

Accelerating emission reduction in Israel: Carbon pricing vs. policy standards

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Palatnik Ruslana Rachel, Davidovitch Ayelet, Volker Krey, Nathan Sussman, Keywan Riahi, and Matthew Gidden. (Forthcoming) Is carbon pricing more efficient than policy standards? Insights from a co-production of knowledge process in Israel. Energy Strategy Reviews, Elsevier

National Development Targets of OECD countries submitted to UNFCCC

Portugal GHG emissions by 2050: 85%, compared to 2005, and ensuring an agricultural and forestry carbon sequestration

Norway Net 0 by 2030

Sweden Net 0 by 2045 with a 15% offset limit

Denmark Net 0 GHG by 2050

UK Net 0 GHG by 2050

France 75% reduction of GHG emissions by 2050, compared to 1990, with detailed sector targets.

-the goal to net 0 is under consolidation

Germany 80% - 95% GHG emissions reduction by 2050, compared to 1990,

EU Green Deal net zero GHG emissions by 2050.

Japan, 2050 target (80% reduction from current levels)

Canada 80% below 2005 levels

...and i should care,
why?

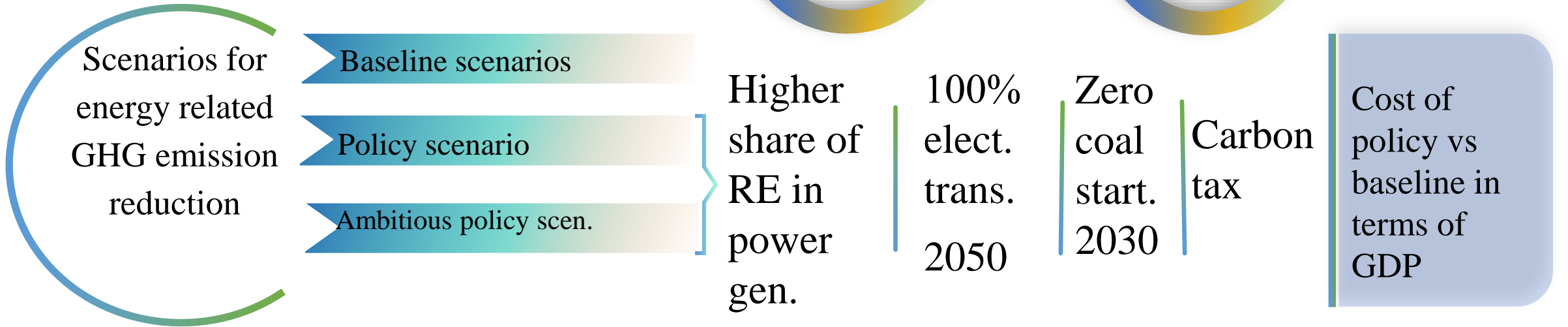
Israeli policy makers question the need for active climate policy:

- Israel contributes only about 0.5 percent to global emissions of greenhouse gases (GHGs).
- From coal to natural gas
- Solar is the main renewable energy (RE) with high intermittency

What target is not too expensive?

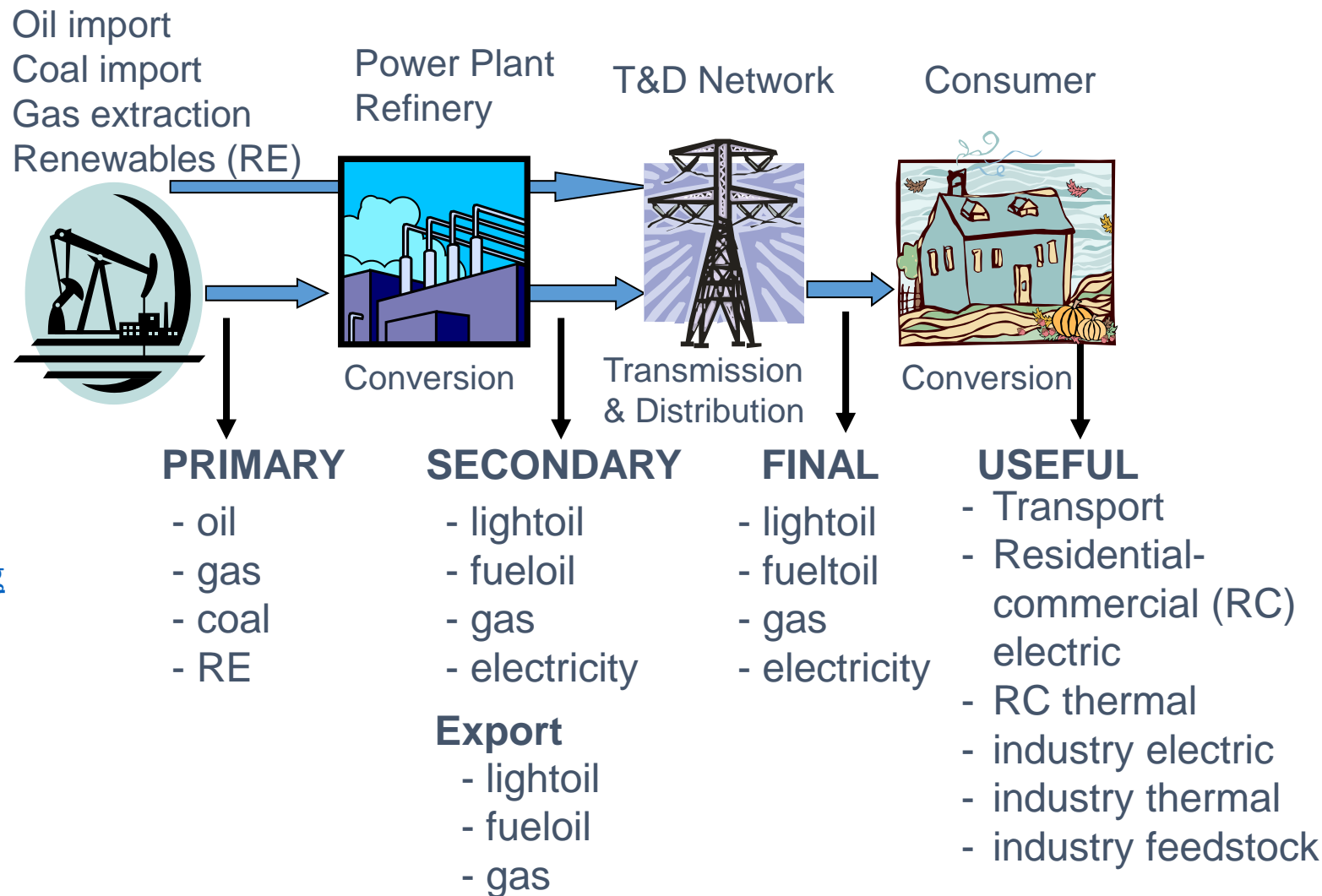
Research structure

- Min. of Energy
- Min. of Transport
- Planning Administration
- Min. of Economy and Industry



Overview of MESSAGEix_IL Energy System

Objective: The least cost option for meeting certain services (demand) over the modeling period

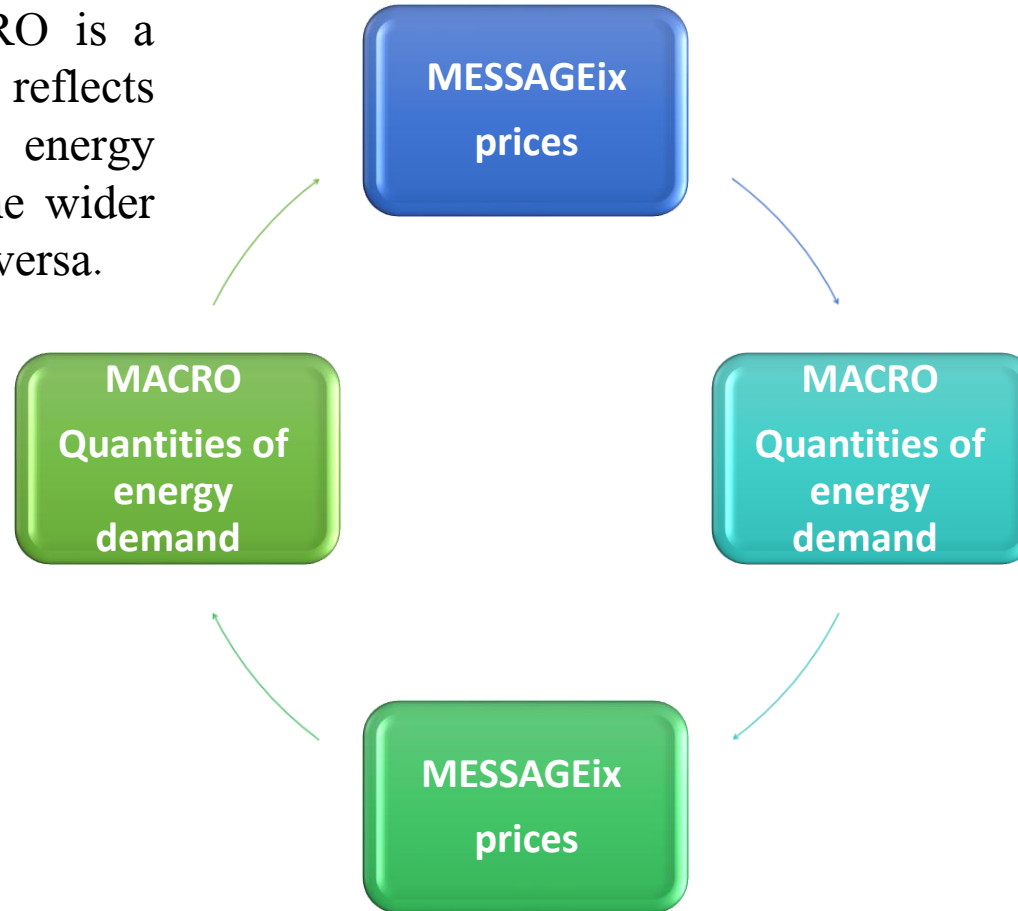


Open model, data and documentation

<https://docs.messageix.org>

Iteration between MESSAGEix-MACRO

MESSAGE-MACRO is a linked model that reflects the influence of energy supply costs on the wider economy and vice versa.



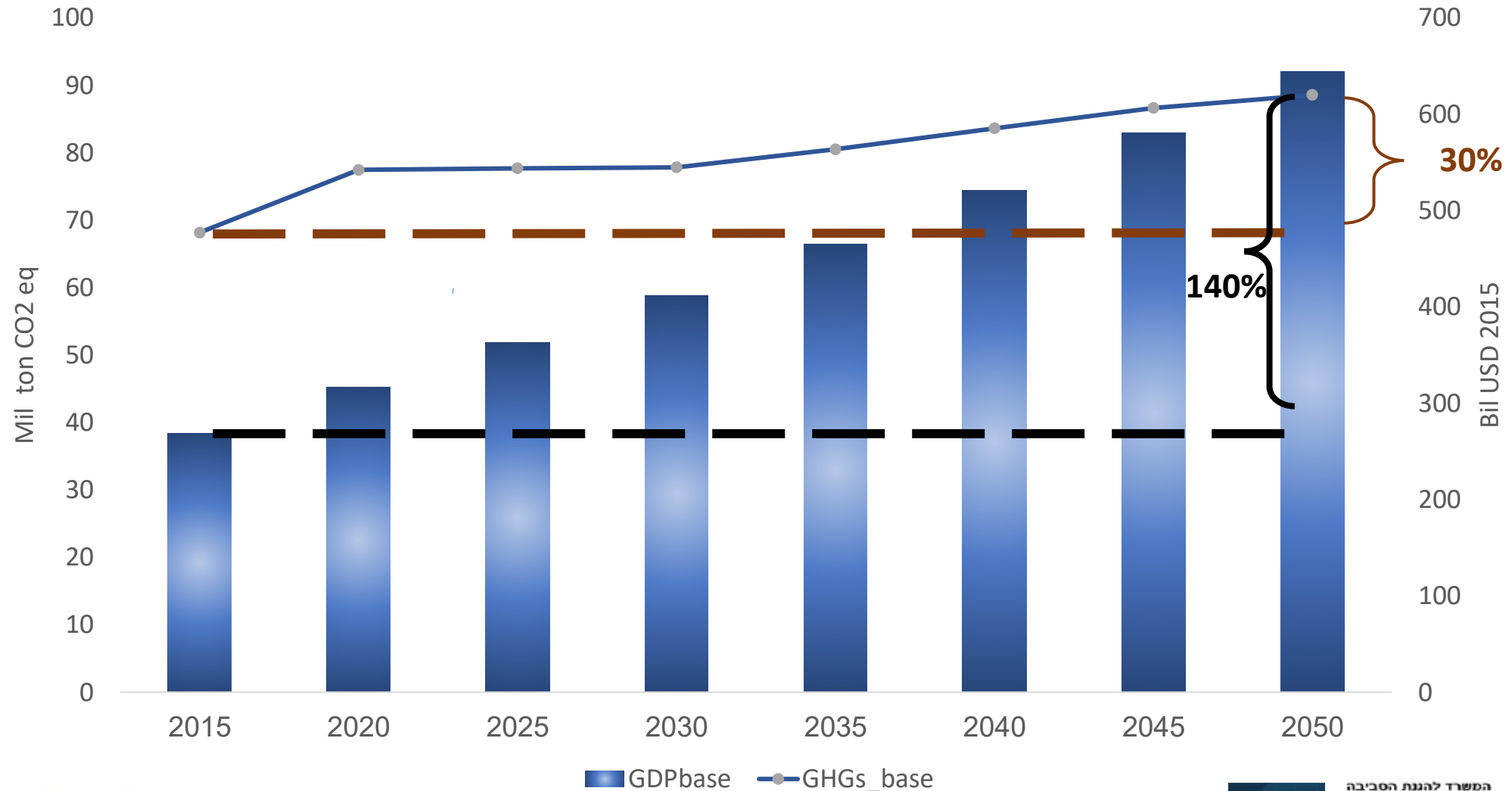
MESSAGEix-GLOBIOM

MESSAGEix-IL

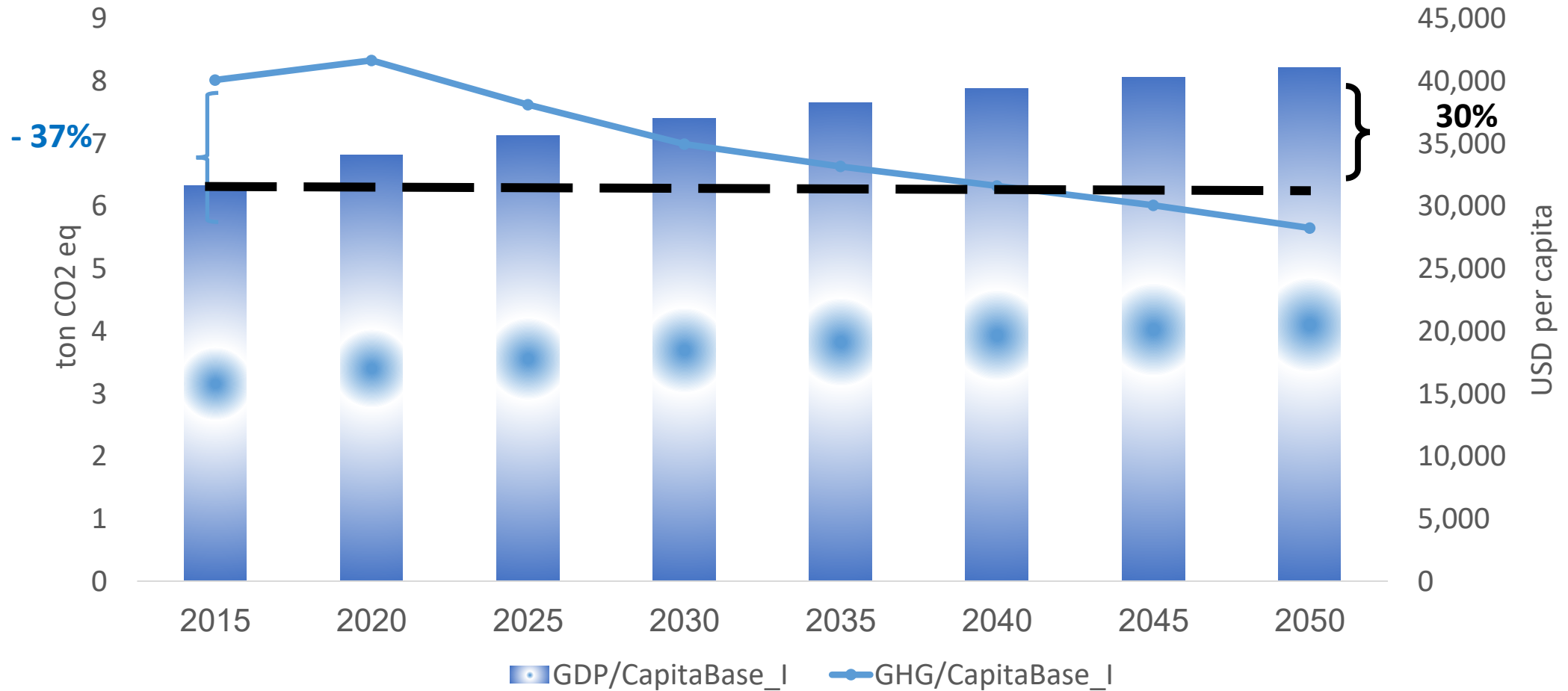
Data	Source
Population growth	Medium and high scenarios CBS (2017)
GDP growth	Medium (BOI, 2019) ; High (IEC, 2017)
Energy prices till 2030	World Bank 2019
Energy prices 2031-2050	EIA 2019
Interest rate	Israeli National Economic Council
Energy taxes Israel	Ministry of Energy, Fuel Department (4/ 2019)
Coal power generation Israel	Ministry of Energy Chief Scientist
Storage costs Israel	Ministry of Energy Chief Scientist
NG Capital cost and OM cost	Ministry of Energy Chief Scientist
Coal Capital cost and OM cost	Ministry of Energy Chief Scientist
Solar Capital cost and OM cost	Ministry of Energy Chief Scientist
Technology efficiency	Ministry of Energy Chief Scientist
Power plants lifetime	Ministry of Energy Chief Scientist
NG reserves	Adiri committee 2018
NG export till 2050	Adiri committee 2018
Historical data on energy balance, Israel	EIA, IEA and CBS
Elasticities of electricity demand	MESSAGE-GLOBIOM & BOI (Galo 2017)
Emissions factors	Ministry of Environmental Protection
Carbon Tax	EPA (2015)
Electricity Transportation	Ministry of Energy
Renewable energy goals	Ministry of Energy Roadmap 2030 and PUA ₆ (2019)

Policy dimension		Baseline	Policy Standards	Carbon Pricing	
Socio - economic	Population (average annual growth)	1.7% (CBS, 2017)	Follows baseline		
	GDP (average annual growth)	2.5% (Argov & Tsur, 2019)			
Power generation	RE	17% from 2030 on	85% in 2050	No green policy Targets	
	Coal	Reduction of the capacity of coal power plants by 2030, remaining 3400 MW available till 2050	Graduate reduction to 0 by 2030		
	NG	export of 25% of reserves by 2050	No limit on NG capacity after 2025		
Electric Transport		30% in 2050	100% in 2050		
Carbon tax (Average annual in a 5-year period, per ton CO _{2eq})		No Carbon Pricing	No Carbon Pricing	2020	\$0
				2025	\$23.3
				2030	\$48
				2035	\$53
				2040	\$58
				2045	\$62
				2050	\$67
				2055+	\$69
<i>Scenario assumptions</i>					

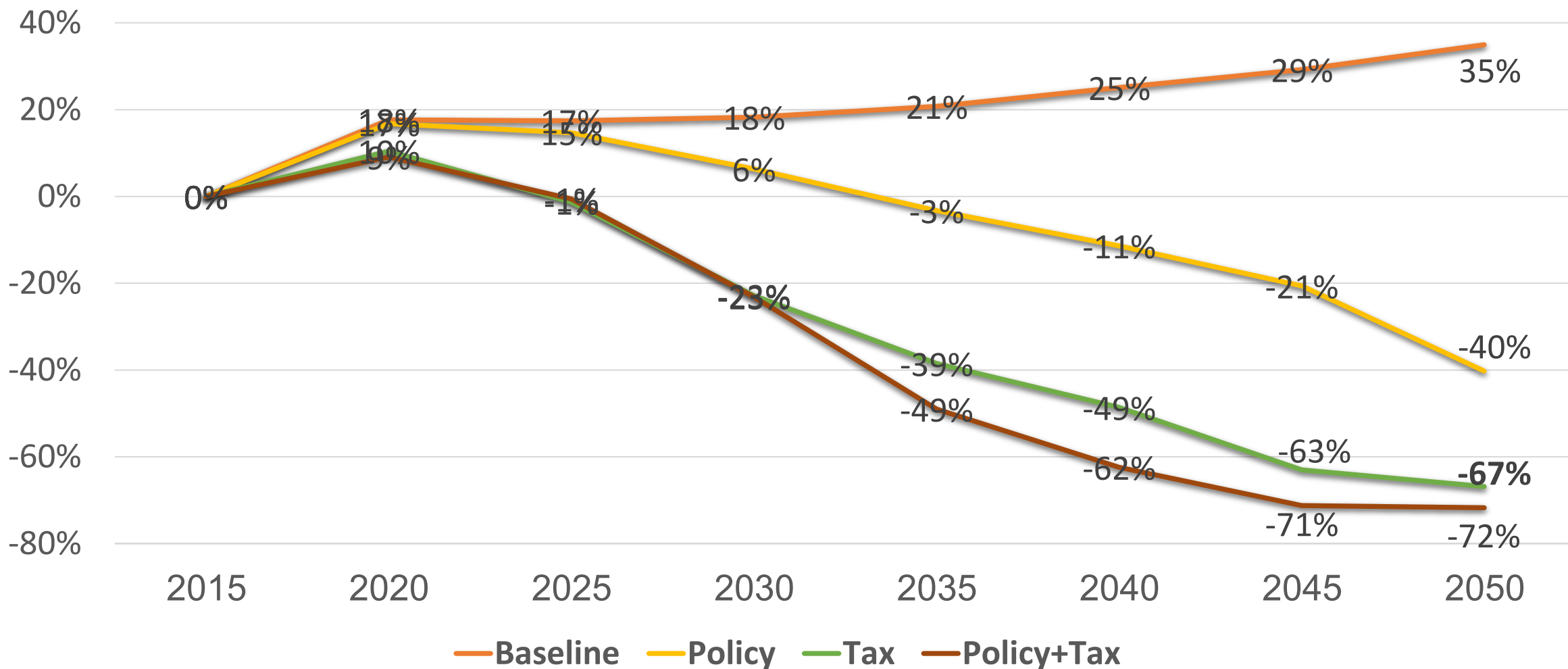
Baseline: GHG emissions and GDP



Baseline: GDP and GHG per capita

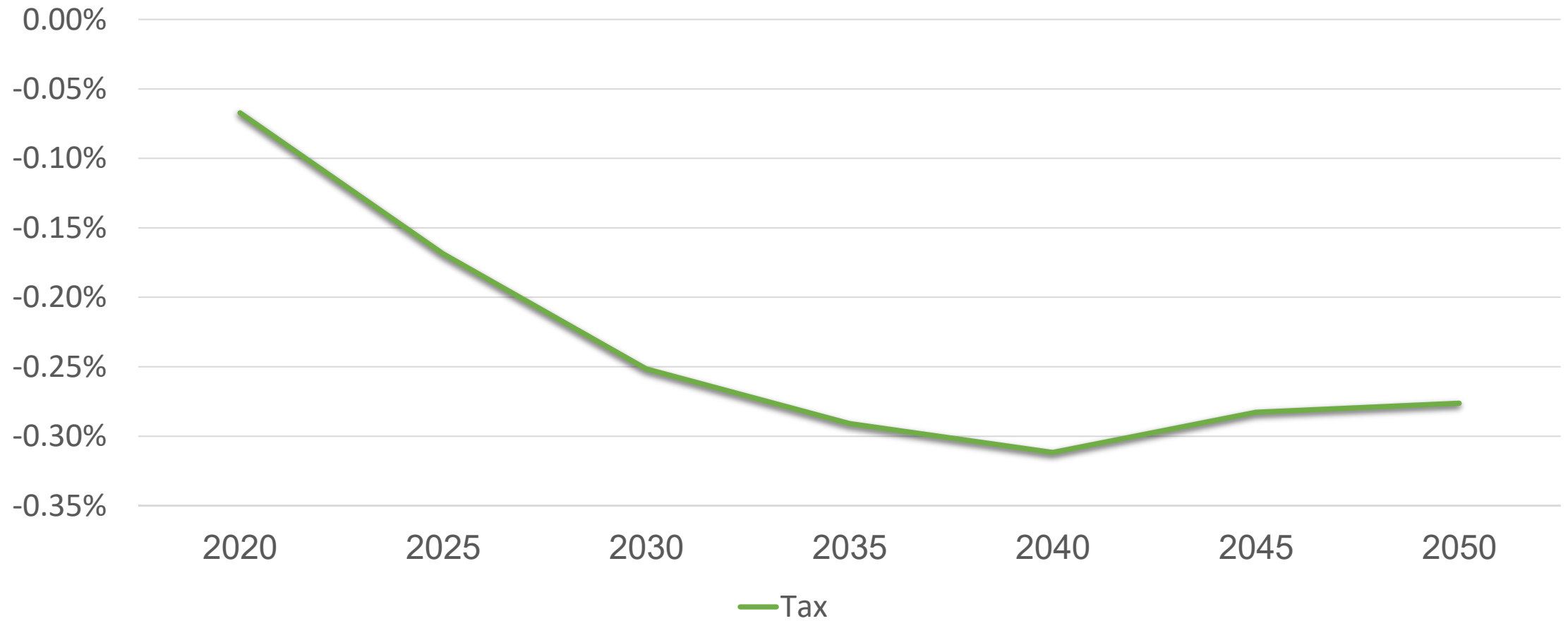


GHG% relative to 2015 and GDP % relative to baseline

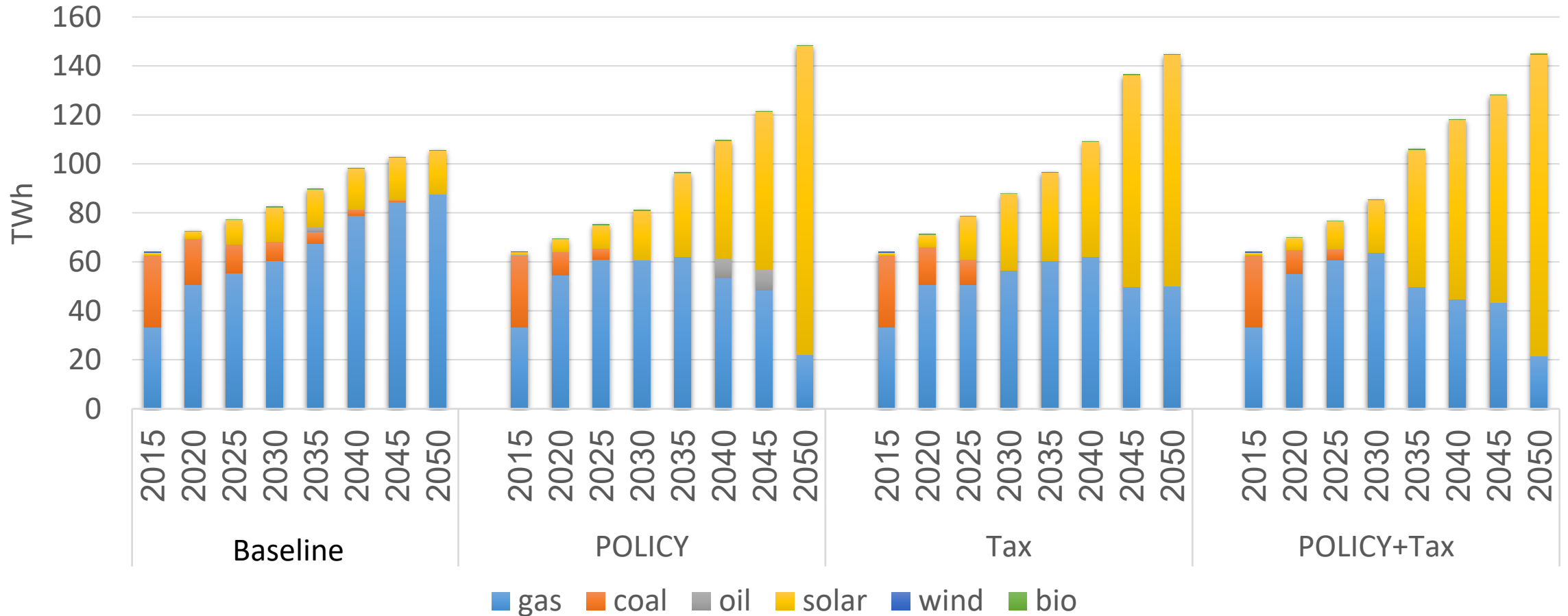


*פליטות הנובעות ממשק האנרגיה (כ-85% מכלל פליטות גז"ח)

The estimated direct economic cost of tax policy in terms of GDP

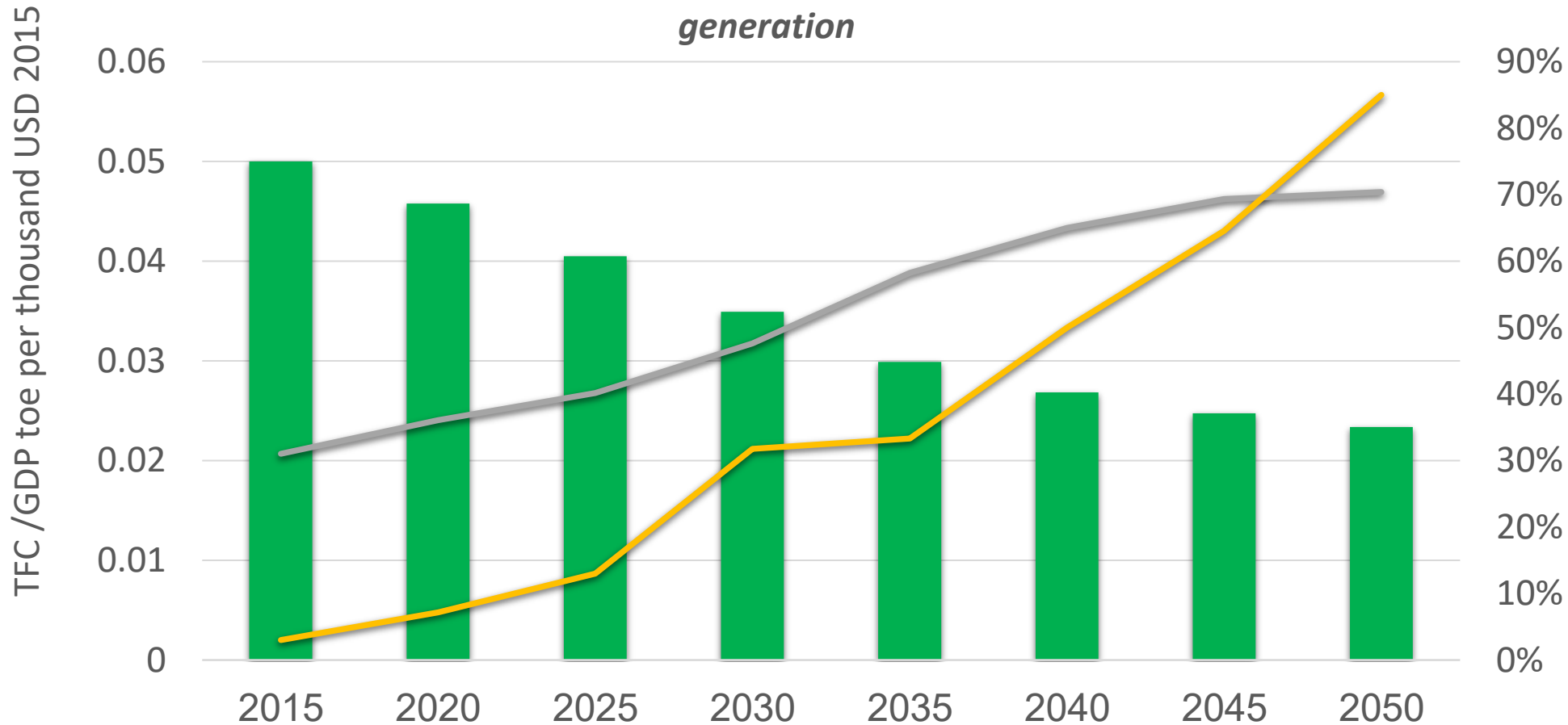


Energy mix in power generation TWh



The whole story in 3 energy indicators

Energy intensity, share of electricity in final energy mix, and share of RE in power generation



energy intensityPol

share electricity inTFC

RE in Elec



The Max Stern
Yezreel Valley
College

Ruslana Rachel Palatnik

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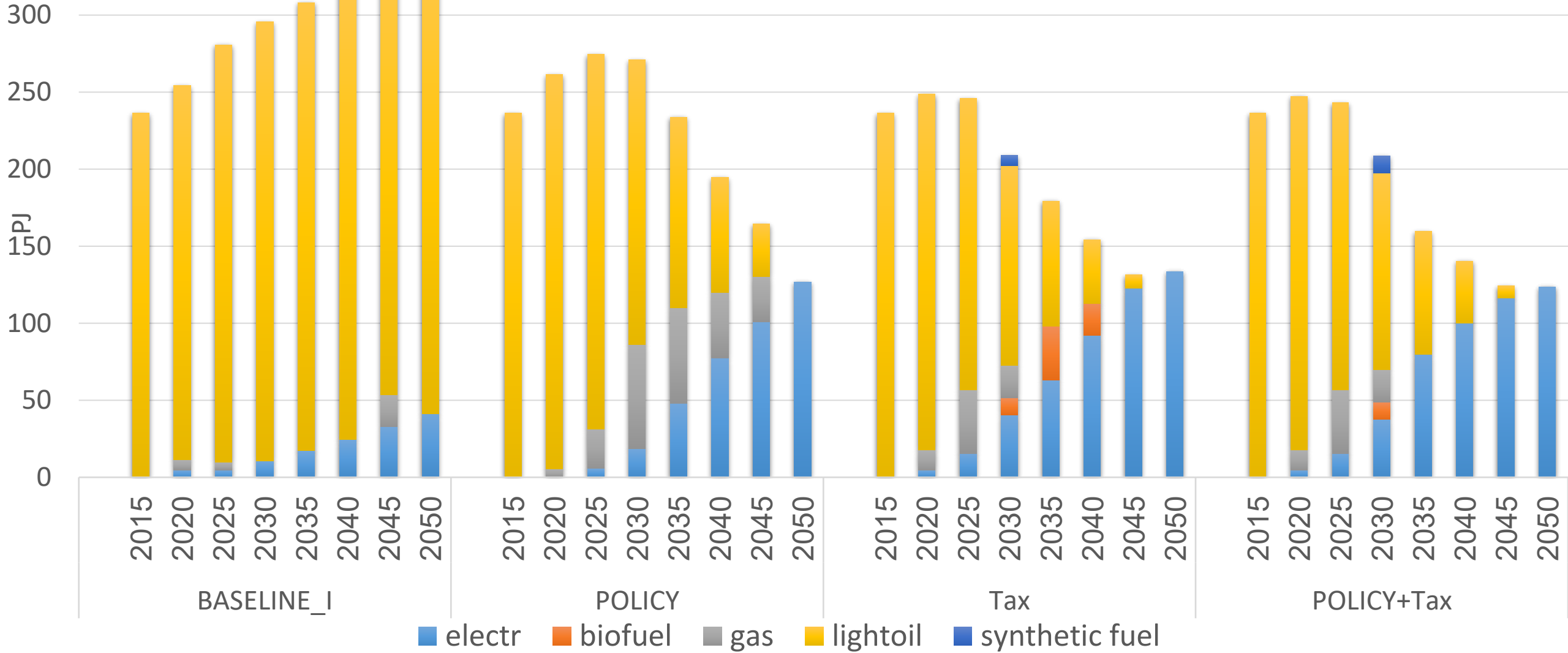


University of Haifa

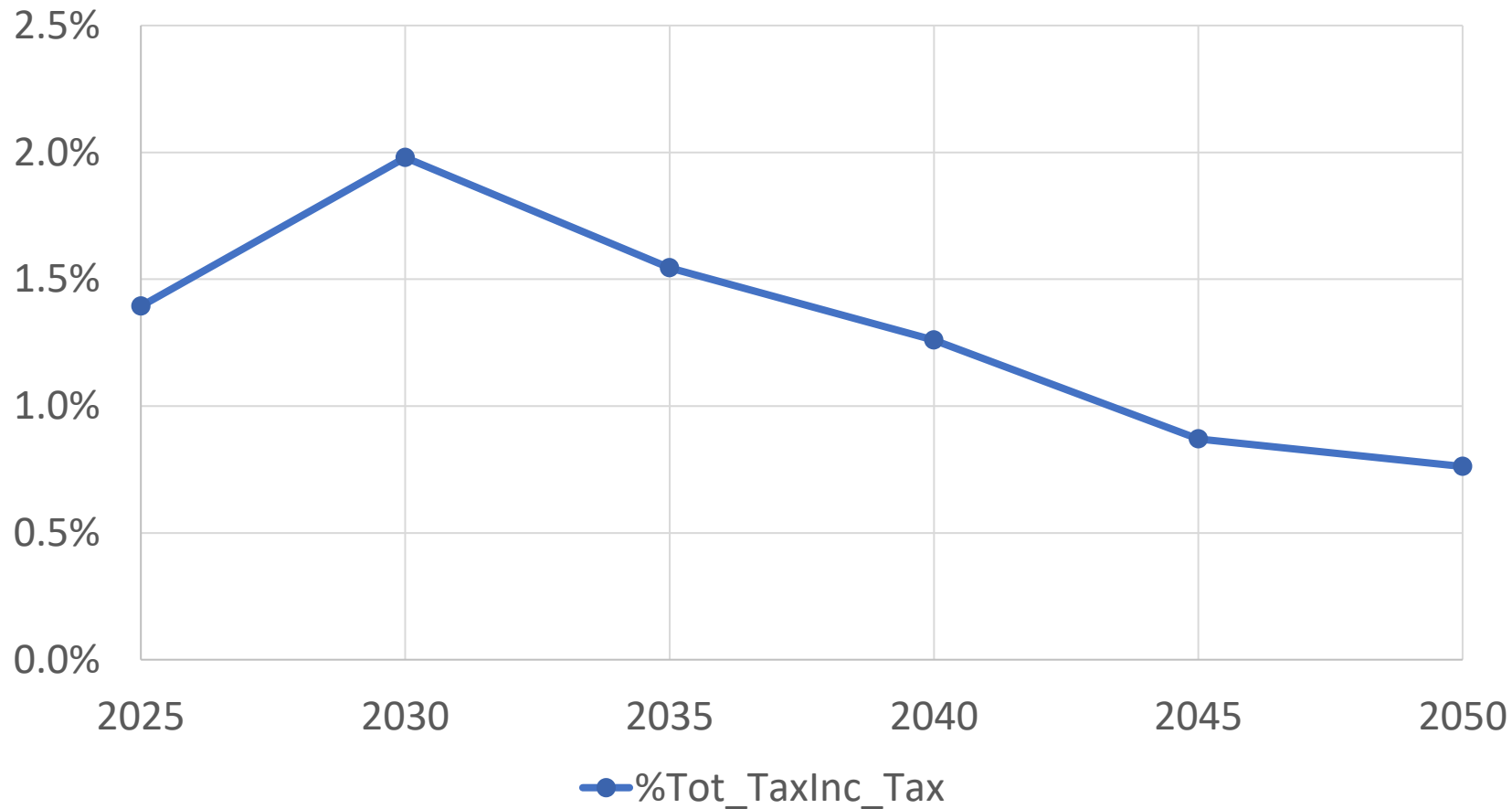


Sustainable
Environmental
Economic
Development
Research Center

Energy mix in transportation according to scenarios



Carbon tax revenue as % of public income



year	\$ per ton CO2eq
2020	\$0
2025	\$23.3
2030	\$48
2035	\$53
2040	\$58
2045	\$62
2050	\$67
2055+	\$69

*פליטות הנובעות ממשק האנרגיה (כ-85% מכלל פליטות גז"ח)

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Discussion

- Only energy related GHG emissions are analyzed
- Only direct costs of the transition are evaluated
- Related benefits for health, productivity, are not in the model

BUT

- Khan et al (2019) analyzed climate impact on countries' productivity
- Israel will **lose 1.15%** GDP per capita in 2050 in case of "no global climate mitigation policy"
- Israel will **gain 0.24%** GDP per capita in 2050 in case of "global climate policy"

Conclusions

- Carbon tax speeds up phase-out of oil in transport and decarbonization of industry
- Another important step for decarbonization is diverting energy production from the use of polluting fossil fuels to RE while electrifying the economy.
- The improved efficiency and transition to RE are partly due to the exogenous targets for RE in power generation and full electrification of transport and are partly due to the imposition of a carbon tax.
- Relatively low carbon tax values reduce energy-related GHG to 33% in 2050 compared to 135% in the Baseline with only a minor impact on GDP growth.

A personal note

- For years public policy in Israel ignored environmental considerations.
- In the past year there was a wind of change
 - Carbon tax is a part of the government budget
- Yet geopolitical tensions, energy prices, and other political circumstances might hamper the progress
- The public, decision-makers and policymakers should internalize environmental impacts in our decisions.
- We need to understand that there is a synergy in economic and sustainability goals, not a contradiction.

Within crisis, are the seeds of opportunity

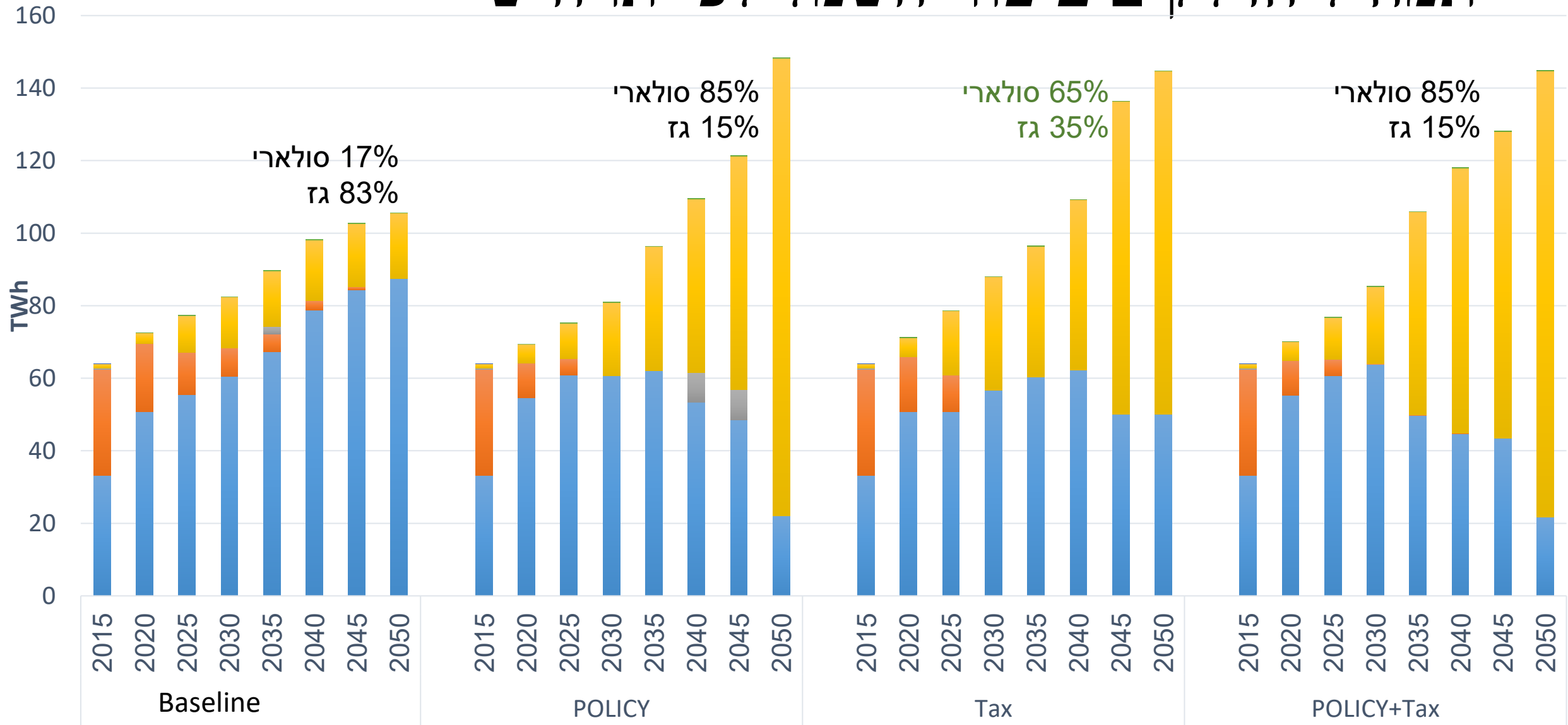
-Marilyn Monroe

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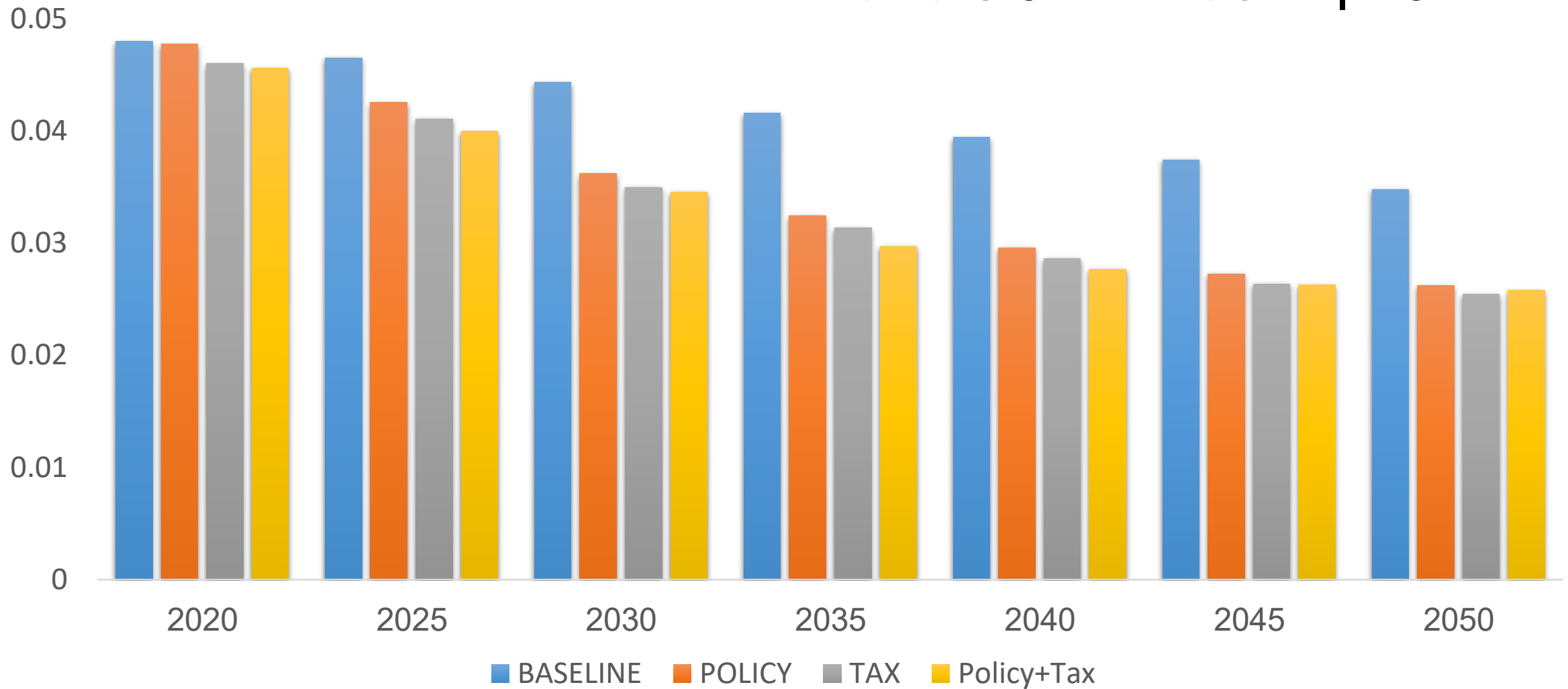
Ruslana Rachel Palatnik

שקפים נוספים לדיון

תמהיל הדלקים ביצור חשמל לפי תרחיש



יחס האנרגיה (עתירות אנרגטית): היחס בין צריכת אנרגיה סופית לתוצר



GDP and GHG emissions in Baseline 1, Policy and Ambitious policy scenarios

