|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Pathway** | | **Measures/Methods** | **Strategy** |  | **Equity/JT Considerations** | **NOTES** |
| high level means of achieving GHG emissions reductions | | Specific outcomes needed to achieve emissions reductions | Description of the specific policy or program that will achieve the desire outcome | NEAR TERM?  (High priority) | How are equity principles considered in program/policy design and any potential adverse impacts addressed? | What add’l design/technical help is needed to make strategies actionable? |
| NON-ENERGY | |  |  |  |  |  |
| Fugitive Emission Reduction from WWTFs | | Require consistently operated flare or systems for reuse of biogas. Evaluate biogas capture potential to identify the feasibility of beneficial uses before flaring excess. | Permit and inspection requirements, issuance of compliance schedules in 1272 orders with financial subsidy | X |  |  |
|  | | Convert aerobic holding tanks to anerobic digestion of sludge where GHGs can be captured for reuse or neutralization. | Permit and inspection requirements, issuance of compliance schedules in 1272 orders with financial subsidy |  |  |  |
| Reduction of Energy Used in Wastewater Treatment | | optimization of sizing and operations of pumps and blowers at WWTFs | Permit and inspection requirements, financial incentive programs, state-funded energy audits, loan forgiveness when implemented in refurbishment projects |  | Community systems improvements are costly and hard to justify | Waste sector (led by solid waste) has met its GHG reductions overall, so need to understand cost-effectiveness to push sector further |
| Reduced Transportation of Wastewater Treatment Residuals. | | Improved dewatering to reduce the need for residual transportation, additional digesters for sudge processing around the state | Funding of dewatering equipment and digesters, support for facilities to hire more operators to run these facilities, support for operator training and certification |  |  |  |
| Reduce the leakage of HFCs from Refrigeration Systems in Vermont | | Refrigerant Management Program (RMP) - link to CA SLCP document (p83 - PDF p87) | Reduce fugitive emissions from refrigeration systems by requiring annual inspections of systems with requirements to repair leaks. Benefit of reducing fugitive emissions of high GWP gases as well as saving businesses money in not needing to buy additional refrigerant. Cost would be associated with equipment fixes and potentially reporting. |  |  | Not as far advanced as other policies; needs more specificity |
| Reduce the end of life emissions of HFCs from Refrigeration Systems in Vermont | | Equipment end of life program to capture HFCs (additional enforcement of current HVAC industry and scrappage facility regulations) | Ensuring that refrigerants in old equipment being disposed of are either destroyed or recaptured properly to avoid their release to the atmosphere |  |  |  |
| Reduce Use of HFCs in Refrigerant Systems in Vermont | | Provide incentives (potentially through/related to refrigerant management plan) for consumers of high GWP HFCs in the state to switch to lower GWP alternatives. | Incentives to reduce high GWP HFC refrigeration systems |  |  | Not as far advanced as other policies; needs more specificity |
| Reduce Process Emissions from Semiconductor Manufacturing | | Continue to explore efficiencies and alternatives to high GWP fluorinated gases in the semiconductor manufacturing process | Continue investigating lower GWP alternatives which can be substituted into the semiconductor manufacturing process. |  |  | Emissions have increased significantly since the 1990 baseline due to changes in process; This is an industry-wide concern (look at federal solutions?) |
| TRANSPORTATION | |  |  |  |  |  |
| Increase Transportation Electrification | Reduce emissions from Light Duty Vehicles; Increase market for ZEVs and PZEVs | * + 1. Significantly expand electric vehicles (EV; zero emissions) via Light Duty Purchase Incentives and rebates for new and used vehicles (sedans, SUVs, 4WD and trucks) for low and moderate income individuals and private, commercial, and government fleet purchases. (Improve and expand existing programs and create new ones if necessary; prioritize LI, BIPOC, high energy-burdened constituencies)     2. Significantly expand EV Charging Equipment (EVCE), particularly fast charging, and expand funding/incentive programs - Private Residential (owned & rental) prioritizing underserved communities and multi-family housing, work place charging; public charging (including within 5 miles of all interstate highway exits). Engage gas stations as potential charging station operators.     3. Enact and enforce building codes supporting EVCE; require EV ready in new construction     4. EVCE Interoperability - (are there programs/policies VT can undertake alone to address this)     5. Invest in outreach, education and workforce development (job/service training) programs and partnerships to help move the market - VEIC/Drive Electric VT and other programs including car purchaser navigator services.     6. Continue and improve communication with and address challenges for dealers, service providers re. EV supply chain challenges, workforce development/technician job training and market development strategies     7. Significantly expand and enable “Lead by Example” fleet programs; state, municipal, public fleets |  | Need to hear directly from the communities on what is needed to address equity.  Need to focus on used car market  Potential to lower operating costs |  |
| Increase Transportation Electrification | | Reduce Emissions from Heavy Duty Trucks and Busses | 1. Expand, create and deploy purchase incentives for state, school, transit, other HD fleets 2. Expand R&D Programs and outreach and education programs for public and private fleet operators (Clean Cities Program) 3. Participate in HD multi-state ZEV Program 4. Set government HD fleet conversion date requirement, with a goal of all new, public HD trucks and busses sold after 2025 are electric when cost-effective equivalent technology is available |  |  |  |
| Increase Transportation Electrification | | EV Other (motorcycles, ATVs, Snow machines, Electric Bikes) | 1. Expand, create purchase incentives (Utilities?) 2. By 2025, institute a time of purchase policy/program that incents purchase of electric alternatives for all equipment 3. Increase bike/ped safety improvements (VTrans) 4. Public education and outreach (Local Motion, VEIC) |  |  |  |
| Improve Transportation Efficiency (lower MPG) | | Encourage replacement / turnover of existing inefficient vehicles and fleets; Increase MPG of all vehicles | * + 1. Implement a Feebate Program on new vehicles, per vehicle class     2. Expand Mileage Smart and Replace Your Ride     3. Implement public and private sector fleet transformation programs     4. Investigate reducing interstate truck speeds |  |  | Analysis of existing programs and evaluate the need for change/expansion across all pathways |
| Increase use of low carbon non-electric fuels | | Adopt use of sustainably produced biodiesel, ethanol, CNG and hydrogen where appropriate. |  |  |  | Technology not as advanced and bang for the buck more questionable; so less critical path; |
| Increase Transportation choices | | Reduce VMT and SOV (single occupancy vehicle) trips | 1. Invest in and expand transit, inter-city bus, commuter rail, rail, micro-transit and Transportation Demand Management (TDM) programs - ride share, vanpool, car share+ programs; increase state and use and flex federal funding to the extent possible to expand these programs; make transit fare-free. 2. Increase funding for Replace Your Ride transportation switching and work to obtain federal and other funding for rail, intermodal (bus, bike/ped, rail, van/carpool/car share) and other programs 3. Increase bike & pedestrian options and infrastructure (new and improved sidewalks, trails, bike lanes and bike paths+) 4. Improve, expand the Complete Streets program 5. Pilot and advance public/private bus sharing (e.g. public/school bus partnerships) |  |  |  |
| Land use & Smart Growth | | Discourage car-dependent land use patterns and achieve reductions in VMT | 1. Fund critical infrastructure, including water and wastewater to urban/village centers in order to facilitate density necessary for reducing VMT. Increase current programs and use ARPA, Jobs Plan and other one time monies. 2. Target funding for safe, connected bike/ped facilities to provide access to and within downtown and village areas; to and from community schools/public buildings etc. 3. Provide guidance to communities regarding SOV-biased existing policies and regulations; reduce parking requirements in downtowns and new construction; increase parking fees etc. 4. Reinvigorate the state’s land use and smart growth goals and priorities and continue to increase and improve the downtown programs and other ACCD planning and funding opportunities. 5. Establish a State Planning Office to support smart growth, affordable housing, program coordination, plan implementation and help plan for and ensure equity in likely climate-induced migration 6. Improve integration of state, regional and local land use and sustainable transportation planning. Increase transportation planning (distinct from road project planning) technical assistance to rural and small communities. 7. Conserve large forest blocks, farmland and open spaces outside of downtowns and compact community centers |  |  | What type of analysis is there that is less urban like VT |
| Critical Cross Cutting Transportation Policies and Strategies | | Necessary for implementation | 1. Use one time ARPA, other dollars to support and expand programs 2. Seek/secure sustainable funding sources, including the Transportation & Climate Initiative, a regional cap and invest program (ensure it's a firewalled fund; beyond TCI MOU, advance a complementary policy/policies to ensure equity outcomes, direct 70% to LI, marginalized VTers+) 3. Government leadership & implementation - Consider creating a Climate Cabinet and an executive branch cabinet-level Climate Czar position, working in coordination with a State Land Use Planning Office 4. Implement an Environmental Justice Policy; establish a state Equity Board or Boards to foster sustained, good processes and track/ensure equitable programs & outcomes+ 5. Continue active participation in multi-state programs - NESCAUM, CA emissions/ZEV programs, TCI and more 6. Measure tele-work, telehealth+ outcomes; promote telecommuting and improve broadband access to realize telework, telehealth+ benefits 7. Ensure grid infrastructure - needed transmission and distribution systems improvements, increased renewable generation, vehicle-to-grid (V2X - load/building/grid) advancements can be implemented in a cost effective manner at homes (single, MF, rental+), businesses, public places+. 8. Put regulations and rate structures in place that maximize economic/gride/cost-reduction benefits, make fast charging more affordable, and support heavy duty fleets |  | TCI is a funding source and needs equity lens |  |
| ELECTRIC SECTOR | |  |  |  |  |  |
| 100% Renewable Electricity Standard | | Evaluate design options for legislative recommendations | In-state vs regional; definition of no-carbon/renewable; ensure new resources are build; treatment of SPEED projects; measurement period |  | Need to call out equity consideration in the transition and different design structures; including mechanisms that enable the consumers to take advantage proposed changes, including consumer education | In-state vs new vs regional renewables and linkage with resiliency; important to think about co-benefits (grid congestion relief, jobs, AQ); how to evaluate the costs of increased resiliency vs BAU of cost of weather events; How are regional markets affecting reliability /resilience |
| Align variable power generation to electricity demand | | Incentivize resources to deliver when needed | * Could be tier within RES * Payment model (Resource delivered during peak demand would receive adder (higher value REC/RES credit or X cent per kwh, e.g.) * Eligible resources could be storage, renewables with delivery shape (wind, hydro), demand reduction, etc. * Potential value for weatherization for homes with heat pumps |  |  |  |
| Flexible Load Management in transportation sector | * shift EV charging to daytime; work with commercial/ bussing fleets to maximize load control value; * work with commercial customers to maximize efficient/load controlled operations; * ensure heat pumps and other devices (water heaters, e.g.) in homes are able to enroll in load control |  |  |  |
| Flexible load management in Heat pumps and other appliances | * Storage paired at homes with DG – resilience at individual home level for outages but also possibility of load control for grid by homeowner, energy services companies * Continue/expand direct load control programs   + Managed charging by utility with agreement of customers * Time-of-use rates – shift rate design to have peaks at “right” hours * Overall reductions   + Energy efficiency, weatherization (for homes with heat pumps) |  |  |  |
| Cross-cutting policies | | Resiliency Zones | community level planning for recovery/resilience from weather and other events that affect infrastructure (local generation; local storage; local communications in central place suited to core community services). |  |  |  |
|  | | Electrification for all | Grants/incentives and low cost financing, with multifamily homes and older housing stock targeted for work hand in hand with weatherization efforts so that panels, service, equipment are not a barrier to switching from fossil fuels for transportation and heating |  |  |  |
| BUILDINGS | |  |  |  |  | NOTE: not asking for carbon price as a strategy; may be raised by council as a funding mechanism |
| Weatherization & EE | |  | 1. Enforced Building Energy Performance Standards 2. Rental Property Efficiency Standards 3. Weatherization at Scale 4. One-stop shopping (may not be feasible in the near-term) | X | *Positive* - Lower energy bills; increased comfort, health, and safety  *Negative* - The high upfront cost makes it critical to provide funding and non-debt alternatives (e.g., *tariffed on bill financing*) to those with high energy burdens | 1. Performance standards will have long run returns  2. Rental Standards likely not to be implemented quickly  3. EAN Action team thinking about how to scale up weatherization  4. Consider incentives/requirements at point of sale |
| HVAC & Water Heating Efficiency | |  | 1. State/Regional Appliance Standards 2. Clean Heat Standard to drive shift to heat pumps, advanced wood heating and RNG | x | Reduced up-front costs for heating/cooling appliances  Improved Indoor AQ  Program incentives for controllable/low-emissions appliances should be designed especially for consumers with high energy burdens; Clean heat standard would need equity component to address upfront costs of low-income high energy burden households | Clean Heat Standard (water heating and space heating) likely to improve emissions more quickly than weatherization; but the combination is critical; Tier 3 of RES will also push the market shift, Energy VT incentives for heat switching |
| Lead by Example | | State Agency GHG Planning | GHG goals applied to state procurement & programs |  |  |  |
| Workforce Development and Education | |  | Ramp up of education & training for all levels of VT workforce |  | Workforce training should take into special consideration local, under-served and overburdened communities |  |
| Consumer Education | |  |  |  |  | Suggested addition |
| Tariffed on-Bill Financing | |  |  |  | *Positive* – new mechanism (and potentially, lower cost capital) for customers to benefit from energy efficiency and clean energy upgrades without paying for the upfront cost and without using conventional debt financing  *Negative* – Increases utility and its customer transactions | A way to pay for implementation of Heat standard |