Appendix E: Co-Benefits Matrix by GHG Measure

Direct and Indirect Co-Benefits

Co-benefits are the additional, positive outcomes that occur alongside a primary climate action, policy, or project, beyond its primary goal. Each measure in this plan has been evaluated not only for its direct impact on emissions but also for its potential to create a healthier, more economically competitive, resilient, and sustainable region. Co-benefits are broadly categorized into **direct** and **indirect** effects. While all measures can produce both, the indirect co-benefits of GHG reduction strategies often yield the most dynamic and long-lasting community impacts.

Direct co-benefits arise from implementing a GHG reduction measure. These are typically measurable outcomes that occur as a direct result of the activity. For example, switching to an EV vehicle reduces tailpipe emissions, improves air quality, and results in lower operating and maintenance costs. In the Metro Atlanta Climate Action Plan (MACAP), the primary direct co-benefit quantitatively analyzed is the reduction of co-pollutants such as carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter ($PM_{2.5}$ and PM_{10}), and volatile organic compounds (VOCs) that are emitted from vehicles, buildings, and industrial sources. These reductions have immediate and measurable impacts on air quality and health.

Indirect co-benefits emerge from direct benefits, e.g. switching to an EV vehicle results in cleaner air, thus improving public health. Additionally, EV vehicle adoption strengthens the local economy because EVs must be manufactured and many are made in Georgia, another indirect co-benefit. Though these co-benefits are often more difficult to measure or attribute to a single action, they significantly increase the value and effectiveness of GHG reduction strategies by delivering community, economic, and environmental co-benefits.

Co-benefits increase the overall value and effectiveness of GHG reduction measures. They demonstrate how climate action simultaneously supports goals for economic development, health equity, cost savings, and environmental protection.

The following matrix summarizes the **direct** and **indirect** co-benefits associated with each GHG reduction measure included in the MACAP.

Co-Benefits Matrix

KEY: ● Direct Co-Benefit ○ Indirect Co-Benefit —— Co-benefit not present

		Improved Air Quality	Expanded Transportation Options	Better Health & Wellbeing			Lower Costs		Increased Safety & Resilience				Protection of Natural Resources		Strengthened Local Economy		
Sector	**Measure Name & Number**	**Improved Air Quality**	**Expanded Transportation Options**	**Improved Living or Working Environment**	**Reduced Noise Pollution**	**Public Health Improvements**	**Lower Bills (Utilities, Gasoline, etc.)**	**Lower O + M Costs**	**Increased Safety**	**Reduced Load on the Electric Grid**	**Community Beautification**	**Community Preparedness & Resilience**	**Conserves Landfill Capacity**	**Decrease Water Consumption**	**Increased Property Value**	**Workforce Development**	**Contributes to Local Economy**
Transportation	T1. Light Duty Electric Vehicles, EV Chargers, and Grid Balancing	●	●	——	●	○	●	●	——	——	——	○	——	——	——	——	○
Transportation	T2. Electrify Fleets	●	——	——	●	○	●	●	——	——	——	○	——	——	——	——	○

		Improved Air Quality	Expanded Transportation Options	Better Health & Wellbeing			Lower Costs		Increased Safety & Resilience				Protection of Natural Resources		Strengthened Local Economy		
Sector	**Measure Name & Number**	**Improved Air Quality**	**Expanded Transportation Options**	**Improved Living or Working Environment**	**Reduced Noise Pollution**	**Public Health Improvements**	**Lower Bills (Utilities, Gasoline, etc.)**	**Lower O + M Costs**	**Increased Safety**	**Reduced Load on the Electric Grid**	**Community Beautification**	**Community Preparedness & Resilience**	**Conserves Landfill Capacity**	**Decrease Water Consumption**	**Increased Property Value**	**Workforce Development**	**Contributes to Local Economy**
Transportation	T3. Reduce Vehicle Miles Traveled	●	●	○	●	●	●	●	○	●	○	○	––	––	○	○	○
Buildings (Residential)	R1. Home Energy Efficiency	●	––	●	○	○	●	●	––	●	––	●	○	●	●	●	○
Buildings (Residential)	R2. Residential Energy Efficiency Codes & Green Building Standards	●	––	●	●	○	●	●	––	●	○	○	○	●	●	○	●
Buildings (Residential)	R3. Electrify Homes	●	––	●	●	○	●	●	––	●	○	●	––	○	●	●	●
Buildings (Commercial and Multifamily)	C1. Commercial and Multifamily Building Energy Efficiency	●	––	●	●	○	●	●	––	●	○	●	○	●	●	○	●

		Improved Air Quality	Expanded Transportation Options	Better Health & Wellbeing			Lower Costs		Increased Safety & Resilience				Protection of Natural Resources		Strengthened Local Economy		
Sector	**Measure Name & Number**	**Improved Air Quality**	**Expanded Transportation Options**	**Improved Living or Working Environment**	**Reduced Noise Pollution**	**Public Health Improvements**	**Lower Bills (Utilities, Gasoline, etc.)**	**Lower O + M Costs**	**Increased Safety**	**Reduced Load on the Electric Grid**	**Community Beautification**	**Community Preparedness & Resilience**	**Conserves Landfill Capacity**	**Decrease Water Consumption**	**Increased Property Value**	**Workforce Development**	**Contributes to Local Economy**
Buildings (Commercial and Multifamily)	C2. Commercial Energy Efficiency Codes & Green Building Standards	●	––	●	●	○	●	●	––	●	○	●	○	●	●	○	●
Buildings (Commercial and Multifamily)	C3. Electrify Commercial and Multifamily Buildings	●	––	●	●	○	●	●	––	●	○	●	––	○	●	●	●
Industry	I1. Industrial Building Energy Efficiency	●	––	●	●	○	●	●	––	●	○	●	○	●	●	○	●
Industry	I2. Electrify Industrial Buildings and Processes	●	––	●	●	○	●	●	––	●	○	●	––	○	●	●	●
Industry	I3. Retrofit Industrial Processes and Equipment	●	––	●	●	○	●	●	●	●	○	●	○	●	○	○	●
Industry	I4. Decrease Non-CO2 GHG Emissions	●	––	●	●	○	●	●	––	●	––	●	○	●	○	○	●

		Improved Air Quality	Expanded Transportation Options	Better Health & Wellbeing			Lower Costs		Increased Safety & Resilience				Protection of Natural Resources		Strengthened Local Economy		
Sector	**Measure Name & Number**	**Improved Air Quality**	**Expanded Transportation Options**	**Improved Living or Working Environment**	**Reduced Noise Pollution**	**Public Health Improvements**	**Lower Bills (Utilities, Gasoline, etc.)**	**Lower O + M Costs**	**Increased Safety**	**Reduced Load on the Electric Grid**	**Community Beautification**	**Community Preparedness & Resilience**	**Conserves Landfill Capacity**	**Decrease Water Consumption**	**Increased Property Value**	**Workforce Development**	**Contributes to Local Economy**
Industry	I5. Convert Waste Heat to Energy or HVAC	●	——	○	●	●	●	●	○	●	——	○	——	○	○	●	●
Energy	E1. Urban Scale Solar	●	——	○	○	●	●	●	○	●	○	●	——	○	○	●	●
Energy	E2. Rooftop Solar and Battery Systems	●	——	○	○	●	●	●	○	●	○	●	——	○	●	●	●
Energy	E3. Electricity Demand Response	○	——	○	— —	○	●	●	——	●	——	○	——	○	——	○	○
Energy	E4. Wastewater Gas-to-Energy	●	——	○	○	○	●	●	○	●	○	●	●	○	○	●	●

		Improved Air Quality	Expanded Transportation Options	Better Health & Wellbeing			Lower Costs		Increased Safety & Resilience				Protection of Natural Resources		Strengthened Local Economy		
Sector	**Measure Name & Number**	**Improved Air Quality**	**Expanded Transportation Options**	**Improved Living or Working Environment**	**Reduced Noise Pollution**	**Public Health Improvements**	**Lower Bills (Utilities, Gasoline, etc.)**	**Lower O + M Costs**	**Increased Safety**	**Reduced Load on the Electric Grid**	**Community Beautification**	**Community Preparedness & Resilience**	**Conserves Landfill Capacity**	**Decrease Water Consumption**	**Increased Property Value**	**Workforce Development**	**Contributes to Local Economy**
Energy	E5. Landfill Gas-to-Energy.	●	––	––	– –	○	●	●	––	●	○	●	●	––	○	●	●
Waste & Materials	WM1. Reduce Construction and Demolition Waste	○	––	○	– –	○	●	●	○	––	○	○	●	○	○	●	●
Waste & Materials	WM2. Increase Composting	○	––	○	– –	○	○	○	––	––	●	○	●	○	○	●	●
Trees & Greenspace	TG1. Add Trees and Green Infrastructure	●	––	●	●	●	○	○	○	●	●	●	––	○	●	●	●
Trees & Greenspace	TG2. Restore and Protect Forests	●	––	●	○	●	○	○	○	––	●	●	––	○	○	●	●
Cross-Sector	CS1. Accelerate Adoption at the Local Level	●	●	●	○	●	○	○	●	●	●	●	○	○	●	●	●

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