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To: **Senate Finance committee**
Re: **S-1 Ryegate Power plant renewal agreement** **February 12, 2021**

Greetings,
I would like to express my support for the renewal of the power purchase agreement for Ryegate power plant on three considerations: Forest and Wildlife Habitat management, economic considerations and renewable energy/climate considerations. I will try to be brief but each of these subjects is deep.

I am a licensed consulting forester, representing about 400 landowners with about 50,000 acres, mostly in southern Vermont. I do some business into northern Vermont and the adjacent states, so I have a regional perspective. I am the president of the Vermont Forestry Foundation, and on the board of the Vermont Forest Products Association. I teach and assist with the new Forestry Degree at Vermont Technical College. Biomass harvesting is a critical forestry tool for solving some of our most serious forest management problems. Throughout the region, we have an excess of poor-quality wood that has no alternative market, and this crowds out the growth of our lumber-quality trees, interferes with desired regeneration of new growth and also has an effect on maintenance of wildlife habitat for game and non-game species. Our forests are out of balance in several ways, particularly lacking the 5-10% young forests (trees under 10 years of age) needed to maintain a mix of age classes, that would provide a sustainable cycle of trees from 100-200 years of age. We have only about 2% currently due to low harvest rates.

About a dozen years ago the state did a study of available biomass for renewable energy and found about 800,000 tons as surplus from the annual growth on a sustainable basis, They had subtracted the annual harvest for other purposes, mortality, higher quality wood products, and land “not well-suited to biomass harvesting” for a realistic, conservative estimate. After this we had proposals to build several biomass energy plants which did not come to fruition. The study had a major flaw however: It did not include the standing inventory from more than a hundred years of “growth beyond harvest”. According to federal data, Vermont forests are overstocked, on average, by about 30 tons per acre. With over 4 million acres of commercial forest, that is 120 million excess tons. I am not saying that all this should go into biomass production, but that is enough wood to run 5 large biomass plants for 60 years, even if trees did not grow.

So, we have this plentiful supply of wood for which there is essentially no other use. Over a million cords simply dies and rots in the forest each year. This is the same kind of forestry problem that leads to the wildfires out west. Our forests are moist enough that it cannot burn at that scale. Some of this wood could be used as pulp, but the demand is not there. We cannot expect anyone to build a new pulp or paper mill in Vermont or nearby. There may come some chemical use for wood to make plastics, liquid fuel, or who-knows-what, but these are not available at commercial scale for us. It is possible to use a portion of this wood for smaller scale

fuel, but there are limitations. Most other wood uses require a decent stem that can be handled; straight, 5-20" diameter, and delimbed. We already sell much of this for pulp and firewood. Large scale biomass energy takes all the rest. These are the waste products of the wood business. And this allows us to essentially 'weed out the forest garden', and to renew our overmature and poor quality stands, and create the young-forest wildlife habitat with plentiful food and low cover.

The economics of this ripple through the whole region. Ryegate buys wood from as much as 100 miles away, though 50 miles is more normal. I have done jobs as far to the south as Grafton and Putney. We have a job in Windham right now, which is just over 100 miles trucking distance. Pulpwood from here goes to Maine and New York – our closest paper mills. We have a few smaller scale pellet mills and heating users (like Middlebury College), but not on the needed scale of thousands of tons per week. Ryegate sends out over $100,000 dollars per week, on average – but year-round – into the community. Some of that goes to the truckers, some to the loggers and a small portion goes to hundreds of landowners. And while income from biomass chips is not a main part of anyone's forest plan, this product allows them to achieve other forestry objectives with a small income instead of a larger cost. I remember 40 years ago- we used to girdle the weed trees to kill them in the forest- which created a hazard of standing dead trees at considerable cost.

The multiplier effects of this dispersement are profound. Besides the normal affects that a trucker might eat at a diner or hire someone to mow his lawn, biomass has a specific role. First, our energy dollars are often sent out of the region, or out of the country. Solar panels are often made overseas. Much of our hydro-power comes from Canada. The biomass money stays close to home, providing taxable activity. We enjoy using "stemwood chips" for smaller scale thermal biomass, which is more efficient. Having the infrastructure of portable chippers in daily use for large scale biomass, allows the smaller scale users with seasonal needs to have a ready supply of local wood. And removing these weeds from the forest garden improves the value growth in the forest. Vermont's wood-based manufacturing provides over a billion dollars in total shipments annually; much of this is based on high-quality hardwoods. To grow these trees sustainably requires a market for the "weeds". So, biomass contributes a portion in many ways.

Even the landowners who will never sell biomass receive a benefit. When we appraise timberlands, we have to consider the range of possible markets. Having access to a biomass market adds a dollar per ton to the value of 100 tons per acre, times, let's say, 2 million acres, is 200 million tons or 200 million dollars. And if you think this is a stretch, consider the loss of Rutland Plywood as a single mill. We were selling white birch sawlogs, from low grade to high-grade, for $150-250 per "thousand board feet" (about 2 cords) as standing trees. The mill burned in 2014 and was not rebuilt. They were the main purchaser of white birch in the region, with enough demand to significantly raise the price. Since 2014, demand for white birch has not returned enough that we normally get $50 per Mbf or less for white birch, and this only includes middle and higher grades. So, the state's forest value lost $100/Mbf or more on all the standing white birch.

As society tries to move away from fossil fuel sources, there is much discussion about the role of biomass, and forests. It is a complicated subject to consider tree growth over years, and

centuries: mortality, harvest rates, alternative fuels, alternative uses of wood, and alternative uses of land. Different studies come with particular bias. To try to keep it simple, we consider corn to be a renewable, carbon neutral fuel as we extract ethanol to add to our gasoline (through an expensive and subsidized process). Trees grow and cycle carbon in a similar way, but over longer periods, and are more directly turned into useful energy. They are natural solar collectors, and provide this wider range of benefits while they grow, compared to corn. We enjoy forests, and managed forests, for recreation, wildlife, clean water, the full range of wood products and all these ecological benefits, in ways that a field of corn cannot compare.

Wood products are a tremendous benefit to our "carbon accounting". Besides being renewable, recyclable, biodegradable and using less energy to manufacture than almost every other raw material, wood products store carbon. And they come from forests that store carbon, and do all these other lovely things. We all agree that forests are a great use of land, and managing forests is complex. And managing these forests well requires some economic ways of reducing the cull and low-quality material, to grow the premium wood that Vermont is famous for. You will find that the folks who actually wear out boots to actively manage forestland will be supportive of the role of biomass markets.

You will see from the detractors, an emphasis on the efficiency of biomass for electricity production as being low, at perhaps 25%. Let me counter that. When we process corn for ethanol, it takes considerable inputs of energy, and only a portion ends up as usable ethanol. I am not an expert on this, but with the price of ethanol I would guess that this is also inefficient. Some will compare the efficiency of coal – a concentrated, dense, dry fuel, and say that wood is inefficient. Well of course it is, but coal is not the preferred alternative, is it? And for those who will say that wood produces more carbon at the smokestack than coal does, to produce a certain amount of electricity, we have to look at the whole equation. If this wood comes from managed forests, and is the byproduct of forest management, then it is essentially a waste product that would normally be left to rot on the forest floor, releasing its carbon with no energy benefit. This is zero efficiency. 25% is a great improvement. And once it is made into electricity, it is almost 100% efficient.

In my forestry practice, I have made great use of biomass harvesting to achieve a wide range of forestry objectives over the last decades. Sawlogs, good firewood, and even preferred pulp are always sorted out on biomass harvesting operations. We use the term "whole tree harvesting" because the whole tree - with branches - is dragged to the landing. Seldom is the "whole tree" chipped, unless it simply has no better market. They will chip a 4" diseased beech tree, or a larger tree with 50% rot, for example. Normally it is the top portion where there are too many limbs, or too crooked, to efficiently handle a "roundwood" product. The logger only gets about $10-15 per ton to log the chipwood, whereas pulp and firewood are more profitable at $15-25 per ton. The logger usually gets $30-50 per ton to pull out sawlogs. So, there is an economic incentive for better wood to be sorted out for higher value markets, and landowners insist on this. No one chips a forest to make money.

To summarize, we have been able to do better job of managing private forestlands, for a range of landowners, and a wide range of forestry problems, because of the Ryegate facility. Burlington is too far for most of my clients in southern Vermont. There are no comparable plants in adjacent

states, and Ryegate is essential to be able to do the best forestry available. Not every landowner or woodlot needs this, but the ones that do, have no other reasonable alternative. Where we have these poor-quality forest products in abundance, we would have to simply cut and leave them, at expense, to rot with no energy benefit.

There is a lot here, and I would be glad to provide additional information, or to meet with the committee for questions - perhaps via zoom. Let me know if you would like additional clarification.

Respectfully yours,

Robbo Holleran
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