

Draft Matrix of CAT Mitigation Options

The following draft matrix is intended to provide a reference tool for the CAT. It lays out the main quantitative results – GHG emissions savings in 2020 and cost estimates (net present value from 2008-2020 and cost effectiveness) – and provides a rubric for elaborating other key descriptions and considerations for each TWG option. Included here are the draft quantitative results to date.

The CAT is requested to consider how this matrix can be made most useful for its further deliberations. In particular, what, if any, additional columns would be helpful to add, bearing in mind the need to be as consistent as possible across all 47 options, spanning all technical areas, and the time available prior to the next meeting?

Note that quantitative results shown below may subject to further revision.

Sector/ Mitigation Option		GHG Savings in 2020 (MMtCO ₂ e)	Net Present Value 2008–2020 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	Additional Columns? (e.g. Brief Description, Key Considerations, Overlapping options...)
Transportation		15.0	TBD	n/a	
Recent Actions		3.6			
	Motor Vehicle Emissions Standards Act	3.4			
	Biofuels (Fuel Quality Standards Act)	0.1 [†]			
	State Fleet Efficiency	0.1			
	Overlap among recent actions	0			
CAT Policy Options (after adjusting for overlaps)		11.4	TBD		
T-0	New Funding Mechanisms	Not quantified			
T-1	Transit, Ridesharing, and Commuter Choice Programs	4.1	\$6,111	\$239	
T-2	State, Regional, and Local VMT and GHG Reduction Goals and Standards	7.4	Not quantified		
T-3	Transportation Pricing	1.2	Not quantified		
T-4	Promote Compact and Transit-Oriented Development	1.7 / 4.1	<\$0	<\$0	
T-5	Quantification of GHG Impacts of Transportation Plans, Programs, and Projects	Not quantified			
T-6	Improvements to Freight Railroads and Intercity Passenger Railroads	0.1	\$3,073	\$5,341	
T-7	Diesel Engine Emission Reductions and Fuel Efficiency	1.0	\$170	\$33	

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	Improvements				
T-8	Local Transportation Financing Tools and Bicycle and Pedestrian Infrastructure Improvements	0.2	\$146	\$94	
T-9	Transportation System Management	Not quantified			
T-10	Actions to Accelerate and Integrate Plug-In Hybrid Electric Vehicle Use	1.1	\$2,007	\$348	
T-11	Low Carbon Fuel Standard	3.9	\$1,886	\$117	
T-12	Zero Emission Vehicle Standards	0.4	\$446	\$246	
Overlap among options (and with recent actions)			TBD		
Energy Supply		TBD	TBD	n/a	
Recent Actions		TBD	XX		
GHG Performance Standards (SB 6001)		<i>TBD**</i>			
Energy Independence Act (I-937) RPS		<i>TBD**</i>			
Overlap among recent actions		-TBD	-TBD		
CAT Policy Options		TBD	TBD		
ES-1	Grid-based renewable energy incentives and/or barrier removal	3.1	\$630*	\$37	
ES-2	Distributed renewable energy incentives and/or barrier removal	0.3	\$124*	\$54	
ES-3	Efficiency improvements at existing renewable and power plants	Not quantified			
ES-4	Technology Research & Development, plus Technology-Focused Initiatives	Not quantified			
ES-5	CCSR (including pre and post-combustion) incentives, requirements and/or enabling policies plus R&D	Not quantified			
ES-6	Transmission system capacity, access, efficiency, and Smart Grid	Not quantified			
ES-7	Combined Heat and Power (CHP) and Thermal Energy Recovery and Use	1.6	\$82*	\$9	
Overlap among options (and with recent actions)		-TBD	-TBD		
Residential, Commercial and Industrial		TBD	TBD	n/a	
Recent Actions		4.8			
State Green Building Standard		0.2			
Building Codes		0.6			

Sector/ Mitigation Option		GHG Savings in 2020 (MMtCO₂e)	Net Present Value 2008–2020 (Million \$)	Cost-Effectiveness (\$/tCO₂e)	Additional Columns? (e.g. Brief Description, Key Considerations, Overlapping options...)
Appliance Standards		0.1			
Energy Independence Act (I-937) Efficiency		3.9			
Overlap among recent actions		-TBD			
CAT Policy Options		TBD	TBD		
RCI-1	Demand-Side Management (DSM) Energy Efficiency Programs, Funds, or Goals for Natural Gas, Propane, and Fuel Oil	2.7	-\$482	-\$32	
RCI-2	Targeted Financial Incentives and Instruments to Encourage Energy Efficiency Improvements (Business Energy Tax Credit and Private/Public Efficiency Funds)	Not quantified separately			
RCI-3	Promotion and Incentives for Improved Community Planning and Improved Design and Construction (Third-party Sustainability, Green, and Energy Efficiency Building Certification Programs) in the Private and Non-State Public Sectors	2.0	\$23*	\$2	
RCI-4	Energy Efficiency Improvement in Existing Buildings, with Emphasis on Building Operations	4.2	-\$62*	-\$3	
RCI-5	Rate structures and Technologies to Promote Reduced GHG Emissions (including Decoupling of Utility Sales and Revenues)	0.4	-\$152*	-\$52	
RCI-6	Provide Incentives to Promote and Reduction of Barriers to Implementation of Renewable Energy Systems	Quantified in coordination with ES TWG. See ES-2.			
RCI-7	Provide Incentives and Resources to Promote and Reduction of Barriers to Implementation of Combined Heat and Power (CHP, or “cogeneration”) and Waste Heat Capture, Including Net-metering for Combined Heat and Power	Quantified in coordination with ES TWG. See ES-7			
RCI-8	Consumer Education Programs, Including Labeling of Embodied Life-cycle Energy and Carbon Content of Products and Buildings	Not quantified			
RCI-9	Identify GHG Emissions Impacts and Measures to Avoid, Minimize, or Mitigate them for Projects Requiring Government Review, and in Designing Government	Not quantified			

Sector/ Mitigation Option		GHG Savings in 2020 (MMtCO ₂ e)	Net Present Value 2008–2020 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	Additional Columns? (e.g. Brief Description, Key Considerations, Overlapping options...)
	Rules and Regulations				
RCI-10	More Stringent Appliance/Equipment/ Lighting Efficiency Standards, and Appliance and Lighting Product Recycling and Design	3.2	-\$429*	-\$16	
RCI-11	Policies and/or Programs Specifically Targeting Non-energy GHG Emissions	1.5	\$6	\$1	
Overlap among options (and with recent actions)		-TBD	-TBD		
Agriculture / Waste		TBD	TBD	n/a	
CAT Policy Options		TBD	TBD		
AW-1	Manure Digesters/Other Waste Energy Utilization	0.9	-\$20	-\$4	
AW-2	In-State Production of Biofuels and Biofuels feedstocks	1.5	\$264	\$57	
AW-3	Significantly Expand Source Reduction, Reuse, Recycling and Composting	4.8	-\$353	-\$12	
AW-4	Agricultural Carbon Management	1.1	-\$110	-\$12	
AW-5	Agricultural Nutrient Management	0.2	-\$2	-\$2	
AW-6	Reductions In On-Farm Energy Use and Improvements in Energy Efficiency	0.1	-\$23	-\$76	
AW-7	Preserve Open Space/Agricultural Land	[1.1] [‡]	\$167	[\$16] [‡]	
AW-8	Support for an Integrated Regional Food System	Not quantified			
Overlap among options, recent actions, other sectors		-TBD	-TBD		
Forestry		TBD	TBD	n/a	
CAT Policy Options		TBD	TBD		
F-1	Improved Forest Health	Not quantified	-\$376	Not quantified	
F-2	Reduced Conversion to Nonforest Cover	4.7	\$556	\$22	
F-3	Enhanced Carbon Sequestration in Forests	0.6	\$107	\$26	
F-4	Enhanced Carbon Sequestration	0.01	Quantified in coordination		

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	in Harvested Wood Products		with F-3		
F-5	Expanded Use of Wood Products for Building Materials	Not quantified			
F-6	Expanded Use of Biomass Feedstocks for Electricity, Heat and Steam Production	0.6	-\$55	-\$12	
F-7	Improved Commercialization of Advanced Lignocellulosic Processes	0.9	\$259	\$70	
F-8	Urban and Community Forests	0.2	-\$165	-\$114	
Overlap among options, recent actions, other sectors		-TBD	-TBD		

* - These estimates will be updated shortly based on the revision of electricity avoided cost estimates.

** - Estimates from *Recent Actions Memo* (July 2007)¹ will be revised shortly based on updated electricity emissions analysis.

† - As revised from Recent Actions Memo. See discussion under option T-11.

‡ - Note that the reductions for this option associated with avoided soil carbon losses will not be included in the sector totals, due to significant uncertainties (these emissions are also excluded from the inventory).

n/a – not applicable (since some options are analyzed for emission reductions, but not costed, sector-wide cost-effectiveness would be misleading)

¹ <http://www.ecy.wa.gov/climatechange/CATdocs/80707RecentActionsMemo.pdf>

Total Results of for CAT Options and Recent Actions

Sector/ Mitigation Option	GHG Savings in 2020 (MMtCO ₂ e)	Net Present Value 2008–2020 (Million \$)	Additional Columns (TBD)
Transportation			
Recent Actions			
CAT Policy Options			
Energy Supply			
Recent Actions			
CAT Policy Options			
Residential, Commercial and Industrial			
Recent Actions			
CAT Policy Options			
Agriculture / Waste			
CAT Policy Options			
Forestry			
CAT Policy Options			
Overlap among sectors not included above			
Biofuels (AW-2, F-7, T-11, Fuel Quality Standards Act)			
Electricity Interactions (between RCI and ES options – these are considerable)			
Other interactions			
Totals			