**Agricultural and Ecosystems Subcommittee**

**PATHWAY C - Energy & Materials: Support and empower Vermont’s farmers, foresters, and land workers to capacitate renewable energy and building product transitions**

Vermont’s farmers, foresters, and land workers can be key actors in harnessing appropriate renewable energy on farms and working lands while protecting those lands, soils, and resources for the valuable multiple benefits they provide from food to biodiversity to clean water. In addition, farmers, foresters, and workers can bring materials to building markets from wood to straw that can reduce the use of high carbon footprint materials like steel and concrete. Overall, the state must track the sustainability of the climate transition to be aware of and mitigate the potential adverse consequences of renewable energy and materials to people and natural resources.

**STRATEGIES AND ACTIONS**

1. **Educate, track, and appropriately reward on-farm renewable energy**: Farms can be the source of renewable electricity like solar. However, farmers need information about how best to undertake analysis for their farm’s potential, what incentives are available for installation, and how to protect valuable farmland, soils, and forests while contributing to renewable energy production
	1. Reward and support renewables on farms on rooftops, barns, storage facilities, and minimizes or avoids loss of working and natural lands to renewables development.
	2. Increase outreach and incentives to on-farm solar installation on existing built infrastructure.

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| *Preliminary Assessment of Strategy against Criteria* |
| *Impact:* Can contribute in part to distributed, renewable energy sourcing across the state on farms while protecting working lands for other climate purposes. |
| *Equity:* Allows farmers too, including small farms, to both produce electricity and receive payments for doing so. Directing renewables onto the built part of farms would ensure lands, waters, and soils remain for climate storage, adaptation and resilience. |
| *Cost-effectiveness*: Through utilizing such federal grant programs as Rural Energy for American Program (REAP), could lower costs for farmers and makes time to payback to farmers and Vermont achievable |
| *Co-Benefits:* Preserves working lands for other climate benefits; provides additional income stream/cost savings for farmers and foresters |
| *Technical Feasibility*: Yes |

1. **Promote and incentivize use of local wood and agricultural products to reduce embodied carbon footprint.** Vermont can be an important source of its own and other adjoining states’ building materials that can reduce the carbon footprint of construction. Steel and concrete require extensive carbon to produce and create emissions in their production. Materials can include wood, straw, and other materials.
	1. Promote and incentivize use of agricultural and sustainably harvested wood -based construction materials (subject to existing certification criteria or procurement standards to be developed) over imported wood and/or non-wood materials with high carbon footprints (such as steel, concrete, etc.) Continue to research life-cycle accounting of these products for greatest impact.
	2. Through state procurement standards, require that publicly-funded building projects use chain of custody certified wood products (MASS timber, cellulose insulation, etc.) that have been harvested under sustainable procurement standards over materials with a higher carbon footprint (such as steel, concrete, etc.), prioritize locally sourced wood products when possible.
	3. Develop a regional certification standard for forestry to validate carbon storage values for forest building products (methodologies supporting supply chain validation for carbon storage are frequently using FSC as a proxy; regional-scale certification standards focused around net carbon benefit are needed for product transparency)
	4. Develop alternative markets for non-timber wood, focusing on cellulose insulation, bioplastic composites, or biofuels

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| *Preliminary Assessment of Strategy against Criteria* |
| *Impact:* Can reduce carbon-intensive building materials in Vermont while increasing local economies providing local materials for local building and construction as well as other products such as bioplastics. |
| *Equity:* Provides additional markets for local farmers and foresters. Would need to be designed well to allow small lot owners to participate. However, if not implemented appropriately, could do harm to natural lands, wildlife, and foraging in forests. |
| *Cost-effectiveness*: For relatively low cost can harness market forces. Though, certification programs will require costs to create and maintain.  |
| *Co-Benefits: P*rovides additional income to farmers and foresters while increasing a more locally-driven construction and other products’ supply chain. |
| *Technical Feasibility*: Yes |

1. **Transition fuel sources for the forestry and maple sector.** To also reduce GHG emissions from the forestry and maple sectors, incentives and support can be provided to move to lower carbon fuels for such activities evaporators and vacuum pumps for mapling and biofuels for forest equipment.
	1. Provide funding to incentivize sugar makers to switch evaporators from fossil fuels to wood pellets and incentivize elimination of diesel generators for sap vacuum pumps.
	2. Incentivize alternative fuels such as biofuels or offsets for logging equipment.

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| *Preliminary Assessment of Strategy against Criteria* |
| *Impact: R*educe carbon footprint of local sugar maple industry and logging |
| *Equity:* Provides incentives for often small-scale producers and businesses to convert to lower carbon alternatives so they too can have support and be part of the overall transition. |
| *Cost-effectiveness*: Requires up front technical support and incentives for change with longer-term benefits of reduced GHG emissions from Vermont enterprises. |
| *Co-Benefits: P*rovides potential cost-savings and payback to producers over time. |
| *Technical Feasibility*: Yes |

1. **Sustainably source renewable energy products and materials.** While Vermont will benefit from renewable energy sources and materials produced in Vermont and elsewhere, these sources and materials may also have adverse impacts to air and water quality (the mining of rare earth metals for batteries), natural lands (the fragmentation of habitat due to wind or solar projects), indigenous peoples (the harm to sacred sites, traditional hunting and foraging lands from large-scale hydro), and environmental justice populations. Vermont should develop and deploy ways to ensure our efforts to address climate do not pose undue and unintended consequences to nature or people.
	1. Fund competitive research to track and innovate on the sustainability and ethical implications of renewable energy materials and products being consumed to meet the CAP including solar, wind, biomass, energy storage, and recycling of materials.

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| *Preliminary Assessment of Strategy against Criteria* |
| *Impact:* Over time ensuring that climate choices supported by the State do not create adverse consequences. |
| *Equity:* Can provide an important screen for choices that may affect traditionally marginalized populations. |
| *Cost-effectiveness*: Requires cost upfront without direct benefit initially but over time can inform and shape transition choices in a more responsible and equitable way. |
| *Co-Benefits:* Reduction in harm to air, water, soils, wildlife, and people. |
| *Technical Feasibility*: Yes |

1. **Biomass.** [TBD]