

Accompaniment to President Hydro Power Association (India)'s letter No. 09 Dt, 28.05.2012 & no. 10 dated 30.05.2012

HYDRO POWER ASSOCIATION (INDIA)

All India Seminars on

“Implementation of Hydro Projects through Private Participation”

held at the

Institution of Engineers, (India), Pune Centre on 10th January 2012

Summary of Proceedings and final recommendations of the seminar.

(A) Summary of Proceedings

1.0 The seminar was organized jointly by Hydro Power Association (India) and the Institution of Engineers (India), Pune. The function was inaugurated by Padmashree Shri. Achyut Gokhale, I.A.S. and Former Chief Secretary of Nagaland, Shri. C.S.Modak, Secretary, Water Resources Department, GOM, Shri. D.P. Shirke, Executive Director of Konkan Development Corporation, Shri. M.D.Pendse, President HPA(I), Mrs. V.A Ankush, Secretary General HPA (I) and Superintending Engineer (Electrical), Shri. Amol Bora, Chairman IEI, Pune Local Centre, and the distinguished guest speaker, Dr. Arun Kumar, Head of AHEC, IIT, Roorkee, Shri. D.R.Kandi, Executive Director of MKVDC, Shri. D.N.Modak, Chief Engineer, Koyna Project and Shri. T.P.Munde, S.E. Koyna Design Circle, were also present. A Souvenir was also released on this occasion. Former Secretaries, Former Executive Directors, Chief Engineers & other Engineers from WRD and other departments, representatives of developers, experts in the field of Hydro power, Consultants and other delegates were present. About 150 participants and experts in the field of Hydro Projects from all over the country attended the seminar. Overall, 15 technical papers were presented in a daylong seminar in three technical sessions.

2.0 Shri M.D Pendse, President, HPA(I) said that this seminar will serve as a platform to resolve bottlenecks and problems for accelerated and streamlined hydropower development. He expressed that the Hydro Power, particularly from Small Hydro Projects is the best source of cheap and perpetual power being most environment friendly, pollution free and renewable, to meet the needs of increasing population and for dealing with inadequate power supply.

3.0 Padmashree Shri. Achyut Gokhale, the Guest of Honour of the function specially mentioned about the use of Micro Hydro Electric Generators for rural development as well as the necessity of creating hydro potential on war footing for rural development, as was done under his guidance in Nagaland.

4.0 Shri. C.S. Modak the Chief Guest of the function and Secretary, Water Resources Department, explained that the government aims to increase Hydro power generation through private developers through small hydro projects. He

informed that Maharashtra State has added about 53 MW of the installed capacity since introduction of hydro policy of 2005. With planned addition of 150 SHP projects in next 5 years' span, it is proposed to achieve target of 30 MW per year. He also added that government will tackle the problems of the developers by making suitable changes and revision in the hydro policy early.

5.0 While opening up the first session of the seminar, the distinguished theme speaker Dr. Arun Kumar, Head, AHEC, IIT, Roorkee presented scenario on Small Hydro Power development in India. He discussed the limitations on the rapid growth of the sector. He appreciated the role of consultants in Maharashtra state in this field. He talked about the turbine model testing and R&D facility of international standard and 1st of its kind in Asia being established at AHEC Roorkee with the support of MNRE, Government of India.

6.0 The first technical session, thereafter, discussed the hydro policies. The hydro power scenario of the state was presented by Shri. Dhananjay Kulkarni consultant. He indicated a potential of 700 MW projects through small, mini and micro projects in Maharashtra State. A paper on Micro hydro electric generator used for village electrification by Shri Uday Pote and Shri Barve was very useful. Shri. T.P Vartak of Four Eyes Research, talked on low head micro hydro power Stations. He suggested need for utilization of large hydro power potential of K.T weirs in the Maharashtra State. A case study of Middle Godavari Sub basin was presented by Shri.Shelke, Retired Chief Engineer, Koyna. He emphasized the need for sub-basin wise approach in implementing hydro policy.

7.0 Difficulties of the developers were discussed in papers from Mahati Hydro, Ashoka Buildcon, DLHPPL and others. The disparity in tariff rates approved by MERC in case of wind, solar, hydro and **biogas**-based generation was thoroughly highlighted. There is need for speeding up power evacuation arrangements and forming simple procedures for approving SHP, grid connectivity and related issues at state electricity board level which is the main hurdle as discussed in these papers. Article on "Difficulties in the bank loans for hydro projects" was presented by Shri. Diwan, Hydro Power consultant, Kolhapur. New concept of "Siphon type HEP" for low heads on canal distributaries useful for farmer's self-reliance was presented by Shri. J.M. Kulkarni former, S.E,WRD. A paper by expert Shri. Dinkar about a few words of caution for new developers in hydro was very useful as a guideline. Shri. M.D.Marathe, well known hydro expert emphasized in detail the future of renewable energy industry in India and Maharashtra State expressing the limitations of each energy source. For increasing "Hydro Thermal ratio" and to meet the peak and base load demands at all times, at national and state level both. He emphasized the urgent need to accelerate the hydropower development (both SHP and PSS schemes).

8.0 The last session discussed financial aspects of small hydro projects. The new era of Renewable Energy Certification and its trading on power exchanges was highlighted by Shri. Surendra Pimperkhedkar of WISE-Pune, which created interest in the SHP developers. Recommendations of the "seminar on SHP on BOT Basis" held in November 2009 were presented in a paper by Er. Dr. Vilas Kumar Bafna, Hydro Power Consultant and Member HPA (I). He also suggested the need for taking up projects to use huge power potential available in Konkan

(with large number of Pico, micro, small hydro projects), small, self-identified projects and also, projects in undeveloped areas by giving special facilities to developers to make them economically viable. Otherwise, in his view, such project be taken up by government to tap every KW of hydro potential and in the interest of overall development of Maharashtra State.

9.0 Shri. D.N. Modak, Chief Engineer, Koyna Project and In-charge Chief Engineer, Hydro Electric Projects (Electrical),WRD, GOM while replying to the queries of the developers, also assured to consider and recommend to the government in WRD, the suggestions like formation of Single Window System, setting up High Power Committee, etc. Dr. D.N More summarized the difficulties in SHP development and suggested need for formation of separate Hydro Power Development Corporation. Presently SHP developers are facing stiff hurdles at all departments concerned which need to be overcome by formation of separate Corporation, he stated.

10.0 Open discussions took place in the concluding session wherein use of advanced technologies being adopted in SHP like Indoor switchyard, ICPO at Darna project and siphon intake turbine, green cess fund were Discussed While concluding the seminar Shri. M.D. Pendse, President, HPA. (India), told that all the difficulties pointed out by the developers and the experts in the hydro field will be sent in the form of recommendations of the seminar to WRD,GOM for appropriately incorporating the same in the Policy document. He also assured that the process of interaction, initiated by this seminar will continue in future also.

(B) recommendations of the seminar

The following are the Recommendations of the seminar based on the deliberations.

1. Signing of HPDA

The promoters have expressed that generally there is a delay in signing of HPDA for various reasons on the part of WRDGOM. There is also lack of simple and standard formats and procedure for HPDA causes avoidable delays. There is lack of awareness of various GR referred by WRD, because they are not made public on KDC website. MSEDCL shall be a party to HPDA and commit power evacuation guarantee.

Recommendation: The procedure of signing should be simplified. The relevant GR used or referred should be made public.

2. Land availability and signing of lease agreement

Majority of the projects allotted and approved by WRD GOM are located on land belonging to WRD. However, the land records of such projects are not clear. The title of the land ownership to WRD is not completed in many project sites. In the existing canal and dam projects the land acquisition procedures are not even initiated for many years after the construction of the projects/works. Many of the projects are delayed due to lack of such information.

Recommendation: Immediately on issue of LOP the WRDGOM should issue instructions to the concerned regional WRD officials to clarify the ownership of land and provide the land ownership details. **Signing of land lease should be separate and should not be made part of HPDA.** However, if possible these two agreements can be signed together.

3. **Processing and vetting fees/Stamp duty/Water royalty charges/Octroi charges**

There is need for revision in the vetting fees of TEFR. This is essential because in most of small projects generation is small and periodical, maintenance costs are high, and there is no assured water availability. Also smaller the capacity more is the incurred cost and maintenance cost.

Recommendation:

- The revised structure of TEFR vetting fees shall be:
 - Up to 5MW installed capacity – No charges
 - 5MW – 25MW installed capacity - Rs.10000 per MW
- Cost of vetting TEFR is to be credited from water royalty as ultimately owner of project is Government.
- Water royalty charges need to be waved as a small incentive to private sector. In hydro project water used for generation is released further for irrigation, water supply and other uses. Already Govt receives water usage charges
- Octroi on electronic equipment, steel, cement to be procured for the projects needs to be waved. This will effect in improving the financial forecast picture of the project
- Stamp duty on registration of HPDA agreement should be waived with immediate effect.

4. **Operative period**

While working out the financial forecast of the project it is found that more than 20 – 25 years are required to recoup the cost incurred on the project (from commissioning). So by keeping operative period of 30 years is not at all economical for investors. In states like Himachal Pradesh where in power generation exist throughout the year the operative period is kept as 40 years. Moreover the life of the project is need to be considered as 40 years by considering good material, equipment and up gradation in the technology. The present MERC guidelines consider tariff period of 35years and therefore the HPDA operative period has to be more than that.

Recommendation: The **operative period** of the HPDA recommended is 40 years.

5. **Design and operational issues**

Check all ICPO for defect before HPDA and certify its pressure testing and discharge capability.WRD should provide time frame for approvals if required. No approval shall be insisted if design is from private design engineers/consultant. WRD shall prepare a list of approved consultant for civil design (As all industries have.). Plant layout shall be left to developer. The flood

water released during monsoon should be through generation only and for this large sets need to be installed.

Recommendation: Suitable guidelines should be issued by WRD to the field offices

6. Green cess and other funds for infrastructure development

MSEDCL collects green cess from all commercial consumers for development of infrastructure and transmission line. These funds of cess collected so far is still unutilised. WRD has displayed the list of planned SHPS on net with their capacity and location. MSEDCL should plan their infrastructure and transmission line connecting the SHP capacity and location and display their plan on net. There are no guidelines or order from MERC to get funds from developer and hence asking MSEDCL to pay transmission cost to developer is illegal. The MSEDCL should get funds from GREEN Cess and should not ask or insist developer to pay.

Recommendation: These funds should be used for private hydro projects instead of demanding the additional funds from developers for transmission line. Gol funds for REC shall also be used for SHP so as to justify power generation and dist to villages.

7. High power committee

The developer has to handle different departments like revenue ministry, electricity board, water resource department, forest and environment department, MEDA (giving subsidy) etc for proper functioning of Hydro projects which needs formulation of a high power committee which will be assisted by a set up of single window system as mentioned subsequently. It is necessary to get clearance for power evacuation, Land acquisition, pollution control, forest and environmental clearance for which such committee needs to be established. This will avoid time consuming processes which affect the financial forecast of the project.

Recommendation: It is, therefore, recommended to appoint a high power committee.

8. Grievance redressal

There is no provision for grievance redressal in the existing WRDGOM policy on small hydro projects.

Recommendation: There should be provision of grievance procedure and its redressal at every stage of the project development and after development.

9. Optimisation of the installed capacity of the plant

Presently WRD,GOM guidelines insist for planning of SHP on 75% dependability. As per CBIP guidelines on formulation of small hydroelectric schemes there are no rigid guidelines for determining the installed capacity. It depends on the economy of generation and the role of a particular project is expected to play. However, as per para 1 page 70 of CBIP "**Manual on small hydroelectric schemes**" in cases where the power is proposed to be fed into

the grid, installed capacity could be based on flows available on 50% dependability. An annexure 4.3 with an example is cited therein.

Recommendation: The modification in these guidelines is proposed. Guidelines for determining the installed capacity should be made flexible if they are on optimum side and left for decision of investor/promoters or specifically allowed on flows available on 50% dependability.

10. **Co-ordination of Government department and offices**

Overlapping jurisdictions are causing problems in DPR approval and in execution of projects.

Recommendation : All the permissions and approval and tracking are to be made from single office like SE KDC. Authorize one office to sign HPDA. A single Window is suggested which can process the applications for approval from concerned line departments.

11. **Issues related to power evacuation concerning MSEDCL/MSETCL**

In general, the developers are facing lot of problems in providing the evacuation facilities for SHP. The sanction of grid connectivity process in CE, State Transmission Utility (STU) should be done at single point as even for small projects Grid Connectivity agreement goes up to Managing Director, MSEDCL level via Executive Engineer – Superintending Engineer – Chief Engineer (Commercial) – Executive Director, Commercial, Director Operations, Director Finance – Managing Director – CE, Commercial – CE,STU. A very long chain causes delay in project and consequential financial burden on hydro developer.

With a view to sort out the evacuation and other problems related with MSEDCL/MSETCL, it is suggested that the issues covered in recommendations given below are taken up by WRD with MSEDCL/MSETCL top authorities and suitable arrangements/guidelines shall be framed mutually so that these can be incorporated and annexed to the GoM WRD hydro power policy.

Recommendation:

- Request for issuance of standard guidelines for application and procedure for approval of grid connectivity. Request for issuance of simplified procedure for approval of power evacuation system with fixed time frame. Online availability of formats and forms of application by MSEDCL. Make available the grid connectivity network maps of 22kv/33kv available, online. Approval of the grid connectivity by MSEDCL within agreed time frame. Any dos and don't should be clearly specified.
- The estimated cost of transmission line and equipment at substation should be given by the pre-designated authorised officer of MSEDCL within one month from date of application by the developer.
- MSEDCL should display model Energy Purchase Agreement (EPA), should get approved the same from MERC and should display it on net. The EPA should be signed by the authorised officer within one month from the date of submission of draft by developer. This now requires more than a year in today's scenario.

- In certain cases, co-ordination between MSEDCL and MSETCL is required but the officer authorised for approval of transmission line should do the co-ordination. Single window approached should be followed for all issues including approvals to testing and commissioning, related to MSEDCL such shall be provided zonewise.
- Model indoor sub station shall be developed and put on web site.
- MSEDCL should plan development of infrastructure and transmission line by every year end and should display proposed plans on net so that the developer can submit the proposal to authorised officer of MSEDCL accordingly.
- SHPs are located at remote and wide spread area across the State. For power evacuation of these SHPs, prime requirement is suitable/stable/uninterrupted grid lines (i.e. "express feeders") nearest to the Extra High Voltage (EHV) substation. As per the identified 134 projects of state SHPs, 52 private projects has installed capacity upto 1 MW; 30 projects have capacity less than 2 MW and 26 projects have capacity in between 2 to 2.5 MW. Considering average approximate requirement of 10-15 km from HV substation and 15-20 km from EHV substation, MSEDCL is required to provide total transmission line of about 3000 km length and this requirement should be planned accordingly. MSEDCL should commit to this.
- MSEDCL/MSETCL should consider this line during their huge expansion plans and upgrade their network according to the needs of the SHPs. List of such SHPs in pipeline and proposed projects is available with WRD. WRD should arrange to send this to MSEDCL/MSETCL.
- In many a cases, 33 kv line passes nearby a small hydro project. It may be possible to tap the line by Line-In-Line-Out (LILO) and installing necessary connecting equipments; line Circuit Breaker (CB) and Isolator, etc. instead of insisting for dedicated 33 kv line to nearest EHV sub-station.
- If we consider about 20 km length of transmission line length, expected expenses is approx. Rs.180 lacs and the developer has to pay Rs.90 lacs (50%) as an interest free advance. Hence, it becomes imperative to finalize, in advance, interconnection point/grid connectivity and cost estimates and make available to the developer at Techno-Economic Feasibility Report (TEFR) stage, within one month of application, which becomes part of TEFR.
- Procedure for payment of power evacuation arrangement
 - MSEDCL demands 50% charges of evacuation expenses as advance from developer to be refunded in 5 equal instalments which is not as per Maharashtra Electricity Regulatory Commission (MERC) order.
 - In case developer agrees to pay 50% charges as advance payment towards power evacuation arrangement, option for payment for line installation to MSEDCL or directly to the contractor appointed by MSEDCL should rest with developer. The payment made by developer should be reimbursed to him within 5 instalments.
 - GOM WRD should persuade Maharashtra Energy Development Agency (MEDA) to pay balance 50% cost of power evacuation arrangement from 'green cess' to MSEDCL after commissioning of the plant.
 - As 40% of the SHP's requirement of line voltage is 11KV/440V, adequate "switching stations" should be made available /planned by MSEDCL for converting existing 11KV local feeder into "Express Feeder" so as to have uninterrupted power evacuation line.

- MSEDCL should stop drafting EPA for individual projects and instead should get approved model EPA from MERC and make it available online. MSEDCL should sign EPA, within one month of submission of request from developer with complete documentation.
- Projects to be commissioned shall be given power evacuation facility by MSEDCL three months prior to its commissioning.
- Mini hydro shall be allowed to connect to 11 kv grid instead of 33 kv.
- Supervision charges shall be reduced to 5 % .
- Since the line is in possession of MSEDCL as per MERC directive, MSEDCL shall provide emergency staff to repair these lines expeditiously to avoid loss of generation.
- At the time of sanction of loan to developers, Banks demand a letter from MSEDCL agreeing to purchase power at the rate decided by MERC. The MSEDCL authorised official, should give such letter to developer within one month of receiving the request from developer.
- In some cases, MSEDCL has changed the location of the receiving substation indicated at the time of preparation of project report. Such changes put additional burden to developer. Hence, MSEDCL should not make changes in the agreed location of the feeding substation.
- MSEDCL demands lump sum charges for providing auxiliary power supply at the time of commissioning of project. However, in case of SHP's where DG set is used to run the auxiliary system, MSEDCL should not demand these charges.

12. **Micro hydro potential on field channel/canals**

A large number of PICO hydro turbines operating on siphon intake (1.5 to 3.75m low or ultra low head) appear to be feasible on canal outlets of main distributaries. Such Siphon turbines are operating in other states like Punjab, Jharkhand etc. Such projects may help improving living standard and productivity of farmers and villagers. There is good potential for employment generation at rural level if such schemes are implemented.

Recommendations: A preliminary survey is proposed to be conducted by WRD followed by few pilot projects. There is need to promote micro hydro turbine manufacturing in the state.

13. **Background need based studies**

Any policy should be based on need based background study. The study should indicate the potential for projects development, type of projects, techno commercial aspects. There are large differences in the estimated potentials mentioned by MNRE, WRDGOM and other private agencies involved. The existing database indicates that a large number of projects are being identified by the private developers also.

Recommendation: It is essential to formulate basin & sub basin wise Hydro power development by identifying the basin & sub basin wise Hydro power sites. WRD should undertake the study of small hydro potential in the state and its infrastructural requirements on priority. The studies conducted should be revised every 5 years. It is also recommended to study the hydropower

potential on sub-basin and basin wise in the state. It is noticed that not necessarily, each basin will have small hydro potential. There are sub-basins like Middle Godavari which has meagre SHP potential. Such studies if conducted can help in deciding the approach for policy determination with basin/sub-basin approach.

14. Water availability and tariff on the basis of PLF

It is observed that the hydropower development in the region of Viderbha, Marathawada and Khandesh is less mainly because rainfall is less in this area compared to western Maharashtra and Konkan. The rate for electrical energy is decided by MERC on the basis of 30% PLF. But, in the above areas, the PLF is about 20%. Hence, in order to harness hydro power in this area, it is necessary to give them additional incentive, may be inversely proportional to PLF or on the basis of some scaling.

Recommendations: WRD may recommend to MERC to give higher rate in above mentioned regions for SHPs with PLF less than 20%..

15. Tariff comparable with other alternate energy

MERC gives energy rate much higher to baggasse plants, although there is scope to recover cost of it by products like spirit, presmud etc. There is, However, no such scope for hydro projects. Hence, the rate for hydro projects should be higher or at least equal to baggasse plants.

16. Increasing “Hydro : Thermal ratio”

For increasing “Hydro : Thermal ratio” and to meet the peak and base load demands at all times, at both the national and state levels, there is urgent need to accelerate the hydro power development (both SHP and Pump Storage Schemes (PSS)). The PSS schemes are proposed to be implemented as joint venture of Government and private, base load power producers.

17. Micro Hydro Installation

Each village requires approx.10KW of energy. It is essential to develop lightweight, portable and highly efficient E & M equipments, which can be easily carried to remote areas (facing major load shading) for installation and use like DG sets for assured power mainly from agricultural point of view. For this, encouragement by way of relaxation of tax benefits and concessions through other facilities for micro hydro projects in remote and hilly areas is very essential.

Recommendation: It is proposed that 2-3 village panchayats can set up such projects jointly wherever the suitable stream flows are available. Government should waive all permissions to such power generation projects for local use without charging any royalties and other charges etc.

18. Urgent need for joint efforts by Govt., private developers and people, for developing Small (nano) Hydro Power Generating units for user friendly operations at the village levels.

Considering the large spread of appropriate sites for development of small and very small hydel stations in rural areas, considerable successful

efforts have been made all over the World to develop such generating units, with even locally available / cheap materials, easy for assembly and commissioning, preferably in modular and standardised forms, for facilitating large scale manufacture and ease of handling and maintenance. To achieve this China, which has the highest numbers of hydro stations in the World, and other European Countries, have their own R & D Organisations for constant up-gradation of the technology of cheapest and user friendly units.

There is, thus, urgent need for joint efforts by Govt, the private developers and people, for developing Small (nano) Hydro Power Generating units for user friendly operations at the village levels in our State also, on similar lines to meet spreading of this technology at village level

Recommendation :

Our learned Minister for Water Resources (Krishna Vally Corporation) Maharashtra State, Shri Ram Raje Naik Nimbalkar in his Message for the Seminar has aptly therefore, pin pointed this need in following words

“ Hydro Power, particularly from small hydro projects, is the best source of perpetual power being most environment - friendly and pollution free to meet the needs of increasing population and for dealing inadequate power supply. As such, more scientific and technological approaches are most essential to develop highly efficient equipments and modular methods of construction for speedy commissioning of small projects. Research is also required for use of light weight materials for electro mechanical equipments and development of portable machines needed for very small (nano) hydro power generating units which can be carried to remote areas and installed like a diesel pump set.”

The Seminar, therefore, fully endorsed this visionary view and strongly recommended to have such R & D initiative to be started forthwith, followed by promoting large scale manufacture of such generating units, through incentives, at very low cost for their spread in rural areas, to make them fairly self sufficient and to meet their power needs through a totally environment friendly and perpetual hydro power