MINUTES OF THE FORTY FIFTH MEETING

OF

FORUM OF REGULATORS (FOR) HELD AT BANGALORE

Venue	**:**	**Conference Hall, Royal Orchid Hotel Bangalore (Karnataka).**
Dates	**:**	**29th - 31st January, 2015**
List of Participants	**:**	**At Annexure-I (enclosed).**

BUSINESS SESSION - I

Inaugural Session :

The 45th meeting of FOR commenced with Chairperson CERC/FOR welcoming Hon'ble Smt. Justice Ranjana Prakash Desai, Chairperson, Appellate Tribunal for Electricity (APTEL), New Delhi on this occasion.

(i) Welcome address, Chairperson CERC/FOR

In his welcome address, Chairperson, CERC/FOR expressed gratitude on behalf of the Members of the Forum, to Chairperson, APTEL for accepting the invitation to inaugurate and address the 45th meeting of the Forum of Regulators. He recalled the various reform measures that had taken place in the power sector in the past few years, leading inter alia to a generation capacity addition of 254 GW in the country. He also remarked that growth was phenomenal in the field of Renewable Energy, Short term market, Private

sector participation in generation and growth in transmission sector and all this was a result of concerted efforts of the Governments, Regulators, the Appellate Tribunal of Electricity and other courts of law.

Chairperson, CERC/FOR also highlighted the role of ERCs and the FOR in taking various initiatives in line with the mandate given in the Electricity Act, 2003 to streamline issues in Renewable Energy, MYT Regulations, TOD tariff etc. Chairperson, CERC/FOR detailed various reports/Model Regulations being brought out by FOR for the benefit of all stakeholders. He also mentioned that though the Forum does not have the power to enforce its decisions, these regulations serve as reference documents for the individual SERCs. In his concluding remarks, Chairperson, CERC/FOR highlighted the various challenges faced by all the ERCs including the CERC which included substantial build up of cases for resolution and limitation of staff.

(ii) Address of Hon'bleChairperson, ATE

Hon'bleChairperson, Appellate Tribunal for Electricity (ATE) in her address mentioned that it has been two months since she took over as Chairperson, ATE and it was a pleasure for her to inaugurate the meeting of Regulators. She stated that there is anxiety among various stakeholders regarding availability of power and this makes the role of Regulators vital. Accordingly, Tariff fixation, promotion of Renewable Energy, adjudication of disputes etc. have also assumed importance. She also emphasized the mandate given by the Electricity Act, 2003 to the Regulators to distance themselves from the Government and as the Act has transferred all such regulatory responsibilities to the Regulatory Commissions, which are quasi-judicial bodies.

Hon’ble Chairperson referred to the Supreme Court case in Maharashtra

Electricity Regulatory Commission Vs Reliance Energy Ltd., (2007) 8 SCC 381 wherein it was held that the Commission is empowered with wide powers. She also made reference to an important judgement by the Constitution Bench of Supreme Court in PTC India Ltd., wherein the Hon'ble Court held that the Regulations under Sections 178 & 181 have an overriding effect on existing contracts and also make it a statutory obligation on regulated entities to align their existing and future contracts with the Regulations. Another important decision by the Supreme Court was that as the Regulations under Section 178 were made under the authority of subordinate legislation, it could be tested only in judicial review proceedings before the Courts and not by way of appeal before the ATE. In a judgement of the Supreme Court in the case of Sai Renewable Power Pvt. Ltd., the Court recognised the functions of the Regulatory Commissions and remarked that these functions could hardly be assumed by any authority and Courts in exercise of their judicial discretion. Chairperson, ATE stated that the expertise of the Regulatory Commissions has also been recognised by the Supreme Court. However, she also highlighted that as the powers are wider, the responsibility to exercise such powers judiciously is also greater. Chairperson, ATE expressed confidence that the Regulators would take care of this aspect while exercising their powers.

Regarding speedy disposal of cases by the Commission, Chairperson, ATE made a reference to the Appellate Order in 2011 based on reference from the Secretary (Power), Government of India regarding non-determination of retail supply tariff by the State Commissions in time. In this matter, the ATE in its Order of 11.11.2011 had given directions to ensure timely tariff determination to be conducted on year to year basis as per the time frame specified in the Regulations. In as much as even the Suo Motu powers of the Commissions were recognized, she stressed that the directions of the ATE need to be meticulously followed. She also urged the Regulatory Commissions to

bring in more clarity and transparency in their orders while observing the principles of natural justice. On the Renewable Energy front, she expressed concern that the Renewable Purchase Obligation Regulations were not being enforced seriously and requested the State Commissions to act as per the requirement under the law and policies to ensure that the power generation from Renewable Energy sources is promoted. She stated that the task of the Regulatory Commissions is very onerous as they need to balance the claims of various stakeholders, utilities, consumers and Government agencies. She referred to the principles of Coherence, Creativity, Communication, Collaboration and Credibility as the "Five Cs" of sound a regulatory system as propounded by Sanford Berg, a distinguished Professor of the University of Florida. She requested the Commissions to discharge their duties by maintaining their independence and autonomy by learning from their experience and improving performances so that the Regulatory Commissions could carry out their mandate in a fair manner.

In her closing remarks, she stated that a brief reading of the orders of the Regulatory Commissions, judgements of the Tribunal and the Supreme Court cases indicate that the Regulatory framework is the backbone of the power sector and therefore the vision of the Regulators, their innovative skills and balancing of competing interests, with the focus on small consumers, would usher in an era of peace and cordial relationship between various stakeholders of the power sector which will ultimately lead to economic prosperity of the country.

(iii) Release of Compendium

Secretary, CERC briefed the delegates that nearly 40 reports and 9 model regulations have been brought out by FOR over a period of 10 years on various issues relating to loss reduction, MYT regulation, Open access, Tariffs etc.

FOR has since compiled all these Reports in 7 volumes to be used for ready reference.

Chairperson, ATE was pleased to release the 1st volume of the Compendium of FOR Reports, which ultimately comprisesix reports on Tariff. Copies of the Report in CD format were also distributed to all the Members present.

(iv) Vote of Thanks

Chairperson, KERC thanked the Chairperson, ATE for having found time out of her busy schedule to travel all the way and inaugurate the 45th FOR meeting at Bangalore. He also thanked the FOR for giving the Karnataka Electricity Regulatory Commission to host the meeting. He stated that the role of ERCs is unique;in that it has to balance the interests of competing stakeholders and in the process on occasions becomes unpopular with one or the other stakeholder. He referred to the FOR as the Forum where the regulators share their experiences on good practices, constraints faced, and evolve consensus on issues of importance facing the sector. He expressed gratitude to ATE for guiding, supporting and recognising the independence of Regulators by way of various judgements some of which were also upheld by the Supreme Court. This has helped the ERCs to ensure long term viability of utilities and protection of interest of consumers. In his concluding remarks, he reiterated that the FOR would follow the guidance given by Chair, ATE for the overall development of sector in its future deliberations and in the best interest of consumers.

BUSINESS SESSION - II

Before the commencement of the Business Session-II, the members

observed two minutes silence on the occasion of Martyrs' Day.

The 45th FOR meeting was chaired by Shri Gireesh B. Pradhan, Chairperson, Central Electricity Regulatory Commission (CERC) and Forum of Regulators (FOR). He extended a warm welcome to all members of the Forum.

AGENDA ITEM NO. 1 : CONFIRMATION OF THE MINUTES OF THE 44TH MEETING OF "FOR" HELD ON 01ST DECEMBER, 2014 AT INDIA HABITAT CENTRE (IHC), NEW DELHI.

The Forum noted and endorsed the minutes of the 44th Meeting of FOR held at India Habitat Centre (IHC), New Delhi held on 1st December, 2014.

AGENDA ITEM NO. 2 : PRESENTATION ON "ADOPTION OF SUITABLE MODEL BY THE STATES TO PROVIDE LED BULBS TO EACH HOUSEHOLD – ROLES AND RESPONSIBILITIES OF VARIOUS STAKEHOLDERS".

A presentation (**enclosed** as **Annexure-II**) on "**DSM Outsourcing Model and ECF through Public Benefits Charge"** was made by a representative from Bureau of Energy Efficiency (BEE). The presentation elaborated on different models used by States to provide LED bulbs to each household. As a consequence of the PMO directive which stated that 100 cities have to be covered in 2 years to provide street lighting and domestic lighting, BEE has undertaken various projects on energy efficiency & DSM. In order to encourage implementation, the projects provide incentives to implementing agencies such as providing LED bulbs at Rs.10 to household consumers,

providing free EE pumps for farmers, and maintenance - free LED street lights. Technical and financial risk mitigation measures have been incorporated for successful implementation of the programme.

BEE also highlighted the features of the PAT Scheme which is notified under the Energy Conservation Act, 2001. The PAT Scheme mandates issuance of Energy Saving Certificates (ESCerts) for per metric ton of oil equivalent of energy consumed to designated consumers in various industries. These EScerts would be issued in electronic form and traded through the Power Exchanges. The Scheme also envisages imposition of penalty for non compliance of various provision of Energy Conservation Act, 2001. BEE also detailed various time line for the PAT cycle.

After discussion, the following was agreed :-

- BEE should develop the draft manual on adjudication of disputes relating to energy efficiency and share with FOR Secretariat to help prepare the Model Regulations in this regard.
- It was informed the modalities of implementation of PAT Scheme are being worked upon by a CERC-BEE Committee and the Forum should apprised once this is finalized.

AGENDA ITEM NO. 3: PRESENTATION ON "REGULATORY APPROACHES AND BUSINESS MODELS FOR OFF-GRID ELECTRIFICATION".

A presentation (**enclosed** as **Annexure-III**) on "**Regulatory Approaches and Business Models for Off-Grid Electrification**" was made by Professor Ignacio Perez-Arriaga of Center for Energy and Environmental Policy Research (CEEPR), MIT, USA. The current scenario of Off-Grid in India was highlighted. He emphasized on the application of Mini Grid as bridge gap

solution till the grid reaches. The mini grids are advantageous in remote areas to provide sustainable, reliable electricity and cost effective electricity. In many cases, grid extension is often highly costly and unlikely to happen – even in the medium to long term. In these scenarios, mini - grids could provide an ideal intermediate solution, especially for small towns or large villages where enough electricity can be generated to power household use, as well as local businesses. When it is used in conjunction with renewable or hybrid systems, they can increase access to electricity, without undermining environmental factors. However, he was of the view that the Government should provide subsidy for mini grid to make it a viable option. He also briefed about one of the projects taken up in Vaishali district of Bihar.

The Forum appreciated the presentation.

AGENDA ITEM NO. 4 : PRESENTATION ON "DSM PROGRAMMES IN US – CALIFORNIA AND INDIA : ACTIVITIES TO IMPLEMENT FUTURE PLANS".

A presentation (**enclosed** as **Annexure-IV**) on **"DSM Programmes in US California and India: Activities to implement Future Plans"** was made by Dr. Jayant Sathaye, Founder, International Energy Studies Group, LBNL, USA.

He provided a glimpse of Demand Side Management (DSM) in USA. He stated that energy efficiency measure is the most cost effective form of energy. He emphasized that the major challenge for India's policy makers is to determine how best to provide the necessary energy for India's extraordinary

economic growth. The traditional approach has been to rely on increasing the supply of conventional energy resources, particularly coal, which accounts for nearly 70% of India's current energy consumption. Load management or rather peak power management is the only focus of DSM programs in Indian utilities. "Load shedding" is the main tool for load management across the utility in all States in India. DSM in its true sense is yet to be implemented in Indian power market. DSM involves steps taken by the customer on their meter to change and regulate the amount or timing of energy consumption. Power supply utilities may offer a variety of measures that can reduce energy consumption and consumer energy expenses. DSM is an important tool for enabling a more efficient use of available energy resources. He informed that already 12 States in India have approved DSM programs and 7 States have projects in pipeline to develop the same.

The Forum noted the presentation.

AGENDA ITEM NO. 5 : PRESENTATION ON "CONSUMER PARTICIPATION IN ELECTRICITY REGULATION : A STUDY OF FIVE STATES IN INDIA".

A presentation on **"Consumer Participation(CP) in Electricity Regulation : A Study of five States in India"** (**enclosed** as **Annexure-V**) was made by the representative of M/s Consumer Unity & Trust Society (CUTS), Jaipur (Rajasthan). CUTS in collaboration with World Bank conducted a study on assessing consumer involvement related issues in the States of Delhi, Haryana, Karnataka, Maharashtra and Rajasthan. Inputs were also taken from the ERCs to arrive at the findings. The study mainly focussed on the present

status in respect of consumer participation and highlighted inter alia the need for evolving supportive eco-system for consumer participation.

CUTS also shared international experiences on the same and provided brief guideline for improvement. The Forum noted the presentation.

Chairperson, CERC/FOR stated that the presentation has brought out several important aspects and therefore, the Forum could, in future convene a special meeting on related issues on Consumer protection.

BUSINESS SESSION - III

AGENDA ITEM NO. 6 : REFERENCE FROM MINISTRY OF POWER (MOP) – REGULATED TARIFF VS. COMPETITIVE TARIFF - PRESENTATION MADE BY ASSOCIATION OF POWER PRODUCERS (APP) TO FORUM OF REGULATORS (FOR) ON 01ST DECEMBER, 2014.

MOP in its letter dated 06th February, 2015 sought the views on the subject "**Regulated Tariff Vs. Competitive Tariff – Presentation made by Association of Power Producers (APP) to Forum of Regulators (FOR) on 1st December, 2014".**

The matter was taken up for discussion and the following was agreed :-

Issue No.1 : One time shift of all the stressed competitively bid projects and projects with capped tariffs to regulated tariff regime under Section 62.

Comments: "FOR" does not agree with the proposition that a one time "blanket" shift from Section 63 to Section 62 should be allowed to all competitively bid power projects. The Appropriate Commission takes a considered view based on the facts of each case and after duly considering provisions of the Act, PPAs, etc. It would also be pertinent to mention that cases involving "compensatory tariff" allowed by CERC and some State ERCs are sub-judice before the APTEL/Supreme Court/superior courts.

Issue No.2 : Tariff determination under Section 62 to continue.

Comments: "FOR" has already communicated its view in this regard earlier and reiterates that the power market in India has not matured to a level where competitive procurement could be mandated. Although competitive bidding is internationally accepted as more efficient, considering the current market situation in India, especially keeping in view the fuel shortage, both options of tariff determination – Sections 62 and 63 – should be continued for the present. APTEL has also held that Section 62 is the basic provision and cannot be done away with.

Issue No.3 : Combination of Section 62 & 63 based on fixed cost price discovery through competition.

Comments: It is understood that the Ministry of Power is reviewing the existing Bidding Guidelines and the Standard Bidding Document (SBD) issued under Section 63 of the Act. "FOR" would be able to take a view after going through the draft revised SBD.

AGENDA ITEM NO. 7 : AMENDMENTS TO ELECTRICITY ACT, 2003 – HIGHLIGHTS – "FOR" SECRETARIAT.

A presentation on **"Amendments to Electricity Act, 2003"** was made by Joint Chief (RA), CERC. He briefed the outline of the proposed amendment in Electricity Act, 2003. A copy of the presentation is **attached** as **Annexure–VI**.

Various issues were discussed. The earlier decisions of the Forum on some of the amendments proposed were highlighted. After discussion, the Forum felt that there are several aspects which have not been examined by the FOR in the past. It was decided to constitute a Working Group which could go into the proposed amendments in detail and submit a report to the Forum for final decision. Chairperson, CERC/FOR was authorised to constitute the Working Group at the earliest.

AGENDA ITEM NO. 8 : REFERENCE FROM DR. KIRIT SOMAIYA, M.P. – CHAIRMAN, STANDING COMMITTEE ON ENERGY ON "DOWNFALL / REDUCTION IN MARKET PRICES OF CRUDE OIL AND COAL".

A reference was received from Dr. Kirit Somaiya, Hon'ble MP & Chairman, Parliamentary Standing Committee on Energy on "Downfall / Reduction in Market Prices of Crude Oil and Coal". After discussion it was decided that the Working Group constituted for examination of the provisions of the proposed amendments in the Act could also examine this issue.

Chairperson, CERC thanked the Chairperson, Members and staff of the Karnataka State Regulatory Commission for their painstaking efforts to host the 45th meeting of FOR at Bangalore.He also thanked all the dignitaries present in the meeting. He also thanked the staff of FOR Secretariat for their efforts at organizing the meeting.

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/ ANNEXURE – I /

LIST OF PARTICIPANTS ATTENDED THE FORTY FIFTHMEETING OF

FORUM OF REGULATORS (FOR)

HELD DURING 29TH – 31ST JANUARY, 2015 AT BANGALORE

S. No.	NAME	ERC
01.	Shri Gireesh B. Pradhan Chairperson	CERC/FOR – in Chair.
02.	Shri Naba Kumar Das Chairperson	AERC
03.	Shri DigvijaiNath Chairperson	APSERC
04.	Shri Umesh Narayan Panjiar Chairperson	BERC
05.	Shri Narayan Singh Chairperson	CSERC
06.	Shri Pravinbhai Patel Chairperson	GERC
07.	Shri Jagjeet Singh Chairperson	HERC
08.	Justice (Retd.) Shri N.N. Tiwari Chairperson	JSERC
09.	Shri S.K. Chaturvedi Chairperson	JERC for Goa & All UTs except Delhi
10.	Shri A. Chhawnmawia	JERC for Manipur & Mizoram
11.	Shri M.R. Sreenivasa Murthy Chairperson	KERC
12.	Shri T.M. Manoharan Chairperson	KSERC
13.	Shri Anand Kumar Chairperson	MSERC
14.	Shri Donray A. Shishak Chairperson	NERC
15.	Ms. Romila Dubey Chairperson	PSERC
16.	Shri VishwanathHiremath Chairperson	RERC

17.	Shri T.T. Dorji Chairperson	SSERC
18.	Shri S. Akshayakumar Chairperson	TNERC
19.	Shri I.A. Khan Chairperson	TSERC
20.	Shri Niharendu Chakraborty Chairperson	TERC
21.	Shri Desh Deepak Verma Chairperson	UPERC
22.	Shri J.P Singh Member	DERC
23.	Shri Azeez M. Khan Member	MERC
24.	Shri S.P. Swain Member	OERC
25.	Ms. Shubha Sarma Secretary	CERC/FOR
26.	Dr. Sushanta K. Chatterjee Joint Chief (RA)	CERC
SPECIAL INVITEES		
27.	Hon'ble Smt. Justice Ranjana Prakash Desai Chairperson	APTEL
28.	Shri M. Deena Dayalan Member	CERC
29.	Shri A.K. Singhal Member	CERC

DSM Outsourcing Model and ECF through Public Benefits Charge

Date: 30th January, 2015

Flagship Projects

S No:	Sector	Project	Annual Energy Savings Achieved	Estimated Investments in 2014-15 and 2015-16
1	Home efficient lighting (DELP) Project completed in Puducherry	• Replacement of inefficient incandescent bulbs to LEDs in households	56 million kWh/ 6 lakh replacements	Rs. 500 crores (2 crores replacement) **500 MW load reduction**
2	Agriculture Demand Side Management Project completed in Hubli	• Replacement of inefficient agriculture pumps with energy efficient pumps	4867 kWh/ pump replacement	Rs. 100 crores (10,000 pump replacement) **10.5 MW load reduction**
3	Urban EE – Street lighting in ULBs Project under implementation in Nashik	• Replacement of 3 lakhs inefficient street lights across the states of AP, Delhi, Puducherry, Tripura, Kerala, and Nashik	186 million kWh	Rs. 300 crores **10.5 MW load reduction**

Replicable Business Models

-No upfront capital investment by states/ ULBs

-

-Incentives for participating entities – LED bulbs at Rs. 10 to household consumers, free EE pumps for farmers, maintenance free LED street lights

- Deemed savings approach – demonstration of energy savings upfront

- Risk mitigation – technical risk through back to back arrangement with suppliers.

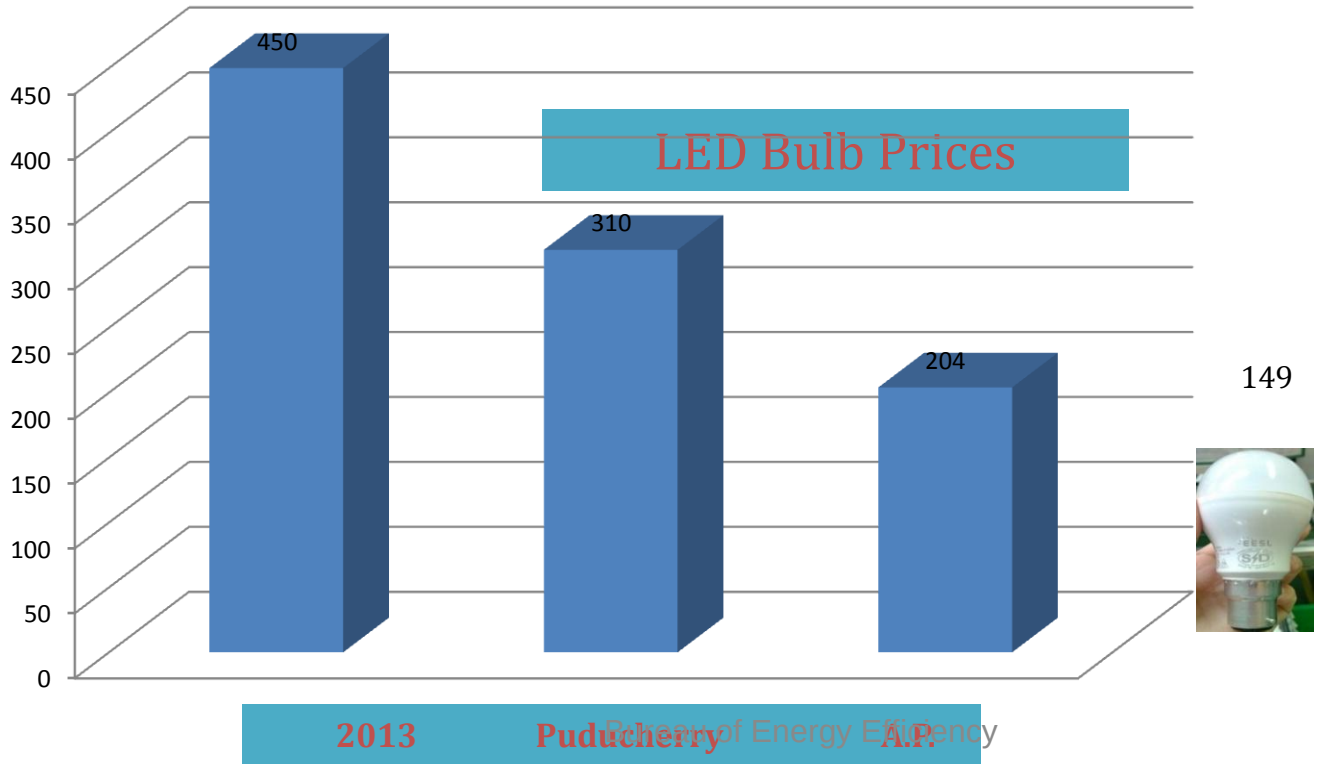
-Financial risk – BG, ESCROW and Revolving LCs – Approval by ERCs for bulb and agriculture programme (part of ARR) and state govt guarantee for Street Lights

-Awareness and outreach in project areas

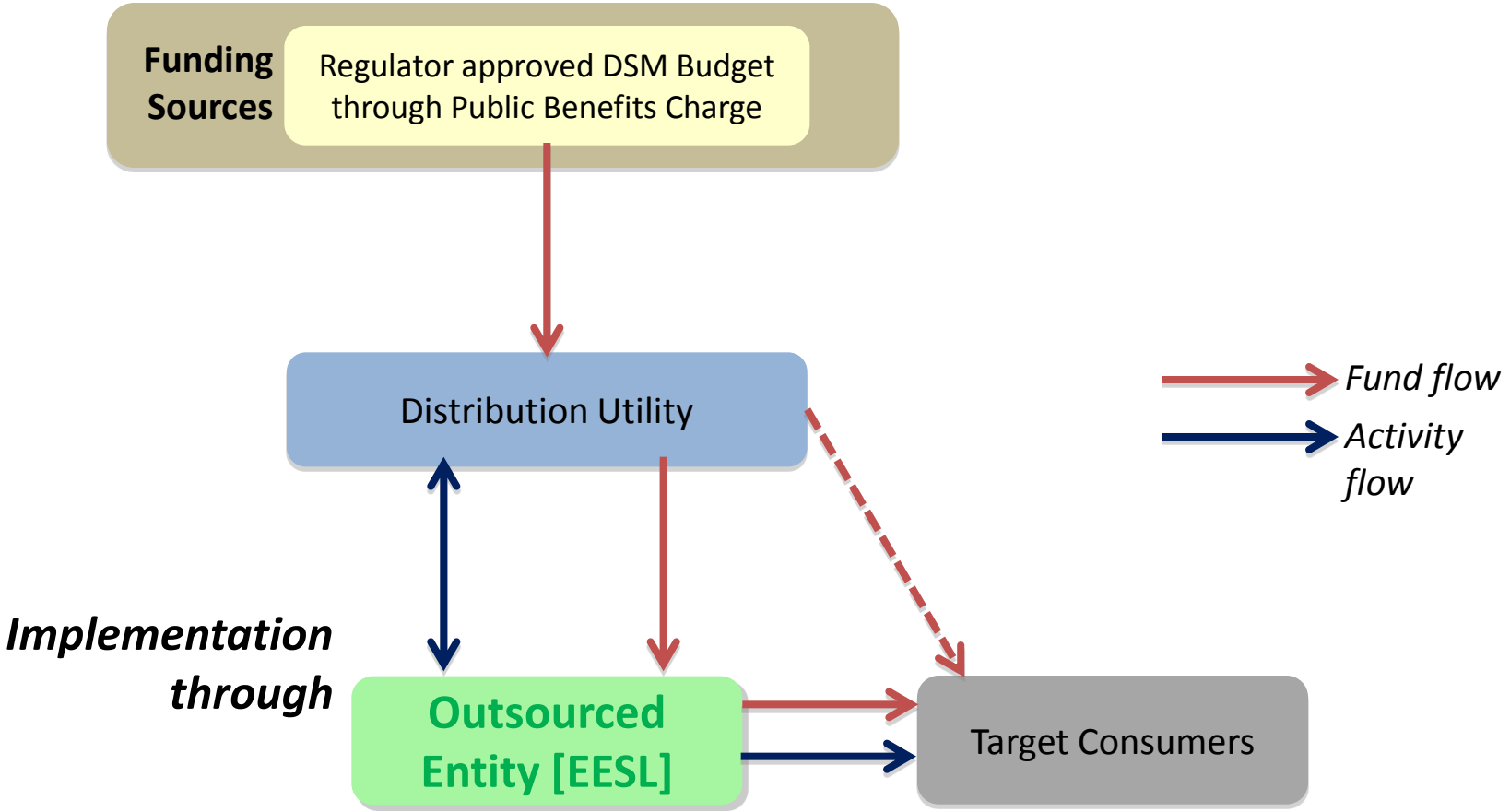
DSM based Efficient Lighting Programme (DELP)

DELP – Effect on Market Prices of LEDs

- ✓LED bulb prices reduced by 50%
- ✓LED street lights prices reduced by 30%
- ✓Warranties of 5-10 years provided – high quality luminaries being procured.



Program design: Utility-driven DSM implementation by appointing Outsourced Entities



HVAC EE Program in MSEDCL is expected to result in total demand savings of 1.17 MW per annum

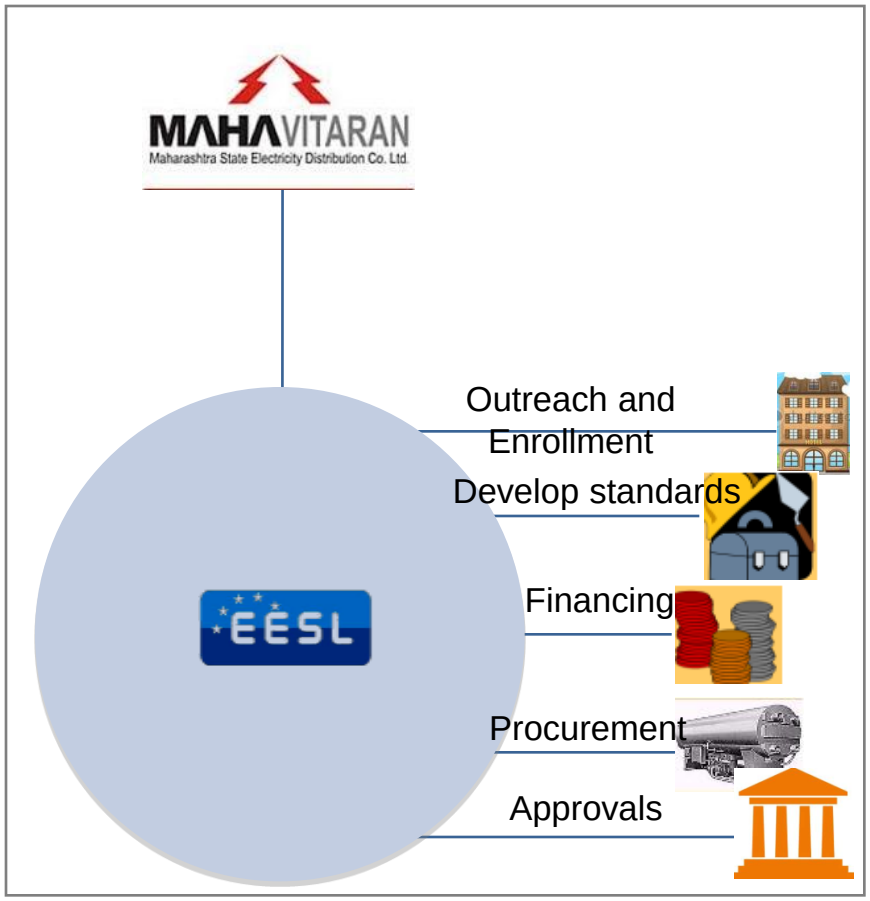
Clears all cost-benefit tests as per MERC's DSM Regulations

MSEDCL

	Target	*Annual Energy Savings*	*Annual Demand Savings*	*Rebate (25%)*
Fan replacement	20,000	1.35 MU	0.44MW	Rs0.7 Cr
Unitary AC replacement	-	-	-	-
Chiller replacement	15	2.59 MU	0.77MW	Rs0.83 Cr
Chiller retro-commission	15	0.55 MU	0.00	Rs0.45 Cr
		4.49 MU	**1.17MW**	**Rs 1.98 Cr**

EESL integrated source for designing, marketing, and implementing MSEDCL's DSM Programme

Vs



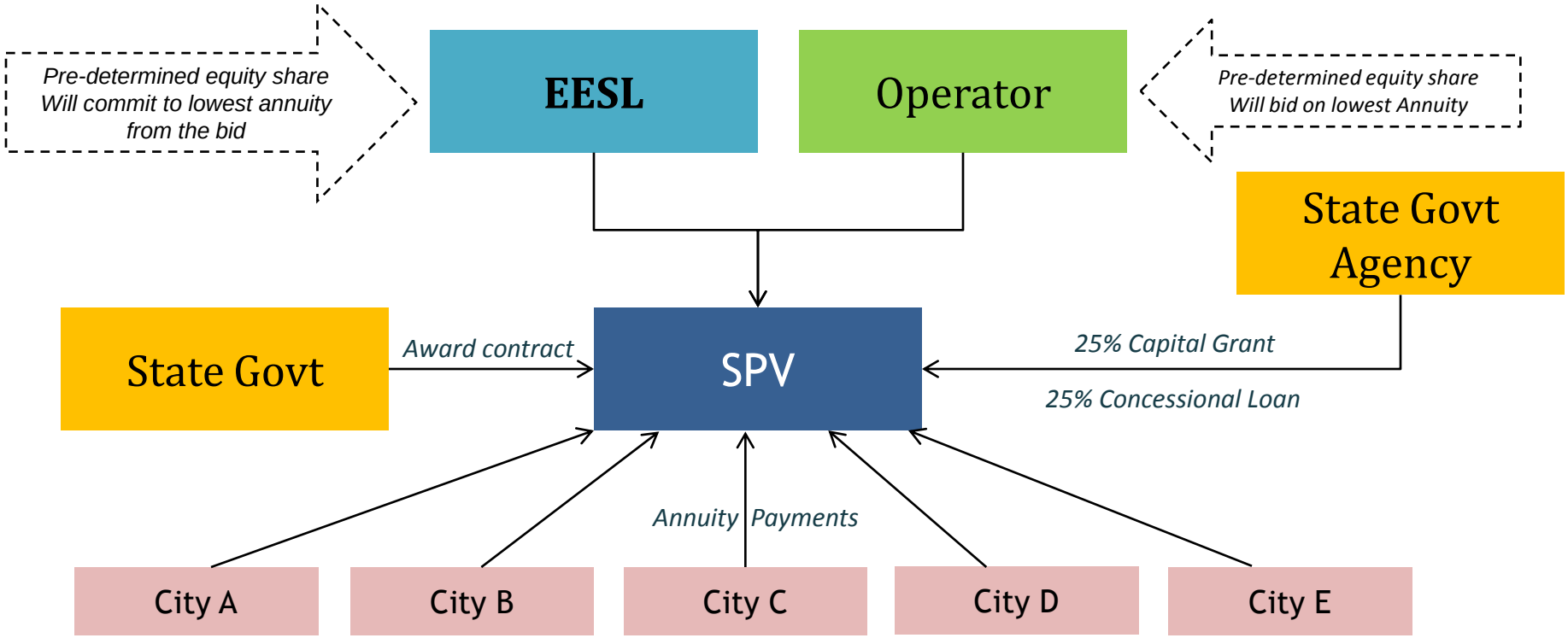
Traditional Approach

EESL's Approach

EESL provide its services in any of the two ways

EESL's Investment and Administration based Service	EESL's Transaction Support Service
• Identifying, designing and implementing the identified intervention using EESL's own funds • Following government norms of procurement, EESL sources the goods and services by open and competitive bidding • Contractual agreement between EESL and equipment supplier , that ensures entire technical performance risk is passed on to the supplier for achievement of expected outcome • State-wide awareness campaigns, and customer enrollment program • Two-pronged approach adopted for Monitoring and Verification – on real-time basis and through third party	• Consumer outreach, awareness and marketing • Finalization of technical specs • Development of procurement bidding documents • Development of contract documents to be signed between vendor partners & facility owners • Desk support and program management • Field implementation through vendor partners – delivery, replacement, disposal • Implement M&V protocol

SPV for Bundled Street Light Projects



EESL involvement to increase bankability from private sector perspective

Proposed structure to have no financial impact to State Government

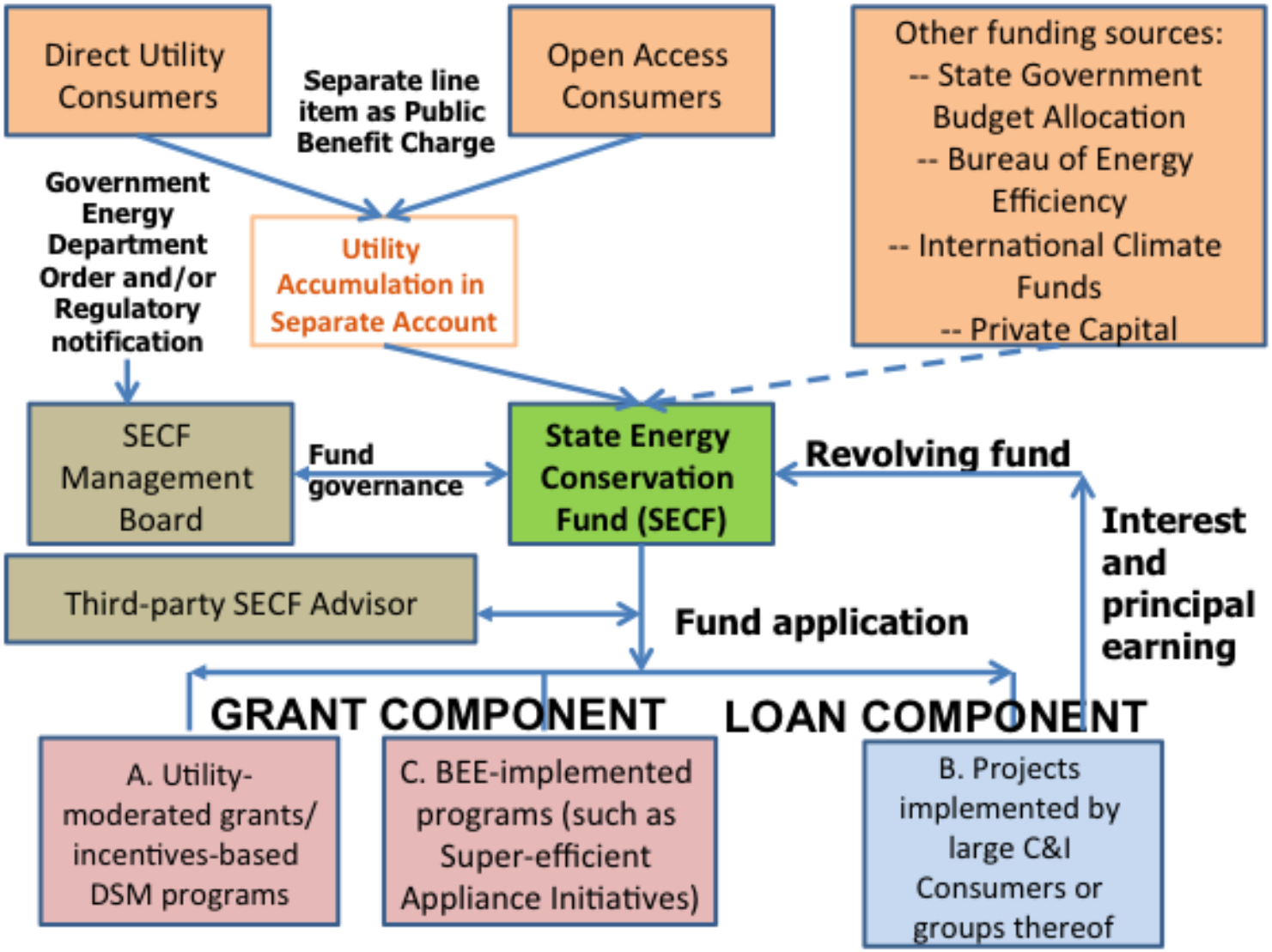
EESL's role in Gujarat DISCOMs

- Commission has notified DSM regulations that mandates the DISCOMs to prepare and implement DSM action plans of worth INR 50Cr each
- Support on DSM petition filing to UGVCL and PGVCL
- DSM Programs prepared on AgDSM, replacement of incandescents, ACs, and Fans for submission to GERC
- Transaction support to DISCOMs for implementing DSM programs – Energy Audits, Installation of Solar Pumps, and Replacement of ICLs and Fans

Creation of State Energy Conservation Fund

- Lack of immediate financing → key barrier for DSM implementation by utilities
- DSM costs recoverable through ARR, but utility needs to spend upfront and recover later → dedicated fund provides a large advantage
- Suggested mechanism for creation of Energy Conservation Fund :
  - **Allow collection of Public Benefits Charge**: from all consumers at pre-defined fixed price per unit for pre-defined fixed period of time (say Rs. 0.01/kWh); also leveraged through SDA Energy Conservation Fund
  - **Types of programs funded**: e.g. rebates to residential & small commercial consumers on first cost of efficient equipment, energy audits for large consumers, administrative costs of third party implementer, etc. → pre-defined at outset
  - **Types of offtake**: Grants/ loans/ incentives; set up as a Revolving Fund
  - **Fund management & capitalization**: Through Fund Manager – e.g. commercial banks/ other funding conduits or EESL
  - **Additional funding**: Potential equal funding from State Government
- ECF set up at State/ utility level
- Public Benefits Charge collected in Maharashtra would be Rs. 90 Crores per year and in Karnataka would be Rs. 50 Crores per year – would give substantial boost to project implementation

Proposed structure



ERCs leading by example

Punjab

- Commission notified DSM regulations that allowed for recovery of costs incurred in DSM activities through adopting DSM funding approaches
- Accordingly PSPCL, created DSM fund by levying a public benefit charge of 1 paise per unit of electricity sold to all consumer categories
- INR 37.74 Crores have been claimed in petition for FY14-15 towards creation of DSM funds.

West Bengal

- To promote usage of efficient lighting technology, commission directed a 25% tariff rebate on usage of metered, LED street lights
- In order to reduce overall system T&D loss and to flatten load curve, the commission has directed a load factor rebate on improvement of existing system load factor

Gujarat

- Commission has notified DSM regulations that mandates the DISCOMs to prepare and implement DSM action plans of worth INR 50Cr each.

PERFORM, ACHIEVE AND TRADE

ESCerts Trading

- Energy Conservation (Energy Consumption Norms and Standards for Designated Consumers, Form, Time within which, and Manner of Preparation and Implementation of Scheme, Procedure for Issue of Energy Savings Certificate and Value of Per Metric Ton of Oil Equivalent of Energy Consumed) Rules, 2012 **(PAT Rules)** notified on 30th March 2012 by Ministry of Power, have specified that the ESCerts to be issued in electronic form and **tradable on Power Exchange**.
- Section 14 A (1) of Energy Conservation Act 2001 gives power to Central Government to issue energy savings certificate to the DCs
- The Section 26 (1A) of the EC Act 2001 have provision of imposing a penalty (not exceeding ten lakh rupees) for non compliance of provisions of clause (n) and an additional penalty for a continuing failure which shall not be less than the price of one metric ton of oil equivalent of energy that is in excess of the prescribed norms
- The value of per metric ton of oil equivalent of energy consumed shall be prescribed by Central Government, in consultation with BEE, under Section 14 B of the Energy Conservation Act 2001

Timelines for target year of PAT Cycle 1

S.No	Name of Form	Submitted/ issued by	Time of Submission	Submission authorities
1.	**Form A** (Performance Assessment Document)	DCs	Three months from conclusion of target year (end of first or second or third year of relevant cycle) **30th June, 2015**	SDA & BEE
2.	**Form B** (Certificate of verification by AEA)	DCs	Three months from conclusion of target year (end of first or second or third year of relevant cycle) **30th June, 2015**	SDA & BEE
3.	BEE's Recommendation to MoP for issuance of ESCerts	BEE	10 working days from from receipt of forms A & B **10th July, 2015**	Ministry of Power
4.	Issuance of ESCerts	Ministry of Power	Within 15 working days from receipt of recommendations by BEE **25th July, 2015**	BEE
5.	**Form D** (status of Compliance)	DC	End of 5 months from the last date of submission of Form A **30th November, 2015**	SDA & BEE
6.	**Form C** (check verification report and certificate)	AEA (Accredited Energy Auditor)	Within 6 months after issuance of ESCerts (**January, 2016**) or within 1 year of submission of compliance report **(Oct, 2016)**	BEE

Penalties and Adjudication

Provisions in EC Acts

Section 26 (Penalty)

•If any person fails to comply with the provision of clauses mentioned in section 26, he shall be liable to a penalty which shall not exceed ten thousand rupees (“ten lakh rupees”)for each such failures and, in the case of continuing failures, with an additional penalty which may extend to one thousand rupees (“ten thousand rupees”)for every day during which such failures continues:

•If any person fails to comply with the provisions of clause (n) of section 14, he shall be liable to a penalty which shall not exceed ten lakh rupees and, in the case of continuing failure, with an additional penalty which shall not be less than the price of every metric ton of oil equivalent of energy, prescribed under this Act, that is in excess of the prescribed norms.”.

Penalties and Adjudication

Provisions in EC Acts

Section 27 (Adjudication)

•For the purpose of adjudging section 26, the State Commission shall appoint any of its members to be an adjudicating officer for holding an inquiry in such manner as may be prescribed by the Central Government, after giving any person concerned a reasonable opportunity of being heard for the purpose of imposing any penalty.

Factors to be taken account by Adjudicating officers for quantum of penalty

a.the amount of disproportionate gain or unfair advantage, wherever quantifiable, made as a result of the default;

b.the repetitive nature of the default

Consideration for SERCs (State Electricity Regulatory Commissions)

•Appointment of Adjudicating officers

•Development of Manuals for adjudicating process

Thank You

Indian Forum of Regulators

Bangalore, January 30, 2015

Regulating & planning rural electrification in India

Prof. Ignacio J. Pérez-Arriaga
MIT, CEEPR, E19-370L
ipa@mit.edu

The issues to be addressed

- Under the **present conditions in India** regarding energy policy, the power sector & the actual level of rural electrification, what **regulatory approaches** & **business models** make sense?
- How can **computer models for rural electrification planning** *(the research work that MIT does, sponsored by the Tata Trusts)* make a positive contribution?

First issue
Searching for sound regulatory approaches

Multiple opinions about the first issue

- During our many meetings in several visits to India, we have found that highly experienced people, with positions that give them excellent perspectives on the Indian power sector, **widely diverge in their assessments** on the best regulatory & business models to address rural electrification in India

  ➜ It is a **difficult topic**

- We shall also provide our humble opinion

A first group of answers…

- Many *(mostly official)* sources state that **current rural electrification projects** will succeed in meeting the official minimum electrification requirements of most remaining non electrified villages
- **Reliability** is **not as bad** as some say & it **will improve** with upstream network reinforcements, plus local & imported centralized generation
- Less clear whether connections will **reach the large % of unelectrified households** & the technical & economic implications of 100% access
- Under the above conditions, **off-grid technologies would be only necessary in some isolated rural areas** where medium voltage (11 kV) lines are not supposed to arrive

… and the second group of answers

- These sources expressed serious **doubts** that **electrification plans** would **proceed** as **swiftly** as officially announced,
- They also indicated that **grid electricity is still too unreliable** & random in many places

& thus alternative **off-grid approaches should be adopted** to provide acceptable electricity access

- **Unregulated off-grid approaches** *(which bring an immediate relief to non electrified households)* with non-standard technologies, **should not be part** of a long-term solution to rural electrification

… second group *(continuation)*

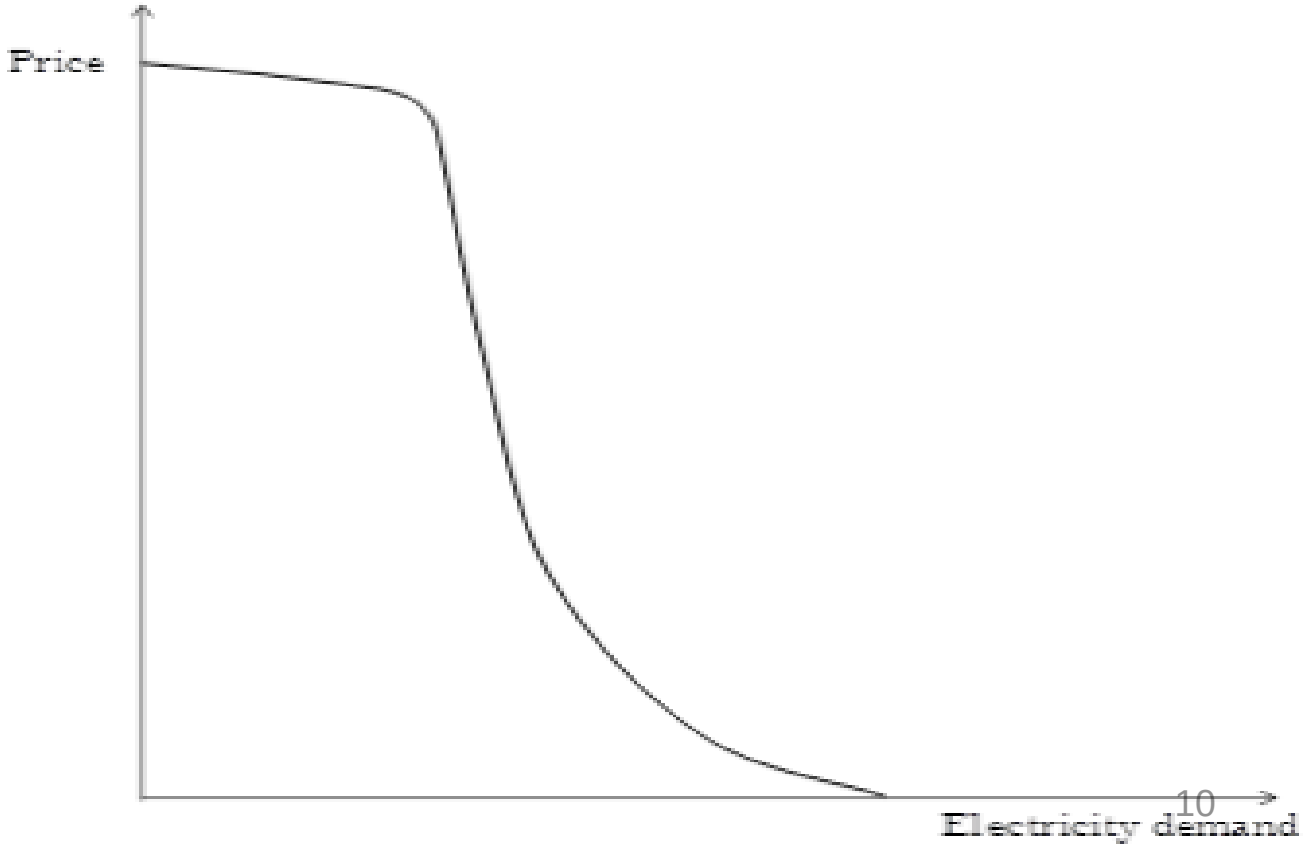
- **Off-grid microgrids** *(grid-compatible when reasonable)* **or solar house systems are a viable alternative** *(a bridge perhaps*) to grid connection
- But among this group of sources there are **diverse opinions** regarding the **level of regulation** & the sources of **funding for the revenue deficit**
  - A **franchise** type of approach perhaps relies too much in funds coming from the tight State budget & needs the agreement of the DISCOM
  - An **independent** approach needs some other source of subsidy (RPO?) to be financially viable

What do we think?

Ingredients of a plausible solution
Starting from some basics

- Just a reminder
  - Regulation is **subject to energy policy**, such as
    - Reach at least a minimum electrification level for every village
    - Promotion of solar generation or renewables in general
- Some facts
  - Almost everybody, including many of the poorest households, **can afford the first few units** of electricity that meet basic needs of lighting & communication
  - But, rural electrification, to supply more than the first few units, does require subsidies *(not necessarily cross-subsidies)* since consumers **cannot afford these high tariffs for a larger amount of electricity**

- The **demand-price curve** describes the response of demand to price
  - Consumers are willing to pay a high price for the most essential electricity services
  - Then the willingness to pay decreases rapidly



Ingredients of a plausible solution
Grid connection vs off-grid

- **Grid connection** has been the obvious & preferred option since
  - Economies of scale reduce costs
  - Theoretically offers good 24x7 reliability level

However

  - Distribution network costs may become **very expensive** in rural isolated areas with low consumption
  - Grid connection loses value if it is **unreliable & random** or if it is uncertain when connection will actually happen
  - Then, **off-grid technologies** are preferable in these cases, either as a **bridge** to grid connection or as a **permanent** solution

Ingredients of a plausible solution
A mix, perhaps? Options

- Let's accept the official statement that **nearly all villages will be "electrified"** in 1 or 2 years time
  - This still leaves **75%** of households in Bihar **unelectrified**
- How to address this problem?
  A. Wait until **DISCOM extends the grid** to every household
  B. Leave **entrepreneurs to engage bilaterally** with villagers to agree on unregulated off-grid solutions
  C. Attract **private investors into building & managing** off-grid *(grid connection seems unlikely)* solutions that are **compatible** with eventual future grid connection

Any /all of them?

Ingredients of a plausible solution
A mix, perhaps? Discussion *(1 of 5)*

- Truly **isolated villages** *(to be identified & acknowledged as such)* need ad hoc off-grid solutions
- Effective “bridge” solutions in **“electrified” villages** have to be made available soon, to prevent postponement of provision of basic electricity service to every household

Ingredients of a plausible solution
A mix, perhaps? Discussion *(2 of 5)*

- **Unregulated off-grid solutions** meet immediate needs, but
  - They **cannot be scaled up** to allow necessary demand growth
  - They are **not compatible with grid extension**
    - This increases the risk (& cost) for entrepreneurs
    - The physical assets may become useless or underutilized
    - Solar (mostly) generation will be replaced by (mostly) coal, defeating clean energy & GHG emissions targets
    - Entrepreneurs can always try to exercise their monopolistic power and abuse consumers

Ingredients of a plausible solution
A mix, perhaps? Discussion *(3 of 5)*

- **Grid-compatible off-grid solutions** for "electrified" villages seem to have most **advantages**
  - They can be used to meet immediate needs & can be scaled up to allow necessary demand growth
  - They can become grid-connected whenever the grid is ready technically & financially
  - Solar generation infrastructure will remain
- But **private investment will not happen unless**
  - Conditions **after-grid-connection** are clear & guaranteed
  - ~~Risk of financing the **income deficit** is acceptable~~

Ingredients of a plausible solution
A mix, perhaps? Discussion *(5 of 5)*

- What **regulation** is needed?
  - Make sure that **technology** of off-grid solutions is **compatible** (when reasonable) with grid connection
  - Provide **satisfactory answers** to investors regarding the technical & economic implications of a **possible future connection** to the grid & remove any uncertainty regarding these conditions
  - While operating off-grid, establish clear technical & economic conditions, in particular regarding the **financial guarantees of the revenue gap**

Ingredients of a plausible solution
Who are these private investors?

- The problem is **BIG** ➜ we have to think **BIG**
- Two complementary options
  - ***Many bees****:* Multiple independent entrepreneurs that can jointly cover a large fraction (or all) the new demand
    - More vulnerable to financial risks
    - Less guarantee of long term sustainability of projects
  - ***One bull*** *(or just a few):* Utility-like approach
    - Deep pockets to endure some financial risks
    - Better guarantee of permanence & long term sustainability

How the MIT-Tata research project could be helpful?

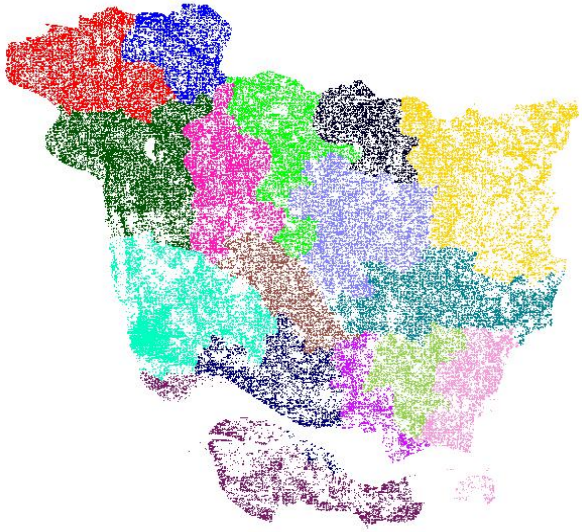
Computer-aided rural electrification planning

- How can **computer models** *(within an integral approach that also considers other relevant factors)* **for rural electrification planning** *(the research work that MIT does, sponsored by the Tata Trusts)* make a positive contribution?

Identify groups of households to model separately

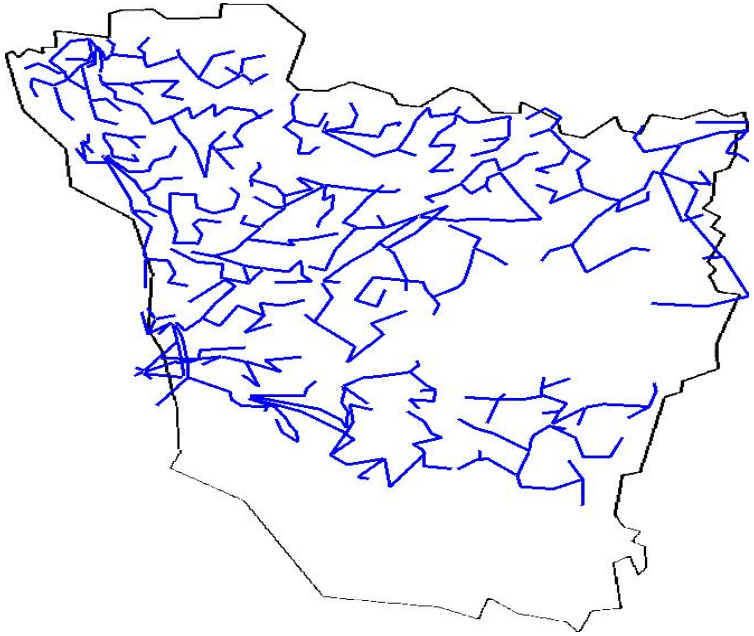
Satellite images

Identify households



Group by blocks

Leave only the non-electrified customers



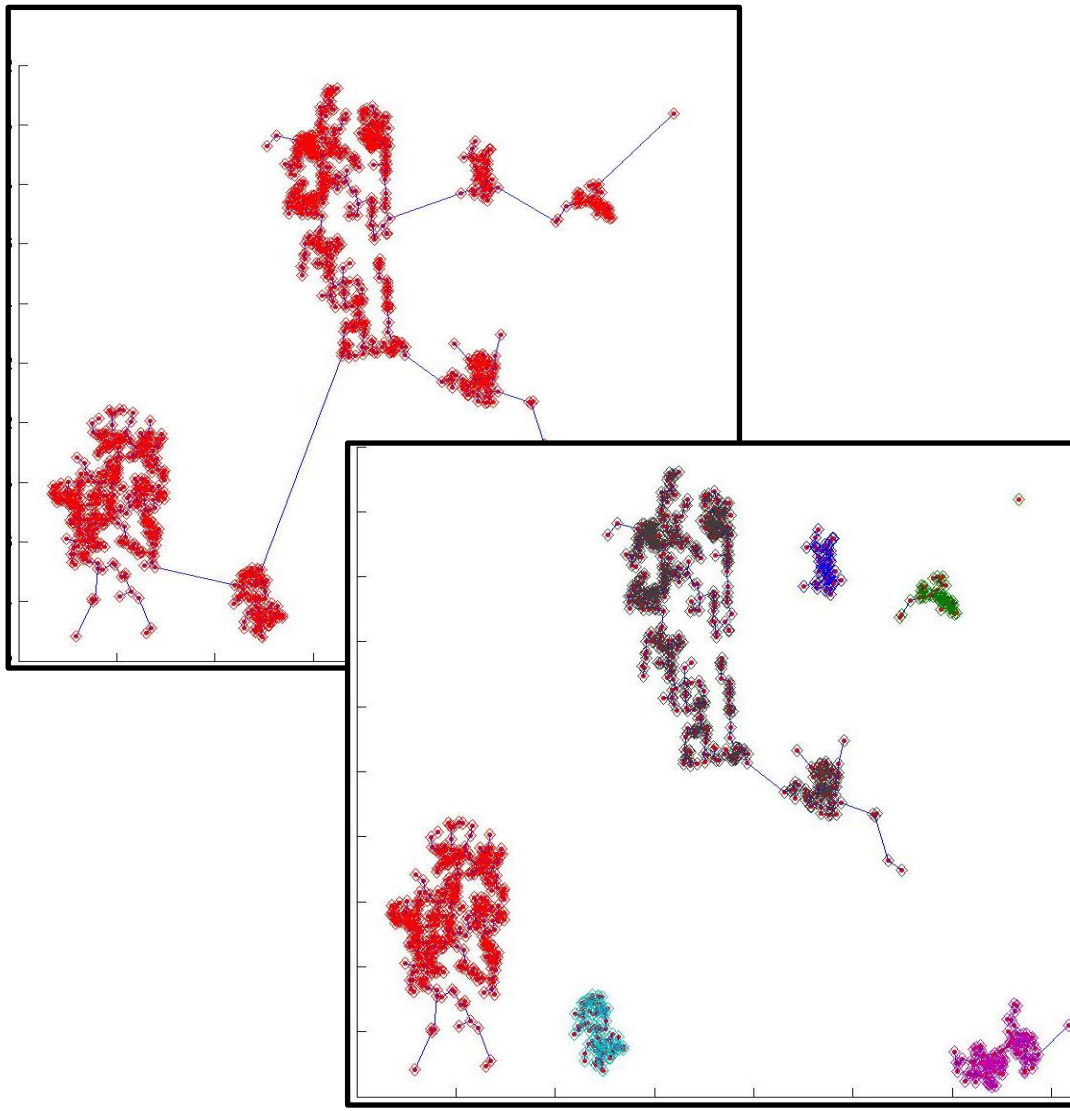
11 kV lines

Electrified customers removed

Clustering dots in a region

Approach:

- Model clustering for:
  - Microgrids & isolated systems
  - Grid extension clusters
- Process iterates over many possibilities
- Choose least-cost clustering



Network Design for a Cluster

Grid Extension

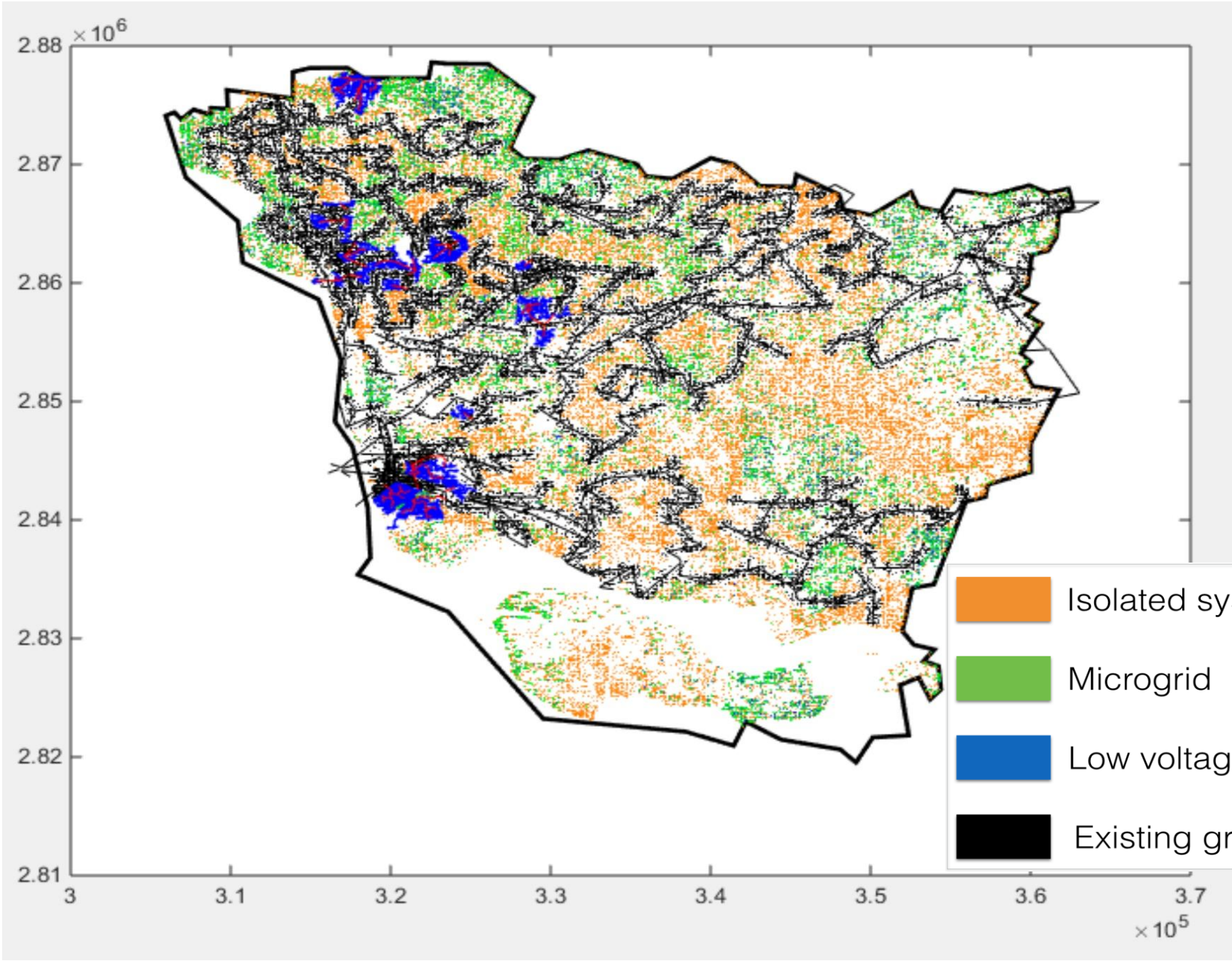
- Determine nearest grid connection point
- Use Reference Network Model (RNM) to design grid downstream of point

Microgrid

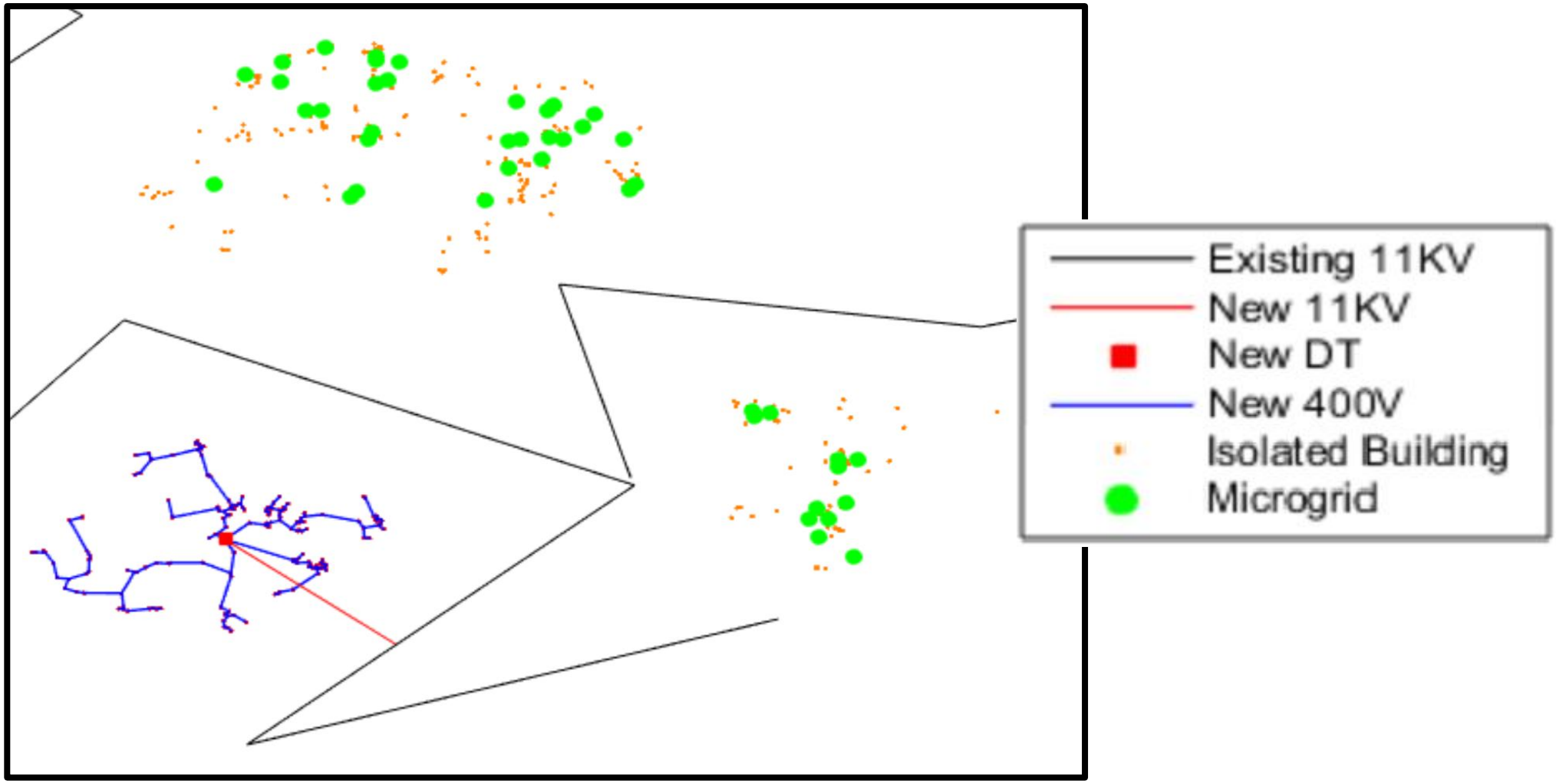
- Determine generation site location
- Design grid downstream of generation site

Isolated System

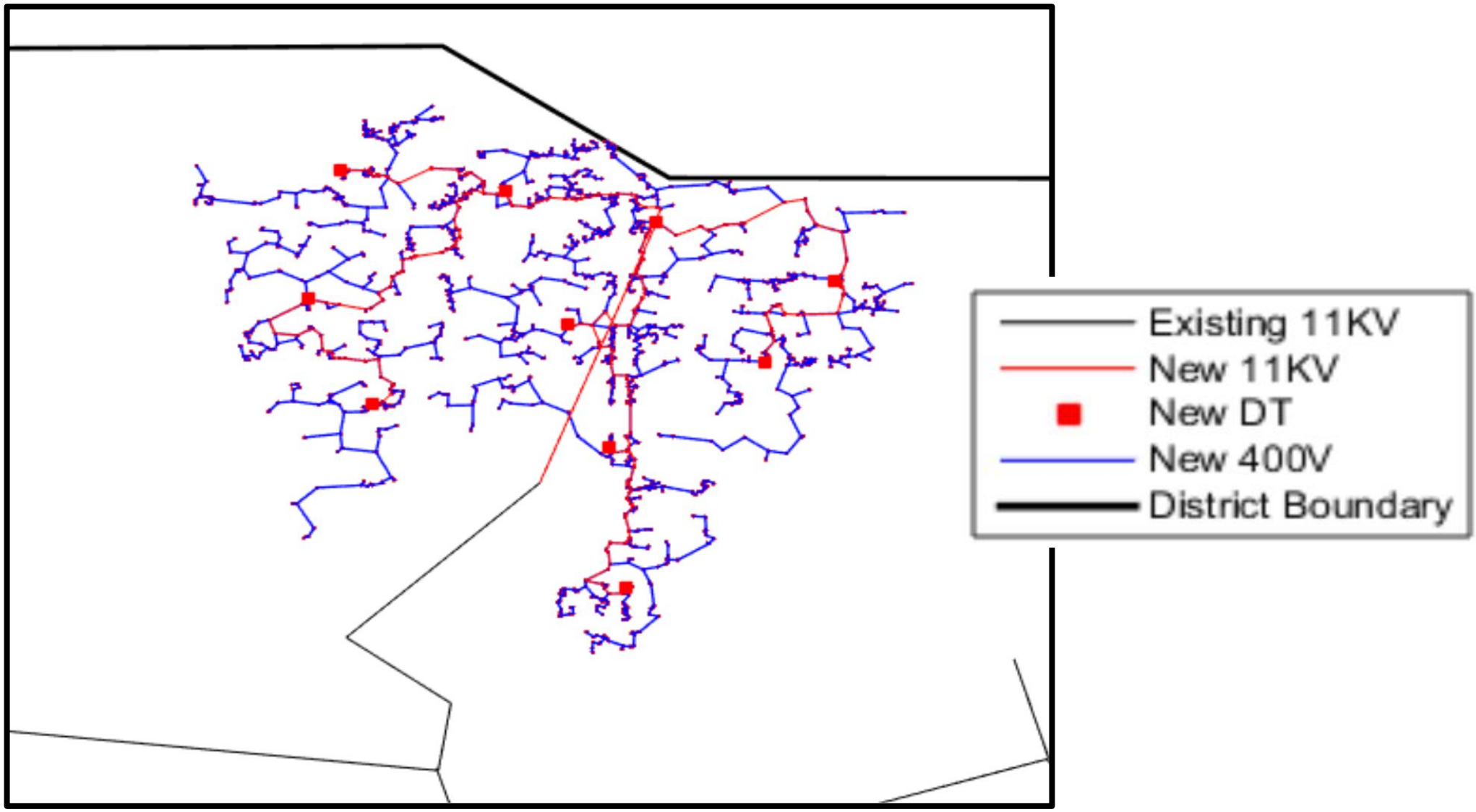
- No network design


×10^6
2.88
2.87
2.86
2.85
2.84
2.83
2.82
2.81
3
3.1
3.2
3.3
3.4
3.5
3.6
3.7
×10^5
Isolated systems
Microgrid
Low voltage lines
Existing grid & customers

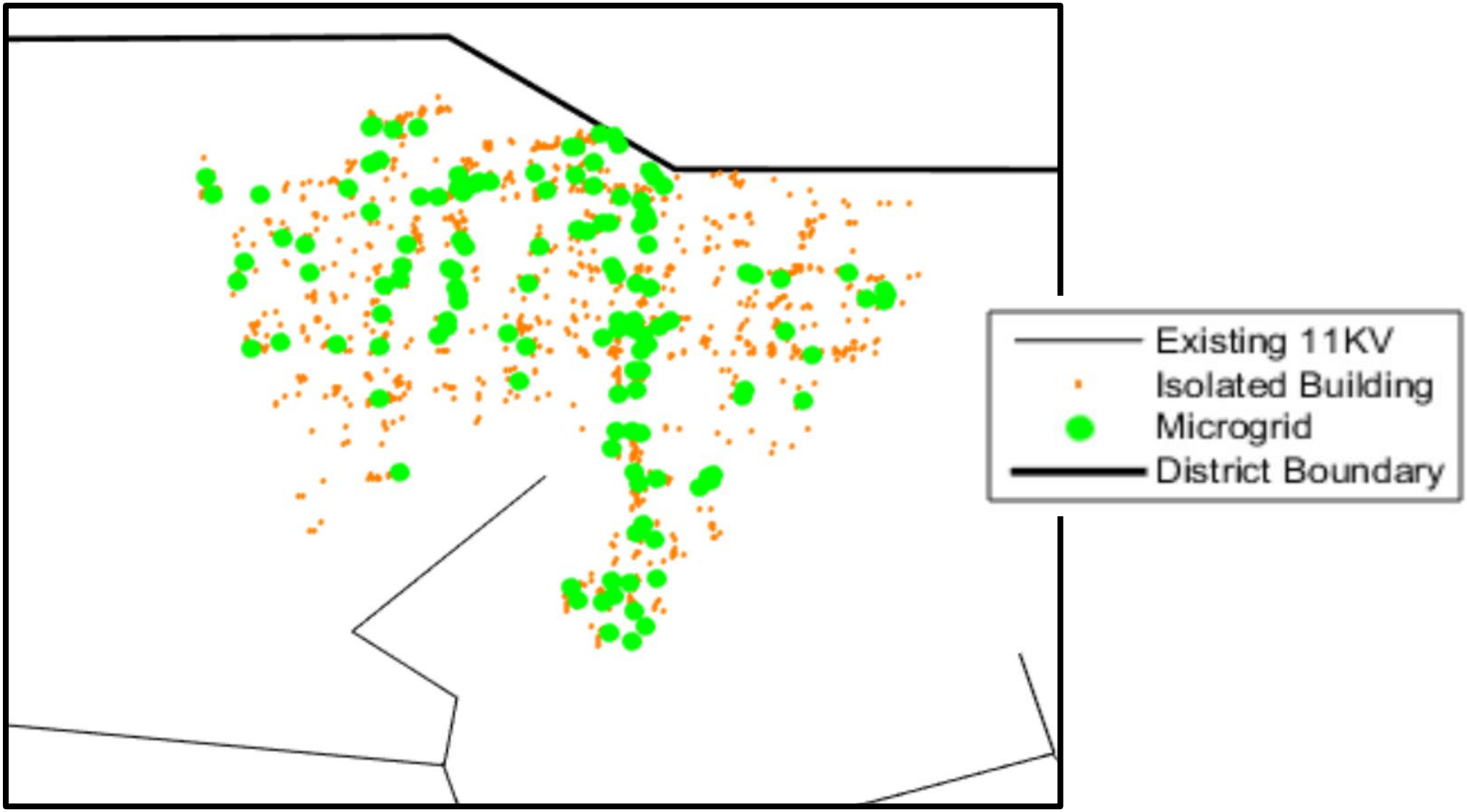
Grid and off-grid mix in a region



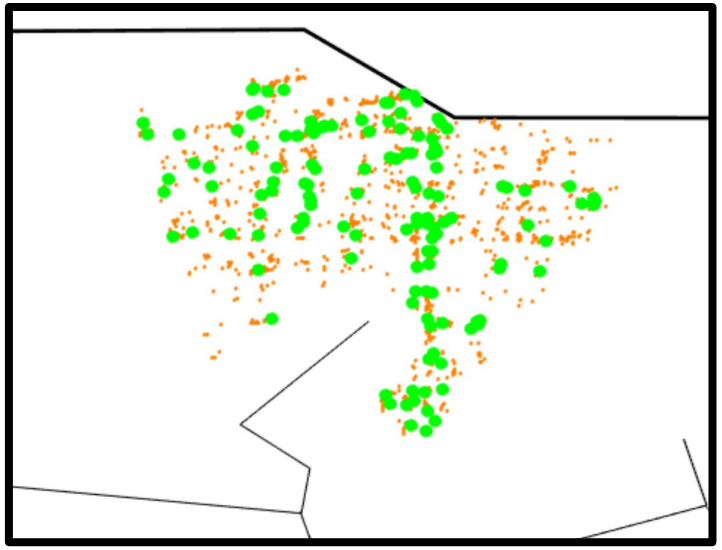
Example of grid extension

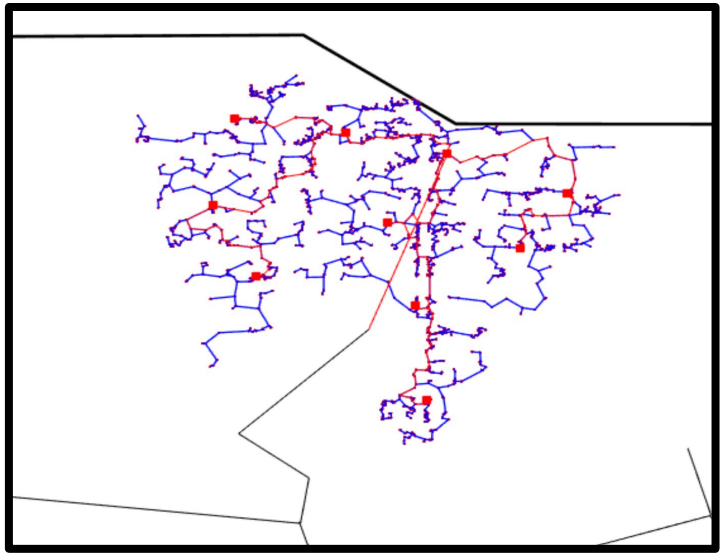


Off-grid for the same example



Grid Extension vs. Off-grid:
Sensitivity to grid reliability





Off-grid Costs (□/yr)

Distribution Network:	3 lakh
Generation + Outages:	116 lakh
Total:	**118 lakh**

Grid Extension Costs (□/yr)

100% grid availability

Distribution Network:	66 lakh
Energy:	46 lakh
Total:	**113 lakh**

50% grid availability

Distribution Network:	66 lakh
Energy + Outages:	110 lakh
Total:	**177 lakh**

Possible applications of the model

Sensitivity analysis

The model can be used to examine **trade-offs** & compare **alternatives**

Examples:

- How **grid reliability** affects the **microgrid** option
- Estimated **supply costs** under different conditions
  - Accounting for **demand growth**
  - Require off-grid systems to comply with **grid code**
- Impact of allowing **fossil fuels** utilization on reliability & costs
- Need for **upstream network reinforcements** depending on demand & electrification levels
- Use of last generation of **efficient appliances**

Example of potential model use
(application to Vaishali district, Bihar)

- Represent the **existing** MV distribution **network** plus **planned grid extensions** to electrify more villages. Now determine
  - The **least expensive** electrification mode for each household
  - Try other options:
    - **Grid extension** to all households
    - Different **demand** or **reliability** levels
    - Different requirements of % of **renewables**
- Compare for each option
  - Total cost, level of service, fuel *(if any)* consumption, volume of subsidies, cost to the consumers, financial impact on the DISCOM

Thank you for your attention

Should we start with a review?

- There are some excellent documents in the specialized literature that cover the topic, both in general & also for the case of India
- We have examined as many as we have had access to, but
  - specialized literature is static,
  - reality is quickly changing,
  - and we have had the advantage of meeting directly some of the major actors in the power sector & rural electrification in India

Ingredients of a plausible solution
A mix, perhaps? Discussion *(4 of 5)*

- **Off-grid solutions** are the only option for isolated rural villages with low consumption
  - **Permanent** solutions should allow for demand growth beyond a few electricity units for very basic services
    - Typically similar to grid-compatible microgrids or maybe solar home systems (SHS)
  - **Transitory** solutions may be based on power packs of the 3rd solar PV generation technology
    - With a completely different business model
- Private investment for full electrification will not happen unless the **income deficit** can be financed with an acceptable risk

Photo courtesy of the website of LBNL's Environmental Energy Technology Division (eetd.lbl.gov)

DSM Programs in US-California and India: Activities to Implement Future Plans

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Jan. 30, 2015

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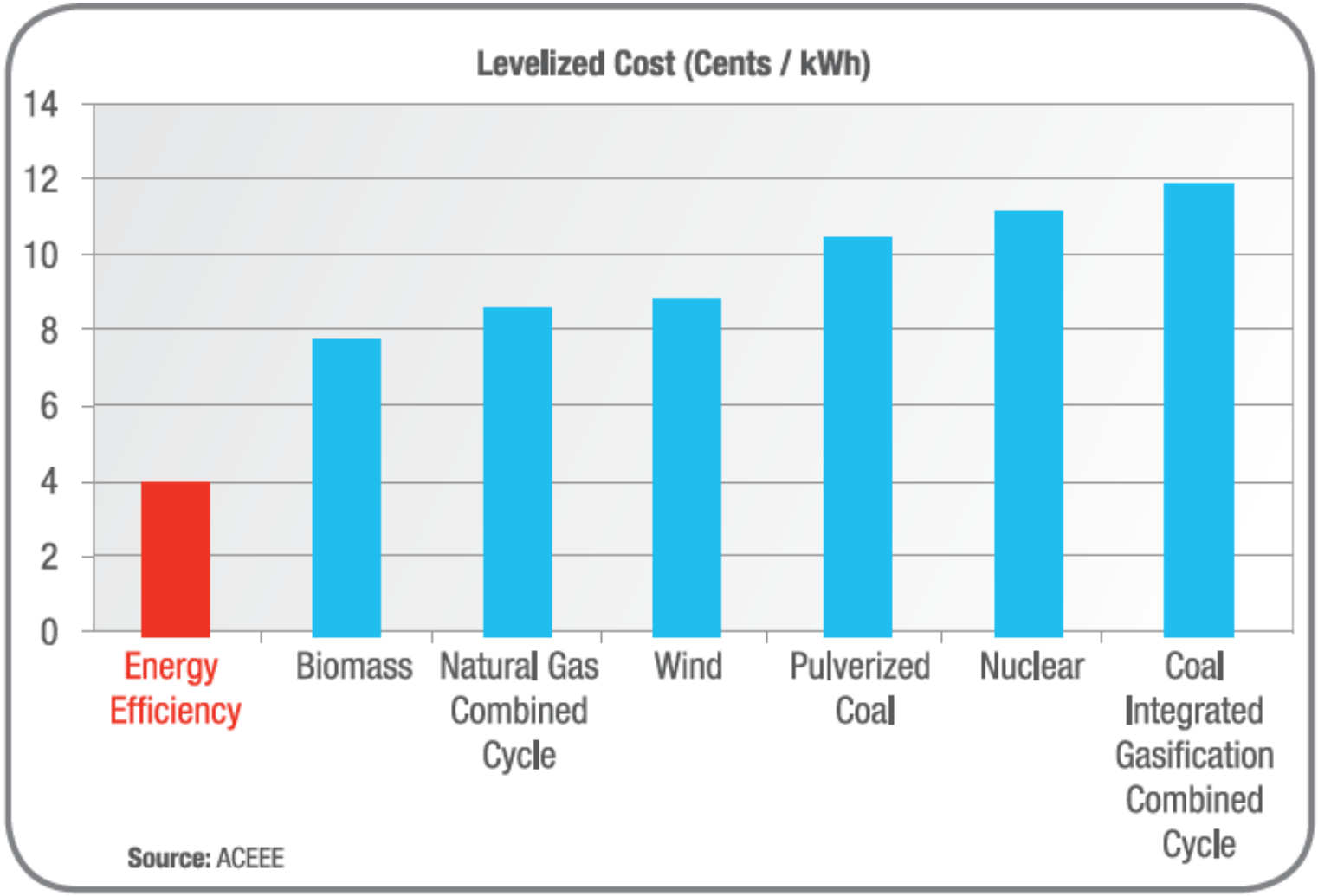
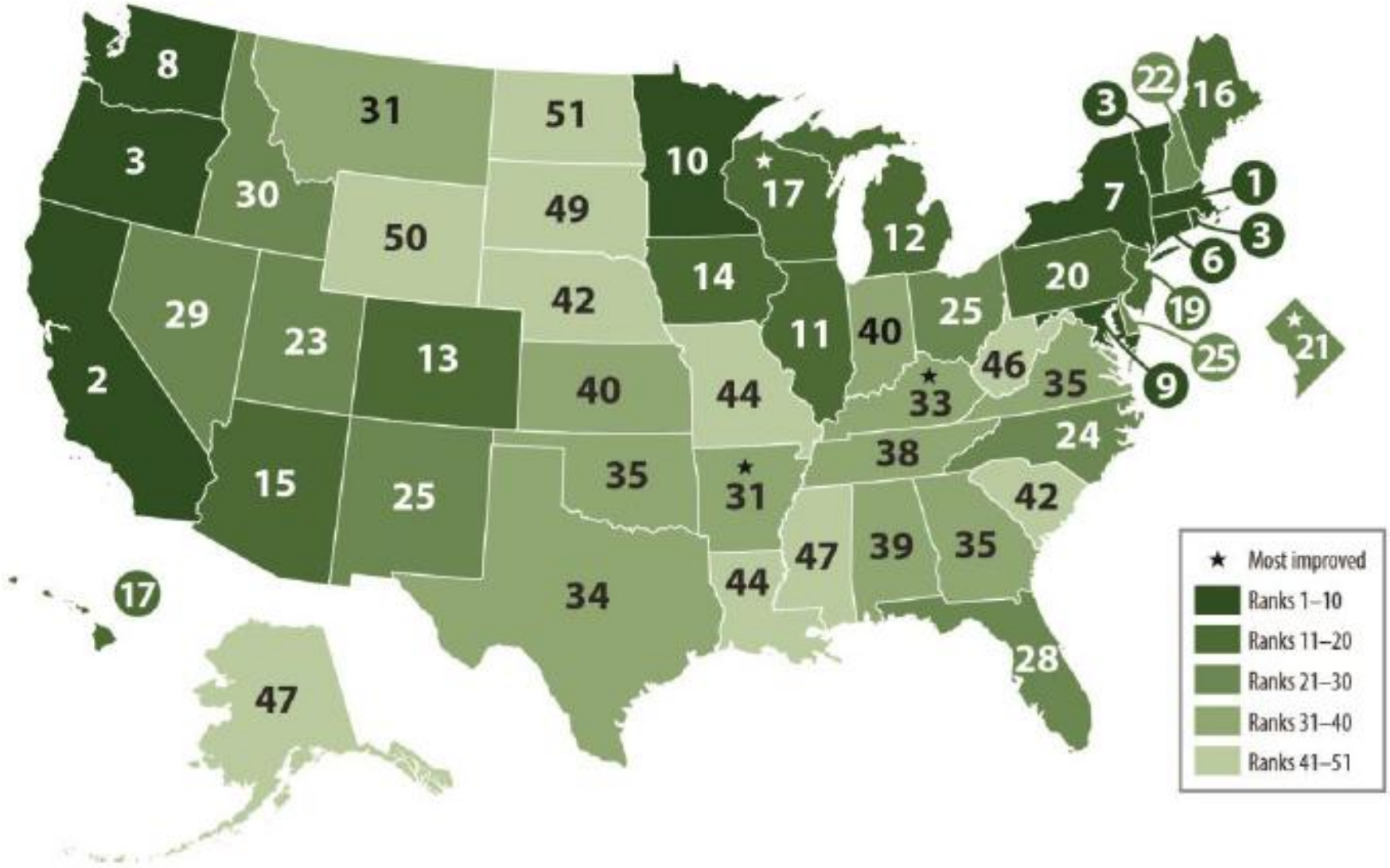
Introduction – United States Energy Efficiency

- Conversations about energy use in the United States often re volve around the need to support the growth of national econo my by expanding the energy supply.
- In fact, however, US has a resource that is cleaner, cheaper, a nd quicker to deploy than building new supply — energy effi ciency.
- Energy efficiency improvements help businesses, gov ernments, and consumers to meet their needs by using *less* energy.
- Efficiency saves money, drives investment across all sectors of the economy, creates jobs, and reduces the environmental im pacts of the energy production system.

Energy Efficiency is the Most Cost Effective Form of Energy



State Scorecard Rankings



Summary of State Scores in 2014 State Scorecard – 50 states

Twenty-four states continue to enforce and adequately fund an energy efficiency resource standard (EERS) (> 8 pts.) that drives investments in utility-sector energy efficiency programs.

Rank	State	Utility & public benefits programs & policies (20 pts.)	Trans-portation policies (9 pts.)	Building energy codes (7 pts.)	Combined heat & power (5 pts.)	State government initiatives (7 pts.)	Appliance efficiency standards (2 pts.)	TOTAL SCORE (50 pts.)	Change in rank from 2013	Change in score from 2013
1	Massachusetts	20	7	5.5	4.5	5	0	**42**	0	0
2	California	12.5	8.5	7	4	6.5	2	**40.5**	0	-0.5
3	Oregon	15	7	5.5	3.5	5.5	1	**37.5**	1	0.5
3	Rhode Island	20	5	6	3	3	0.5	**37.5**	3	2
3	Vermont	18.5	6	6	3	4	0	**37.5**	4	3
6	Connecticut	14	5	5	4.5	6	1	**35.5**	-1	-0.5
7	New York	13.5	8	5.5	2	6	0	**35**	-4	-3
8	Washington	13	7	6	2.5	4.5	0.5	**33.5**	0	0
9	Maryland	10.5	5	6	3	5	0.5	**30**	0	2.5
10	Minnesota	14	3.5	4.5	1.5	5.5	0	**29**	1	3.5

US Energy Plan Costs

- Total budgets for electricity efficiency programs in 2013 reached $6.3 billion. Adding this to natural gas program budgets of $1.4 billion, we estimate total efficiency program budgets of more than $7.7 billion in 2013.

- Savings from electricity efficiency programs in 2013 totaled approximately 24.3 million megawatt-hours (MWh), a 7% increase over the 2011 savings reported last year.

Growth of Electricity Consumption in India

Consumption as on	Total (in GWh)	% of Total						Per-Capita Consumption (in kWh)
		Domestic	Commercial	Industrial	Traction	Agriculture	Misc	
31-Dec-1947	4,182	10.11%	4.26%	70.78%	6.62%	2.99%	5.24%	16.3
31-Dec-1950	5,610	9.36%	5.51%	72.32%	5.49%	2.89%	4.44%	18.2
31-Mar-1956	10,150	9.20%	5.38%	74.03%	3.99%	3.11%	4.29%	30.9
31-Mar-1961	16,804	8.88%	5.05%	74.67%	2.70%	4.96%	3.75%	45.9
31-Mar-1966	30,455	7.73%	5.42%	74.19%	3.47%	6.21%	2.97%	73.9
31-Mar-1974	55,557	8.36%	5.38%	68.02%	2.76%	11.36%	4.13%	126.2
31-Mar-1979	84,005	9.02%	5.15%	64.81%	2.60%	14.32%	4.10%	171.6
31-Mar-1985	124,569	12.45%	5.57%	59.02%	2.31%	16.83%	3.83%	228.7
31-Mar-1990	195,098	15.16%	4.89%	51.45%	2.09%	22.58%	3.83%	329.2
31-Mar-1997	315,294	17.53%	5.56%	44.17%	2.09%	26.65%	4.01%	464.6
31-Mar-2002	374,670	21.27%	6.44%	42.57%	2.16%	21.80%	5.75%	671.9
31-Mar-2007	525,672	21.12%	7.65%	45.89%	2.05%	18.84%	4.45%	559.2
31-March-2012	785,194	22.00%	8.00%	45.00%	2.00%	18.00%	5.00%	883.6
31-March-2013	852,902	21.79%	8.33%	44.87%	1.81%	17.95%	5.25%	917.2 Provisional

Technology Assessment for India DSM

- Key Items: Lighting, Ceiling Fans, HVAC systems, Refrigeration, Water Heating and Motor Driven Systems

- Lighting

Sector	Electricity used (% of total)	Lighting Component (% of total electricity used)
Industry	49	4-5
Commercial/Public	17	4-5
Domestic	10	50-90
Others	24	2

- Prime Minister Modi has supported in 2014 the extensive use of LEDs acros s India

- Over 400 million lighting points in India (BEE estimate)
  - CFLs could reduce 6,000 – 10,000 MW of electricity demand
  - LEDs could reduce much more 10,000 – 15,000 MW of electricity demand
  - 20 million tons of CO2 reduction from grid-connected power plants

Calculation of Annual Energy Cost Savings for Available Alternatives to Standard *Ceiling Fan*

Indices for Comparison	Standard Ceiling Fan	5 Star Rated Fan (BEE)	Super Energy Efficient Fan (BLDC motor)
Power(Watt)	75	50	35
Span (mm)	1200	1200	1200
Speed (rpm)	400	350	350
Air Delivery (m^3/Min)	235	225	230
Cost/Unit (Rs.)	1400	1900	2600
Annual energy consumption(kWh)	247.50	165	115.50
Annual Energy Cost Savings (Rs.)	-	82.50	132.00

Refrigeration

Replacement of Non-star with 5-star Rated Frost Free Refrigerator

	No star Rated	5 Star Rated
Refrigerator type	Frost Free	Frost Free
Storage capacity (Liters)	250	250
Retail Cost/Unit (Rs.)	15000	25000
Annual Energy Consumption (kWh)	1000	364

DSM Activities in Maharashtra

- Initiated in 2008 to date ---
  - Regulatory commissioners came from California and met with RCs in Ma harashtra and also with CERC
  - In 2011, MSEDCL created a DSM Committee with LBNL
  - Tata and Reliance activities
    - Ceiling fans, thermal energy storage program, ACs, and manag e 500 MW loads in commercial and industrial consumers
  - MSEDCL activities – past and present ones.
    - Pilot Agricultural DSM Program: Replacement of Old Agricult ural Pumps by 4 Star rated pumps – BEE support
    - Ceiling fans installed in 5200 locations in sub-stations across Mahar ashtra – led to about 40% reduction in electricity use.
    - Cool roofs in buildings in Nagpur – about 8 degree C temper ature drop in white colored rooms compared with light gray colored ro om. AC estimation is now in place
    - Overall activities in 15 locations – 20,000 fan replacements, ACs, Chiller Replacement and Chiller Retro-commission

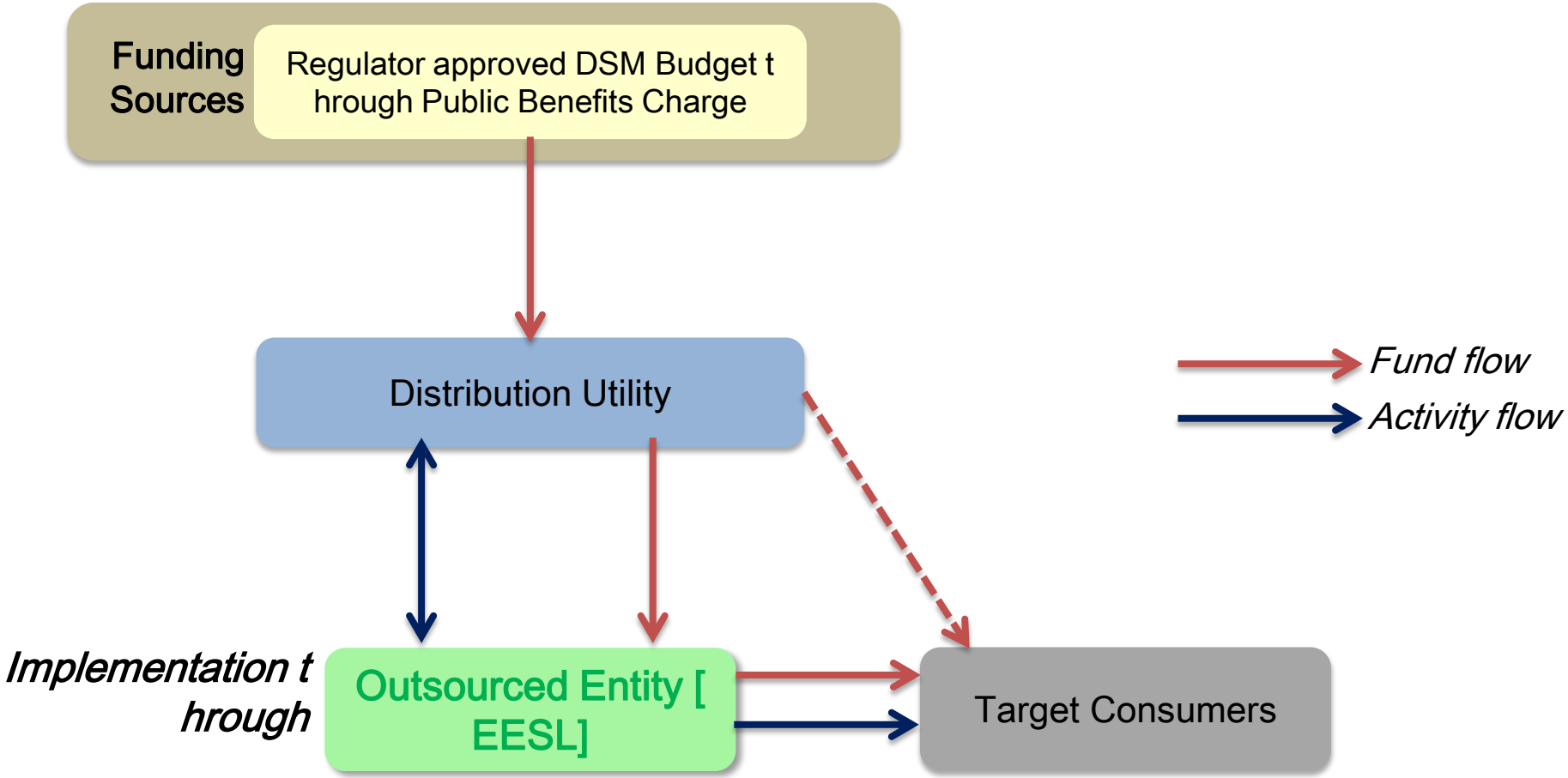
MSEDCL HVAC Government Demand Program is Expected to Result in Total Demand Savings of 1.17 Mw per Annum

Clears all cost-benefit tests as per MERC's DSM Regulations

MSEDCL

	Target	*Annual Energy Savings*	*Annual Demand Savings*	*Rebate (25%)*
Fan replacement	20,000	1.35 MU	0.44MW	Rs0.7 Cr
Unitary AC replacement	-	-	-	-
Chiller replacement	15	2.59 MU	0.77MW	Rs0.83 Cr
Chiller retro-commission	15	0.55 MU	0.00	Rs0.45 Cr
		4.49 MU	**1.17MW**	**Rs 1.98 Cr**

Program Design: Utility-driven DSM Implementation by Appointing Outsourced Entities



Current DSM Activities in India

- Activities were initiated back in 1991 by WB and continued ever y year by US AID, and State Dept. in 2000+.
- Initiated from 2010 to 2014 ---
  - Several associated states have expanded their application of DSM for u se by utility companies
  - About 12 states have already issued DSM orders
    - Assam, Delhi, Gujarat, Himachal, J&K, Jharkhand, Maharashtra, Orissa, Pu njab, Rajasthan, Tamil Nadu, and Tripura
  - Five other states are also issuing such orders now
    - Bihar, Haryana, Karnataka, Kerala, and UP
  - EESL, Saurabh Kumar, is currently working with MSEDCL, Gujarat, Pun jab and West Bengal to promote DSM programs.

Potential Challenges for Implementation o f Activities in India

- **Lack of Belief:**
  - DISCOMs are not sure whether DSM programs will have predict able and sustainable savings.
    - They are hesitant to include the future savings from DSM programs
  - Very few cases where savings were monitored, programs were evalu ated and incorporated learnings from the pilot program
  - DISCOMs are more confident about outcome of investment they make for generation but not for DSM programs

Potential Challenges for Implementation o f Activities in India

- Lack of Ownership
  - No ownership for DSM at most state levels
  - DISCOMs don't consider DSM to be a solution as a result there is no clear mandate for any organization to undertake EE programs
  - Lack of political visibility is the primary reason for the neglect of DSM by state governments
  - There is low CSO awareness about DSM
    - As a result there is lack of public pressure and no progress on the DSM

- Lack of Implementation Framework
  - The responsibility of designing, monitoring and implementing the fra mework is entrusted mostly to DISCOM
  - Companies like EESL and others are emerging
    - EESL is supporting MSEDCL, Gujarat, etc.

Examples of Activities Worth Pursuing by 12+ States

- Maharashtra government and utility company buildings as de monstrated by MSEDCL
  - Ceiling fans, cool roofs, and ACs and Chiller in government buildi ngs
- Tata and Reliance Activities in Mumbai
  - Ceiling fans, thermal energy storage program, ACs, and manage 500 MW loads in commercial and industrial consumers
- Putting in Place an Implementation Framework
  - BEE and EESL: Expand Bachat Lamp Yojana and agricultural pu mps.
- Formation of State Energy Conservation Committees
  - Conservation committee should be constituted at the state level to rev iew the EE activities such as one supposed to operate in Maharashtr a

Need for Innovations to Implement DSM in India

- Create a steady stream of funding through public benefit s charge
  - US experience suggests 1% to 3% of the ARR spent on DSM
  - Indian Regulators in Haryana have issued DSM regulations that incl ude provision for collecting Public Benefits Charge and fund man agement by professional fund managers
  - KERC Draft DSM regulations too support formation of energy conse rvation fund
- Integrate DSM Outsourced Entities
  - Entities such as EESL or other Consultants, not-for profits (TERI, CS TEP) can manage project portfolios
  - Such a model has been developed by MP Ensystems with a clear roadmap for 1000 MW HVAC energy efficiency initiative

Conclusion

- United States DSM activities are in every 50 states and 24 of these provide excellent examples of how and what may be implemented
- Energy efficiency is typically the lowest cost and is a stable high electricity use in India
- Providing resources to consumers would reduce their electricity demand and allow the use of saved electricity to make up for the losses
- Since 12+ states have approved and set up DSM programs it would be critical to support and expand their application to all potential residential and other customers
  - Maharashtra, Karnataka, others, and US would be examples to learn for use by 12+ states
  - Pursue lighting, ceiling fans, HVAC systems, refrigeration, water heating and motor driven systems

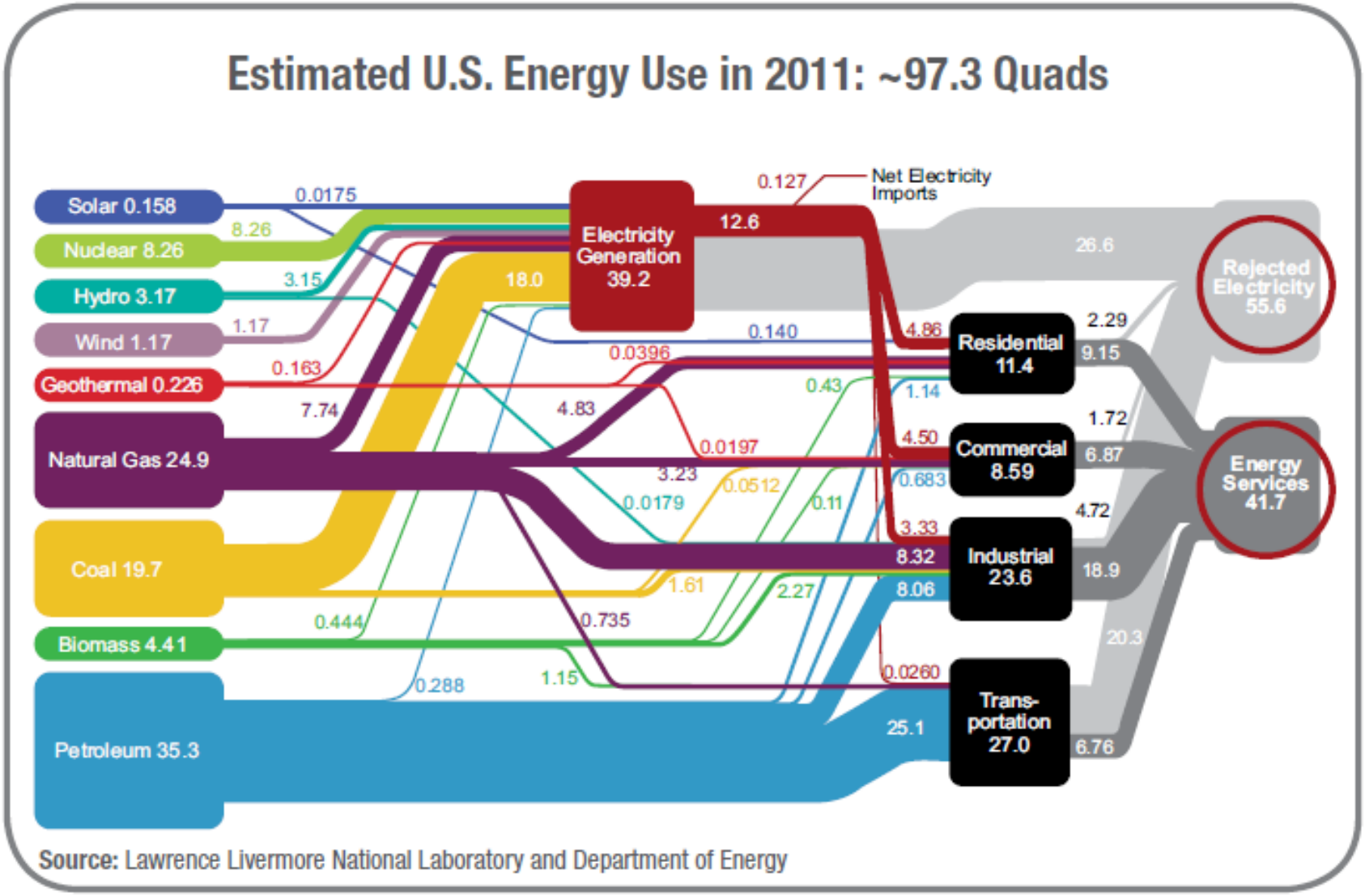
Sources for Information and Data Collection

- United States – California
  - US Department of Energy (DOE),
  - US Energy Information Administration (EIA)
  - US Environmental Protection Agency (EPA)
  - American Council for an Energy Efficient Economy (ACEEE)
  - Lawrence Berkeley National Laboratory (LBNL)
  - Dow Chemical Company (DOW) Analysis

- India
  - Central Electricity Regulation Commission (CERC)
  - Bureau of Energy Efficiency (BEE) and Energy Efficiency Services Limited (EESL)
  - Maharashtra Utility Companies -- MSEDCL, Tata, Reliance, BEST
  - Shakti -- Shakti Sustainable Energy Foundation, Delhi
  - Prayas Energy Group, Pune
  - MP Ensystems Advisory Private Ltd.. Mumbai
  - Idam Infrastructure Advisory Private Limited (IIAPL)

Additional Activities

Estimated US Energy Use



Electric Efficiency Program Budgets per Capita –

12 Top States

State	2013 budget ($million)	$ per capita
Massachusetts	507.7	75.86
Rhode Island	77.5	73.70
Vermont	42.8	68.30
New Jersey	395.1	44.40
Oregon	171.3	43.58
Washington	293.7	42.13
Maryland	205.9	34.73
Iowa	106.7	34.53
California	1,188.8	31.01
New York	593.9	30.22
Minnesota	155.5	28.69
Connecticut	102.4	28.48

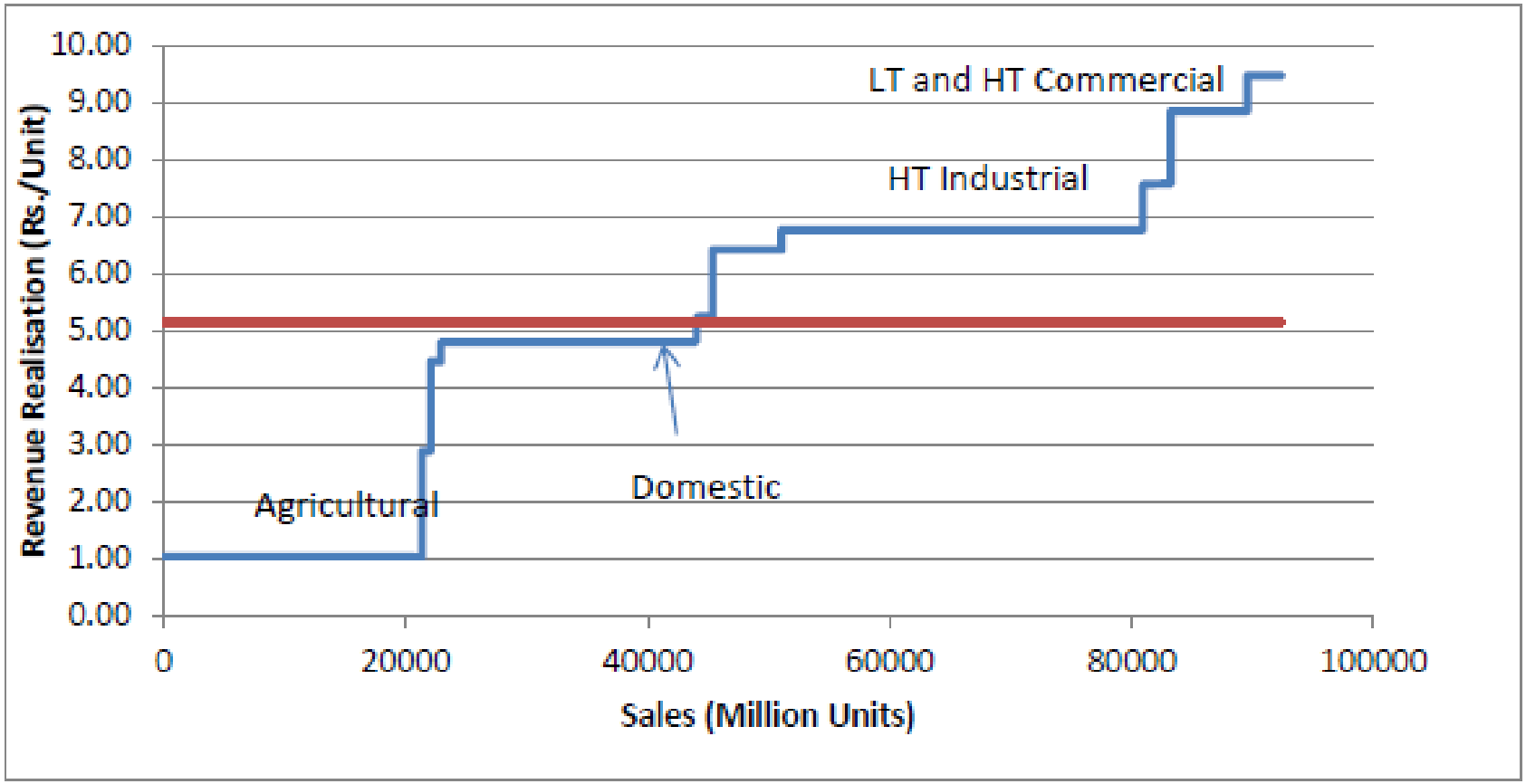
US Energy Plan Costs

- Total budgets for electricity efficiency programs in 2013 reached $6.3 billion. Adding this to natural gas program budgets of $1.4 billion, we estimate total efficiency program budgets of more than $7.7 billion in 2013.

- Savings from electricity efficiency programs in 2013 totaled approximately 24.3 million megawatt-hours (MWh), a 7% increase over the 2011 savings reported last year.

Average Revenue Realization for Maharashtra DISCOMs 2013-14 as per MYT

Typical for Most States



Past DSM Activities in India

- Initiated back in 1991
  - Analysis was done by World Bank staff for application in Uttar Pradesh, and other states
  - Also supported by US AID in several locations in Rajasthan for example 1995 onwards.
  - USAID also supported activities in early 2000, and an important one was initiated in Karnataka
  - US State Department supported such activities starting in 2006. Work was initiated by Dr. Pramod Deo, Maharashtra Regulatory Commissioner. In 2007-08 it led to the setting up for use by four utility companies – MSEDCL, Tata, Reliance and BEST.
  - All four are now engaged with DSM programs

Heating, Ventilation and Air Conditioning Systems (HVAC)

Main Processes that come under HVAC Category:

a) Heating : Raising the temperature of the targeted space to the desired level

b) Cooling : Decreasing the temperature of the targeted space to the desired level

c) Humidifying: Raising the moisture content in the targeted space to the desired level

d) Dehumidifying: Lowering the moisture in the targeted space to the desired level

e) Cleaning: Removing unwanted particles such as dust from the targeted space.

f) Air movement and Ventilating: Providing ventilation to the targeted space to maintain freshness.

Nobel Peace Prize 2007: Climate Change

Al Gore and IPCC
Intergovernmental Panel on Climate Change --
Dr. Rajendra Pachauri

Nobel Prize Contributor
Jayant Sathaye
and
several others

* CERC and LBNL -- MOP was established in 2009, and a second five year one was set up i n 2014.
* Both pursued DOE programs and o ther activities since then.

US-China Agreement: Energy Efficiency

- Both President's announced their nations' commitment to cur b greenhouse gas (GHG) emissions in Nov. 2014.
- Under the new agreement, the U.S. will build upon existing eff orts and reduce emissions 26-28% below 2005 levels by 2025 .
- China is committing to reduce its carbon intensity (carbon emi ssions per unit of GDP) by 40-45% and increase its use of clea n energy sources by 20% by 2030 or earlier.
- This announcement is significant in many ways, as China is o ne of the world's biggest polluters and together the U.S. and China are responsible for 45% of total global emissions.

Consumer Participation and Protection

A Study of Five States

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Overview

- Rationale for Study
- Approach of the Study
- Observations
- Preliminary Recommendations
- Proposed Actions for FoR

Five States: Delhi, Haryana, Karnataka, Maharashtra and Rajasthan

Rationale for Study

- Many good policy initiatives and structural changes in power sector, but improvement sluggish
  - Frequent calls for populist measures that contradict reform efforts
  - Lack of trust in system among consumers
- Build-up trust and increase social acceptance of regulatory decisions through avenues for consumer voice:
  - Better quality of service through Improved consumer grievance redressal mechanism (CGRM)
  - Increased involvement of consumers in regulatory proceedings
- Civil society organizations (CSOs) should be seen as partners of SERC
  - Consumer participation (CP) can strengthen information base available to SERCs for making decisions

Approach to Assessment of Consumer Involvement

Focus of Assessment	Grievance Related	Inputs for Regulatory Issues
Structure and Processes	Review of documents ; Semi-structured interviews	Review of documents; Semi-structured interviews
Observed Outcomes	Analysis of CGRF and Ombudsman data	Review of proceedings and orders
Consumers' Perception	Surveys and Interviews	Surveys and Interviews

Together , the three types of assessments gave an indication of the effectiveness of consumer involvement in the regulatory process.

Observations - CGRM

- Composition of CGRFs important for fairness
  - Need more independence from licensees
- Inadequate resources for CGRF in some cases
- Some CGRFs not considering all issues such as quality of supply
- SoPs have been set up, but potential untapped
- Low consumer awareness about CGRM regs
- Important to incentivize utilities to improve internal complaint handling processes
- Information about complaints and grievances not feeding into regulatory decisions

CGRM has emerged as useful platform for consumers to raise voice, but not reached desired level of effectiveness.

Observations - CP

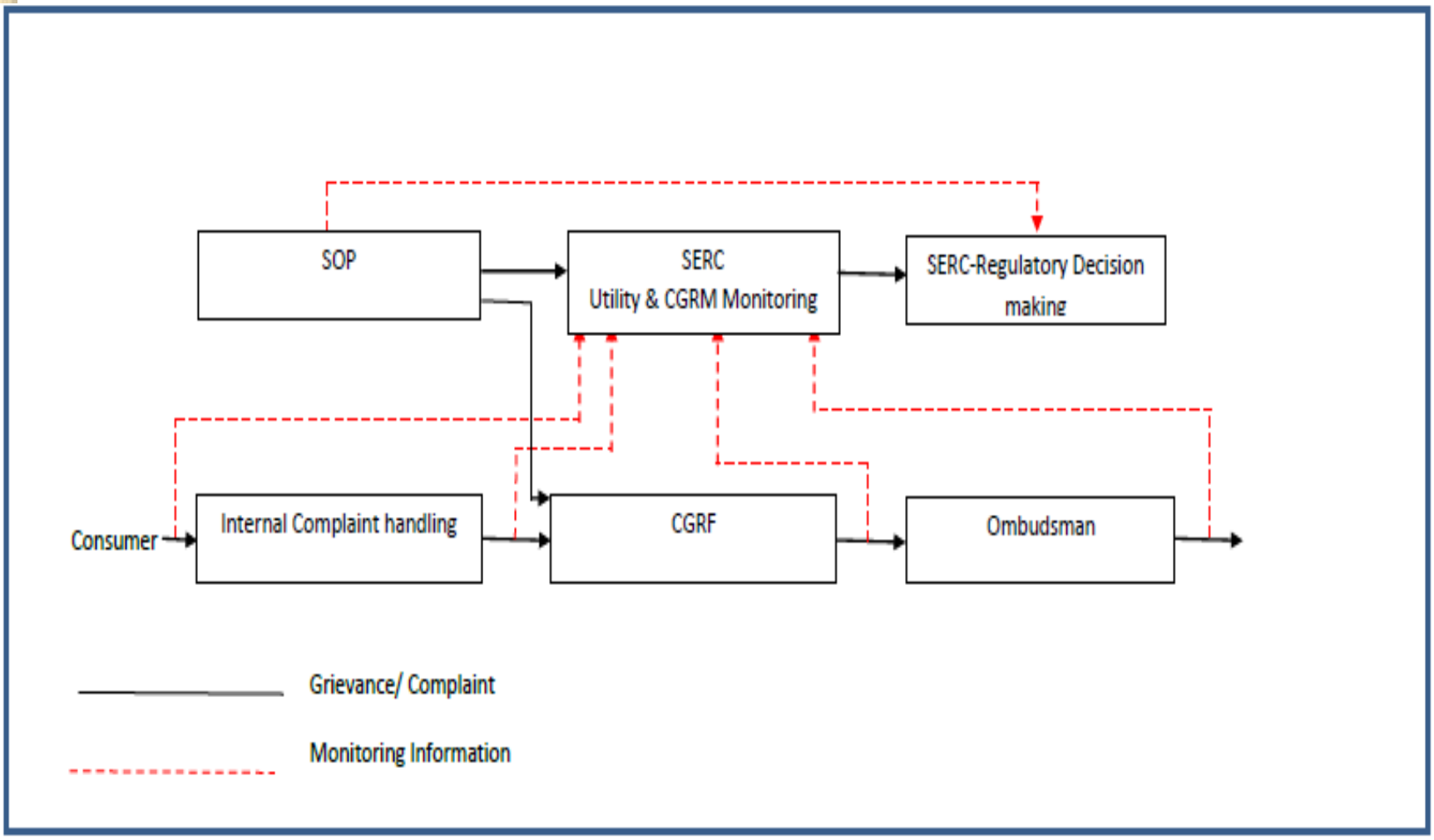
- Level of CP varies across states
  - Except MH, consumer groups non-existent or struggling
  - Large consumers better informed and organized
- Need supportive eco-system for CP:
  - Informed and assertive consumer groups
  - Receptive and engaging SERC
  - Non-interfering state government
- In some states, misuse of public hearings for political purposes
- In some states, SERCs lenient with government-owned discoms
- SERCs need innovative ways to communicate decisions.
- SACs not very effective
  - Composition skewed in favor of government and discoms
  - Focus more on operational issues and not much on major policy issues

Provisions for CP in EAct, but adoption is often symbolic and not much substantive participation

International Experience in CP&P

- Reviewed experience in: USA, UK, Australia and Brazil
- Need space for deliberations with interaction with major stakeholders:
  - Public hearings not sufficient; one-way communication
- Need strong advocate for consumers
  - Small consumers: dispersed; not organized; lack of expertise and resources.
  - Consumer Advocate should be: consistently present, technically capable, adequate resources
- Providing choice of supplier does not obviate need for strong consumer protection and advocacy.

Preliminary Recommendations – I
Need for Holistic Approach to CP&P



Have consumer cell in each SERC to assist with monitoring and analysis

Preliminary Recommendations – 2 Improvements in CGRM

- Improve discom internal complaint handling process
- Make CGRF independent of licensee
- CGRF should consider all non-criminal issues, not just monetary issues
- SERC should monitor and enforce compliance of CGRF orders by discom

Preliminary Recommendations – 3 Compliance with SoP

- Ensure filing of performance reports per Sec 59 of EAct.
- Follow with meeting of SERC, discom, CGRF and Ombudsman
- Monitor performance at aggregate level and individual complaint level
- Explicit authorization to CGRF to order compensation for not meeting SoP even if consumer does not ask for it.

Preliminary Recommendations – 4 CP

- Create space for deliberations
  - Hold consultations on major issues beyond technical validation sessions
- Need at least one designated consumer representative (CR) in each state
  - Consistently present
  - Technically capable
  - Adequate resources

Preliminary Recommendations – 5 CP (Contd)

- Select and finance designated CRs
  - Selection through regional institutes
  - Create fund for financing CRs
- Need representatives for vulnerable groups
- Improve SACs
  - Balanced composition
  - Independent chairperson
- Better communication with consumers by SERC

Suggested Actions for FoR

- Set up committee to deliberate on improving CP&P
  - Detailed presentation and discussion of our study
  - Prepare action plan for CP&P
  - Wider engagement (MoP, industry leaders etc.)
- Create fund for CRs
- Develop process for selecting designated CRs
- Provide training to designated CRs and special interest groups representing vulnerable groups.

Thank You

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Amendments in Electricity Act, 2003

Salient features of Proposed Amendments

- Enforcing Grid Security.
- Thrust on Renewable Energy.
- Streamlining of Tariff determination process.
- Matters relating to Regulatory Commissions.
- Encouraging Retail Sale Competition: Separation of Carriage and Content in the distribution sector.

Enforcing Grid Security

- **Increase in penalty** for non-compliance of orders/ directions relating to Grid Security and other directions.
  - Rupees Fifteen Lacs to Rupees Ten Crore **(Section 29)**,
  - Rupees Five Lacs to Rupees One Crore **(Section 33)**,
  - Rupees One Lac to Rupees One Crore and recurring penalty of Rupees Six thousand to Rupees One Lac on every day of non-compliance **(Section 142)** and
  - Rupees One Lac to Rupees One Crore and recurring penalty of Rupees five thousand to Rupees One Lac on every day of non-compliance **(Section 146)**.

- Note:
  - The penalty for Renewable Energy generating companies shall be Rupees Ten Lacs and in case of continuing failure an additional penalty of Rupees Ten thousand per day; and
  - No penalty on individuals **(Section 149)**.

Thrust on Renewable Energy

- Introducing **atleast 10% Renewable Power Generation obligation** on setting up of new coal and lignite based thermal power plants **(Section 7)**
- **Exemption** of sale of electricity generated from renewable energy sources **from cross subsidy and open access charge for a period** as prescribed **(Section 42(4))**
- Bringing (Renewable Purchase Obligation) RPO and (Renewable Generation Obligation) RGO **under penal provision with penalty under** Section 142 **(Section 142)**.
- Provision for National Renewable Energy Policy **(Section 3)**
- Exemption for licence for persons generating and supplying electricity from Renewable Energy sources **(Section 14)**.

Streamlining of Tariff Determination Process

- Allowing licensees to **recover cost of electricity** without any revenue deficit **(Section 61(d))**.
- Provisions of Tariff Policy **made mandatory** for Tariff determination **(Section 61(2))**
- Provision for initiating *suo-motu* proceedings for determination of tariff **(Section 64)**.
- Recommendation for revocation of license by Government due to **non-compliance of standards** **(Section 59A)**.

Matters relating to Regulatory Commissions

- The term of office for the Chairperson or other Member shall hold office for a term of **three years** from the date he enters upon his office or 65 years of age whichever is earlier and eligible for second term on re-appointment **(Section 89)**.
- Provision for **expeditious disposal** of tariff petitions by the Commission from 120 days to 90 days **(Section 64)**.
- **Review of performance** of Regulatory Commissions by a Peer Committee constituted by Forum of Regulators **(Section 109A)**.
- Removal of Member in case of **non-performance** **(Section 90)**.
- Interim nomination against **vacancies in case of delay** of more than 5 months in the appointment of Chairpersons/ Members of the State Commissions **(Section 85)**.

Promotion of competition and choice to consumers

- Electricity Act, 2003 has encouraged competition in generation and transmission sectors.
- Distribution sector has been largely regulated marked by high losses and inefficient operation.
- Competition and choice is proposed through separation of carriage and content in the proposed amendment.

Encouraging Retail Sale Competition: Separation of Carriage & Content in the Distribution Sector (1/2)

- Distribution and supply businesses to be recognized as separate licensed activities (Section 14)
- **Distribution licensee** to be responsible for development, operation and maintenance of distribution network business and shall have an obligation to provide connection on demand to any consumer in its area of distribution (Section 42)
- **Incumbent supply licensee**
  - To be carved out of the existing distribution licensee
  - Responsible for arranging supply of electricity for all the consumers in its area of supply (Section 51A)
- **Subsequent supply licensee**
  - Licenses to be granted to other applicants in the area of supply of the incumbent supply licensee – **atleast one company to be a Government Company** (Section 14)**.**
  - Existing Distribution licensee and Franchisee shall continue as per the terms of their on-going license/ contract (Section 14).

Encouraging Retail Sale Competition: Separation of Carriage & Content in the Distribution Sector (2/2)

- **Intermediary Company** to hold all the PPAs as per re-organization scheme **(Section 131(4A))**
- Supply licensees so designated by Appropriate Commission to be **Provider of the last resort** **(Section 51B)**
- Tariff for consumers not to be regulated – only ceiling tariff **(Section 51D)**
- Sections amended: 14, 20, 24, 42, 44, 45, 47, 48, 49, 50, 69A and introduction of new part VI and VIB as consequential changes.

Other Issues

- Exemption to developer of SEZ area for obtaining distribution licence
- Exemption to Railways and Metro Rail for obtaining distribution licence
- Making provisions for collection and realisation of any dues along with the electricity dues.
- 15 days notice period for disconnection of supply not required in case of Pre-paid meters.

Thank You