Table 1
Greenhouse Gas Emissions Reduction Strategies – Multi Sector Working Group
Staff Proposed Consensus Recommendations for: Region-wide Implementation
Revised January 6, 2016

	Strategies	Region-wide Implementation	Example Elements
1	**Existing Buildings** Reduce energy and water consumption in existing buildings	15% reduction (1%/year for 15 years) in existing building energy use	Improved energy codes, green purchasing, and local government efficiency improvements
2	**New Buildings** Improve new building energy and water performance	15% reduction in new building energy use by 2027; 25% of new buildings net zero by 2040	Improved energy codes; net zero buildings policies; updates to development codes & policies
3	**Infrastructure Energy** Increase infrastructure efficiency and renewable energy use	35% reduction in fossil fuel use for infrastructure systems	Investments in end use efficiency, on-site renewables by local and regional utilities and authorities
4	**Clean Power Supply** Reduce electric power sector emissions	Support state actions to achieve 30% decrease in mass CO_2e emissions	Support full state implementation of the federal Clean Power Plan
5	**Distributed Renewables** Increase distributed renewable energy deployment	250,000 (equivalent) residential Photovoltaic (PV) systems	Solarize/solar coops, municipal solar installations
6	**Solid Waste** Reduce emissions associated with municipal solid waste	60-70% recycling rate by 2030 80% reduction in waste to landfills	Increased recycling, reuse, and composting; green purchasing; optimize methane recovery; and waste to energy
7	**Non-Road Equipment** Reduce emissions from non-road engines	20% reduction in CO_2e emissions	Government purchasing, retrofits, and anti-idling policies.
8	**Sustainable Development Patterns** Locating more of the forecasted increase in housing and jobs in Activity Centers	66% of new housing and 82% of new jobs in Activity Centers and locations served by premium transit	Concentrating development in activity centers resulting in improved building energy performance
9	**Reduced Natural Gas Pipeline Leaks** Reduce natural gas distribution system leaks and fugitive emissions	20% reduction of natural gas fugitive emissions	Support cost recovery for utility programs that upgrade infrastructure to reduce pipeline leaks
10	**Public Outreach**	Critical support component for other strategies	Public and community engagement, including school curriculum; public information and employee behavior change campaigns; utility customer education & data
11	**Tree Canopy** Increase regional tree canopy and reduce tree loss through sustainable development, trees absorb CO_2	Mitigate tree canopy loss	Public sector tree planting programs, voluntary planting by development entities for project approval
12	**Sustainable Development Patterns** Locating more of the forecasted increase in housing and jobs in Activity Centers	66% of new housing and 82% of new jobs in Activity Centers and locations served by premium transit	Local policies to place majority of future growth in Activity Centers and localities served by premium transit, reducing vehicle trips and VMT
13	**Improve Fuel Economy of Light-Duty Fleet** Faster adoption of more fuel efficient vehicles in the private sector	10% of private light duty fleet (~300,000 vehicles)	Develop new electric vehicle infrastructure such as public charging facilities and EV readiness in building codes

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	Strategies	Region-wide Implementation	Example Elements
14	**Increase use of Alternative Fuels in Public Sector Fleets** Increased adoption of alternative fuel vehicles in public sector fleets	10% of fleet	Increased purchase of zero-emission and Bio-Diesel vehicles, retrofit garages and refueling facilities
15	**Low-Carbon Fuel Standard** Reduce the carbon intensity of on-road fuels through regional Low Carbon Fuel Standards	Reduction of total on-road emissions by 5%	Policies to increase sale of low carbon fuel (CNG, Bio-Diesel, etc.)
16	**Truck Stop Electrification (TSE)** Reduce idling of heavy-duty trucks by providing TSE	Install 20 truck bays at each of 6 truck stops	Investment in TSE equipment
17	**Travel Demand Management** Reduce VMT by shifting SOV commuters to alternate modes with non-SOV benefits	60% commuters receive $50/month subsidy for alternate commute	Federal, state, local incentives or requirements for alternate commuter subsidy
18	**Transit Service Enhancements** Increase transit ridership through increased or improved services	15% improvement in runtimes and headways of transit	Bus on shoulders systems, dedicated busways, transit signal priority, additional transit vehicle purchase
19	**Transit Fare Reduction** Increase transit ridership through reduced fares	25% transit fare reduction	Discount policies, free transfers, free off-peak service
20	**Road Pricing** Encourage alternate modes of travel through road pricing	-	-
21	**Enhancing System Operations** Reduce fuel consumption through enhanced system operations	Provide infrastructure and services to achieve the goal of 30% of vehicles operating under eco-driving principles; Implementation of operational improvements in all jurisdictions.	Eco-driving campaign, infrastructure and services for connected/automatous vehicles Traffic signal retiming, integrated corridor management, ramp metering, intersection efficiency improvements
22	**Reduce Speeding on Freeways** Reduce driving at speeds with higher rates of GHG emissions	Increase resources for speed limit enforcement on freeways and limited access facilities	Increased manual and electronic enforcement of speed limits

Table 2
Greenhouse Gas Emissions Reduction Strategies – Multi Sector Working Group
Staff Proposed Consensus Recommendations for: Selected Local Jurisdiction Implementation
Revised January 6, 2016

	Strategies	Selected Local Implementation	Example Elements
1	**Existing Buildings** Reduce energy and water consumption in existing buildings	30% reduction (2%/year for 15 years) in building energy use	Improved codes, targets, challenges, incentives, financing, benchmarking, disclosure, green purchasing, and performance contracting • Reduce community wide emissions by 50% by 2032 (DC); • Benchmarking and Disclosure Requirements (DC, Montgomery Co); • Green Bank (Montgomery Co) • Georgetown Energy Prize Competition (Takoma Park/Arlington Co) • DOE Better Buildings Challenge (various) • Green Construction Codes (DC)
2	**New Buildings** Improve new building energy and water performance	33% reduction in new building energy use by 2027; 100% of new buildings net zero	Improved codes, incentives, and net zero buildings policies; concentrating development in activity centers resulting in improved transit, bike and pedestrian infrastructure; updates to development codes & policies • Green Construction Code (DC) • Green Building Policies (Fairfax Co) • 100% of new buildings net zero by 2032 (DC) • Net zero homes (Prince George's Redevelopment Authority
3	**Infrastructure Energy** Increase infrastructure efficiency and renewable energy use	Net zero facilities	Plan targets, reduced pipeline leaks, end use efficiency, on-site distributed energy • DC Water, WSSC, Alexandria Renew sustainability plans • WMATA 8-13 MW Solar RFP
4	**Clean Power Supply** Reduce electric power sector emissions	Expanded deployment of new large-scale distributed energy systems	Regional elements plus support Renewable Portfolio Standard (RPS) strengthening, deploy energy storage & Combined Heat and Power (CHP)/Microgrids • Walter Reed campus redevelopment (DC) • Microgrid RFP (Montgomery Co)
5	**Distributed Renewables** Increase distributed renewable energy deployment	Maximize government load served by renewables	Solar access ordinances, streamlined processes, cooperative purchasing, community solar, PPAs, and incentives • 10-12 MW Solar, 35% wind (DC) • 5 MW Solar (Montgomery Co) • Solarize (MD, NoVa)
6	**Solid Waste** Reduce emissions associated with municipal solid waste	Local zero waste targets	Increased recycling, reuse, and composting; green purchasing; methane recovery; support new technologies, and waste to energy • Zero Waste Resolution (Arlington County); • Statewide Zero Waste Plan (MD) • Zero waste to landfill goal; 80% diversion rate by 2032 (DC) • Prince William County WTE technology RFP

Table 2
Greenhouse Gas Emissions Reduction Strategies – Multi Sector Working Group
Staff Proposed Consensus Recommendations for: Selected Local Jurisdiction Implementation
Revised January 6, 2016

	Strategies	Selected Local Implementation	Example Elements
7	**Non-Road Equipment** Reduce emissions from non-road engines	30% reduction in CO_2e emissions	Public engagement programs, government purchasing, retrofits, and anti-idling policies • Non-road anti-idling rule (DC) • GWRCCC • State & local vehicle alt-fuel initiative (VA) • ZEV MOU (MD)
8	**Sustainable Development Patterns** Locating more of the forecasted increase in housing and jobs in Activity Centers	-	-
9	**Reduced Natural Gas Pipeline Leaks** Reduce natural gas distribution system leaks and fugitive emissions	-	-
10	**Public Outreach**	Support and expand local programs	Community engagement, including school curriculum; public information campaigns; employee behavior; utility customer education & data; communication of project-level greenhouse gas impacts • EmPower Maryland • Sustainable DC • Re-Think Energy (Arlington Co) • GreenChallenge.org; (Frederick Co) • Get2Green (Fairfax County Public Schools)
11	**Tree Canopy** Increase regional tree canopy and reduce tree loss through sustainable development	Increase tree canopy	Mitigation bank, mandatory planting by development for project approval, open space conservation, silvicultural districts • Tree preservation ordinances (DC and Takoma Park) • 5% tree canopy increase goal (Fairfax County)
12	**Sustainable Development Patterns** Locating more of the forecasted increase in housing and jobs in Activity Centers	-	-
13	**Improve Fuel Economy of Light-Duty Fleet** Faster adoption of more fuel efficient vehicles in the private sector	15% of private light-duty fleet	Financial incentives for fuel efficient vehicles and financial disincentives for gas guzzlers • Greening the Fleet Initiative (DC) • Electric vehicle charging infrastructure (Prince William County)
14	**Increase use of Alternative Fuels in Public Sector Fleets** Increased adoption of alternative fuel vehicles in public sector fleets	15% of fleet	Increased purchase of zero-emission and Bio-Diesel vehicles, retrofit garages and refueling facilities • Purchase of electric buses (Frederick County) • Replace diesel buses with alternate fuel (Loudoun, Prince George's, and others)

Table 2
Greenhouse Gas Emissions Reduction Strategies – Multi Sector Working Group
Staff Proposed Consensus Recommendations for: Selected Local Jurisdiction Implementation
Revised January 6, 2016

	Strategies	Selected Local Implementation	Example Elements
15	**Low-Carbon Fuel Standard** Reduce the carbon intensity of on-road fuels through regional Low Carbon Fuel Standards	-	-
16	**Truck Stop Electrification (TSE)** Reduce idling of heavy-duty trucks by providing TSE.	-	-
17	**Travel Demand Management** Reduce VMT by shifting SOV commuters to alternate modes with non-SOV benefits	Parking pricing and other management practices	Increased parking costs in Activity Centers; federal, state, local incentives or requirements for alternative commuter benefit • Commuter benefit ordinance (DC)
18	**Transit Service Enhancements** Increase transit ridership through increased or improved services	20% improvement in runtimes and headways of local transit	Bus on shoulders systems, dedicated busways, transit signal priority, additional transit vehicle purchase • Transit signal priority project • BRT (Crystal City-Potomac Yard Transitway)
19	**Transit Fare Reduction** Increase transit ridership through reduced fares	40% transit fare reduction on local transit	Discount policies, free transfers, free off-peak service • Free transfers to WMATA for commuter rail passengers (VA, MD) • Student passes (DC)
20	**Road Pricing** Encourage alternate modes of travel through road pricing	-	-
21	**Enhancing System Operations** Vehicles operating with eco-driving principles (efficient acceleration/deceleration, reduced idling, reduced speeding)	Provide infrastructure and services to achieve the goal of 60% of vehides operating under eco-driving principles; Implementation of operational improvements in all jurisdictions.	Infrastructure and services for connected/automatous vehicles Traffic signal retiming, integrated corridor management, ramp metering, intersection efficiency improvements • I-95 Corridor Coalition Eco-Driving Campaign • Active Traffic Management (I-66) • Traffic signal timing project (DC)
22	**Reduce Speeding on Freeways** Reduce driving at speeds with higher rates of GHG emissions	-	-

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Table 3
Greenhouse Gas Emissions Reduction Strategies – Multi Sector Working Group
Staff Proposed Consensus Recommendations for: Future Consideration
Revised January 6, 2016

	Strategies	Future Consideration	Example Elements
1	**Existing Buildings** Reduce energy and water consumption in existing buildings	-	-
2	**New Buildings** Improve new building energy and water performance	All new buildings in region net zero	Authority for building & land use code upgrades
3	**Infrastructure Energy** Increase infrastructure efficiency and renewable energy use	All utilities net zero	Utility strategic and capital investment plans
4	**Clean Power Supply** Reduce electric power sector emissions	Nuclear power/offshore wind Widespread energy storage Vehicle-to-grid Fuel cells	100% Renewable Energy Goals or Mandate (City of San Diego, State of Hawaii)
5	**Distributed Renewables** Increase distributed renewable energy deployment	1 million (equivalent) residential PV systems	Utility 2.0; State RPSs
6	**Solid Waste** Reduce emissions associated with municipal solid waste	Zero waste to landfills goals	Availability of waste management options
7	**Non-Road Equipment** Reduce emissions from non-road engines	Repower/retrofit initiative	Funding for retrofits/repowers; CMAQ
8	**Encourage Development in Activity Centers (Sequestration)** Increase carbon sequestration through tree conservation	Region-wide increase tree canopy by 5%	Regional Tree Canopy Workgroup
9	**Reduced Natural Gas Pipeline Leaks** Reduce natural gas distribution system leaks and fugitive emissions	-	-
10	**Public Outreach**	Enhanced communication effort	Communicate project-level greenhouse gas impacts
11	**Tree Canopy** Increase regional tree canopy and reduce tree loss through sustainable development	5% increase in Tree Canopy	Public sector tree planting programs, voluntary or mandatory planting by development entities for project approval, creation of silvicultural districts or similar local policies
12	**Sustainable Development Patterns** Locating more of the forecasted increase in housing and jobs in Activity Centers	90% of new housing and 90% of new jobs in Activity Centers and locations served by premium transit	Local policies to place future growth in Activity Centers and localities served by premium transit and balancing jobs and housing by moving development across jurisdictional boundaries, reducing vehicle trips and VMT

Table 3
Greenhouse Gas Emissions Reduction Strategies – Multi Sector Working Group
Staff Proposed Consensus Recommendations for: Future Consideration
Revised January 6, 2016

	Strategies	Future Consideration	Example Elements
13	**Improve Fuel Economy of Light-Duty Fleet** Faster adoption of more fuel efficient vehicles in the private sector	25% of fleet	Financial incentives for fuel efficient vehicles and financial disincentives for gas guzzlers, develop electric vehicle infrastructure support
14	**Increase use of Alternative Fuels in Public Sector Fleets** Increased adoption of alternative fuel vehicles in public sector fleets	-	-
15	**Low-Carbon Fuel Standard** Reduce the carbon intensity of on-road fuels through regional Low Carbon Fuel Standards	Reduction of total on-road emissions by 10%	Policies to increase sale of low carbon fuel such as CNG, Bio-Diesel, etc.
16	**Truck Stop Electrification (TSE)** Reduce idling of heavy-duty trucks by providing TSE.	-	-
17	**Travel Demand Management** Reduce VMT by shifting SOV commuters to alternate modes with non-SOV benefits	100% commuters receive $80/month subsidy of alternate commute and 100% activity centers have parking pricing and parking management	Average of $8/day parking pricing in Activity Centers; Federal, state, local incentives or requirements for alternative commuter benefit
18	**Transit Service Enhancements** Increase transit ridership through increased or improved services	20% improvement in runtimes and headways	Bus on Shoulders, dedicated busways, transit signal priority, additional transit vehicle purchase
19	**Transit Fare Reduction** Increase transit ridership through reduced fares	40% fare reduction region-wide	Discount policies, free transfers, free off-peak service
20	**Road Pricing** Encourage alternate modes of travel through road pricing	Region wide road pricing of 10c/mile $5/day Cordon pricing in the District of Columbia	Tolling infrastructure
21	**Enhancing System Operations** Vehicles operating with eco-driving principles (efficient acceleration/deceleration, reduced idling, reduced speeding)	Provide infrastructure and services to achieve the goal of 80% of vehicles operating under eco-driving principles; Implementation of operational improvements in all jurisdictions.	Infrastructure and services for connected/autonomous vehicles; Traffic signal retiming, integrated corridor management, ramp metering, intersection efficiency improvements; Subsidies for autonomous vehicles
22	**Reduce Speeding on Freeways** Reduce driving at speeds with higher rates of GHG emissions	-	-

Table 4
Greenhouse Gas Emissions Reduction Strategies – Multi-Sector Working Group
Estimated Greenhouse Gas Reductions for Region-wide and Selected Local Jurisdiction Implementation Strategies
January 6, 2016

	Strategies	Consensus Regional and Local Strategies % Reduction Goal	ICF Estimate Viable Strategies % Reduction Goal	ICF Estimate Viable and Stretch Strategies % Reduction Goal
1	**Building Energy Efficiency** Strategies 1 – Existing Building Efficiency 2 – New Building Efficiency 3 – Infrastructure Efficiency	8%	15%	18%
2	**Power Sector and Renewables** Strategies 4 – Clean Power Supply 5 – Distributed Renewables	9%	10%	14%
3	**Other Energy and Built Environment** Strategies 6 – Solid Waste 7 – Non-Road Equipment 8 – Sustainable Development 9 – Reduced Pipeline Leaks	<1%	1%	1%
4	**Land Use and Tree Canopy** Strategies 11 – Tree Canopy 12 – Sustainable Development	<1%	2%	3%
5	**Vehicles and Fuels** Strategies 13 – Light-Duty Fleet Fuel Economy 14 – Public Sector Fleet Alternative Fuels 15 – Low-Carbon Fuels 16 – Truck Stop Electrification	1%	2%	4%
6	**Travel Demand Management and Pricing** Strategies 17 – Travel Demand Management 18 – Transit Service Enhancements 19 – Transit Fare Reduction 20 – Road Pricing	<1%	<1%	2%
7	**Other Transportation and Land Use** Strategies 21 – Enhanced System Operations 22 – Reduce Freeway Speeding	<1%	<1%	<1%
	Total	19%	30%	42%