



جامعة الإمام عبد الرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY
POLICY AND PROCEDURES

Date: November 2019

Revision:

ADM-207

DEPARTMENT : ADMINISTRATION

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POLICY AND PROCEDURES:

1. **TITLE:** Policy to reduce greenhouse gas emissions

2. **PURPOSE:**

- To reduce the greenhouse gas emissions responsible for climate change.
- To provide information on emissions and removals of the main greenhouse gases to and from the atmosphere.

3. **DEFINITION:**

Gases that trap heat in the atmosphere are called greenhouse gases. These are the following:

- **Carbon dioxide (CO):** Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials, and also as a result of certain chemical reactions (e.g., manufacture of cement). Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.
- **Methane (CH):** Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills.
- **Nitrous oxide (NO):** Nitrous oxide is emitted during agricultural, land use, industrial activities, combustion of fossil fuels and solid waste, as well as during treatment of wastewater.
- **Fluorinated gases:** Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases.

4. **POLICY:**

- This policy presented procedures and descriptions of the main methods that we can use and implement to stop climate change. To stop climate change, we need to stop the amount of greenhouse gases, like carbon dioxide, from increasing.
- The primary sources of greenhouse gas emissions are:
 - Transportation (29 percent of 2021 greenhouse gas emissions) – The transportation sector generates the largest share of greenhouse gas emissions. Greenhouse gas emissions from transportation primarily come from burning fossil fuel for our cars, trucks, ships, trains, and planes. Over 90 percent of the fuel used for transportation is petroleum based, which includes primarily gasoline and diesel.
 - Electricity production (25 percent of 2021 greenhouse gas emissions) – Electricity production generates the second largest share of greenhouse gas emissions. Approximately 62 percent of our electricity comes from burning fossil fuels, mostly coal and natural gas
 - Industry (23 percent of 2021 greenhouse gas emissions) – Greenhouse gas emissions from industry primarily come from burning fossil fuels for energy, as well as greenhouse gas emissions from certain chemical reactions necessary to produce goods from raw materials.



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- Commercial and Residential (13 percent of 2021 greenhouse gas emissions) – Greenhouse gas emissions from businesses and homes arise primarily from fossil fuels burned for heat, the use of certain products that contain greenhouse gases, and the handling of waste.
- Agriculture (10 percent of 2021 greenhouse gas emissions) – Greenhouse gas emissions from agriculture come from livestock such as cows, agricultural soils, and rice production.
- Land Use and Forestry (12 percent of 2021 greenhouse gas emissions) – Land areas can act as a sink (absorbing CO from the atmosphere) or a source of greenhouse gas emissions.
- There are two main ways to stop the amount of greenhouse gases from increasing: we can stop adding them to the air, and we can increase the Earth’s ability to pull them out of the air. This is called climate mitigation. There is no any single way to mitigate climate change. Instead, we will have to piece together many different solutions to stop the climate from warming. Below are descriptions of the main methods that we can use.

5. PROCEDURES:

a. Reducing Emissions from Electricity

5.1.1. Increased Efficiency of Fossil-fired Power Plants and Fuel Switching

5.1.1.1. Increasing the efficiency of existing fossil fuel-fired power plants by using advanced technologies; substituting less carbon-intensive fuels; shifting generation from higher-emitting to lower-emitting power plants.

5.1.1.2. Converting a coal-fired boiler to use of natural gas, or co-firing natural gas.

5.1.1.3. Converting a single-cycle gas turbine into a combined-cycle turbine.

5.1.1.4. Shifting dispatch of electric generators to lower-emitting units or power plants.

5.1.2. Renewable Energy

5.1.2.1. Using renewable energy sources rather than fossil fuel to generate electricity.

5.1.2.2. Increasing the share of total electricity generated from wind, solar, hydro, and geothermal sources, as well as certain biofuel sources, through the addition of new renewable energy generating capacity.

5.1.3. Increased End-Use Energy Efficiency

5.1.3.1. Reducing electricity use and peak demand by increasing energy efficiency and conservation in homes, businesses, and industry.

5.1.4 Nuclear Energy

5.1.4.1. Generating electricity from nuclear energy rather than the combustion of fossil fuels.

5.1.4.2. Extending the life of existing nuclear plants and building new nuclear generating capacity.

5.1.5 Carbon Capture and Sequestration (CCS)

5.1.5.1. Capturing CO as a byproduct of fossil fuel combustion before it enters the atmosphere, transporting the CO, injecting the CO deep underground at a carefully selected and suitable subsurface geologic formation where it is securely stored.

5.1.5.2. Capturing CO from the stacks of a coal-fired power plant and then transferring the CO via pipeline, injecting the CO deep underground at a carefully selected and suitable nearby abandoned oil field where it is securely stored.

b. Reducing Emissions from Transportation

5.2.1. Fuel Switching



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5.2.1.1. Using fuels that emit less CO than fuels currently being used. Alternative sources can include biofuels; hydrogen; electricity from renewable sources, such as wind and solar; or fossil fuels that are less CO -intensive than the fuels that they replace.

5.2.1.2. Using public buses that are fueled by compressed natural gas rather than gasoline or diesel.

5.2.1.3. Using electric or hybrid automobiles, provided that the energy is generated from lower-carbon or non-fossil fuels.

5.2.1.4. Using renewable fuels such as low carbon biofuels.

5.2.2. Improving Fuel Efficiency with Advanced Design, Materials, and Technologies

5.2.2.1 Using advanced technologies, design, and materials to develop more fuel-efficient vehicles.

5.2.2.2. Developing advanced vehicle technologies such as hybrid vehicles and electric vehicles, that can store energy from braking and use it for power later.

5.2.2.3. Reducing the weight of materials used to build vehicles.

5.2.2.4. Reducing the aerodynamic resistance of vehicles through better shape design.

5.2.3. Improving Operating Practices

5.2.3.1. Adoption practices that minimize fuel.

5.2.3.2. Improving vehicle practices and vehicle maintenance.

5.2.3.3. Reducing the average taxi time for aircraft.

5.2.3.4. Driving sensibly (avoiding rapid acceleration and braking, observing the speed limit).

5.2.3.5. Reducing engine idling.

5.2.3.6. Improved voyage planning for ships, such as through improved weather routing, to increase fuel efficiency.

5.2.4. Reducing Travel Demand

5.2.4.1. Employing urban planning to reduce the number of miles that people drive each day.

5.2.4.2. Reducing the need for driving through travel efficiency measures such as commuter, biking, and pedestrian programs.

5.2.4.3. Building public transportation, sidewalks, and bike paths to increase lower emission transportation choices.

5.2.4.4. Zoning for mixed use areas, so that residences, schools, stores, and businesses are close together, reducing the need for driving.

c. Reducing Emissions from Industry

5.3.1. Energy Efficiency

5.3.1.1. Upgrading to more efficient industrial technology.

5.3.1.2. Identifying the ways that manufacturers can use less energy to light and heat factories or to run equipment.

5.3.2. Fuel Switching

5.3.2.1. Switching to fuels that result in less CO emissions but the same amount of energy, when combusted.

5.3.2.2. Using natural gas instead of coal to run machinery.

5.3.3. Recycling

5.3.3.1. Producing industrial products from materials that are recycled or renewable, rather than producing new products from raw materials.

5.3.3.2. Using scrap steel and scrap aluminum as opposed to smelting new aluminum or forging new steel.

5.3.4. Training and Awareness



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5.3.4.1. Making companies and workers aware of the steps to reduce or prevent emissions leaks from equipment. EPA has a variety of voluntary programs that provide resources for training and other steps for reducing emissions. EPA supports programs for the aluminum, semiconductor and magnesium industries.

5.3.4.2. Instituting handling policies and procedures for perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF) that reduce occurrences of accidental releases and leaks from containers and equipment.

d. Reducing Emissions from Homes and Businesses

5.4.1. Homes and Commercial Buildings

5.4.1.1 Reducing energy use through energy efficiency.

5.4.1.2. Homes and commercial buildings use large amounts of energy for heating, cooling, lighting, and other functions. "Green building" techniques and retrofits can allow new and existing buildings to use less energy to accomplish the same functions, leading to fewer greenhouse gas emissions.

5.4.1.3. Techniques to improve building energy efficiency include better insulation; more energy-efficient heating, cooling, ventilation, and refrigeration systems; efficient fluorescent lighting; passive heating and lighting to take advantage of sunlight; and the purchase of energy-efficient appliances and electronics.

5.4.2. Wastewater Treatment

5.4.2. 1. Making water and wastewater systems more energy efficient.

5.4.2. 2. Drinking water and wastewater systems account for approximately 2 percent of energy .. By incorporating energy efficiency practices into their water and wastewater plant, municipalities and utilities can save 15 to 30 percent in energy use.

5.4.3. Waste Management

5.4.3.1. Reducing solid waste sent to landfills. Capturing and using methane produced in current landfills.

5.4.3.2. Landfill gas is the natural byproduct of the decomposition of solid waste in landfills. It primarily consists of CO and CH .

5.4.3.3. Establish low-cost methods to reduce greenhouse gases from consumer waste exist, including recycling programs, waste reduction programs, and landfill methane capture programs.

5.4.4. Air Conditioning and Refrigeration

5.4.4.1. Reducing leakage from air conditioning and refrigeration equipment.

5.4.4.2. Using refrigerants with lower global warming potentials.

5.4.4.3. Commonly used refrigerants in homes and businesses include ozone depleting hydrochlorofluorocarbon (HCFC) refrigerants, often HCFC-22, and blends consisting entirely or primarily of hydrofluorocarbons (HFCs), both of which are potent greenhouse gases. Several advancements in air conditioning and refrigeration technology help food retailers reduce both refrigerant charges and refrigerant emissions.

e. Reducing Emissions from Agriculture

5.5.1. Land and Crop Management

5.5.1.1. Adjusting the methods for managing land and growing crops.

5.5.1.2. Fertilizing crops with the appropriate amount of nitrogen required for optimal crop production, since over-application of nitrogen can lead to higher nitrous oxide emissions without enhancing crop production.

5.5.1.3. Draining water from wetland rice soils during the growing season to reduce methane emissions.



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5.5.2. Livestock Management

5.5.2.1. Adjusting feeding practices and other management methods to reduce the amount of methane resulting from enteric fermentation.

5.5.2.2. Improving pasture quality to increase animal productivity, which can reduce the amount of methane emitted per unit of animal product. Also, increased productivity in livestock can be introduced through improved breeding practices.

5.5.3. Manure Management

5.5.3.1. Controlling the way in which manure decomposes to reduce nitrous oxide and methane emissions.

5.5.3.2. Capturing methane from manure decomposition to produce renewable energy.

5.5.3.3. Handling manure as a solid or depositing it on pasture rather than storing it in a liquid-based system such as a lagoon would likely reduce methane emissions but may increase nitrous oxide emissions.

5.5.3.4. Storing manure in anaerobic lagoons to maximize methane production and then capturing the methane to use as an energy substitute for fossil fuels.

5.5.3.5. A voluntary outreach and education program that promotes recovery and use of methane from animal manure.

f. Reducing Emissions and Enhancing Sinks from Land Use, Land-Use Change, and Forestry

5.6.1. Change in Uses of Land

5.6.1.1. Increasing carbon storage by using land differently or maintaining carbon storage by avoiding land degradation.

5.6.1.2. Afforestation and minimizing the conversion of forest land to other land uses, such as settlements, croplands, or grasslands.

5.6.2. Changes in Land Management Practices

5.6.2.1. Improving management practices on existing land-use types.

5.6.2.2. Utilizing reduced tillage practices on cropland and improved grazing management practices on grassland.

5.6.2.3. Planting after natural or human-induced forest disturbances to accelerate vegetation growth and minimize soil carbon losses.

6. RESPONSIBILITIES:

- Government Sector
- Private Sector
- Individual/ Staff in the University

7. DISTRIBUTION:

This policy will be distributed annually to students, parents/guardians, and staff, and it will also be included in any student codes of conduct, disciplinary policies, student handbooks, and university websites.