Idam Infrastructure Advisory Pvt. Ltd.

Regulatory Framework for Storage Microgrids

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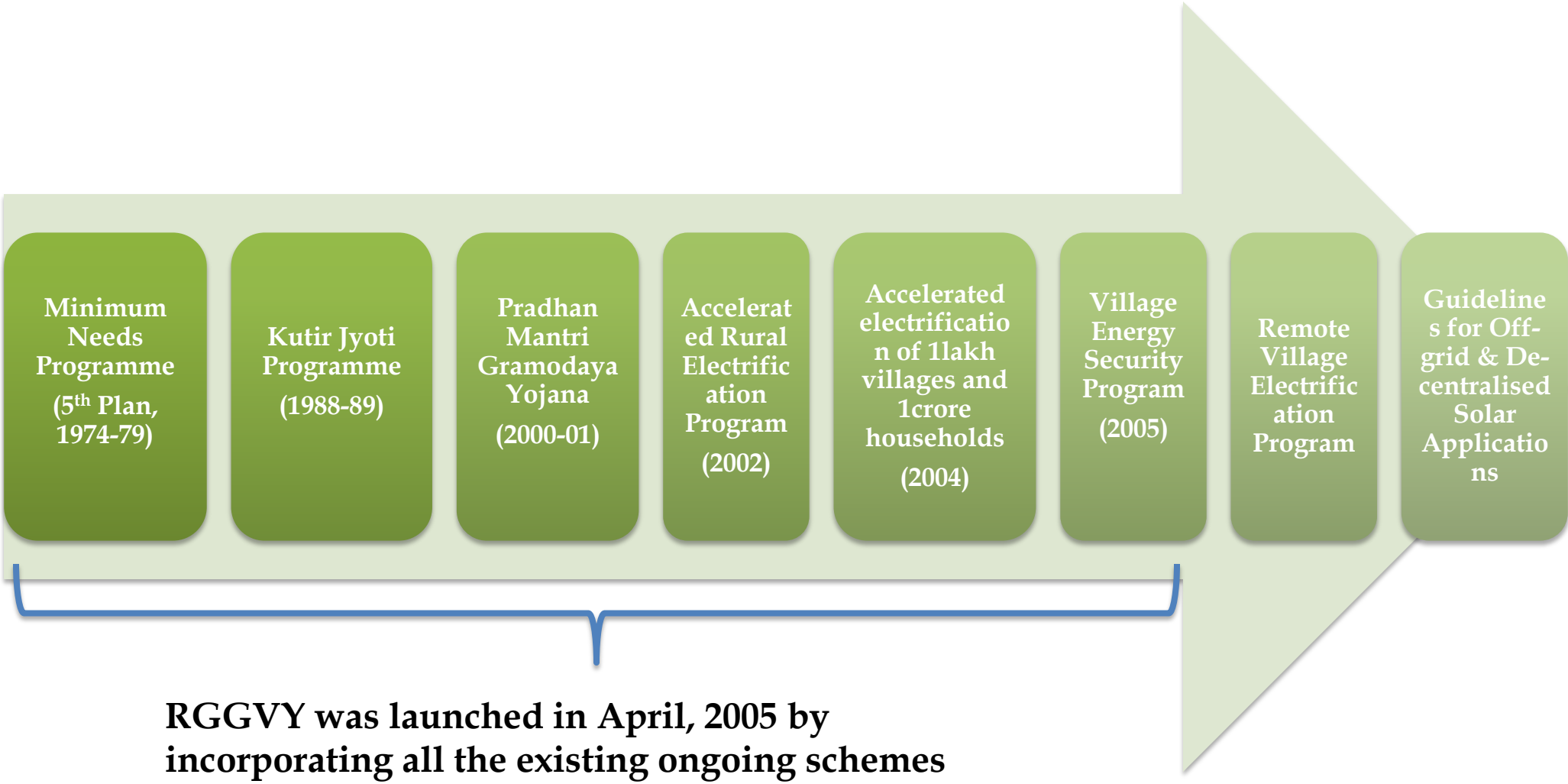
Major Rural Electrification Initiatives



RGGVY was launched in April, 2005 by incorporating all the existing ongoing schemes

Rural electrification position in India

Population (Census 2011)	**1,210,193,422**
Village electrification status on 31-03-2013	
No of inhabited villages (2001 census)	**593732**
Cum achievement as per new definition	**557439** (93.9%)
Un-electrified villages as on 31-03-2013	**33466**
Power supply position FY 2012-13	
Requirement (MU)	**998,114**
Availability (MU)	**911,209**
Surplus /deficit (MU, %)	**-86,905 , (-8.7%)**
Peak demand (MW)	**135,453**
Peak Met (MW)	**123,294**
Surplus /deficit (MW, %)	**-12,159, (-9.0%)**

Need for Microgrids ??

- Around **1.3 billion** people do not have access to electricity
- India has **23%** of the world population without access to electricity
- Amongst the Developing Asia, India ranks number 1 with around 47% of the developing Asian population residing in India
- Average electrification rate – **75%**
- Rural electrification rate – **67%,** large section of this population resides in padas/ bastis/ hamlets with population less than 500
- Urban electrification rate **– 94%**
- Cost of energy based on RE reaching grid parity in few states

Problems faced by Microgrid Operators

- Lack of appropriate regulatory framework for Micro grids
- Difficulty in raising funds for micro-grid projects – lack of successful track record
- Low financial returns and fewer exit options for investors
- Project viability due to high cost and low acceptance
- High capital cost due to small Scale projects
- Lack of trained manpower for in house O&M
- Theft of critical components like PV panels, batteries, cables etc
- Lack of paying capacities of rural consumers
- Low costs of alternatives such as diesel & kerosene
- Comparison with cheaper and reliable grid power
- Notability of RE based micro grids to match the load profile of rural consumers
- Inaccessible and Remote areas – requires high installation and O&M cost
- Unacceptability among the rural communities when grid is available

Regulatory Framework for Rural Electrification

Electricity Act, 2003

Section 3 of EA 2003 empowers the central government to formulate two policies, namely the NEP and the Tariff Policy to ensure optimal utilization of resources, including fossil fuels and renewable or non-conventional sources of energy.

Section 4 mandates the central government to formulate policies for stand-alone systems for rural electrification and utilizing renewable or non-conventional energy resources.

Section 5 mandates the central government to formulate a policy for rural electrification empowering Panchayat4 institutions and local communities to buy power and manage its distribution in rural areas.

Section 6 emphasizes three main issues:

Universal service obligation and the government's focus on rural electrification

Waiving the requirement of a licence for generating electricity

Waiving the requirement of a licence for distributing electricity in notified rural areas to buy power and manage its distribution in rural areas.

Regulatory Framework for Rural Electrification

National Electricity Policy

Clause 5.1.2 of the policy stipulates creation of a reliable rural electrification system at places where it is feasible to expand the grid.

In order to do so, the policy stipulates creation a rural electrification distribution backbone (REDB).

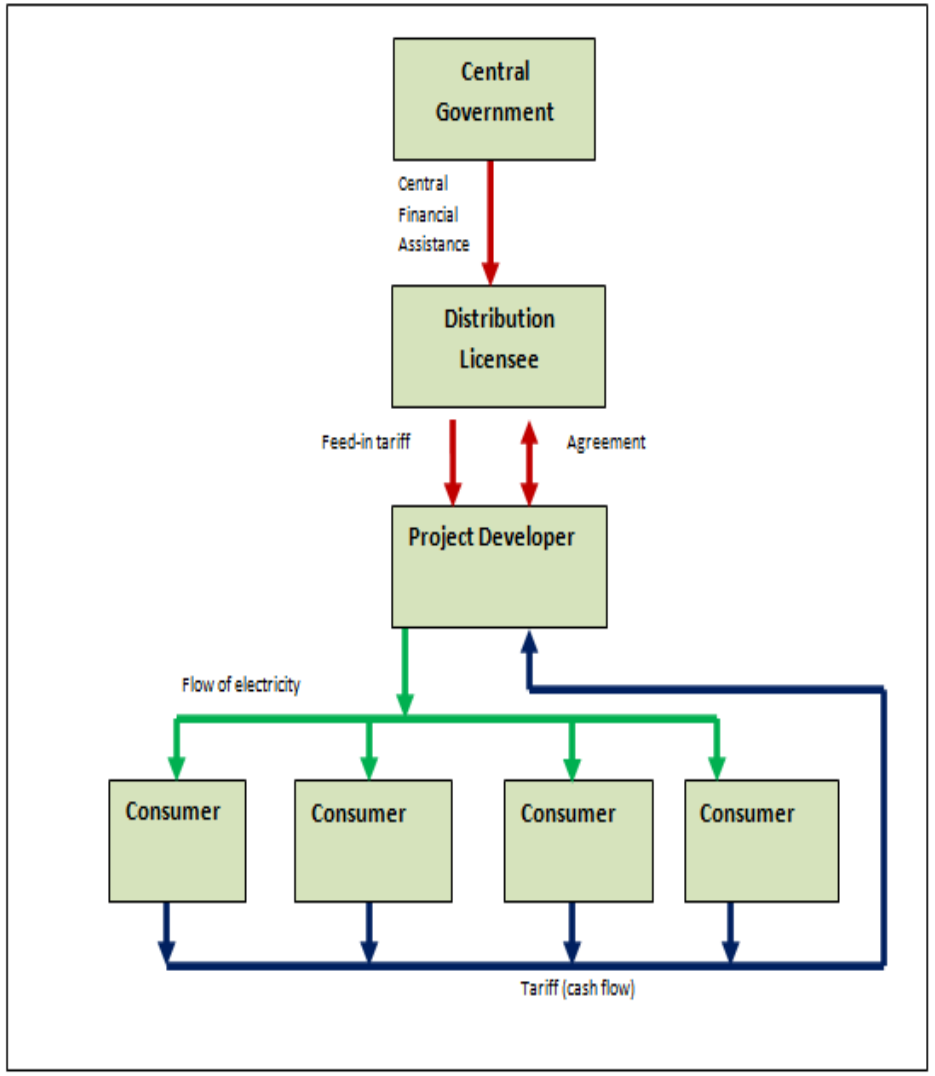
Further, the policy emphasizes the development of decentralized distributed generation facilities based on conventional or non-conventional resources, whichever is suitable and economical, for rural electrification where the grid expansion is neither cost effective nor technically feasible.

National Tariff Policy

Clause 6.4 of the Tariff Policy addresses various aspects associated with promotion and

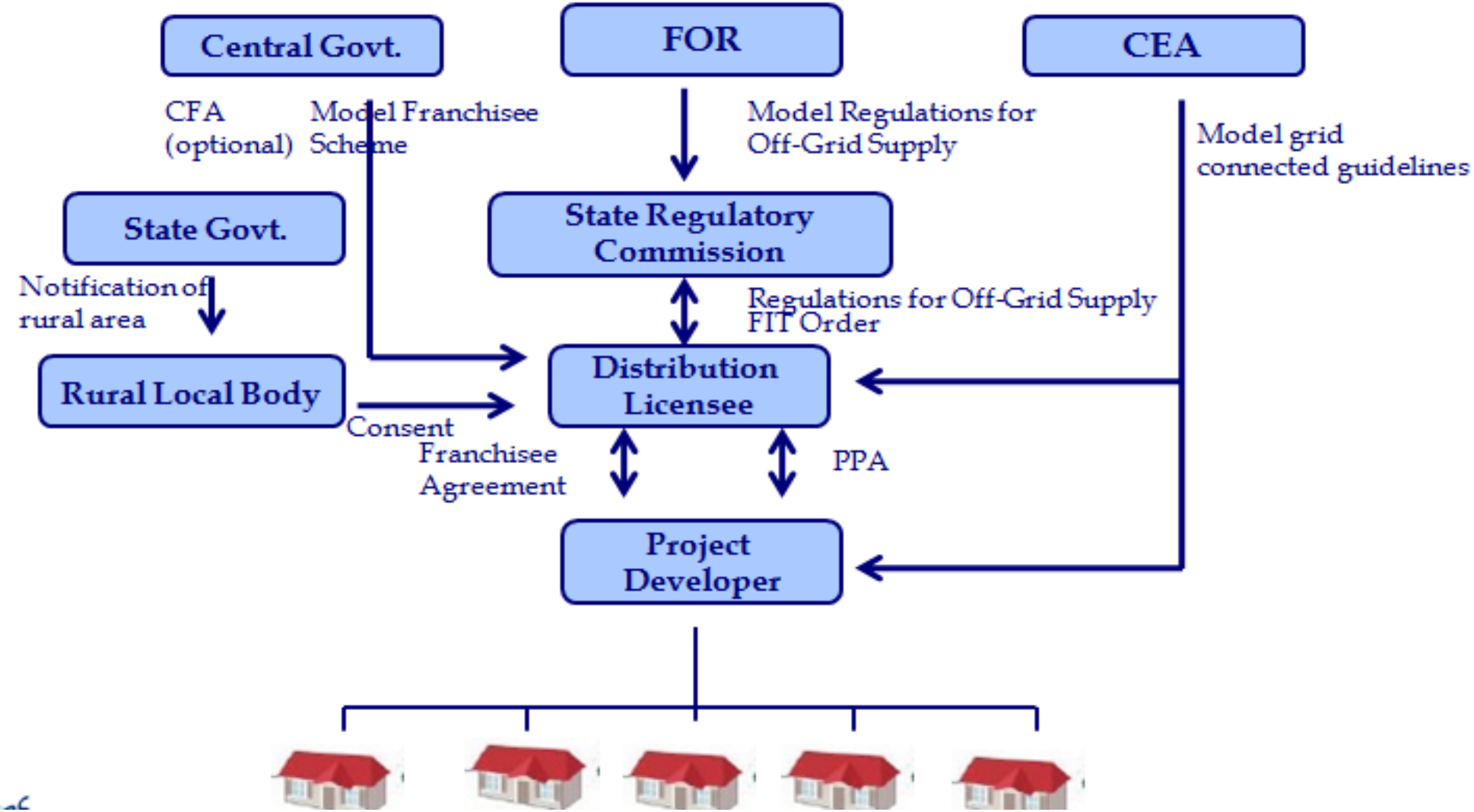
harnessing of renewable energy sources.

Off-Grid Distributed Generation Based Distribution Franchisee Model



- Project developer would act as RE generator and enter into PPA with DISCOM and receive FIT.
- The PD will also enter into second agreement as Distribution of DISCOM and will provide electricity to the consumers and collect the tariff by the consumers of the local DISCOM.
- The DISCOM shall provide FIT to project developer over its lifeline as per PPA.
- DISCOM can use this purchased power to fulfil its RPO and also CFA for promoting off-grid rural electrification that can be channelled to DISCOM to bridge the viability gap of cost of generation and supply of RE power.
- In event of grid extension PD will keep providing agreed power and get FIT as per PPA and Franchise agreement can be terminated if both parties decide.

Institutional & Contractual Structure



Roles & Responsibilities of Key Stakeholders (1/3)

Central Government

- Provide CFA to Distribution Licensee to support Off-grid RE projects

Forum of Regulators

- Model Regulations for Off-grid Renewable Energy Generation and Supply
- Develop guidelines for development of feed-in tariff for small scale renewable energy generators used for off-grid supply

Central Electricity Authority

- Develop model grid connectivity guidelines for small RE systems

State Regulatory Commission

- Notify State Regulations for Regulations for Off-grid Renewable Energy Generation and Supply
- Adoption of Model Regulations with suitable adjustments to take into consideration state specific factors
- Issue Tariff order for Off-grid renewable energy generation
- Guidance to various stakeholders participating in the scheme

Roles & Responsibilities of Key Stakeholders (2/3)

Distribution Licensee

- Distribution Licensee submit tariff petition to SERC;
- Enter into Franchisee Agreement and PPA with PD
- Provide FIT to PD;
- Request to Central Govt. for CFA if / as required
- Take into consideration off-grid schemes while planning grid expansion

Rural Local Body

- Confirm un-electrified status of village / hamlet / pada
- Confirm number of households & establishments
- Provide consent to PD for generating and distributing electricity

Roles & Responsibilities of Key Stakeholders (3/3)

Project Developer

- Identification of Project Scheme;
- Finalization of technology based on resource availability
- Confirm State Government's notification of rural area from RLB
- Undertaking of prefeasibility study;
- Development of DPR;
- Agreement b/w Distribution Licensee and PD;
- Financial Closure & project commissioning;
- Provide electricity to consumers & receive tariff as paid by consumer of local Distribution Licensee;
- Receive FIT minus consumer tariff from Distribution Licensee

Consumer

- Pay charges to PD

Advantages of ODGBDF Model

- Maximum certainty of revenue to the developer
- Proper integration of off-grid projects with grid as and when is feasible
- Would enable large scale deployment of off-grid projects
- Internalisation of costs of rural electrification
- Distribution Licensee can meet twin objective of electrification and RPO
- Possible to customise model according to local requirements
- Optimum utilisation of the government subsidy, if offered
- FIT guidelines at national level would bring in uniformity.
- Model could be used for off-grid as well as on-grid supply augmentation

Applicability of ODGBDF Model

- Model encourages large scale private sector participation as the model leads to assurance of revenue

- The model is based on revenue subsidy which would be one of the major requirements of the private sector as even with capital subsidy, the projects are not viable

- Need to develop similar models at state / national / international level

Way Forward

- In November 2011, FOR, in its meeting in Shimla accepted the recommendations
- Regulations/guidelines for ODGBDF model have also been accepted by FOR
- MNRE, MOP and FOR may need to work on development of suitable policy framework for “Central Financial Assistance”

Thank You

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