

## HB363, Dr. Alex Pavlak, Support with Amendments

I'm a PhD engineer from Severna Park and the Chair of the Future of Energy Initiative. One of my day jobs used to be to lead teams that developed unprecedented systems for the Pentagon.

Those of us who engineer systems for a living understand the importance of following a sequence:

- 1) We set a goal → 2) Quantify options → 3) Pick one.

This is how we build buildings, bridges and put a man on the Moon. When Maryland decided to replace the Wilson Bridge, you first hired an architect to explain the choices: high bridge, low bridge, drawbridge, tunnel. The architect came back recommending a tunnel. Stakeholders chose a drawbridge. The sequence works!

The original RPS skips the first two steps. There is no final goal, no vision, no alternatives. The RPS is a policy plan based on the belief that intermittent generators are the correct solution to something.

In contrast to the RPS, CARES has a clear and stable final goal! 100% clean electric power. That is an excellent performance goal. It says what to do, not how to do it. Maryland should be required to show that anything it builds is a useful component of a 100% clean electric power system.

Step 2 should be to quantify options. Everybody sees the clean technologies: wind, solar, nuclear, sequestration, storage, transmission ... The serious question is how these technologies fit together to deliver reliable affordable power when and where it is needed. Specifically, what does 100% renewables system look like? How does it work? What does it cost? How does it compare with 100% nuclear? What about combinations? Least cost? A little fossil-fuel? Import/exports? This is an architectural task. In my world we call it a [Concept Design Study](#). It's a standard best practice at the Pentagon and NASA.

After options are quantified, then stakeholders get to pick. Don't like nuclear, don't pick nuclear. But that choice should be based on numbers, not a guess.

This CARES bill is a good step forward, but it is not balanced. It is addressing policy before stakeholders have chosen a system design. It should be amended to:

***Clearly state the goal  
Include a Concept Design Study.***

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*How much does a Concept Design Study Cost?*

Based on similar NASA/Pentagon studies, my guess is \$5-10 million thought cost is very sensitive to scope and how the program is managed. A lesson learned over the past 3 years is that States do not have the experience or management culture for conducting state-of-the-art system studies. States should proceed cautiously, in stages, in partnership with DOE, PJM and other PJM Coastal States. First develop MOUs with other States, then DOE then PJM.

*Why Maryland? Shouldn't PJM lead the study?*

Maryland policy is committing tens of billions to new generation. Since the State is investing the money, the State owes its ratepayers assurances that the investment is sound.



Electric power governance (ISO's, RTO's, LSEs, NERC, FERC, ...) is optimized for the operation of stable systems and is not well suited for changing system concepts. Specifically, PJM's charter is to operate a market, balance load and obey NERC's rules. No one has responsibility for system design. PJM membership is split between coastal and non-coastal states and currently has a fuel neutral policy. They may have an interest (although they tell me that they do not) in supporting a concept Design Study but they almost certainly will not lead it, at least at the current time. Also, PJM's core competence is system operations, not system development.

Also, when Maryland subsidizes intermittent generation, it is imposing indirect costs on the whole system. FERC's charter is to assure that Maryland does not impose cost on other PJM States, hence the origins of the MOPR. Maryland needs to understand those relationships in order to respond and protect its citizens.

