chandigarh (29,433 Consumers)**
- **Adopted Functionalities: AMI, DT monitoring, S/S Automation, Rooftop Solar PV, IT infra**
- Project was approved by Empowered Committee of NSGM on 29.03.2016 for a cost of Rs.28.58 Crores against the estimated DPR cost of Rs.49.52 Crores.
- Sanction letter to CED was issued on 22.04.2016.
- Smart Grid cell established at Chandigarh
- RECPDCL appointed as Project Management Agency

14. Amravati, MSEDCL, Maharashtra

- **Approved Project Cost: Rs.90.05 Crs, GoI Support: Rs.27.02 Crs (@30%)**
- **Smart Grid Project at Amravati Town of Maharashtra (1,48,495 Consumers)**
- **Adopted Functionalities: AMI, OMS, DR**
- Project was approved by Empowered Committee of NSGM on 29.03.2016 for a cost of Rs.90.05 Crores against the estimated DPR cost of Rs.133.57 Crores.
- Sanction letter to MSEDCL was issued on 22.04.2016.
- RfP is under approval. Note for regulations have been drafted.
- Creation of SLPMU in process.

15. Congress Nagar, MSEDCL, Maharashtra

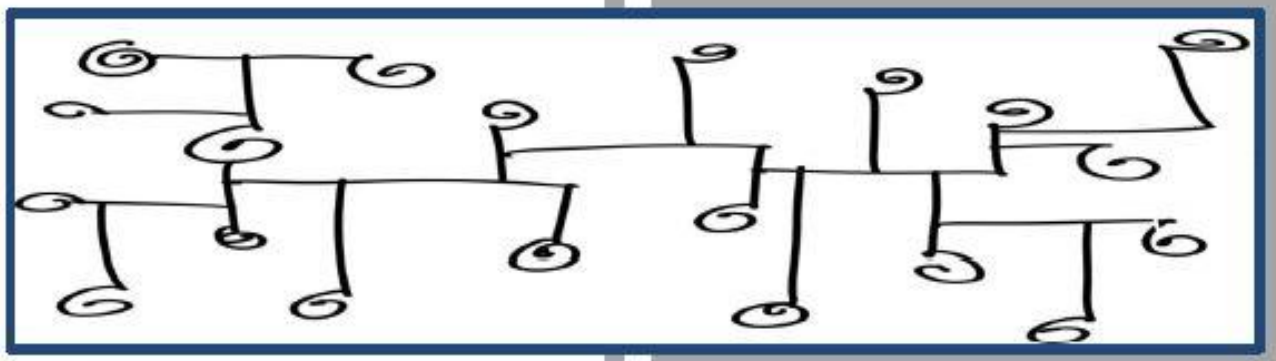
- **Approved Project Cost: Rs.139.15 Crs, GoI Support: Rs.41.74 Crs (@30%)**
- **Smart Grid Project at Congress Nagar Division of Nagpur (1,25,403 Consumers)**
- **Adopted Functionalities: AMI, SCADA, OMS, DR**
- Approval of the project for a project cost of Rs.139.15 Crores against the estimated DPR cost of Rs.196.21 Crores was accorded by Ministry of Power with the provision of post-facto ratification by Empowered Committee.
- Sanction letter to MSEDCL was issued on 29.07.2016.

Tender No.

UGVCL/IT-EMC/Smart Grid Pilot Project/

Uttar Gujarat Vij Company Limited (UGVCL)

(An ISO 9001:2000 Company)



Request for Proposal (Volume-II)

For

Appointment of Smart Grid Implementing Agency for Implementation of Smart Grid Pilot Project

Content of the Tender

- Introduction, Scope of Work and General Requirements
- Advanced Metering Infrastructure (AMI)
- Peak Load Management (PLM)
- System Integration
- Hardware
- System Software Requirement
- Inspection Testing and Operational Acceptance
- Project Management and Implementation Plan
- Documentation and Deliverables.
- Maintenance and Support Services

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News: Present Scenario

India Power Corporation Ltd to adopt smart grid with USTDA in Gaya

By *Debjoy Sengupta*, ET Bureau | Updated: Sep 21, 2016, 09.41 PM IST Post a Comment

READ MORE ON » USTDA | Smart Grid | IPCL | Gaya

KOLKATA: India Power Corporation Ltd has entered into a partnership with US Trade & Development Agency to implement smart gird technology on India Power's distribution network - particularly to its Gaya Franchise in Bihar. It will boost efficiency and reliability while minimizing wastage.

A smart grid is commonly characterized by the application of digital processing and communications to centralize data flow and information management.

A smart grid is commonly characterized by the application of digital processing and communications to centralize data flow and information management. American expertise will help overcome challenges like integration of new grid information - one of the key issues in designs of smart grids.

At present, electric utilities now find themselves making three classes of transformations: improvement of infrastructure; addition of the digital layer; and business process transformation, necessary to capitalize on the investments in smart technology. Much of the work going on in electric grid modernization, especially for substations and distribution automation, is now included in the general concept of the smart grid.

The opportunity to conduct USTDA sponsored technical assistance for IPCL will be completed by interested US firms through Federal Business Opportunities.

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.

TUFIDCO & City Corporation Formed Working Groups For Smart City

October 15, 2016 Pradeep Kumar Smart Cities News

According to the published news in Times of India, a meeting was held on Monday between Tamil Nadu Urban Finance and Infrastructure Development Corporation Ltd (TUFIDCO) and the city corporation to find the suggestion on the smart city proposals and also from various working groups.

A senior officer of the corporation said that actually the meeting was called to form working groups for discussion on following.

- Lake restoration and renovation
- Traffic movement
- Infrastructure planning
- Parks and open spaces
- Non-motorized transport

In this regard, the corporation official said that the representatives had shown a presentation of the proposal and opinions were given on the project. However, the tenders would be called for these projects very soon and we wanted to ensure that all the gaps were filled.

According to the sources, the NGOs had also given several suggestions on decentralizing the entire project and requested for the public participation in this project.

An official said that many works such as desilting the lakes and technology development could be done by non-profit organizations. It can save a lot of money.

In this meeting, the city corporation commissioner K Vijayakarthikeyan, urban planners, industrialists and along with the city-based NGOs. The meeting was chaired by P W C Davidar, chairman and managing director of TUFIDCO.

Smart City Project: Chandigarh signs MoU with French body

Seeking assistance from the AFD, UT Adviser Parimal Rai emphasised the importance of making Chandigarh not just smart but the smartest city on the world map.

By: **Express News Service** | Chandigarh | Published:September 24, 2016 4:50 am

Delegates at the Indo-French workshop in Chandigarh on Friday. Express

The UT Administration on Friday signed a memorandum of understanding (MoU) with the Agence Francaise Development (AFD) on technical cooperation in the field of sustainable urban mobility during a workshop, "Chandigarh Smart City", held in Chandigarh on Friday. The MoU was signed by Minister Counsellor, Embassy of France in India, Jean Marc; director AFD, Nicolas Fornage; and K K Jindal, secretary transport, Chandigarh Administration.

BEST OF EXPRESS


India
Mumbai RTI activist, who targeted illegal constructions, shot dead


India
India slams Pakistan over BRICS wall


India
States may have to offer bids, compete now to get projects, events


India
Sealing the border: After strikes, walking the Line of Control

No funds, smart grid tender misses 3rd deadline

TNN | Oct 11, 2016, 01.51 AM IST

GURGAON: More than a year after Union minister for power Piyush Goyal announced the ambitious smart grid project for Gurgaon, the tender hasn't been opened yet. The date of tender opening has been postponed to November 4 from September 28 over uncertainty regarding funds. With this, the tender opening has missed its deadline for the third time.

A source familiar with the project details said the reason behind the latest delay was lack of clarity over funding of the project. "While Rs 273 crore has been allocated by the Centre, the state government is considering where to arrange its share of the funds from for the first phase of the project," a senior official associated with the project said.

The total cost of the project, which has been divided into three phases, is Rs 7,000 crore. The cost of Phase 1 covering sectors 1-57 is Rs 1,200 crore, of which the Centre has granted Rs 273 crore and the rest is to be arranged by the state government.

The official said the availability of the funds should not be a problem, but the government is still not sure of where to raise the money from and what kind of instruments to use.

The project is aimed at making Gurgaon free from power cuts by providing uninterrupted power supply throughout the day. The government had said the project would prove beneficial for conservation of the environment as it would put an end to the consumption of diesel through generator sets, generally used for power back-up.

The tender was floated in December 2015 and was supposed to open in July 2016. It was then extended to August 17, 2016. The tender was again delayed from August 17 to September 28 which has yet again been rescheduled.

The smart grid team is now hoping to open the tender on November 4 and start the work by February, 2017.

City Beat: Centre Releases Rs 200 Cr For Chennai & Coimbatore Smart City Projects

Gearing up for the Smart Cities Mission, the Centre has set up a Special Purpose Vehicle (SPV) and released Rs **200 crore** of funds each for Chennai and Coimbatore. These funds are a part of the Central government grant under which each city will get Rs 500 crore. Tamil Nadu, with 12 cities, has the highest number of smart cities approved so far. Moreover, for further developments, the Centre has also approved funds for Tamil Nadu which include **Rs 2,936 crore** for the Smart City Mission, **Rs 7,082 crore** for the Atal Mission for Rejuvenation and Urban Transformation, Rs 340 crore for the Swachh Bharat Mission, Rs 45 crore for the Hriday scheme and Rs 1,796 crore for the Housing Mission.

September 21, 2016 07:07 PM Eastern Daylight Time

KOLKATA, India & SAN JOSE, Calif.--(BUSINESS WIRE)--CESC Limited, India's leading fully integrated electrical company with over 2.9 million customer connections and serving over 17 million people in the state of West Bengal, today won the 'Smart Grid Project of the Year' award at the Asian Power Awards for its program with Silver Spring Networks, Inc. (NYSE: SSNI). Silver Spring is deploying Starfish™, its IPv6 public cloud IoT network and data platform, for CESC in Kolkata for Advanced Metering Infrastructure (AMI) and Distribution Automation (DA) applications. Through Silver Spring's Operations Optimizer solution, a powerful analytics application that creates insights from a variety of data sources, the program will further help CESC improve grid reliability, reduce energy loss and ensure billing accuracy.

Silver Spring and CESC are also collaborating through Starfish to offer smart grid and smart city services to other organizations in West Bengal and throughout India. Starfish can help utilities, energy service providers, cities, commercial enterprises and developers access a reliable, secure and scalable IoT network and data platform that has already connected millions of devices on five continents.

Printed from
THE TIMES OF INDIA

Rs 1,000 crore project to rid Gurgaon of blackouts

TNN | Sep 29, 2016, 07.56 AM IST

NEW DELHI: Gurgaon's chronic power woes could be a thing of the past in a little more than a year from now. A Rs 1,000 crore-plus transmission project is under way to raise electricity supply to the millennium city and its surrounding areas, home to scores of multinationals, call centres and manufacturing units, by 2,000-3,000 MW. The project, awarded to Sterlite Power promoted by NRI metals-and-mining tycoon Anil Agarwal, is part of the Jagdish Khattar government's efforts to turn Haryana into a zero-blackout state.

The Sterlite project would prop up another plan being pursued by the central and state governments to make Gurgaon the first city in the country with a full-scale smart grid that would allow consumers to reduce power bills by turning into `prosumers'-becoming suppliers during the day by feeding surplus power from rooftop solar systems into the mains and drawing back in the night.

The Sterlite project envisages laying four lines totalling 170 km and three high-power sub-stations to raise wheeling capacity to rid the area of generators and power cuts. The sub-stations would streng then the network in Gurgaon and connect other sub-stations located at Palwal, Rangla, Rajpur and adjoining areas of Meerpur Kurah in Haryana - all part of the inter-state transmission system.

"This project is quite challenging as it passes through established human settlements. We are confident of delivering it ahead of schedule, as we have been doing on our other projects," Sterlite Power CEO Pratik Agarwal told TOI.

Coimbatore outscored Chennai in smart city competition

Last Updated: Wednesday, March 23, 2016 - 18:31

RE2TN

- iPLON, as a Monitoring and Operation and Maintenance Team can sum up the Communication requirement that is needed for any Smart Grid Technology.
- Germany is well known for providing new technologies in the Renewable energy. We can have a vibrant technology transfer that is needed for the reformation of the present Grid.
- iPLON can provide the robust and experienced technology on the controlling systems for the distributed power generation facilities from different domains like Wind, Hydro, biomass and Solar.

Conclusion

- Smart City projects are sprouting throughout the country from the help of Government and funding.
- Smart Grid, although an independent structure to the smart cities mission, can be achieved once the smart cities gets implemented.
- The nation is experiencing new changes in structure towards Smart Development, but finding suitable technologies from these pilot study and implementing them are the necessity now.

Thank You

Smart Grid in Smart Cities Environment

GOWRISHANKAR RAMANAN

18.10.2016

AGENDA

- Smart State, Smart City
- Smart Grid
- Smart Metering
- About iPLON
- Architectural Diagram, Protocol IoT
- What can iPLON +Partners offer??

A City that welcomes Immigrants – Smart City

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

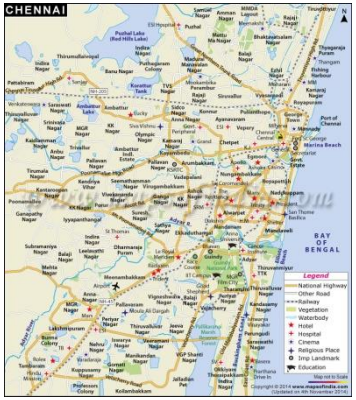
http://smartcities.gov.in/

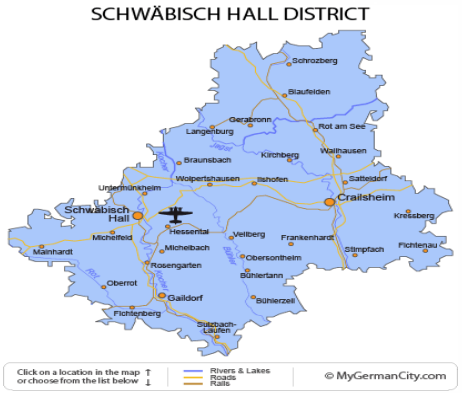

JAMMU & KASHMIR
CHINA
PAKISTAN
HIMACHAL PRADESH
PUNJAB
UTTARAKHAND
HARYANA
Delhi
NEPAL
RAJASTHAN
UTTAR PRADESH
SIKKIM
BHUTAN
ARUNACHAL PRADESH
ASSAM
NAGALAND
MEGHALAYA
MANIPUR
BIHAR
BANGLADESH
TRIPURA
MIZORAM
JHARKHAND
WEST BENGAL
GUJARAT
MADHYA PRADESH
CHHATTISGARH
ORISSA
MYANMAR
MAHARASTRA
ARABIAN SEA
BAY OF BENGAL
ANDHRA PRADESH
GOA
KARNATAKA
PUDUCHERRY
TAMIL NADU
LAKSHADWEEP
ANDAMAN NICOBAR ISLANDS
SRI LANKA


GERMANY
Denmark
Baltic Sea
North Sea
Kiel Bay
Pomeranian Bay
SCHLESWIG-HOLSTEIN
MECKLENBURG-VORPOMMERN
HAMBURG
BREMEN
NIEDERSACHSEN
Netherlands
Poland
BERLIN
Berlin
BRANDENBURG
SACHSEN-ANHALT
NORDRHEIN-WESTFALEN
SACHSEN
THURINGEN
HESSEN
Belgium
RHEINLAND-PFALZ
Luxembourg
Czech Republic
SAARLAND
BAYERN
BADEN-WURTTEMBERG
France
Austria
Switzerland
Liechtenstein
www.mapsopensource.com


Tiruvallur
Chennai
Kancheepuram
Krishnagiri
Tiruvannamalai
Dharmapuri
Villupuram
Salem
The Nilgiris
Erode
Cuddalore
Namakkal
Perambalur
Ariyalur
Coimbatore
Tiruppur
Karur
Tiruchirappalli
Nagapattinam
Thanjavur
Thiruvarur
Dindigul
Pudukkottai
Theni
Madurai
Sivaganga
Virudhunagar
Ramanathapuram
Tuticorin
Tirunelveli
Kanniyakumari


Baden-Württemberg
Odenwald
Mannheim
Heidelberg
Karlsruhe
Pforzheim
Stuttgart
Heilbronn
Freiburg


CHENNAI
BAY OF BENGAL
Legend
National Highway
Other Road
Railway
Vegetation
Waterbody
Hotel
Hospital
Cinema
Religious Place
Imp Landmark
Education


SCHWÄBISCH HALL DISTRICT
Schrozberg
Blaufelden
Gerabronn
Langenburg
Rot am See
Kirchberg
Braunsbach
Wallhausen
Wolpertshausen
Ilshofen
Satteldorf
Untermünkheim
Crailsheim
Schwäbisch Hall
Kressberg
Hessental
Vellberg
Michelfeld
Frankenhardt
Michelbach
Stimpfach
Mainhardt
Obersontheim
Rosengarten
Fichtenau
Oberrot
Bühlertann
Gaildorf
Bühlerzell
Fichtenberg
Sulzbach-Laufen
Click on a location in the map or choose from the list below
Rivers & Lakes
Roads
Rails
© MyGermanCity.com

Benchmarking TN & Germany

Country	Area	Per person Consumption	Number of Utility Companies	Population
Germany	357,021km^2	7081 kWh/year	>800	72,147,030
TN, India	130,060 km^2	684 kWh/year	1	77,880,000

SMART CITY

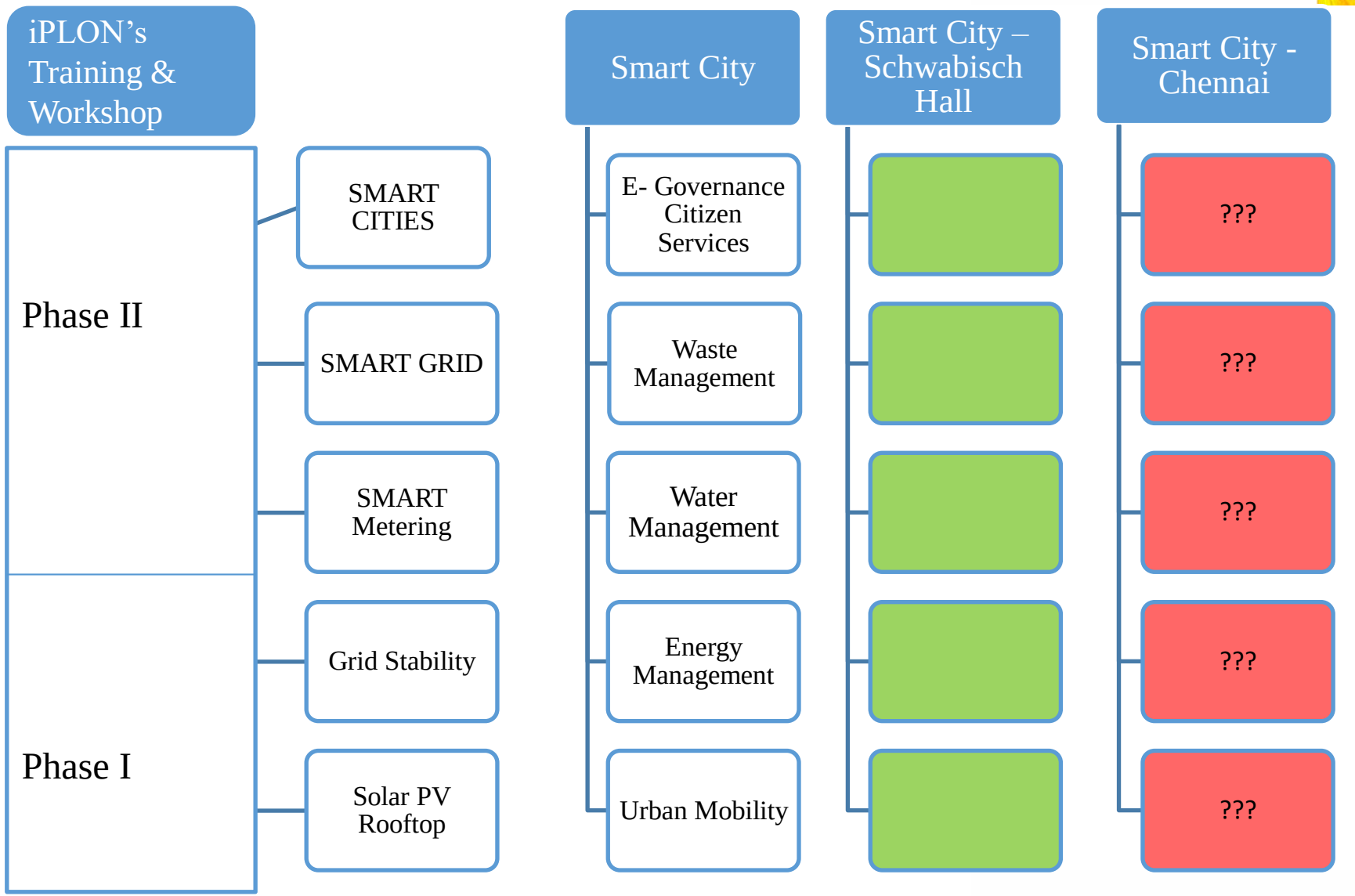
Schwäbisch Hall

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

Overview of Smart Cities



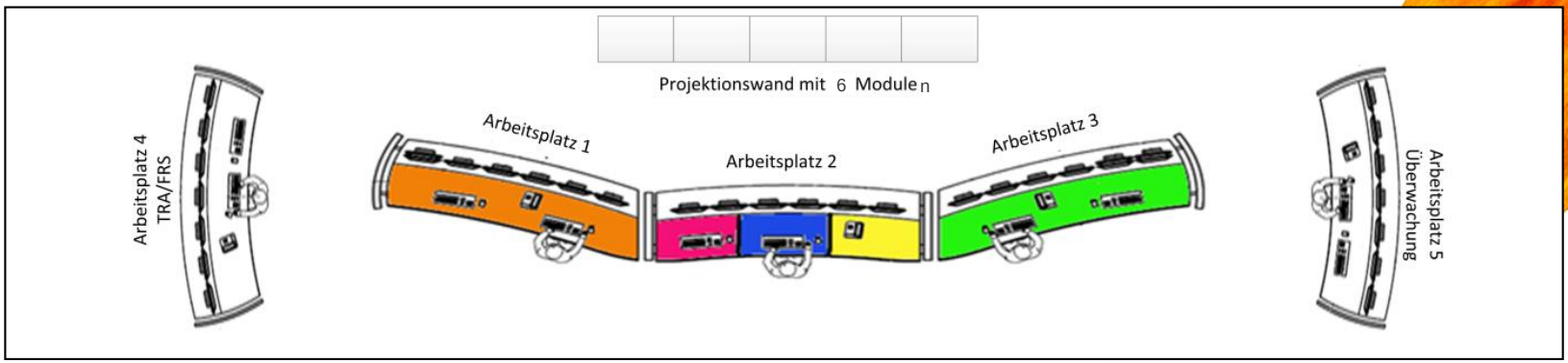

SOLARTANKSTELLE

TSO in Europe and Germany

- European Network of Transmission
- System Operators for Electricity (ENTSO-E)
  - 41 Transmission System Operator* (TSO) in 34 Countries
- German TSO
  - Amprion GmbH
  - Tennet TSO GmbH
  - TransnetBW GmbH
  - 50Hertz Transmission GmbH

* in Germany TSO – "Übertragungsnetzbetreiber (ÜNB)"

Multi utility control room at Stadtwerke Schwäbisch Hall



Peter Breuning

- Head of department: grid control & engineering services at Stadtwerke Schwäbisch Hall GmbH (multiy utility)
- Lecturer University Heilbronn & Harz
- Speaker IDS User Group --52 Multi Utility Companys
- Member working group FNN (VDI) (directive for power plant connections, HV-grids)
- Technical Direktor "power grids" - Smart Grid platform BaWü

Power Supply

1214 Mio-kWh/a commercially

Natural Gas Distributi

1458 Mio-kWh/a commercially

Water Supply

27 Mio-m^3/a

Thermal Energy Supply

130 Mio-kWh/a

Indoor/Outdoor Swimming Area and Halls

700,000 people

Car Parking

2000 cars

Stadtwerke Schwäbisch Hall GmbH

500 employees

16 trainees

262 Mio-Euro Sales

Energy Services

Contracting

Payer Remote Reading & EDM

Process Leadership

Technical Installations

Facility Management

224 stations

18900 data points

Power Plants

48 CHP Models

1 Combined Cycle

6 Biomass-CHP

3 Wood Heating

6 Hydro Electric

2 Wind Turbine

Renewable Energy

Photo Voltaic : 43MW

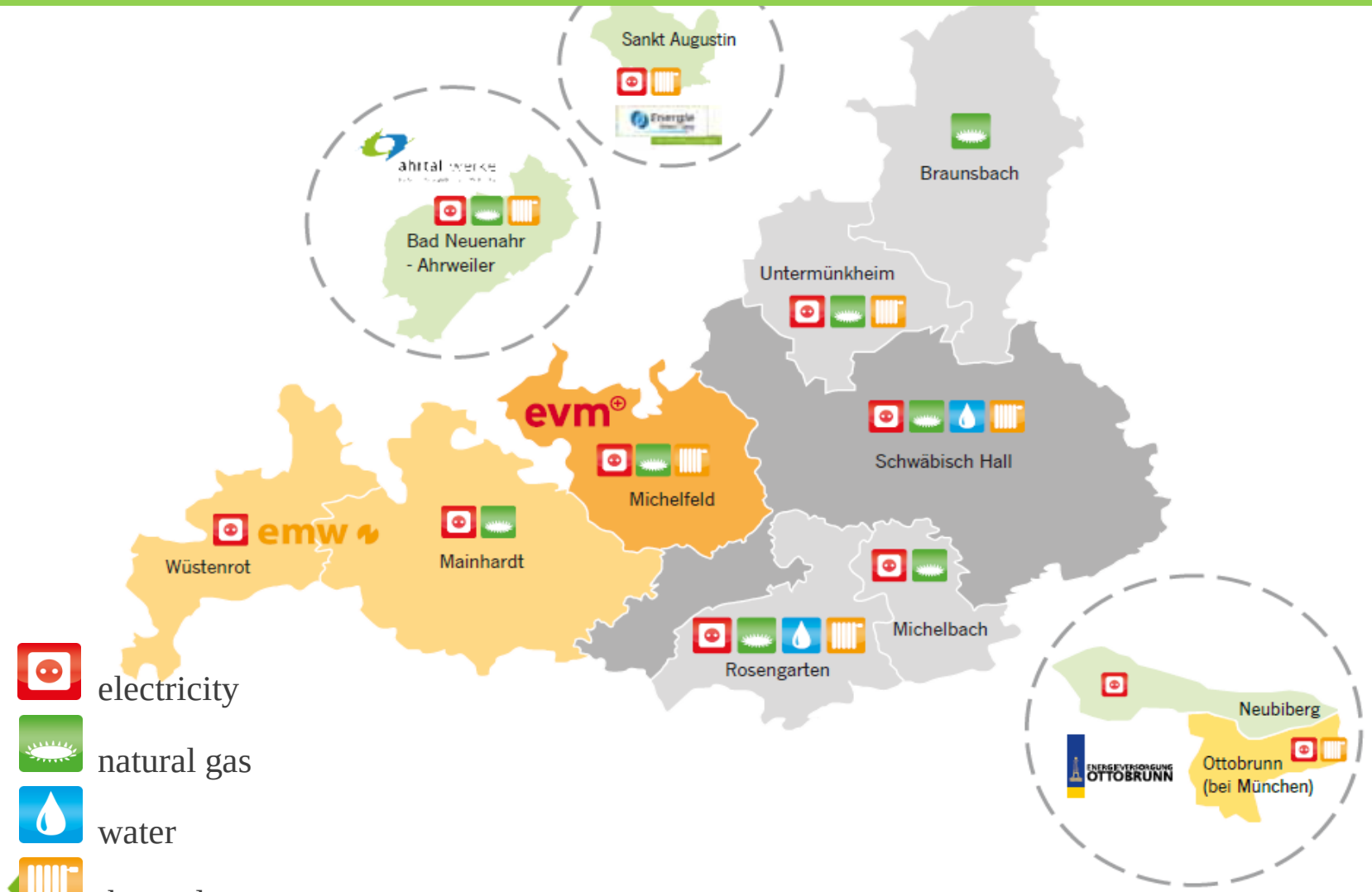
Hydro Electric : 2.45MW

Wind Turbine : 27MW

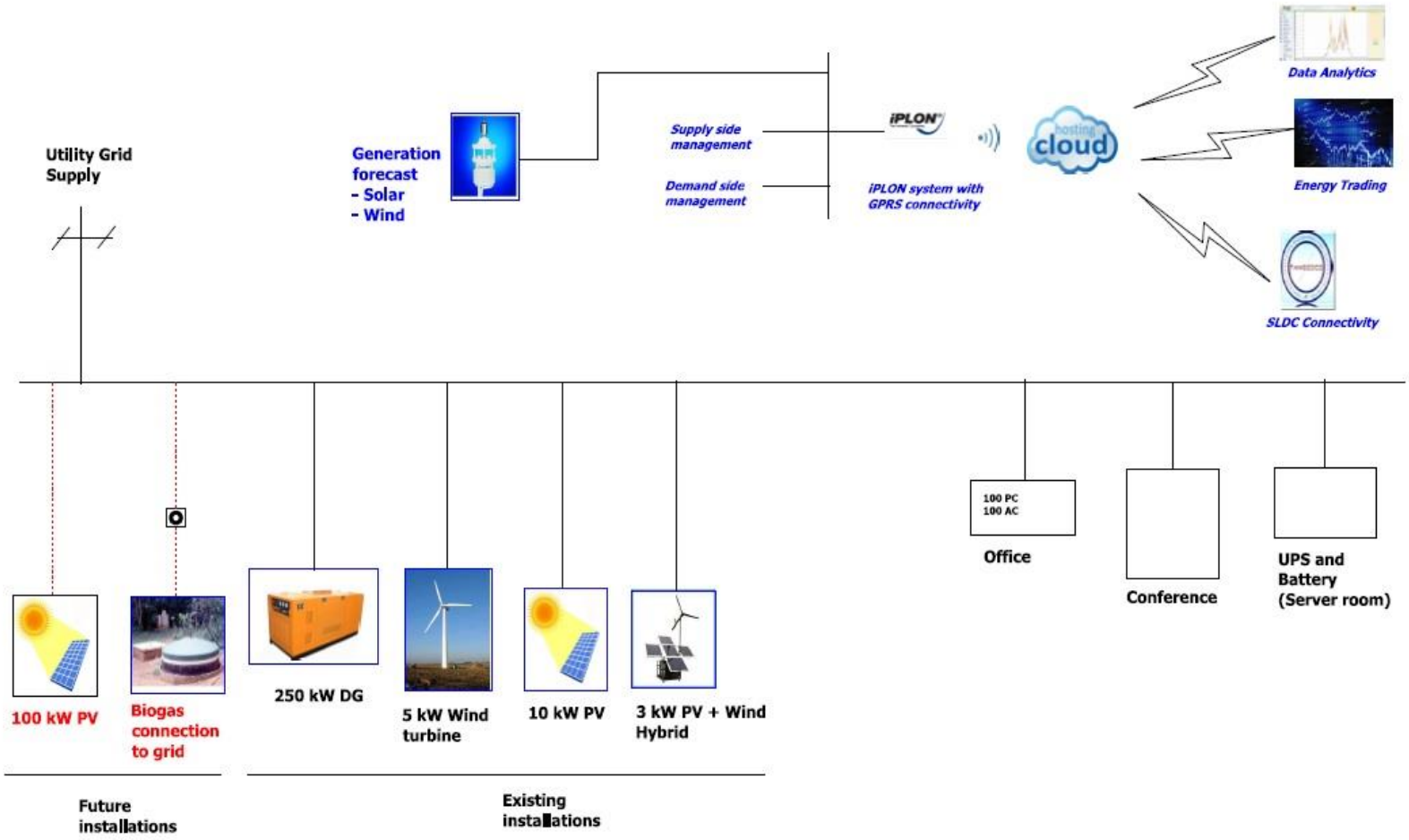
Biomass : 8MW

Waste Management: 455kw

concession area Stadtwerke Schwäbisch Hall GmbH 70.000 inhabitants are living in the grid Schwäbisch Hall



Logical View : iPLON Architectural Diagram



Smart Grid

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

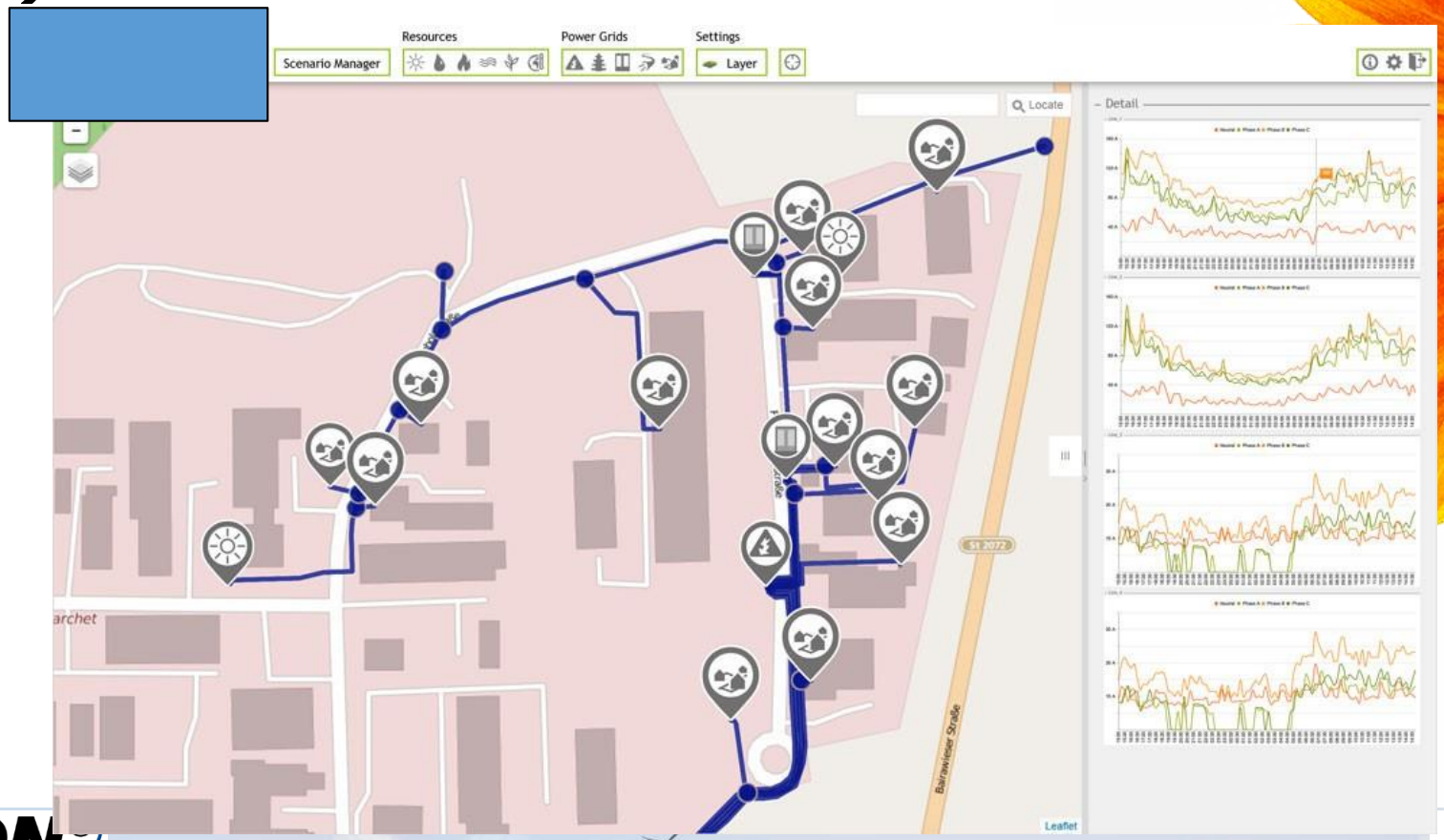
Continuous monitoring & feedbacks from the network

Faults anticipation and helps faults prevention

Two way communication b/w utilities & customers

Smart Meter

Information from Low Voltage Grid (Smart Meter)



iPLON
The Infranet Company

KFW DEG

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

Energy flows in between the voltage levels with (renewable) DER

Großkraftwerke
(Kernenergie, Kohle)

Extra high voltage (380 and 220 kV) in transmission grids

Verbundpartner

Mittelgroße Kraftwerke
(Kohle, Öl, Gas, Wasser)

High voltage (110 kV) in subtransmission grids

Stadtwerke

Industrie

Kleinere Kraftwerke
(Wasser, Wind, Biogas)

Medium voltage (30, 20 or 10 kV) in regional distribution grids

Stadtwerke

Industrie / Gewerbe

Kleinstkraftwerke
(Fotovoltaik)

Low voltage (230/400 V) in local distribution grids

Haushalte

Gewerbe

Landwirtschaft

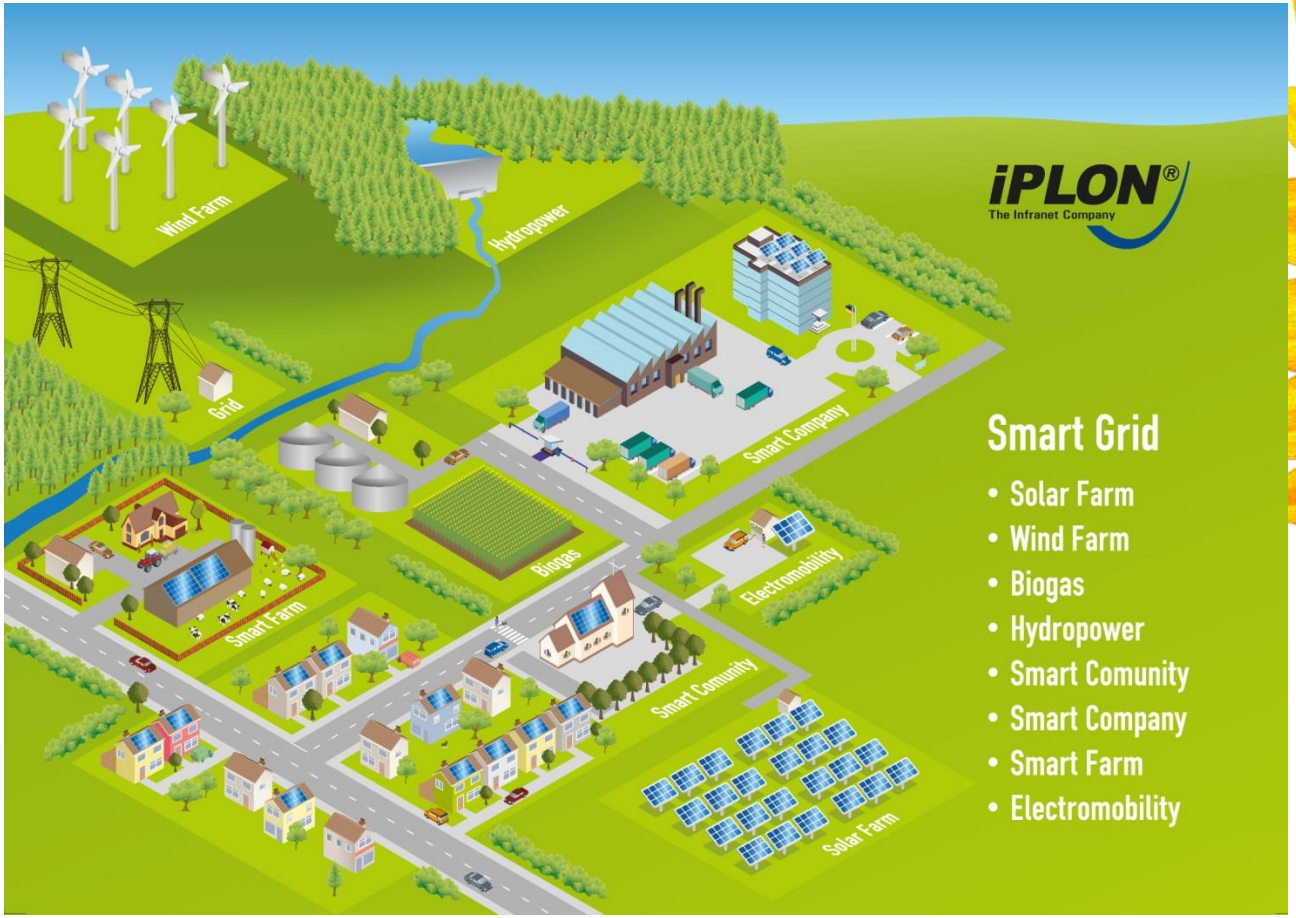
Bidirectional Energy flow

iPLON® The Infranet Company

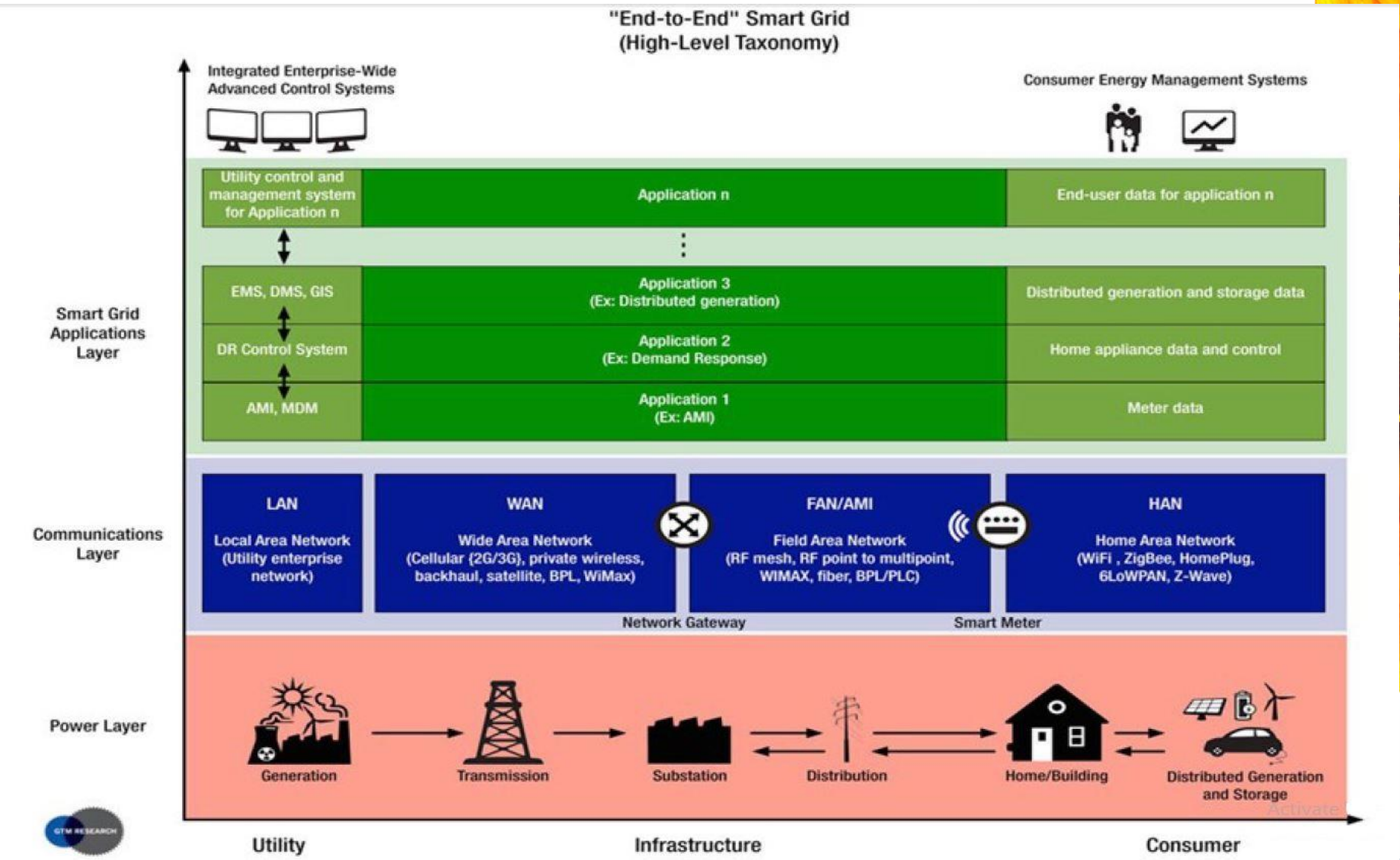
KFW DEG

- Decentral RE supply side Mangement

iPLON mantra– "Smart Grids"



Smart Grid Application Layer



iPLON®
The Infranet Company

KFW DEG

What is IEC 60870 ?

- IEC 60870 set of standards which define systems used for telecontrol (supervisory control and data acquisition) 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 origin

- International Electrotechnical Commission 60870 Standards (IEC 60870)
- 60870 standards are developed by IEC Technical Committee 57 (Working Group 03)
  - Define systems used for telecontrol (supervisory control and data acquisition) in electrical engineering and power system automation
  - 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.

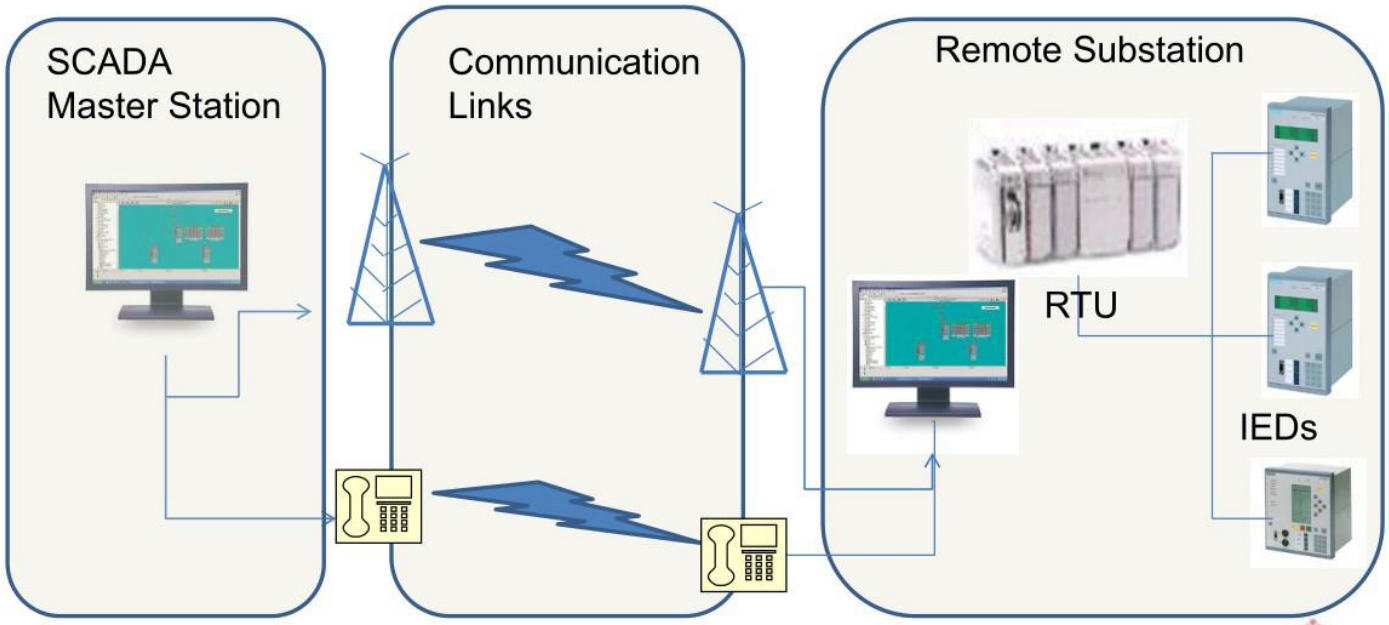
SLDC in India

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



ProSoft TECHNOLOGY

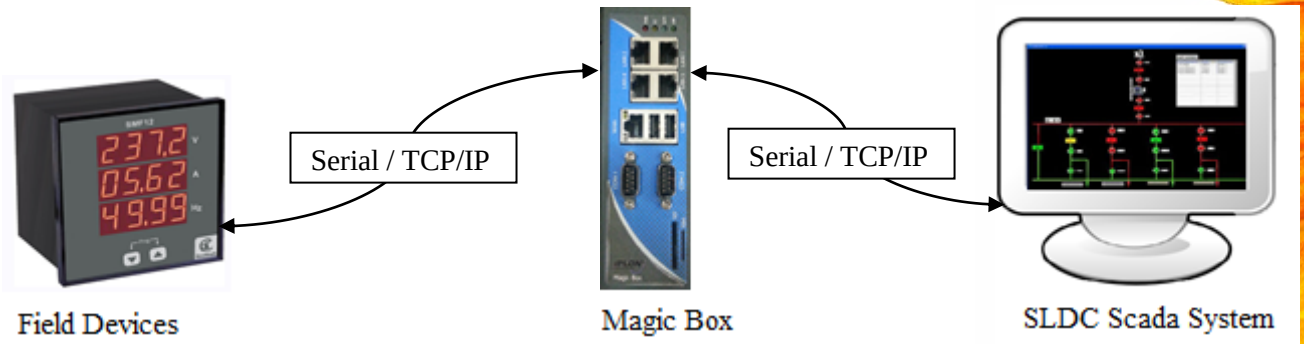
What can iPLON offer??

Why iPLON is the right partner for you

- 35 member strong team with office in Chennai
- Planned expansion of team strength to 50 in 2017
- Victor Thamburaj, CEO has 35 years of experience working in Germany and 3 years in India
- ONE STOP SHOP FOR ALL MONITORING NEEDS!!

iPLON – Magic Box

Communication between SLDC and Power Plant


Serial / TCP/IP
Serial / TCP/IP
Field Devices
Magic Box
SLDC Scada System

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**
- **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		
☐	56000 bit/s				
☐	64000 bit/s				

SLDC- Interoperability Check list

Process information in monitor direction

☐	<1>	:= Single-point information	M_SP_NA_1
☐	<2>	:= Single-point information with time tag	M_SP_TA_1
☐	<3>	:= Double-point information	M_DP_NA_1
☐	<4>	:= Double-point information with time tag	M_DP_TA_1
☐	<5>	:= Step position information	M_ST_NA_1
☐	<6>	:= Step position information with time tag	M_ST_TA_1
☐	<7>	:= Bitstring of 32 bit	M_BO_NA_1
☐	<8>	:= Bitstring of 32 bit with time tag	M_BO_TA_1
☐	<9>	:= Measured value, normalised value	M_ME_NA_1
☐	<10>	:= Measured value, normalised value with time tag	M_ME_TA_1
☐	<11>	:= Measured value, scaled value	M_ME_NB_1
☐	<12>	:= Measured value, scaled value with time tag	M_ME_TB_1
☐	<13>	:= Measured value, short floating point value	M_ME_NC_I
☐	<14>	:= Measured value, short floating point value with time tag	M_ME_TC_1
☐	<15>	:= Integrated totals	M_IT_NA_1
☐	<16>	:= Integrated totals with time tag	M_IT_TA_1
☐	<17>	:= Event of protection equipment with time tag	M_EP_TA_1
☐	<18>	:= Packed start events of protection equipment with time tag	M_EP_TB_1
☐	<19>	:= Packed output circuit information of protection equipment with time tag	M_EP_TC_1
☐	<20>	:= Packed single-point information with status change detection	M_PS_NA_1

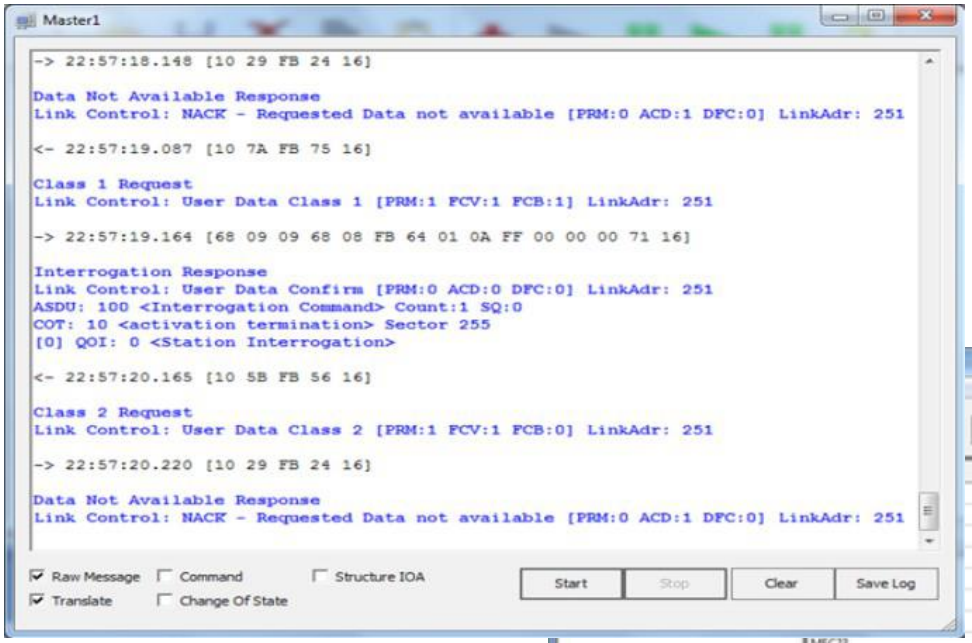
SLDC- Project Developer (PD) Organizational Workflow

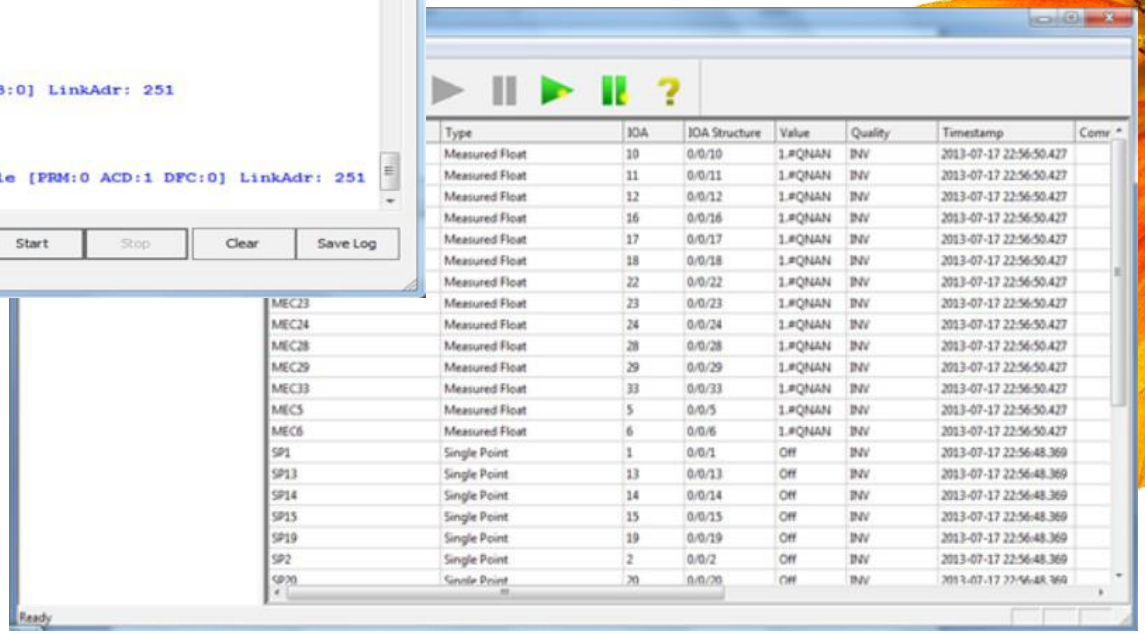
Contents

SLDC- Test scripts

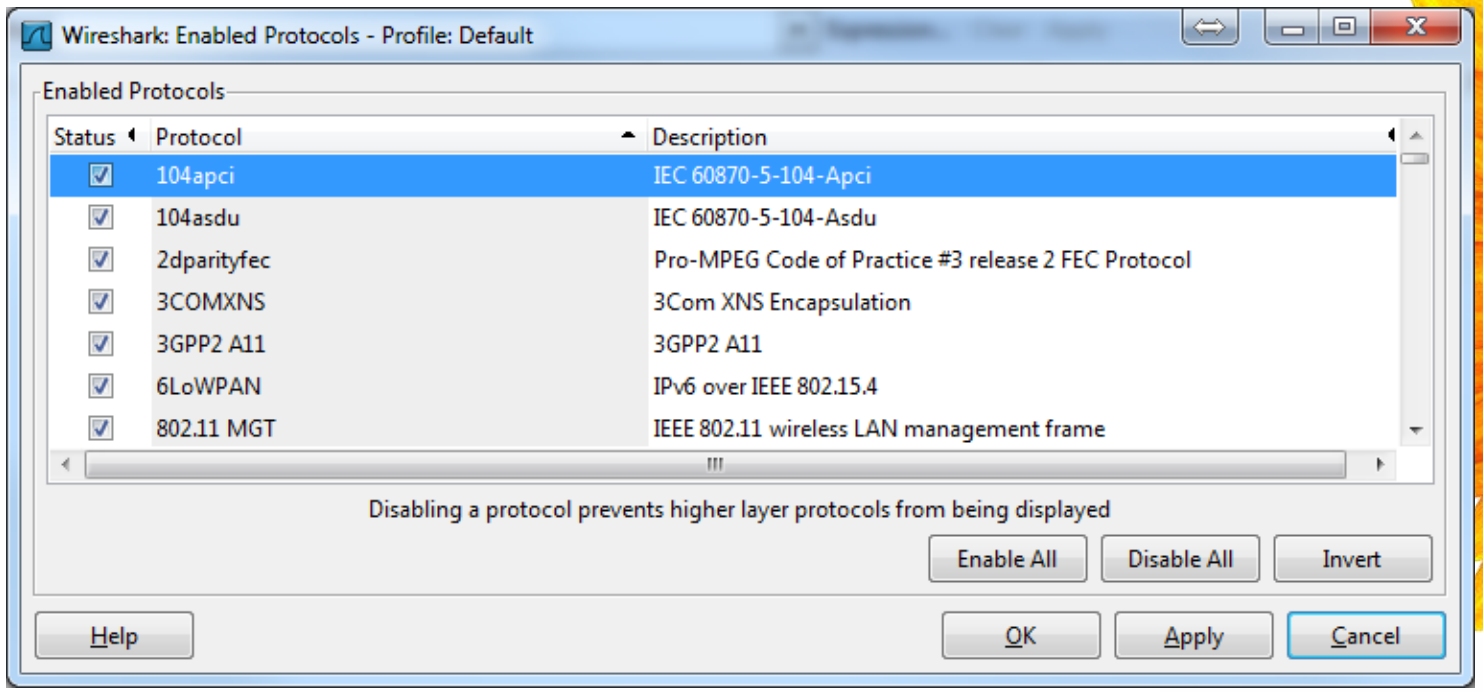
Contents

60870 Test Tools : Mitraware





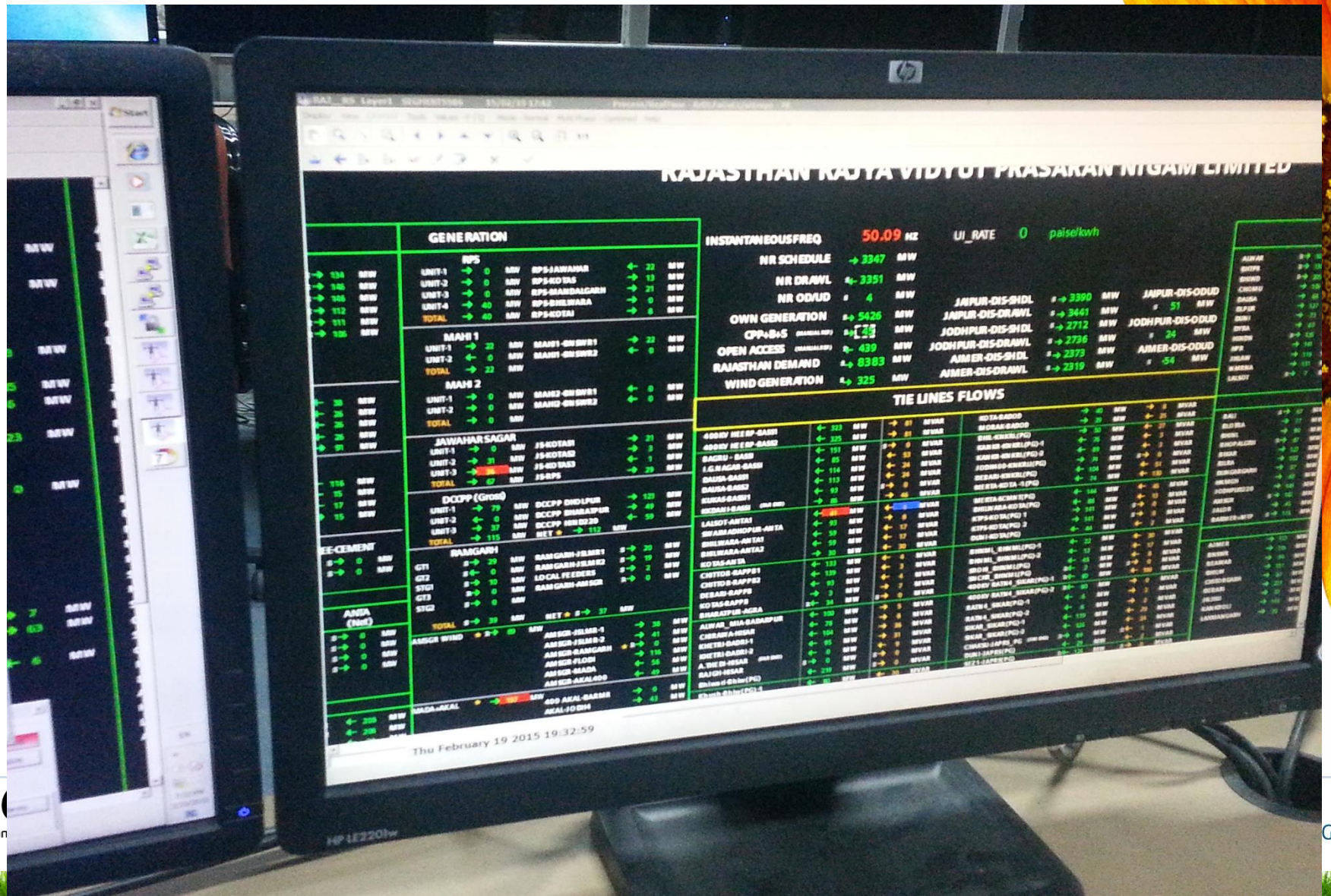
60870 Testing Tools : Wireshark



SLDC in TAMILNADU

SLDC (Chennai) – SS (Kanchi)

SLDC in RAJASTHAN
SCADA SCREEN

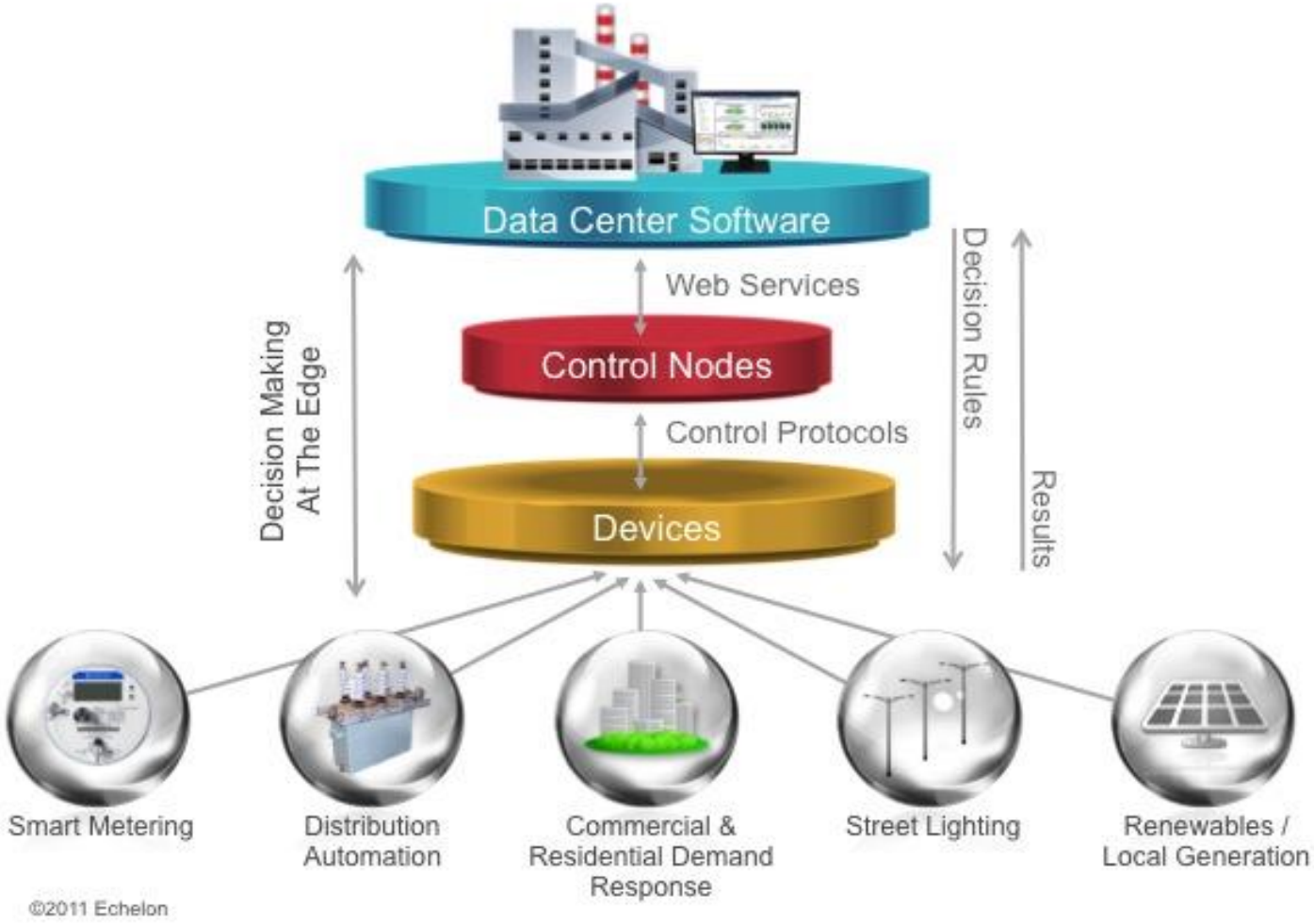


SLDC in RAJASTHAN
SCADA SCREEN

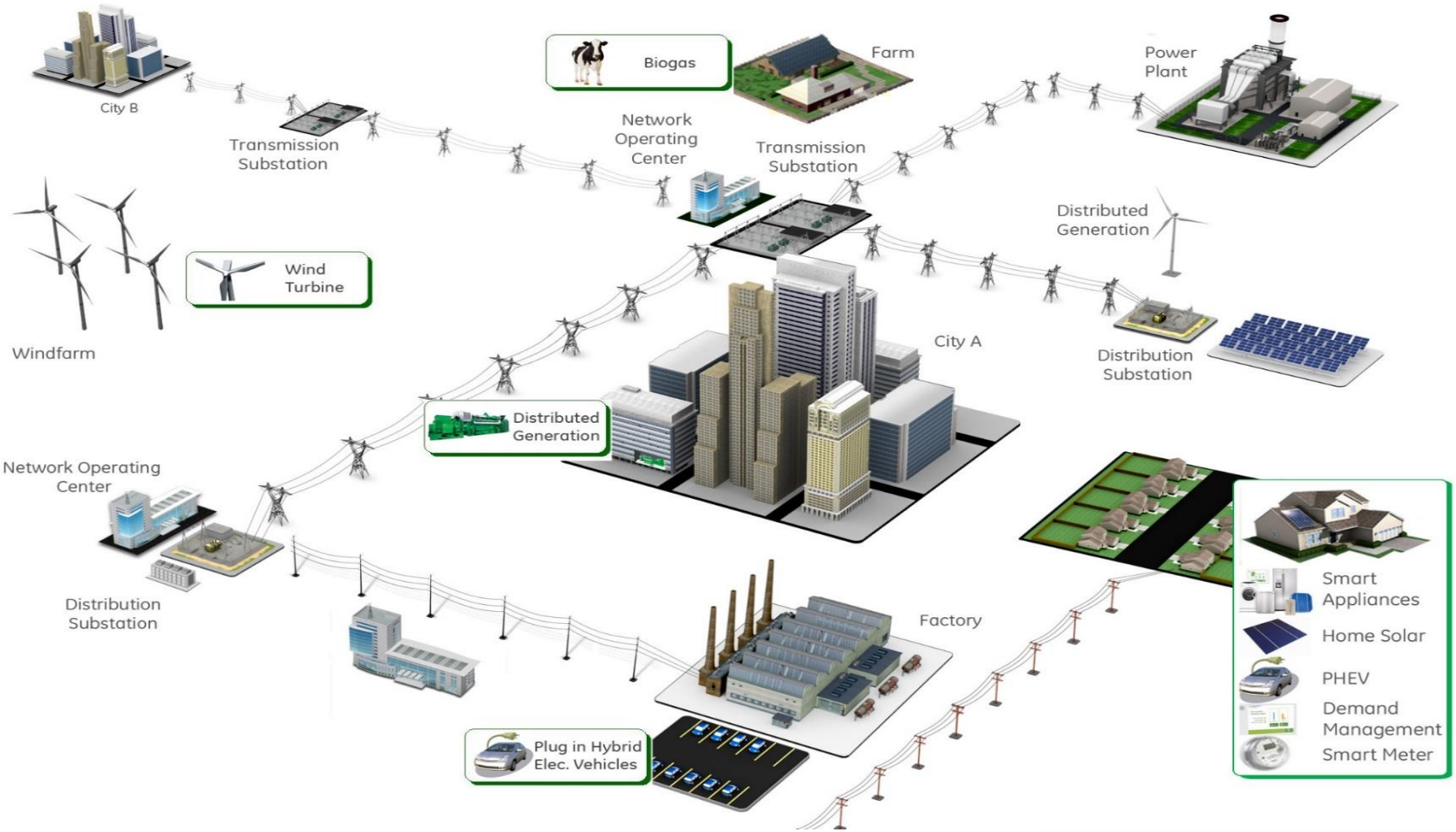
4 Messages

- Post Carbon Society is the F U T U R E !!!!
- iPLON is focusing in this domain
- Chennai, Coimabatore are good places to start
- Baden Würtemberg and TN fit well !!

Smart Grid Energy Control Network



Post Carbon City



Time to start

	TN	Germany
Issues /Challenges in Grid stability	Issues /Challenges in Grid stability	Issues /Challenges in Grid stability
Methodology for solutions	??	Methodology for solutions
Solutions (Products +Services)	??	Solutions (Products +Services)
“lessons learnt”	??	“lessons learnt”

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KFW DEG

Solar Cluster Baden-Württemberg

Smart Grid Baden-Württemberg

alliander

AVAT AUTOMATION

BOSCH

bridging IT
Menschen Methoden Lösungen

AIRBUS DEFENCE & SPACE

ids

Dr. Langniß
ENERGIE & ANALYSE

EIFER
EUROPEAN INSTITUTE FOR ENERGY RESEARCH

bbh

Fraunhofer ISE

FICHTNER

KIT
Karlsruher Institut für Technologie

PATIT - PATents for IT

hsag Heidelberger Services AG

FZI

Hochschule Offenburg
offenburg.university

seven2one

mpc

VENIOS
Vereinigt IT und Energie

NEXT KRAFTWERKE

schäffler sinnogy
innovation energy

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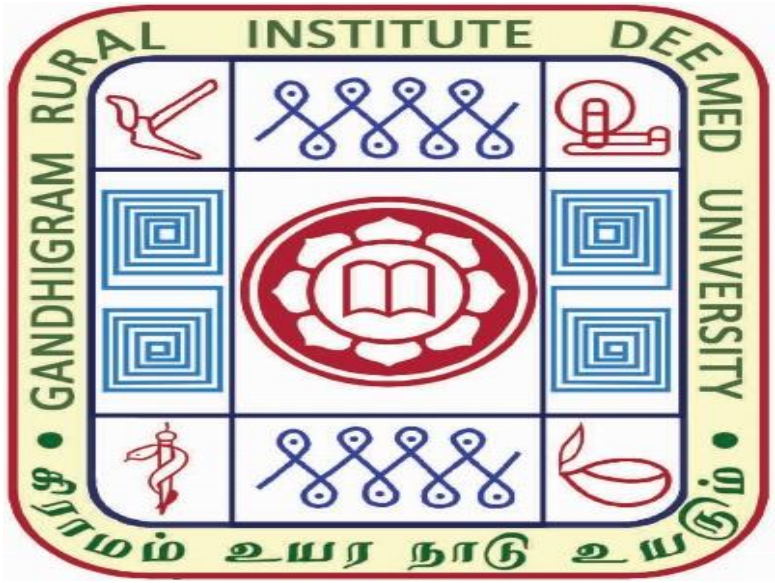
Thank You!

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

Stadtwerke Gandhigram: A model for a Smart University



Lumine Divya A
iPLON India Pvt Ltd.,

iPLON®
The Infranet Company

Emi??

Ent??

Was??

What?

Enna??

Kya??

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

- Multi Utility Company
  - Renewable Energy Resources
  - Water supply
  - Waste Management
  - E-Mobility

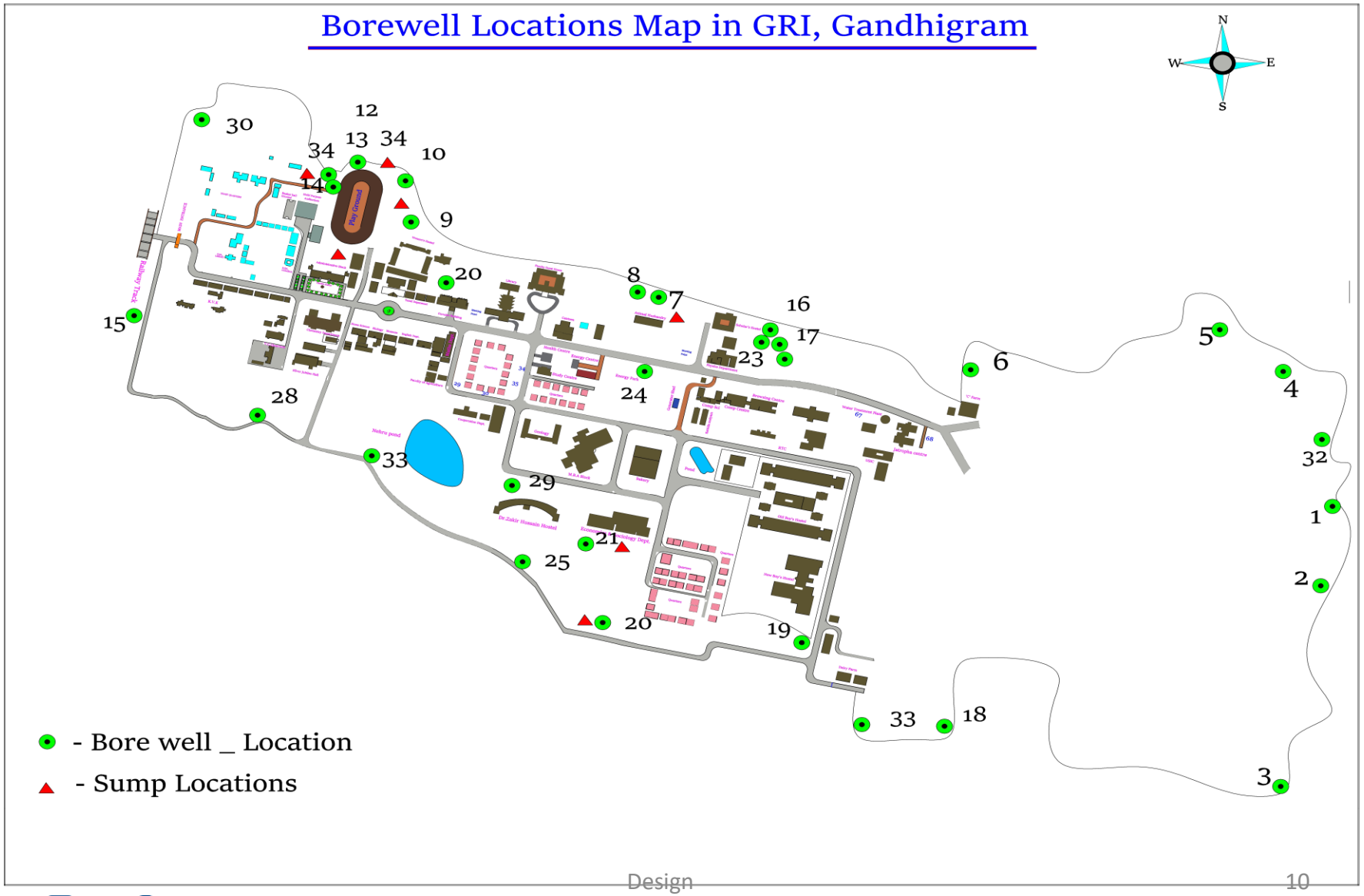

iPLON®
The Infranet Company
Wind Farm
Hydropower
Grid
Smart Company
Biogas
Electromobility
Smart Farm
Smart Comunity
Solar Farm
Smart Grid
• Solar Farm
• Wind Farm
• Biogas
• Hydropower
• Smart Comunity
• Smart Company
• Smart Farm
• Electromobility

1 MW Solar Power Plant


KENDRIYA VIDYALAYA GADDEDEVU

Water Management

Water Management




TANK-B
Sintex
TANK-A
Sintex

- No of borewells : 35
- Requirement : 4 lakh lit/day
- Amount pumped : 3 lakh lit/day
- Hostel : 1 lakh lit/day
- Depth of borewell : 1200m depth
- RO plant capacity : 16,000 litres

Waste Management

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
- Used to collect nearly 150 – 200 kg/Day
- Slurry is used for growing energy crops
- CO_2 offset level: 86,232 to 95,813 kg/year

E-Mobility

Solar Powered Passenger Autorickshaw

- Grid charge (optional) = 220V AC 50Hz
- Output = 30-50V at 20A
- Solar PV module = 12V DC/50W
- Maximum watts = 746 W
- Per charge = 2 units of electricity
- Per kilometer = 10 paisa

E-Bus


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


VEHICLE FOR THE DIFFERENTLY ABLED
SPEEDWAYS ELECTRIC

iPLON®
The Infranet Company

E-bus

- 230V AC is given to the converter circuit of 72V & 185Ah to obtain DC voltage.
- 6V batteries are connected in series to obtain 72 Volts.
- The AC induction motor of 7.5kW with 72V & 400A is used to power up the E-bus

Endhinu??

Enduku??

Warum??

Why?

Kyun??

En??

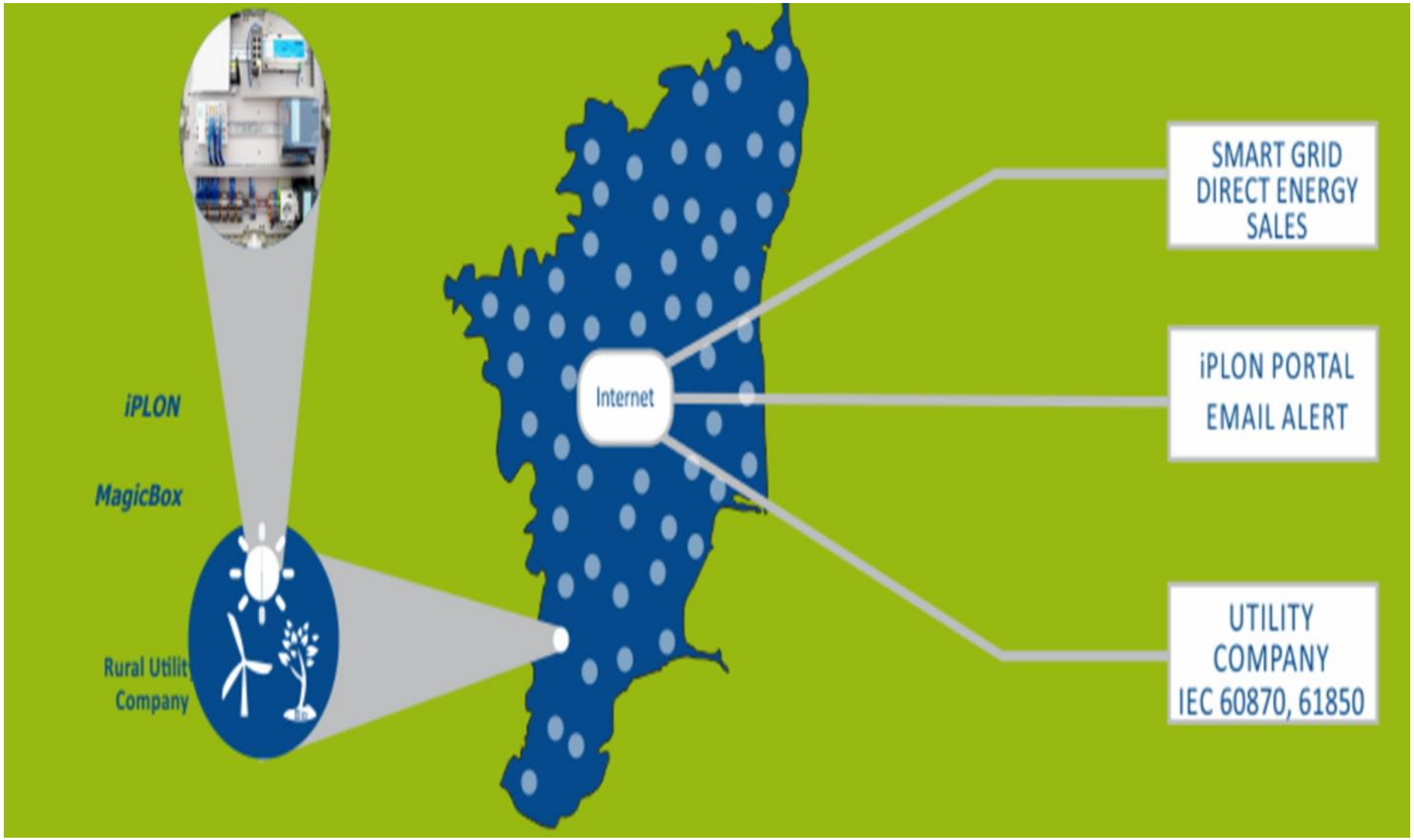
Mission of Gandhigram

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

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

Rural Utility Company



- Because it supports creation of high quality rural jobs
- Makes use of clean and renewable energy
- Leads to Smart Cities but Smarter VILLAGES
- Basic utilities for all (Energy and Water)
- Focusses on Decentralization leading to transparency and independence

Wie??

Elae??

Kaise??

How?

Engina??

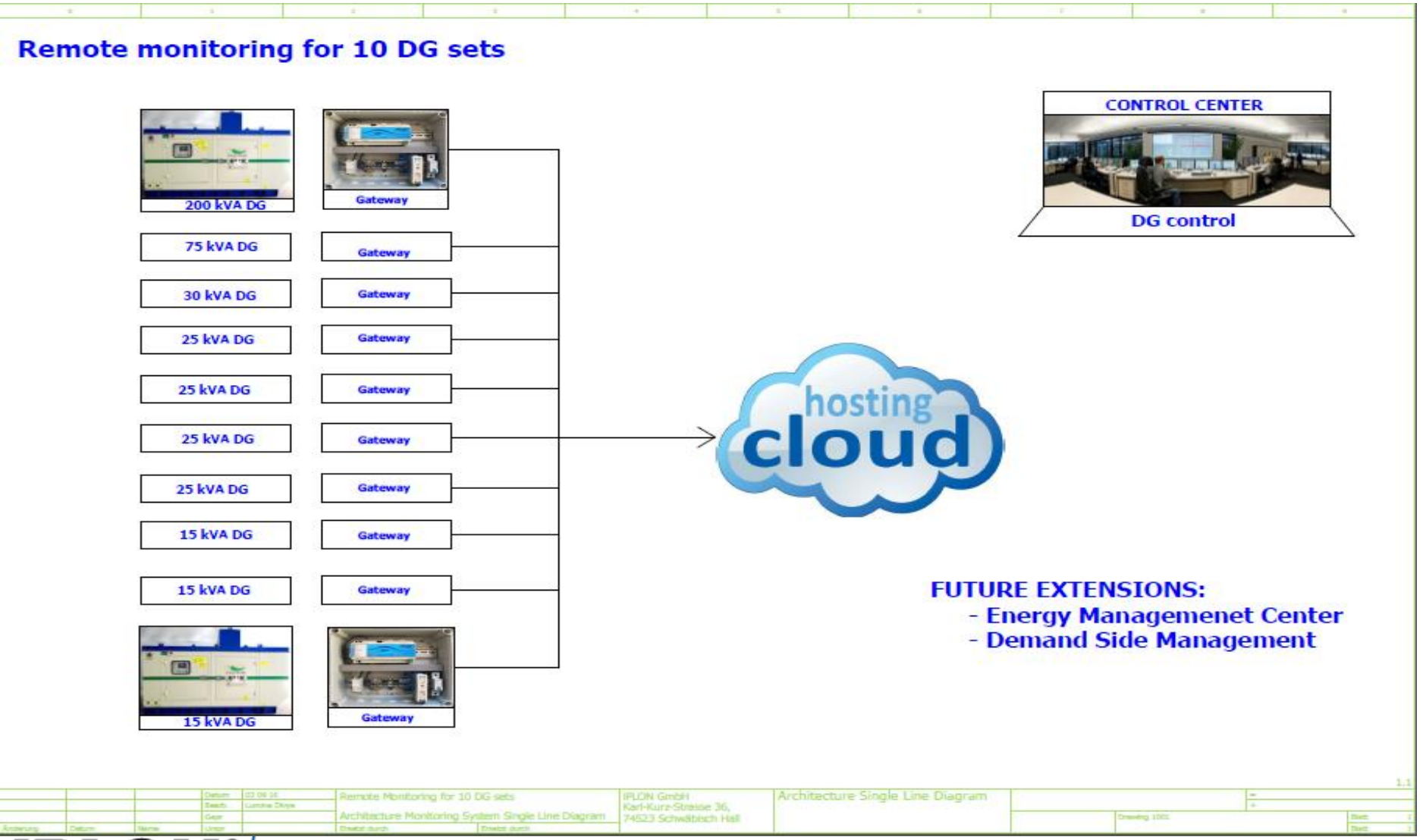
Eppadi??

City Association: Schwaebisch Hall and Dindigal (?)

SchwäbischHall

- Innovation through Co-operation
- Encouraging Entrepreneurship and SMEs
- Association with Industry
- Knowledge Transfer Smart city Schwaebisch Hall – Smart Village Gandhigram
- Partnership with German Universities and Smart grid & RE communities
- Student Exchange Program and Internships

Smart Control Systems



Yaar?

Aar?

Who?

Evaru?

Yaar?

Wer?

- Students from the University across departments
- PhD scholars, Professors and staff (Think-Tank)
- iPLON and its network (SME in Germany and India)
- Stadtwerke Schwaebisch Hall (one of the best in the world)
- A people’s movement (Gandhiji’s way!!)

Students from Gandhigram

- Project Management
- Electrical CAD Designing
- Marketing & Networking

- Stadtwerke Gandhigram
- Training and Workshops
- Whitepapers

- Organizational structure
- Bitrix24
- Whitepaper

- Technical Sales
- Forecasting
- BricsCAD

- Performance Analysis
- O&M of solar plants

- Embedded Systems
- Cloud Based Central Monitoring System

- Operation and Maintenance
- Testing

Memorandum of Understanding

Training and Workshops

August 15, 2016

Independence Day

iPLON®
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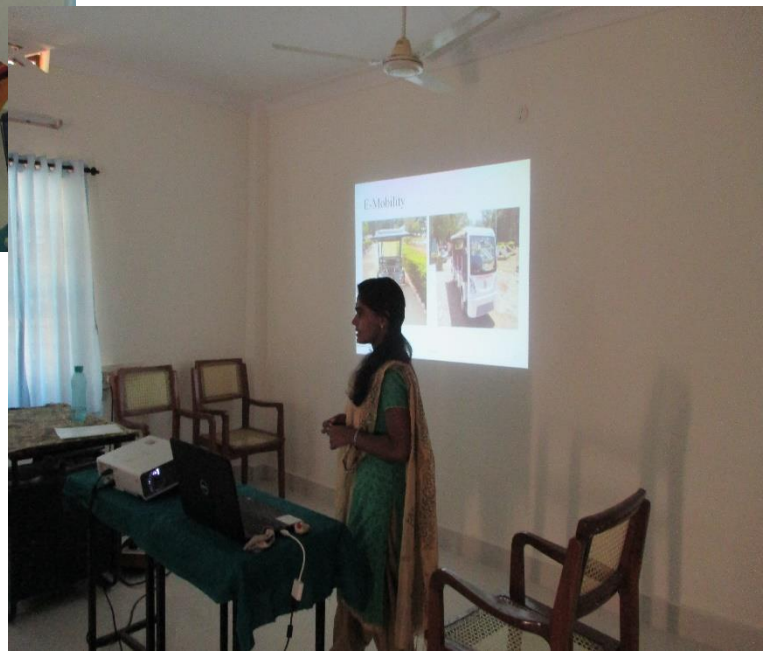
October 2, 2016



Gandhi Jayanthi

iPLON®
The Infranet Company

Next Steps

- DG Control System: 1st Assessment Done!
- 1MW PV plant site survey: Amplus Solar
- 18th October workshop: Prof Kirubakaran
- Promoting Stadtwerke Gandhigram in Germany and RE exhibitions
- November 2016 and February 2017 workshops
- M.S Projects (1st and 2nd year) – new technologies
- Stadtwerke Gandhigram Mission, Vision, Goals etc.: Student Ideas required!
- January 26th (Republic Day Deliverables)

Next Steps

- Association with German Industries working in the smart grid domain (Karlsruhe Institute of Technology and Freiburg University)
- Student Exchange Program
- Internships and Projects with iPLON partner companies and Stadtwerke Schwabisch Hall
- Joint projects between different departments for developing solutions for Renewable Energy and Smart Grid
- Technical Projects in the areas of monitoring, control, data analytics and forecasting

Thank You!

www.iplon.de

www.youtube.com/user/iPLONChannel

iPLON mantra– “Smart Grids”