



State of Israel

**The State Comptroller
and Ombudsman of Israel**

Special Audit Report

**National Climate Action
by the Government of Israel**

Summaries of Report Chapters



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“Look at God's work - for who can straighten what He has twisted?” (Ecclesiastes 7:13)

- When the Holy One created the first human being, He took him and led him around all the trees of the Garden of Eden. He said to him: “Look at My works, how beautiful and praiseworthy they are! All that I have created, I have created it for you. Be mindful that you do not corrupt and destroy My world, for if you corrupt it, there is no one to repair it after you.”

Midrash Ecclesiastes Rabbah, ch. 7

The natural resources of the earth, including the air, water, land, flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate.

Declaration of the United Nations
Conference on the Human Environment,
Stockholm 16 June 1972



Foreword

This special audit report on the National Climate Action by the Government of Israel, was submitted to the Knesset and presented to the public in preparation for the 2021 United Nations Climate Change Conference (COP26), scheduled to meet in early November 2021 – at a time when many countries are making pivotal policy decisions that will influence the way we will manage this global crisis, which is expected to continue in the coming decades.

This audit report is unique in several respects. **First**, the state audit chose to address an issue that is currently developing. This decision was based on a future-oriented approach and the desire to give decision-makers a comprehensive document that will support them in preparing for and managing this multidimensional issue. **Second**, the report includes analysis of risks in different fields – including financial, physical, and geopolitical. The findings indicate the need to integrate them into the national risk strategy and take them into account when addressing strategic issues under the government's responsibility. **Third**, the report addresses several levels of this issue: the inter-ministerial level, which includes dozens of government ministries and public entities; the sectorial level – public, private, and civil society; the economic level, including sectors such as energy and transportation; and the international level. These levels are interconnected; taken together, they present a comprehensive assessment of the issue. **Fourth**, based on the understanding that the State Comptroller tracks core issues, the concluding chapter of this report includes an analysis of organizational and functional gaps. Addressing these gaps can contribute to improving government actions in managing the climate issue.

Over the past few decades, scientific studies have led the world to the understanding that continued emission of greenhouse gases (GHGs) at current levels will lead to increasing concentrations in the atmosphere, and thus to significant climate change, and, that as result, a cross-borders and cross-sectors crisis is evolving and is expected to cause deterioration in the global economy, health, and ecology. To prevent the realization of this scenario, comprehensive global action is required to reduce GHG emissions through the transition to a net carbon neutral economy.

Effective management of mitigation and adaptation to climate change effects necessitates a perceptual shift and requires an understanding that climate change is not only an environmental issue – it has become a systemic crisis that threatens many areas of life. Therefore, it is relevant to the entire range of government activity. Various countries have declared a state of climate emergency, and they have begun to take actions on the national and local level. They do so based on the understanding that climate change is a significant component of the risk map, and not just an environmental issue with limited effects, and that national adaptation to climate change is a central component of a national strategy for strengthening public resilience and systemic readiness for multi-risk crises.



In the understanding that the government must take initial steps based on existing knowledge, the State Comptroller conducted a comprehensive examination of government resolutions and actions promoted by the government of Israel over the past several years, in several main areas: mitigation of GHGs emissions; multi-sectorial adaptation to climate change risks; macroeconomic and financial risks caused by climate change; and Israel's governance structure for addressing these issues. The audit report also includes an international layer, which contains comparative reviews of actions taken in other countries, presentation of content from international professional organizations on the report topics, analysis of global trends, actions and recommendations of countries and international organizations, risk analysis, and scientific reports. Throughout the audit process, the auditors met with many experts and researchers, key staff actors, and field actors in dozens of public entities, many government ministries and subordinate bodies, industry representatives and other stakeholders.

The audit revealed many findings that indicate that the State of Israel has yet to make the necessary perceptual shift. Only a minority of public entities exhibited actions for improving adaptation to climate change. Israel is one of the few countries in the world that does not act based on a national adaptation plan that is budgeted and approved, although it is in a "hotspot" (high-risk area), and thus even more exposed to climate change risks. Further, climate change is not part of the national threat map. Not all the required mechanisms for reducing GHG emissions have been implemented. In addition, disagreements among government ministries have delayed Israel's ability to meet its obligations and targets for GHG emissions reduction and the transition to renewable energy, and are expected to cause further delays. Israel has not yet internalized the risks posed by climate change to the economy and financial system. Finally, in the field of climate innovation, Israel is at the bottom of the list of countries reviewed.

The audit report recommends examining the obstacles in the existing organizational and functional structure that affect this issue. These include decentralization of authority among many government entities, segmentation of each layer related to climate change management, and the built-in gap between the responsibility of a public entity for a certain area and its authority to act in this area. These barriers impede the prioritization of the government's public targets as well as resolution of the conflicts between them. The audit also recommends defining climate action as a core target under government responsibility (of all government ministries) and determine that climate change should be managed on a national platform that will enable decision-making based on balancing the conflicting public interests, under uncertain conditions – decisions that have the power to change the economy. This can contribute to improvement of long-term government planning through an integrative viewpoint, lead the State of Israel to a low-carbon economy, and promote the integration of climate considerations in government work. As part of this process, the audit recommends strengthening the necessary knowledge capacities in the scientific, economic, and technological fields. The government must act so that the national infrastructure and resources and public and private funding will support the State of Israel's transition to a low-



carbon economy and the promotion of adaptation actions and ensure that all necessary steps are taken to meet its obligations and targets for GHG emissions reduction.

It should be noted that during the final stages of this audit, the government made several resolutions related to climate change, and set targets and actions for implementation.

In conclusion, Israel's government faces a two-sided challenge. On the one hand, it must address questions of risk management on the national level and construct a path that will lead to a low-carbon economy, green growth, and the transition to green energy. On the other, it must achieve maximum adaptation to the risks that climate change poses to people, infrastructure, and nature. I hope that the findings of this report and its recommendations will contribute to the promotion of the issues relating to climate change and motivate the audited entities to act in this field.

Matanyahu Englman

State Comptroller
and Ombudsman

Jerusalem, October 2021



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Glossary

Adaptation – actions and adaptation for risks related to climate change.

Adaptation plans – National adaptation strategy (NAS) and national action plan (NAP).

Adaptation report – Recommendations intended to support in implementing the targets of Government Resolution No. 4079 and to help Israel to better adapt to climate changes based on the actions of the CCAA and the subcommittees (published in April 2021).

Annual follow-up report – Annual report to the Israeli government of the Steering Committee for GHG Reduction on implementation of the national plan and targets for reducing GHG emissions, as determined in Government Resolution No. 542.

Anthropogenic greenhouse gases – Gases produced by human activity. Most of the anthropogenic greenhouse gas emissions originate in burning fossil fuels for producing energy in activities such as electricity production, transportation, cooking and heating.

BAU scenario – Business-as-usual scenario; the emissions forecast in the BAU scenario relating to GHG emissions expected in the absence of policies or additional government action.

CCAA team – The CCAA; managing team who manages the integration of the national climate change adaptation plan.

Climate Change Adaptation Administration (CCAA) – An entity of the Ministry of Environmental Protection, comprises 35 bodies including representatives of government ministries, civil bodies, and environmental organizations. The role of this team is to manage formulation of the national climate change adaptation plan.

Climate event – extreme weather event, including unusual environmental events (such as haze, sandstorms, air pollution), mostly limited in extent.

Climate Law Memorandum – 5781-2021, published in May 2021 by the Ministry of Environmental Protection. It aims “to lead to prevention and reduction of GHG emissions and climate crisis damage in Israel... by setting targets for reducing emissions and GHGs and preparing national plans”.

Combined cycle power plant – Power plant that relies on storage of PV energy, alternative to peaking power plant.

COVID-19 – Coronavirus disease (COVID-19), an infectious disease caused by the SARS-CoV-2 virus.

Decarbonization – Negating CO2 emissions during economic activity.



Decision makers proposal for transition to a low-carbon economy – Draft of a government resolution on the “Transition to a Low-Carbon Economy” which details Israel’s new national targets of GHG Emissions reduction. The Ministry of Environmental Protection has been promoting this proposal since late 2020. The draft proposal was finally accepted as Government Resolution 171.

Defense establishment – The Ministry of Defense and the Israel Defense Forces.

Dual-use zone – Area designated for the construction of installations for producing renewable energy that is being used for other purposes, such as built-up land, agricultural areas, or parking lots.

ESG – Environmental, Social, and Governance; considerations in the fields of environment, social welfare, and corporate governance that can be evaluated during economic or financial activity, such as through reporting on activity of companies and corporations.

Framework convention – The United Nations Framework Convention on Climate Change (UNFCCC), the UN’s fundamental convention on climate change.

GDP – Gross domestic product.

Government Guide to Risk Management – A guide designed to aid decision-makers in managing public risk (published by the Prime Minister’s Office, 2018).

Government Resolution No. 171 – Israel government resolution dated July 2021 on “The Transition to a Low-Carbon Economy.”

Government Resolution No. 208 – Israel government resolution dated August 2021 on “The Transition to Green Energy and Correction of the Government Resolution.”

Government Resolution No. 465 – Israel government resolution dated October 2020 on “Promoting Renewable Energy in the Electricity Sector.”

Government Resolution No. 474 – Israel government resolution dated June 2009 on “Israel’s Adaptation to Climate Change – Adaptation and Readiness for Climate Change and GHG Emissions Reduction.”

Government Resolution No. 542 – Israel government resolution dated September 2015 on “GHG Emissions Reduction and Improving Efficiency of Energy Consumption in the Economy”, passed following the Paris Agreement, which defined national reduction targets for 2030.

Government Resolution No. 1403; National Plan 2016 – Israel government resolution dated April 2016 on a “National Plan for Implementing the Targets for GHG Emissions Reduction and Improving Energy Efficiency.”



Government Resolution No. 4079 – Israel government resolution dated July 2018 on “Israel’s Preparation for Climate Change Adaptation: Recommendations to the Government for National Strategy and a National Action Plan.”

Greenhouse gases (GHGs) – A group of gases that prevent the radiation reflected from Earth from escaping into the atmosphere contributing to global warming and climate change. Converting them to carbon dioxide (or CO₂) equivalents makes it possible to compare them and to determine their individual and total contributions to global warming.

IMS – Israel Meteorological Service.

IPCC Fifth Assessment Report – The Fifth Assessment Report of the United Nations Intergovernmental Panel on Climate Change (2014).

Low-carbon economy – An integrated economic policy that aims to change patterns of economic activity so that it will have minimal effect on the ecological system and reduce anthropogenic GHG emissions, to prevent the effects of climate change. This policy can reduce GHG emissions to net zero carbon.

Mitigation – Reduction of GHG emissions.

National targets – National targets for GHG reduction determined by countries under the Paris Agreement (see NDCs).

NEMA – National Emergency Management Authority.

New plan for improving energy efficiency 2030 – The new national plan for improving energy efficiency for 2020-2030 (published by the Ministry of Energy in November 2020).

NGFS – Network of Central Banks and Supervisors for Greening the Financial System.

OECD – Organization for Economic Co-operation and Development

OECD climate recommendations report – Comprehensive report on promoting climate action in Israel written by the OECD in 2020 under the title “Accelerating Climate Action in Israel.”

RIA – Regulatory Impact Assessment; OECD methodology, implemented in Israel.

Roadmap for Energy Sector 2050 – Summary document on a study by the Ministry of Energy on updated emissions targets for 2050 (published for public comments in March 2021).

Scientific study and recommendations for a national strategy – A study coordinated by the Chief Scientist at the Ministry of Environmental Protection following Government Resolution No. 474 of 2009, which included a scientific survey of the climate change issue, actions being performed for climate change adaptation, and actions that government



ministries intend to promote. The study's conclusions were presented to the government in 2017.

SDGs – Sustainable Development Goals; the UN's 17 goals for sustainable development, adopted in 2015.

Six main GHGs – General term for carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbon (HFC), perfluorochemicals (PFC), and sulfur hexafluoride (SF₆).

State Comptroller's questionnaire / the questionnaire – questionnaire distributed by the State Comptroller's Office to 63 government ministries, and government and public bodies to obtain information on their activity and the government's activity on climate change.

Steering Committee for GHG Reduction – Steering and follow-up committee on the issue of GHG emissions reduction, established under Government Resolution No. 1403, under the Ministry of Environmental Protection.

Supervisor's Letter 2009 – Letter of the Supervisor of Banks of the Bank of Israel to banking corporations regarding environmental risk (published in 2009).

Transition process to low-carbon economy 2050 (2050 process) – An inter-ministerial and multi-sectorial process that began in 2018 at the initiative of the Ministry of Environmental Protection. It aims to formulate a vision, strategy, and long-term plan to transform Israel's economy into low to neutral emissions by 2050.

UNFCCC – United Nations Framework Convention on Climate Change; UN framework treaty on climate change adopted in 1992, The Convention has near universal membership (197 Parties) and is the parent treaty of the 2015 Paris Agreement.

Vector – An organism that transmits diseases but does not cause them. The vector acts as a host for the pathogen.

WHO – World Health Organization.



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2021



Introduction

National Climate Action by the Government of Israel Summary

Introduction | National Climate Action by the Government of Israel

Summary

Background

The industrial revolution and technological advancement have led humanity to significant achievements, such as rising life expectancy, better quality of life, and improvement in many aspects of human welfare and wellbeing. Yet these achievements have exacted a heavy environmental price, including depletion of natural resources, biodiversity loss, and ecosystems degradation.

The atmosphere, the layer of gases that envelops our planet, is vital for supporting life on Earth. Two main types of gases, some found naturally, are emitted into the atmosphere. The first, polluting gases, such as nitrogen oxide and sulfur dioxide, are poisonous and directly damage health and the environment. In contrast, the second type, greenhouse gases (GHGs, carbon dioxide or CO₂) do not directly influence human health, but they have been known to have severe negative impacts, including an indirect impact on human health. Some of the gases are released from natural sources, like breathing, volcanic eruptions, forest fires, and biomass (mass of organic matter) decomposition, while others are the result of human activity (anthropogenic GHGs). Most of the anthropogenic GHGs originate from burning fossil fuels for generating energy, through activities such as production of electricity, transportation, cooling, and heating.

For hundreds of millions of years, Earth's climate has been determined by the quantity of solar radiation that reaches the planet through the atmosphere (a layer of gases that envelopes the Earth, including GHGs) and by the quantity of radiation that it emits. One of the main causes of climate change is the greenhouse effect. Solar radiation penetrates the layer of gases, and some is absorbed by the planet while some is released into space. Due to human activity that causes increased emission of GHGs, the concentration of GHGs in Earth's atmosphere has grown, thus sealing the atmosphere to radiation that would otherwise be released into space. This trapped radiation is converted into heat energy, warming of the atmosphere and increasing global temperatures. This process creates the physical conditions on Earth that eventually lead to climate change, as we will describe below.



This process, known as the “greenhouse effect,” can also lead to a feedback loop: a chain of mutually interactive processes that intensify the risks involved in climate change at an ever-increasing pace. This feedback loop might produce extreme changes in the world climate that may even surpass the point of no return – known as the “tipping point.” This extreme situation refers to a critical point of rising temperatures that will lead to other physical changes at a much faster rate than scientists predict today. Examples of such changes are accelerated melting of glaciers – including in Greenland; change in ocean functions and their ability to absorb GHGs that are emitted into the atmosphere; acidification of oceans; change in marine currents; reduction of the quantity of solar radiation that is returned from the Earth to the atmosphere due to reduced coverage of the ice layer; and additional fires due to drought.

Climate change has many effects, and these are expressed in four main trends: rising temperatures; reduction in rainfall; rising sea levels; and increase in frequency of extreme weather events, which influence both natural and human systems, and are related to social, economic, and demographic pressures. For example, the forecasted trend for rising sea levels is expected to lead to the flooding of thousands of square kilometers of land populated by hundreds of millions of people, mainly in coastal regions, ocean islands, and river drainage basins. This flooding will likely impact human living areas, lead to the loss of agricultural areas and the salination of underground water reservoirs, which will reduce the sources of available water in the world, thus leading to immigration of inhabitants.

In addition, climate change is likely to harm human health for several reasons. The human body is sensitive to extreme weather conditions such as cold, heat, and storms. In addition, climate change causes the spread of infectious diseases that are carried by animals and sensitive to temperature change, such as malaria and the West Nile virus.

The main actions performed today to combat climate change stem from the need to promote a sustainable global climate policy, based on two related insights. The first is that we must act to reduce emission of GHGs into the atmosphere, to prevent intensification of the greenhouse effect and global warming. The second insight is that even if the level of GHGs in the atmosphere declines or stabilizes, we still anticipate a certain unavoidable increase in global temperatures. This will lead to effects that we will describe in this report, and we must prepare for them in advance.

These insights were expressed in the principles defined at the United Nations Framework Convention on Climate Change (UNFCCC). At this convention, the need arose for basing global action for combating climate change on commitments ratified by some two hundred countries, including Israel, in these fields: reduction of GHG emissions (mitigation); promotion of actions to prepare for and adjust to the effects of climate change (adaptation); and international cooperation in funding, research, and promotion of new technologies.

According to the Intergovernmental Panel on Climate Change (IPCC), countries must cooperate to integrate actions for mitigation and adaptation,¹ based on a policy that integrates the required actions in both fields. International and national entities must effectively promote their activities. Further, humanity must make changes in modern lifestyle and infrastructure. In addition, funding must support research in innovative technologies and investment in them.

Key figures

			2015-2020
6	35%	24%	
Main types of GHGs: carbon dioxide (CO ₂); methane (CH ₄); perfluorocarbons (PFC); sulfur hexafluoride (SF ₆); Nitrogen oxides (NO _x); Hydrofluorocarbons (HFC)	The share of greenhouse gas emissions produced by the electricity sector from burning fuels	The share of greenhouse gas emissions caused by various type of land use	The hottest six years ever documented according to the World Meteorological Organization
127 billion tons	198	315 Mha	23%
Quantity of ice lost annually in Antarctica during 2002-2018	Parties signed on the UNFCCC as of 2021	Area of world forest lost 2001-2015 due to deforestation, fires, urbanization, and agriculture	Percentage of global GHGs that are accumulated and absorbed by water areas across the globe

¹ Mitigation refers to actions that aim to reduce greenhouse gases. Adaptation refers to actions for adapting to climate change.



Audit actions

 From February 2020 to June 2021, the State Comptroller and Ombudsman of Israel (the State Comptroller) examined aspects related to the activities of dozens of government ministries and other government and public entities on the issue of national adaptation to climate change. The audit mapped areas and entities relevant to the climate crisis and examined government actions related to reduction of GHGs emissions and energy efficiency. The audit also studied how the government is preparing to manage the risks related to climate change and their effect on the state, and examined the state's level of preparation for extreme weather events. The State Comptroller also reviewed the economic consequences of climate change and the financial, scientific, and technological tools needed to manage the climate crisis effectively. In addition, it examined how policy tools and government work processes are formulated to address the climate crisis. As part of the audit, a comprehensive comparative review was performed that assessed how this issue was managed in other countries, international organizations, and professional bodies; whether the climate crisis was considered a national strategic issue; and what were the relevant integrated recommendations for Israel based on the current professional knowledge around the world.

The audit was conducted at the following Israel government ministries, offices and entities: Ministry of Environmental Protection, the Israel Meteorological Service, the Ministry of Agriculture and Rural Development, the Ministry of Health, the Ministry of Finance, the Prime Minister's Office, the Israel Innovation Authority, the Planning Administration, and the National Emergency Management Authority. Additional reviews were conducted at the Israel National Security Council, the Ministry of Economy and Industry, the Ministry of Defense and the Israel Defense Forces, the Securities Authority, Bank of Israel, Ministry of Foreign Affairs, Israel Land Authority, the Electricity Authority and Israel Electric Company, Ministry of Public Security, as well as other government entities, supporting bodies, local authorities, and non-government entities.

As part of this audit, the State Comptroller held round-table discussions with various companies and entities from Israeli industry. It distributed a questionnaire to 63 government ministries and other government and public entities to obtain information about their activities and the government's activities related to the climate crisis, and about their understanding of the required actions to address the issue on the national and sectorial levels (Questionnaire). In addition, the State Comptroller further clarified additional issues with entities in Israel and abroad, reviewing global processes and trends involved in the climate crisis.

This audit report includes four main sections on the following topics:

Chapter 1 | Mitigation – Actions to Reduce GHG Emissions

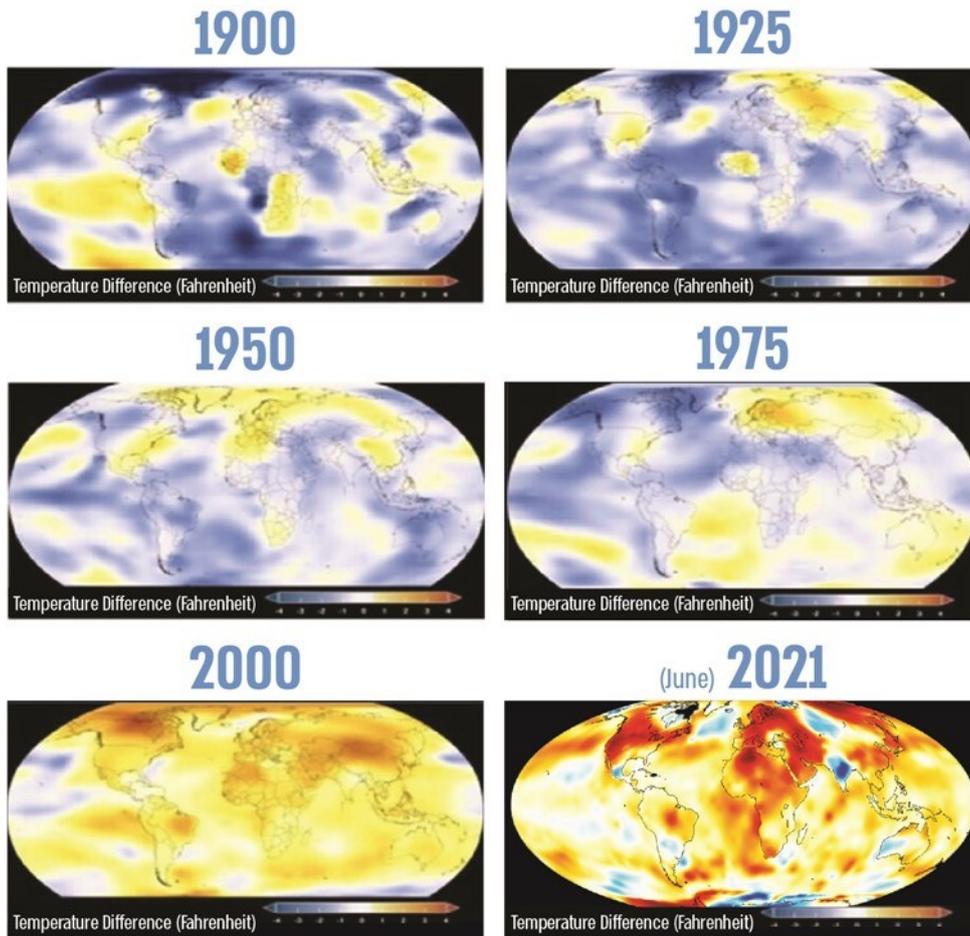
Chapter 2 | Adaptation – National Plan and Measures

**Chapter 3 | Review of Economic and Financial Risks of Climate Change and their
Management by the State of Israel**

**Chapter 4 | Climate Change Governance - Organizational, Functional and
Professional Structures**



Map of Global Warming, 1900-2021



Based on NASA data, adapted by the State Comptroller.



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2021



Chapter 1

Mitigation – Actions to Reduce GHG Emissions

Summary

Chapter 1 | Mitigation – Actions to Reduce GHG Emissions

Summary

Background

The quantity of GHGs emitted into the atmosphere by all countries determines their concentration in the air. A higher concentration means a sharper rise in the temperature on Earth, and this in turn leads to escalation of global climate change phenomena. Since the Industrial Revolution, when people began to use coal and petroleum in industry and transportation and for production of electricity, GHGs have been emitted into the atmosphere in ever-increasing quantities. In recent decades, these quantities have grown at a particularly intensive rate. The main leap in global greenhouse gas emissions took place in the past seventy years, and the level continues to rise today. Current growth of the emissions rate is estimated to be thousands of times greater than during the period preceding the Industrial Revolution, and scientists estimate that the level has yet to reach its peak. The significance of this is a sharp rise in the concentration of GHGs in the air.

In the past few decades, the international community has recognized that global warming caused by greenhouse gas emissions from human activities is one of the severest problems that it must manage. To do so, it must use two main tools: (a) Production of clean energy, meaning energy that is free of greenhouse gas emissions and not from fossil fuels; (b) Energy efficiency, reduction of energy use through more efficient consumption.

While the effect of air-polluting emissions is mostly limited to the geographical area of their sources, the effect of greenhouse gas emissions is not local: each country is impacted by the quantity of emissions produced by other countries. Therefore, to reduce the global quantity of emissions, the international community must work in close cooperation.

The accumulation of scientific evidence on the topic of climate change and the understanding that effective global cooperation is needed to reduce global greenhouse gas emissions urged the international community to formulate in 1992 the United Nations Framework Convention on Climate Change (UNFCCC), which Israel has ratified.



Key figures

2°C

The goal for limiting global warming as defined in the Paris Agreement, with preference for 1.5°C

2050

Target date for carbon neutrality under the Paris Agreement, with ambitious intermediate targets set for 2030

10th out of 29

Israel's place on the list of reviewed OECD nations of emissions per capita in 2016. In 2019, Israel emitted 8.8 CO_{2eq} tonnes per capita

103%

Anticipated increase (absolute) in the quantity of emissions in Israel in 2030 as compared to 1990, under 2015 targets. This compares to an average reduction of 32% in emissions by other OECD countries reviewed

2% of GDP

Israel's investment in infrastructure in 2016, compared to the average rate of OECD nations, which is 3.4%-3.5% of GDP (75% more than in Israel)

+0.9%

Increase in global demand for renewable energy in 2020. Demand for coal decreased by 6.7%, for natural gas by 3.3%, and for petroleum by 8.5% according to IEA

30%

Israel's 2030 goal for renewable energy, compared to targets of 55%-100% in OECD nations surveyed. As of 2020, Israel's renewable energy use stands at 6.1%

NIS 49.2 billion

Estimate of cost to the energy sector to reduce greenhouse gas emissions for 2050, as indicated by the Ministry of Energy model for the scenario based on renewable energy. This estimate is also the most economical of all the models

Key findings

Per capita emissions in Israel are high compared to other countries:

The per capita emissions trend mainly exhibits a downward trend (inconsistent decline from 10.7 tonnes CO_{2eq} per capita in 2000 to 8.8 tonnes CO_{2eq} per capita in 2018). But in comparison to the 29 OECD nations reviewed, Israel was ranked tenth (in the upper third) on the list of countries with the highest per capita emissions rate in 2016. Israel's relatively high emissions rate per km² (3.6 tonnes per km² in 2018) combined with its population figure of 9.3 million means that Israel emits GHGs at a magnitude similar to that of a medium-size state.

Israel's Actions for Reducing Greenhouse Gas Emissions before 2020

 **Mitigation (actions for reducing greenhouse gas emissions) - 1996-2009:** Israel joined the UNFCCC treaty and ratified it in 1996, and it took 13 years for operative decisions to be made regarding formulation of policy for reduction of greenhouse gas emissions. Even then, the actions required for implementation of the recommendations and for achieving targets in the field of reduction of greenhouse gas emissions were not taken – even though the cost-benefit analyses performed showed that implementing means for reducing greenhouse gas emissions is clearly beneficial.

Setting targets for reduction of greenhouse gas emissions

1. In April 2016, over twenty years after Israel joined the UNFCCC treaty, its government adopted a national plan that set goals for reducing greenhouse gas emissions (general and sectorial). These goals were lower than the conservative recommendation issued by the interoffice steering committee (instead of the recommended 7.2 tonnes CO_{2eq} per capita, the target defined was for 7.7 tonnes CO_{2eq} per capita).
2. Israel set a target for reducing greenhouse gas emissions per capita only, even though developed nations are expected to set absolute and ambitious targets. Setting per capita targets enables Israel to increase the absolute quantity of emissions as long as its population continues to grow, and this is in opposition to the declining trend in most other OECD nations.



3. Israel set a target for reduction of greenhouse gas emissions that was expected to lead to an increase of 103% in emissions as compared to 1990 and 12% as compared to 2005, while the targets of the other nations surveyed (Switzerland, the European Union, Canada, United States, Mexico, and South Korea) were expected to lead to an average decrease of 32% and 33%, respectively.

Therefore, Israel is not taking the lead in setting targets for reduction of greenhouse gas emissions, as required under the Paris Agreement.

 **Fulfilling the reduction potential as compared to the goal of 7.7 Tonnes of CO₂ equivalent per capita:**

Comprehensive cost-benefit analyses performed over time have shown that there is significant economic benefit to adopting the many measures for reducing greenhouse gas emissions that were studied (sometimes up to 80%). In practice, fewer such measures were adopted. Therefore, even if all reduction measures in the national plan for reducing GHG emissions are de facto implemented, achieving the set target is likely to lead only to partial fulfilment (efficiency of NIS 50 billion instead of NIS 217 billion, less than one-fourth) of the environmental and economic potential inherent in implementing these measures. In addition, Government Resolution No. 542 (from 2015) regarding Israel's targets for reducing emissions, and the subsequent National Plan for Reduction of Greenhouse Gas Emissions (2016), do not indicate internalization of the economic costs of GHG emissions, whether through a carbon tax or other means.

 **Per capita emissions and absolute quantity of emissions:**

From 2015-2020, Israel's absolute emissions increased. For example, in 2018 this measure grew by 2.3 million tonnes CO_{2eq} and in 2019, by 0.3 million tonnes CO_{2eq}, as compared to the quantity of emissions in 2015. As for per capita data, the value of 8.5 tonnes of greenhouse gas emissions per capita as of 2020 reflects a decline compared to 2015, and meeting the target set for 2025, thanks to the trend of reduction in coal use in electricity production that began in 2012. However, the report of the Inter-Ministerial Steering Committee for Monitoring, Reporting, and Verification (MRV) on reduction of GHG emissions headed by the Ministry of Environmental Protection, noted for 2020 that the COVID-19 pandemic led to a significant reduction in economic activity, and that "the COVID-19 crisis contributed to the relatively low level of emissions for 2020." According to the report, this resulted from a decrease in the consumption of fuel for transportation (10% reduction in consumption compared to 2019), reduction in the use of electricity (1.4% reduction in consumption compared to 2019), and reduction in overall consumption.

 **Evaluation of the progress in achieving sectorial targets:** Progress in achieving goals for all sectors ranged on the scale from delay in achieving target to zero.

Various directives in Government Resolution No. 542 of 2015 and Government Resolution No. 1403 of 2016 (in fields such as: economic instruments in addition to the recommendations of the Green Taxation Committee; mechanisms for encouraging energy efficiency in government offices; encouraging public transportation; barriers to constructing renewable energy facilities; and use of electricity bills as clearinghouses), which included both budgetary and regulatory aspects – were not implemented since these decisions were made. Therefore, the Israeli government's sectorial targets for reducing greenhouse gas emissions were not achieved. Following are details:

1. **Target for reducing private mileage by 20%:** Private mileage increased from 42 billion km in 2015 to 50 billion km in 2019. According to the Ministry of Environmental Protection's annual follow-up report of May 2021, "the government is not anticipated to meet the target for the transportation sector for reducing private mileage". In addition, the Ministry of Transportation did not prepare a designated plan for reducing private mileage as required under the 2016 Government Resolution on this issue.
2. **Target for increase of 20% in energy efficiency:** Israel did not meet the targets that it set for itself in Government Resolution 4095 (2008) for 2020, and in practice, energy efficiency stood at 62% less than the target. In addition, out of NIS 800 million budgeted under the Government Resolution 542 for reducing GHG emissions through efficiency, at least NIS 500 million were not utilized.
3. **Target for generating electricity from renewable energy sources:** Israel did not meet the goal of 10% that it set for itself for 2020 (in practice, 35%-40% less than the target set). Progress toward achieving the target of 17% renewable energy for 2030 is slow, (especially compared to the current target of 30%) and as of the end of 2020, reached only 6.1%.

 **Investment in infrastructure:** According to the OECD, from around 1997, Israel's investment in infrastructure was lower than the average investment in OECD nations. As of 2016, investment in infrastructure in Israel is estimated at some 2% of gross domestic product, while the OECD average is 3.4%-3.5% of GDP (75% more than in Israel).



Setting Israel's Targets for Reducing Sectorial Greenhouse Gas Emissions

- Formulating Israel's strategy for transitioning to a low-carbon economy by 2050:** In the process of "Transitioning to a Low-Carbon Economy by 2050" (Transitioning 2050) led by the Ministry of Environmental Protection, delays have occurred in setting targets, mainly in the field of energy, due to lack of agreement on targets between the Ministry of Energy and the Ministry of Environmental Protection. As a result, the step of integrating all economic sectors in the process has been delayed. As of June 2021, Israel had yet to present a plan for reducing GHG emissions, as expected under the Paris Agreement.
- Characteristics of climate issue governance:** Multiple legislative and administrative authorities, conflicts between targets of government ministries, and structural gaps between responsibility and authority create built-in difficulties in promoting reduction of GHG emissions. In cases of conflict or potential conflict between the main goals of government ministries and the target for reducing greenhouse gas emissions, the ministries prioritize the promotion of the goals central to their ministerial responsibility over emissions reduction (except for the Ministry of Environmental Protection). Over time, this results in insufficient prioritization of climate change and emissions reduction targets in favor of other goals and ministerial priorities – when formulating targets, budgeting them, and also on the way to achieving them.

The Energy Sector

- The new goal for renewable energy for 2030 compared to OECD countries and others:** The countries that were reviewed, including OECD countries, set their targets for renewable energy for 2030 at 40% to 100%, while Israel presents its new target as 30% - the lowest of the reviewed OECD countries, which under the Paris Agreement, are supposed to present targets at absolute, ambitious values and lead the global process of decarbonization. Setting targets that will increase the investment in fossil fuel energy infrastructures by 2030 might endanger the process of transition to a low carbon economy by 2050.
- Participation in Government Resolution No. 465 for target of 30% renewable energy by 2030:** The decision on issues such as the area of land available for photovoltaic (PV) installations (open and dual), technological maturity for storing electricity in PV installations, and cost-benefit analyses on the basis of which the Minister of Energy's decision was made (listed as Government Resolution No. 465 [2020], which states that "the government has recorded the decision of the Minister of Energy on the policy principles affirming that by 2030, 30% of electricity production will be from

renewable energy”) were conducted by the Ministry of Energy and the Electricity Authority, with no preliminary participation of government ministries and additional relevant entities (such as the Israel Land Authority, Ministry of the Interior Planning Administration, Ministry of Construction and Housing, and the Ministry of Environmental Protection) in the decision-making. In addition, the Electricity Authority’s assessment was limited to the feasibility of a 30% rate of renewable energy, it did not examine the full potential for reducing GHG emissions for 2030, and it did not include the impact of technological advancements anticipated in the coming years.

-  **Setting energy sector targets for 2050:** In Government Resolution No. 171, the State of Israel set a target for GHG emissions reduction from the energy sector that reflects a policy of transitioning to a low-carbon economy, and not to a carbon neutral economy, as many OECD countries plan to do. The Ministry of Energy did not set a target for renewable energy for 2050, due to the barriers it listed and uncertainty in setting long-term targets. The Ministry set a target for reducing emissions from the energy sector, but in the roadmap it published in 2021 for public comments and in its policy papers, it did not describe how it intended to reach this target without setting ambitious goals for renewable energy, and in the absence of mature alternative technologies or other technologies now in use (such as CCS technologies for carbon capture, nuclear energy, hydrogen energy, and future technologies). The Ministry also did not outline how it intends to act to promote the use of these alternative technologies or to remove the barriers it described in its policy documents.
-  The scenarios presented by the Ministry of Energy demonstrate that it believes that full implementation of the target for emissions reduction of 85% can be achieved through the production of 54% to 90% of the electricity from renewable energy – a broad range that grants it flexibility. The ministry did not suggest this range of renewable energy as a sub-target under the overall target for emissions reduction. Maintaining the mix at 70% natural gas energy after 2030 without setting renewable energy targets for 2050 lays a foundation for planning, development, and investment in further development of the gas sector in Israel, and might negatively affect the future transition to a low-carbon economy.
-  **Estimated cost of transition to low-carbon economy:** The cost estimate performed indicated that in 2030, 2040, and 2050, the scenario emphasizing non-solar technologies (such as carbon capture) is the most expensive. The scenario emphasizing solar energy in 2050 – the relevant target date for the transition strategy to a low-carbon economy – has the lowest costs of all the scenarios. This scenario is estimated at NIS 49.2 billion, as compared to the scenario emphasizing non-solar technologies, estimated at NIS 56.9 billion. The Ministry of Energy did not reassess the scenarios, although the data indicates that the technology-based scenario is less economically feasible, and that it should focus on the solar scenario, which has a broad range of flexibility (up to 90% renewable energy) and assess the methods of implementing it. In addition, these



estimates for implementing the various scenarios were not presented in the roadmap for the energy sector for 2050, which was published for public comments in April 2021.

📌 Policy for GHG emissions reduction compared to fossil fuel production:

For over a decade, the government has declared a policy of reducing GHG emissions and air pollution. Promotion of fossil fuel production does not align with this policy. The government does promote the struggle against climate change and in favor of clean air, but it is also promoting a policy of maximizing the exploitation potential of resources¹. This policy should be adapted to the national effort to reduce GHG emissions.

The Transportation Sector

📌 Electric vehicles: As of 2020, electric vehicles in Israel accounted for 0.05% of all vehicles, and measures to increase this share are in the early stages. Following the global COVID-19 pandemic, the Ministry of Energy decided to postpone the target set in 2019 – to prohibit import of vehicles with fuel-burning engines starting from 2030 – by another five years (until 2035), although it did not demonstrate that other countries have acted similarly.

📌 Plan to reduce GHG emissions in the transportation sector: Significant sections of the plan to reduce GHG emissions in the transportation sector promoted by the Ministries of Transportation, Environmental Protection, and Energy remain at the level of recommendations or proposals for actions and policy tools. The Ministry of Transportation has not yet formulated a detailed plan for reducing GHG emissions from this sector that integrates with this ministry's other strategic plans. In addition, the link between the proposed measures and to what extent their adoption will contribute to reduction of GHG emissions, was not established. Examples of recommendations (not yet adopted or budgeted) are: increasing the investment in public transportation infrastructure, especially in mass transportation systems; a policy package adapted for parking management; pricing of road travel per type of vehicle; closing roads to traffic and creating infrastructure to encourage bicycle riding and walking; a national plan to encourage distance work, learning, and shopping.

📌 Barriers: The ministries listed various barriers which impede the implementation of the said measures, and their removal requires involvement of many ministries and supporting units (including the Israel Land Authority, the Planning Administration, the Ministry of the Interior, and local authorities). Examples of such barriers are: the charging infrastructure for electric cars is inefficient; legal issues complicating the installation of

¹ Israel has a plan for extracting fuel from the gas fields that it is developing through energy companies; a plan for development and construction of infrastructure and power stations of thousands of megawatts; and a plan for mining, production, and refinement of various fossil fuels, including energy-producing oil shales, petroleum, and gas.

charging points in apartment buildings; local authorities lack knowledge about charging; absence of a plan to encourage use of public transportation.

The Buildings and Cities Sector

 **Israel's targets for net zero energy buildings:** Most of the countries surveyed determined that residential buildings will be required to meet net zero building standards by 2020. In Israel, this requirement is expected to apply as of 2025, and in a partial manner only. For example, structures higher than five stories, expected to represent 80% of residential buildings, and industrial structures are not included in the requirement for net zero buildings. The plan does not include new targets for 2050, except for commercial buildings. In addition, no plan has been established for the implementation of these targets for net zero building and reduction of GHG emissions in the construction sector, nor for the mechanism that will work to achieve them.

 **Energy efficiency in existing buildings:** No targets have been set to require energy efficiency in existing buildings, which in 2050 (according to the Ministry of Energy) are expected to represent 50% of all structures.

The Waste Sector

 The Ministry of Environmental Protection has not set targets for reducing GHG emissions from the waste sector as part of Government Resolution No. 542 (following the Paris Agreement), although according to its own strategy document on the issue, deficiencies were found in reduction of waste quantities and the manner of waste treatment.



Reducing per capita emissions: Per capita emissions are mostly exhibiting a downward trend (inconsistent decline from 10.7 tonnes CO_{2eq} per capita in 2000 to 8.8 tonnes CO_{2eq} per capita in 2018). The 2020 level reflects a decline compared to the 2015 level, and meets the target set for 2025.

Reducing production of electricity from coal: In 2012, Israel's energy sector began to transition from coal-based electricity production to gas-based production (as the primary source), reducing coal-based production. From 2012-2018, use of coal for electricity production declined by 29%, while from 2018-2020, this value declined by an additional 4%. This led to a decline in emission of pollutants into the air and a certain decline in carbon emissions. This decrease is the main factor in the per capita decrease of CO₂ emissions. Continued implementation of this policy will lead to an estimated decrease of 9 million tonnes of GHGs by 2025 and 17 million tonnes of GHGs by 2030.



Initiating a process of "Transitioning to a Low-Carbon Economy by 2050": The Ministry of Environmental Protection has initiated a process of Transitioning 2050 - an inter-ministerial and inter-sectorial process to formulate a vision, strategy, and long-term plan to transform Israel's economy to low emission or net zero emission by 2050. This process requires the cooperation of major government offices such as the Ministry of Energy, Planning Administration, Ministry of Transportation, and the support of non-governmental organizations and entities.

Preparing a sectorial plan for reducing GHG emissions: The Ministry of Energy has prepared a roadmap plan for reducing GHG emissions in the energy sector, which it published for public comments in 2021.

Key recommendations

-  The audit recommends that the Ministry of Environmental Protection examine Israel's GHG emissions targets as compared to other developed and OECD countries, and formulate absolute targets alongside its per capita reduction targets. It is recommended examining Israel's targets on this issue as compared to 2005 and 2020 data and business as usual (BAU) values, in preparation for 2030. By doing so, Israel will be able to reap the full economic benefits that result, as well as position itself as a leader in the field, as required under the Paris Agreement.
-  The audit recommends closing the gaps in national infrastructures by improving existing infrastructures and constructing new ones necessary for Israel's capability to reduce GHG emissions. It is further recommended that the Ministry of Finance lead an assessment of the said gaps, presented in the report, and that together with the relevant government ministries, it should integrate targets for development and promotion of infrastructure, emphasizing infrastructure that will accelerate the reduction of GHG emissions and support the transition to a low carbon economy.
-  The audit recommends that in examining the recommendations of the report of the gas policy team, and reaching a final decision on the issue, the government should do so in consideration of Government Resolution No. 171 regarding the transition to a low carbon economy, while accounting for the effects of these recommendations on Israel's ability to achieve its target for low-carbon economy by 2050.

The audit recommends that the government should recognize reduction of GHG emissions as a national target, and translate this recognition into prioritization of operative tools that will promote its achievement. This includes prioritization of targets such as expanding dual-use PV installations, promoting mass transportation systems and electric car charging stations in the public space. This should be done through broad measures to facilitate achievement – such as easing the planning and construction

regulations for these structures, allocation of dual-use zones and land for them, and granting tax relief or other economic incentives.

Energy

-  The audit recommends that the Ministries of Energy and Environmental Protection formulate an agreed policy regarding fossil resources, in accordance with the national effort to reduce GHG emissions and air pollutants. This policy should be based on economic analysis that includes all costs and benefits (including externalities) of the various alternatives and on environmental and climate analysis. If necessary, this policy should be submitted to the government for discussion.
-  It is important to establish a collaborative framework for the process of formulating renewable energy targets for 2030 and 2050, particularly the assessment that forms the basis for determining these targets. The audit recommends that this process should be implemented with of all ministries responsible for the relevant fields, including the Ministry of Energy, the Electricity Authority, the Ministry of Environmental Protection, the Planning Administration, the Israel Land Authority, the Ministry of Agriculture, the Tax Authority, and the Ministry of Finance. The decision regarding targets is based on estimates and assessments under the fields of responsibility of all these entities, and therefore it is vital to work toward inter-ministerial agreement on issues, including: potential of the dual-use zones and available lands, location of the available areas, identification of barriers to expanding this potential and measures for addressing them, economic incentives, and level of technological maturity.
-  The audit recommends that in addition to the discussion on removing the barriers to the increase of renewable energy, a discussion should be held with all relevant parties, including the Ministry of Energy, the Ministry of Environmental Protection, the Planning Administration, the Israel Land Authority, the Ministry of Finance, and central government entities, regarding the maximum possible increase of the target for renewable energy for 2030. Setting targets that will increase investment in fossil energy infrastructures may endanger the transition process to low-carbon economy by 2050.
-  The audit recommends that the Ministry of Energy should set targets for the energy sector for 2050, including in the field of renewable energy, as other countries reviewed have done. To enable some flexibility and adjustment to various technological and economic developments, the ministry can set a range for the renewable energy target for 2050. Alternatively, the ministry may determine the renewable energy target necessary for meeting the set level of GHG emissions reduction, while noting in its policy documents that achieving the targets depends on solutions for technological challenges and removal of barriers. The policy documents should also note that changes may be made in the mix of solutions implemented, in accordance with the technological



developments, and that achieving the targets depends on the measures taken for addressing these barriers.



The lack of diversity in non-solar renewable energy alternatives in Israel, and its limited land resources make it difficult for the Ministry of Energy to choose the “solar scenario”. This requires the government to formulate an action plan on this issue and identify solutions for these limitations, including through development and promotion of means and measures that the various government ministries suggested but have not yet promoted adequately. These include: prioritizing PV installations in dual-use zones; implementing the directives of Government Resolution No. 208 for the removal of barriers to PV installations; maximizing energy production from additional net zero emission sources; maximizing the possibility of connecting Israel’s electricity system to neighboring countries and to the European electricity network; and promoting innovation and technological advancements.



The ability to set ambitious targets for 2030 will influence Israel’s ability to conduct the transition to a net zero carbon economy, or at least to a low carbon economy, by 2050. Therefore, the audit recommends that the Ministry of Energy aims to maximize the potential for emissions reduction in the upcoming decade, until 2030. Setting a low target for 2030 and building infrastructure for production of electricity from gas might influence the economic feasibility of transition to a low-carbon economy by 2050. Due to the long-term broad effects and the need to promote the issue as a national goal, the political level should be involved in formulating the government agreements on the targets. The audit further recommends examining how the target of 30% renewable energy by 2030 will enable Israel to complete the transition to a low-carbon economy by 2050, considering the targets of the other OECD countries, and based on this examination, considering the need to update Israel’s target.



The audit recommends that the Ministry of Energy complete the government approval process of the new plan for energy efficiency for 2030, taking into account the targets that other countries have adopted for this issue. Accordingly, each of the relevant entities (including the Ministries of Energy, Environmental Protection, Finance, and Construction and Housing; the Electricity Authority, the Planning Administration, the Israel Land Authority, and the Tax Authority) should act to achieve the plan’s goals in all sectors, and the government ministers responsible for these entities should report to the government regarding their actions on the issue, as required by law.

Transportation

-  The audit recommends that the Ministry of Transport, in cooperation with the Ministry of Energy and the Ministry of Environmental Protection if necessary, formulate a plan with measurable targets and deadlines for the transition to electric vehicles in Israel.
-  The transportation sector is facing changes that will reshape it. Development of a sustainable transportation system that is efficient, rapid, and frequent is vital in the State of Israel, which has limited land resources and a rapid rate of population growth. Such a profound change requires reevaluation of the way Israel plans its spaces and lands, regulates the transportation field, incentivizes, and removes barriers – to enable the required changes in this sector for reducing GHG emissions and pollutants. To fulfill this vision, it should be supported by a strategic government plan that includes detailed targets, schedules, managing barriers, division of roles and responsibilities across the government, budgets, and indicators and compliance measures for the implementation of the plan. All involved entities, including the Ministry of Transport, the Ministry of Energy, the Ministry of Environmental Protection, the Planning Administration, the Israel Land Authority, the Ministry of Finance, the Tax Authority, and the other relevant entities, should cooperate to complete the formulation of such a plan, and act to implement it.
-  The audit recommends that the relevant government entities, including the Ministries of Transportation, Environmental Protection, and Energy, formulate a detailed multi-year work plan that is validated and budgeted. This plan will outline the path to achieving the goal of reducing GHG emissions in the transportation sector, to maximize the significant economic, environmental, and health benefits of achieving these targets.

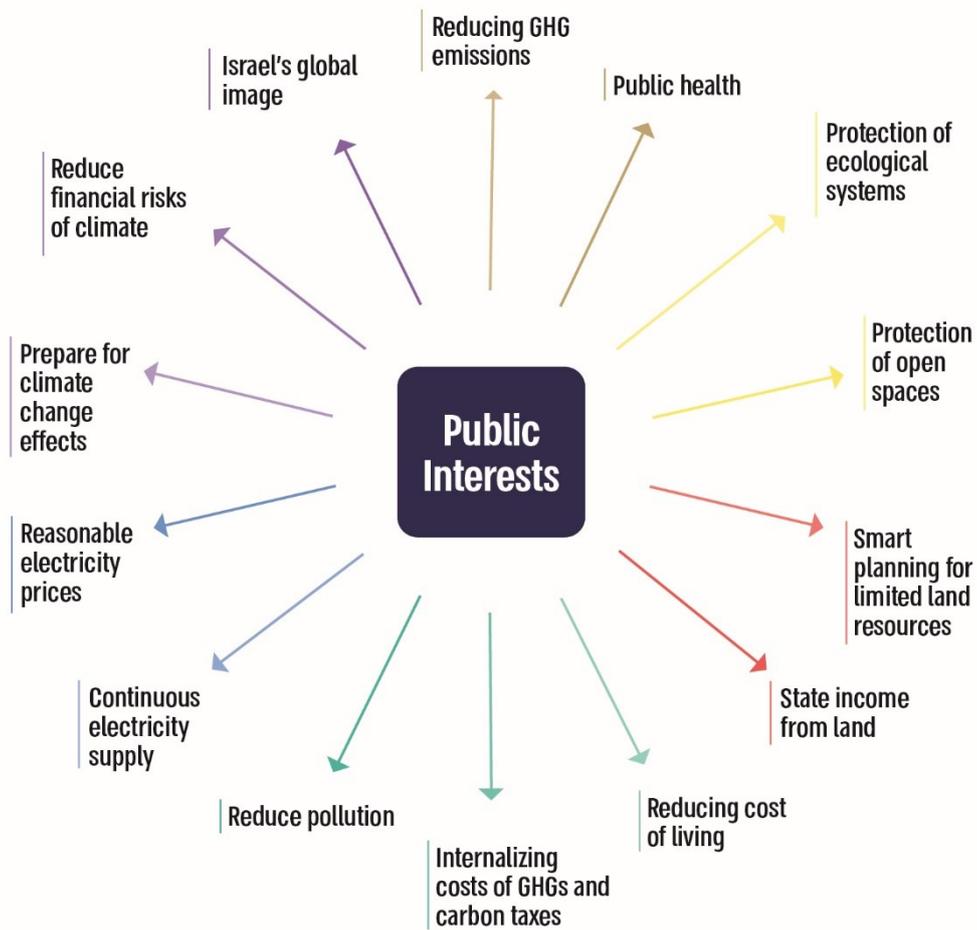
Buildings and Cities

-  The audit recommends that the planning administration (with the assistance of the relevant ministries, including the Ministries of Energy, Environmental Protection, and Finance) complete the update of the targets for 2050 and formulate a detailed plan for achieving them – to maximize the full potential for reducing GHG emissions and for economic savings in this sector by 2050. Further, this plan should include a mechanism for updating the targets, in accordance with future technological advancements.
-  The relevant entities, including the Ministries of Energy, Environmental Protection, Finance, Construction and Housing, the Electricity Authority, the Planning Administration, the Israel Land Authority, and the Tax Authority, should act to promote targets for energy efficiency and net zero energy in buildings and cities, by determining a mix of appropriate incentives, establishing appropriate standards, and formulating appropriate regulation backed by enforcement. This should be done in consideration of the recommendations

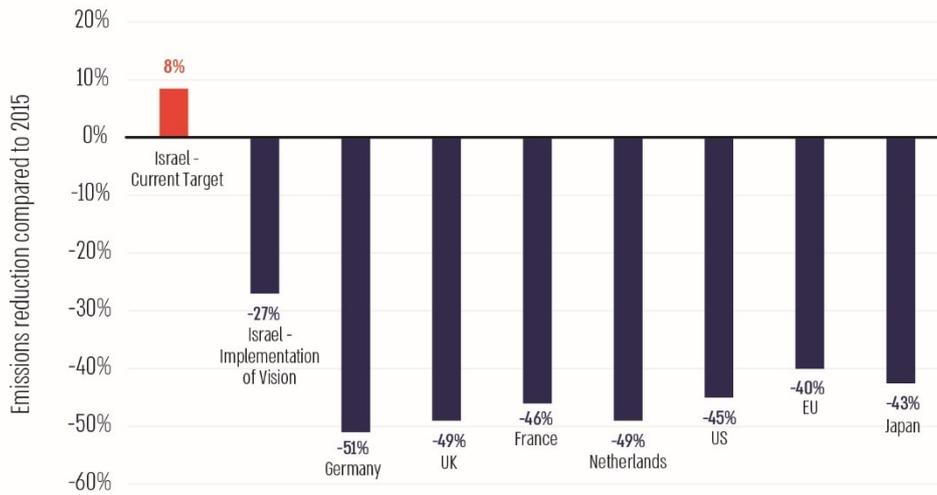


of the report on the potential for emissions reduction in buildings (2017) and the new plan for Energy Efficiency 2030. These entities should also act to implement this.

Other Public Interests Promoted by Government Ministries (competing with GHG emissions reduction)



National Targets for GHG Emissions Reduction by 2030 in Selected Countries, Compared to 2015



Source: Ministry of Environmental Protection, from UNFCCC GHG emissions database; UNFCCC 2020, INDCs, compiled by the State Comptroller.

- * The US value is the anticipated reduction based on the announcement made by President Biden in April 2021.
- ** Israel's 2015 target of 7.7 tonnes CO₂eq emissions per capita.
- *** The vision target of Israel (as determined in Government Resolution 171) is based on increasing renewable energy to 40% of total energy use by 2030.

Conclusion

Thirteen years have passed since Israel joined the UNFCCC and began operative actions to reduce GHG emissions. However, as of 2021, although per capita emissions have declined, absolute GHG emissions in Israel increased. As for the sectorial targets set in 2015, progress toward them ranges between “delay in achieving target” to “zero.” Regarding setting new reduction targets, the audit found that existing barriers make it difficult for government ministries to formulate a strategic plan for transition to a low-carbon economy.

The effects of the transition to a net zero or low-carbon economy are long-ranging for the sectors of electricity, transportation, construction and urban development, and the Israeli



economy. This transition, if implemented, will have a broad effect on the need for investment in and development of the electricity network in Israel in the coming decades; on planning for state land reserves; planning for urban spaces; budget expenditures for funding the transition to a low-carbon economy; and other areas. These actions will require a series of ongoing, interrelated reforms – over at least thirty years – and thus they require careful planning. To make the transition to a low-carbon economy, many government entities must join forces to: allocate resources that will support the process and develop the electricity network; include new technologies to support changing the profile of electricity production; remove barriers (planning, regulatory, technological, and other) and promote supporting regulation; internalize changes in the operation of the electricity sector; and manage a new set of risks that does not exist for the economy as it operates today.

The audit recommends that the government make the effort to determine these issues and lead Israel toward a low-carbon or even a net zero carbon economy.



THE STATE COMPTROLLER
AND OMBUDSMAN OF ISRAEL

2021



Chapter 2

Adaptation – National Plan and Measures Summary

Chapter 2 | **Adaptation – National Plan and Measures**

summary

Background

The conventional professional position by most climate scientists and international entities is that the world is undergoing changes in climate patterns and new climate conditions, with significant consequences for countries worldwide. These changes lead to lengthening of extreme weather events and exceptional environmental events (climate events) and increase in their frequency and magnitude, as well as other exceptional events that can be unpredictable. Increase and intensification of climate events and continued change in climate patterns can cause considerable negative impacts to Israel's economy and represent a risk to Israel's national security. Some of the areas that may be affected are: natural water sources; national food security; nature areas, ecological systems, and biodiversity loss; public health; electricity production; technological systems; national security and geostrategic threats. Other fields affected are work productivity, at-risk populations and increase of "energy poverty," risks in the insurance market, and risks to national infrastructure.

As a result, the need has arisen in Israel to implement actions on the national and strategic level to promote effective adaptation to climate change, as part of Government Resolution No. 474 (2009); the document "Recommendations for Strategy and a National Action Plan" (2017) (Scientific Study and Recommendations for National Strategy); Government Resolution No. 4079 (2018); and the Adaptation Report written in Israel in 2021 by the Climate Change Adaptation Administration of the Ministry of Environmental Protection (below, the CCAA). These reports emphasized the need to promote preventive measures and early action, based on a national strategic action plan, through coordination between multiple public entities and long-term budgeting. The purpose of these actions is to promote ongoing adaptation actions and research, some of which will extend over a period of years.



Key figures

~+1.2°C	2.1 billion	+37%	2-4 \$ billion/year
Rise in global temperature since 1985	Number of people harmed by global climate events between 2000-2019, including 1.2 million deaths	Rise in global deaths 1991-2018 due to global warming	Global annual economic damage due to the direct and indirect effects of climate change until 2030
84%	16%	92%	2 of 50
Percentage of the 63 public entities that received the State Comptroller's questionnaire (Questionnaire) that do not have a plan for adaptation to climate risks	Implementation rate for actions that were reported as budgeted and scheduled for implementation, out of the 378 actions listed in Government Resolution No. 4079 and involving the public entities listed there	Percentage of the public entities that responded to the Questionnaire and reported that they do not act based on prioritization and analysis of climate trends of the CCAA	Out of 50 projects that the CCAA recommended that the government promote for national adaptation, only 2 are under discussion with the Ministry of Finance for budgeting purposes

Key findings



1. National Adaptation to Climate Change

- A. Preparedness for the effects of climate change:** Three years after Government Resolution No. 4079, Israel does not have a budgeted, implementable national action plan that it follows, reflecting failure to achieve the overall goal of this Government Resolution: "Israel will demonstrate a high level of preparedness for the effects of a changing climate".

- B. Advance preparation:** According to Government Resolution No. 4079, advance preparation and promotion of long-term actions for prevention of risks is necessary in fields likely to be affected by climate changes, including health, agriculture and food, water and energy, infrastructure, planning and local authorities, readiness for emergencies, national security, and biodiversity. Yet 82% of public entities that responded to the Questionnaire, reported that they did not assess these issues as part of an organizational risk management process, and 77% did not map risks or influences of climate change on their actions.

2. Government Capacity Building for Adaptation

A. Establishing an administrative body with authorities, resources, and knowledge acquisition capacity

- (1) **Execution authorities / Execution powers for the CCAA:** The CCAA was granted a central role in the formulation, coordination, integration, and execution of the national policy for climate change adaptation. However, it was not given the necessary authorities to perform its roles. Thus the State of Israel's ability to plan, implement, and manage this issue has been impaired.
- (2) **Budgeting of the CCAA and the actions it leads:** The CCAA has not been allocated the resources necessary for promoting the actions for which it and its subcommittees are responsible, as the Civil Service Commission has not authorized an organizational framework or designated job positions for it. Due to the lack of budget, many activities have not been promoted, including research activities for effective adaptation; developing a methodology for risk management; and economic assessments of the damage to the economy, prevention costs, and direct and indirect benefits of actions required for national adaptation. The Climate Change Adaptation Report that the CCAA submitted to the Knesset for approval in 2021 includes recommendations for budgeting some 50 projects immediately. However, the CCAA has not been granted the required authorities to carry out its roles or a designated long-term budget to enable the implementation of adaptation actions.
- (3) **National Knowledge Center:** The CCAA lacks most of the entities that were recommended by the Scientific Study and Recommendations for National Strategy (that was adopted by the Government) and that are accepted globally: an umbrella scientific advisory committee, a knowledge and data center, and a risk assessment expert. These would be able to assist the CCAA to serve as a national knowledge entity that will act to produce the knowledge necessary for promoting national adaptation actions on the issue of climate change.



B. Budgeting and Implementation of Adaptation Plans in Israel

- (1) **Budgeting the national plan:** Despite Government Resolution No. 4079, which states that each entity is required to act to promote the climate risk adaptation plan, 84% of the public entities that received the Questionnaire do not have a climate risk adaptation plan, nor have they budgeted the necessary actions for it. In addition, 89% of the entities did not work with the Ministry of Finance to promote plans on this issue.
- (2) **Budgeting projects:** Of the 378 tasks included in Government Resolution No. 4079 relevant to the public entities listed in this decision, the public entities reported that 60 of the tasks (16%) were budgeted and included in the ministerial work plans, with schedules and deadlines for implementation were set for them.

C. Creating research knowledge for managing climate change uncertainty

- (1) **Scientific-meteorological aspect:** The CCAA did not take the necessary actions based on the Scientific Study and Recommendations for National Strategy¹ to address the research knowledge gaps. As a result, the existing scientific knowledge base in the Scientific Study and Recommendations for National Strategy has not been developed, updated, or validated since Government Resolution No. 4079.
- (2) **Economic aspect:** Although in 2009 the government decided to promote adaptation actions based on assessment of the economic and budget aspects resulting from implementation of the adaptation measures, this has yet to be performed.
- (3) **Economic assessment of adaptation cost:** The absence of tools, budgets, and professional staff in the CCAA necessary for performing full economic assessments may lead to that the State of Israel lacks a national scientific knowledge base that includes macro-economic assessment to promote adaptation to climate change.
- (4) **Knowledge gaps:** The CCAA lacks an organized plan for closing knowledge gaps on the issue of climate change adaptation, and it lacks a full status report

¹ The Scientific Study and Recommendations for National Strategy is a document of recommendations to the government for national strategic adaptation that was presented the government in December 2017, further to Government Decision No. 474 of 2009. It included details on climate change trends, risks to various sectors, and recommendations for action through 31 national tasks relevant for many public entities in the State of Israel. This study was adopted in Government Decision 4079 (July 2018).

on the studies carried out by public sector entities or planned studies on this issue.

D. Developing climate scenarios and entities' use of them

- (1) Although the Israel Meteorological Service (IMS) has updated meteorological data for past events and future trends, public entities make only partial use of it. Three-quarters of the entities that responded to the Questionnaire reported that they do not use the future meteorological trends.
- (2) Despite the needs for strengthening climate knowledge, building Israel's climate research capability, and building a scientific knowledge base to support decision-making under Government Resolution No. 4079, due to lack of budget, a national center has not been established for climate simulations within the IMS. Additional sections related to the need for strengthening climate knowledge were also not implemented. Without improving the technological capability of the IMS, the public entities in Israel will have difficulty gauging the future climate trends that will affect them. For this reason, a gap may be created between the government action and the actual climate trend, which may influence a certain sector or a particular population.

3. Formulating and implementing a national adaptation plan

A. Cross-government mainstreaming and integration of climate change adaptation considerations in actions and decision-making processes

- (1) In response to the Questionnaire, 60% of public entities reported that they have no contact with key entities such as the Prime Minister's Office, the Ministry of Finance, and the Planning and Budgeting Committee, regarding adaptation to the risks involved in climate change. One-fourth of these entities define climate change as an issue that will be included in their targets for the next few years.
- (2) The issue of climate change adaptation is managed by the CCAA as an additional extra task, beyond the scope of its regular responsibilities, without professionalization or specialization on the issue. Of the public entities that responded to the Questionnaire, 69% reported that they have no professional function for this issue.



B. Climate change risk identification and analysis

- (1) No dedicated subcommittee in the CCAA has been established to assess risks as per Government Resolution No. 4079. The other subcommittees in the CCAA that worked on risks did not address the issues that the Scientific Study and Recommendations for National Strategy recommended for inclusion as part of the activity of this committee. The CCAA did not complete formulation of a decision-making methodology based on risk management.
- (2) Of the public entities that responded to the Questionnaire, 77% reported that they have not mapped the risks associated with climate change, and 75% do not perform joint risk mapping together with other public entities; 82% of the entities did not examine the issue as part of organizational risk management; 92% of the entities reported that they do not follow prioritization or the CCAA's analysis of climate trends.
- (3) Risk to national infrastructure: there is a genuine concern about damages to Israel's national infrastructure due to climate changes, such as to desalination plants and mass transportation systems.

C. Recognition of the climate crisis as a national strategic threat:

As of July 2021, the National Emergency Management Authority (NEMA) has not included climate change in the national threat map. Therefore, climate change is not included in the aggregate national threat assessment.

D. Adaptation of the defense establishment to climate change risks:

As of July 2021, the Ministry of Defense and the Israel Defense Forces (IDF) were in preliminary stages of examining and studying climate change adaptation. They had not yet established working teams to formulate concrete work plans addressing the risks to the defense establishment in the coming years, as part of the IDF's multiyear plan that was authorized up to 2024 (the Momentum Multiyear Plan) and in the medium to long-term range.

E. Promoting adaptation in coordination with the higher education system:

The CCAA has not worked with the Council for Higher Education or with the Planning and Budgeting Committee (for higher education) to promote academic research, as determined in Government Resolution No. 4079.

4. Health Risks, Diseases, and Pandemics Caused by Climate Change

The State of Israel is located in a “hot spot” subject to the effects and risks of climate change which cause global ecological changes. These lead to the spread of vectors (disease spreaders) to new regions. Along with seasonal changes, disturbances of balances in nature, destruction of natural habitats, and loss of species, the State of Israel might be exposed to considerable risks. These will affect its national security in several spheres: the public health and welfare system, including concern about increasing frequency of disease and pandemic (such as COVID-19); social and mental effects; effects on women; food and water security; and geo-strategic aspects.

The national plan for health and environment that was outlined in Government Resolution No. 1287 (March 2016) was not presented for the approval of the Ministers of Health and Environmental Protection, nor was it presented for government approval. In addition, although the Ministry of Health examined certain actions according to Government Resolution No. 4079 (July 2018), this did not lead to any significant action to implement the underlying principle of the decision – to promote action plans and policy steps to reduce the health risk. As such, these Government Resolutions were not fulfilled, nor were their underlying rationales – promoting steps to improve the quality of life of the State of Israel’s citizens and of the coming generations, and to preserve their health.



The Israel Meteorological Service (IMS): The IMS performed major studies to construct climate scenarios as accepted around the world. It acted to collect data on past events and future trends, and prepared risk scenarios for three entities: the Ministry of Agriculture, the Electricity Authority, and the National Emergency Management Authority, using the professional tools in its possession.

Methodology for risk management and adaptation actions: The Ministry of Agriculture and the Water Authority formulated a risk analysis methodology for climate change adaptation, on the sectorial level. In addition, adaptation actions were conducted by several government-affiliated entities in the fields of transportation and aviation, and by the Israel Electric Company for adaptation to exceptional electricity demand during climate events.

International research and cooperation on educational programs: The Ministry of Foreign Affairs and Israeli educational institutions acted to promote research and international cooperation between Israeli and foreign educational institutions.



Key recommendations

1. National climate change adaptation

-  The audit recommends that the Ministry of Environmental Protection formulate a decision-makers proposal for government resolution in addition to Government Resolution No. 4079, so that the State of Israel and public entities will transition from the stage of recommendation and assessment of plans to the implementation of a national plan for adaptation in practice.

2. Government capacity building for adaptation

CCAA

- A. The audit suggests that the Ministry of Finance and the Ministry of Environmental Protection examine the need for allocating a designated, multiyear budget to the CCAA, adequate for the challenge and its ongoing nature, so that it may continue to promote climate change adaptation actions.
- B. The audit suggests examining the need for the Civil Service Commission to allocate designated job positions to be filled by experts and knowledge holders, for the purpose of professionalization of the CCAA staff and additional bodies in public entities and their specialization. The audit recommends that the Ministry of Environmental Protection, the IMS, and the Ministry of Science and Technology examine the actions necessary to enable the CCAA to serve as a national knowledge center; to make data accessible and to integrate it; and to grant it research capacities for analyzing the data and for promoting research that will enable it to understand the necessary actions – on the national level and for the public entities in Israel.
- C. The audit recommends that the CCAA strengthen the reporting mechanism of the entities on the progress of their actions, to verify that the information base available to decision-makers reflects the current scientific status, including future trends, to help them act efficiently and in accordance with climate change effects on various sectors and populations, as Government Resolution No. 4079 requires.

Updating the Knowledge Base

- A. The audit recommends that the CCAA act to update the scientific aspects of the knowledge base and to complete it, to ensure that the ministerial plans will be formulated in accordance with the current and best available data on concrete risks

in each field. The audit further recommends that the CCAA form a plan to overcome knowledge gaps on the issue of climate change adaptation, and set up a portal that will include the studies and data on the issue and make these available to public entities and the public. The audit further recommends that the Ministry of Finance, the CCAA, the Ministry of Environmental Protection, and the Ministry of Science and Technology act on the issue to promote economic studies on the national and sectorial level, which will support well-informed decision-making and prioritization of adaptation actions.

- B. The audit recommends that the Ministry of Finance and the National Economic Council act to assist the CCAA to formulate a national macroeconomic assessment as a basis for a national plan on climate adaptation.
- C. The audit recommends that the Ministry of Finance, the Planning and Budgeting Committee, the Council for Higher Education, the National Science Foundation, the Ministry of Science and Technology, the Ministry of Environmental Protection, the IMS and the Ministry of Foreign Affairs, examine the promotion of activities in international research bodies in cooperation with academic institutions, research institutes, and additional relevant entities. This will enable significant broadening of the professional knowledge base.



Formulating Climate Scenarios and Using Them as Part of the Activity of Public Entities

- A. The audit recommends that CCAA, the Ministry of Finance, the Ministry of Transportation, and the Ministry of Science and Technology will work with the IMS to examine ways of promoting the establishment of a national computation and calculation center for climate simulations, which will operate as part of the IMS and be accessible to Israel's scientific community.
- B. The audit recommends that the CCAA act such that the adaptation of public entities in Israel will be based not only on past data or internal assessments, but also on future meteorological trends that will indicate the relevant risks in each sector and for various populations, to achieve maximum suitability between the risks and the measures that should be promoted.



Public Entities in Israel

The audit recommends that the CCAA and the Ministry of Environmental Protection, the Prime Minister's Office, and government ministries named in Government Resolution No. 4079 complete assessment of the need to allocate a dedicated framework of resources for promoting national and sectorial adaptation actions, as customary in other countries, along with funding researchers and tools for professionalization.



3. Formulating and Implementing a National Adaptation Plan



A. Integration of adaptation considerations in public entities

- (1) The audit recommends that the central administrative bodies, including the National Security Council and the Ministry of Finance, act to integrate the need for climate change adaptation in promoting the government processes for national adaptation.
- (2) The audit recommends that in the early stages of the authorization of plans, the bodies responsible for planning and construction of infrastructure on a national level should verify the integration of inputs related to climate change, based on scientific data and expert opinions. In light of the systemic impact of the climate change, efforts must continue to formulate obligatory directives for adaptation and integrate them within these bodies, so that the planning and execution of core plans in the fields of infrastructure, construction, agriculture, and transportation in Israel, will be in accordance with the climate risks involved.
- (3) The audit recommends that the Civil Service Commission in cooperation with the CCAA and public entities in Israel examine the needs for a climate change-specialized organizational response in those offices and entities whose activity has a significant and systemic connection to adaptation.



B. Cooperation between public entities:

The audit recommends that the CCAA consider how to improve joint action to achieve the best possible adaptation to climate change. It also recommends strengthening the national framework of cooperation between public entities, addressing issues related to or overlapping climate change, including mapping the public stakeholder entities, and to generate a professional dialogue between them. In addition, the audit recommends encouraging the development of cooperative efforts by building educational frameworks and allocating resources to promote research and joint activities.



C. IMS Capabilities

- (1) The audit proposes that the CCAA, the Ministry of Finance, the Ministry of Transportation, and the Ministry of Science and Technology examine whether the capabilities of the IMS today are appropriate, considering the future challenges, and which actions should be promoted in the short and medium-to-long term so that the State of Israel will be equipped with the appropriate tools for best climate change adaptation. The audit also

proposes that these entities examine together with the IMS the methods of promoting the establishment of a national calculation center.

- (2) The audit recommends that the Ministries of Finance, Transportation, and Science and Technology, and the IMS, together with the CCAA and executive entities such as the National Fire and Rescue Authority, assess the needs and requirements for building additional capacities in the world of meteorological “intelligence,” the costs and benefits involved, and act according to this assessment.

D. Risk Management

- (1) The audit recommends that the CCAA act to formulate a decision-making methodology based on risk management, in consideration of the government risk management guide, the OECD proposed methodology, and the practice of other countries.
- (2) The audit recommends that the CCAA, with the assistance of the IMS, act with government ministries to promote a risk management process that each ministry can use to formulate an effective adaptation plan. This should be based on performing a specific risk management process for each sector and mapping of risk levels in each field, against concrete climate indicators.
- (3) The audit recommends that the relevant public entities assess the climate change risks applicable to them, based on scientific research and forecasts. In addition, they should promote adaptation actions for risk prevention, for infrastructure that is both planned and currently under construction.

 **E. National threat assessment:** The audit recommends that the NEMA examine the CCAA recommendations for treating climate change as a risk considered “a threat scenario on a national level,” and as such, examine the possibility of including it in the national threat assessment of Israel.

 **F. Defense establishment:** The audit recommends that the Ministry of Defense and the IDF act to implement climate change adaptation as part of the current multiyear plan, and that they act with the CCAA, based on the accumulated knowledge, to complete the strategic approach on the issue and formulate and implement operative steps. This should be done in parallel to an ongoing learning process on security preparedness, on regional and geostrategic levels and with a future-oriented approach.

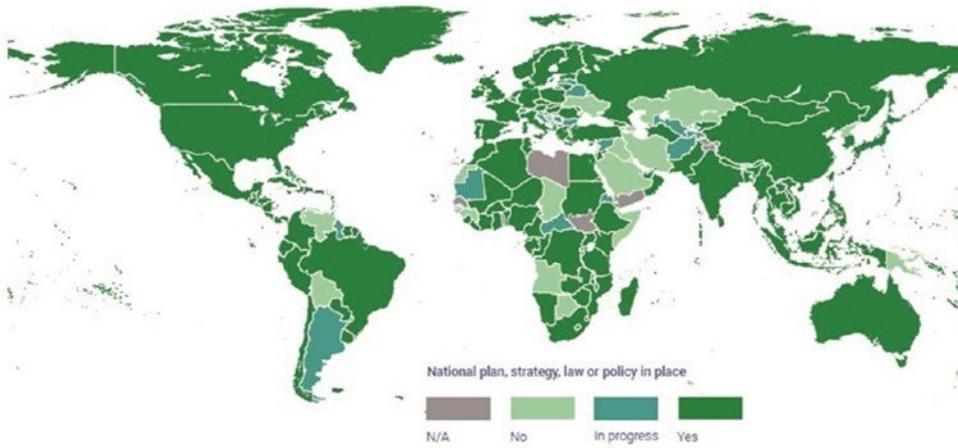


-  **G. Higher education:** The audit recommends that the CCAA work together with the Ministry of Education, the Council for Higher Education, the Planning and Budgeting Committee, the Ministry of Science and Technology examine the necessary actions for implementing the climate change issue and adaptation to its risks in educational curricula in the educational system and academia, to help raise awareness on the issue and develop skills in the field, in a manner that will give a response to future market needs. The audit further recommends that the CCAA act with the Council for Higher Education and the Planning and Budgeting Committee to promote academic research in the field.

4. Climate Change Risks to Public Health

-  **Actions for establishing a monitoring and early warning system and for reducing research knowledge gaps:** The audit recommends that the Ministry of Health and the Ministry of Environmental Protection work with public bodies such as the Israel Meteorological Service, the Council for Higher Education, the Planning and Budgeting Committee, the Ministry of Science and Technology, and the military health system, to examine the efficiency of these actions with regards to the State of Israel. These bodies should consider promoting similar actions related to establishing databases, monitoring, and acting to reduce knowledge gaps, so that the government ministers will have a complete picture of the status regarding risks of outbreaks of diseases and pandemics, which are expected to worsen due to climate change.
-  **Making Policy Decisions:** The audit recommends that the Ministries of Health, Finance, and Environmental Protection promote overall policy, set targets, and make operative decisions for implementation, *inter-alia*. decisionmakers should formulate a complementary proposal for Government Resolutions already made on this issue. This is for the purpose of promoting effective adaptation of the Israeli health system to climate change risks affecting public health.

Implementation of National Climate Change Adaptation Plans in Other Countries (Israel not indicated to have such a plan)



Source: UNEP Adaptation Gap Report, 2020.



Government recommendations for projects in the National Climate Change Adaptation Plan, and fields where budget discussions are currently being held with the Ministry of Finance



Local Government*

- Adaptation
- Drainage and runoff
- Shading



Agriculture

- Seed development
- Strengthening the fund for farmers' compensation
- Agricultural production and food supply



Flood Prevention

- Master plans for drainage
- Regulation
- Separation of municipal runoff from sewage



Urban Planning

- Green building standard including
- Integration of climate considerations in planning



Forecasting Extreme Events

- Establishing a climate calculations center
- Warning systems



Social Resilience

- Mapping vulnerable populations
- Training social workers
- Amending labor laws



Emergency preparedness*

- Barrier area regulations for fire prevention
- Formation of national perception on emergency preparedness



Protecting Infrastructure

- Mapping infrastructure
- Incorporating climate change in planning



Development of Research and Knowledge

- Knowledge center
- Overcoming knowledge gaps
- Innovation
- Risk management plan



Education and Awareness

- Incorporation in academic courses
- Public awareness
- Decisionmakers' awareness



Health

- Mapping effects
- Disease monitoring systems
- Action plan



Ecological Systems

- National action plan for biodiversity
- Ecological corridors
- Rehabilitation of rivers

Based on the CCAA Adaptation Report 2021, adapted by the State Comptroller.

* Fields in which budget discussions are being held with the Ministry of Finance, as per the CCAA report.

Conclusion

Studies around the world indicate that despite countries' actions to reduce GHG emissions, global temperatures will continue to rise and could soar by as much as 3°C-4°C by the end of this century, with unprecedented effects. This reality requires countries around the world to prepare for climate change and the risks it presents and to strengthen the resilience of many systems. According to studies, approximately three-quarters of the world's countries have formulated (or are in the process of formulating) a national adaptation plan, which could reduce the expected negative impacts from climate change. These adaptation actions are based on sustainability principles for promoting positive effects on the economy, human health, and the environment. Improving climate change adaptation is a central component in the strategy for strengthen public resilience and readiness for national and regional crises.

Despite global developments and the growing recognition of the importance of early adaptation in the State of Israel based on a budgeted national plan, the findings of this audit chapter indicate that 84% of public entities, including most government ministries (which received the Questionnaire), do not have an adaptation plan for climate risks as part of their activities. In addition, central government bodies in Israel, particularly the Ministry of Finance and the National Security Council, do not participate in the national adaptation actions promoted by the CCAA in the Ministry of Environmental Protection.

This reality means that for as long as climate change worsens, Israel faces increasing risks. For this reason, the State of Israel must act on this issue and complete formulation of a national and sectorial action plan based on allocating the required resources, and join the global trend of adaptation to climate change.



THE STATE COMPTROLLER
AND OMBUDSMAN OF ISRAEL

2021



Chapter 3

Review of Economic and Financial Risks of Climate Change and their Management by the State of Israel

Summary

Chapter 3 | Review of Economic and Financial Risks of Climate Change and their Management by the State of Israel

Summary

Background

The various forms of natural capital, including the oceans, water sources, air, soil, and ecological systems, have economic value in that they provide services to human beings and are vital for human activity. However, they are not traded on the market as commodities, and therefore are not easy to measure. These products are mostly considered as public goods - meaning that their users do not usually have a direct personal interest in preserving them, so sometimes they are degraded, or even destroyed. This phenomenon is known as "negative externalities" and reflects the economic concept called the "tragedy of the commons." The negative effect of environmental degradation has financial value, expressed in loss of social welfare. The field of environmental economics offers various solutions that assist in internalizing these negative externalities and reducing public resources degradation.

Human activity across the globe has led to emissions of GHGs and other air pollutants into the atmosphere – a major public resource. The resulting global warming and human health and environmental degradation are considered negative external effects. In terms of economic analysis, the climate crisis is a negative external effect and can be defined as a market failure – in other words, a negative effect that the free market cannot overcome on its own. Some analysts have determined that this market failure is the most significant ever in history.

Since the movement of GHGs is not contained by national borders, it creates a "free rider" effect, meaning that only the countries that reduce their emissions bear the costs of reduction and the others are "free riders," benefitting without bearing any costs. This lowers the incentive of each country to increase its efforts toward GHG reduction. This market failure also has an intergenerational aspect, as GHG emissions have a cumulative effect, and the catastrophic effects of climate change will be felt in the coming decades.

Chapter 3 addresses the economic and financial aspects of climate change caused by this market failure – for the State of Israel, its economy, and its financial system, according to the following sections:



Part 3.1 | Economic aspects of climate change for the state; review of current global and Israeli economic assessments of the damage caused by climate change, and of mitigation and adaptation costs; effects on the employment market.

Part 3.2 | Carbon pricing, to promote internalization of the external costs and lead to reduction of GHG emissions, as per the Paris Agreement targets.

Part 3.3 | Risks to the financial system resulting from climate change.

These are developing fields, and the development of their methodologies and methods of analysis are ongoing globally. This influences the means of examination and the content of this chapter.

Key figures

**2.5%-
18.1%**

Estimated GDP loss by 2050 in the BAU (business as usual) scenario, without deeper GHG emissions reduction

**8.5%-
27.6%**

Estimated GDP loss in the Middle East and Africa by 2050 in the BAU scenario, without deeper GHG emissions reduction, according to studies reviewed

61

Arrangements of carbon pricing adopted by countries, according to a 2020 World Bank study, which apply to 22% of global GHG emissions

€ 120

Cost of one tonne of carbon in 2030 as per the OECD recommendation, representing the effective price for global transition to a net zero carbon economy by the mid-21st century

**\$3.7
trillion**

Global aggregate exposure of the 16 highest-risk sectors for carbon regulation, as of 2018, based on estimate by a major international rating company, including energy, transportation, and construction sectors

**\$1-18
trillion**

Total global estimated value of "stranded assets" that will lose their value due to meeting the 2°C temperature limitation target, according to the Bank for International Settlements (BIS) (including shutdown of fossil fuel reserves)

1,587

Number of climate-related lawsuits submitted globally from 1986-2020 (emphasizing recent years), according to the Grantham Research Institute on Climate Change at LSE – most were resolved in favor of the plaintiffs

0

Number of specific environmental audits of the banking system conducted by the Bank of Israel's Supervisor of Banks since 2009, of some 300 audits performed¹

¹ Reference to environmental risk was found in six regular audits, mainly regarding legal implications. No audit addressed climate risk.



Part 3.1 | **Climate change as a result of market failure, and preparedness for the economic impacts of climate change**

Background

Climate risk is expected to influence a country's financial status through its GDP, growth rate, and budget, as climate change effects are expected to cause tangible, long-term damage to various sectors of the economy, while also harming the ability to supply products and services. In addition, climate change has a direct influence on the stability of prices in the economy. The anticipated scope of economic damage (derived from the severity of climate damage) is still unknown; therefore, uncertainty is a central component in the process of preparing for these risks. Risk management and cost-benefit analysis can support decision-making under uncertain conditions. In addition, efforts involved in addressing the climate crisis and transitioning to a low-carbon economy affect the labor market.

Key findings

The Climate Crisis as a Result of Market Failure

 The damage caused by GHG emissions is a result of the external influences of economic activity that are difficult to price. When emissions have no immediate real financial cost and there are no negative consequences for GHG emitters, economic actors² do not account for these costs in their activity. Because the cost of damage from GHG emissions is not calculated and causes negative externalities that are not immediate, this leads to market failure. The damage from emissions is not expressed in the conventional assessments of economic activity – through the product, or in the conventional time frames for economic forecasts.

² Such as companies, financial bodies, countries, and individuals.

Preparedness for the Economic Effects of Climate Change

-  As of the completion of this audit, no government economic body or entity responsible for macroeconomic forecasts in Israel has performed a national assessment regarding the long-term damage and effects of climate change on the Israeli economy in the BAU scenario or other scenarios in which mitigation and adaptation measures are implemented. Lacking such climate-related economic assessments (on the macro level and the level of individual actions), the National Economic Council did not act to prioritize the issue in its strategic assessment, and the Ministry of Finance did not approve requests to allocate resources, including that of the CCAA.
-  Current studies on climate change damage that were presented in this section of the report indicate long-term macroeconomic risks anticipated globally and in Israel as a result of climate change. The loss of global GDP by 2050 is estimated at 2.5%-18.1% in the BAU scenario. According to the studies reviewed, in the Middle East and Africa, where Israel and its neighbors are located, GDP loss is even higher and estimated at between 8.5%-27.6%. Existing assessments around the world for this damage are partial, due to the uncertainty that characterizes long-term climate change scenarios. This raises the concern that the accumulated effects of climate change on the economy will be even worse than the assessments reviewed (particularly at the highest levels of global warming). Because there is no existing model or scenario that can give a full picture of the economic effects of climate change, the risks they pose will remain largely impossible to contain. Attention must be paid to the fact that the results of the models are partial and produce forecasts that underestimate the scope of the aggregate economic effects of climate damage.

The Cost of Implementing Mitigation and Adaptation

Measures

-  The economic analyses reviewed show that if Israel does not take steps to slow climate change, climate-related economic damage will be higher than the cost to the economy of the emissions reduction process. This is because a GHG reduction policy has clear benefits, and the Israeli economy can achieve significant reduction of GHG emissions without harming long-term growth targets, according to the studies. In addition, cost-benefit analysis shows that transition to a low-carbon economy can lead to a rise in GDP and social welfare.
-  According to a study by the NGFS (Network of Central Banks and Supervisors for transitioning to a green financial system), a timely, gradual, and orderly transition to a low-carbon or net zero carbon economy is the scenario with the least effect on GDP. The gaps indicated by this report on the issue of GHG reduction and on carbon pricing in Israel reveal that the State of Israel is behind in comparison to other OECD countries. The physical risks of the climate crisis (BAU scenario) are expected to lead to an



estimated loss of 11% of global GDP by 2050, and 25% by 2100, according to the study. Further, the estimated damage of an orderly transition to a low-carbon economy is smaller than in the BAU scenario and in the disorderly scenario: 2% of GDP in the orderly transition scenario by 2050, as opposed to over 6% in the disorderly transition scenario, and 4% in the orderly transition scenario by 2100, as opposed to 9% in the disorderly transition. Therefore, the more Israel delays the transition to a low-carbon scenario, the higher the likelihood that the cost to its economy will be greater.

Effects of the Transition to a Low-Carbon Economy on the Employment Market

 The Ministry of Economy and Industry and the Ministry of Welfare and Social Affairs have not examined the consequences of climate change and the anticipated changes resulting from the transition to a low-carbon economy on the employment market. The transition to a low-carbon economy can have negative effects on employment in high-emissions fields. Various studies show that the negative effects on the labor market resulting from this transition can be reduced, and positive effects can even be gained. But this requires planning, determining a national policy for developing employment requiring high-level "green" skills, along with the general policy of transition to a low-carbon economy and implementation of this policy. A green policy can create jobs in a number "green" economic sectors (such as solar energy), while reducing jobs takes place mainly in "brown" sectors (such as fuel refining or aviation), whose activity is replaced by "green" sectors. For example, one study on this issue estimated that achieving the former targets that Israel set under the Paris Agreement for electricity production through 17% renewable energy in 2030 will create 16,764 jobs related to constructing solar installations, and meeting the targets for energy efficiency will directly add 1400 jobs.³

Technological Climate Innovation in Israel

 In 2018, the rate of public investment by the Israel Innovation Authority in the field of "energy, water, environment, and sustainability" stood at 4%, the third lowest rate of all fields reviewed. In addition, comparative statistics for other OECD countries show that in the field of "climate-related technologies", Israel ranks at the bottom of the ladder, along with three other countries. In 2016-2018, 2% of the new technologies developed in Israel were climate-related, as compared to 6% during 2000-2002.

³ See: Stanley Rubenstein (2019), "Reducing Emissions of Greenhouse Gases in Israel: Ramifications for Employment," doctoral dissertation, University of Haifa.

Key recommendations

Economic Assessments of Climate Change

- 💡 Despite their existing limitations, performing economic assessments using models that test various scenarios is an important instrument for reducing uncertainty and for decision-making on a variety of climate-related issues. A comprehensive economic assessment is needed for long-term decision-making by all government ministries (including the Ministry of Finance) in the economic sectors, and as a tool for analysis, and determining between alternatives. The audit recommends that the Ministry of Finance in coordination with the National Economic Council and the Bank of Israel perform an economic assessment on the effects of climate change on the State of Israel in various scenarios and timeframes. Until such a comprehensive national assessment is performed, the Ministry of Finance and the National Economic Council should integrate the economic effects of climate change into their considerations, where relevant, in examining policy steps.

Costs of Implementing Mitigation and Adaptation Measures

- 💡 The market failure at the heart of climate change and its characteristics, including uncertainty and gradual degradation over decades, require the government and decision-makers in Israel to examine this issue through new tools and with a long-term perspective, so as to make decisions in the present that will mitigate future risks. The alternative is to wait until the effects of climate change become known, and according to the studies presented in the report, this is the more costly option. Even if these decisions are made under conditions of uncertainty, they should not delay the government's implementation of the necessary measures for GHG reduction and climate change adaptation, because the scientific consensus today is that without implementation of radical emission reduction policies in the coming decade, in the next few decades the climate crisis will accelerate and threaten the ecological, economic, and health systems, as well as geostrategic and geopolitical stability.
- 💡 Studies emphasize the importance of timing for GHG reduction actions and the State of Israel's adaptation to climate change. According to these, reduction actions should be made at these initial stages. The type and scope of adaptation activities are expected to be implemented as a function of climate-related damage, but it is economically beneficial to begin implementing them as early as possible and gradually. This is especially true since GHGs remain in the atmosphere for a very long time (even centuries).



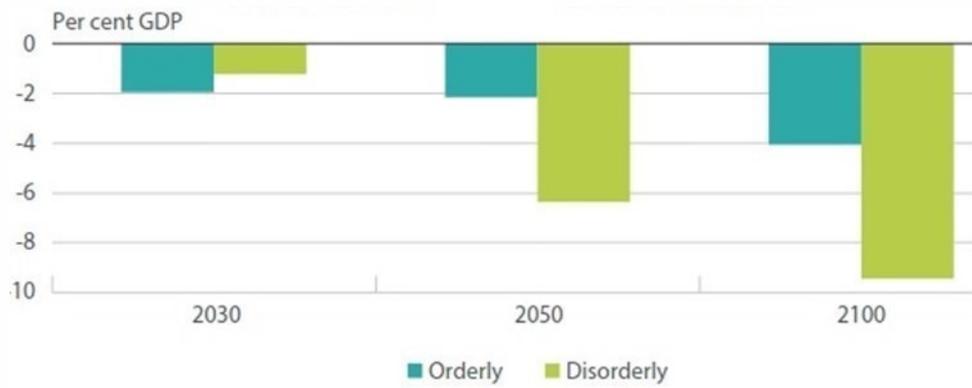
Effects of the Transition to a Low-Carbon Economy on the Labor Market

 Studies from around the world and Israel show that the transition to a low-carbon economy involves risks but also significant opportunities for the employment market. To reduce the risks and exploit the opportunities, the audit recommends that government ministries, including the Ministries of Finance, Economy, Welfare and Social Affairs, and Environmental Protection, in cooperation with other bodies such as the Israel Tax Authority and the Bank of Israel, include development of "green" employment as part of the policy of transition to a low-carbon economy. These entities should act to promote the employment issue as part of the transition. The audit recommends identifying the effects of the transition to a low-carbon economy on the employment market and analyzing the gaps in the field. Plans should be promoted to enable gradual management of gaps in the training and skills required to support the transition to a low-carbon economy, and as far as possible, to minimize the shocks to the employment market this will cause and exploit the full potential the transition contains for opportunities for this market.

Climate Change Technological Innovation in Israel

 The audit recommends that the Ministries of Finance, Environmental Protection, Economy and Industry, and Foreign Affairs, as well as the Israel Innovation Authority, in cooperation with the industrial sector and the Manufacturers Association of Israel, examine the need for action in the following fields: mapping the fields in which Israel has a relative advantage; promoting long-term, synchronized actions based on prioritization of government-wide targets and pooling of resources targeting innovation in clean-tech; and identification of knowledge gaps among the professional entities in the government ministries addressing these issues. In addition, the audit recommends that the Israel Innovation Authority complete its examination and assessment actions, and together with industry and academia, promote the implementation of its conclusions and recommendations related to clean-tech and the climate technology fields.

Cumulative GDP Impact from Transition Risk in Orderly and Disorderly Scenarios (according to NGFS)



Source: NGFS, based on calculations from the Potsdam Institute for Climate Impact Research (PIK).



Part 3.2 | Carbon Pricing

Background

As mentioned, market failure is an underlying cause of the global warming phenomenon. Without regulatory intervention, the economic players do not take environmental degradation into consideration, as this degradation has no market price. From an economic viewpoint, managing global warming involves changing the relative price of the use of GHG emitting sources. This can be done by adopting policy tools for internalizing the external environmental costs of the production and emission of GHGs. As opposed to direct costs, external costs are not expressed by the market mechanism. Therefore, various calculation methods have been developed, such as those accepted by the OECD.

In the past decade, various countries have begun to use carbon pricing on industrial sectors, to meet GHG emissions targets under the Paris Agreement. They are doing so by adopting the carbon tax mechanism, which is levied on each tonne of CO₂ emitted into the atmosphere. This tax is levied on the use of fuel for industry, electricity production, and transportation.

Professional bodies around the world have noted the advantages of using the carbon tax. One advantage is greater efficiency of allocating resources in the economy, as the carbon tax is levied on the polluting product, and its price causes producers and consumers to internalize its external effects. Another is that carbon pricing can also act as an incentive for catalyzing entrepreneurship and innovation, encouraging the development and adoption of new technologies that enable reduction of emissions. Further, the carbon tax can be levied based on a broad tax that reflects a significant portion from the GHG-emitting sectors. In addition, the carbon tax creates certainty regarding the price of carbon, and it is relatively easy to collect. In parallel, according to some professional opinions, when imposing the carbon tax, factors related to increased electricity prices should be considered, as well as damage to local industries' competitiveness and learning the effects on GHG emissions reduction.

Key findings

 **International trends:** With time, an increasing number of countries are adopting carbon pricing arrangements. As of July 2021, 61 countries have adopted such arrangements. At the same time, EU countries are promoting a policy under which imports from non-EU trading partners will be charged a Carbon Border Adjustment Mechanism. These processes are likely to lead to a reality in which EU trade partners, including Israel, may be influenced by EU policy, and exports of goods (mainly carbon-rich) from Israel may be exposed to trade limitations.

 **Processes for promoting carbon pricing in Israel:** Since 2008, a series of studies has been performed by Israeli government and professional entities to analyze the significance of carbon taxing. These studies have identified the advantages involved in this process. However, as of September 2021, no operative steps have been taken on this issue.

 In August 2021, following completion of this audit, a policy paper was published on carbon pricing in Israel.⁴ In addition, Government Resolution No. 286⁵ was passed, determining a carbon taxing mechanism, and the Minister of Finance was charged with correcting the Excise Tax Directive on Fuel 5764/2004 and the Directive for Tax Fees and Exemptions and Purchase Tax on Goods 5777/2017. In addition, this resolution determined that the Minister of Finance must “publish the carbon tax rate on fuel in terms of tax per tonne.”

⁴ Ministry of Environmental Protection (August 2021), “Carbon Pricing in Israel.”

See: https://www.gov.il/he/departments/news/israel_will_implement_carbon_pricing_for_the_first_time.

⁵ See https://www.gov.il/he/departments/policies/dec286_2021

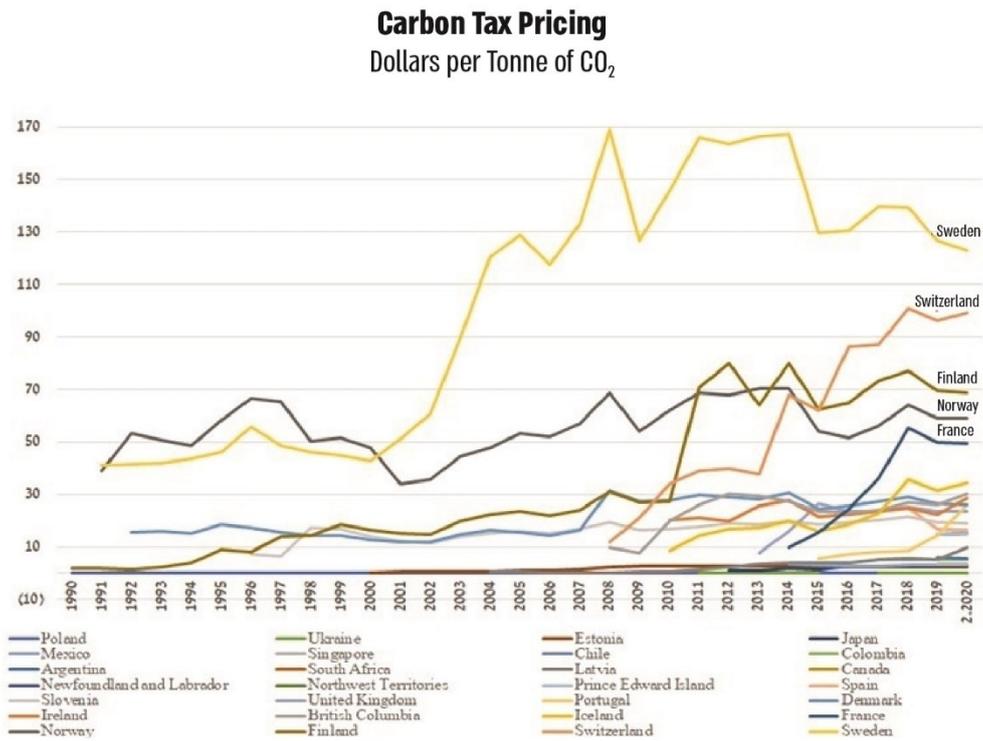


Key recommendations



As part of the carbon tax reform and while determining the carbon tax rate on fuel in terms of tax per tonne of carbon, as decided in the Government Resolution, the Ministries of Finance, Environmental Protection, Energy, Transportation, and Foreign Affairs, with the Tax Authority, Electricity Authority, and the business and industrial sectors, should act to formulate recommendations based on a broad view of the Israeli economy. This includes examining the effect of carbon pricing on local industry, competitiveness, and Israeli export, and on how tax receipts are used. They should also act to formulate a system of incentives and investments, and a plan for infrastructure and available alternatives through a long-term, broad view for transitioning to renewable energy. They should also include a mechanism for examining the effectiveness of the tax pricing on the Israeli economy.

Development of Carbon Tax Pricing from the Tax Start Date and Extent of GHG Coverage by Country



Source: Ministry of Energy, 2020.



Part 3.3 | Climate change as a Cause of Financial Risk

Background

For the past two decades, a practice of integrating principles of “responsible investment” has developed in the business activity of corporations, the stock market, and the financial system. One of the methodologies for this is the integration of ESG environmental, social, and governance (ESG) considerations in business and financial policy. This practice is sometimes known as “sustainable finance.” Within ESG, climate change mostly receives special consideration from regulators and financial bodies worldwide.

The purpose of identification and analysis of these risks, particularly science-based risks such as climate risks, is to examine the risk exposure based on various scenarios that are not examined as part of the core business activities of the financial entity, company, or organization, although they may influence it deeply. In a financial institution, this purpose is to improve its agility and resilience by understanding the channels of influence and minimizing exposure to risk through improving the controls and decision-making processes in the field.

Climate change poses uniquely complex risks, as they effect many sectors, geographical regions, and assets, sometimes simultaneously. This difficulty intensifies due to uncertainty regarding climate change characteristics and the fact that standard risk assessment models, which rely on past data, will be less efficient in performing future risk assessments. Financial sectors that are threatened by the climate crisis include the stock market, the insurance field, and the banking system. This section will address the climate-related risks to financial institutions and the State of Israel as players on the stock market.

Key findings

General

 In general, Israel's financial regulatory directives today do not reflect climate risk. They apply to certain types of corporations (for example, public companies) and under limited circumstances (such as voluntary implementation or relating to ESG considerations as a unit without specific treatment of climate considerations). In addition, the directives do not include uniformity in disclosure and reporting, although the ability of a financial institution to relate to climate aspects in its investment, funding, or insurance policies (and ESG in general) depends on disclosure of relevant, quality information by the companies in which they invest, fund, or insure.

 The climate crisis poses financial risks to countries, companies, and individuals through two types of climate risk:

1. **"physical risks"** – acute risks,⁶ and chronic effects of long-term changes in weather patterns, which effect property, physical capital, infrastructure, agriculture, and real estate;
2. **"transition risks"** – originating from the global transition to a low-carbon economy.⁷ Today's estimates of the resulting loss of global asset value range from \$1-18 trillion. The transition risks due to uncertainty regarding the technologies that will fully develop and uncertainty regarding the regulations that will be formulated are likely to effect sectors in Israel: production of petroleum products, chemicals, and their products with proceeds from sales (local and export) – NIS 67.5 billion; production of rubber and plastic products with proceeds of NIS 19.6 billion; mining and quarrying with proceeds of NIS 17.7 billion. These sectors are likely to be affected if the decision is made to impose a carbon tax; if a policy is promoted of transition to electric vehicles and production of renewable energy; or if other countries impose taxes on exports of this type of product.

 When countries join the aggressive mitigation pathway (sharp and rapid reduction of GHG emissions), the physical climate risks will decline, while transition risks will expand.

⁶ Originating from extreme weather events or catastrophes that cause sudden disruption and damage to human beings and property.

⁷ These usually relate to a decline in the value of assets, when demand drops due to regulatory changes or increased rigor of regulations to adapt them to the climate change fight; technological developments and changes that will be adopted as part of the climate change fight; or fluctuations in consumer preferences and changes in public norms related to climate.



This highlights the importance of an orderly, timely, and gradual transition to a low-carbon economy and the need to maintain control of the transition process to a low-carbon or net zero carbon economy. By contrast, if countries act according to the BAU scenario (without emissions reduction), do too little, or act too slowly to reduce emissions as this report has indicated regarding Israel, the physical risks of climate change will grow as compared to the transition risks. In response to realization of the physical risks, the need will intensify for a rapid, disorderly transition to a low-carbon economy, and the transition risks will expand accordingly.

- 👉 Israel's involvement in international activity in the field of climate-related financial risks is limited to two initiatives: the Bank of Israel joined the NGFS in October 2020, and the Tel Aviv Stock Exchange joined the UN Sustainable Stock Exchanges Initiative in early 2021. The audit demonstrated extensive international activity of other countries, in the field of climate-related financial and economic risk. Many countries exhibited broad, continuous international activity of regulators and policymakers. This activity crosses sectors and includes the field of banking, investments, insurance, and even macroeconomics, and involves hundreds of government and regulatory bodies in many countries, to transform it into a normative issue. These cooperative efforts produce professional recommendations, insights, position papers, and practical principles. As noted, the audit found that the State of Israel's level of involvement in international forums is low (except for the Bank of Israel and the Supervisor of Banks, which have been involved in diverse international activities since 2020).

Climate Risks in the Banking System

- 👉 Since the 2009 letter sent by the Supervisor of Banks requiring banks to integrate environmental risks in their general risk management, the Supervisor of Banks has not conducted an audit specifically focused on environmental risk. The issue of environmental risk arose informally as part of six audits from 2012-2017, and none of these audits related to climate risk, which has a unique profile and complexity.
- 👉 The findings of the survey conducted by the Supervisor of Banks in 2019 revealed that its directives in the said letter sent in 2009 "were implemented in a very limited manner, mainly with regards to credit. Most of the banks reinforced processes in their regulations for identifying environmental risk aspects when granting credit, but they did not reinforce regulations for monitoring and controlling the risk." The Supervisor of Banks gained the impression that "the risk management system and the internal audit system are involved in a relatively limited manner in environmental risk management and did not define procedures for risk management from a conglomerate perspective. In addition, it was found that effective discussions were not held on the issue by the management and board of directors."

-  The 2009 letter from the Supervisor of Banks did not specifically mention climate change, did not relate to horizontal, uniform implementation of the letter, nor did it detail the necessary integration mechanisms for implementing its directives. This permitted broad discretion to banking corporations and did not promote uniformity in the banking system. Since then, knowledge and practice in the climate risk field have developed widely, particularly in the field of climate risk. Still, the audit revealed that in the decade since this letter (2009-2020), the Supervisor of Banks has done almost no work on environmental or climate risks, nor has it updated its directives according to the developments of international professional entities or in other countries. In addition, it has not verified that the banking corporations implemented the directives of the 2009 letter in accordance with the international norms, as instructed.
-  The audit found that the Bank of Israel balances file is not invested in ESG (sustainable and responsible) investments.
-  The Financial Stability Committee headed by the Governor of Bank of Israel has not discussed the issue of climate-related financial risk.

Climate Risks in Investments, Insurance, and Savings

-  As of the audit date, the Israel Securities Authority has not conducted an audit on environmental risk and how public companies follow directives on environmental reporting.
-  A study that the Ministry of Environmental Protection conducted in 2012 on 33 public companies (with significant environmental information) found significant differences between the companies' disclosure in scope and content, and that some companies did not include an environmental disclosure in their reports, or the environmental disclosure in their report was insufficient compared to their actual status. The main conclusion that arose from the Ministry's study was that the regulations must be corrected to include a precise definition of the necessary types of environmental data and level of detail, and a format for a uniform report should be proposed. The audit found that in the seven years since this study, the actions performed as suggested above regarding environmental reporting requirements applying to public companies did not lead to the suggested corrections to the regulation.
-  Disclosure and reporting on integration ESG considerations in business and financial policy in the framework published by the Israel Securities Authority do not differentiate climate from other ESG considerations. In addition, a voluntary framework for ESG disclosure approved by the Israel Securities Authority allowing to report in different formats means that the companies will retain discretion on issues such as whether to disclose, the data included, frequency, format, and location of publication. Without quality and comparable disclosure that meets globally accepted disclosure principles, the Israel Securities Authority is likely to face difficulty promoting an investment policy that



accounts for climate aspects, and the companies will not be required to improve their performance to attract investors.



The 2007 directives for the Capital Markets, Insurance, and Savings Authority⁸ did not relate to climate aspects and did not include directives for the format of the ESG report that should be published. It did not specify whether to include climate aspects, nor did it include a uniform format for the report. In addition, the audit did not find that the Israel Securities Authority acts on climate risks for additional aspects aside from disclosure, such as directives to insurers or pension funds, to include climate risks in their risk management policy.



In October 2020, the Bank of Israel joined the NGFS.

In 2020-2021, the Supervisor of Banks increased activity on the issue, and implemented various actions, most during and after this audit. These included several actions for learning the issue of climate-related financial risk and international activity in the field. In December 2020, the Supervisor of Banks sent a letter of to the banking institutions on "Managing Environmental Risk," with a declaration of its intention to hold discussions with them on environmental risk and their preparation for meeting supervisory expectations, including those detailed in the documents of the international supervisory authorities. In addition, the Supervisor of Banks decided that in the 2021 annual work plan, "the issue should be included in the work plan as a separate topic, including allocation of clearly defined time and resources for addressing it." The Bank of Israel's Policy and Planning Committee formulated a regulation draft for "Proper Banking Management" on "Managing Environmental Risks." As of August 2020, this draft includes directives on climate risks.

In early 2021, the Tel Aviv Stock Exchange joined the UN's Sustainable Stock Exchanges Initiative.

The call for papers on disclosure of corporate responsibility and ESG risks published by the Israel Securities Authority in July 2020 was shared with the public, and included 11 questions for consultation.

During the audit, in early February 2021, the Capital Market, Insurance, and Savings Authority publicized a draft amendment for instructions of the Special Circular,⁹ which

⁸ The Israel Securities Authority guides each institution to declare in its investment policy that it will publish whether it relates to ESG aspects, and if so, detail their nature and the activity involved in their implementation. A 2007 directive, designated for the investments committee in institutions, determines rules for identifying exposure due to a borrower's failure to follow rules and regulations, including in the environmental protection field.

⁹ The Special Circular is the regulation code that contains the instructions of the director of the Capital Market, Insurance, and Savings Authority, and includes all regulatory directives for the supervised bodies.

suggested to oblige the investment committee of an institutional investor to include a policy that relates to ESG aspects when determining its general investment policy.

Key recommendations

General

-  In the range between the BAU scenario (scenario 8.5 of RCP – which states that without actions for GHG emissions reduction, a high concentration of GHGs is produced in the atmosphere, and this leads to rising temperatures due to the maximum level of GHGs in the atmosphere) and a scenario of aggressive mitigation (net-zero carbon by 2050 in scenario 2.6 RCP, rise of up to 2°C), there is a range of physical climate risks and transition risks that create financial and economic risks of unestimated scope. The audit recommends that the Prime Minister's Office, the National Economic Council, the Ministry of Finance, and the Ministry of Environmental Protection, together with the financial regulators, perform an analysis of the physical risks of climate change and the transition risks, based on several scenarios, and assess the financial and economic significance they involve. In doing so, these bodies should survey the actions and tools presented in the report, select the most effective tools for managing the issue, and formulate plans for implementing them. If needed, they should obtain the assistance of the Ministry of Justice for legal clarifications regarding actions required.
-  The audit recommends that the Ministry of Finance, the Securities Authority, and the Capital Market Authority consider the possibility of joining relevant international forums, for the purpose of promoting Israel's adaptation to climate-related financial and economic risk. They should study the outcomes of these entities and their implications for Israel, and the need to implement the recommendations to address the climate-related financial risks in Israel and minimize them. The audit recommends that the regulators study the current developments in other countries that aim to upgrade their management of climate risk, and that the response they promote should fit these developments. Implementation of these actions might reduce the exposure to climate risks (especially transition risks) and ensure that the transition to a low-carbon economy will be orderly and gradual, while taking action to protect public funds and invest it against the risks likely to arise due to the climate crisis.
-  Application of complementary tools by the regulator should be considered. For example, financial regulators can create a market of financial products, and adopt and encourage standardization and international versions of "green" financial products. Simultaneously, the state can encourage use of the standardization that is being developed around the world in the field of underwriting green financial products, while promoting certification and training of professionals in this field.



-  Considering the developing global recognition of climate-based financial risk and this global development, the audit recommends that the regulators act in their legal role and capacity to preserve the stability of the financial system and the handling of climate and environmental risks that threaten it. In addition, to reinforce this groundwork, the audit recommends that in formulating Israel's climate reduction targets and policy for 2030-2050, the Ministries of Energy and Finance should specifically address the relationship between climate change and economic and financial aspects (for the state and for the financial system).
-  The audit recommends that the Ministry of Finance and the Bank of Israel examine the climate-related risks to their economic and financial activity, since these fields are also exposed to climate risks. They should do so, for example, in formulating the state budget and the tenders it publishes; the infrastructure it promotes; the bonds it issues; and the grants, incentives, and benefits it allocates in all sectors of the economy; and in managing the nostro and public reserves of government and regulatory entities (for example, the Bank of Israel) and government companies. The audit further recommends that public funds used for this activity should be managed while considering the risks presented in this section.
-  The audit recommends that the financial regulators and the Ministry of Finance consider creating a joint professional platform for a work framework to promote coherence in the field. Ongoing cooperation and coordination between these entities is important for promoting a shared language, uniformity in risk definition, and building capabilities and knowledge in a relatively new field. The audit recommends that the Financial Stability Committee promote cooperation between the financial authorities for uniform definition of systemic risks related to climate; analyzing, assessing, and monitoring them; promoting implementation of studies by the financial supervision authorities – for example, on the financial system's readiness for these risks; and coordinating development and implementation of tools and methods for prevention or reduction of these systemic risks. These tasks should be done with the assistance of implementation bodies from among the committee members.

Climate Risk in the Banking System

-  The audit recommends that the Bank of Israel and the Supervisor of Banks continue to examine the guidelines that develop through international activity on the issue of climate-related financial risk and analyze the trends that develop from other countries' practices. Based on this: (a) The Supervisor of Banks should update its directives to the supervised entities to promote integration of climate risks, and set monitoring principles for itself on this issue. (b) The Bank of Israel should consider integrating sustainability aspects in its investment portfolios. (c) The Bank of Israel should initiate cooperative efforts with financial regulators and other relevant bodies on the climate change issue. (d) The Bank of Israel should examine aspects of banking system stability with regards to climate

change, and on this basis, derive additional actions such as performing stress tests and promoting disclosure rules.

-  The audit recommends that the Governor of the Bank of Israel, in his role as a government advisor on economic issues, act to promote the State of Israel's climate risk adaptation in additional relevant fields.

Climate Risk in Investments, Insurance, and Savings

-  The audit recommends that the Israel Securities Authority recognize that the voluntary disclosure framework for environmental issues is inferior compared to the previous framework which promoted environmental disclosure, as the previous framework also included amending primary legislation to impose disclosure obligations on environmental issues based on uniform criteria, which would also have granted the Authority supervisory authority on the issue.

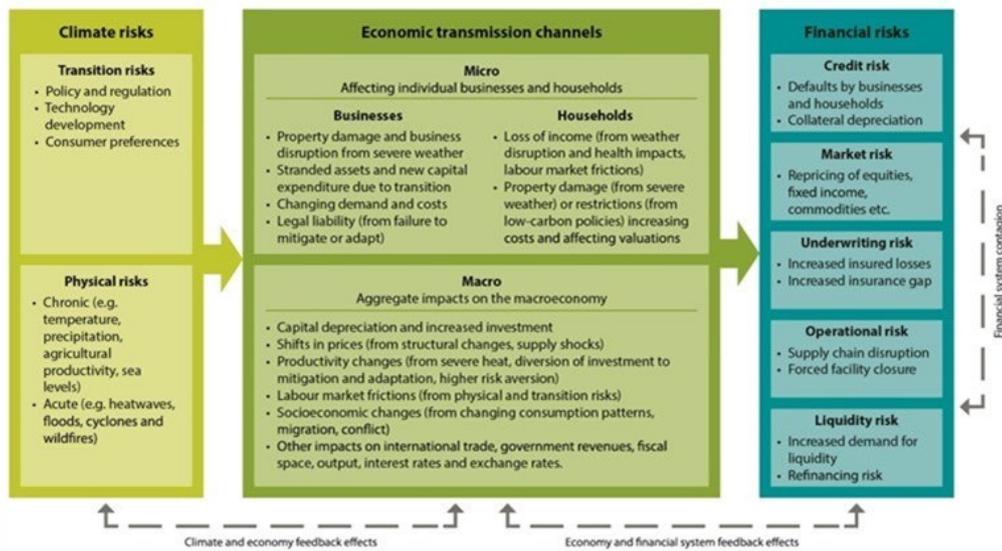
-  The audit recommends that the Israel Securities Authority work with the Ministry of Justice to lead examination of the means to promote disclosure obligations and uniform reporting of climate aspects, in light of the economic risks caused by climate change, their connection to loss of investment value, and the international developments in this matter as reviewed in this report. The climate disclosure rules can differ in severity, application, and scope from the other aspects of the UN Sustainable Development Goals (SDGs), which will reflect the increased climate change risk and transition to a low-carbon economy. In this regard, the audit recommends examining adoption of the principles underlying the rules of disclosure that are becoming prominent in the world, including the Task Force on Climate-Related Financial Disclosures (TCFD) recommendations. Further, the audit recommends that the Ministry of Justice lead a joint study with the Securities Authority and the Capital Market Authority, regarding imposition of the climate-related disclosure and reporting obligations on non-public companies as well, including government companies, based on criteria such as size or level of exposure to climate risk.

-  The audit recommends that the Capital Markets Authority complete publication of the special circular in a manner that will include addressing the financial risks caused by climate change (physical risks – mainly to the insurance sector, and transition risks – mainly to assets and investments). As such, the audit recommends that the Capital Markets Authority consider issuing directives and formulating policy tools related to ESG considerations in a differential manner that fits the risk severity – so that climate change, which receives a special position globally due to the risk severity, will receive a response from the Authority that is appropriate for the risk severity. The audit also recommends that the Capital Market Authority consult with the Ministry of Justice regarding integration of ESG considerations in investment policy vis-a-vis the issue of institutional investors' trustee obligation, and to integrate into the directives the requirement for knowledge



and expertise, as accepted around the world in this field. Finally, the audit recommends that the Capital Market Authority also examine promoting the integration of climate considerations based on the above-mentioned considerations, with regards to non-bank funding for the entities it supervises, particularly funding of infrastructure projects.

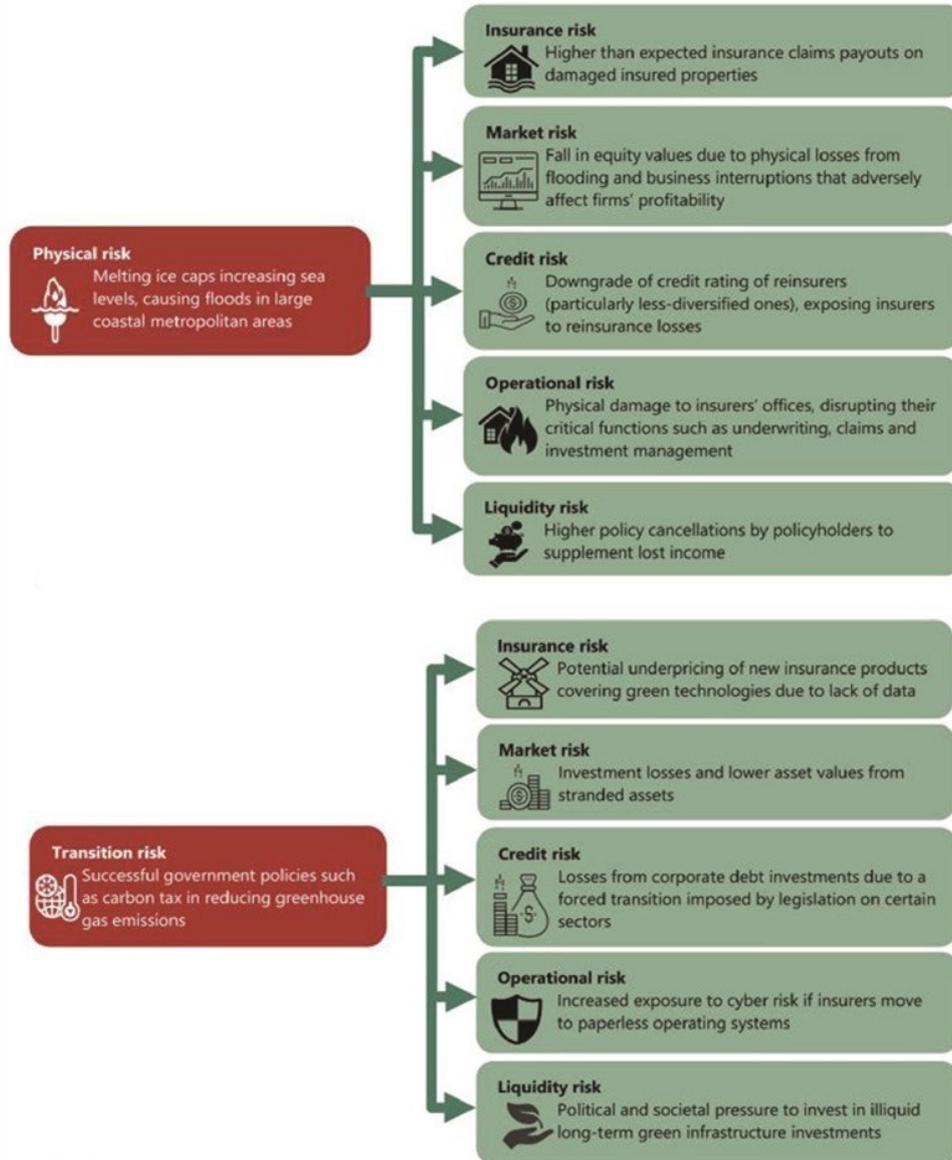
Transmission Channels: Climate Risks to Financial Risks



Based on data from the Network for Greening the Financial System (NGFS),¹⁰ compiled by the State Comptroller.

¹⁰ "NGFS Climate Scenarios for Central Banks and Supervisors," June 2020.

Examples of potential physical and transition climate risks in the insurance sector



Based on data from the Financial Stability Institute of the Bank for International Settlements, compiled by the State Comptroller.



Conclusion

Countries, regulators, financial entities, and international and national organizations around the world agree that climate change poses economic and financial risks to the economy and financial system. Extreme weather events and frequent natural disasters, along with the transition from an economy based on GHG emissions to a low-carbon economy, are likely to lead to negative effects on financial stability and loss of value to assets and infrastructure. This audit recommends that these entities relate to climate risks in parallel to the other ESG considerations. The adaptation of Israel's government and financial regulators to these potential risks is mostly at its initial stages. The various entities should correct the deficiencies noted in this chapter, and the audit recommends that they examine the recommendations, which will influence their readiness and economic-financial resilience with regards to the climate crisis in the coming decades.



THE STATE COMPTROLLER
AND OMBUDSMAN OF ISRAEL

2021



Chapter 4

Climate Change Governance - Organizational, Functional and Professional Structures Summary

Chapter 4 | **Climate Change Governance - Organizational, Functional and Professional Structures**

Summary

Background

This audit report addresses various aspects of the climate crisis, which are classified in the three previous chapters under the following topics: GHG emissions reduction (mitigation); integrative adaptation and acclimation to sectorial risks related to climate change (adaptation); and the economic and financial effects of climate change. In this concluding chapter, we will examine aspects of organizational, functional, and professional governance, with the aim of identifying the measures that government ministries and public entities should consider to adopt to attain the State of Israel's climate targets. This is necessary because to date, the government addressed these issues at differing levels of intensity, and the planning and functional foundation necessary to achieve the desired change has not yet been established. As of 2021, Israel's government faces the challenge of formulating an effective "climate policy package" under current conditions.

The findings presented in this chapter are based, *inter alia*, on the following: the gaps mentioned in the previous chapters of this audit report; the principles and recommendations presented in the OECD report for the transition process of Israel to a low-carbon economy by 2050; cumulative international knowledge in the climate field; data compiled from the Questionnaire distributed by the State Comptroller to government ministries and supporting units. Pooling, analysis, and weighting of this data enables mapping the deficiencies and the corrections that should be made to manage the systemic challenge that Israel faces and laying a foundation for alternatives for managing it.



Key figures

92%

Of the public entities that responded to the Questionnaire (55 of 60) believe that climate change is relevant or partially relevant to their activity

86%

Of the public entities that responded to the Questionnaire (43 of 50) believe that the adaptation and mitigation aspects of climate change are not managed in an appropriate and comprehensive manner in Israel

87%

Of the public entities that responded to the Questionnaire (45 of 52) believe that climate change exhibits the characteristics of a national crisis, requiring national adaptation

70%

Of the public entities that responded to the Questionnaire (35 of 50) believe that the national handling of climate change issues should not remain within the CCAA

4

Designated government employees (out of 83,000 total) work on climate change issues in Israel

18

Countries (including the US and many in Europe) and 1800 municipalities and local authorities in over 30 countries have declared a state of climate emergency as of early 2021¹

56

Countries have adopted climate framework legislation – a law passed by the legislative branch (not just decisions of the executive branch). Most are developed nations

4%

Public investment by the Israel Innovation Authority in the fields of energy, water, environment, and sustainability in 2018

Key findings



Uncertainty as a barrier: The instruments that serve the government today, for example short and medium-term decision-making based on classic cost-benefit analysis, are insufficient for meeting the climate change challenge. The climate crisis is characterized by built-in uncertainty, which in many cases contributes to difficulty in advancing government action (such as advancing national adaptation actions, consequently not budgeting them and not determining a rate of renewable energy for 2050).

¹ By October 2021, 23 countries have made climate emergency declarations.

-  **Conflicting public considerations:** The main considerations guiding government entities that are relevant for managing climate action, and their public priorities, do not always align with the advancement of climate issues. This is expressed in the relevant government ministries through insufficient allocation of personnel, budgets, or attention paid to climate considerations in comparison to allocations for public targets which are these ministries' main responsibility. A conflict that cannot be solved through inter-ministerial dialogue or agreement will be difficult to solve without a hierarchy among ministries, and without an integrative body with a broad vision and inter-ministerial decision-making authority.
-  **Decentralization of government management and work in segments:** Segmentation in managing a broad systemic issue like climate change, leads to barriers and to many conflicts between ministries – both in the level of ambition to which Israel should aspire in setting climate targets, and in the means of achieving them. This situation makes it more difficult to integrate the considerations of dozens of entities when making decisions on climate targets, and burdens the implementation of government climate actions. Based on the findings of the Questionnaire, 86% of government ministries and public entities believe that climate change issues are not managed adequately.
-  **Improved involvement of government ministries:** The policy tools used by government ministries for routine work have not always led to their sufficient involvement in climate issues, both as part of routine operations and while formulating and implementing the national climate targets. The lack of sufficient involvement of government ministries in the past has led to limited progress in Israel's climate activity since it ratified the UNFCCC treaty.
-  **Scope and form of budgeting:** Climate action is largely based on investment in infrastructure, and it is not budgeted in a designated manner or at the appropriate scope. Examples are the CCAA, which acts without a specifically designated budget and without specifically designated personnel; government decisions on GHG emissions reduction that were not budgeted (except for energy efficiency, which was partially budgeted); and the mechanism for implementing them was not budgeted. The result is that the work model of segmented budgeting (per ministry) and one-time or specific limited budgeting does not enable systemic promotion of the climate action and burdens the process of significant target-setting in adaptation and mitigation.
-  **An integrative budgeting and funding government framework for climate activity:** Throughout the world, a tendency is increasing of promoting integrated frameworks for budget and funding planning for the transition to a net zero carbon or low-carbon economy, which requires significant government investment. Israel lacks a holistic framework for budgeting and funding climate plans (including targets for which the price of achievement is estimated in billions of NIS over several decades)



combined with market solutions. This raises concerns regarding the government's ability to implement its targets for broad transition to a low-carbon economy by 2050, as determined in Government Resolution No. 171 (July 2021), and to carry out climate change adaptation actions in many sectors. In addition, Israel has not yet implemented actions through sustainable financial tools and regulation, such as green bonds and loans, that will aid in the transition to a low-carbon economy, or actions that will support its integration into global processes to attract foreign green investments that will promote sustainable economic growth.

 **Climate change as a strategic threat and emergency situation:** As of July 2021, climate change has not been officially declared a threat or strategic issue that justifies systemic adaptation of public entities in Israel, such as the National Security Council, the defense establishment, NEMA, the National Economic Council, etc. Climate change also has not been declared a "state of emergency". Yet most government entities that responded to the Questionnaire (87%) consider that climate change bears the systemic characteristics of a national crisis.



In 2020, defense bodies in Israel began to study the implications of climate change for defense. The Ministry of Defense defined it as having a "significant effect" on national security, and as including negative potential effects, directly and indirectly, on the defense establishment, on the building and use of military power.

In April 2021, the Ministry of Environmental Protection published the climate law memorandum. As of the date of this audit, this law memorandum has not yet been confirmed.

Key recommendations



The audit recommends adopting changes in the routine operational system used to manage government issues of climate change, to address the problem of segmentation and reduce the gap between responsibility and authority. For this purpose: (a) The audit recommends defining climate action as a core target under government responsibility (of all government ministries), and not just of the Ministry of Environmental Protection. This issue is systemic and involves all ministries, and should be categorized as such; (b) The audit recommends adopting an appropriate platform for managing climate action that will enable well-balanced decisions between conflicting public interests. This platform should facilitate broad, multidimensional study and long-term planning and granting the authority to balance public interests.

-  Climate change is a continuing, long-term challenge, and handling it requires a series of fundamental structural reforms to be implemented at an increasing pace. Therefore, the issue cannot be managed in a topical manner or as an additional task outside the job description of entities whose main field of responsibility is not climate. Considering the integral functional and organizational difficulties that arose in government handling of climate issues, the audit recommends that the government designate the routine handling of this to a permanent entity. This body will have executive authority and decision-making powers, knowledge and understanding in the climate field, and a secure budget. In addition, the audit recommends considering the establishment of an advisory scientific body that will provide the government and the climate management entity with knowledge and scientific data on the climate issue and on additional fields of required expertise, such as economy, ecology, health, and agriculture. Further, the audit recommends upholding the principle that policy setting and decision-making on the issue will be implemented based on knowledge and scientific data.
-  Considering the dimensions of the climate challenge and scope of resources required for managing it, the audit recommends formulating a framework plan for budgeting and funding the transition to a low-carbon economy and adaptation to climate change. The audit proposes that this framework plan be promoted by a central economic entity or inter-ministerial government entity that will coordinate government activity on the issue, with the involvement of the relevant government ministries such as the Ministry of Finance, Environmental Protection, and Economy and Industry, with entities such as the Tax Authority, the Bank of Israel, and the Capital Market Authority. A data foundation (including mapping the funding needs for climate actions, the existing funding sources, and the current set of financial tools) can aid in examining alternatives and policy tools for funding channels for Israel's climate action plan, while favoring action based on a long-term government strategy, with prioritization of targets and pooling of resources.
-  Considering the comprehensive effects of climate change, the audit suggest that the Prime Minister's Office formulate a proposal for a government resolution that will guide each of the entities relevant to the topic, including: NEMA, the Ministry of Defense, the IDF, the National Security Council, the National Economic Council, and the Prime Minister's Office, to consider recognizing the climate crisis as a security or strategic threat or emergency climate situation, and to examine ways to exercise their authorities and the instruments at their disposal. These processes could place climate change at the top of the list of national priorities, direct government attention, and enable allocation of more significant resources to the issue.
-  The audit recommends that the Ministry of Environmental Protection continue promoting the proposed climate law that was publicized in April 2021, while noting: climate legislation in other countries – as of October 2020, 56 adopted such legislation; the principles derived from it, as described in this chapter; and the issues raised in this audit report. Climate legislation provides tools for government management of climate threats

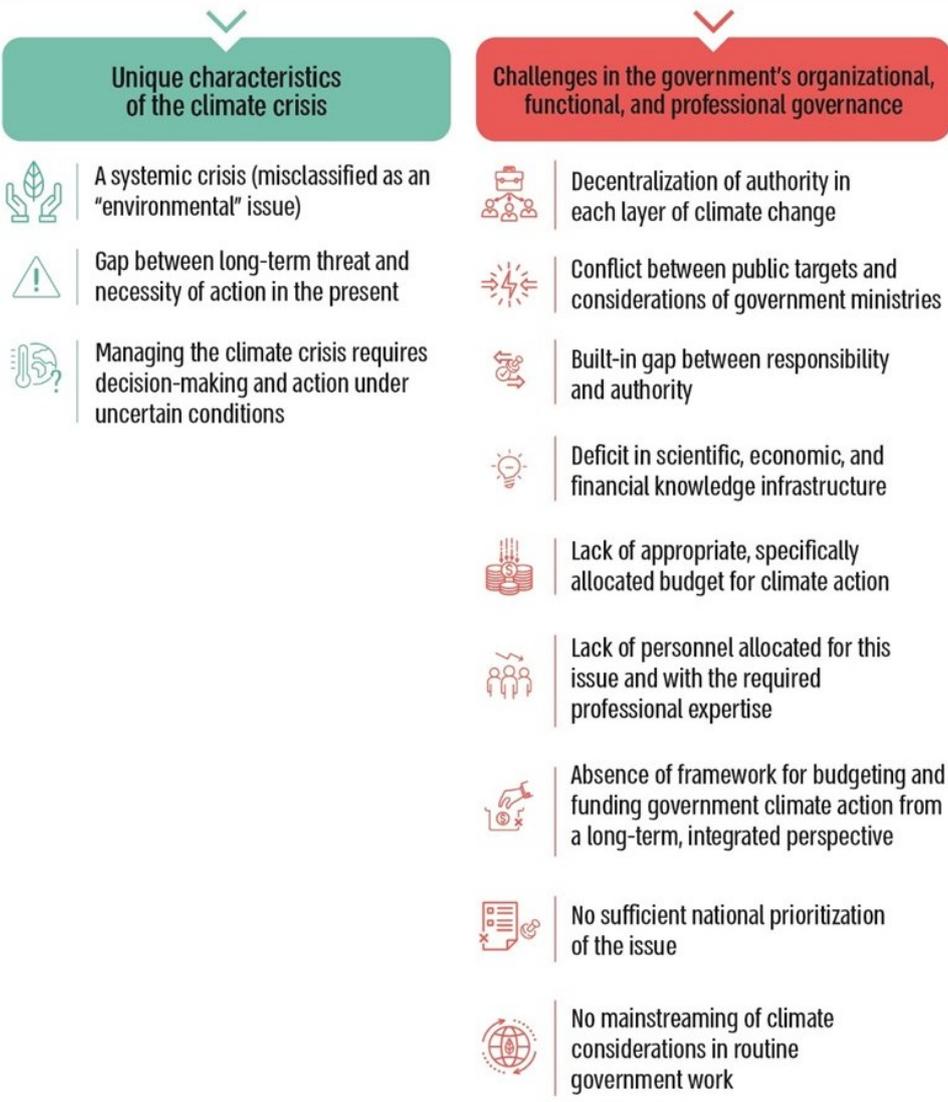


and for managing uncertainty, and grants agility and a regular, stable normative framework for the long term.



For climate change adaptation and GHG emissions reduction to be implemented on a broad scale, the audit recommends integrating and implementing them in the government policy cycle and planning process. Mainstreaming is necessary so climate change becomes the concern of the entire government in routine ministerial activity. As a method of implementation, the audit recommends that the Prime Minister's Office and the Ministry of Environmental Protection complete the integration of climate assessment instruments in the Government Guide to Regulatory Impact Analysis (RIA) and examine the possibility of anchoring the requirement to weigh external costs in government work processes. The audit also proposes that the Prime Minister's Office examine the possibility of integrating principles of the Whole Government Approach, and measures of sustainability and national resilience in the work of government bodies relevant to climate change.

Key Challenges in Government Climate Action



The result is an ongoing challenge in GHG emission reduction and delay in national adaptation to climate change



Conclusion

Coping with the effects of climate change is complex and has unique systemic characteristics. It requires cross-ministry cooperation on many issues and follow-up on implementation of their activities, while competing with other public considerations for budgets and the government's attention. It also necessitates long-term management, during which government policy is gradually and periodically updated; setting an ongoing budget that fits the size of the challenge; and performing systemic risk management. Considering these characteristics and challenges, this audit chapter suggests examining a change in perception regarding governance of climate action, the normative and organizational framework for action on the issue, and the policy tools that are used.