RECOMMENDATIONS

The effects of several of the assumptions examined in this report are quite significant in governing the deployment of wind capacity in NEMS and the results of the sensitivity analyses help rank the relative importance of these factors in terms of their impact on technology development. Based on our findings, we can recommend several areas in which to focus future work on the NEMS model itself as well as areas in which model input data may require revision. First, the relevance of each of the cost multipliers should be evaluated. Redundant factors may need to be revised or eliminated. For example, both the 1 GW maximum annual deployment limit and the short-term supply curve are designed to moderate growth. Both are probably not needed. However, in several of the permit and half capital cost cases, wind capacity increases at rates of up to 50 percent per year and in some regions and years provides up to 100 percent of new capacity additions. Under these conditions, it is not unreasonable to assume that wind development costs would increase. Because the growth multipliers are so influential, further research may be necessary to determine if the current penalties are the most appropriate. In addition, the number and size of the steps used in the LP may need to be reexamined, when an order exceeds 20 percent of current resources.[3]

Similarly, the long-term supply curves increase the overnight capital cost by 200 percent for over 90 percent of the nation's potential wind power, which significantly reduces the amount of wind power that can be economically developed. Only 1.5 percent of the potential wind resource in NEMS is available without a long-term supply cost penalty. A different allocation of wind resource among the long-term supply constraint steps should be explored. In addition, the wind resource availability itself may need to be reexamined. For example, the California and Northwest studies which EIA has used to develop the regional cost multipliers in those regions show more wind resources than the current resource base in NEMS for these regions.[4] NREL is also working on updating the wind potential in several regions and is finding that there may be more resource than previously estimated.

While there is a legitimate concern about how much intermittent capacity a region can absorb without jeopardizing reliability, the absolute cutoff on intermittent generation at 10 percent of a region's total may not be the best approach. Ideally, it could be replaced with a more gradual cost penalty. For example, a reduction of the capacity credit of the plant may be a more appropriate mechanism to regulate this constraint. If this strategy is pursued, the percent of generation at which this constraint is currently invoked could also be reviewed. Current research suggests that intermittents may contribute in the range of 20–40 percent, and even up to 50 percent of generation (Grubb, 1998), without compromising the reliability of the power system, if loads are well matched.

It may also be appropriate to expand the option to permit inter-regional transmission for wind and other technologies, considering the probability that this practice will become more common

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[3]The maximum order amount has been reduced to 100 percent in the AEO2000 in order to reduce the step size and decrease the cost penalty of the initial step. In addition, the share of capacity that can be ordered at no additional cost was increased to 30 percent and the cost penalty was reduced to 0.5 percent.

[4]For AEO2000, EIA has increased the proportions of total wind resources in the lowest cost categories for the CNV and ERCOT regions.

under deregulation and the fact that this function has already been implemented for a limited case (coal in California). Including inter-regional transmission for wind would need to be part of a peer-reviewed process to evaluate transmission costs associated with such siting.

Of course, any structural or data inputs changes made regarding wind capacity should also be evaluated for application to other renewable technologies. Many of these technologies have the same or similar cost multipliers. Consistent treatment might lead to greater capacity for biomass or solar while reducing wind capacity in carbon permit scenarios. Further work could also extend the sensitivity cases to other generating technologies in NEMS, since most of the parameters examined are common to all technologies. A comprehensive analysis would also include the effects on wind of changes made to assumptions regarding other technologies.