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(Fanning an Alternative, Down to Earth, August 1–15, 2008**)**

Apropos your **letter No.P.14.43, dated 9 August 2008,** asking for my comments on **'Fanning an Alternative', that appeared in Down to Earth, August 1–15 2008,** I am providing clarifications on certain key issues that are incorrect. I have categorised my comments into ten broad sub-heads.

1. Incentives to Wind Power

On page 35 of the Down to Earth (DTE) issue under reference it is stated: "Till 1993, the Union (Government)…provided capital subsidy to set up windfarms. Subsequently, onus shifted to state governments. The Union Government, however, continued to provide accelerated depreciation (80% in the first year), virtually allowing an investor to write off its capital in a year, and a 10-year tax holiday." This statement and the sentences before it give the impression that the state governments continue to give incentives to wind power. After March 2002, no sales tax incentive or capital subsidy has been given by any state government. The benefit of 80% accelerated depreciation in the first year given by the Union Government is available to many other renewable energy technologies also. It is thus incorrect to say that the wind power sector alone is receiving special favour. This kind of fiscal support measures are given to fledgling and beneficial technologies by governments the world over. Huge direct and hidden subsidies are availed by the oil, gas and kerosene sectors and even the conventional power sector.

As regards how the accelerated depreciation operates in practice, the same has been misunderstood by the authors. It is actually availed at the corporate tax rate which is around 33%. So an investor gets only 33% of the 80% capital invested which works out to only 26% of capital invested. Hence it is erroneous to say that it "allows the investor to write off his capital in a year." Perhaps, it would be appropriate to talk about recovering the equity capital (generally 25% to 30%) in the first year. Added to this is the 14% interest on debt for project financing today which is making investments in clean energy unviable. Again, the ten-year tax holiday is not only for wind power generators. All private investors in infrastructure projects enjoy this facility.

Regarding investment in evacuation, in all power projects in India, government utilities construct transmission lines upto a predetermined point near the generation site for evacuation of power. This was true even in the case of the infamous Enron Power Project. Such transmission lines are later transferred to the state utilities and become their property. The same is practiced in the case of wind power also. If alternative energy developers are expected to invest in transmission facilities also, this source of clean energy will never become viable in India. As regards tariff paid for wind power, we feel that it does not fully reflect the environmental endowments of this green source of energy. Conventional power is apparently cheap because its price does not incorporate the cost of environmental and social externalities that they give rise to. If they are costed and factored into the price of conventional power, even today, renewable energy will be much cheaper. (WISE has conducted a detailed study that proves this fact).

2. The Opaqueness of Turbine Pricing

On page 36, under the sub-head 'Opaque green' it is stated that data on the manufacturing cost of wind turbines is not available in the public domain and this results in overpricing of the turbines by the manufacturers. It is common knowledge that the price of any industrial product is market-determined and not based on transparent data on the cost of manufacturing. Is there any industry in the country which

publicly declares that their cost of manufacturing of 'x' product is such and such and therefore they are charging 'y' price so that they get 'z' profit?

On the same page it is said that wind developers enjoy a "sweet real estate deal" by keeping the land to themselves. The ownership of the land around the turbine (at least two acres for each turbine) has to be transferred to the investor and the developers are not free to keep it with themselves. The banks who finance the project insist on the land being in the name of the investor and mortgaging it to the bank. The remaining land around the turbines or those covering common infrastructure (like roads) continue to be owned by the developer. But this cannot be alienated for any other purpose and is not fit for alternative use. It is completely unproductive land denoting dead investment.

3. Missing Data and Puzzling Little Facts

On page 34 of the article it is stated that in Maharashtra, "the installed capacity of 1756 MW of wind power generated about 1804 million units of electricity." On page 35, in the box item titled 'Puzzling little fact', data for 2004/05 and 2005/06 are missing as seen below:

Financial Year	00/01	01/02	02/03	03/04	06/07	07/08
Generation (MUs)	143	333	667	684	1714	1804
Installed capacity (MW)	190	399	401	407	1487	1756
PLF (%)	8.6	9.5	19.0	19.2	13.2	11.7

(Source: '*Fanning an Alternative*', Down to Earth, Aug 1-15 2008)

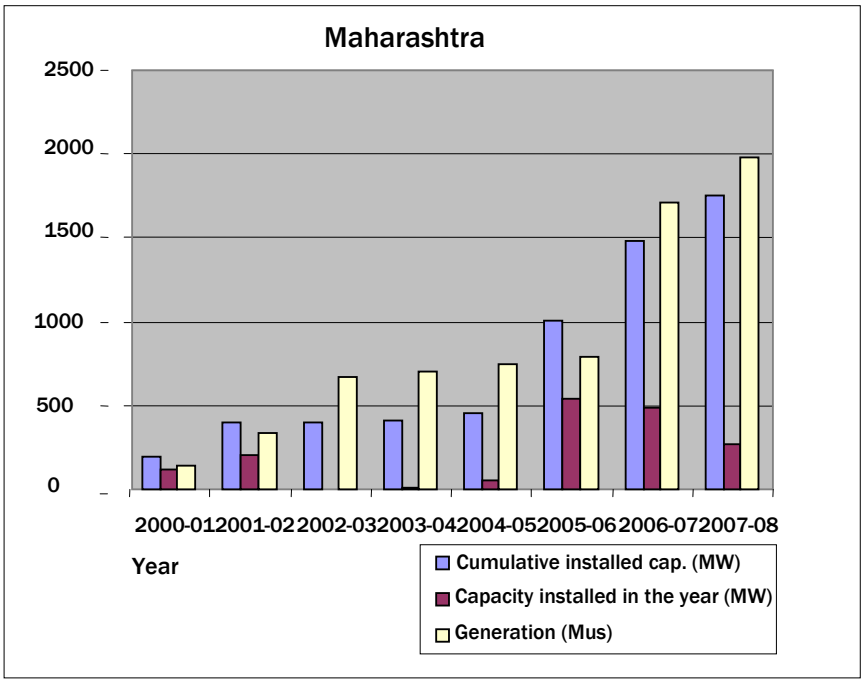
The data shown on Maharashtra Energy Development Agency's (MEDA) website is the cumulative capacity and capacity installed in a particular financial year and units generated in the corresponding year. It should not necessarily mean that capacity installed during the same year has fully contributed to the generation. The reason is that in any financial year, some projects are commissioned in September and some are commissioned in March. Thus, the generation from projects installed during March will not represent full year generation in the financial year under consideration. Also, since wind is a seasonal resource, 70% of the generation happens during April to September. The full year generation from newly installed turbines will be available only in the next financial year. These factors have to be considered while calculating the PLF. The straight-line method adopted by the authors is therefore incorrect. The long-term generation data is available on MEDA website and following is the correct position:

Year	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08
Capacity installed in the year (MW)	117.19	206.43	0.00	7.93	48.75	545.10	484.5	268.15
Cumulative capacity (MW)	192.930	399.355	399.355	407.285	456.035	1001.135	1485.635	1753.785
Generation (MUs)	140.04	332.04	672.46	705.5	742.96	790.53	1714.30	1983.90
Correct PLF	21.1	19.6	19.2	20.2	20.8	19.8	19.5	15.2

(Source: MEDA website: http:www.mahaurja.com/pg-we-overview.html)

It is evident from the above table that from 2000/01 till 2006/07, wind turbines installed in Maharashtra were generating at PLF of ~20% with little variations in individual years, except in 2007/08, when PLF declined to about 15.2%. The same data is represented below in graphical manner. It can also be

observed that increase in annual installed capacity during 2005/06 (545.10 MW) and 2006/07 (484.15 MW) resulted in significant increase in generation during 2006/07 (1714.30 MUs) and 2007/08 (1983.90 MUs).



The decline in 2007/08 happened because, in Maharashtra, many turbines had to be shut down for longer durations due to:

- Wind turbine cable thefts in Dhule area where there is a large concentration of turbines.
- Local agitations on account of various reasons forced manufacturers / operators to shut down the machines (mostly in Western Maharashtra).
- Increase in load shedding – Maharashtra is facing huge power deficit (3000 MW–5000 MW) since the last few years. Planned load shedding is in place for longer durations. This happens during summer-monsoon months when wind generation is at its peak. If grid is not live / active, wind turbines cannot pump energy into the grid as they require initial power from the grid for magnetising (to get the turbine started).

The power generated by wind turbines can only be transferred to the grid or evacuated when there is power supply in the connected system. If the utility companies keep their supplies (substation) switched off, the wind turbines cannot feed the grid even if wind is available and turbines are generating. Not only does the evacuation of power become very critical but also its quality i.e. parameters like voltage, frequency, etc. The performance of the wind power project (% PLF) is dependent on such enabling factors. Maharashtra has been facing serious problems of load shedding for a decade now and evacuation of wind power suffers in this process.

4. Lack of Competition in the Wind Turbine Market

On page 36 of the DTE article it is mentioned that, “Companies determine their costs, and with only a few companies making wind mills, there is no competition and even less transparency.” Today, there are about 9 wind turbine manufacturers in the Indian market. Out of these, the 4 main players, namely Enercon,

Suzlon, Vestas India, Vestas RRB (now RRB Energy Ltd) share more than 82% of the market (based on cumulative capacity installed till Sept 2007). Remaining share is apportioned by five manufacturers who mainly offer smaller wind turbines of 250 kW to 300 kW capacities. The demand outstrips supply and this has created the situation mentioned in the DTE article. However, this picture will change in the next two years. There will be at least 8 new manufacturers entering the Indian market in the next 2–3 years, with foreign technology tie-ups or as joint ventures. Two of the existing small-time manufacturers have also gone in for foreign tie-ups to upgrade their products and production facility. The present Indian market size of 1700 MW–1800 MW per year is likely to go up to 2500 MW–5000 MW in the next 3–5 years time. The manufacturing capacity in India is scaling up from the present 4500 MW to 10000+ MW, considering the large potential for exports. This will definitely increase competition among the manufacturers, will hopefully reduce the cost per MW in the near future, besides bringing in better efficiency and performance standards.

5. Renewable Portfolio Standards (RPS)

RPS stands for Renewable Portfolio Standards which is a system prevalent in the United States (more than 25 states in the U.S. have such laws) for mandating purchase of green power by utilities. While working as Director General of MEDA, I was the first in India to file a petition before the Maharashtra Electricity Regulatory Commission (MERC) for imposition of RPS in Maharashtra, based on an enabling provision in the newly enacted Electricity Act, 2003. The first order based on that petition was issued on 3 September 2004, and MERC chose to call it a 'Renewable Purchase Obligation' or 'RPO.' This order was updated in August 2006 when MERC talked of an RPS. So the statement on page 37 of the DTE article that "MERC introduced RPS in Maharashtra through an August 16 2006 order" is only partially correct. The RPS order is not limited to only three utilities present in Mumbai. It covers all five utilities and captive users in the state. They are as follows:

- Maharashtra State Electricity Distribution Company Ltd (MSEDCL)
- Reliance Energy Ltd (REL)
- Tata Power Company Ltd (TPC)
- Brihan-Mumbai Electric Supply and Transport (BEST)
- Mula-Pravara Electric Co-op Society Ltd (MPECSL)
- All captive players in the state

On page 37, it is further mentioned that the "RPS Technical Task Force is yet to submit its final report." But MEDA has submitted the Technical Task Force Report on RPS to MERC in March 2008. The report is available on its website. (http://www.mahaurja.com/RPS.htm).

The article goes on to make the following two statements: "In the first year, the three Mumbai suppliers did not meet their 3% target and were exempted from penalty" (page 37) and "It is also not clear, as in Maharashtra, if the utilities are let off if they do not meet the compulsory green quota." (Page 41). Chapter 3 of the RPS Technical Task Force Report titled 'Impact of RPS' mentions: "It is worthwhile to mention here that the Hon. Commission (MERC) had fixed 3% of RE procurement in the state and as against this, the estimated RPS achievement was about 2.91% during 2006/07." As this was the first year of the RPS regime, the collection of data was restricted only to the distribution licensees. If the data from captive RE generation as mentioned in Section 3.3 had been considered during 2006/07, theoretically, it would have exceeded 3% stipulation. In any case, in view of the provisions contained in para 2.10.7 and 2.10.8 of the RPS order, there was no occasion to consider penalty element during 2006/07 (para 3.2).

However, recently, in August 2008, MEDA enforced the RPS order provisions regarding non-compliance and penalty when they issued instructions to all stakeholders in the state to submit data in prescribed formats. Clause No. 2.10.7 of the RPS order says: "the eligible persons shall be liable to pay penalty at the rate of Rs. 5.00 per unit of shortfall during 2007/08." Further, it is clarified that "such penalties levied on distribution licensees towards shortfall in renewable energy procurement will not be allowed as 'pass through' expenses in their annual revenue requirement." After receiving the data for financial year 2007/08, the penalty for respective licensees in the state was imposed as follows:

Licensees	Shortfall (MUs)	Penalty (Rs in Crore)
MSEDCL	399.5465929	199.77
REL	367.2710719	183.63
BEST	180.8444367	90.42
MPECS	24.040834	12.02
Total	**954.245963**	**485.85**

(Source: http://www.mahaurja.com/RPS.htm)

6. Capital Cost and 'Cost of Capital'

In page 39 of the DTE article, there seems to be some confusion about the term 'Cost of Capital'. Actually, it should be corrected as 'Capital Cost.'

Cost of capital is the required return necessary to make a capital budgeting project, such as building a new factory. It includes the cost of debt and the cost of equity. It determines how a company can raise money (through a stock issue, borrowing, or a mix of the two). In economic terms, the cost of capital is viewed from two different angles:

- The cost of raising funds to finance a project. This cost may be in the form of the interest which the company may be required to pay to the suppliers of funds.
- Opportunity cost of the funds of the company i.e. rate of return which the company would have earned if the funds were not invested.

Capital cost is the cost incurred on the purchase of land, buildings, construction and equipment to be used in the production of goods or the rendering of services; in other words, the total cost needed to bring a project to a commercially operable status.

On page 39 of the DTE article it is mentioned that "the per MW capital cost of wind power projects has gone up from Rs. 4–5 crore earlier to Rs. 6 crore now; the logic of economies of scale have not worked." We do agree that manufacturers should try to reduce costs. But there are some genuine reasons for cost increases, like technology obsolescence rate being very fast, rising cost of materials like steel, rupee's depreciation against the Euro, etc. Like in any other industry, introduction of new products pushes up cost. Wind turbines are highly material intensive and with every increase in price of steel, copper, etc., the cost of turbines go up. Virtually all wind technology in India is of European origin. Hence the escalation of the Euro adversely affects costs in India. So a comparison with costs in Europe is unfair. Having said all this, we repeat that manufacturers should strive towards cost reduction. Governmental stipulations on indigenisation of production (70% in China) would solve the problem to some extent. Reduction in overheads, increased efficiency, etc., will also help in cost reduction. Because it is not the per MW cost that is relevant, but the per kWh cost. As generation efficiency incrases, cost per kWh goes down.

7. Why Tamil Nadu is Better

On page 39, it is mentioned that "Tamil Nadu, most wind-advanced, has the lowest tariff." Elsewhere it is also mentioned that Tamil Nadu has the highest PLF in India. Wind policies differ from state to state. Thus, the various cost elements in project costs differ from state to state. The cost of generation (CoG)/tariff also depends on the wind regime obtaining in each state. In case of Tamil Nadu, it has got better wind regime than any other state. Most of the sites in Tamil Nadu also get benefit of two rainy seasons (Jun-Sep and Nov-Dec). Thus, their average PLF is higher (~27%) than other states. (Pl refer to the following table which gives region-wise PLF in Tamil Nadu). Due to this, their cost of generation and in turn, tariff is the lowest.

Region	PLF of New Machines	PLF of Old machines
Muppandal pass	31.64%	26.38%
Shencotta pass	25.21%	22.70%
Palghat Pass	23.86%	21.22%
Average PLF	**27.46%**	**25.90%**

(Source: Tamil Nadu Electricity Regulatory Commission Order dated 15 May 2008)

Apart from this, it can be observed that if we travel from sites in southern and western India to sites in northern India, the PLF goes down and corresponding tariff goes up. This is due to change in wind patterns and site characteristics. The following table shows these variations. However, there is no direct relationship between tariff and PLF since CoG and tariff calculations depend on many other cost elements which vary from state to state (charges levied in each state), depending upon their policies.

State	Avg. PLF (%)	Tariff (Rs/kWh)
Tamil Nadu	26.7%	2.90
Karnataka	26%	3.40
Gujarat	23%	3.37
Maharashtra	20%	3.50
Haryana	20%	4.08

(Source: State tariff orders and policies in force)

It would be interesting to compare the average PLF of large hydropower projects in India. The data for seven years from 2000/01 to 2006/07 shows that the average PLF is only 32.4%! Large hydropower is a sector where huge amounts of government money have been sunk and each citizen should be concerned about the returns they give. In wind power, virtually all investment has come from the private sector. If wind has received some government incentives, large hydro, thermal and nuclear power have received much more, as has been revealed in a two-year research study by WISE.

8. Benefits to Local Communities

It is further stated in the DTE article that "in all this, local communities–villagers who live in the vicinity of the wind farm, aware it produces electricity–get little other than the constant noise the plant produces, and the vibrations caused by the working of the turbine, that literally disturbs their life." (page 41)

Modern wind turbines (600 kW–2000 kW) hardly make any disturbing noise. Substantial technology upgradation has happened in this area and considerable distances are also maintained between the turbines and sensitive human habitats, in most of the locations. The older turbines in the 55 kW–300 kW

range may have been noisy. But that is no more the case. To our knowledge, at least two independent studies have been done (in Tamil Nadu and Maharashtra) to assess the socio-economic impacts of wind power development in interior areas. Both have found the impacts to be positive in terms of infrastructure development in interior areas, employment generation, tourism development, strengthening of the local grids, etc.

Now I would like to turn to some issues raised by you (Sunita Narain) in your letter. WISE is in agreement with the suggestions regarding sharing some of the benefits of wind power with the local communities. It would be ideal if only the 'footprint' required for installing the turbine is leased from the landholders and they are given reasonable annual lease rents. This is particularly relevant in tribal areas where alienation of tribal land can be prevented and a supplementary source of income can be provided to them. But the reality is that in most locations, these lands are hardly productive and the farmers get very little income from them. Whereas, after wind power development starts, the land prices shoot up substantially and most of the local landowners can't resist the lure of big sums of money flowing in immediately, rather than waiting for 25 years of annual lease rent. 'Footprint' leasing has other problems, in terms of roads for access and insistence by banks (who funded the wind investment) on ownership of the land by the borrower or investor. Such practical problems have resulted in all parties preferring outright sale / purchase of land. However, we do feel that the leasing model should be tried, at least in the case of tribal lands, to prevent permanent land alienation and augment the income of this impoverished section of society. We should also not forget that some wind turbine manufacturers do undertake corporate social responsibility projects in these areas mainly in education, health, and other community welfare activities. This should be considered against forced eviction of thousands of people for conventional power projects, without even giving them adequate compensation. Governments, in most cases, do not acquire private land for wind power developers.

9. Generation-Based Incentives (GBI)

Generation linked incentives, instead of depreciation on capital assets have been discussed for a long time. Recently, the Ministry of New and Renewable Energy (MNRE) has announced a demonstration scheme for generation-based incentives offering Rs. 0.50/kWh for 10 years of the project life. Ironically, this is initially only for 49 MW and it will be revised thereafter. In case the GBI program is to succeed, long-term assurance of the existence of the scheme is necessary. The present cap of 49 MW may not attract independent power producers or large investors unless the cap goes. But it is a welcome step. However, in our opinion, government should implement the generation-linked Production Tax Credit system. This will really help the sector to increase efficiency and incentives will be linked to generation, instead of capital costs. The wind industry also favours introduction of a generation-based incentive.

10. Policy Prescriptions

As already clarified, generation-based incentives are being advocated by the wind industry also. It is for the Government of India to take a long-term view on this issue. The second policy prescription in the DTE article calls for changing CDM rules. But I am sure you are also aware that this is not in the power of anyone in India to do so. Secondly, CDM benefits are not assured at the time of financial closure or signing of PPA of a project. There is no certainty that a project will receive CDM benefits in future. There is also no way this benefit can be factored in at the early stage of project development or implementation. So we cannot use CDM as a policy tool for deciding tariff or incentive structure.

Renewable Portfolio Standards–as explained–are already being effectively used for market expansion of wind and other renewables since 2004. So this is not a new suggestion.

Ensuring benefits to local communities is not a 'policy tool' to develop the sector (though I personally favour such an approach).

Conclusion

All of us agree that a transition to sustainable energy is critical to facilitate sustainable development. It is also imperative due to the need to mitigate climate change, the volatility of fossil fuel prices and their projected depletion. Wind energy is leading the sustainable energy revolution the world over and in India. So I think that we should all come together and synergise our efforts towards its promotion. This is not to rule out informed criticism to facilitate its growth. I feel the DTE article would probably result in fanning wind power phobia, which I am sure is not your intention.

While pointing out shortcomings of renewable energy technologies we should not be oblivious to the shortfalls of conventional technologies, especially fossil fuel-based power generation. Also, it is a myth that renewables are subsidised if you compute all the obvious and hidden costs of conventional power generation. WISE undertook two years of patient research to unearth subsidies availed by conventional power projects in the hydro, coal and gas sectors. We selected 19 power projects from across the country which have been in operation for more than ten years. Only 'normal' projects which have not been exceptionally favoured have been selected. Data was collected from authentic sources. Our findings indicate that these projects received about 150% of their original investment as subsidies from the government. We are bringing out a summary of the findings in a monograph titled "Power Drain: Subsidies to Conventional Power in India." The monograph is now available in the public domain and can be purchased from WISE. The belief that renewable power enjoys undue subsidies is completely misplaced. We also hope to soon undertake a study for costing of externalities of conventional power.

In conclusion, I would like to once again reiterate that we should all engage in a constructive dialogue to promote renewable energy technologies. Negative representation of some of its perceived shortcomings would result in a setback to this emerging sector, very vital to a green future and our future energy security. I would like to end by saying that positive and constructive criticism is an absolute necessity to lead the country towards positive development. But negative, ill-informed criticism could nip development in the bud…and if this happens, it would indeed be unfortunate for all of us.

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