

DRAFT:

ANDHRA PRADESH WIND-SOLAR HYBRID POWER POLICY – 2016

1. Introduction

India as part of INDC (Intended Nationally Determined Contribution) in response to COP 21 (Conference of Parties) conference held in Paris, have promised reduction in Emission Intensity of GDP of India by 33 to 35% by 2030 and achievement of 40% of installed capacity from non-fossil fuel based energy by 2030. As a part of its commitment to mitigate the Climate Change the Government of India has set a target to increase the Renewable Energy capacity in the country by 5 times , to achieve 175 GW capacity by the year 2021-22, comprising of 100 GW of Solar power and 60 GW of Wind power. During REINVEST conducted at New Delhi during February, 2015, Green Energy Commitment was received by the Private and Public sectors to an extent of 283 GW.

Government of Andhra Pradesh is keen to harness the huge solar and wind potential of the State. Several initiatives such as investor friendly solar and wind power policies, large scale solar park(s) development, green corridor investment for power evacuation and power procurement through PPA's with APDISCOMs have been undertaken to promote RE capacity addition, to meet the growing energy demand of the state in environmentally sustainable manner. The Government of Andhra Pradesh has targeted to achieve 18,000 MW Renewable Energy capacity addition by the year 2021-22, comprising of 10,000 MW of solar Power and 8,000 MW of wind Power, which is 10 % of the national target.

Solar and wind power potential in AP is concentrated in the Rayalaseema belt and studies reveal that their generation profile is complementary to each other. A hybrid wind solar project can help for optimal utilization of transmission infrastructure. Further, under the AP Wind Power Policy-2015, it is proposed to promote Solar and Wind Hybrid Power projects to enable better utilization of common infrastructure and related facilities. The existing wind farms may have scope of adding solar PV capacity and similarly there may be wind potential in the vicinity of existing solar PV plant. GoAP is keen to encourage wind solar hybrid projects in all possible

manner and combination, in order to harness the combined potential of these clean energy sources in an optimal manner and to help in minimizing the variability.

2. Objectives and Goals

- i. The main objective of the Policy is to provide a framework for promotion of large grid connected wind-solar PV systems for optimal and efficient utilization of transmission infrastructure and land, reducing the variability in renewable power generation and thus achieving better grid stability.
- ii. Optimal utilization of transmission infrastructure being built by State Utility to evacuate renewable power.
- iii. Policy aims to encourage new technologies, methods and way-outs involving combined operation of wind and solar PV plants may also be coupled with any other Renewable Energy Sources and other emerging Technologies like Energy Storage systems.
- iv. Target a sum total of wind and solar hybrid capacity of 3000 MW by 2019-20, which will be part of the commitment of Government of AP towards creation of 18,000 MW of RE projects, as mentioned under para 1

3. Period of Enforcement

This policy shall come into operation with effect from the date of issuance and shall remain applicable for a period of five (5) years and/ or shall remain in force till such time a new policy is issued.

4. Wind-Solar Hybrid System

Wind-Solar Hybrid System means the **Combined generation** of power at existing or new solar/wind power projects (or) **Co-located** i.e addition of Wind or Solar Power capacity at the interconnection point of the RE pooling station point of existing wind or solar power installations (or) **Co-injection** i.e addition of Wind or Solar Power capacity after inter connection point (i.e. EHV Side) of the RE pooling station of existing wind or solar power

capacity may also be coupled with any other Renewable Energy Sources and other emerging Technologies like Energy Storage systems.

Under the category of wind-solar hybrid power plants, Wind and Solar PV systems will be configured to operate at the same point of grid connection. Another important aspect would be related to the sizing – which would depend on the resource characteristics. In order to achieve the benefits of hybrid plant in terms of optimal and efficient utilization of transmission infrastructure and better grid stability by reducing the variability in renewable power generation:

- a. In the locations where the wind power density is quite good, the size of the solar PVs capacity to be added as the solar-hybrid component could be relatively smaller.
- b. In case of the sites where the wind power density is relatively lower or moderate, the component of the solar PV capacity could be relatively on a higher side.
- c. APTRANSCO would also like to consider allowing connectivity based on Ampacity (i.e. limiting the amperes that would be flowing in the transmission network, in opposition to MVA/MW connectivity, so that the developers on their own can optimize the sizing of the wind-solar hybrid project, on a case to case basis.

5. Implementation Strategy

5.1. The implementation of wind solar hybrid system will depend on different configurations and use of technology as detailed below:

a) Wind-Solar Hybrid- AC integration

In this configuration the AC output of the both the wind and solar system is integrated either at LT side using three-winding step-up transformer or at HT side. In the latter case both systems use separate step-up transformer and HT output of both the systems is connected to common AC Bus-bar or at . Suitable control equipment is deployed for controlling the power output of hybrid system.

b) Wind-Solar Hybrid- DC integration

DC integration is possible in case of variable speed drive wind turbines using invertors. In this configuration the DC output of the both the wind and solar PV plant is connected to a common DC bus and a common invertors suitable for combined output AC capacity is used to convert this DC power in to AC power.

5.2. For simplicity purpose, herein onwards wind-solar hybrid plants are divided into two categories:

i. Type-A hybrid plant

This category includes existing operational, under-construction and allotted wind or solar power plants. For wind plants capacity has been allocated before the issuance date of this policy whereas, solar power has been allotted through tender process or already set up under Open Access.

ii. Type-B hybrid plant

This includes proposed wind or solar power plants which have not been allocated till the issuance date of this policy

5.3. Hybridization of Type-A hybrid plant (existing allocation):

Existing wind power or solar power projects, willing to install solar PV plant or wind turbine generators (WTGs) respectively to avail benefit of hybrid project, may be allowed to do so with following Conditions:

i. The hybrid power injected in to the grid will not be more than the transmission capacity/grid connectivity allowed/sanctioned for existing wind/solar project or Ampacity if the developer is interested on case to case basis. This will ensure that no augmentation of transmission capacity is required. In case of any additional transmission capacity requirement by the developer, AP Transco may allocate additional capacity by carrying out Load flow analysis of the existing network only. No augmentation will be made by AP Transco.

ii. No additional connectivity/transmission capacity charges will be levied by the respective transmission entity for installing the solar PV/wind turbine generators considering that same transmission capacity is being used. However, in case of system studies required for allocation of additional capacity, the project developer will pay all statutory fees to APTRANSCO/DISCOMs.

- iii. The additional solar/wind power generated from the hybrid project may be sold through open access or may be sold to AP DISCOM (s) through PPA at the tariff as applicable in Section-7.

5.4. Type-B hybrid plant (new allocation):

In case of new wind-solar hybrid projects, the developer have option to use the hybrid power for captive use or third party sale or may sell the hybrid power to the DISCOMs. The hybrid power so purchased by Distribution Company may be used to offset both solar and non-solar RPO.

6. Capacity Allotment

a. Type-A hybrid plant (existing allocation):

To develop additional solar capacity in wind power plant or vice-versa, participation is limited to only existing developers. Existing developer can develop the new capacity either on its own, through JV or in partnership with firms/companies.

b. Type-B hybrid plant (new allocation)

- i. The sum total of the solar and wind capacity to be based on transmission evacuation capacity.
- ii. The choice of capacity split between wind and solar lies with the developer. However, the split has to be within the floor (1:0.6) and ceiling ratio (1:1.5) limits between wind and solar as specified by the nodal agency.

7. Tariff for sale to AP DISCOMs (s)

a. Type-A hybrid plant(existing allocation)

- 1. Existing wind power project adding solar power

In respect of wind power generation, the tariff determined by the State Electricity Regulatory Commission, based on the year of commissioning of the project will be applicable.

In respect of solar capacity to be taken up in the existing wind farm project area, the solar tariff will be the feed-in-tariff as determined by the State Electricity Regulatory Commission. The tariff will be different based on voltage level of injection of power as follows,

- i. Net injection at 33KV level or below as per the tariff determined by APERC
- ii. Net injection at above 33 KV level as per the tariff determined by APERC

The feed-in- tariff as decided by APERC will be paid until the targeted capacity of 3000 MW is reached.

b. Type-B hybrid plant(new allocation)

Tariff paid will be based on Net injection capacity of the hybrid power plant, separately for wind power and solar power as recorded in the separate energy meters fixed at the project sites. However, if the State Electricity Regulatory Commission fixes tariff for Hybrid power duly indicating the percentage of share of solar and wind power, the same will be made applicable based on the common energy meter. The tariff will be different based on voltage level of injection of power as follows,

- i. Net injection at 33KV level or below as per the tariff determined by APERC
- ii. Net injection at above 33 KV level as per the tariff determined by APERC

The feed-in- tariff as decided by APERC will be paid until the targeted capacity of 3000 MW is reached.

In all other cases, when targeted capacity addition of 3000 MW is reached, the tariff will determined separately for both wind and solar power through transparent bidding process as follows,

- a) Tenders shall be called for procuring power from sum total of wind and solar capacity. Maximum injection capacity shall be specified.
- b) Bidder shall quote offered capacity (MW) for wind and solar separately

- c) Bidder shall quote separate tariff for both wind and solar capacities offered
- d) Normative CUF for wind (23%) & solar (18%) shall be specified for evaluation
- e) Selection will be done based on lowest weighted average levelised tariff

8. Metering

- i. Assessment of solar and wind power injected into the grid through main meter from the hybrid project will be worked out on the basis of readings of AC meters installed on LT sides of the WTG and solar PV plant in case of AC integration and in case of DC integration on the basis of readings of DC meters installed at the DC outputs of the wind and solar PV plant. In a hybrid power plant, both solar and wind power will have separate meters
- ii. For both Type-A and Type-B hybrid plants, same metering system will be implemented. Distribution losses between these separate meters and interconnection point of the APTransco / DISCOM will be calculated on pro-rata basis in proportion of power injected through these separate meters.

9. GoAP Incentives

To enable wind-solar hybrid power capacity addition in the State, following incentives shall be provided to the Eligible Developers for those projects commissioned during the operative period mentioned in the para three (3) and will be continued for a period of 25 years from date of commissioning of the projects.

a) Power Evacuation

- i. Hybrid power projects will be exempted from paying the supervision charges to APTRANSCO/DISCOM towards the internal evacuation infrastructure within the plant site and upto pooling sub-station. All electrical installations within plant site and upto pooling sub-station shall be as per the statutory requirements and shall be certified by the Chief Electrical Inspector General (CEIG) or any other statutory authority.

- ii. APTRANSCO/DISCOM will dispose the proposals for the technical feasibility for evacuation within 14 days from the date of receipt of application. Any upstream system strengthening requirement shall be borne by APTRANSCO/DISCOM on a priority basis. However, the Eligible Developer shall bear the entire cost of power evacuation facilities for interconnecting the hybrid plant with the grid.
- iii. While the responsibility of the upstream strengthening and the cost thereof lies with the APTRANSCO/DISCOMs, the developer in the interest of the project commissioning timelines may approach the APTRANSCO/DISCOMs to do it on his own as per the scheme approved, based on a mutually accepted reimbursement mechanism, which can be agreed between the Developer and the utility on a case to case basis.
- iv. The Eligible Developer shall abide by the orders, rules, regulations and terms and conditions as approved by APERC from time to time for operation of hybrid plant, power evacuation, transmission and wheeling of energy.

b) Distribution Losses

Distribution losses shall be exempted in case of injecting of power at voltage of 33 KV or below irrespective of voltage level of delivery point within DISCOM.

b) Transmission and Distribution charges for wheeling of power

There will be no Transmission and Distribution charges for wheeling of power generated from hybrid power projects, to the desired location/s for captive use/third party sale within the State through grid. However, the Transmission and Distribution charges for wheeling of power generated from the hybrid power projects for sale outside the State shall be applicable as per regulations of APERC. The T&D charges exemption for 3rd party sale by Eligible Developers under this policy will be permitted only to HT category consumers as categorized in Tariff Orders and as per the regulations issued by APERC from time to time.

c) Energy Banking

Banking of 100% of energy shall be permitted during all 12 months of the year. Banking charges shall be adjusted in kind @ 2% of the energy delivered at the point of drawl. The banking year shall be from April to March Energy injected into the grid from date of synchronization to Commercial Operation Date (COD) will be considered as deemed energy banking. The

unutilized banked energy shall be considered as deemed purchase by Discoms at the pooled power purchase cost as determined by the APERC for the applicable year. Energy settlement shall be done on monthly basis.

d) Open Access

Intra-state Open Access clearance for the whole tenure of the project or 25 years whichever is earlier will be granted as per the APERC Regulations amended from time to time. In absence of any response or intimation from the Nodal Agency to the generator within 21 days, then such application shall be considered to be deemed open access.

e) Cross Subsidy Surcharge

The cross subsidy surcharge shall be exempted for third party sale within the State for a period of five years from the date of commissioning of hybrid power capacity. This benefit will be extended until 3000 MW targeted capacity is reached.

f) Electricity Duty

All hybrid power projects are exempted from paying Electricity Duty in case of sale of power to APDISCOMs

g) Deemed Public Private Partnership (PPP) Status

Deemed PPP status shall be provided for hybrid projects which have entered into a PPA with APDISCOMs for sale of power.

h) Non Agriculture Status

Deemed Non-Agricultural (NA) status for the land where hybrid power projects will be accorded, on payment of applicable statutory fees

i) Deemed Industry Status

Setting up and generation of Electricity from the hybrid power projects shall be treated as eligible industry under the schemes administered by the Industries Department and incentives available to industrial units under such scheme and such other benefits the state and the central government extends on account of the new state formation will also be made available for the hybrid power projects.

j) Must run status

Injection from hybrid power projects shall be considered to be deemed scheduled subject to prevailing regulations/grid code of appropriate commission.

k) Pollution Clearance

Hybrid power projects will be exempted from obtaining any NOC/Consent for establishment and Consent to Operate under pollution control laws from AP Pollution Control Board

10. Nodal Agency

- i. NREDCAP shall act as a Nodal Agency under this policy and as decided by the government from time to time.
- ii. Nodal Agency and/or designated offices by the Nodal Agency shall be responsible for facilitating single window clearance of projects for the following activities:
 - a. Registration of projects
 - b. Allotment of capacity of projects
 - c. Processing of proposals for allotment of revenue land or Forest land.
 - d. Arranging approval for power evacuation plan and open access.
 - e. Arranging other statutory clearances/approvals if any.
 - f. Co-ordination with MNRE/SECI/APTRANSCO/ APDISCOMs and other central and state agencies.
- iii. An online system will be established by the Nodal Agency for acceptance of applications and for providing status updates. The developers will be given a login access for tracking the status updates. All approvals/clearances shall be disposed within 30 days from the date of registration.

11. Repowering

Repowering is allowed for wind-solar hybrid plants and shall be as per 'AP Wind Power Policy 2015.

12. Time Lines for Project Completion for Type-B Hybrid Plant

The Eligible Developers should enter into a project agreement along with the applicable fees and bank guarantees with the Nodal Agency within two (2) months from the date of sanction of the capacity allotment. In case of hybrid power projects allotted in revenue lands, the project shall be commissioned within 18 months from the date of possession of revenue lands and/ or issue of power evacuation clearance, whichever is later. In case of hybrid power projects allotted in private lands, the projects shall be commissioned within 18 months from the date of issue of power evacuation clearance.

In case of revenue and private lands, if there is no development at the site, even after three (3) years from the date of sanction, the site may be offered to any other developer by the Nodal Agency. The Nodal Agency would be at liberty to invite bids for setting up hybrid power projects in such sites, where no development is taken up within prescribed period. In such cases, the Government may resume the lands so allotted or acquire the land purchased by the developers at the same price at which the sale deeds were registered and offer the lands to other developers by inviting bids.

13. Manufacturing And Green Energy Commitment

After the formation of the new state, there is necessity to attract investments in manufacturing sector for overall development of State and to create the employment. The Government intends to promote wind turbine and solar manufacturing facilities that can contribute towards wind and solar sector development in the State and create employment opportunities. In addition to the incentives applicable for promoting manufacturing as per the existing industrial, solar and wind power policies, it is proposed to provide preference in allotment of the wind solar hybrid capacity for projects that come up based on manufacturing facilities located within the State.

Preference in allotment of the wind and solar hybrid power capacity out of the targeted capacity of 3000 MW envisaged under this policy, will be given to the developers who have pledged

Green Energy commitment to Hon'ble Prime Minister during REInvest to develop the Renewable Energy Projects specifically in the state of Andhra Pradesh.

14. Project Monitoring Committee

A “High Level Committee” constituted with the following members will monitor the progress of implementation of the Hybrid Power Projects cleared under the policy:

1. Prl. Secretary, Energy , I&I & CRDA
2. Chairman and Managing Director, APTRANSCO
3. CMD of APDISCOM(s)
4. VC & MD, NREDCAP(Member-Convener)
5. Representatives (2) of solar/wind power developers

If any difficulty arises in giving effect to this policy, the High Level Committee is authorized to issue clarification as well as interpretation to such provisions, as may appear to be necessary for removing the difficulty either on its own motion or after hearing those parties who have represented.

15. Mid-Term Review

State Govt. may undertake a mid-term review of this policy as and when need arises in view of any technological breakthrough or to remove any inconsistency with Electricity Act 2003, rules and regulations made there under or any Govt. of India policy.

16. Power to remove difficulties

If any difficulty arises in giving effect to this policy, energy department is authorized to issue clarification as well as interpretation to such provisions, as may appear to be necessary for removing the difficulty either on its own motion or after hearing those parties who have represented for change in any provision.

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