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Testimony to the VT Senate
Energy and Natural Resources Committee
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Virginia Lyons, Chair
Mark MacDonald, Vice Chair
Joe Benning, Clerk
Randolph Brock
Richard McCormack

Honorable Chairperson Lyons and members of the Committee, thank you for this opportunity to discuss the current state of the development of renewable energy on Vermont's mountains. For the record my name is Geoffrey M. Goll. I am a water resource engineer and am licensed as a Professional Engineer in seven states including Vermont.

First and foremost, I understand that the topic of renewable energy development is complex and you need to consider a variety of impacts. I recognize that there are concerns about ridgeline wind development related to economics, reliability, etc. But I am here to talk as a professional about high elevation stormwater and hydrology. As you may, or may not be aware I specifically have had the opportunity to review the plans and calculations for the Sheffield First Wind, Kingdom Community Wind, and the Deerfield Wind projects. While the Sheffield First Wind project predates the recently revised stormwater management regulations for high elevations, the Lowell Kingdom Community Wind and Deerfield Wind projects have not taken advantage of these well intentioned regulations. In fact, and as will be described, it is my professional opinion that the installation of these developments create impairments from the start of construction, and will permanently alter the headwaters and hydrology of these mountains; which are not only the heart and soul of the Green Mountain State, but also the state's source of clean and cold water and last defense against flooding.

In 2010 the Vermont State Legislature (via of legislation) directed the Agency of Natural Resources (ANR) to create stormwater management rules that would allow for the construction of high elevation renewable energy development that would protect these sensitive ecosystems from irreparable harm in the pursuit of the goal of energy independence and reduction of greenhouse gas emissions. As a result, effective March 15, 2011 ANR adopted rules that included incentives for high elevation renewable energy development by encouraging the minimization of stormwater management controls as long as specific criteria were met. One of the most significant criterions that were developed was the requirement that impervious cover was limited to 5%. To emphasize the importance of this 5%, during a stakeholder meeting held on July 1, 2010, ANR recognized that if projects created greater than

5% impervious cover in a high elevation watershed, degradation of streams down-gradient of the project area would be expected. Another significant concern stated by ANR at that same stakeholder meeting was that the protection of the mountains' groundwater from damage was paramount as these areas provide the base flow for clean and cold water to downhill streams, wetlands, rivers and lakes.

Based on these stakeholder meetings, ANR developed regulations with the intent of protecting the quality of the state's water resources. However, the reality of these projects is as follows:

- **Both the Lowell Project and the Deerfield Wind Project cannot meet the critera of the high elevation renewable energy watershed hydrology credit**[1], due in most part to the exceedance of the 5% maximum impervious criterion, or the inability to control lands downhill from development that would ultimately violate this same criterion.
- The Lowell Kingdom Community Wind project, contrary to the goals and objectives of the groundwater protection requirements, recognized as so important by the Agency of Natural Resources, did not plan appropriately the impact on groundwater resources and as a result of earthwork and blasting activities, has been intercepting significant areas of groundwater flow and has been recognized as so by the applicant[2]. **As a result the road and turbine pad excavations are now bleeding groundwater and hindering the mountain's ability to sustain clean and cold water to streams and wetlands during drier times of the year.**

As a result of the inability of the applications to meet the criteria ANR adopted, the legislature's well intentioned directive has not been met. In fact, the applications simply are falling back on pre-existing stormwater regulation's normally used in lower elevation development; "alternate stormwater treatment practices". This alternative approach requires ANR to rely on the applicant's certification that practices not yet accepted by ANR as effective. The applicant can simpy provide data to show that such practices work, or in the absence of such data, the applicant simply certifies that these systems will work and must follow up with monitoring. Such alternative or experimental practices being used are level spreaders that, in theory, are supposed to spread out runoff and mimic mountain hydrology. However, **there is no current evidence that level spreaders will serve to protect water quality and hydrology.** In fact, through an exhaustive literature review of credible federal, state and local authorities on stormwater management, these same authorities advise against the use of such level spreaders on steep slopes such as that exist on all of these high elevation renewable energy sites due to spreaders high rate of failure. As required by the rule and in light of criticism of the approach, the applicant Green Mountain Power stated that they will conduct extensive monitoring of these experimental level spreader systems, and if it is found that these systems are not

[1] Stated in Stormwater Management Narritives of these applications.
[2] Evidence in publically available EPSC reports and through acknowledgement of USEPA representatives.

functioning to protect water quality they will remediate these areas and install conventional stormwater treatment practices. The fallacy of this approach is that no planning or alternative plan has been prepared to determine whether Green Mountain Power could even implement remedial work due to 1) the massive effort to reconstruct up to 31 sites on the mountain and 2) to work within regulatory constraints such as wetlands, streams and their associated buffers. **As a result, all the monitoring will do is document the degradation of the Lowell Mountain's water resources and slow death of its ecosystem**; a violation of the Vermont Water Quality Standards. Based on my review of the initial application for the Deerfield Wind project, the issues will be no different.

What does this mean? It means that the projects as designed did not and cannot meet the watershed hydrology credit that was so well intentioned. It is now realized that designers through the need to transport massive turbine components, large cranes, and concrete to the top of these ridges cannot possibly design a project that puts a lighter hand on the landscape.

So what do we do? Well this is a time of opportunity:

- Place a moratorium on any further development of ridgeline industrial wind energy development including the issuance of Public Service Board Certificates of Public Good and ANR stormwater permits; and
- Instruct your Agency of Natural Resources to do the following:
    - Assess and monitor the impacts of the current "state of the art" being employed at Kingdom Community Wind in Lowell. If we wait and the approach at Lowell is found to be detrimental to the environment, and this approach is used on multiple mountains, the remediation of all of these projects will be unmanageable and unattainable.
    - Reassess the stormwater management rules in light of the field results at Lowell and take the time to development revised regulations and guidance for these high elevation projects.
- Develop specific standards for pre-design field investigations and analysis of surface and groundwater hydrology. As far as we are aware, other than wetland delineations, observations of streams and wildlife assessments, no detailed groundwater studies have been conducted to allow ANR to adequately assess the impacts of designs on groundwater resources.
- Require that Aquatic Organism Passage be required on all streams, not only to address concerns for brook trout, but to allow for passage of other aquatic organism including amphibians and aquatic invertebrates which live at the highest of elevations
- Provide the Department of Fish and Wildlife with more authority to review stormwater applications in the context of thermal degradation and aquatic organism passage.

- Demand that the wind industry adapt and change the design of *their* equipment to the sensitive and difficult terrain of high elevation environments instead of requiring the mountain to be modified to meet the needs of the industry.

As evidenced by the devastating impacts caused by the remnants of Hurricane Irene, the protection of these ridgelines and their headwaters are the first lines of defense against exacerbating flooding in already vulnerable communities. Keep in mind that the Deerfield Wind Project drains directly to the Town of Wilmington; one the hardest hit communities in the state. At this moment Vermont has the ability to ensure that Wilmington is not further endangered by the construction of this project.

Thank you and I would be pleased to answer any questions you may have.