Evolution of Rural Electrification Process in India: A Historical Perspective

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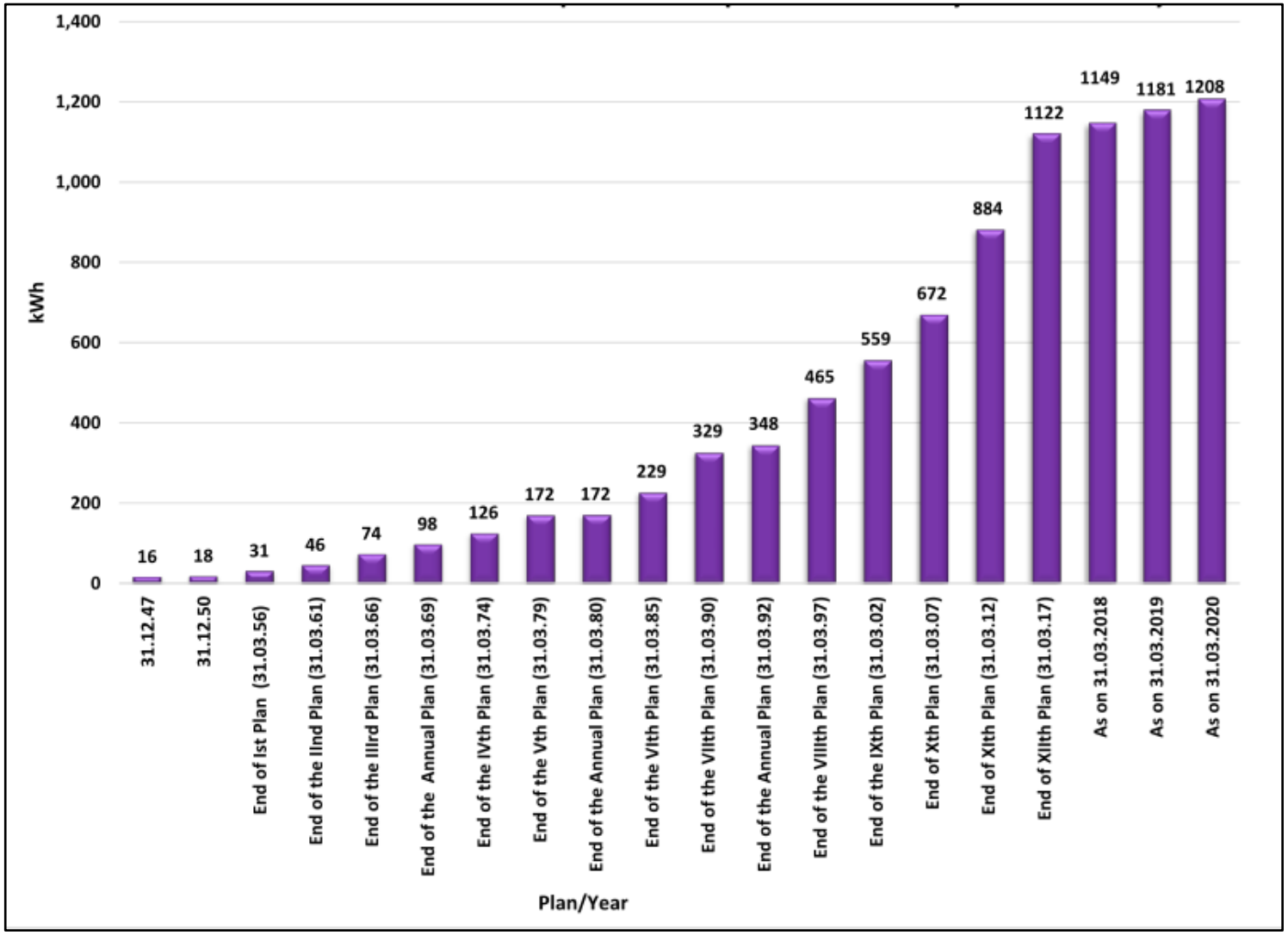
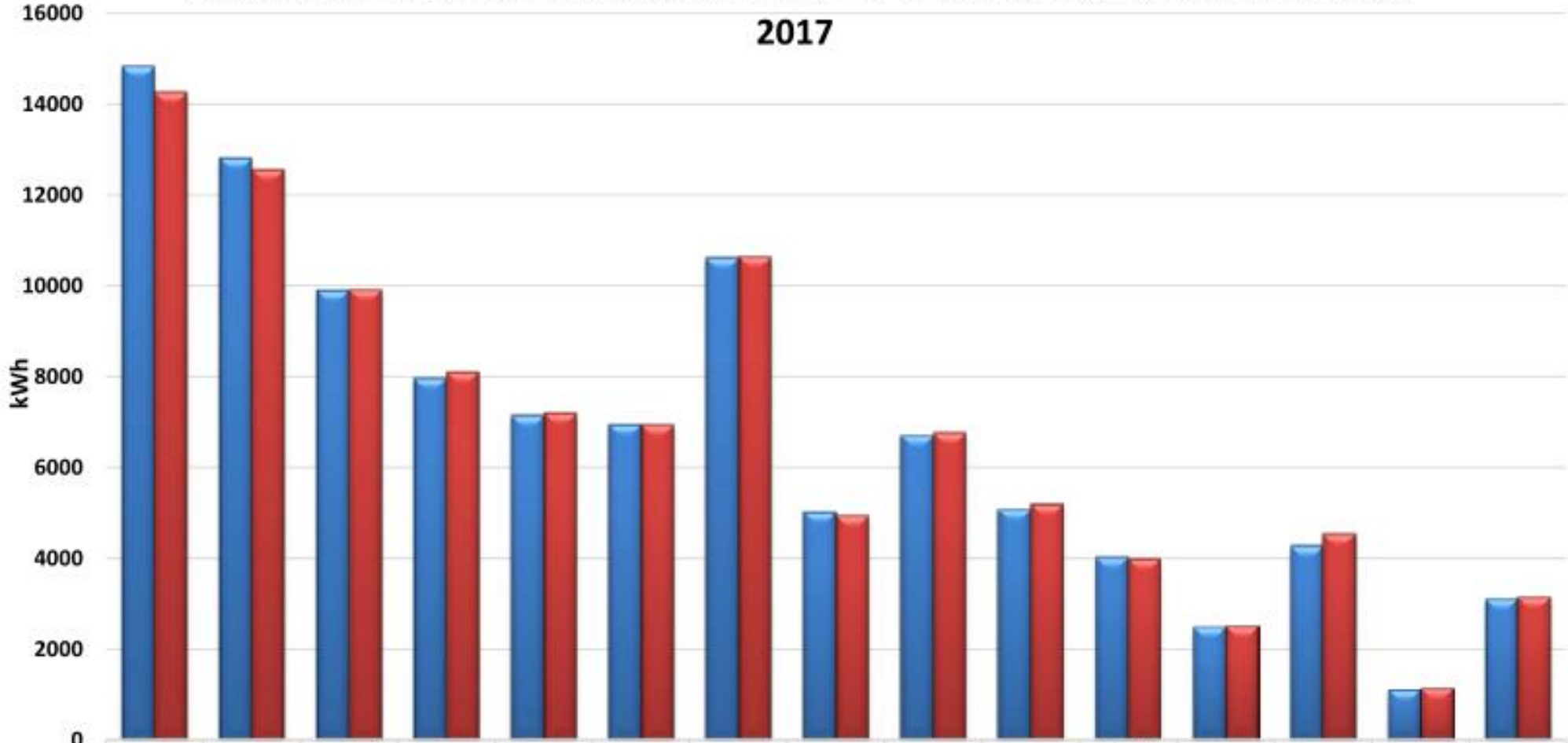
Per Capita Electricity Consumption in India



- From less than 0.3% of population coverage to near universal electrification in India

PER CAPITA ELECTRICITY CONSUMPTION IN VARIOUS COUNTRIES IN 2016 & 2017



	Canada	USA	Australia	Japan	France	Germany	Korea	UK	Russia	Italy	South Africa	Brazil	China	India*	World
2016	14844	12825	9911	7974	7148	6956	10618	5033	6715	5081	4031	2504	4279	1122	3110
2017	14273	12573	9922	8111	7209	6947	10654	4951	6771	5202	4004	2521	4546	1149	3152

Source : IEA publication 'Key World Energy Statistics 2016 website (other than India)

* Per capita consumption = (gross electrical energy avaibality /mid year population)

Evolution of Rural Electrification in India

- The pre-independence period from 1900 to 1947’s;
- The period of state ownership from the 1948s to early 1990s, and
- The post-reforms period from 1990s onward

The Early Years

- 1879 - Electricity generation began under the colonial regime with the demonstration of electric lighting in Calcutta (now Kolkata)
- Around the same time, electricity started to be served in Crawford Market, Bombay (now Mumbai)
- 1897 - First commercial generation of electricity started in Darjeeling - **130 kW** Sidrapong hydel power station was commissioned
- 1899 - 1MW plant in Calcutta to supply DC electricity.
- 1910 - 15 MW plant by CESC commissioned generating AC at 6 kV, which was stepped down & converted to DC to supply to consumers.
- Learning from the experiences, the princely states of Mysore, Kashmir & Travancore also set up hydro-electric plants
- 1915 - Tata Hydroelectric Agency started supplying power to Bombay, the first private sector generation by an Indian company

Pre-Independence Period

- Electricity was mainly used for electrifying major towns;
- For rural areas electricity was primarily used for powering irrigation pump-sets; and
- Distributed generation and supply, dominated by the private developers and princely states, was the primary model followed.

Indian Electricity Act, 1910

Regulate the generation, supply, and use of electricity and dealt with licensing, regulation and safety, giving considerable authority to the provincial governments

- Provided basic framework for electric supply industry;
- Growth of the sector through private licensees by State Govts.
- Provision for a license for supply of electricity in a specified area;
- Legal framework for laying down of wires and other works;
- Provisions laying down the relationship between licensee and consumer

The Electricity Act 1887, was the first legislation regulating the generation, supply and use of electricity. That was repealed and replaced by the Indian Electricity Act 1903, which later got replaced by the Indian Electricity Act 1910.

".....Why do we want cheap and abundant electricity in India? The answer is that without cheap and abundant electricity no effort for the industrialisation of India can succeed. .... Ask another question, why is industrialisation necessary? .... We want industrialisation as the surest means to rescue the people from the eternal cycle of poverty in which they are caught....."

- Dr B R Amdedkar, Chairman, Committee on Public Utilities & Electricity, 1943

"…Have you worked out the problem of electricity for every home? What is the cost? My remark quoted by you is a poser for the time being.... Since you believe in it, I want you to work it out and demonstrate the physical and economic possibility of 'electrifying every home' of India……"

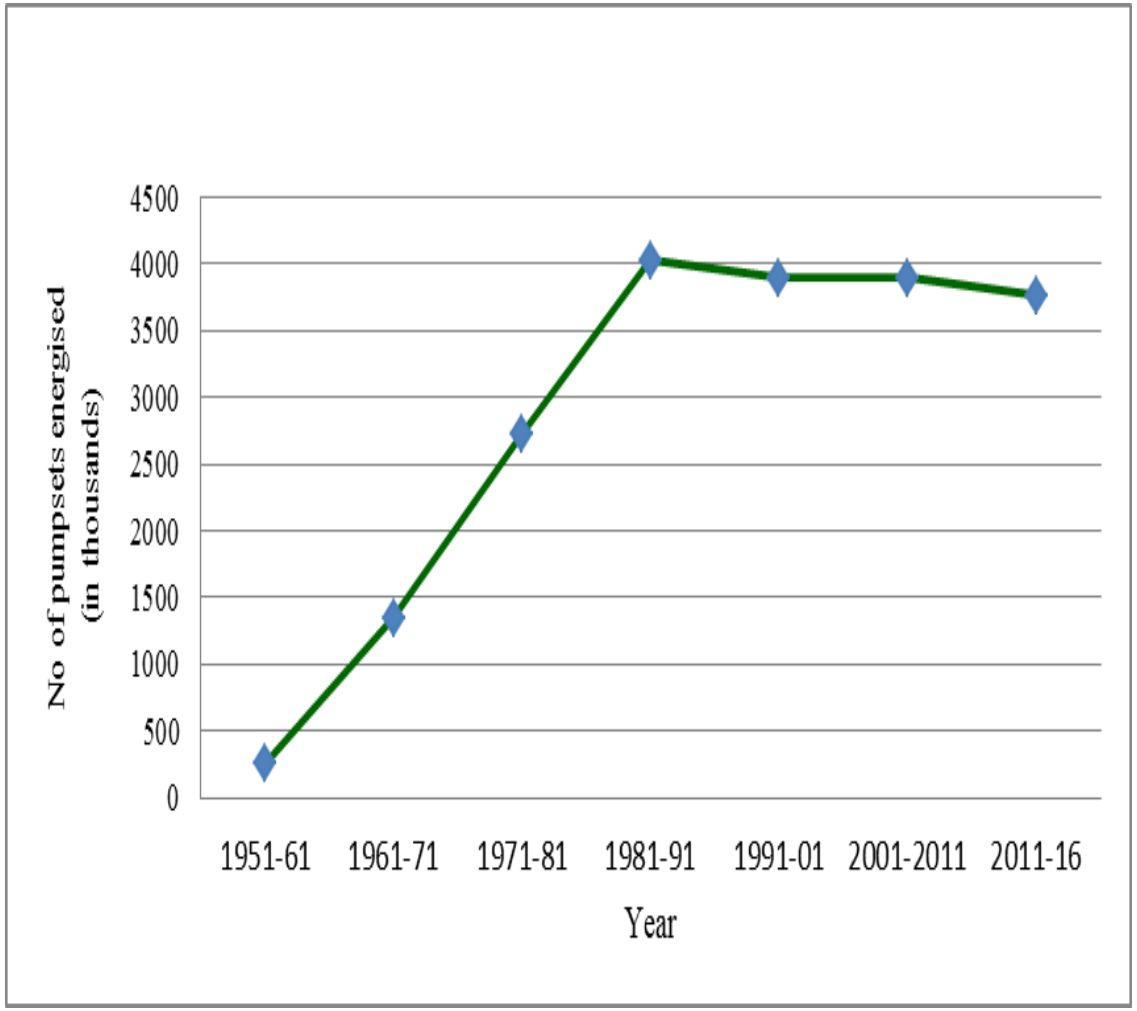
- Mahatma Gandhi's letter dt. 30 April 1945 to Shri Amiya Nath Bose

Period of State Ownership after India's Independence

- Electricity Act of 1948 –
  - Developed along the contour of 1926 Electricity (Supply) Act of UK to facilitate the establishment of regional coordination in the development of electricity transcending the geographical limits of local bodies
- Critical issues for decision
  - State versus private ownership (a major policy shift)
  - Provincial versus federal control
    - In line with 1935 Govt. of India Act
    - Considering material interests (e.g. electricity tax)
  - Centralized vs decentralized mode of electricity generation and supply

FYPs Priorities

- 1950 & 1955 - Emphasis on irrigation for enhancing agricultural productivity as well as on the development of micro-enterprises
- Policy shift in the 1960s: village electrification to pumpset energization
- While India did progress considerably in terms of pump-pset energization to achieve food security, this turned out to be a major cause of SEBs deteriorating financial health
- Policy shift in 1970's: Pumpset energization to electrification as 'basic needs'
- Minimum Needs Programme, Kutir Jyoti etc.



Rajadhyaksha Committee in 1980–All villages by 1994/95 & HHs by 2000

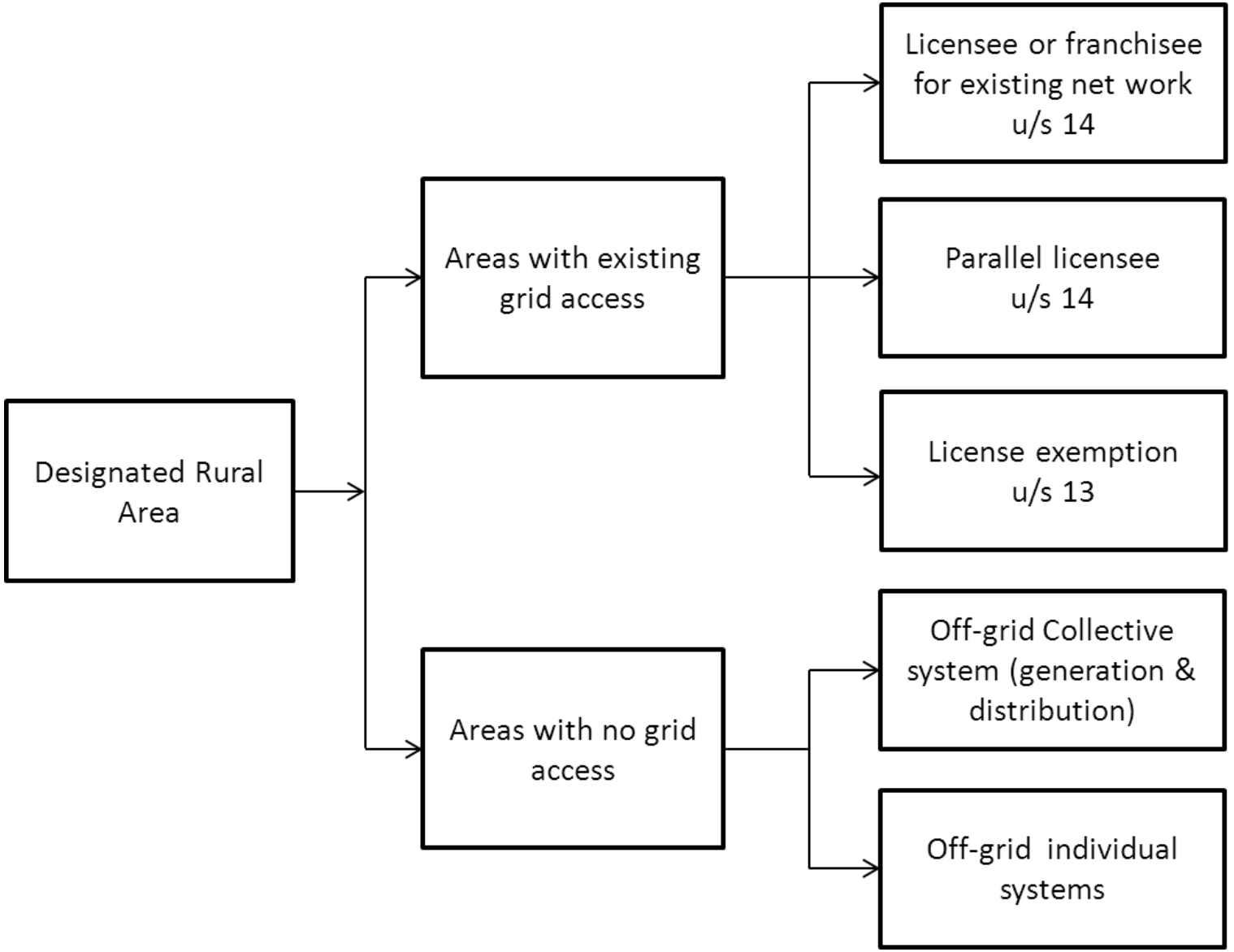
Post Reforms (1990 onwards)

- Independent Power Producers
- Power sector Regulation
- Privatization & Franchising
- Accelerated Rural Electrification Programme
- Rural Electricity Supply Technology Mission
- Remote Village Electrification Programme
- Village Energy Security Programme

Electricity Act, 2003

- Harmonized and rationalized the provisions in the IE Act 1910, Electricity (Supply) Act 1948 and ERC Act 1998;
- Encouraged private sector participation in generation, transmission and distribution by de-licensing generation and licensing for transmission, distribution & trading;
- Distanced the regulatory responsibilities from Government to Regulatory Commissions – both at central and state level;
- Obligated the central and state to ensure electrification of all households in the country;
- Provision of open access in transmission and distribution;
- Unbundling of the State Electricity Boards

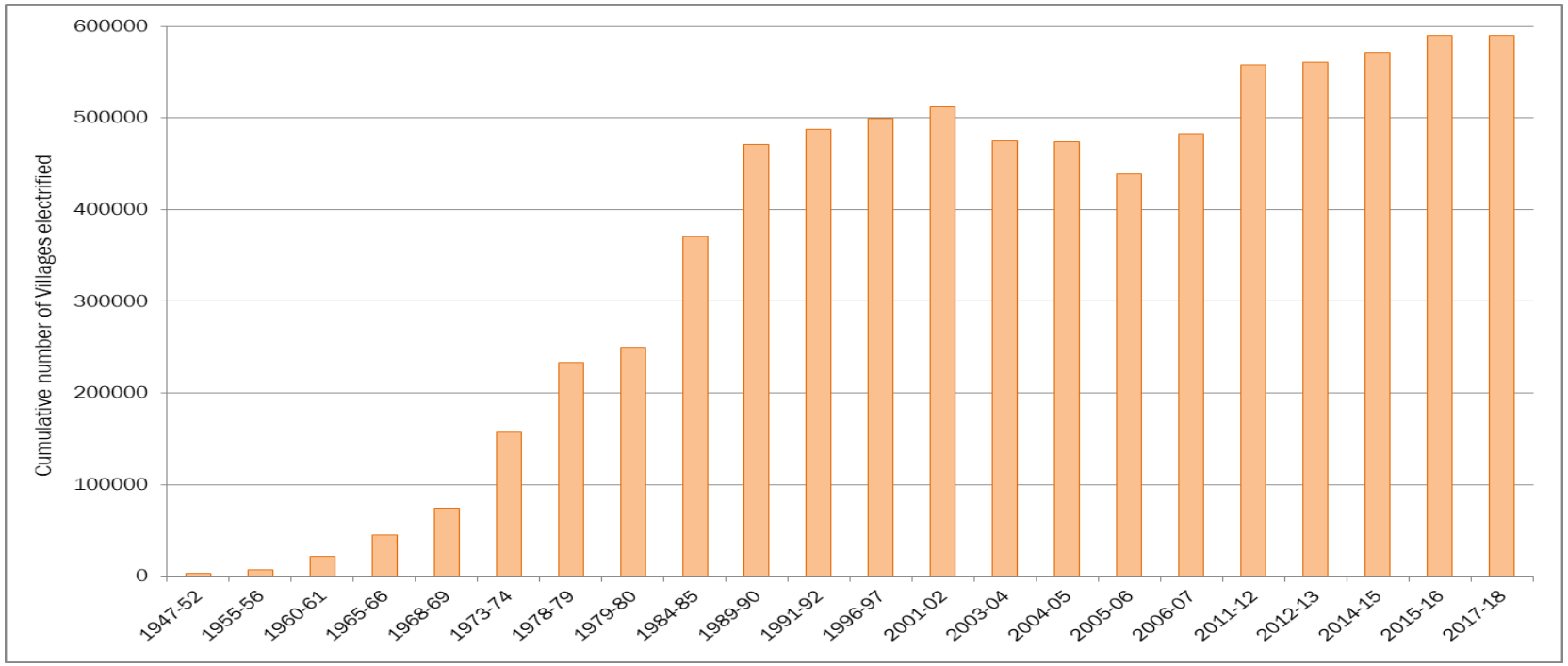
Rural Electricity Delivery Options



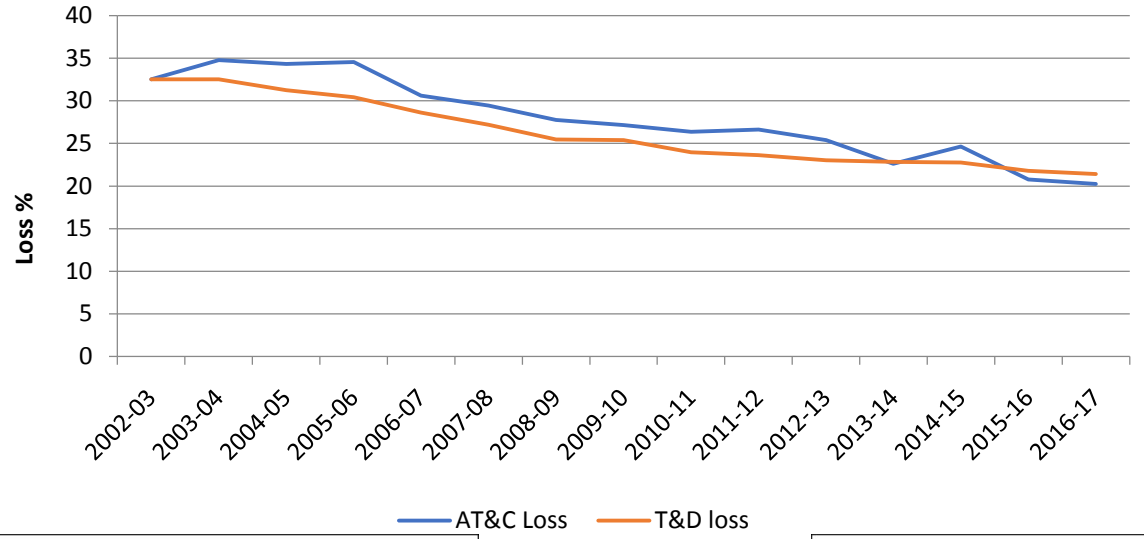
Since EA 2003

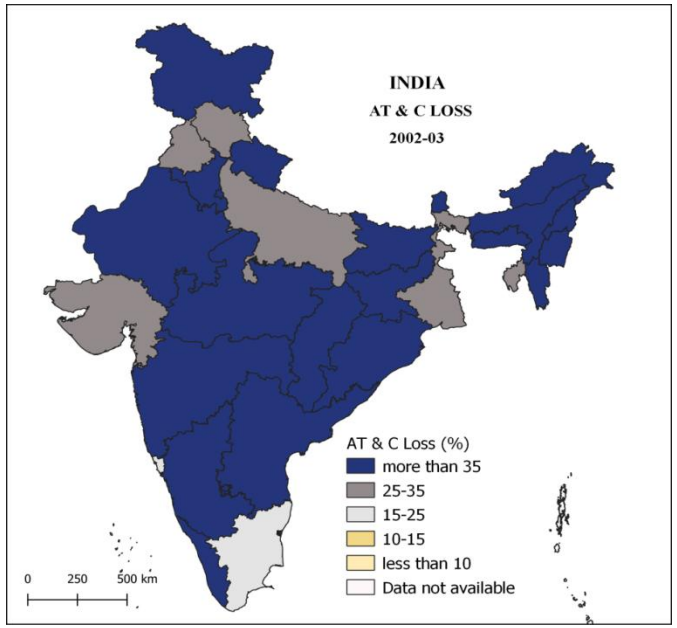
- Rajiv Gandhi Grameen Vidyutikaran Yojana
- Decentralised Distributed Generation
- Deendayal Upadhyay Gram Jyoti Yojana
- SAUBHAGYA

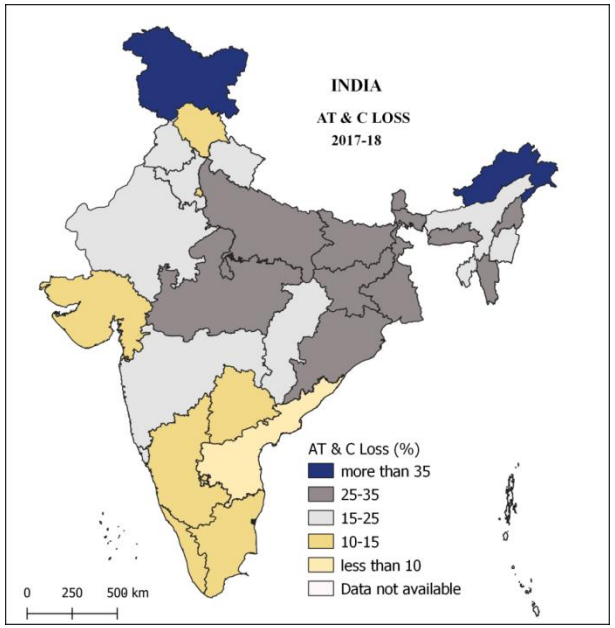
The Result from 1947



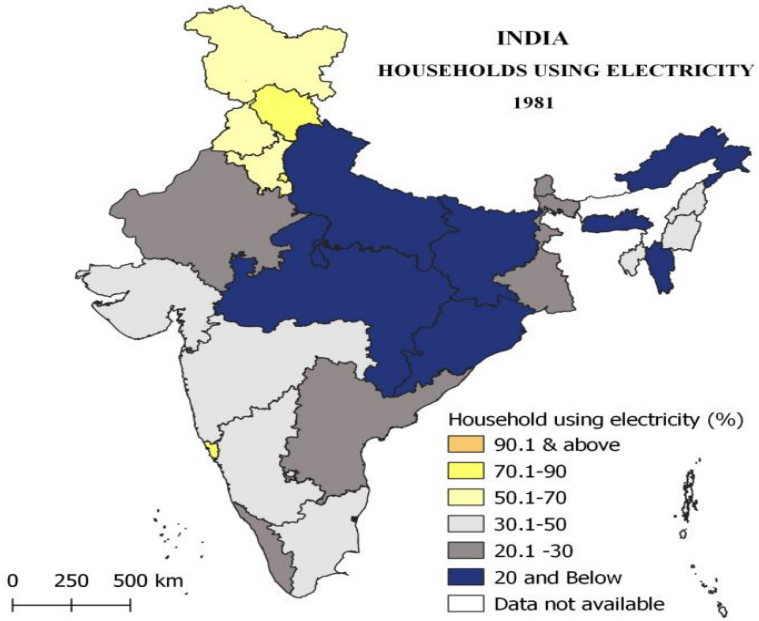
AT&C Loss before Electricity Act & after UDAY

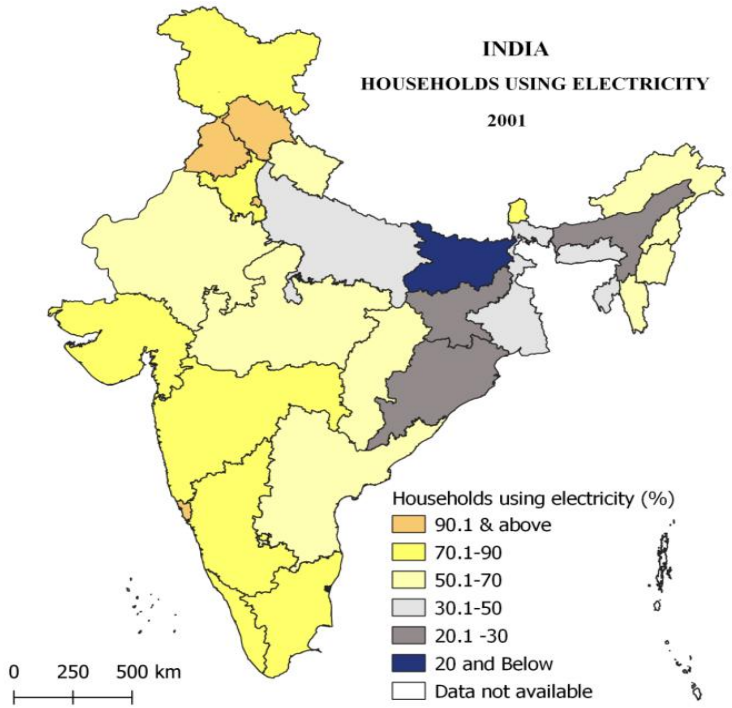


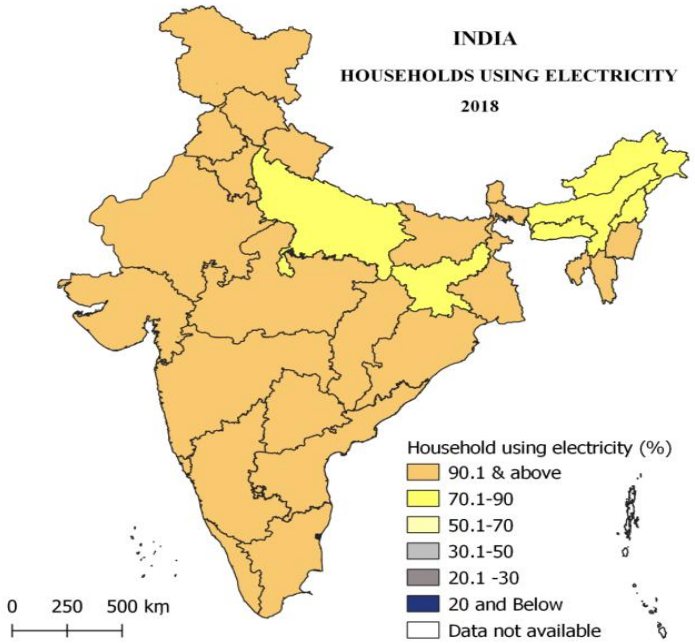




Progress of HH Electrification in India







Current Challenges

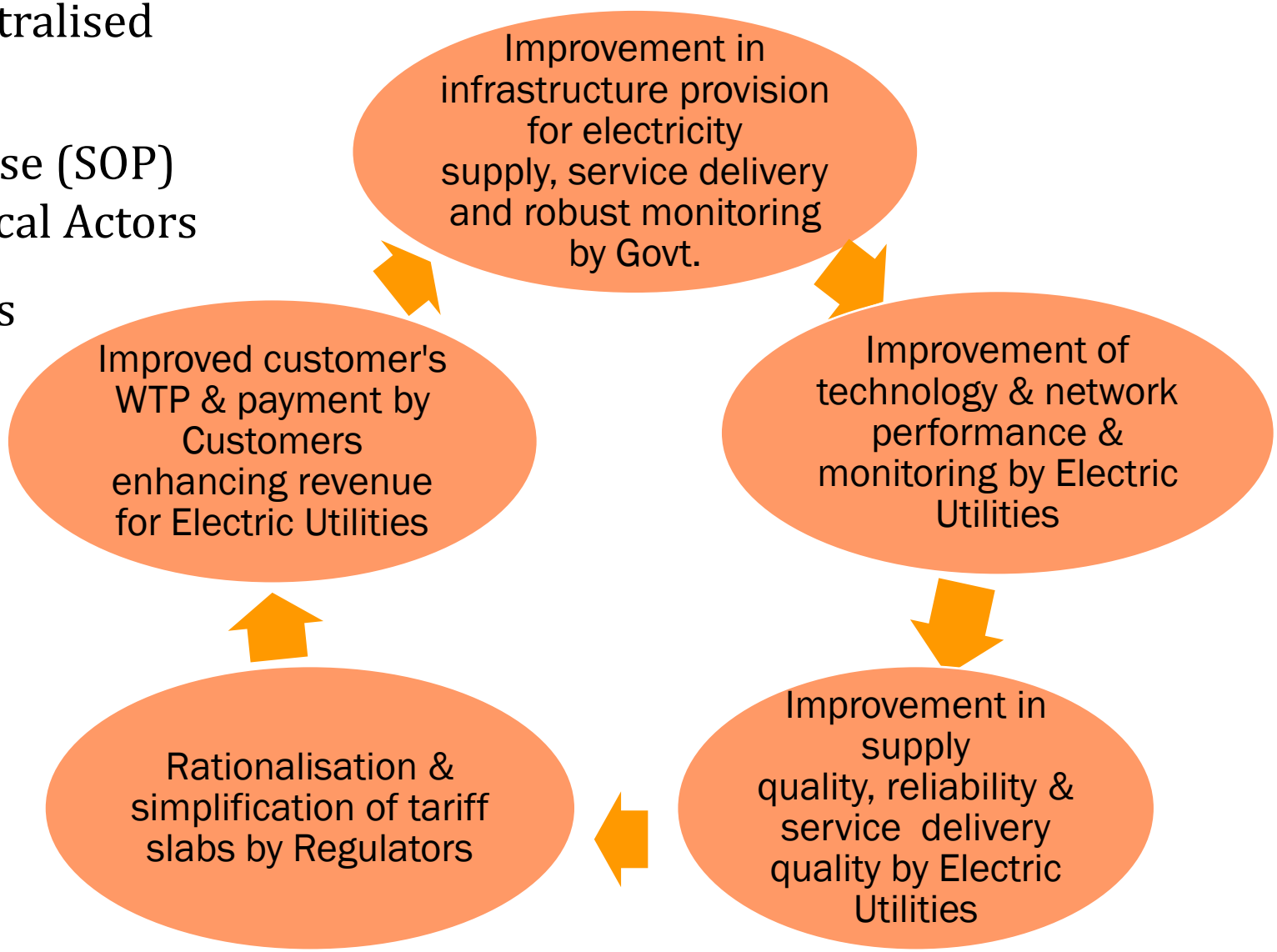
- Subsidy trap and Financial unviability
- Improving Household electricity level & Supply reliability
- Absence of Complementary schemes at the state level
- Absence of synergy with rural development efforts
- Institutional and Governance barriers

What Inferences can be drawn?

- Process of rural electrification in India has followed distinct thought process at different periods:
  - Private decentralised to public centralised
  - Focus on industries to pumpsets to village to households
  - Productive input to basic services to infrastructure
- Dominance of economic consideration & Area approach over HHs
- Disparity in state-level access –
  - State(s) with complementary schemes have better success rate
  - Predominantly farming states have performed better
- Increasing control by central govt. vis-à-vis states over time
- Inconsistencies in data reported despite improvement in monitoring
- Slower growth in energy consumption in the domestic sector

Framework to Strengthen the Rural Electricity Sector

- Centralised or Decentralised Generation
- Structured Rules-in-Use (SOP) for Sub National + Local Actors
- Decentralised Services



Thank You

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