

# IPDS in Smart Cities

**New Delhi  
21<sup>st</sup> November 2015**

“Assured Electricity supply” is one of the identified pillars of “Smart City – Core Infrastructure” identified by the Smart City guidelines of Gol.

## Energy Management

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



# IPDS – A snapshot

- Scheme Cost: Rs 32,612 crore including budgetary support of Rs 25,354 crore
- Main Components
  - Strengthening of sub-transmission and distribution networks in the urban areas;
  - Metering of distribution transformers / feeders / consumers in the urban area.
  - IT enablement of distribution sector and strengthening of distribution network being under taken under R-APDRP (subsumed in IPDS).
  - Provisioning of Solar Panels on Govt. buildings
- Projects worth Rs 24,204 crore for 3,406 towns in 26 States/ UTs sanctioned (including In-principal sanction of Rs 19,072 crore for 3044 towns).
- States are in process of issuing NITs.

# RAPDRP (subsumed in IPDS) - Status

## Projects worth Rs 39,198 crore are under implementation

	Project Cost (Rs Cr)	Towns covered (No)	Towns 'Go-live'/ Completed	Remarks
<b>Part A (IT)</b>	5,427	1409	1090	IT enabled energy accounting / auditing system and customer care centre in towns with population > 30,000 (10,000 for Sp Cat states)
<b>Part A (SCADA)</b>	1,556	72	22 (only control Centre)	SCADA in town with population > 4 Lacs and Annual Energy Input > 350 MU
<b>Part B</b>	32,215	1258	282	Distribution strengthening and up-gradation Projects in towns with population > 30,000 (10,000 for Sp Cat states)
<b>Total</b>	<b>39,198</b>			

# Convergence of IPDS with Smart City Guidelines

## Assured Electricity supply

- Infrastructure upgrades of Sub-transmission and distribution networks: (Better aesthetics with aerial bunched cables, UG cables)

## At least 10% of smart city's energy requirements coming from Solar

- Rooftop Solar provision in IPDS; advisory of 7-10% of Rooftop Solar issued to States recently

## Smart metering, robust IT connectivity and Digitization

- AMR for feeders and DTs
- Smart metering / AMI in IPDS in SCADA towns
  - Reduction in losses; amenability to demand management
- IT enabling; Complaint management system
- GIS mapping of Electrical assets and consumers
- SCADA : Remote monitoring at feeder level; Bandwidth creation

## Energy efficient street lighting

## Outage management system

## 80% Green buildings

Not  
include  
d in  
IPDS

# Investment sanctioned in Smart Cities under IPDS

## Investment in 98 Smart Cities (in Rs Crore) as on 31.10.2015

	No. of Towns	Present Status	Amount Sanctioned	Amount Disbursed
Part A IT	82	49 (towns declared Go-live)	<u>2248</u>	1191
Part A SCADA	46	17 (Control centre commissioned)	<u>1090</u>	328
Part B	64	6 (towns completed)	<u>12906</u>	2085
<b>Sub total (R-APDRP)</b>			<b>16244</b>	<b>3604</b>
IPDS	76 *	(Circles approved containing Smart city)	<u>9516</u>	49
<b>Grand Total (IPDS incl. R-APDRP)</b>			<b>25760</b>	<b>3653</b>

\* IPDS Projects have been sanctioned circle wise which cover the Smart City town and Project cost indicated is the cost for entire circle.

# Smart Cities – Leveraging IPDS (RAPDRP)

- Under R-APDRP several building blocks of Smart Cities / Grids (GIS Maps, SCADA/DMS, Billing/CRM Systems, IT Networks including Data Centres) are being built.
- The digital assets of R-APDRP can be extended to other infrastructure domains at marginal cost.
- Strengthening and Up-gradation of Distribution networks being done under RAPDRP and sanctioned under IPDS to be used to transform into Smart City.

# Smart Cities – Leveraging IPDS (RAPDRP)

- RAPDRP created a basic backbone of Enterprise level Data center using IT Infrastructure and strong communication network up-to DT level which shall act as enablers for following Smart Grid interventions :
  - Peak load management;
    - Demand Side Management,
    - Time of Day
  - Renewable Energy integration;
  - Operational efficiency improvement;
    - Asset monitoring,
    - Smart Metering and AMI
    - Substation Automation;
  - Consumer service improvement;
    - Outage Management System,
    - Power Quality Management
    - Work force management.



# 24x7 Power Supply in Smart Cities

- Government of India is committed to facilitate 24x7 power supply for all by 2019
- Govt. of India have taken up a joint initiative with All States/UTs for preparation of State specific roadmap
- A web portal ([powerforall.co.in](http://powerforall.co.in)) has been created to capture the roll-out plans and progress to be updated online by States
- State specific roadmap includes:
  - ✓ Estimation of demand and supply
  - ✓ Generation Plan
  - ✓ Transmission Plan
  - ✓ Distribution Plan
  - ✓ Renewable Energy Plan
  - ✓ Energy Efficiency Plan
  - ✓ Financial Sustainability Plan
  - ✓ Capacity Building

- **Standards and Labels:** 19 appliances with 4 mandatory (tubular fluorescent lamp, room air conditioner, frost free refrigerator, distribution transformers )
- **Energy Conservation Building Code :** 8 states have notified, 15 are under process of notification. Design guidelines for energy efficient multi-storey residential buildings already developed.
- **Energy Consumption norms for energy intensive industries**
  - ✓ Perform, Achieve and Trade (PAT)
- **Energy Efficient LED lighting by M/s EESL:**
  - ✓ Replacement of 90 lakh street lights will be covered in 114 cities that will result in annual savings of 2400 million kWh by 2016.
  - ✓ Replacement of 20 crore conventional bulbs with LED bulbs in 151 cities that will result in annual savings of 6332 million kWh by 2016.

# National Smart Grid Mission (NSGM)

- National Smart Grid Mission (NSGM) launched.
- NSGM to plan and monitor implementation of policies and programmes related to Smart Grid activities in India.
- Outlay for 12<sup>th</sup> Plan: Rs 980 crore with a budgetary support of Rs 338 crore.
- Seven states / UTs (UP, WB, Haryana, Rajasthan, Goa, Tamil Nadu and Chandigarh) have submitted the DPRs under NSGM.



- Indicative list of NSGM support activities for Smart Grid projects:
  - Assistance in formulation of projects, financing models etc.
  - Financial assistance up-to 30% of project cost.
  - Training and Capacity Building
  - Technology selection guidelines and best practices
  - Facilitate Consumer Awareness initiatives
  - Project Appraisal post implementation.

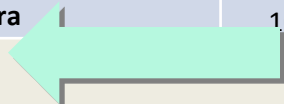
- State Governments / DISCOMs have the primary role in distribution of electricity.
- “24X7 power supply” is the joint effort of States and Centre.
- Projects under IPDS and NSGM are proposed by States.
- Projects on cost sharing basis between States and Centre.
- Implementing Agencies are advised to give priority to Smart Cities.

**Thank You**

# R-APDRP Investment in Smart Cities (1/2)

Amount in Rs Crore)

		Part-A IT			Part-A SCADA			Part-B			Total R-APDRP	
State/ UTs	No. of Smart Cities	No. of Towns	Sanction	Disb	No. of Towns	Sanction	Disb	No. of Towns	Sanction	Disb	Sanction	Disb
Andaman & Nicobar Is	1	0	0	0	0	0	0	0	0	0	0	0
Andhra Pradesh	3	3	70	39	1	10	3	2	38	6	118	48
Arunachal Pradesh	1	1	3	1	0	0	0	0	0	0	3	1
Assam	1	1	79	50	1	22	7	1	228	68	328	125
Bihar	3	3	15	4	0	0	0	2	117	18	132	22
Chandigarh	1	0	0	0	0	0	0	0	0	0	0	0
Chhatisgarh	2	2	57	43	1	25	8	2	253	38	336	89
Daman & Diu	1	0	0	0	0	0	0	0	0	0	0	0
Dadra & Nagar Haveli	1	0	0	0	0	0	0	0	0	0	0	0
Delhi	1	0	0	0	0	0	0	0	0	0	0	0
Goa	1	1	79	22	0	0	0	0	0	0	79	22
Gujarat	6	5	119	74	4	101	30	5	439	56	659	160
Haryana	2	2	18	11	1	24	7	2	214	0	256	18
Himachal Pradesh	1	1	3	1	0	0	0	1	10	3	13	4
Jharkhand	1	1	71	42	1	30	0	1	397	0	498	42
Karnataka	6	6	43	20	0	0	0	2	95	36	138	56
Kerala	1	1	52	16	1	30	9	1	208	31	290	56
Lakshadweep	1	0	0	0	0	0	0	0	0	0	0	0
Madhya Pradesh	7	7	176	118	5	103	31	7	1162	174	1441	323
Maharashtra	10	8	203	124	5	90	39	6	1426	254	1719	417



# R-APDRP Investment in Smart Cities (2/2)

Amount in Rs Crore)

State/ UTs	No. of Smart Cities	Part-A IT			Part-A SCADA			Part-B			Total R-APDRP	
		No. of Towns	Sanction	Disb	No. of Towns	Sanction	Disb	No. of Towns	Sanction	Disb	Sanction	Disb
Manipur	1	1	25	7	0	0	0	1	181	66	205	73
Meghalaya	1	1	25	8	0	0	0	1	73	22	98	30
Mizoram	1	1	25	8	0	0	0	1	157	47	182	55
Nagaland	1	1	4	1	0	0	0	0	0	0	4	1
Odisha	2	1	71	21	1	14	4	1	117	18	202	43
Puducherry	1	0	0	0	0	0	0	0	0	0	0	0
Punjab	3	3	94	51	3	52	16	3	857	129	1004	196
Rajasthan	4	4	136	73	3	94	28	4	470	59	700	160
Sikkim	1	1	0	0	0	0	0	0	0	0	0	0
Tamil Nadu	12	12	285	85	7	182	55	5	1648	388	2115	528
Telangana	2	2	156	93	2	78	23	2	977	147	1210	263
Tripura	1	0	21	6	0	0	0	1	56	35	77	41
Uttar Pradesh**	12	10	343	241	9	219	63	10	3553	426	4115	730
Uttarakhand	1	1	72	30	1	17	5	1	191	57	280	92
West Bengal	4	2	4	2	0	0	0	2	40	6	44	8
<b>Total</b>	<b>98</b>	<b>82</b>	<b>2248</b>	<b>1191</b>	<b>46</b>	<b>1090</b>	<b>328</b>	<b>64</b>	<b>12906</b>	<b>2084</b>	<b>16244</b>	<b>3604</b>

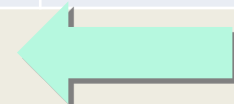
Note: Sanctions under Part-A (IT) & SCADA is for IT enablement and for distribution strengthening under Part-B.



# IPDS Investment in Smart Cities (1/2)

Amount in Rs Crore)

Name of State/UT	No. of Smart Cities	Corresponding circles under IPDS	Approved Project Cost
Andaman & Nicobar Islands	1	0	0
Andhra Pradesh	3	3	221
Arunachal Pradesh	1	1	66
Assam	1	1	103
Bihar	3	3	271
Chandigarh	1	0	0
Chhatisgarh	2	2	165
Daman & Diu	1	0	0
Dadra & Nagar Haveli	1	0	0
Delhi	1	1	318
Goa	1	1	32
Gujarat	6	5	582
Haryana	2	1	108
Himachal Pradesh	1	1	14
Jharkhand	1	1	106
Karnataka	6	6	339
Kerala	1	0	0
Lakshadweep	1	0	0



# IPDS Investment in Smart Cities (2/2)

Amount in Rs Crore)

Name of State/UT	No. of Smart Cities	Corresponding circles under IPDS	Approved Project Cost
Madhya Pradesh	7	7	763
Maharashtra	10	10	1143
Manipur	1	1	66
Meghalaya	1	0	0
Mizoram	1	0	0
Nagaland	1	1	44
Odisha	2	0	0
Puducherry	1	1	22
Punjab	3	1	54
Rajasthan	4	4	491
Sikkim	1	0	0
Tamil Nadu	12	11	684
Telangana	2	2	277
Tripura	1	1	4
Uttar Pradesh**	12	7	3000
Uttarakhand	1	1	31
West Bengal	4	3	611
<b>Total</b>	<b>98</b>	<b>76</b>	<b>9516</b>

Note: Cost of corresponding circles of smart cities are compiled



# Status of DPRs under NSGM

S.No.	Project Area	Nos. of Consumers	Status
1.	<b>Varanasi PuVVNL</b>	9,020 (24.48 Crs)	Draft DPR submitted to Utility on 12.10.15 by POWERGRID (AMI, PLM, DTMU, PQM, Echarging Infra)
2.	<b>Chandigarh CED</b>	7,600 (24 Crs)	Draft DPR submitted to Utility on 16.10.15 by POWERGRID (AMI, SAS, Integration of Roof Top Solar)
3.	<b>Kolkata WBSEDCL</b>	24,262 (34.97 Crs)	Draft DPR submitted to Utility on 17.10.15 by POWERGRID (AMI, DTMU, Integration of Roof Top solar)
4.	<b>Gurgaon DHBVN</b>	29,144 (52.41 Crs)	Draft DPR submitted to Utility on 15.10.15 by POWERGRID (AMI, DTMU, PLM, PQM)
5.	<b>Ajmer AVVNL</b>	22,546 (45.51 Crs)	Draft DPR submitted to Utility on 27.10.15 by POWERGRID (AMI, DTMU, OMS, PLM)
6.	<b>Goa GED</b>	22,974 (141.59 Crs)	Draft DPR submitted to Utility by ISGF (AMI, PLM, DTMU, SCADA/DMS, DA, Substation Modernization, ERP etc.)
7.	<b>Tiruvannamalai TNEB</b>	29,487 (117.55 Crs)	Draft DPR submitted to Utility by ISGF (AMI, PLM, MG, RE Integration, Energy Storage etc.)



# Benefits & Service Improvements in Go Live Towns



- **Loss reduction in Go Live Towns**
  - Utilities have started administrative interventions using diagnostic tool created under R-APDRP Part-A(IT) for reduction of AT&C Losses
  - AT&C Loss Improvements in 630 of 1090 Towns declared Go Live
  - Utilities are monitoring Billing Efficiency in High Loss Feeders in Go Live Towns
  - Billing Efficiency Improvement as reported in High loss feeders: 676/1465
- **Consumer facilities in GO Live Towns**
  - Majority of New Connections released through IT system.
  - New Connections Release as per SERC Timelines: 75%
  - 67% of Consumer Grievances are being resolved within SERC timelines through IT enabled customer care centers
  - Enlarged e-payment facilities through web portal, payment through credit cards etc.

# Estimated Cost

## ❖ **Assumptions**

- ❖ *Population ~10 lacs*
- ❖ *Consumer Base ~2 lacs (Single Phase -60% and Three Phase-40%)*

## ❖ **Tentative Cost for a Smart City (~ 382 Crore)-Greenfield**

- ❖ *AMI System incl MDAS,MDM & PLM – 161 Crore*
- ❖ *GIS Mapping- 10 Crore*
- ❖ *SCADA/DMS – 4.5 Crore*
- ❖ *Outage Management System- 129 Crore*
- ❖ *Control Centre HW & SW- 10 Crore*
- ❖ *Communication Infrastructure-28 Crore*
- ❖ *Street Light Automation System-40 Crore*

## ❖ **Estimated Project completion -3 Years from Sanction.**

- ❖ ***Tentative Cost for a Smart City (~ 334 Crore)-Brownfield  
(IT and SCADA implemented under RAPDRP)***
  - ❖ *AMI System incl PLM – 155 Crore*
  - ❖ *Outage Management System- 103 Crore*
  - ❖ *Control Centre HW & SW- 5 Crore*
  - ❖ *Communication Infrastructure-28 Crore*
  - ❖ *Street Light Automation System-40 Crore*
  - ❖ *Integration Cost -3 Crore*
  
- ❖ ***Estimated Project completion -30 Months from Sanction.***

- ❖ ***Tentative Cost for a Smart City (~ 369 Crore)-Brownfield  
(IT implemented under RAPDRP)***
  - ❖ *AMI System incl PLM – 155 Crore*
  - ❖ *Outage Management System- 103 Crore*
  - ❖ *Control Centre HW & SW- 5 Crore*
  - ❖ *Communication Infrastructure-28 Crore*
  - ❖ *Street Light Automation System-40 Crore*
  - ❖ *Integration Cost -3 Crore*
  
- ❖ ***Estimated Project completion -30 Months from Sanction.***