QUINTANA ROO

UNDER 2° Secretariat CLIMATE GROUP

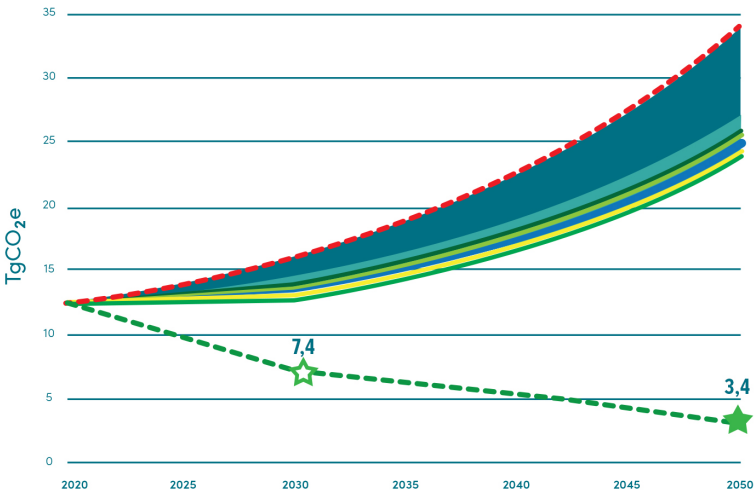
Portfolio of actions: Climate Pathway Project

The Government of Quintana Roo, Mexico has completed a 2.5-year process to develop its decarbonisation pathway. The pathway is based on Quintana Roo's reduction targets* of 21% by 2030 and 63% by 2050.

As part of the process, the government prioritised the 11 mitigation actions shown below.

* Compared to the 2016 baseline.

Projected GHG emission reductions from prioritised actions in Quintana Roo



**$TgCO_2e$ = Teragrams of carbon dioxide equivalent, 1 Tg = one million metric tons

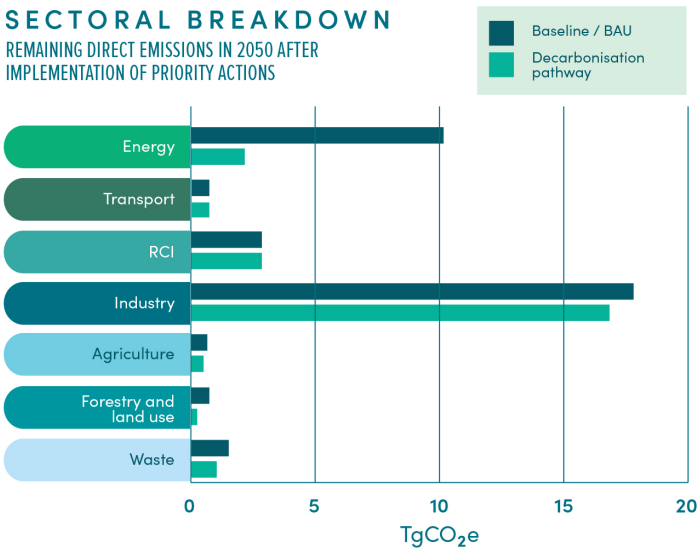
PRIORITY ACTIONS

- Centralised solar energy
- Centralised wind energy
- Urban housing - efficient design
- Commercial and public buildings: heating, ventilation and cooling
- Vehicle electrification
- Reduced agricultural burning
- Planning infrastructure and urban growth to minimise deforestation
- Reducing the risk of forest fires
- Municipal waste reduction
- Recycling and composting of industrial solid waste
- Energy production from waste
- Baseline / BAU
- Decarbonisation targets
- 2030 target = 7.4 $TgCO_2e$
- 2050 target = 3.4 $TgCO_2e$

As shown by the graph, the priority actions would amount to a 29% reduction in BAU emissions by 2050.

SECTORAL BREAKDOWN

REMAINING DIRECT EMISSIONS IN 2050 AFTER IMPLEMENTATION OF PRIORITY ACTIONS



Expected impact of priority actions on GHG emissions

The implementation of these actions would add up to approximately **2.7 million** tonnes of avoided emissions by **2030**

And more than **9.9 million** tonnes of avoided emissions by **2050**

WITH THE SUPPORT OF — MAIN PARTNER — PARTNERS

NICFI Norway's International Climate and Forest Initiative · CLIMATE GROUP · GCF task force · WINROCK INTERNATIONAL · THE CENTER FOR CLIMATE STRATEGIES · Libélula

Find the full report here: https://www.theclimategroup.org/climate-pathway-project

E-1 CENTRALISED SOLAR ENERGY

DESCRIPTION: This action is designed to reduce the greenhouse gas (GHG) emissions (mainly CO_2) of the energy supply in Quintana Roo through the construction of new centralised solar farms connected to the national grid.

LEVEL OF EFFORT AND TIMING OF IMPLEMENTATION:

- By 2030, reduce the carbon intensity of grid-supplied power by 35% from BAU levels by increasing solar energy production.
- By 2050, reduce the carbon intensity of grid-supplied power by 65% from BAU levels by increasing solar energy production.

Impact on GHG emissions reduction

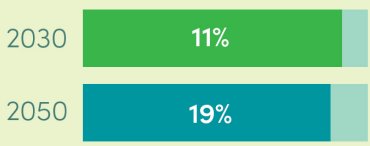
Cumulative GHG emission reductions (2021 - 2050):

86 $TgCO_2e$

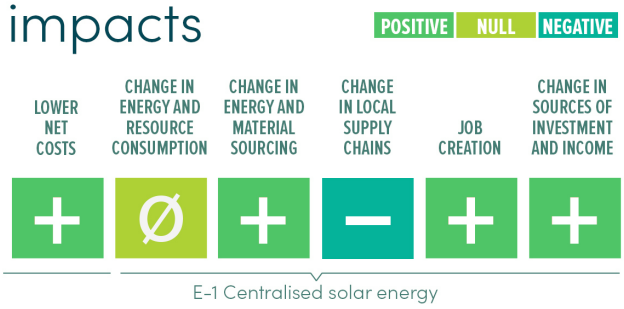
E-1 has a very high mitigation potential of **43%** of total emissions in the energy supply sector.

CONTRIBUTION TO TOTAL REDUCTIONS (%)

REDUCTION FROM BAU (%)



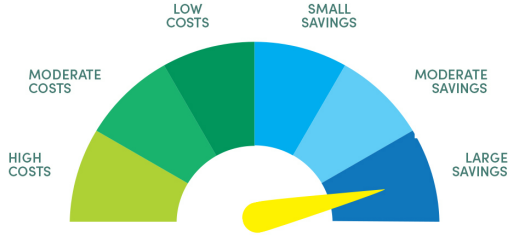
Macroeconomic impacts



Co-benefits

Costs and savings

Large direct savings for the state in water and electricity supply expenditure, as compared to BAU scenario.



E-2. CENTRALISED WIND ENERGY

DESCRIPTION: This action is designed to reduce the greenhouse gas (GHG) emissions (mainly CO_2) of the energy supply in Quintana Roo through the construction of new centralised wind farms connected to the national grid.

LEVEL OF EFFORT AND TIMING OF IMPLEMENTATION:

- By 2030, reduce the carbon intensity of grid-supplied power by 5% from BAU levels through increased wind energy production.
- By 2050, reduce the carbon intensity of grid-supplied power by 15% from BAU levels through increased wind energy production

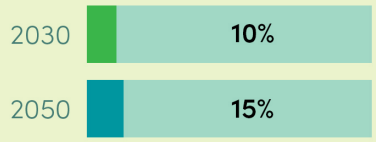
Impact on GHG emissions reduction

Cumulative GHG emission reductions: (2020 - 2050)

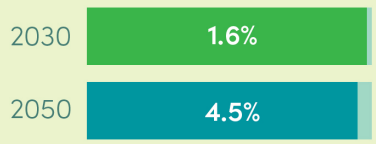
17 $TgCO_2e$

E-2 has a low mitigation potential of **9%** of total emissions in the energy supply sector.

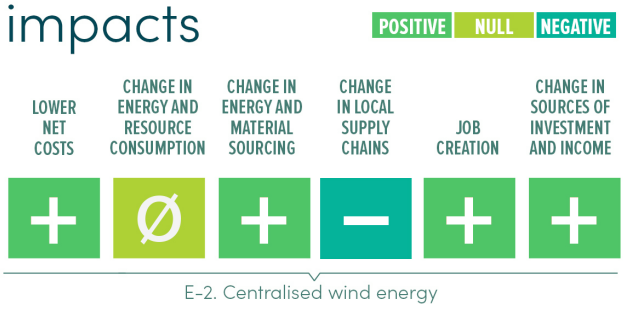
CONTRIBUTION TO TOTAL REDUCTIONS (%)



REDUCTION FROM BAU (%)



Macroeconomic impacts

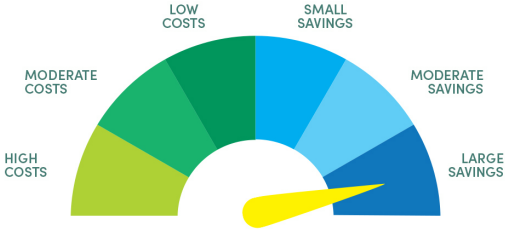


E-2. Centralised wind energy

Co-benefits

Costs and savings

Large direct savings for the state in water and electricity supply expenditure, as compared to BAU



RCI-1. URBAN HOUSING - EFFICIENT DESIGN

DESCRIPTION: This action is designed to reduce greenhouse gas (GHG) emissions (mainly CO_2) associated with energy supply by increasing energy efficiency in newly constructed urban housing. The design of more efficient urban dwellings includes building both more efficient building structures with natural ventilation and lighting (weatherproofing, building exterior materials, insulation, orientation and design of windows, etc.) and employing more efficient household appliances (especially air-conditioning).

LEVEL OF EFFORT AND TIMING OF IMPLEMENTATION:

· By 2025, implement urban housing design and construction requirements that achieve an overall reduction of 20% in power consumption compared to current consumption based on current building standards.

· By 2035, implement urban housing design and construction requirements that achieve an overall reduction of 35% in power consumption compared to current consumption based on current building standards.

· By 2050, implement urban housing design and construction requirements that achieve an overall reduction of 50% in power consumption compared to current consumption based on current building standards.

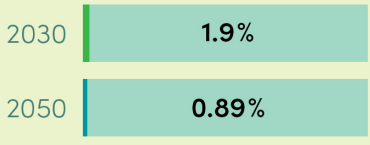
Impact on GHG emissions reduction

Cumulative GHG emission reductions: (2020 - 2050)

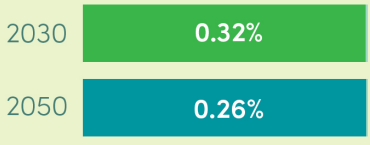
1.9 $TgCO_2e$

RCI-1 has a very low mitigation potential of **0.9%** of total emissions in the RCI sector (residential, commercial, institutional).

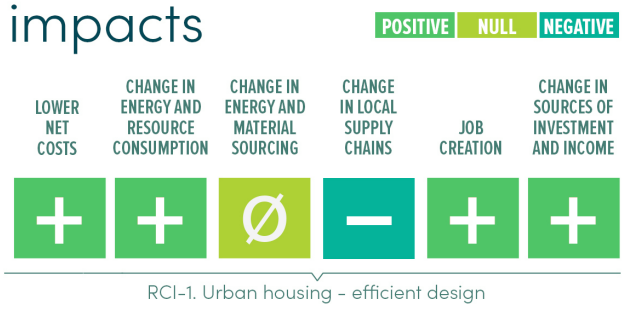
CONTRIBUTION TO TOTAL REDUCTIONS (%)



REDUCTION FROM BAU (%)

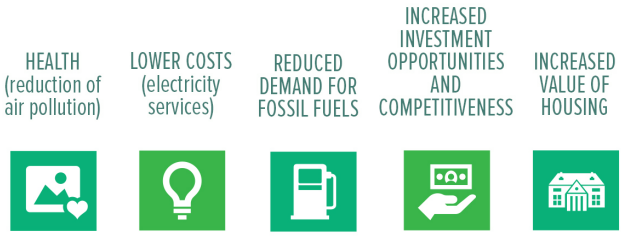


Macroeconomic impacts



RCI-1. Urban housing - efficient design

Co-benefits



Costs and savings

Small direct savings for the state, due to lower electricity supply costs for the state's residents and businesses compared to the BAU scenario.

RCI-2. COMMERCIAL AND PUBLIC BUILDINGS: HEATING, VENTILATION AND COOLING

DESCRIPTION: This action is designed to reduce greenhouse gas (GHG) emissions (mainly CO_2) associated with electricity consumption through more energy efficient heating, ventilation and air conditioning (HVAC) systems in commercial and institutional buildings. The action will apply to new and existing commercial and institutional buildings. For existing buildings, more efficient HVAC systems will be required where existing systems need to be modified or replaced at the end of the equipment's lifecycle. Reductions in the use of grid-supplied power as a result of the use of these new, more efficient HVAC systems will indirectly reduce GHG emissions from power plants that provide electricity to the grid.

LEVEL OF EFFORT AND TIMING OF IMPLEMENTATION:

- By 2025, develop and implement HVAC efficiency standards for commercial and institutional buildings that achieve a 25% reduction in power consumption compared to consumption according to current building standards.
- By 2035, develop and implement HVAC efficiency standards for commercial and institutional buildings that achieve a 35% reduction in power consumption compared to consumption according to current building standards.
- By 2050, develop and implement HVAC efficiency standards for commercial and institutional buildings that achieve a 50% reduction in power consumption compared to consumption according to current building standards.

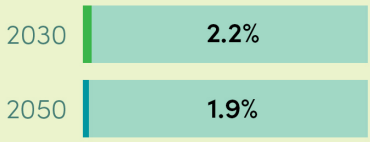
Impact on GHG emissions reduction

Cumulative GHG emission reductions: (2020-2050)

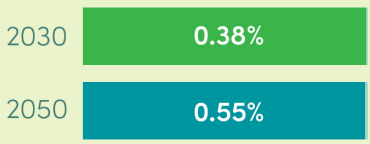
2.9 $TgCO_2e$

RCI-2 has a low mitigation potential of **1.4%** of total emissions in the RCI sector (residential, commercial, institutional).

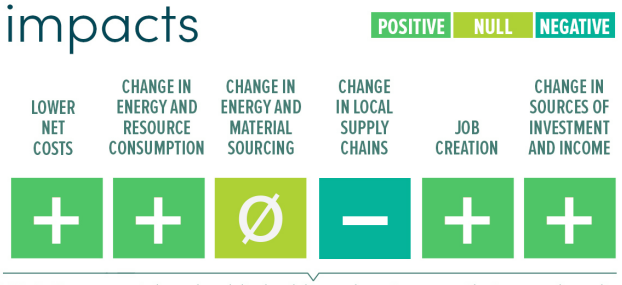
CONTRIBUTION TO TOTAL REDUCTIONS (%)



REDUCTION FROM BAU (%)

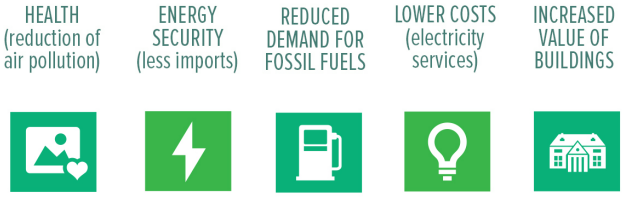


Macroeconomic impacts



RCI-2. Commercial and public buildings: heating, ventilation and cooling

Co-benefits



Costs and savings

Small direct savings compared to typical service sector spending levels.

T-1. VEHICLE ELECTRIFICATION

DESCRIPTION: This action is designed to reduce the greenhouse gas (GHG) emissions (mainly CO_2) of the transport sector in Quintana Roo through vehicle electrification. By means of reducing exhaust pipe emissions through decreasing the vehicle fleet using traditional internal combustion engines that burn fossil fuels (gasoline and diesel) and transitioning to electric trains, which require about one third of the power needed by internal combustion engine powertrains. In addition, through the increased adoption of vehicle electrification more renewable energy will be added to the power grid, decentralizing reliance of fossil fuel energy and subsequently reducing GHG emissions.

LEVEL OF EFFORT AND TIMING OF IMPLEMENTATION:

- By 2035, electric vehicles will account for 50% of new light vehicle and bus sales. For medium to heavy duty trucks, the sales target will be 30%.
- By 2050, electric vehicles in all size categories will account for 100% of new vehicle sales.

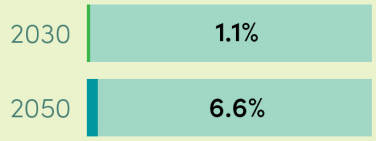
Impact on GHG emissions reduction

Cumulative GHG emission reductions:
(2020 - 2050)

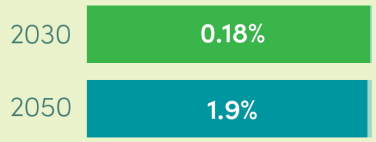
5.2 $TgCO_2e$

T-1 has a low mitigation potential of **1.9%** of total emissions in the transport sector.

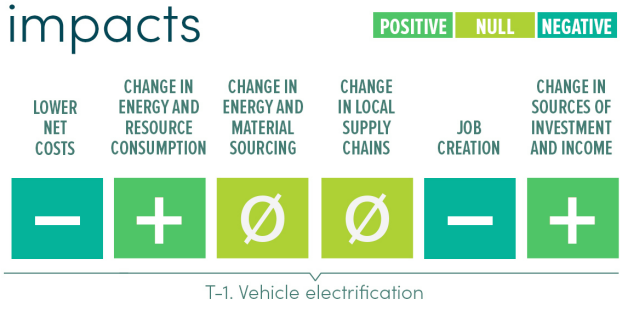
CONTRIBUTION TO TOTAL REDUCTIONS (%)



REDUCTION FROM BAU (%)

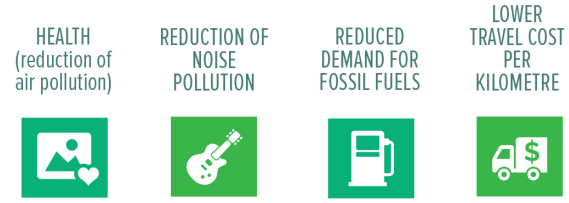


Macroeconomic impacts



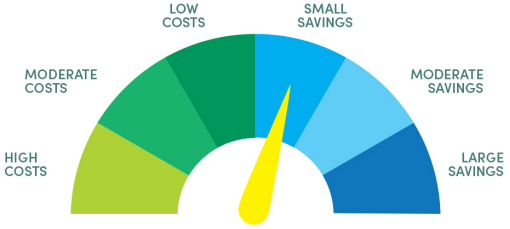
T-1. Vehicle electrification

Co-benefits



Costs and savings

Small direct savings for the state, as compared to BAU spending levels in the commercial sector (specifically the transport, mail and warehousing sub-sector).



AG-1. REDUCED AGRICULTURAL BURNING

DESCRIPTION: This action aims to use initiatives which support the reduction of methane (CH_4) and nitrous oxide (N_2O) emissions through agricultural burning. Agricultural burning is the intentional use of fire to remove crop residues from agricultural fields. Burning is also used to eliminate weeds, control pests and prevent diseases.

LEVEL OF EFFORT AND TIMING OF IMPLEMENTATION:

- By 2030, reduce sugar cane field activity by 30%, with the residue of the outer leaf used as mulch, feedstock for co-firing, feedstock for biofuel production.
- By 2050, reduce sugar cane field activity by 80%, with the residue of the outer leaf used as mulch, feedstock for co-firing, feedstock for biofuel production.

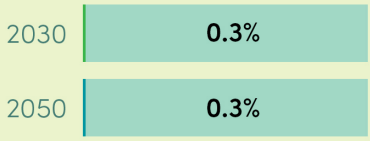
Impact on GHG emissions reduction

Cumulative GHG emission reductions: (2020 - 2050)

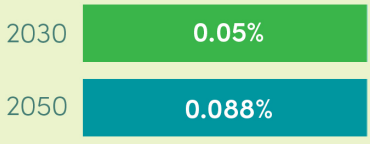
0.41 $TgCO_2e$

AG-1 has a low mitigation potential of **3.1%** of total emissions in the agriculture and livestock sector.

CONTRIBUTION TO TOTAL REDUCTIONS (%)



REDUCTION FROM BAU (%)



Macroeconomic impacts

POSITIVE NULL NEGATIVE

LOWER NET COSTS	CHANGE IN ENERGY AND RESOURCE CONSUMPTION	CHANGE IN ENERGY AND MATERIAL SOURCING	CHANGE IN LOCAL SUPPLY CHAINS	JOB CREATION	CHANGE IN SOURCES OF INVESTMENT AND INCOME
−	−	+	+	−	+

AG-1. Reduced agricultural burning

Co-benefits

HEALTH (reduction of air pollution) · USE AND MONETISATION OF CROP RESIDUES · SOIL REMEDIATION AND EROSION REDUCTION · POTENTIAL FOR SPENDING LESS IN SYNTHETIC INPUTS · YIELD IMPROVEMENT

Costs and savings

Small direct savings for the state, as compared to BAU spending levels in the agriculture, livestock, forestry and fisheries sectors.

FOLU-1. PLANNING INFRASTRUCTURE AND URBAN GROWTH TO MINIMISE DEFORESTATION

DESCRIPTION: This action aims to reduce the rates of deforestation by establishing new infrastructure and urban growth in the state and their related GHG emissions.

LEVEL OF EFFORT AND TIMING OF IMPLEMENTATION:

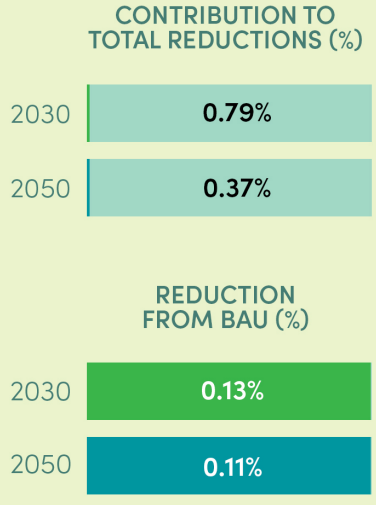
- By 2030, a total of 2.082 hectares of deforestation will have been avoided (50% of the projected conversion of forest land to human settlements from 2022 to 2030 in the baseline).
- By 2050, a total of 10.062 hectares of deforestation will have been avoided (75% of the projected conversion of forest land to human settlements from 2022 to 2050 in the baseline).

Impact on GHG emissions reduction

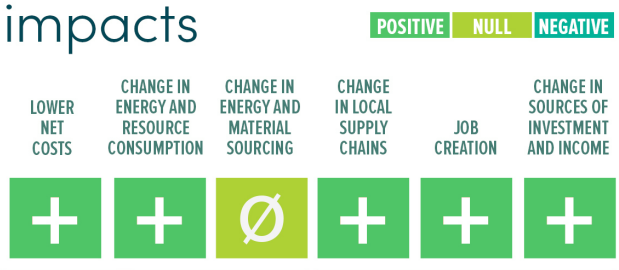
Cumulative GHG emission reductions: (2020 - 2050)

0.94 $TgCO_2e$

FOLU-1 has a moderate mitigation potential of **5%** of total emissions in the FOLU sector (forestry and other land use).

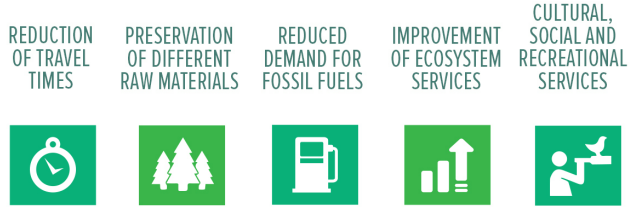


Macroeconomic impacts



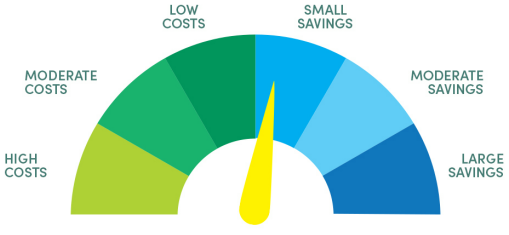
FOLU-1. Planning infrastructure and urban growth to minimise deforestation

Co-benefits



Costs and savings

Small direct savings for the state, as compared to BAU spending levels in the transport sector (which is considered the most relevant economic sector for this action focused on reducing the establishment of new infrastructure and urban growth).



FOLU-2. REDUCING THE RISK OF FOREST FIRES

Description: This action aims to reduce the total area of forest impacted by forest fires and associated emissions.

Level of effort and timing of implementation:

- By 2030, forest fires will be prevented in 50% of the areas expected to experience forest fires.
- By 2050, forest fires will be prevented in 65% of the areas expected to experience forest fires.

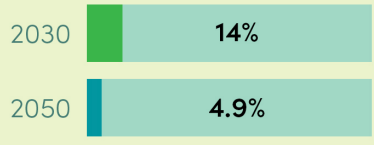
Impact on GHG emissions reduction

Cumulative GHG emission reductions:
(2020 - 2050)

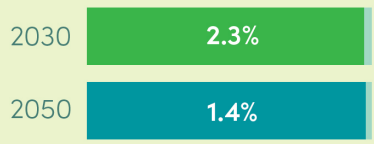
10 $TgCO_2e$

FOLU-2 has a very high mitigation potential of **55%** of total emissions in the FOLU sector (forestry and other land use).

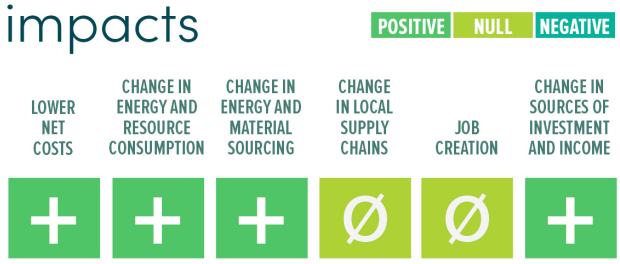
CONTRIBUTION TO TOTAL REDUCTIONS (%)



REDUCTION FROM BAU (%)



Macroeconomic impacts

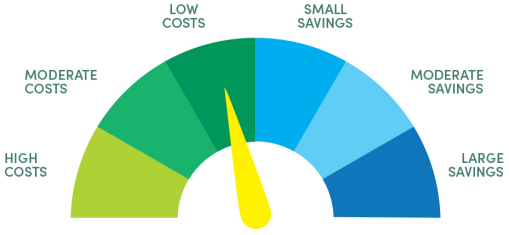


FOLU-2. Reducing the risk of forest fires

Co-benefits

Costs and savings

Low direct costs for the state, as compared to BAU spending levels in the agriculture, livestock and forestry sectors.



W-1. MUNICIPAL WASTE REDUCTION

DESCRIPTION: This action aims to reduce methane (CH_4) emissions from municipal solid waste landfills by reducing the amount of waste generated by households, commercial and government establishments.

LEVEL OF EFFORT AND TIMING OF IMPLEMENTATION:

- By 2025, reduce per capita municipal solid waste generation by 5%
- By 2030, reduce per capita municipal solid waste generation by 10%
- By 2040, reduce per capita municipal solid waste generation by 20%
- By 2050, reduce per capita municipal solid waste generation by 35%

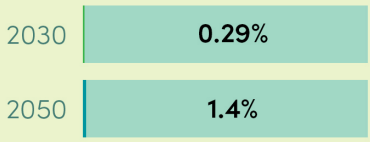
Impact on GHG emissions reduction

Cumulative GHG emission reductions: (2020 - 2050)

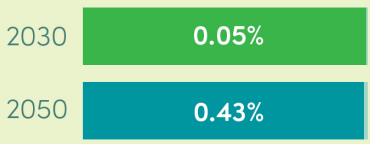
1.3 $TgCO_2e$

W-1 has a low mitigation potential of **5.6%** of total emissions in the waste sector.

CONTRIBUTION TO TOTAL REDUCTIONS (%)



REDUCTION FROM BAU (%)



Macroeconomic impacts

POSITIVE NULL NEGATIVE

W-1. Municipal waste reduction

Co-benefits

Costs and savings

Small direct savings for the state, which are highly dependent on the type of implementation strategies used and local waste disposal costs.

W-2. RECYCLING AND COMPOSTING OF INDUSTRIAL SOLID WASTE

DESCRIPTION: This action increases the stream of industrial solid waste diverted from landfill, either through recycling or composting, in order to limit GHG emissions associated with waste disposal. The state of Quintana Roo intends to implement this action in the construction, sugar cane, cement industries, and to a lesser extent in soft drink bottling plants, ice factories, sawmills, automotive factories and airports, which are the main industrial sector activities in the state.

LEVEL OF EFFORT AND TIMING OF IMPLEMENTATION:

- By 2030, reduce industrial solid waste disposal by 15% from the baseline, through recycling and composting.
- By 2050, reduce industrial solid waste disposal by 40% from the baseline, through recycling and composting.

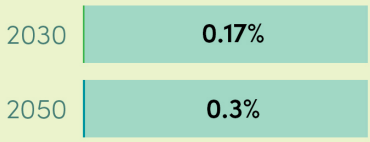
Impact on GHG emissions reduction

Cumulative GHG emission reductions: (2020 - 2050)

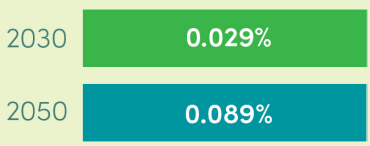
0.33 $TgCO_2e$

W-2 has a low mitigation potential of **1.4%** of total emissions in the waste sector.

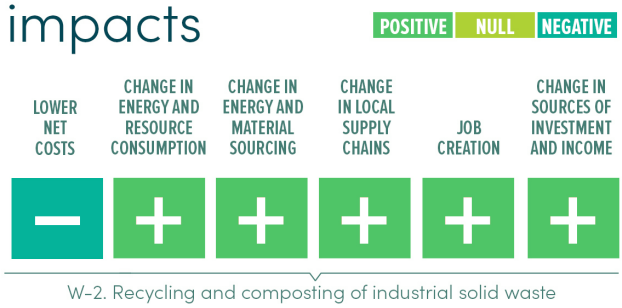
CONTRIBUTION TO TOTAL REDUCTIONS (%)



REDUCTION FROM BAU (%)



Macroeconomic impacts

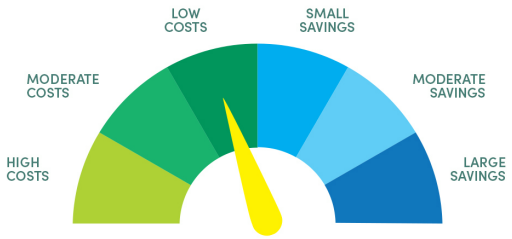


W-2. Recycling and composting of industrial solid waste

Co-benefits

Costs and savings

Low direct costs for the state, which are highly dependent on the type of implementation mechanisms chosen.



W-3. ENERGY PRODUCTION FROM WASTE

DESCRIPTION: This action aims to divert municipal solid waste (MSW) from landfills in order to reduce methane emissions. MSW will be used as feedstock to generate electricity in a thermal power plant, replacing the use of fossil fuels and reducing associated emissions. The state of Quintana Roo intends to implement this action in the following municipalities: Benito Juárez, Solidaridad, Felipe Carrillo Puerto, Bacalar and Othón P. Blanco.

LEVEL OF EFFORT AND TIMING OF IMPLEMENTATION:

- By 2030, convert 250.000 tonnes of MSW into electricity.
- By 2050, convert 400.000 tonnes of MSW into electricity.

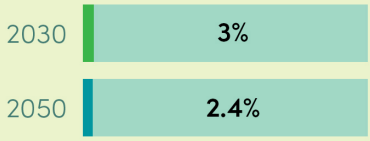
Impact on GHG emissions reduction

Cumulative GHG emission reductions:
(2020 - 2050)

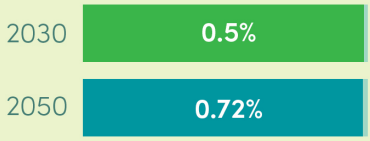
3.7 $TgCO_2e$

W-3 has a moderate mitigation potential of **16%** of total emissions in the waste sector.

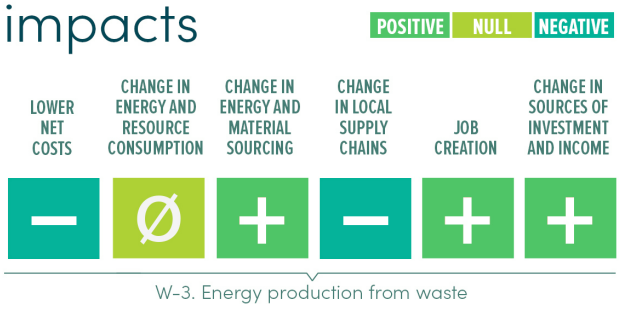
CONTRIBUTION TO TOTAL REDUCTIONS (%)



REDUCTION FROM BAU (%)



Macroeconomic impacts



W-3. Energy production from waste

Co-benefits

Costs and savings

Low direct costs for the state, due to the installation and operating costs of the power plant, the costs of any additional sorting and processing of waste required for combustion and the savings associated with reduced landfilling.