Assessment of fixed wind tariff system against tiered wind tariffs systems

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"If you have a light, let others light their candle at it"
(Thomas Fuller, 1608-1661)

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1) Are there advantages of fixed tariffs against tiered tariffs ?

The only apparent advantage of a fixed tariff is its simplicity: same tariff for all wind energy investments on all potential sites, whatever their average annual wind speed.

Against this apparent advantage, obviously there are many disadvantages:

- Investments on very good sites will enjoy a too attractive profitability. In order to lower this over-profit, the tariff may be chosen at a lower level, but in this case too few wind farms will be built with too little impact on energy and environment policies.
- Investments on normal quality sites will be too small or inexistent. In order to change this, the tariff may be chosen at a higher value, but in this case the preceding disadvantage will be appearing again.
- So, a fair balance between those two disadvantages will be impossible to attain, and the fixed tariff value can be only an "experimental value", with consequences to be visible only after 3 to 5 years, may be 3 to 5 years too late to get successful energy and environment policies.
- Other problems with fixed tariffs are well documented: too much wind farms in most windy places with abnormal fees for access to land and landscape integration problems. On the contrary medium quality wind sites will not be developed with consequently not enough farmers and landowners benefiting from this wind energy development policy. The fact that those problems were manageable in Denmark in the 80's and the 90's was due that this country is a small one with a substantial part of it endowed with good windy conditions (no "continental part" with low and very low winds) and to the fact that in those times wind investments were small (one to a few 100 to 300 kW wind turbines per farmer) and lastly but not least that in those times a good or a very good profitability was chosen in order to "boost" the wind technology and the nascent local wind industry, and also to attract investors on a technology which at this time was completely new and so considered as risky. Those conditions are no longer possible to consider at present. In Spain, where a tariff option is a fixed one (the other is the market price of electricity plus an environmental fixed premium), it is well documented that wind projects are concentrated on the best places and that only big investors with big projects (larger than 20 MW to 100 MW) can manage to fight for those good sites.

This policy is obviously not adapted to the present Ontario one for developing community wind.

2) Are fixed tariffs proposals sufficiently attractive for successful energy and environmental policies ?

If we consider for example a proposal of a fixed tariff of 11cCAD/kWh on 20 years with a 50 % part of this tariff corrected each year from the effect of a constant 3 % per year inflation rate, considering a real discount rate of 6 % (defined as the average weighted cost of capital before tax of a project from a small private developer) in the following figure 1 we can see the minimum capacity factor Nh (expressed in equivalent numbers per year of operation at rated power) corresponding to targeted profitability index values varying from 0 to 0.4 and from investment costs ratio varying from 1 400 CAD/kW (a very optimistic value in 2006 for projects under 10 MW) to 1 800 CAD/kW (a current value at present for small projects).

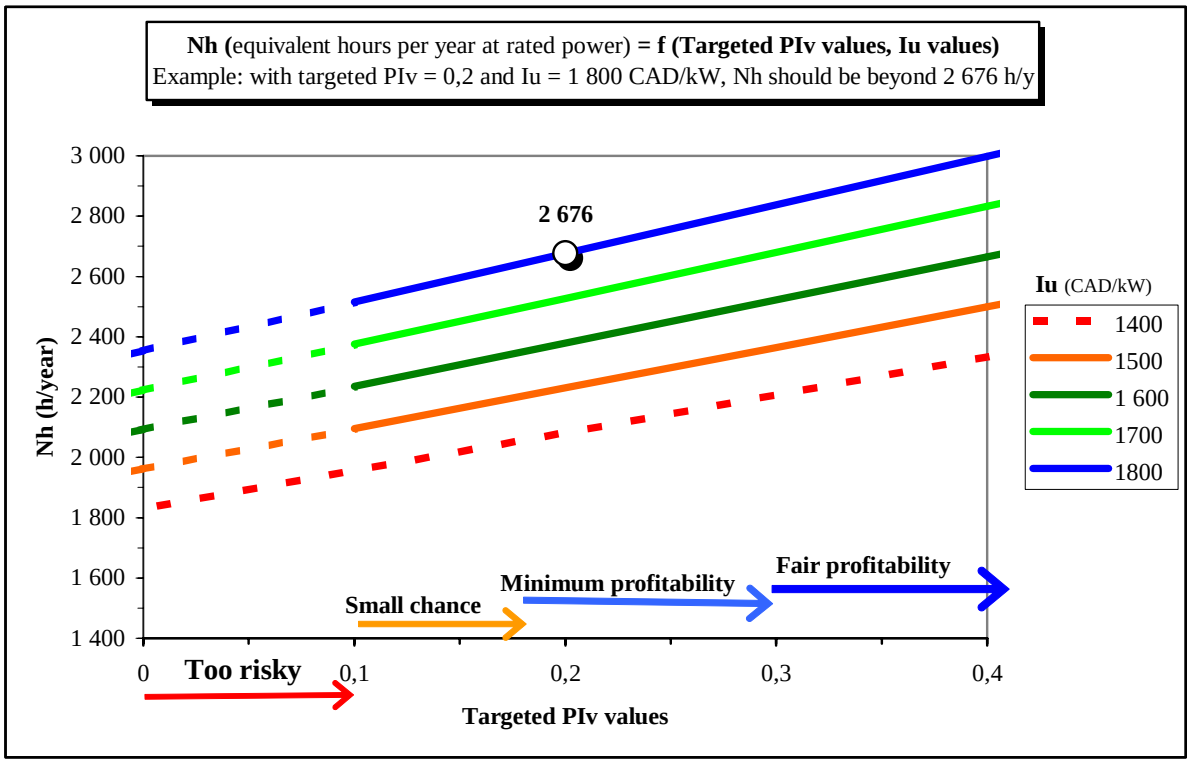

Figure 1: minimum capacity factor Nh (h/year) to get a targeted profitability

The relevant risks and quality levels of targeted profitability index zones are reminded on this figure: too small and to risky to attract investors if under 0.1 ; attracting a few investors with small profitability policy on zero risks projects if between 0.1 to 0.2 ; attracting low profitability policy investors on projects with well known and small risks from 0.2 to 0.3 and attracting all investors on standard projects for values beyond 0.3.

From this figure, one can see that only a few projects with average capacity factors over 2 200 h/year on 20 years can be built and that only low cost projects beyond 2 400 h/year could be sufficiently attractive. From the following figure 2 representing energy performance of a modern and high quality wind farm, one can see that this 2 400 h/year capacity factor (or

1 100 kWh/year.m^2 specific energy yield) can be attained only on sites with around 7 m/s and beyond annual average wind speed. Availability of such sites may be problematic if ambitious energy and environment policies are targeted.

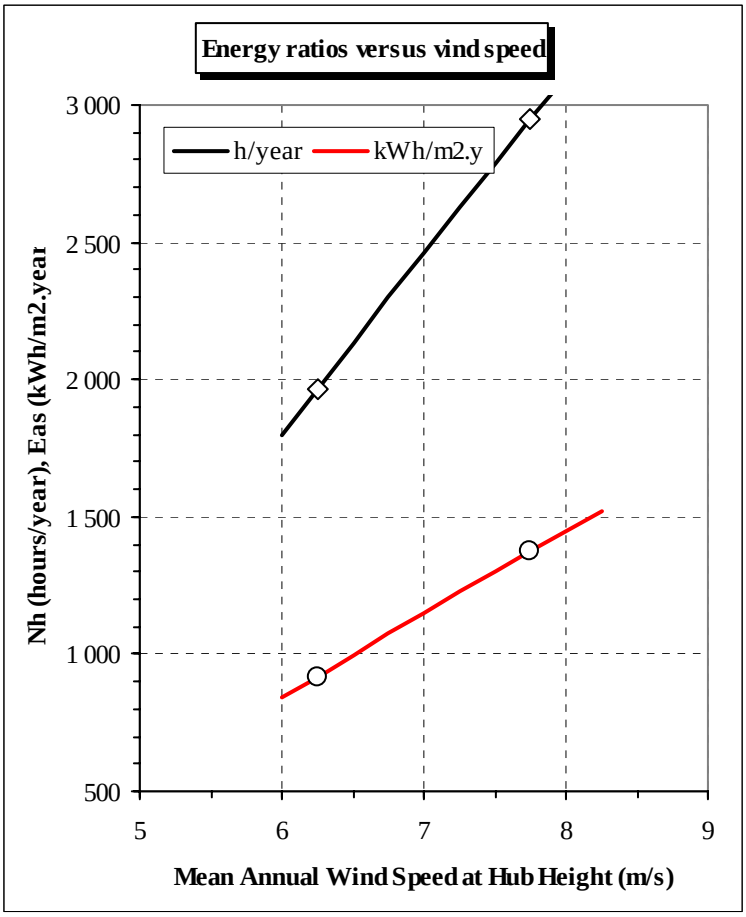

Figure 2: typical capacity factor and specific energy yield for a state of the art wind farm

3) Are fixed tariffs sufficient robust to avoid stranded wind investments ?

The major risk for wind projects is to get an actual long term on-site wind speed which is lower than estimated, even if state of the art methods are used such as one year on-site measurements and correlation with long term data from the nearest meteorological station.
In such a case, profitability will decrease dramatically in the case of fixed tariffs, with stranded costs as a real risk.

On the contrary, a tiered tariff system as suggested by OSEA in 2005 and as those experienced in Germany and in France since 2000 and 2001 gives a fair chance to developers: if the actual energy yield during the first five years is lower than anticipated, the tariff on years 6 to 20 will be automatically corrected. The resulting profitability will be slightly lower than the one expected if real wind speed was the same than the one anticipated but this profitability decrease will be less aggressive than the one resulting from fixed tariffs, thus decreasing greatly the risk of stranded costs.

And there is also an advantage of tiered tariffs if the actual wind speed is higher than anticipated: in this case the tariff on years 6 to 20 will be lower and will lower the over-cost

for the electricity customer, and the profitability for the investor will slightly increase: so the benefit of higher winds than anticipated will be fairly shared between investors and electricity consumers!

On the contrary, in the case of fixed tariffs, higher wind speeds than anticipated will boost the profitability for investors without any advantages for the electricity consumer.

4) Conclusions

From this analysis, it is obvious that in case of ambitious energy and environment policies tiered wind tariffs systems such as the one proposed by OSEA in 2005 present huge advantages compared to fixed wind tariffs systems.

And obviously, the present global and regional energy and environmental challenges and threats demand such ambitious policies.
