



The role of new technologies /digitalization for end-use data collection.

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- Broad Framework of Data Collection, Processing & Dissemination
- Role of Digital Technology
- New age Digital Technologies
- Policies in India for digitization
- Use Case for Data enabled Policies & Actions
- India Initiatives – Some Examples
- Challenges
- Policy actions & Way Forward

Broad Framework to Data Collection, Processing & Dissemination

- **Data Collection**

- ☐ Cost & resource intensive process
 - what is actually required, should only be collected
- ☐ Augmentation of existing data to address gaps
 - plan new surveys and avoid duplication,

- **Data Processing & Validation**

- ☐ Adopting best practices & quality assurance procedures
 - identify any discrepancy
 - check of consistency
- ☐ Comprehensive analysis of data for a meaningful conclusion

- **Data Dissemination**

- ☐ Availability to everyone on an impartial basis.
 - accurate, up-to-date and comprehensive in nature
 - periodicity, affordability, free to download.
- ☐ Confidentiality to be protected

Data Collection

- Less resource intensive
- Consistency
- Diversity
- Quality
- Error-free



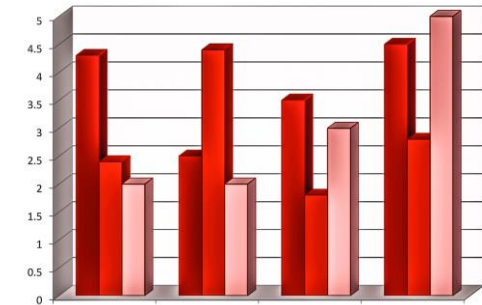
Data Processing

- Faster & efficient
- Deep analysis
- Cross sectoral analysis
- Sensitivity analysis
- Forecasting / Time –series analysis



Data Dissemination

- Web access
- Easy to download/export
- Real time information
- Enhanced visualization
- Reach to every citizen
- Wide data dissemination



• General Technologies

- **Interview** - Computer-Aided Interview
- **Survey** - Web based, Telephonic, Interactive Voice Recording (IVR)
- **Web data extraction** - scraper, crawler
- **Geo tagging** – GPS, GIS
- **User behavior tracking** - Web based, GPS
- **Real time monitoring** – On-site infrastructure

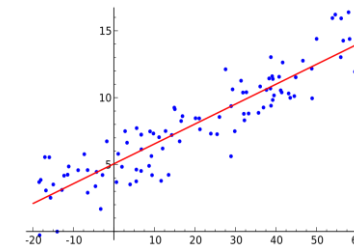
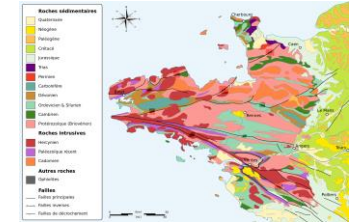
• Energy specific

- **Real time monitoring**
 - Smart meter with NILM algorithm
 - Smart thermostat , Smart plug, smart home appliances
 - Sensors (Wireless, IoT etc.)
 - Gateway (GSM, GPRS etc.)
- **LiDAR** (e.g. - to estimate solar potential in a place)



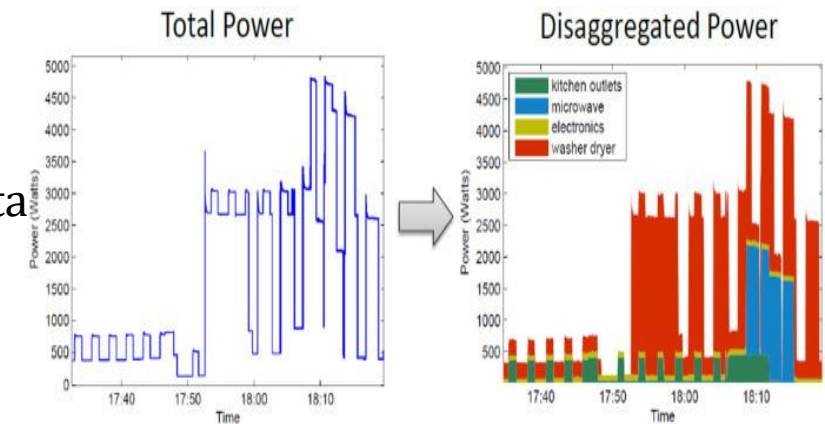
• General Technologies

- *Optical Character Recognition (OCR)*
- *Microsoft Excel* - COUNTIFS, VLOOKUP
- *Programming language* - R, Python
- *Analytics & Visualization* - Tableau, Qlikview
- *Algorithms and artificial intelligence*
- *Simulation Tools*



• Energy specific

- *Algorithms and artificial intelligence* - NILM
- *Programming for Automation (e.g. Python* – live weather data extraction)
- *Simulation* – GIS based model,
- *Building Management System*-BIM, BEMS/HEMS
- *Utility EMS* - DR capabilities



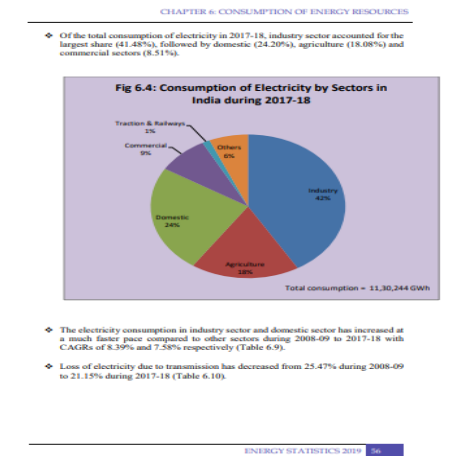
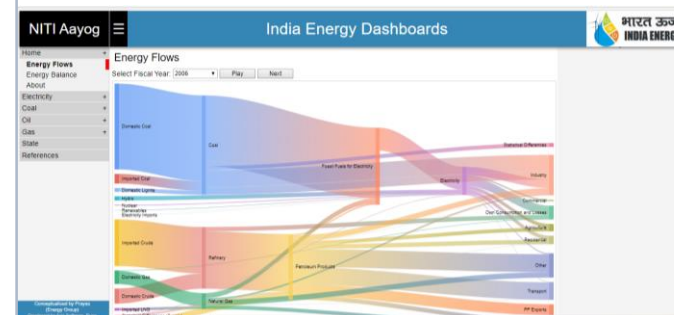
sources : A review disaggregation method in Non-intrusive Appliance Load Monitoring, Wikipedia,& LBNL

Data Dissemination

- Infographics
- Excel/PDF files
- Web portals
- Mobile Applications
- Visualization tools (Tableau)



	A	B	C	D
1	City	Country	Number	
2	Amsterdam	Netherlands	812	
3	Athens	Greece	355	
4	Auckland	New Zealand	919	
5	Bangkok	Thailand	72	
6	Barcelona	Spain	529	
7	Beijing	China	274	
8	Berlin	Germany	608	
9	Bogotá	Colombia	355	
10	Bratislava	Slovakia	699	
11	Brussels	Belgium	91	
12				



Policy Drivers /Opportunities for Digital Technologies

Digital India

- Centre of Excellence for IoT
- Cyber Swachhta Kendra
- Geographic Information System (GIS)
- Creating a skilled workforce on digital technologies under DDU-GKY

National Smart Grid Mission

- Advanced Metering Infrastructure (AMI) for two way communication
- 17 (12 pilot) smart grid projects sanctioned

Ujwal DISCOM Assurance Yojana (UDAY)

- Target to install smart meters for consumers with monthly consumption >200 unit by Dec'19
- Target to reduce AT&C losses to 15% by 2019

Smart Meter National Program

- Target to replace 25 crore conventional meters with smart meters

Use Case for Data enabled Policies & Actions

- Citizen-centric policy making
- Impact assessment of existing policies
- Data driven governance
- Crime Prediction & Prevention
- National Security interventions

Government



- Forecasting & Predictive modeling
- Security, Fraud prevention and Compliance

Businesses



- Awareness and engagement
- Citizen level services (Health, Education etc.)
- Preventive & Predictive maintenance
- Fault detection & diagnostics

Consumers



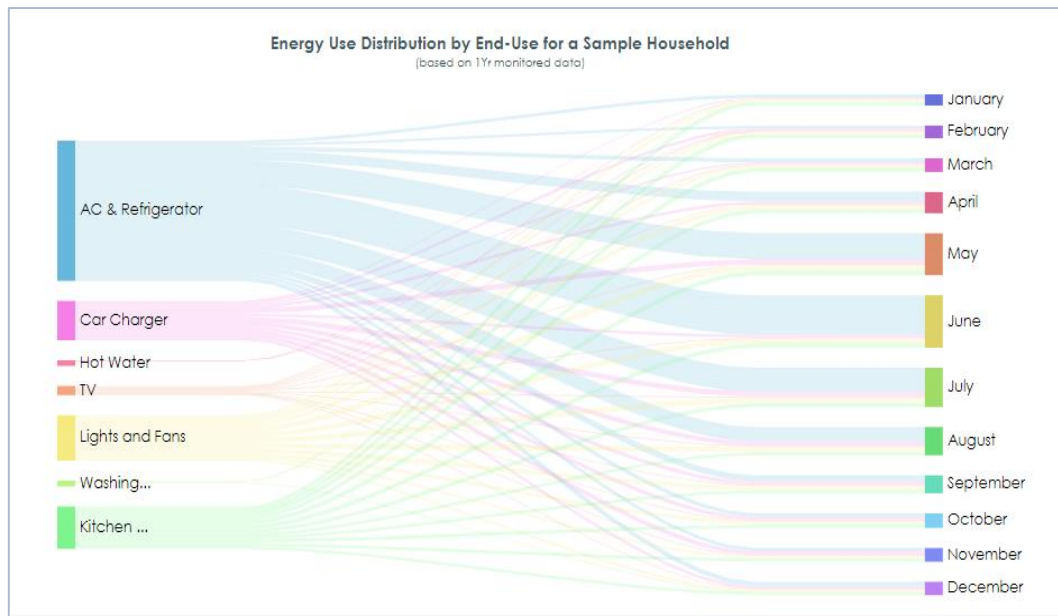
- Outage detection and prediction
- Failure probability modelling
- Dynamic load management
- Smart grid & theft detection
- Preventive maintenance
- Demand response

Utilities



Case Study 1: NEEM – National Energy End-use Monitoring Dashboard

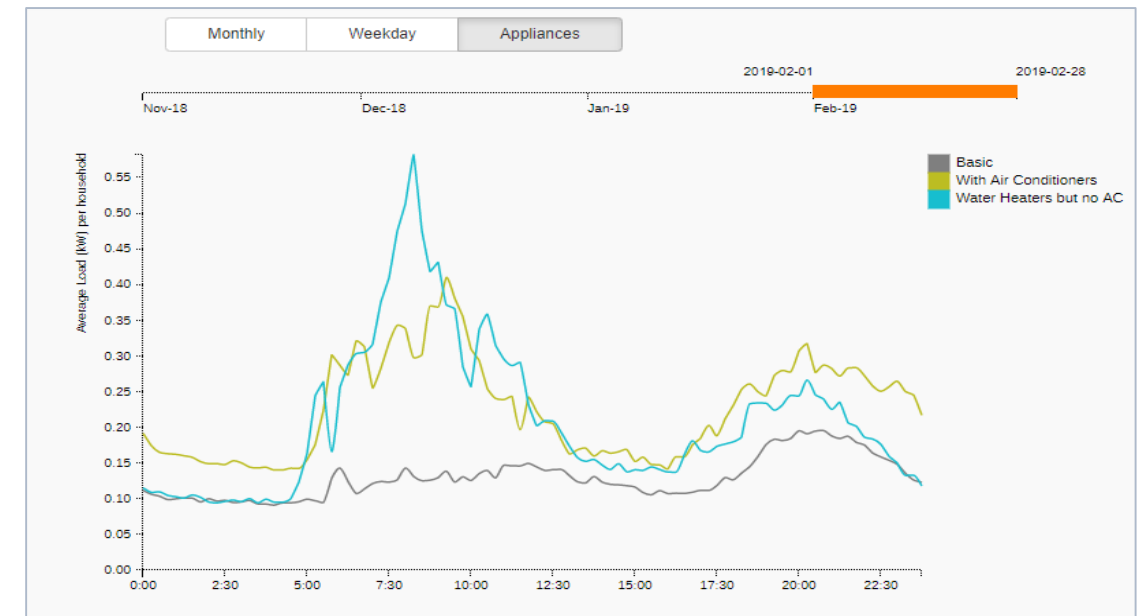
- IoT based building management system by Zenatix
- Key parameters monitored – Appliance ownership, annual usage hours, appliance age etc.



Source : NEEM Dashboard by EDS for CLASP and BEE

Case Study 2 : eMARC – Monitoring and Analysis of Residential Electricity Consumption

- energy monitor(eMARC) installed on Main line and Refrigerator/ AC,
- data transfer to cloud via GSM/GPRS
- Key parameters monitored –refrigerator load curve



Source : Prayas(Energy Group)

Weblink: <http://emarc.watchyourpower.org/>

India Initiatives – India Energy Security Scenarios & Energy Dashboard



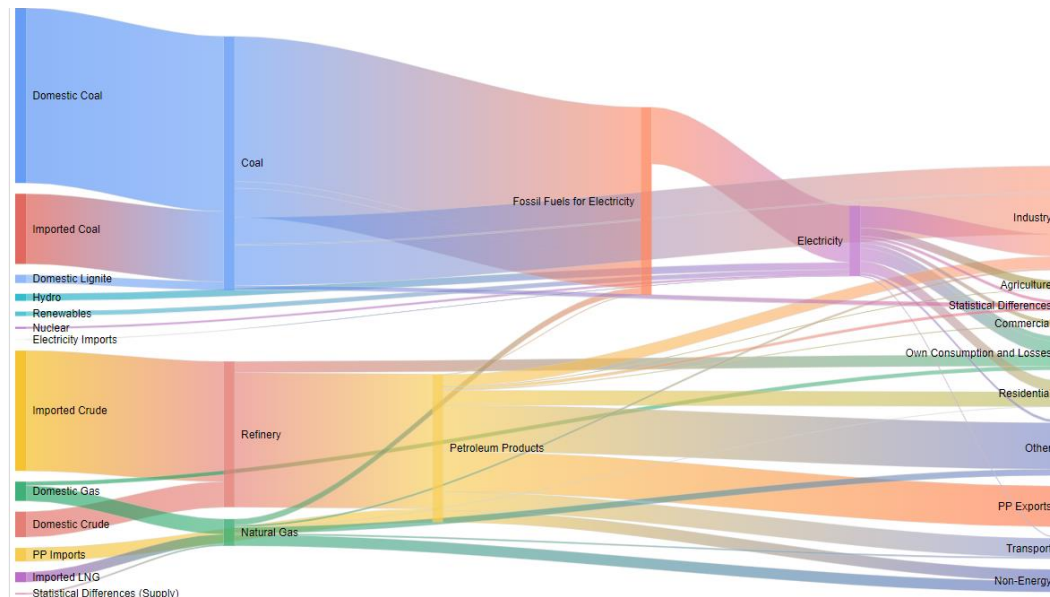
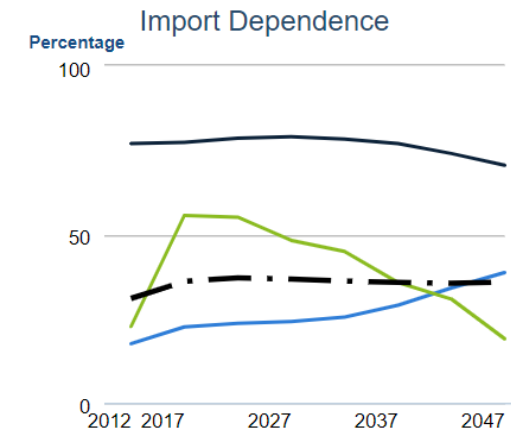
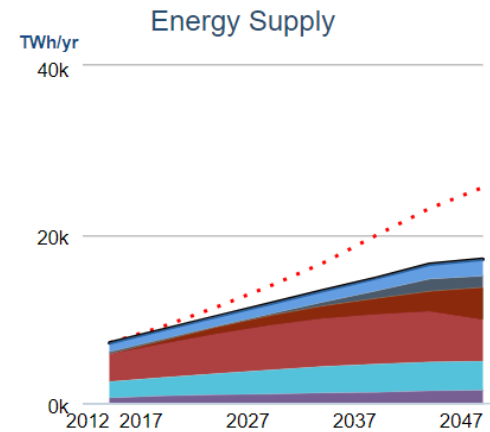
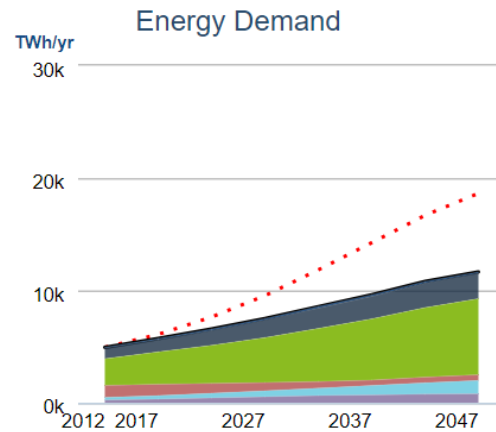
भारत ऊर्जा सुरक्षा परिदृश्य
INDIA ENERGY SECURITY SCENARIOS 2047

All Energy - Your Chosen Pathway

ALL ENERGY | ELECTRICITY | ENERGY SECURITY | ENERGY EMISSIONS | ENERGY FLOWS | LAND REQUIREMENT | GRID BALANCING | ENERGY COSTS | MY S

Explore

- Energy Demand & Supply
- Sector-wise Drilldown
- Compare 2012 and 2047



Industry
Commercial
Agriculture
Residential
Transport
Exports

India Energy
Security
Scenario
2047

*Energy scenario
building tool for
India.*

India
Energy
Dashboard

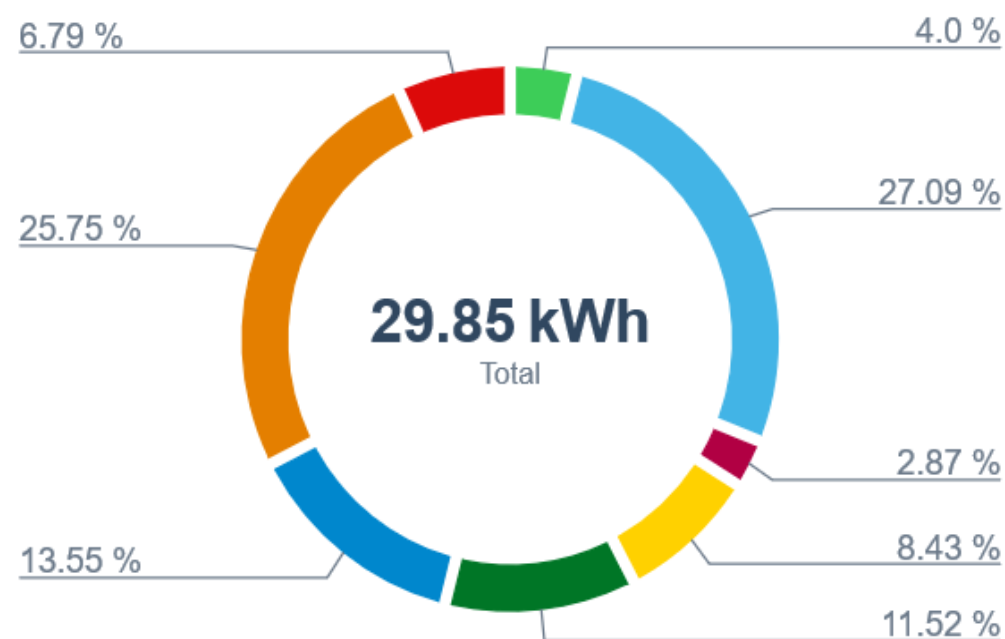
*Energy sector
dashboard for
India*

India Initiatives - Making Energy Visible

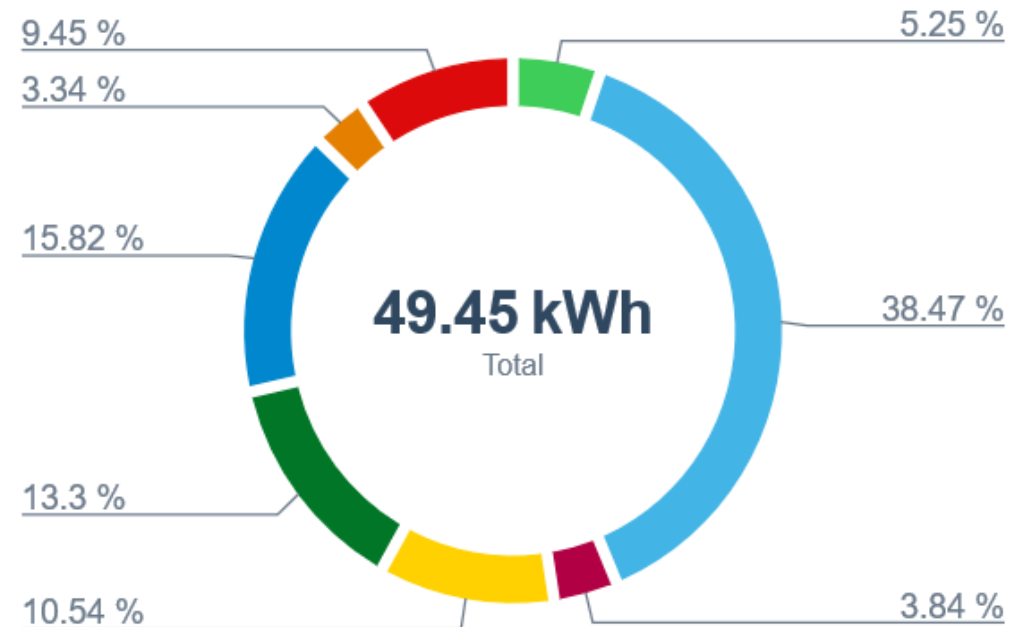
AEEE New Office in New Delhi – Setting a New Benchmark for Digital Energy Management

Energy analysis: Monthly / Weekly / Daily / Hourly insights

Trends: Power, Energy, PF, CO2, Temperature, Relative Humidity etc.



Energy This day



Energy Last day

AC Indoor AC Outdoor, fan, General Power, Lighting, UPS, Ventilation, WS Power,

Challenges to Digitalization for End Use Data

INTEGRATION of new-age digital technology with existing infrastructure is not easy

INVESTMENT will be huge to build a strong foundation of digital transformation in the country

CYBERSECURITY & DATA PRIVACY concerns are increasing with growing digitization

VOLUME OF DATA leads to increased demand of data centers and high energy consumption

BIG DATA HANDLING As digitization grows, handling big data will be a challenge in terms of storage, analytics, validation etc.

EMPLOYMENT Pertinent questions are raised on the impact of digitization on employment, nature of future jobs etc.

UNIQUE EXPERTISE & SKILLSET will be required to lead the digitization initiative

Policy Actions & Way Forward

Protection from cyber attacks and privacy risks

- Standard framework creation, designated agency for handling data, protection of consumer rights

Innovative business models

- Deep market penetration, for example – Pay As You Save model

Standard communication protocol

- Efficient data dissemination to each stakeholder involved.
- Interoperability.

Green data centers

- Avoid irrelevant data capture, reduce environment footprint of data centres

“User-friendly” data dissemination

- Standard format to compare data from different source, improved data access

Creating digitally literate workforce

- Skilled workforce for transforming job market



Thanks!

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