



Government of Karnataka

ENERGY



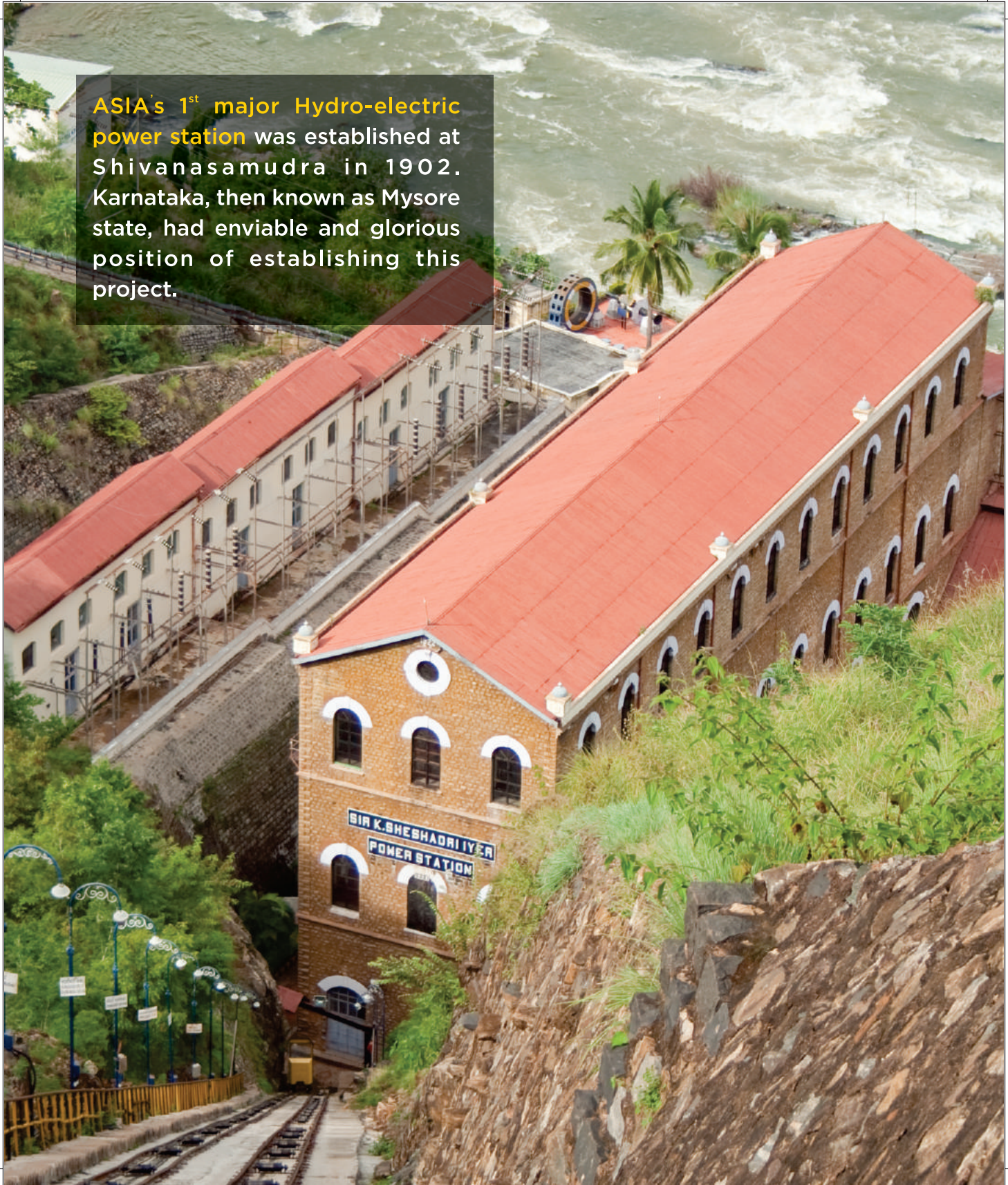
INVEST  
KARNATAKA  
2016

GLOBAL INVESTORS MEET

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Bangalore Palace, Bengaluru



ASIA's 1<sup>st</sup> major Hydro-electric power station was established at Shivanasamudra in 1902. Karnataka, then known as Mysore state, had enviable and glorious position of establishing this project.



# Foreword



**Shri D K Shivakumar**  
Hon'ble Minister of Energy,  
Government of Karnataka

*Karnataka enjoys a pride of place in power sector in India, being the developer of the country's first hydro-electric power station in Shivanasamudra, laying the foundation stone for country's first solar project and making progressive strides ever since.*

*State's social culture, work culture, and expert manpower are world-renowned and the State continues to make bold strides in order to compete on an international scale. As the Minister for Energy of the State, I take great pleasure in sharing with you all the progress we have made thus far and also the lucrative potential that the State has to offer in the sector. Unique policies in Renewable energy open up new and exciting possibilities apart from fulfilling the social obligation of generation of green energy. With the process of purchase and conversion of lands streamlined to acute efficiency, there is simply no stopping business from growing in the State. Karnataka lays special emphasis for wind and all other renewable projects, giving special focus for captive and independent power producers and has already undertaken steps for long, medium, and short term plans to ensure uninterrupted quality power supply to the manufacturing sector. Karnataka opens its doors with an ambition of making Karnataka the manufacturing hub of India for solar panels/modules by offering special incentives and concessions to manufacturers. Karnataka is poised to house the single biggest Solar Park in the world that produces a mammoth 2000 megawatts.*

*The State, time and again, has proven to be a sure shot investment destination for investors and I personally invite you to share our vision of stewarding our State towards a brighter future. Come, trust, invest and reap benefits in the Energy sector.*

# Foreword

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**Shri Ravi Kumar P**  
Additional Chief Secretary  
Energy Department, Government of Karnataka.

“

*With unique policies designed specifically for domains such as Wind and Solar energy generation and plans to build the world's largest Solar Park, the State is proving to be a lucrative destination for potential investors. The State's well-known work culture and able manpower aid the rampant progress happening in the State and its enviable past cements its status as a leader in the Energy sector. Hence, I invite you to invest and leverage the immense potential the State has to offer.*

”

# CONTENTS



**1** Karnataka Growth Drivers

**2** Karnataka Energy Scenario

**3** Policy Enablers and Government Initiatives

**4** Investment Zones and Opportunities



# Karnataka Growth Drivers

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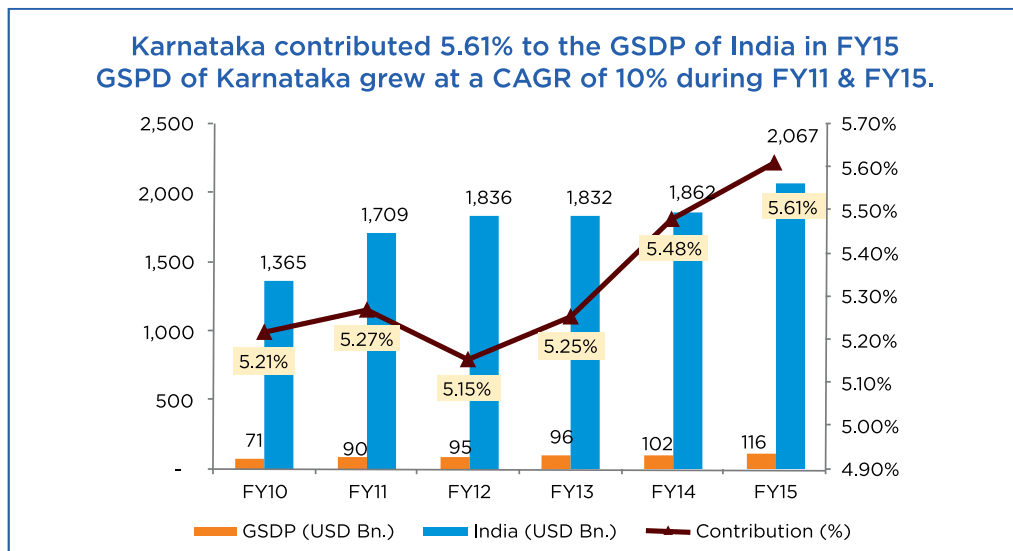


# Advantage Karnataka

- Investor friendly Fiscal and Policy incentives under Karnataka Renewable Energy Policy 2016-22 vis-à-vis Karnataka Industrial Policy 2014-19. Also, the State has a robust Solar Policy 2014-21 in place
- Renewable energy contributes to 35% of the total installed capacity; potential is estimated in excess of 86,557 MW
- Having the highest potential of 7,900 MW of **pumped storage hydro power** in Southern India
- Bengaluru, the capital city of Karnataka is the best test site for Smart Grid in the country as Distribution Automation System and Transmission SCADA are already implemented. Presence of local IT and professional skills is an additional advantage for bringing in more investment to the State

## Many firsts for Karnataka

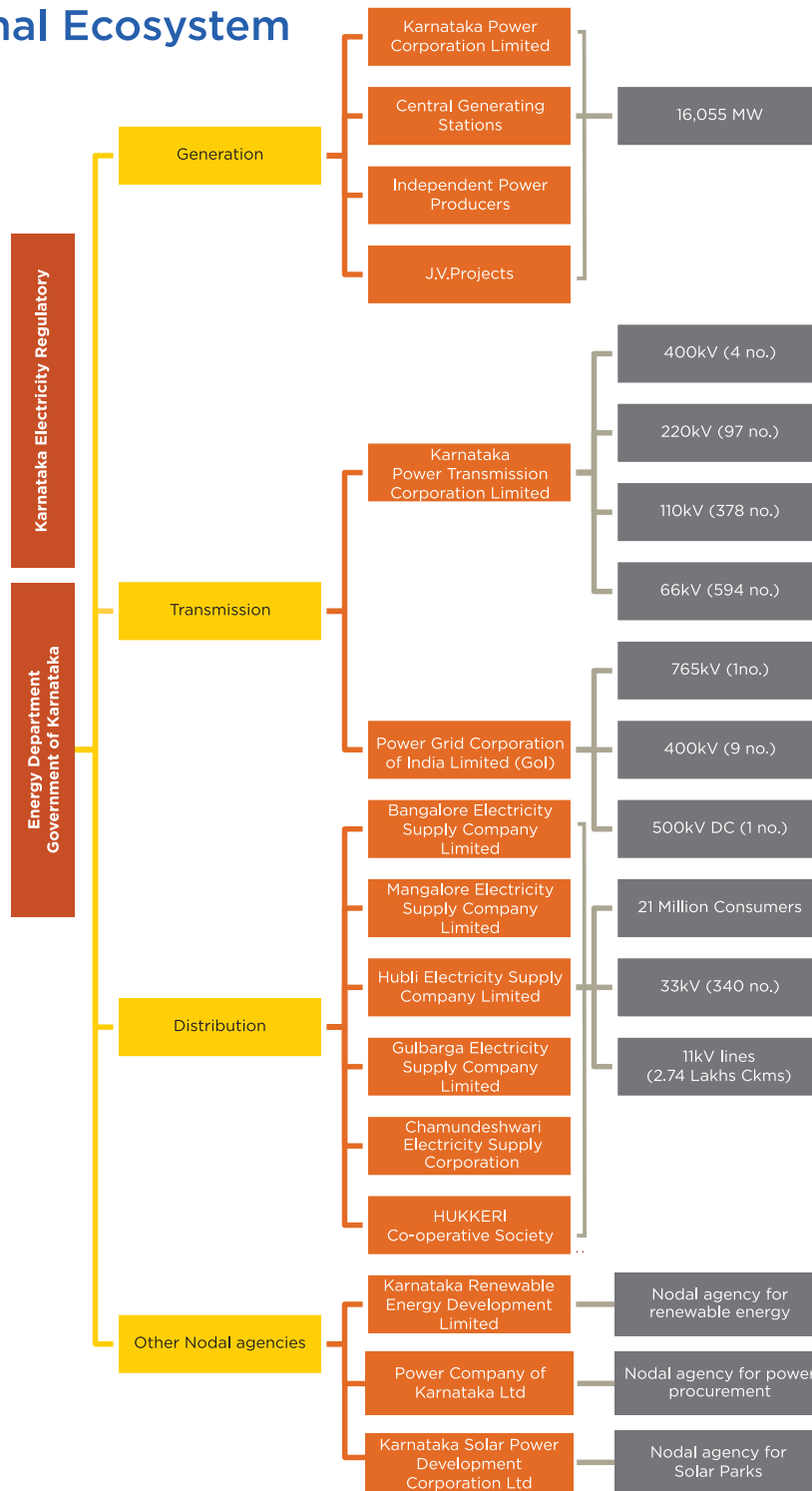
- 1<sup>st</sup> hydroelectric generation station in Asia at Shivanasamudra, Mysuru (3.2 MW), operating since 1902
- Longest transmission line (147 km), at the highest voltage (78 kV – 25 cycles) in the World, operating since 1902
- 1<sup>st</sup> State to form separate entities for Generation and Transmission during 1970
- 1<sup>st</sup> State to set up the utility scale solar power plant of capacity 3 MW, operating since December 2009
- 1<sup>st</sup> in the world to setup 2000MW Solar Park



**Karnataka contributed 5.61% to the GSDP of India in FY15**



# Institutional Ecosystem





# Karnataka Energy Scenario



# 2

# Karnataka is moving towards Sustainable Energy Security

## Government of Karnataka Vision:

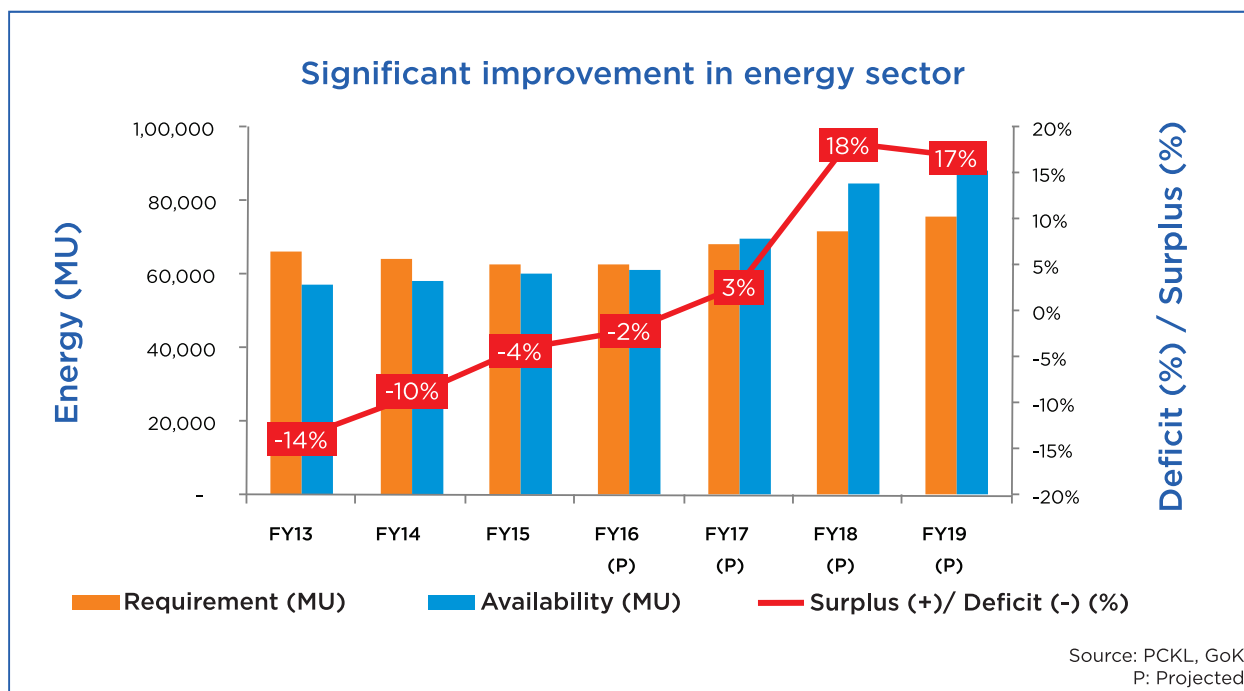
“To provide 24x7 Power Supply to all by the year 2020”

- Committed to make Karnataka Self Reliant
- Improving the Efficiency of Electricity Companies
- Encouraging Development of Renewable Energy
- Implementing Energy Conservation Measures



Government of Karnataka

- Government of Karnataka is committed to provide 24x7 power to all by 2020.
- Energy sector successfully bridged the difference between energy requirement and availability by 10% in last 3 Financial Years
- Providing electricity to 21 Million consumers in the State
- AT&C losses for the ESCOMs stand at 18.1% in FY15, which is far below than national average (25%)
- Access to electricity in villages is 100% in the State, except a few hamlets in the remote deep forest

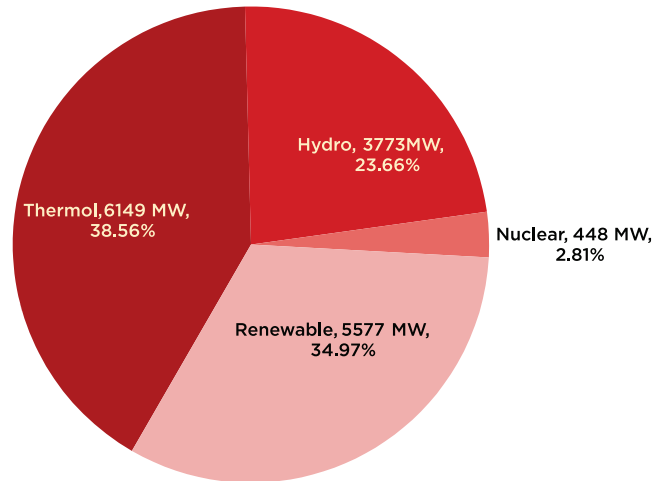


# Power Generation



Karnataka has significant potential for all forms of energy

## Installed capacity by energy mix



\*Source: CEA,\* KREDL

### New Generation expected to be commissioned shortly: 4,326 MW:

- KPCL (2,300 MW)
- NTPC, Kudgi (1,200 MW)
- DVC (450 MW) - LTOA
- Central Allocation (376 MW)

- Installed capacity of Karnataka is 15,947 MW as on Nov 2015; 7<sup>th</sup> largest state in terms of generation capacity in India
- Currently, Private sector and State sector ownership stands at 43% each with 17% from Central sector
- Installed capacity by Private sector has grown at a CAGR of 12% in the last 5 Financial Years
- State with the highest installed capacity of 3,600 MW for hydro power; potential of 7,900 MW of **pumped storage hydro power** in Karnataka

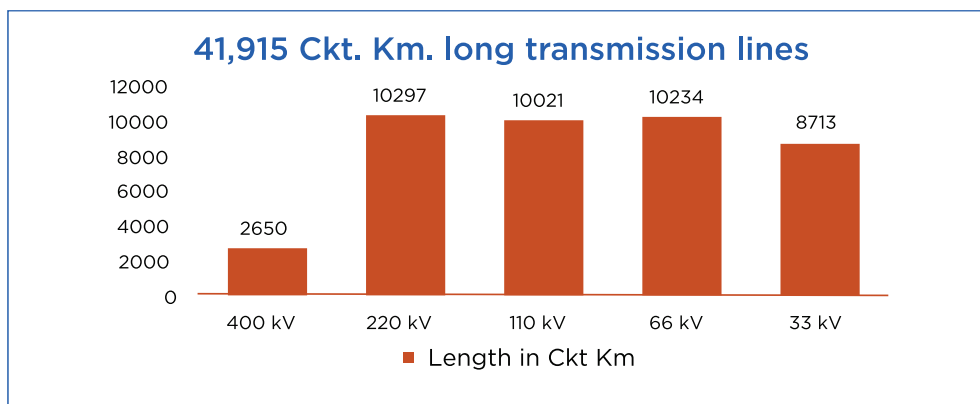
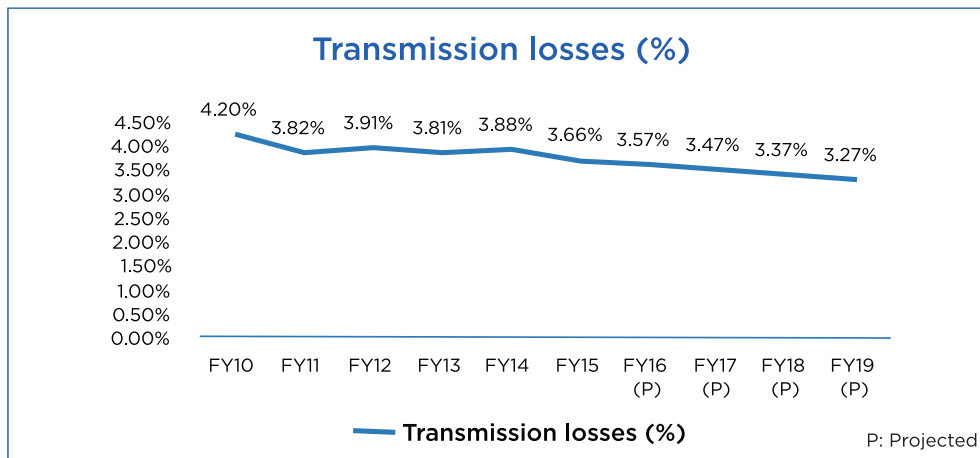
# Power Transmission

## Technology driven transmission infrastructure



- KPTCL was awarded the best transmission utility in the Country by CBIP\*
- Completed capital expenditure to the tune of INR 27,440 mn in last 3 FYs
- New initiatives
  - Usage of V-SAT communication network
  - 1,243 stations of KPTCL and ESCOMs covered by SCADA\*\*
  - Usage of GIS switchgear, hybrid switchgear, EHV cable testing van, and hotline method.
  - Usage of covered conductor in 66kV Transmission Line and High Temperature Low Sag (HTLS) Conductor in Bengaluru
- The planned transmission capacity addition are 20,230 MW, 21,505 MW and 22,270 MW in FY17, FY18 and FY19 respectively

\*CBIP: Central Board of Irrigation and Power  
 \*\*SCADA: Supervisory Control and Data Acquisition



# Power Company of Karnataka Limited

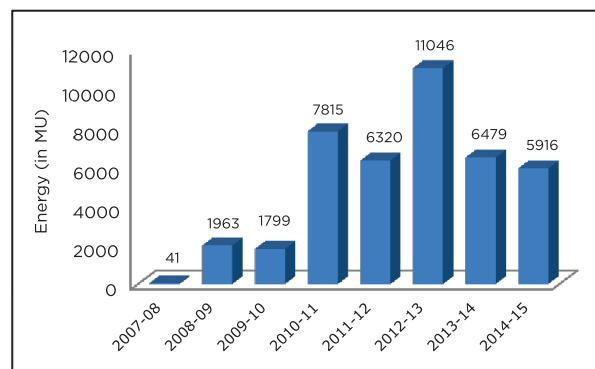


**Power Company of Karnataka Limited is a Special Purpose Vehicle (SPV) incorporated on behalf of ESCOMs under the Companies Act, 1956 on 20th August 2007 for capacity addition in the State.**

- PCKL since its inception has enabled ESCOMs for signing of PPAs for 17,358 MW Long Term Power from Central sector, State sector, JV projects and IPPs, which includes 14,044 MW capacity additions in the State.

PCKL facilitated signing of PPAs by State ESCOMs under long term	
Central Sector	5450 MW
State Sector	10050 MW
IPP's	1740 MW
Joint Venture	117 MW
Total	17,358 MW

- PCKL is responsible for capacity addition by way of setting up of new power projects through bidding process, under DBFOT as per the guidelines issued by Ministry of Power, GoI.
- PCKL, responsible for long term procurement of power under DBFOO bidding guidelines of Ministry of Power, GoI.
- Coordinates with other States and Central Government agencies on power project development and related issues.
- Preparation/ Scrutiny of Power Purchase Agreements of Conventional Power projects in respect of Central Sector, State Sector, IPPs and JV Projects to ensure compliance with technical and commercial parameters.
- Pre & post Power Purchase Agreement issues relating to Central Sector, State Sector, IPPs and JV Projects.
- Forecasting energy availability and demand forecasting on behalf of the ESCOMs.
- PCKL, on approval of Karnataka Electricity Regulatory Commission, procures power through transparent competitive bidding process under short-term & medium term and procurement through power exchanges to mitigate the power shortage.
- Verification and scrutiny of short term power procurement bills & IPPs energy charges bills.
- Apportionment of cost of power purchased among the ESCOMs and accounting of energy exported/imported from various sources including barter arrangements and bilateral exchanges.



## Performance of ESCOMs at a Glance:



Particulars	BESCOM	MESCOM	HESCOM	GESCOM	CESC	TOTAL STATE
Area of distribution and Supply (Sq. Km.)	41,092	26,222	54,513	43,861	27,773	1,93,461
Districts	8	4	7	6	5	30
Number of electricity consumers (in lakhs)	94.44	20.75	40.90	25.53	27.36	209
Number of sub stations 400 KV, 220 KV, 110 KV, 66 KV (of KPTCL)	433	82	192	129	202	1,038
Number of 33 KV sub stations	-	36	168	131	5	340
Number of Distribution Transformers	2,11,287	49,552	1,35,271	72,638	84,086	5,52,834
Length of 11 KV Lines (in CKMs)	88,188.95	30,044.20	63,096	49,781.95	42,658	2,73,769
Length of LT Lines (in CKMs)	1,62,329.49	70,672.73	1,12,284.6	81,727	75,117	5,02,131
Length of 33 KV Lines (in CKMs)	-	692.30	3,192.24	2,597.70	97.00	6,579.00



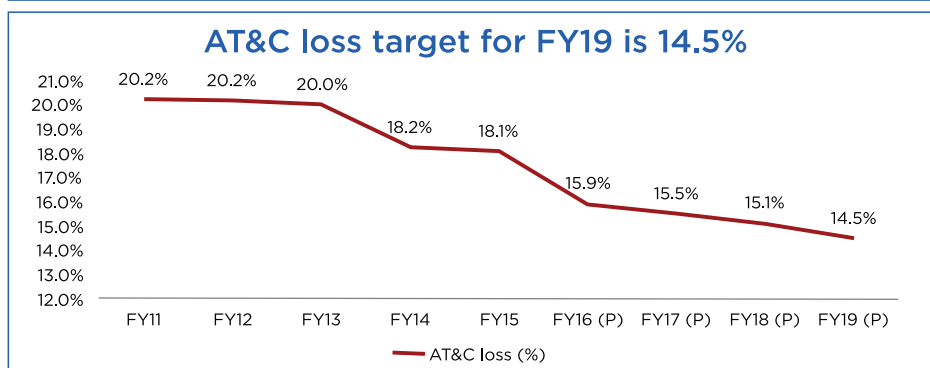
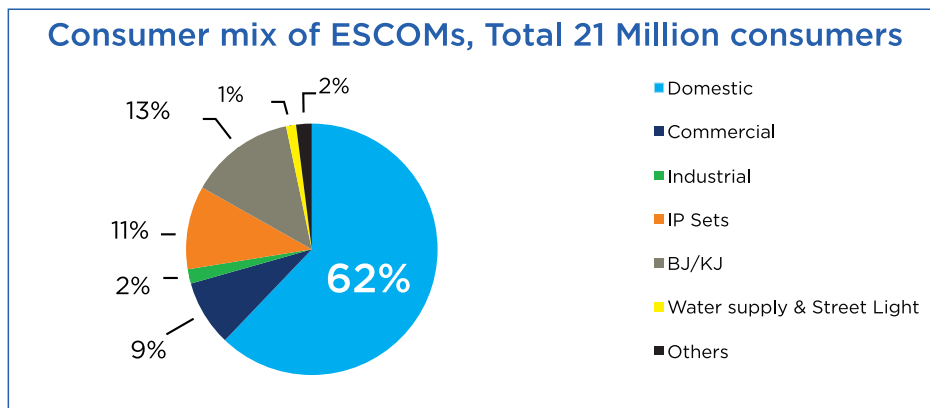
## Distribution Segment

### ESCOMS are taking customer services to the next level

- Growth of consumers and consumption is 4.86% and 4.56% respectively in FY15
- BESCOM, one of the best distribution utility, rated as B+ in ICRA ratings
- Best customer service practices in India
  - 24x7 helpline no 1912, SMS 5888
  - Online services for solar rooftop registration, new service connection, bill payment options including Electronic Clearance System, Any Time/ Any Where Payment, and MIS reports

#### New initiatives

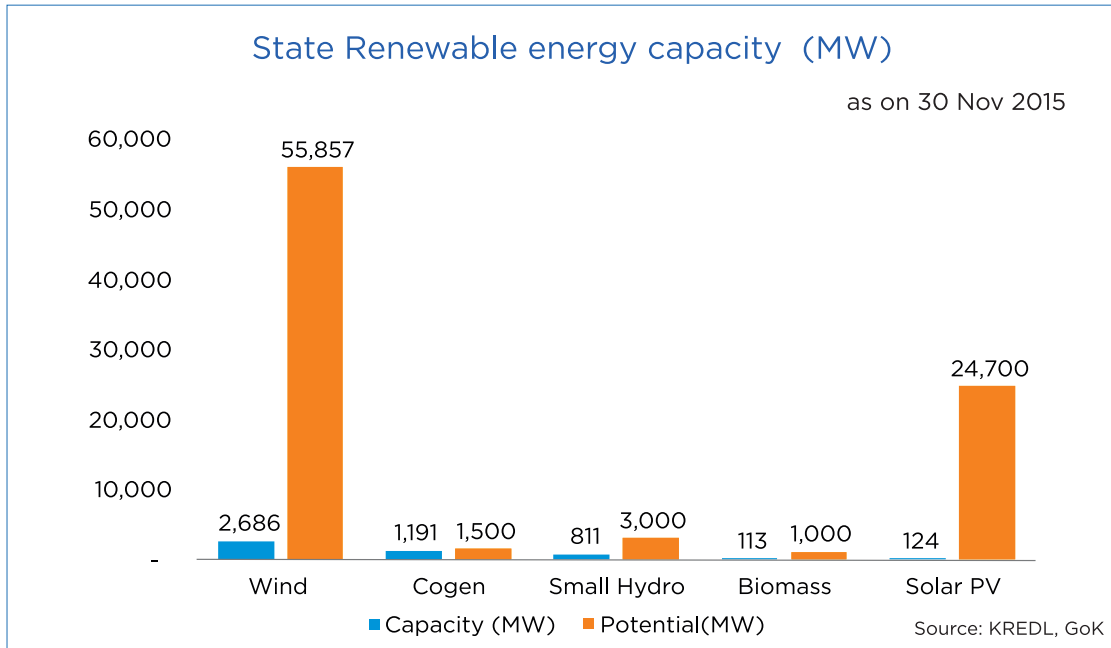
- Proposed **Smart Grid Pilot Project** at Indiranagar in Bengaluru by BESCOM
- Encouraging the use of LED lights instead of incandescent lamps and CFL, to domestic customers through **Domestic Efficient Lighting Program (DELP)**, resulting in a significant reduction in peak load and consumption
- BESCOM has taken up **Distribution Automation System (DAS)** Project for entire Bengaluru Metropolitan area which enables better network planning, optimization network capability, improved efficiency and online energy audit
- Creation of **Technology Innovation Center** to promote R&D to reach the consumers



# Renewable Energy



## Significant potential for renewable energy, in excess of 86,557 MW



- Karnataka receives solar radiation in the range of 5.1 - 6.4 kWh/m<sup>2</sup> (summer), 3.5 - 5.3 kWh/m<sup>2</sup> (monsoon), and 3.8 - 5.9 kWh/m<sup>2</sup> (winter), enabling solar energy generation available across all seasons.
- Installed capacity for renewable energy is 5,045 MW and accounts for ~31% of installed capacity
- Karnataka has a wind potential of 55,857 MW at 100 Meter Hub height, and solar PV potential of 24,700 MW





# Policy Enablers and Government Initiatives

# 3

# Karnataka Solar Policy 2014-21

## Key Highlights

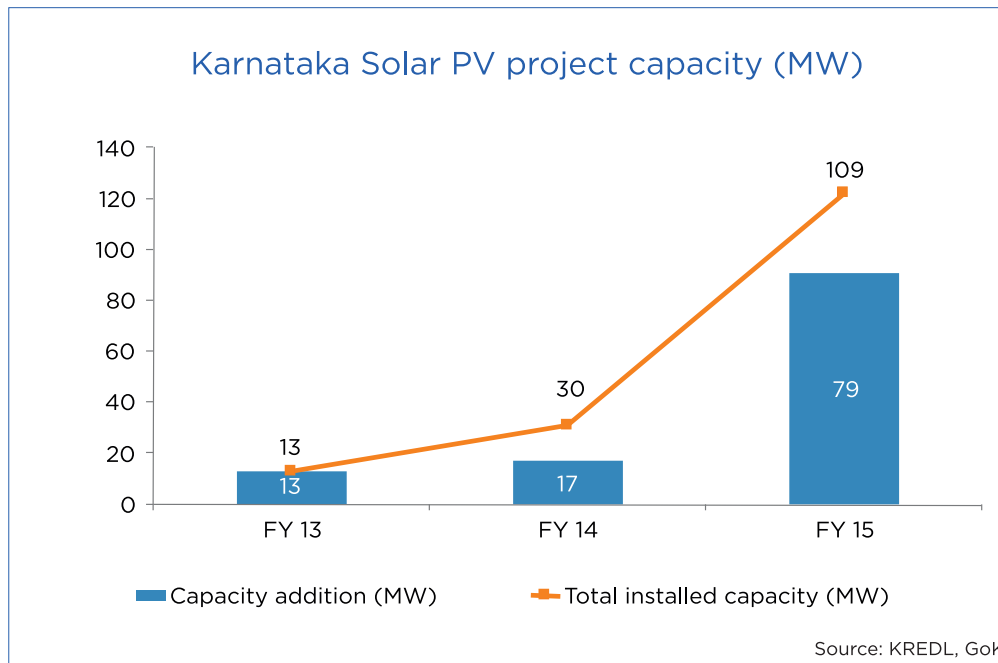
- Government of Karnataka (GoK) on 22<sup>nd</sup> May 2014 revised its existing State Solar Power Policy with minimum target of 2,000 MW
- MNRE has revised this target to 6,000 MW to achieve national target of 175 GW
- Planning to achieve 6,000 MW (in phased manner) by 2021
  - Grid connected projects – 3,600 MW
    - Projects by land owning farmers - 300 MW
    - Projects under REC mechanism, captive/group captive, IPPs – No limit
    - Projects under bundled power
    - Projects selected by competitive bidding (capacity > 3 MW)
  - Grid connected rooftop projects – 2,400 MW by 2020

## Key Initiatives in Renewable Sector

- GoK encourages energy-efficient design standards for energy generation, options that provide heat insulation including grid tied building integrated PV (BIPV)
- Supports deployment of solar powered irrigation pump sets through Surya Raitha projects
- Development of Solar Parks to utilize uneven waste land for power generation
- Encouragement to create private land banks by farmers or associations for solar projects on long term lease up-to 30 years
- Envisages grid tied canal corridor projects
- Grid connected “solar with other renewable hybrid projects”
- Consumer friendly net metering policy for promoting rooftop solar with a target of 400 MW by 2018

## Renewable energy

### Solar Power



- Industry friendly policies and regulations.
  - No Cross subsidy surcharge (3<sup>rd</sup> party)
  - No transmission and wheeling charge
  - 100% banking for open access projects
- State is promoting utility scale on-grid projects; roof top projects with net metering policy decentralized on-grid projects through “farmers category”, and other off-grid projects



# Solar Power

## Incentives and Support

### Simplified Land Acquisition Process

- Time bound permissions to acquire land under section 109 of the Karnataka Land Reforms Act, 1961 and deemed conversion of lands acquired

### Evacuation of Power

- Time bound clearance for evacuation approval from KPTCL
- Reduction of supervision charges by KPTCL/ESCOs from 10% to 5%

### Other approvals

- Exempted for obtaining clearance from State Pollution Control Board projects up to 5 MW capacity

### Solar Roof Top PV systems and net metering

- Solar Roof Top PV systems can be installed on residential/commercial/ industrial buildings in the State
- Excess Generated energy can be fed to the grid with net metering
- Attractive Tariff for roof top solar as determined by KERC and notified by ESCOMs:
  - INR 9.56/- per kWh Without Subsidy
  - INR 7.20/- per kWh With Subsidy



### Surya Raitha Scheme for Promoting Solar Irrigation Pumpset

- To promote adoption of Solar PV pumpset by farmers, GoK has announced Surya Raitha scheme for Solar PV irrigation pumpset
- This scheme is applicable for IP sets to the extent of 10HP capacity. Net-metering concept for rooftop solar power as per KERC order is being adopted for this scheme
- For investment farmer can avail soft loan from banks and subsidy from MNRE

## Fiscal incentives

- Developers can avail tax concessions in respect of Entry Tax, Stamp Duty, and Registration as per industrial policy of GoK
- Measures to exempt VAT: The Value Added Tax applicable to panels and inverters required for establishment of Solar Power Project has been exempted
- Government of India incentives: Concessional Excise Duty & Customs Duty Exemptions are allowed for Project Developers by Ministry of New & Renewable Energy

## Solar Parks

- Solar Parks are to be developed in private dry lands/waste lands which will provide plug and play facility for developers
- JV company Karnataka Solar Power Development Corporation Limited (KSPDCL) has been formed for development of solar parks in Karnataka. Initially, it is proposed to develop 2,000 MW Solar Park at Pavagada taluk in Tumkur district and 11,000 acres of land has been identified for the project. This park is the world largest Solar Park
- Promotion of Distributed Generation through small solar parks (Min 100 acre)

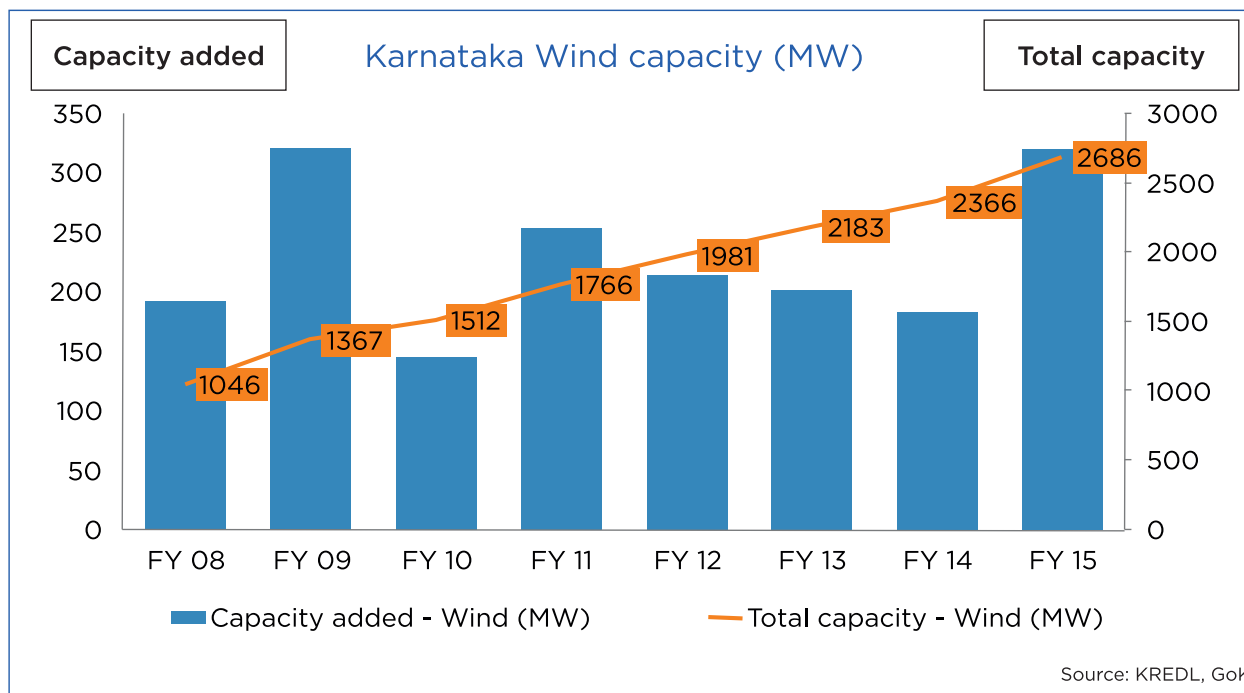
## 1,200 MW Distributed Generation Project

- KREDL floated RfP for development of 1,200 MW solar PV power projects through a distributed generation concept spread across 60 Taluks
- Five Taluks were reserved for module manufacturers to promote local solar PV module manufacturers of Karnataka
- Bid was closed on 28<sup>th</sup> January 2016 and evaluation under progress
- PPAs will be executed with the ESCOMs for 25 years



## Wind Power

- Karnataka is one of the wind-rich states in India and has a potential of around 55,857 MW, at 100 m height
- Capacity addition in the State has been quite stable at around +390 MW/annum in the last two years
- Karnataka introduced preferential tariff framework in 2004, a key enabler with a present tariff of INR **4.50/kWh**. The State is one of the preferred destinations for wind power projects in the country
- Strong potential for repowering of existing older machines. 500 MW can be achieved through repowering of old machines



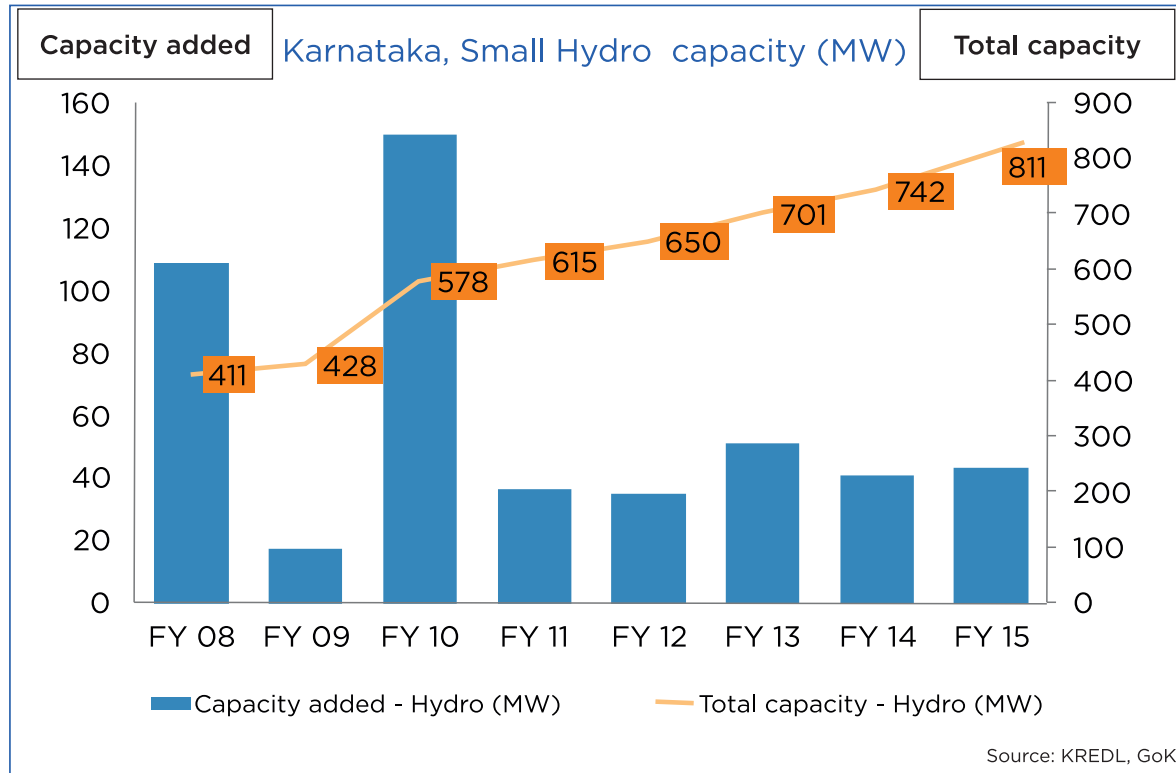
### Incentives:

- Simplification of land acquisition and conversion process
- Expedition of forest clearances and industrial status to wind power projects



## Small Hydro Projects

- Karnataka has high development and dependency on hydel power; of which SHP contributes to around 22% of State hydel capacity; having the highest PLF in the southern part of the country
- Karnataka is endowed with small hydro power potential estimated to be about 3,000MW, of which only 26% has been harnessed so far
- A tariff of **INR 4.16/kWh** is one of the best in the country for a high PLF region

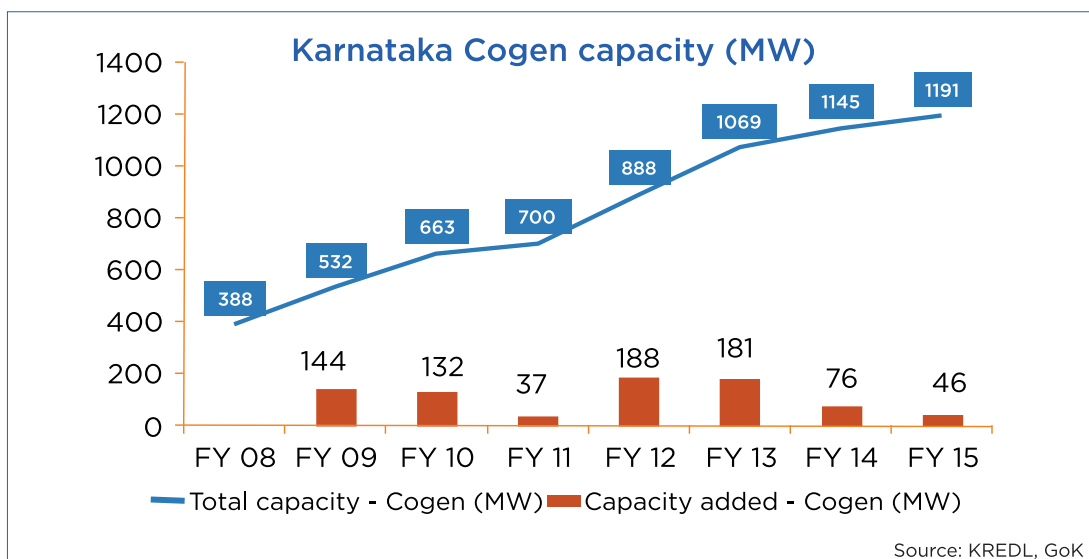
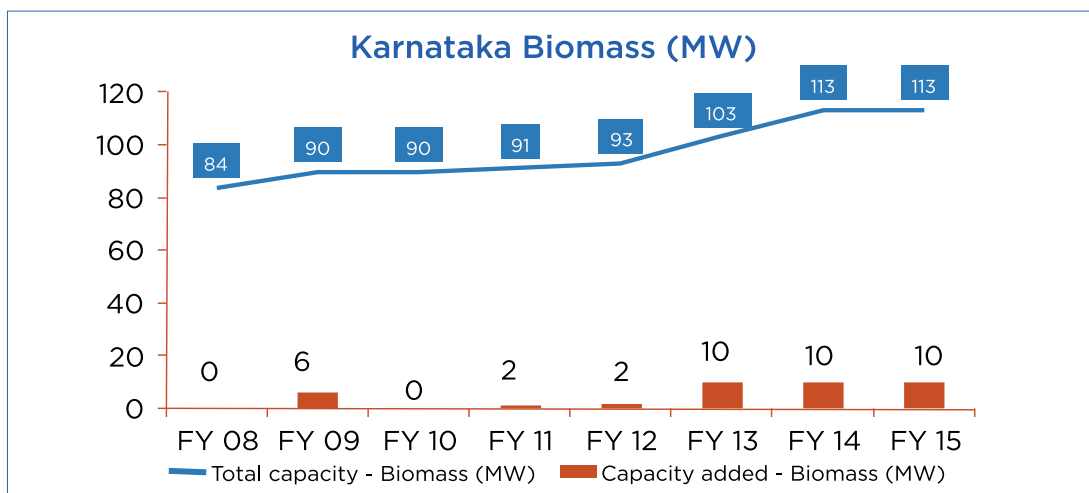


### Incentives:

- Simplified land acquisition and conversion process
- Expedition of forest clearances and industrial status to small hydro projects
- Land lease for 30 years+ (forest and Govt. land)
- MNRE subsidy up to INR 10 mn / MW

## Biomass and Cogen Power

- Simplified land acquisition and conversion process and provision of industrial status for biomass and cogen power projects
- Tariff of **INR 4.83/kWh** for Cogen and **INR 5.19/kWh** for biomass based projects is one of the best in the country
- **Incentives:** GoI and GoK offer the following exemptions and incentives:
  - Central Excise Duty exemptions,
  - Tax holiday,
  - Customs Duty exemption, and VAT reimbursement up to 50%.





# Investment Zones and Opportunities

# 4

# Shelf of Projects

## Renewable Energy

### **Solar Power:** (as per Solar Policy 2014-21)

- Ultra Mega Solar Parks having capacity of 500 MW or above are planned as per MNRE guidelines
- Solar projects can be installed under IPP model. There are no wheeling and banking charges & cross subsidy for the projects commissioned before 2018
- Government of Karnataka encourages solar parks with area not less than 100 acres through a viable model in backwards districts of Karnataka
- Karnataka offers the best policy and tariff in net metering in the country; promotional measures will be taken for increasing awareness about the advantages of net metering within residential, community, institutional, industrial, and commercial establishments
- A new policy for promoting gross metering for commercial and industrial establishments will be published to tap solar power potential

### **Wind power:**

- Investors are encouraged to set up wind power plants as per the prevailing policies of Karnataka.
- Re-powering of old wind mills having capacity less than 500 KW will be taken up in the State in a pro-active manner for enhancing the existing capacity . In this regard, discussions with investors will be made to frame a new policy document for enhancing wind power potential in the State.

**Hybrid model (Solar and Wind):** A new tariff order for determination of tariff for hybrid energy with combination of solar and wind is under consideration.

**Micro/mini grid:** Implementation of micro/mini grid solutions for electrifying villages will be taken up to increase access to electricity



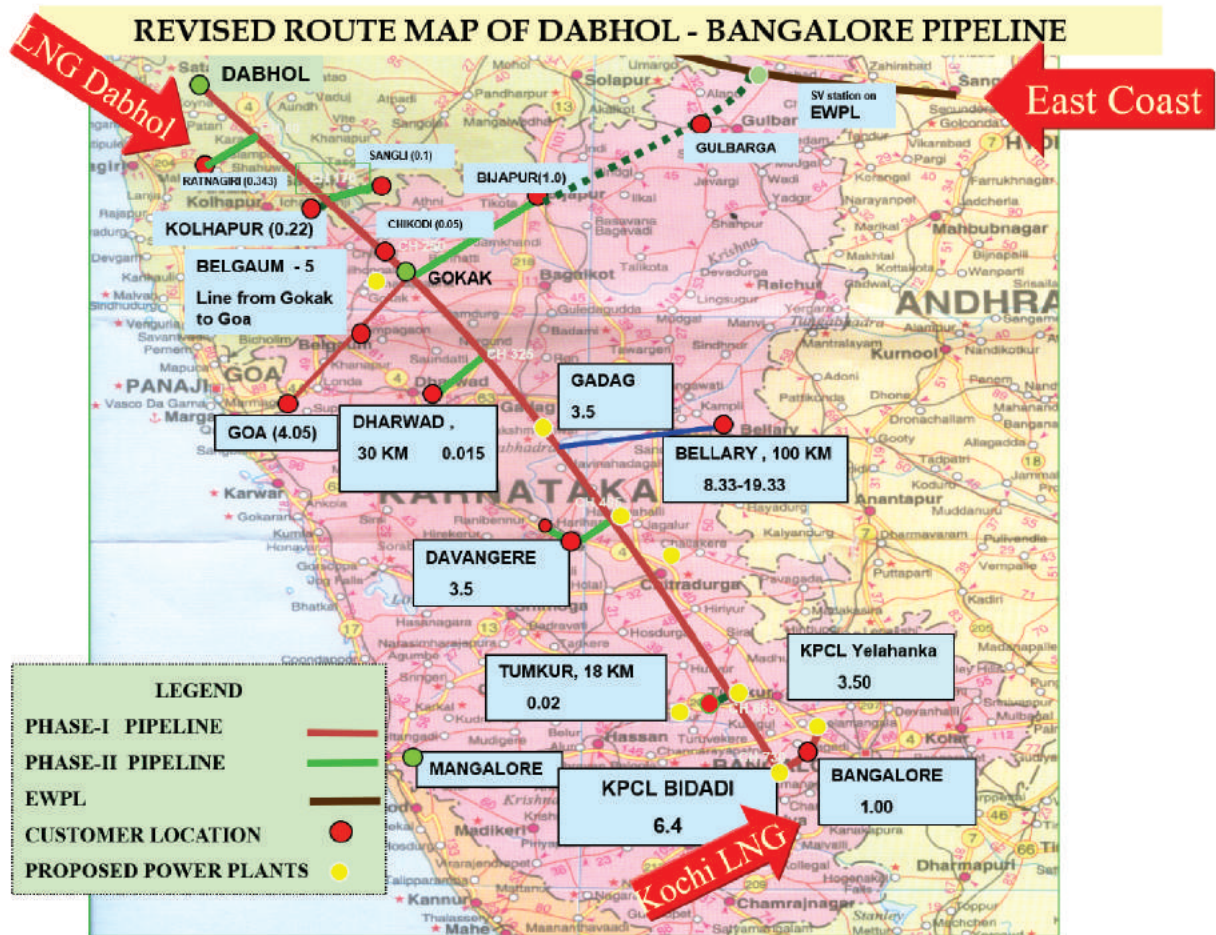
## Karnataka Power Corporation Ltd (KPCL) Vision 2025

A total of 9,365 MW could be added in next ten years by seizing the opportunities in the state. It could be seen from the table that, KPCL shall embark on developing thermal projects either coal based or gas based plants with a total capital investment of INR 59,730 Crore.

Sl. No.	Project	No. x Capacity (MW)	Total Capacity (MW)	Cost in Rs. crores
1	Pumped storage Power Plants	2x500	1,000	5,000.00
2	Kudithini Thermal Power Station	2x800	1,600	12,770.00
3	Godhna Thermal Power Plant	2x800	1,600	12,770.00
4	Yelahaka Combined Cycle Power Plant	2x350	700	3,150.00
5	Yeramaras Thermal Power Station Unit-3	1x800	800	6,000.00
6	Bidadi Combined Cycle Power Plant Stage-1	1x700	700	3,150.00
7	Solar PV Plants		500	3,000.00
8	Wind Mills		100	750.00
9	Gulbarga Thermal Power Station	2x660	1,320	9,240.00
10	Bidadi Combined Cycle Power Plant Stage-2.	1x700	700	3,150.00
11	Shiva ROR Scheme		345	750.00
	<b>Total</b>		<b>9,365</b>	<b>59,730.00</b>

# Gas based power plants:

Gas based merchant power plants along the existing Dabhol-Bangalore GAIL gas pipeline are in pipeline and interested investors are invited for establishing gas based power plants



## Distribution

- Implementation of solar rooftop projects through existing policies of Karnataka.
- Implementation of smart grid pilot projects.



## Thrust on new initiatives

- Implementation of an **Energy Centre of Excellence and Incubation Centre** at Nagarbhavi, Bengaluru, which will act as nodal institution for promoting excellence and innovation in technology and will also act as a techno-commercial project incubation centre.
- Creation of **Technology Innovation Center at BESCO** which aims to develop superior, workable, technically feasible and economically viable models to reduce capital investment requirements, operating cost, and energy wastage











Government of Karnataka

## Contact Details

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