

המשרד להגנת הסביבה



الوزارة لحماية البيئة
Israel Ministry of Environmental Protection

Pollution Release & Transfer Register

Summary & Analysis of 2019 Repts

September 2020

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[PRTR \(on Ministry of Environmental Protection website\)](#)

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PRTR - Pollutant Release and Transfer Register

Israel has committed to implement a PRTR within the framework of its joining the OECD.

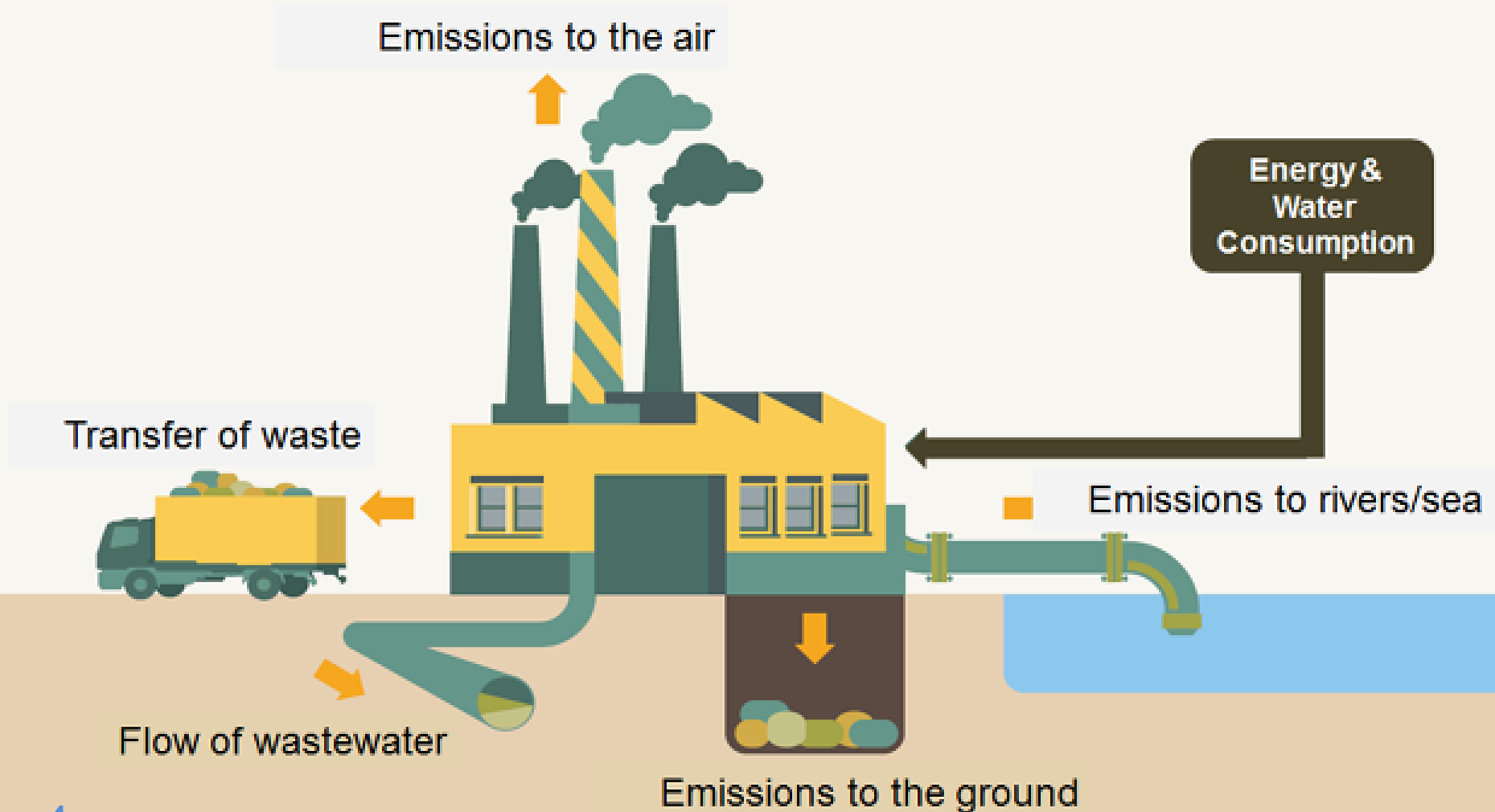
All OECD countries (aside from Turkey) have a PRTR, or a similar mechanism.

The largest industrial sectors report to the PRTR:

- **Energy** – power stations, refineries, fuel producers, etc.
- **Chemical** – producers of: pharmaceuticals, fertilizers, pesticides, etc.
- **Metal** – factories: foundries, smelting, galvanizing, metal plating, etc.
- **Food and beverages** – dairies, slaughterhouses
- **Waste and wastewater** – wastewater treatment plants, landfills, transit stations, etc.
- **Animal breeding** – poultry, pigs, fish, etc.

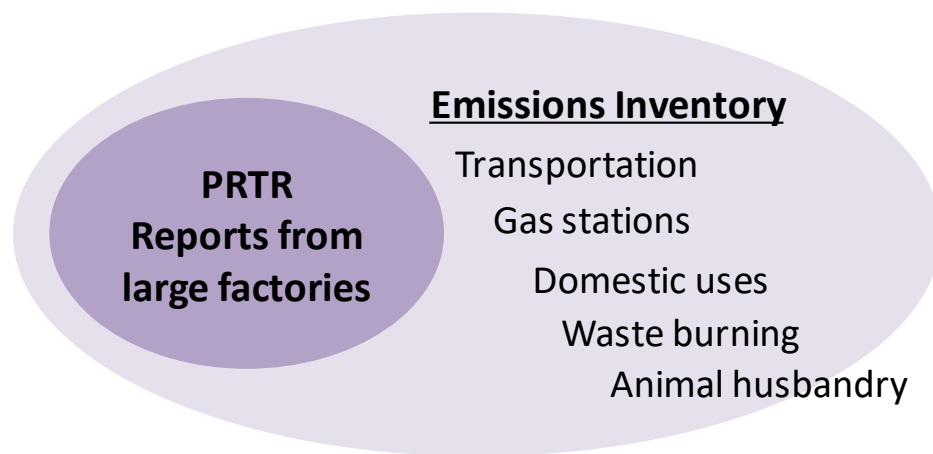


What is reported in the PRTR?



Explanation: National emissions inventory

The inventory includes the total emissions of pollutants from most emissions sources in Israel. The inventory, which includes the PRTR, was calculated by the Ministry of Environmental Protection according to methodologies accepted by the European Union's EEA and the United States EPA. The inventory is updated once every two years. The most recent one published was for 2018.



[Link to 2018 inventory of air emissions](#)

The 2018 inventory included, for the first time, calculations for known and probable human carcinogens – formaldehyde, benzo[a]pyrene, cadmium, mercury, nickel, arsenic, and lead. It also included ammonia, as well as calculations of emissions from the following sources:

Various types of fires - municipal waste, agricultural waste, wood for domestic heating, charcoal

Transport - vessels in ports, trains, mechanical vehicles

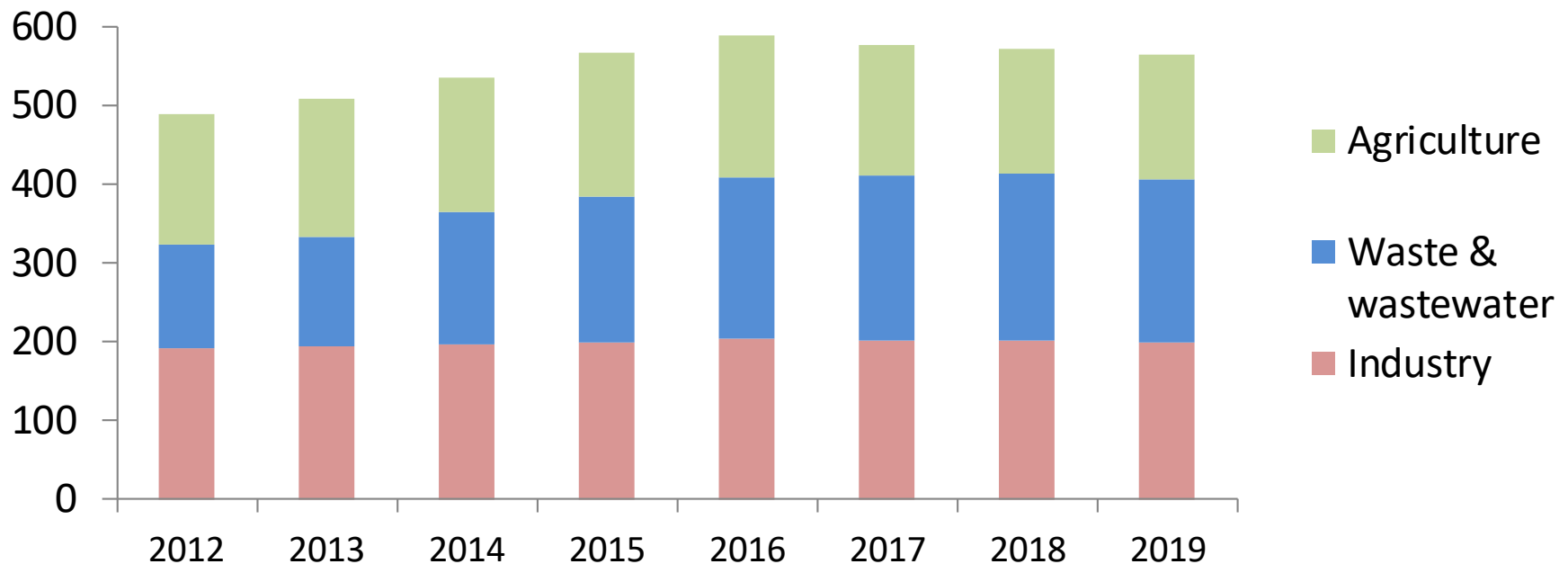
Animal husbandry - cowsheds, chicken coops, pigpens



In 2019:

- > 18 factories were shut down or reduced activities
- > 17 factories reported to the PRTR for the first time

Number of factories reporting



In 2019, 18 factories were closed or emissions were reduced to below the reporting threshold: 1 power plant (Etgal), 3 metals plants (Supersold, A. Schnep, Chromenikel), 1 chemical plant, 2 quarries, 1 hazardous waste treatment plant, 4 landfills, 3 waste transit stations, 2 chicken coops

17 factories reported for the first time: beverage manufacturer, surface treatment plant, ceramics producer, slaughterhouse, chicken coops, waste transit stations, mines, quarries

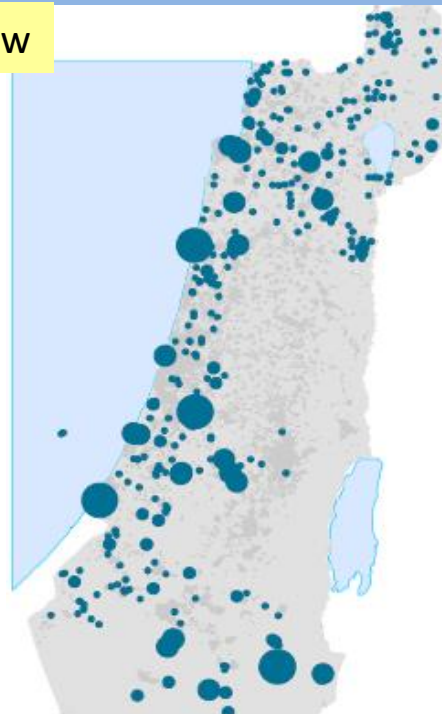
Enforcement proceedings are being considered against factories that are obligated to, but haven't, submitted PRTR reports



Total 2019 external costs of emissions to air from PRTR factories: NIS 13 billion

New

10 largest polluters: Make up 73% of external costs



#	Location	Factory	External costs (million of shekels)	
			Pollutants	Greenhouse gases
1	Hadera	IEC: Orot Rabin Power Plant	2,092	1,592
2	Ramle	Nesher Israel Cement Enterprises	818	396
3	Ashkelon	IEC: Rutenberg Power Plant	493	1,154
4	Mishor Rotem	Rotem Amfert Negev	345	72
5	Nof Hagalil	Phoenicia Glass Industries	176	15
6	Ashkelon	Dorad Power Station	157	238
7	Beit Shemesh	Hartuv Cement	122	62
8	Ashdod	Paz Ashdod Oil Refinery	119	58
9	Haifa	Oil Refineries Ltd.	105	244
10	Gezer	IEC: Gezer Combined Cycle Plant	95	219
Total in PRTR			6,218	6,725

External costs, in millions of shekel

- Less than 3
- 3-30
- 30-300
- More than 300

- External cost expresses negative externality effects on health and the environment as a monetary value.
- The calculation includes 18 pollutants whose external costs have been calculated, doesn't include GHGs.
- The calculation was performed according to the methodologies recorded in the MoEP's [Green Book](#).
- After Rutenberg emissions were reduced, Nesher's factory became Israel's second largest polluter.
- The Phoenicia factory was closed in May 2020. The Hartuv cement plant closed its production kiln in Dec. 2019.
- The PRTR Law did not apply in Judea and Samaria.



In 2019 external costs of emissions to air were reduced by 3% to ~NIS 450 million

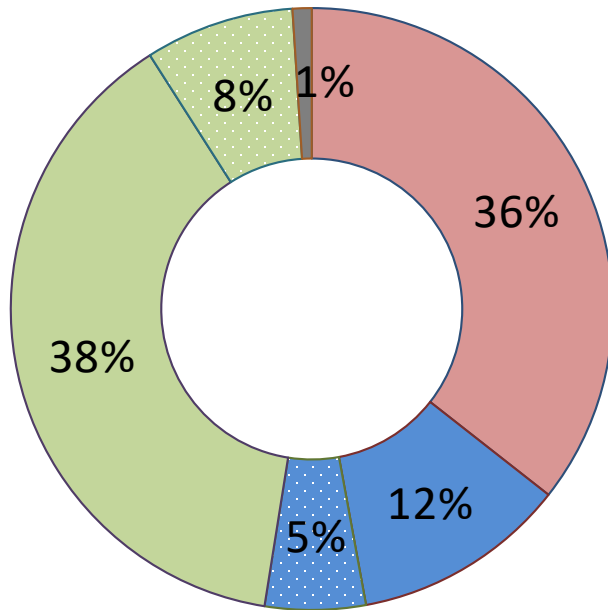
New 10 factories with largest decrease in external costs of air pollution in 2019

#	Location	Factory	External costs (millions of NIS)		Reduction percentage	Details
			2018	2019		
1	Migdal Haemek	Nilit	46.6	6.4	86	Transfer to natural gas use
2	Marine environment	Noble Energy - Tamar Gas	37.5	14.4	61	Emissions recovery system installed
3	Haifa	Shemen Industries	34.9	14.3	59	Decrease in fuel oil, increase in natural gas
4	Tel Aviv	IEC: Rutenberg Power Plant	47.5	36.4	23	Decrease in CO2 (production drop)
5	Mishor Rotem Industrial Zone	Rotem Amfert Negev	517.8	417.3	19	Decrease in sulfur oxides, particles, NMVOC
6	Alon Tabor Industrial Park	IEC: Alon Tabor Power Plant	144.9	120	17	Decrease in CO2 (production drop)
7	Ashdod	Paz Ashdod Oil Refinery	213	176.6	17	Decrease in nitrogen oxides & sulfur oxides
8	Zin Factory Industrial Park	Rotem Amfert Negev - Zin factory	32.5	28.7	12	Decrease in particulate matter & nitrogen oxides
9	Haifa	Oil Refineries Ltd.	382	348.4	9	Decrease in nitrogen oxides, sulfur oxides, ammonia, NMVOCs
10	Hadera	IEC: Orot Rabin Power Plant	4,010	3,684	8	Decrease in nitrogen oxides & sulfur oxides



- > Transportation makes up 46% of emissions
- > Electricity generation makes up 36%

National overview
2018 inventory + 2019 PRTR



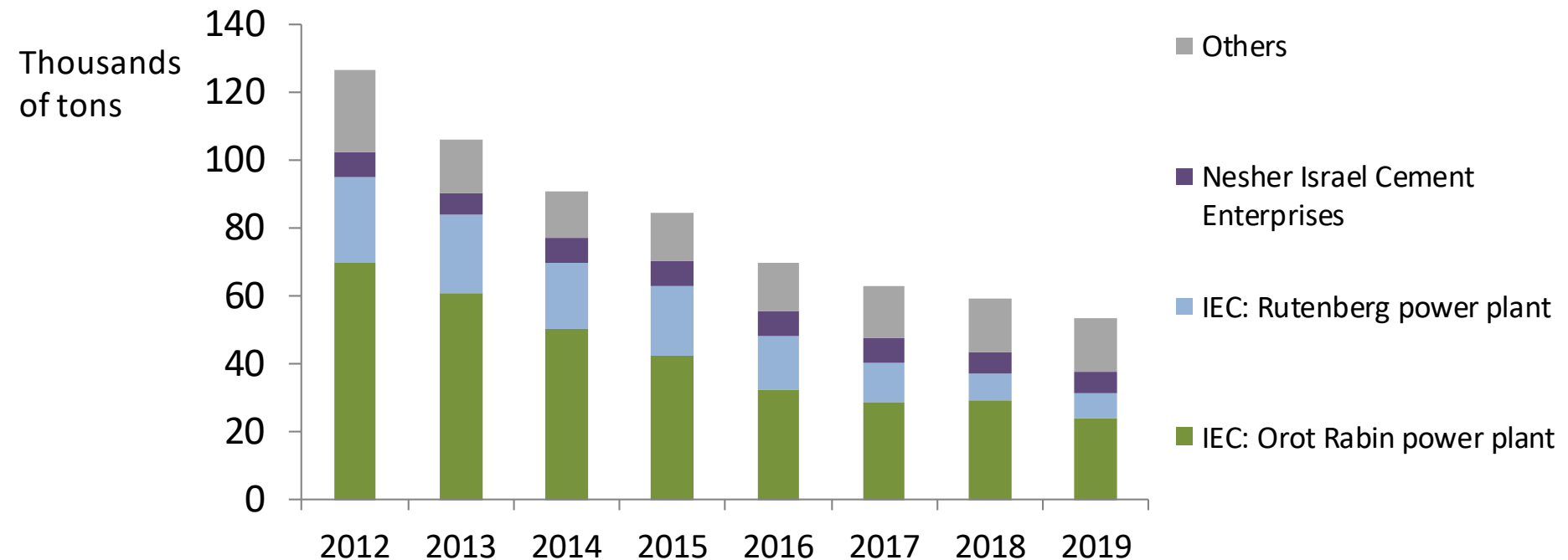
- Electricity generation
- Industry in the PRTR
- Industry (not in PRTR)
- Overland transportation (roads, heavy machinery, trains)
- Maritime transportation
- Other



Nox: Since 2012, emissions to the air have dropped by 58%

Multi-year PRTR trend

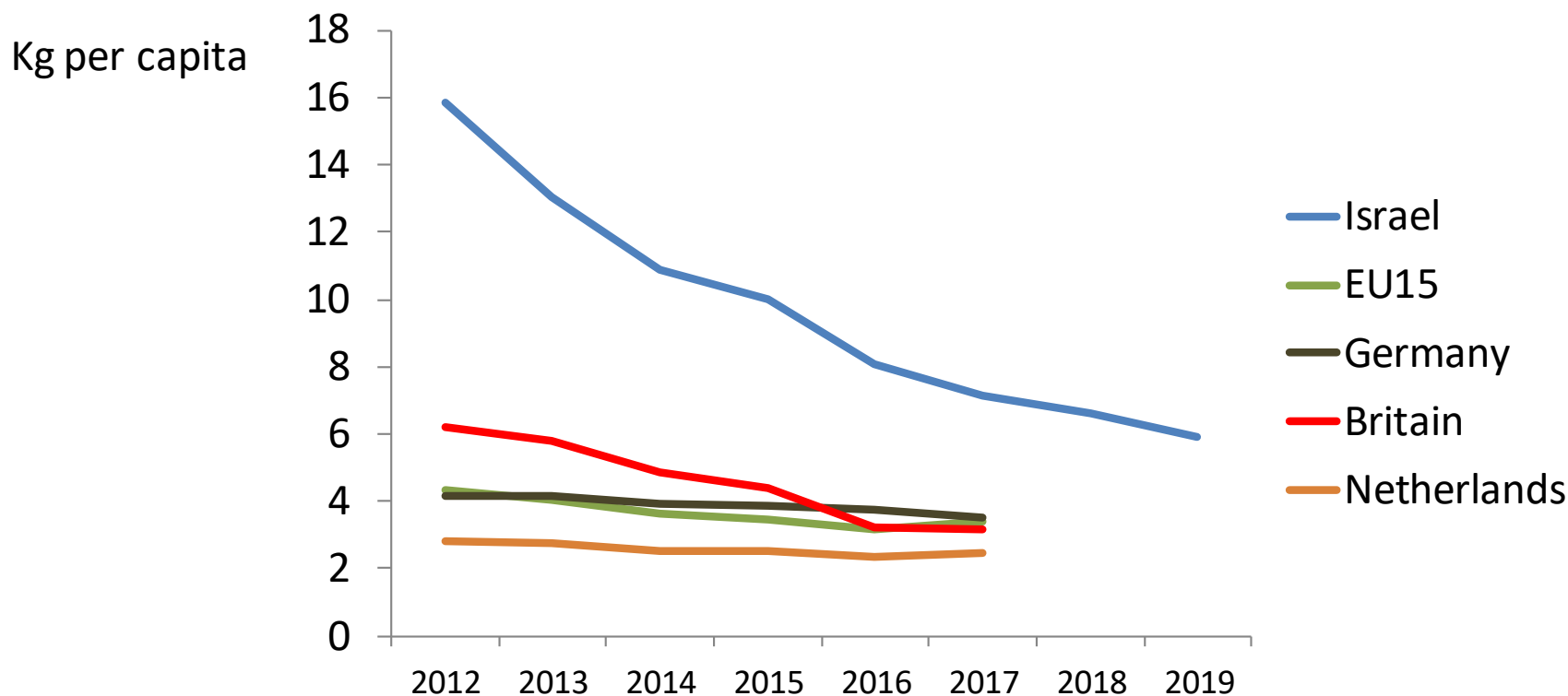
In 2019, Nox emissions fell 11%, mainly due to a reduction in coal use in the old production units at Orot Rabin. 70% of emissions are caused by 3 sources: the Israel Electric Company's Orot Rabin (Hadera) and Rutenber (Ashkelon) power plants and Nesher Israeli Cement Enterprises in Ramla.



Nox: After reductions, per capita emissions in Israel are double those in the EU15

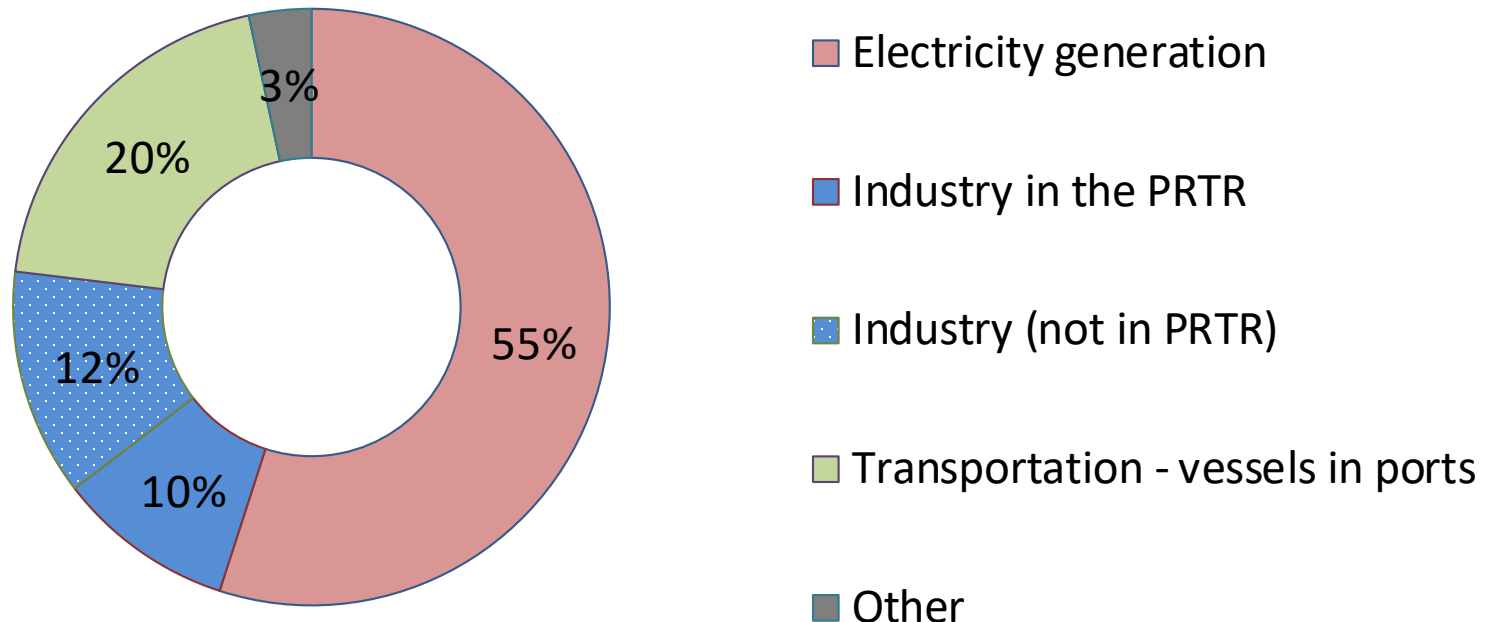
International comparison

Emissions per capita in Israel is still double that of the EU15, because some of the production units at the coal-fired power plants still operate without advanced reduction measures.



SOx: Power plants contribute 55% of emissions

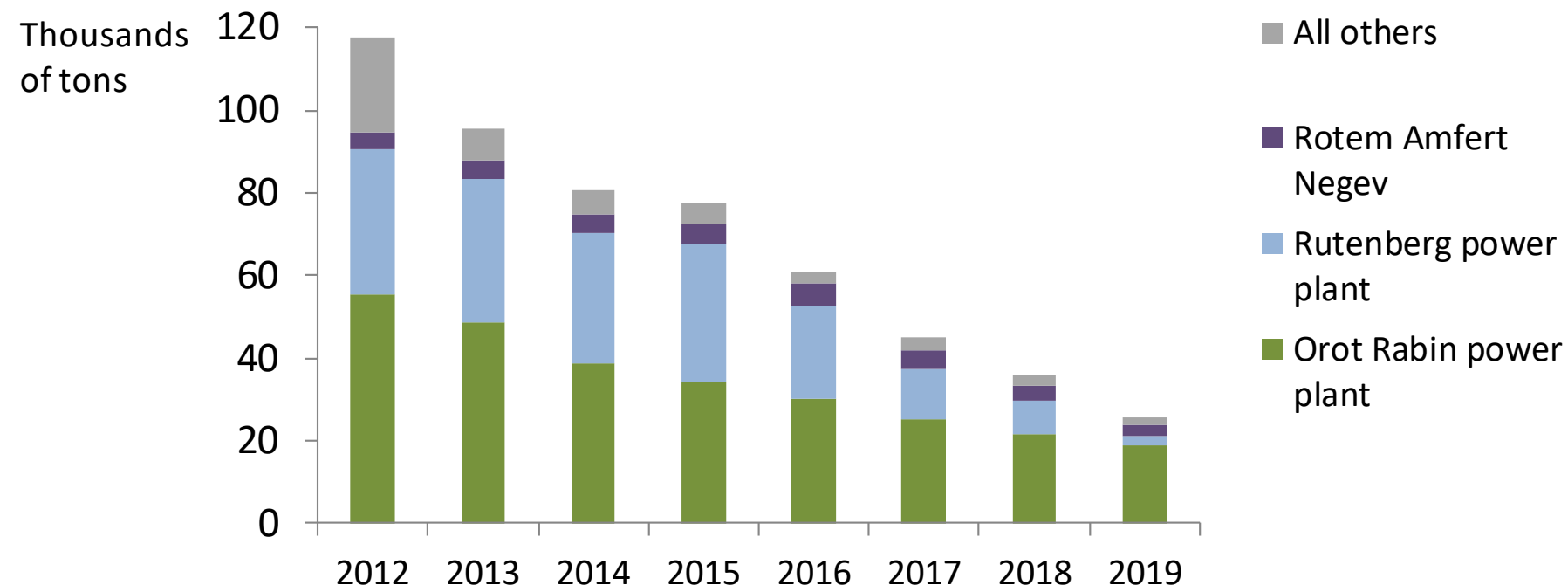
National overview
2018 inventory + 2019 PRTR



SOx: Since 2012, SOx emissions decreased by 78%

Multi-Year PRTR trend

In 2019, there was a 28% reduction in sulfur oxide emissions, mainly due to implementation of the Ministry's requirements to install reduction equipment in coal-fired power plants. FGD systems began operating in Rutenberg's Units 1 and 2. In addition, there was a transition to natural gas instead of fuel oil in 13 factories. The Orot Rabin power plant causes 74% of all sulfur oxide emissions in the PRTR.

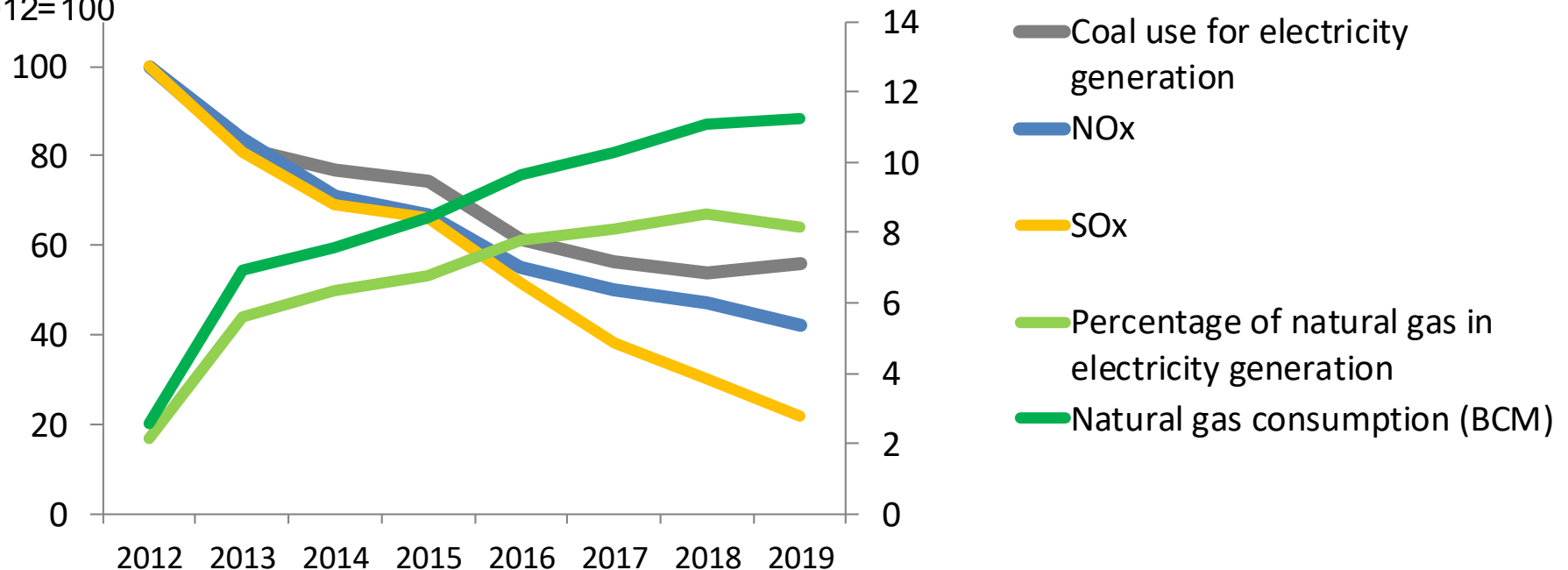


Despite an increase in coal use, emissions decreased due to installation of pollution-reduction devices

Coal consumption mainly increased due to Units 5 & 6, and Units 1 & 2, at the Orot Rabin and Rutenberg power plant, respectively. These units have emissions-reducing devices. There was also a significant decrease in coal use at the older Orot Rabin production units.

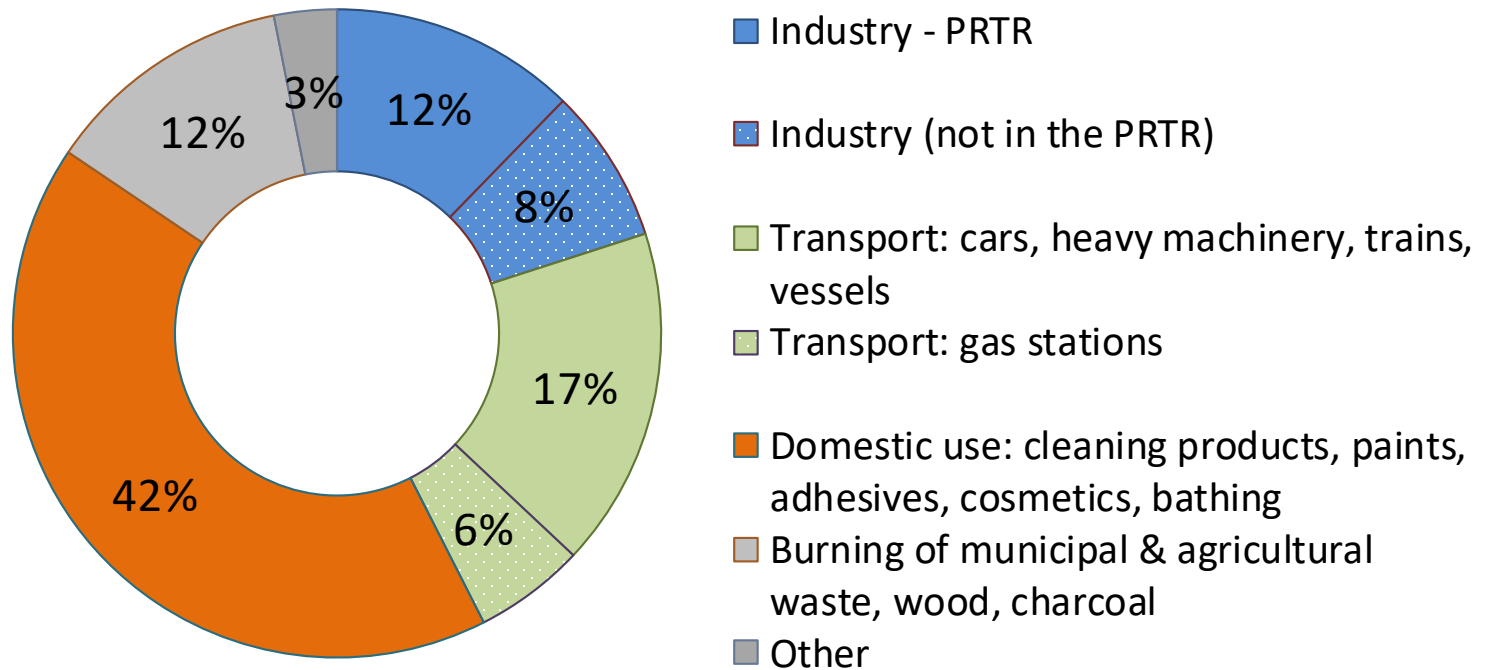
Percentage of natural gas use in electricity generation/Pollutants and coal use
2012= 100

Natural gas consumption (BCM)



NMVOCs: Domestic use makes up 42% of emissions

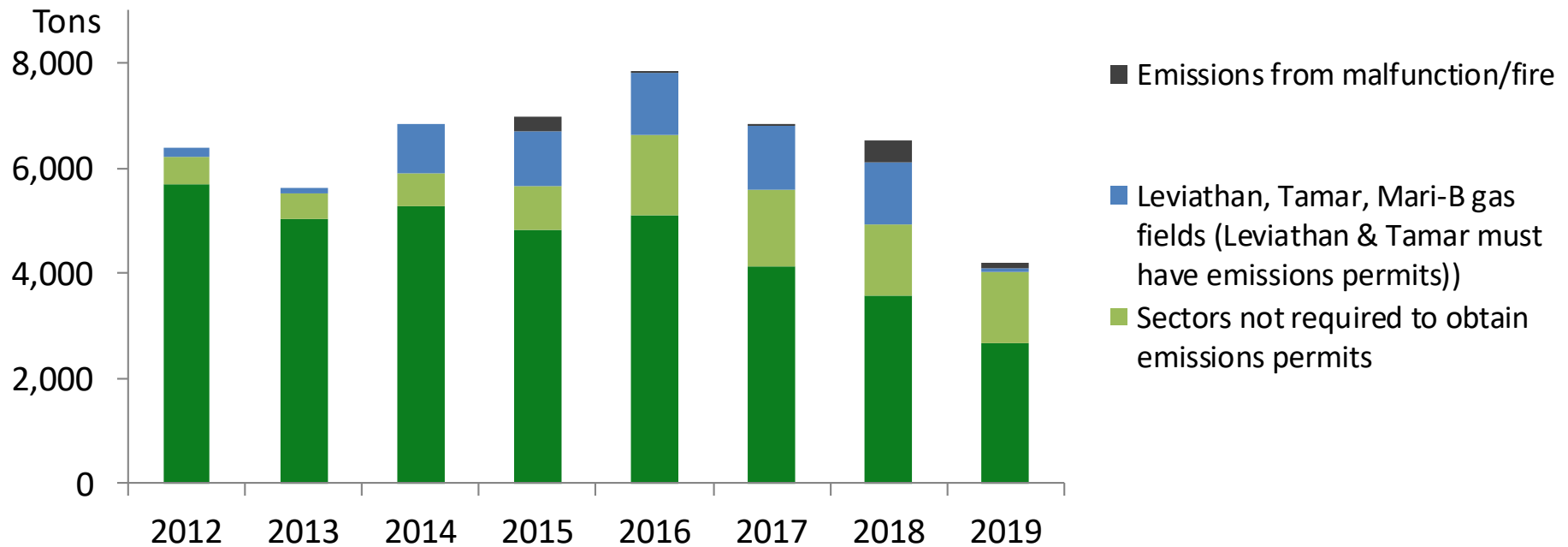
National overview:
2018 inventory + 2019 PRTR



NMVOCs: Routine emissions decreased by 30% (including the Leviathan*, Tamar, & Mari-B** rigs)

Multi-Year PRTR trend

Routine NMVOC emissions (excluding malfunctions/fires) decreased 36% cumulatively since 2012. Emissions from sectors required to have air emission permits decreased 53% cumulatively since 2012. In 2019, emissions fell 25% (due to MoEP demands of ORL, Carmel Olefins, Rotem Ampert Negev, and CLP Industries). Emissions increased in sectors not required to have emission permits, due to a 2016 change in calculation guidelines. In March 2019, the Tamar gas rig installed an emissions recovery system, which reduces 98% of emissions.



* During the Leviathan testing period, from Nov. 18 to Dec. 31, 2019, 5.8 tons of NMVOCs were emitted.

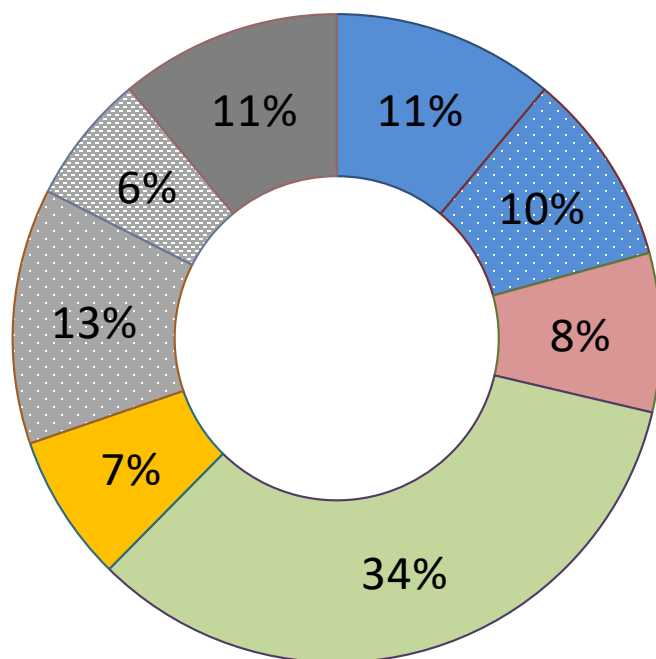
Leviathan is exempt from reporting to the PRTR in its first year, under section 3 (f) of the PRTR Law. These data are based on an annual report submitted to the MoEP, as per conditions of Leviathan's air emissions permit.

** The Mari-B rig stopped producing natural gas on May 31, 2019.



PM10: Waste burning contributed 19% of emissions

National overview
2018 inventory + 2019 PRTR



- Industry in the PRTR
- Industry (not in the PRTR)
- Electricity generation
- Road transportation, heavy machinery, trains, vessels (in ports)
- Animal husbandry
- Illegal burning of municipal waste
- Burning of agricultural waste
- Burning of wood for home heating and charcoal

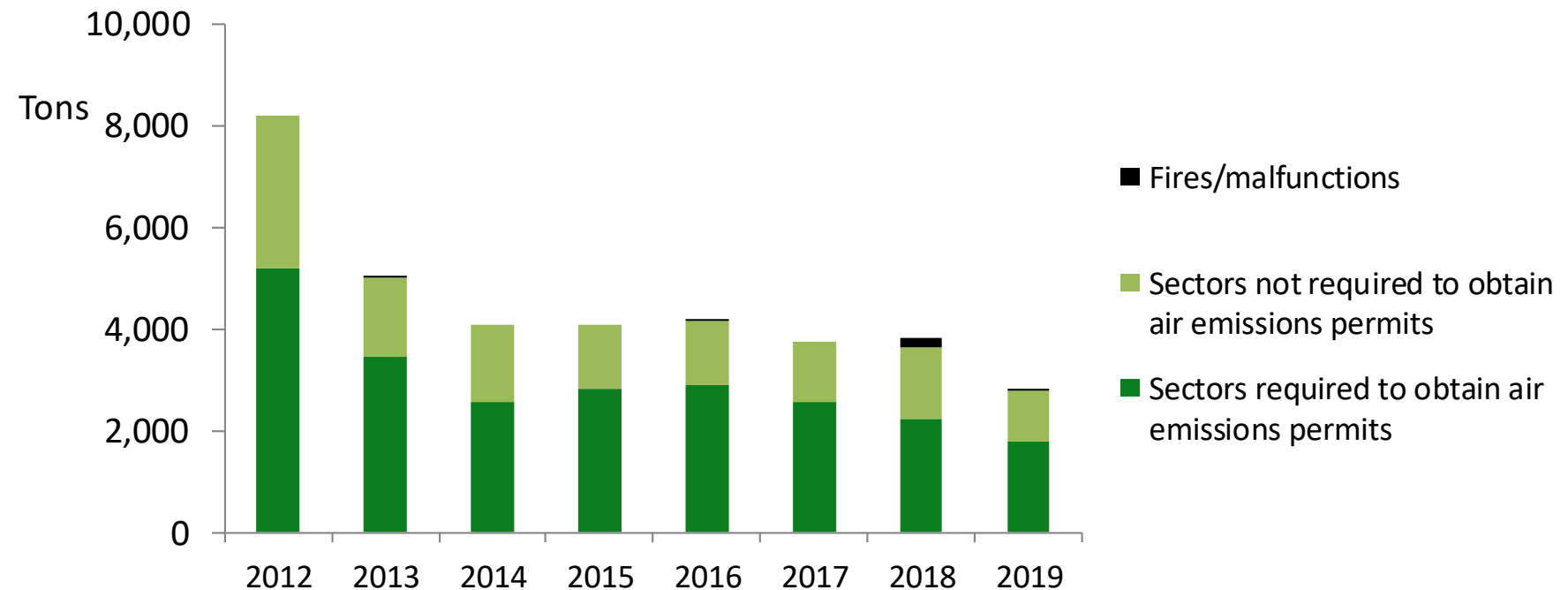


It should be noted that PM10 particles also come from deserts outside of Israel.
The background concentration of these particles is about 40 micrograms per cubic meter.

PM10: Routine emissions from sectors required to obtain air emissions permits were reduced by 19%

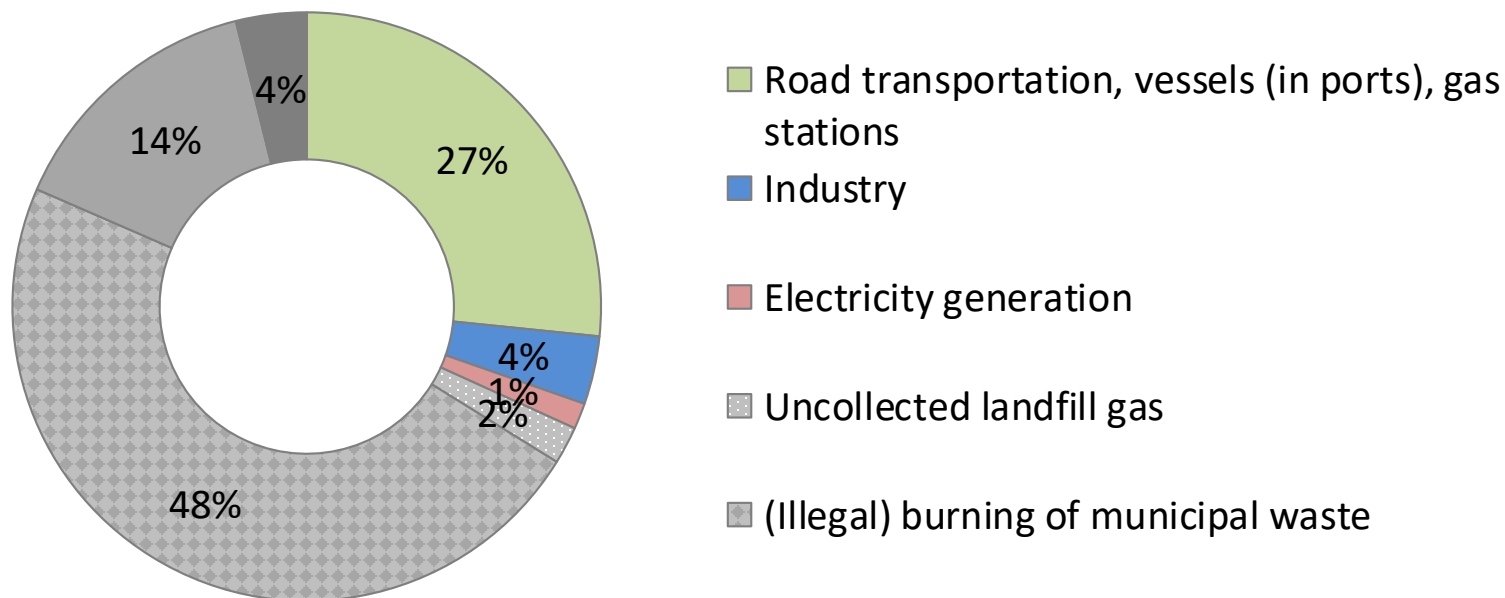
Multi-year trend in PRTR

PM10 emissions reported to the PRTR have decreased cumulatively since 2012 by 66%; in 2019 they decreased by 27%. Most of the reductions in 2019 were at Rotem Amfert Negev, the Rutenberg power station, and the OPC Rotem power plant. Emissions from sectors required to obtain air emission permits have decreased cumulatively since 2012 by 65%. Most of the reduction in 2019 were due to updates in guidelines for calculating emissions to chicken coops.



Known or probably carcinogens*: Waste fires contributed 62% of emissions

National overview
2018 inventory + 2019 PRTR



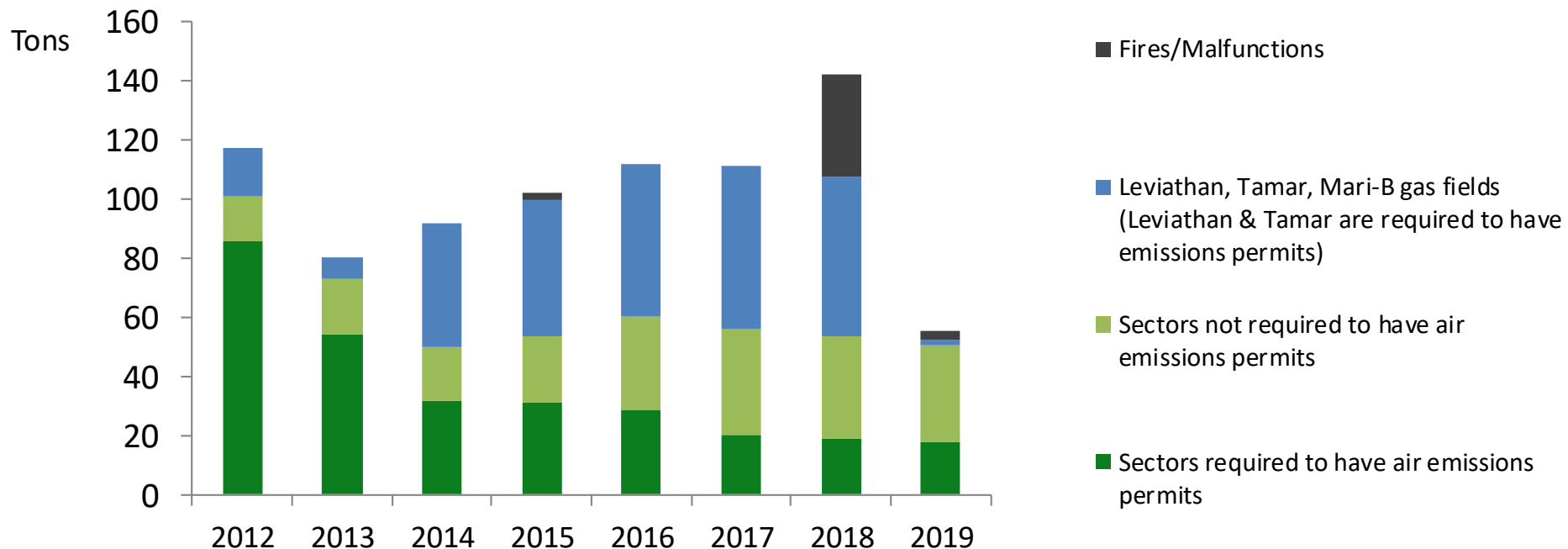
The reporting obligation to the PRTR includes a list of 114 pollutants. Of these, 38 are known or probable carcinogens, according to the Ministry of Health's Inter-Ministerial Committee for Carcinogens, Mutants and Teratogens.



Known or probably carcinogens: Routine emissions decreased 51% in 2019 (including Leviathan,* Tamar, Mari-B** gas platforms)

Multi-Year PRTR trend

The reason for the decrease is that at the end of March 2019, an emissions recovery system was installed in the Tamar gas rig, which reduces 98% of emissions. Routine emissions (excluding malfunctions/fires) have decreased cumulatively since 2012 by 55%. Emissions from industries required to have air emission permits decreased in 2019 by 5%, and cumulatively since 2012 by 79%. Emissions from sectors not required to have emissions permits increased as the result of the updating of calculation guidelines.



*During the run-up period for the Leviathan rig, from Nov. 18, 2019 to Dec. 31, 2019, 0.023 tons of known or probable carcinogens were emitted into the air. Leviathan is exempt from reporting to the PRTR because it is in its first year of operation. These data are based on an annual report submitted to the Ministry, in accordance with its air emissions permit.

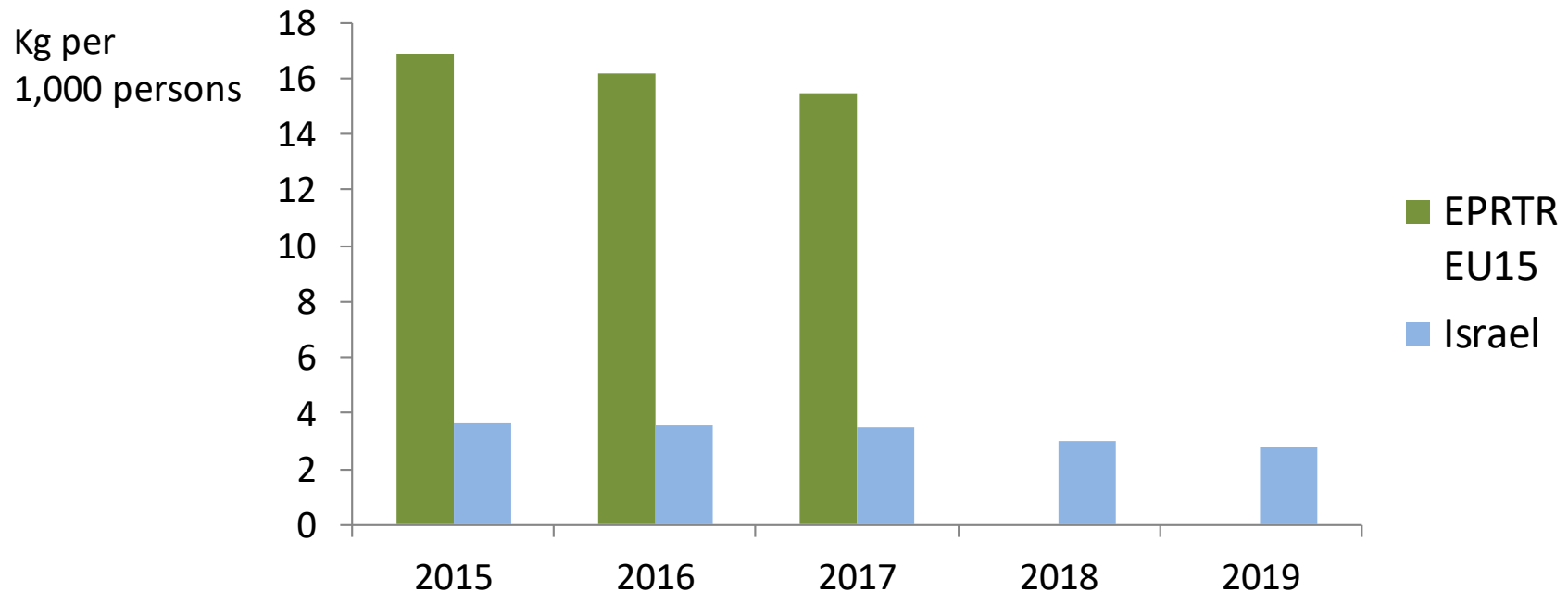
** The Mari-B rig stopped producing natural gas on May 31, 2019.



Known or probably carcinogens: | Routine per capita emissions were 82% lower than EU15 emissions

International comparison

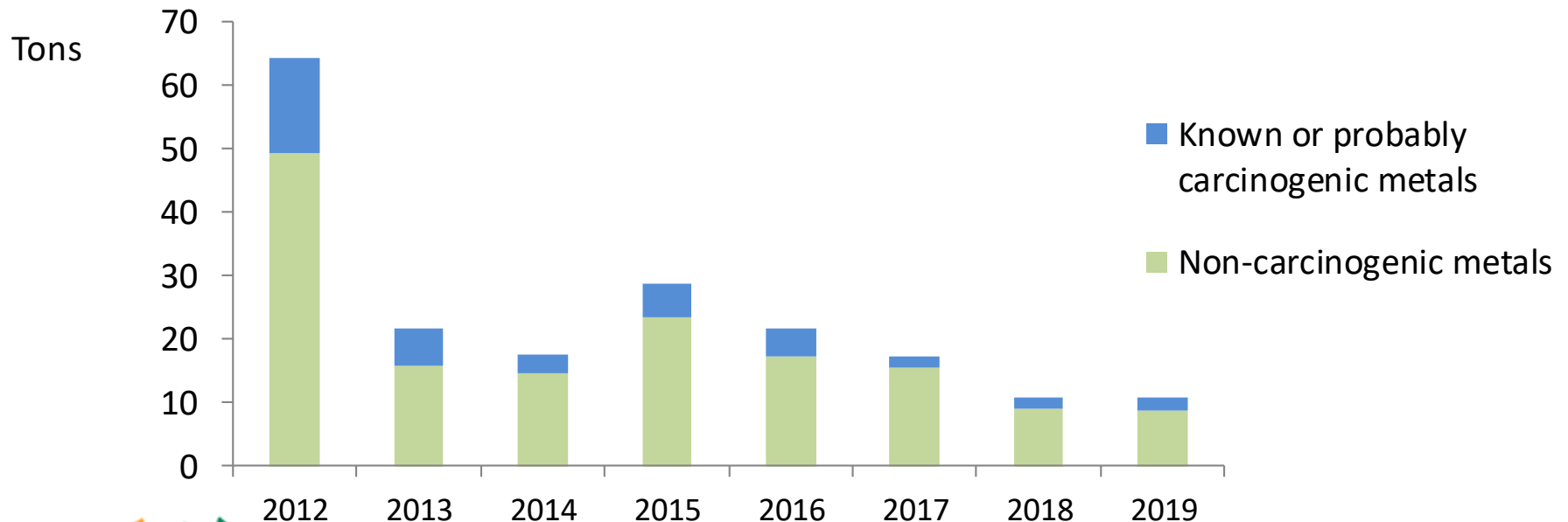
The European PRTR does not include fuel production; therefore natural gas rigs are not included in the comparison. The comparison also does not include 3 industries that were added to Israel's PRTR, and 4 materials that are not included in the European Registry.



Metals: There was no change in emissions to the air in 2019

Multi-Year PRTR trend

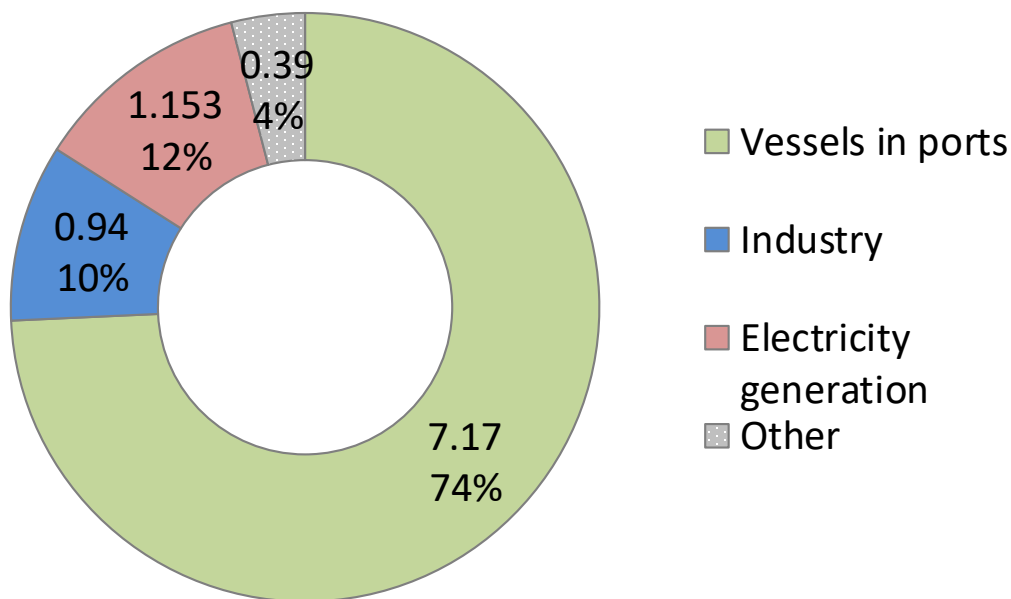
Metal emissions reported to the PRTR have decreased cumulatively since 2012 by 82%. Emissions of metals that are known or probable human carcinogens have decreased cumulatively since 2012 by 86%. In 2019, there was a 5% increase in the emission of carcinogenic metals into the air, due to an increase in the amount of mercury emitted at the Orot Rabin power plant - 229 Kg compared to less than 0.5 kg in 2018 (unknown reason), and at the Nesher plant - 155 kg compared to 34.6 Kg in 2018 (change in calculation method – from calculation by sampling to calculation by continuous monitoring).



Known or probable carcinogenic metals:*

Vessels in ports contribute 74% of emissions

National overview
2018 inventory + 2019 PRTR

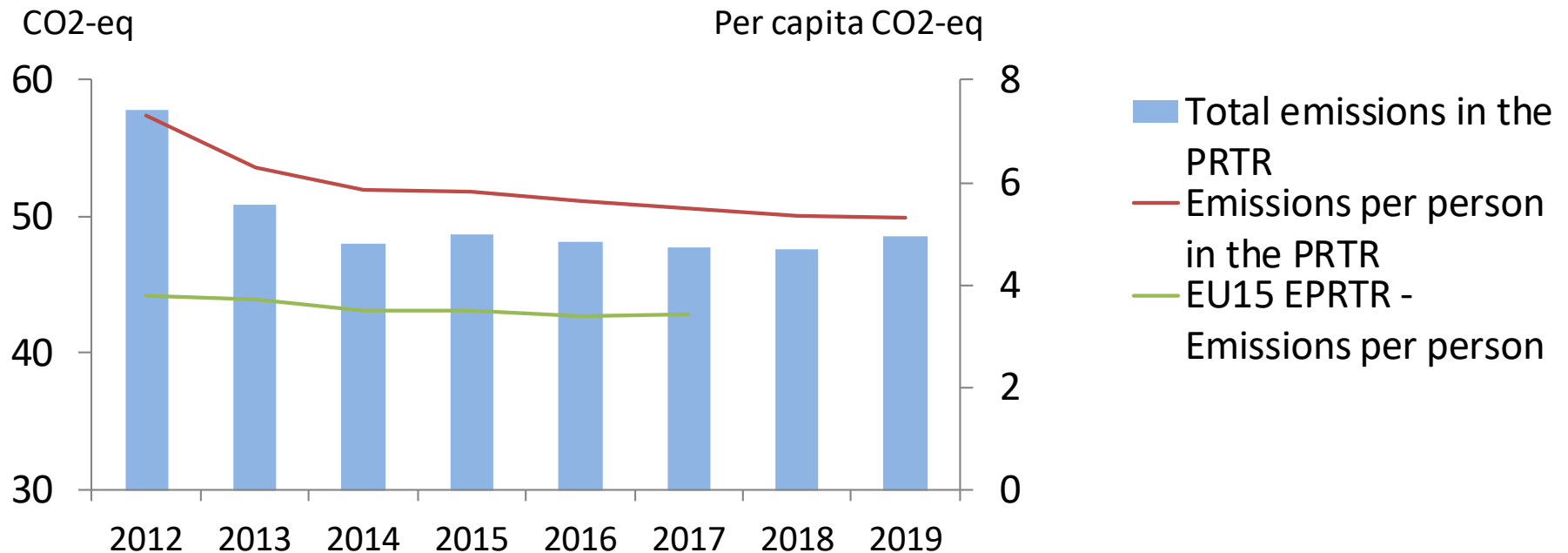


Greenhouse gases: 2% increase in emissions

International comparison

Half of the increase in greenhouse gas emissions in 2019 was caused by an increase in electricity production. The other half was due to a doubling of HFC cooling gas emissions (a malfunction in the Milouoff slaughterhouse).

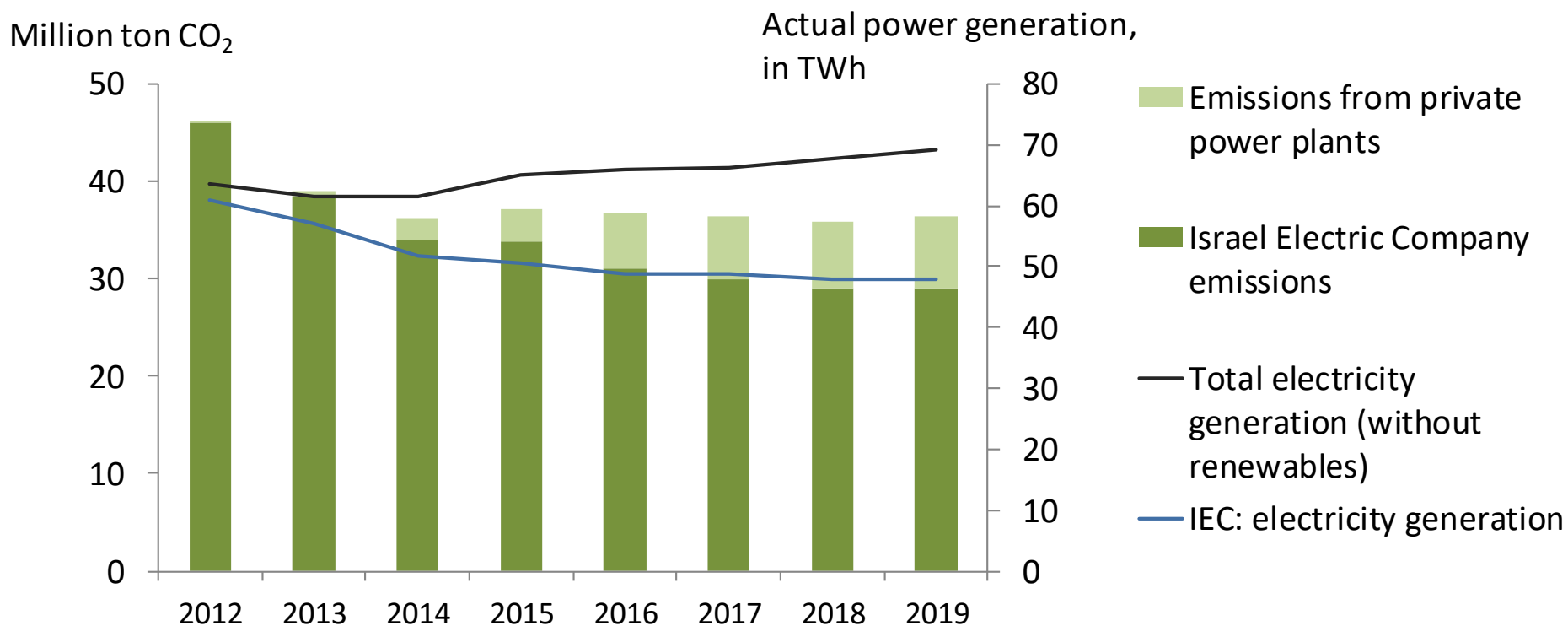
Despite a 27% decrease in per capita GHG emissions in the PRTR since 2012, this figure is still 55% higher than the per capita emissions in the EPRTTR (EU15).



Carbon dioxide: 2% increase in emissions from power plants

Multi-Year PRTR trend

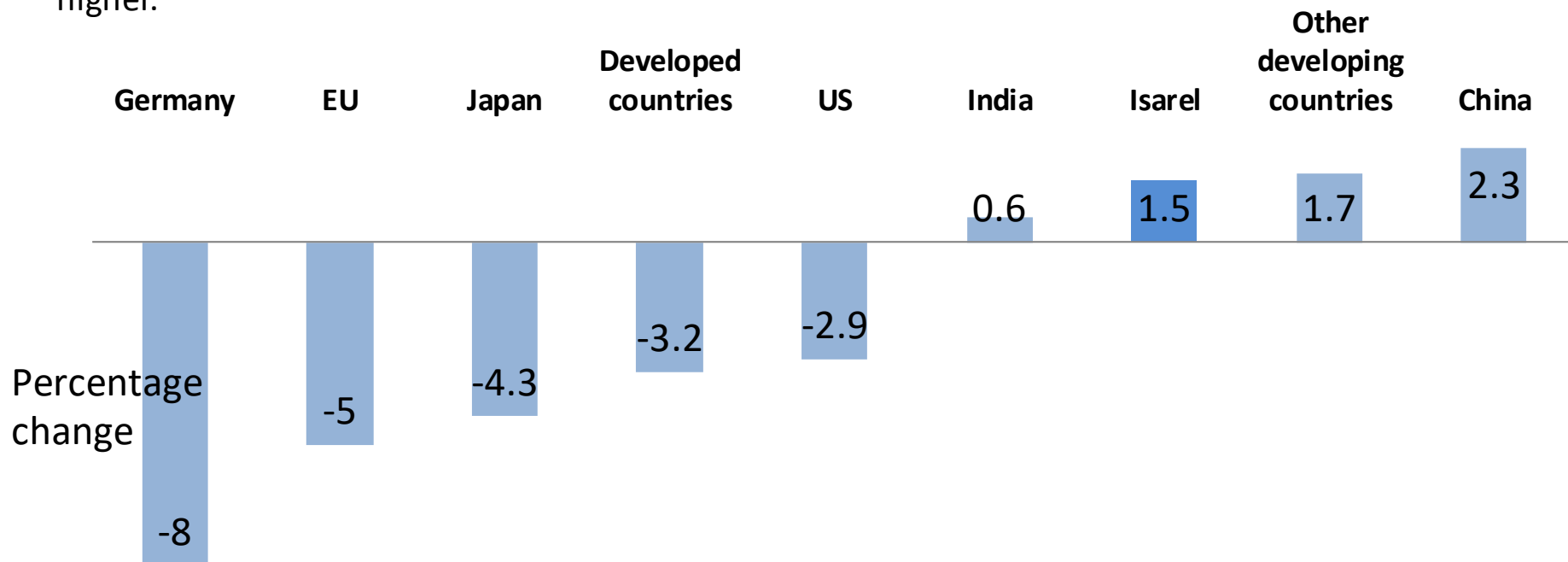
Despite a 9% increase in electricity generation (from non-renewable sources) since 2012, carbon dioxide emissions from power plants have decreased by 22%, due to a reduction in the use of coal for electricity generation. The Alon Tavor power plant passed from the Electric Company to private ownership in 2019.



Carbon dioxide: Increase in emissions in the energy sector in Israel in 2019

International Comparison New

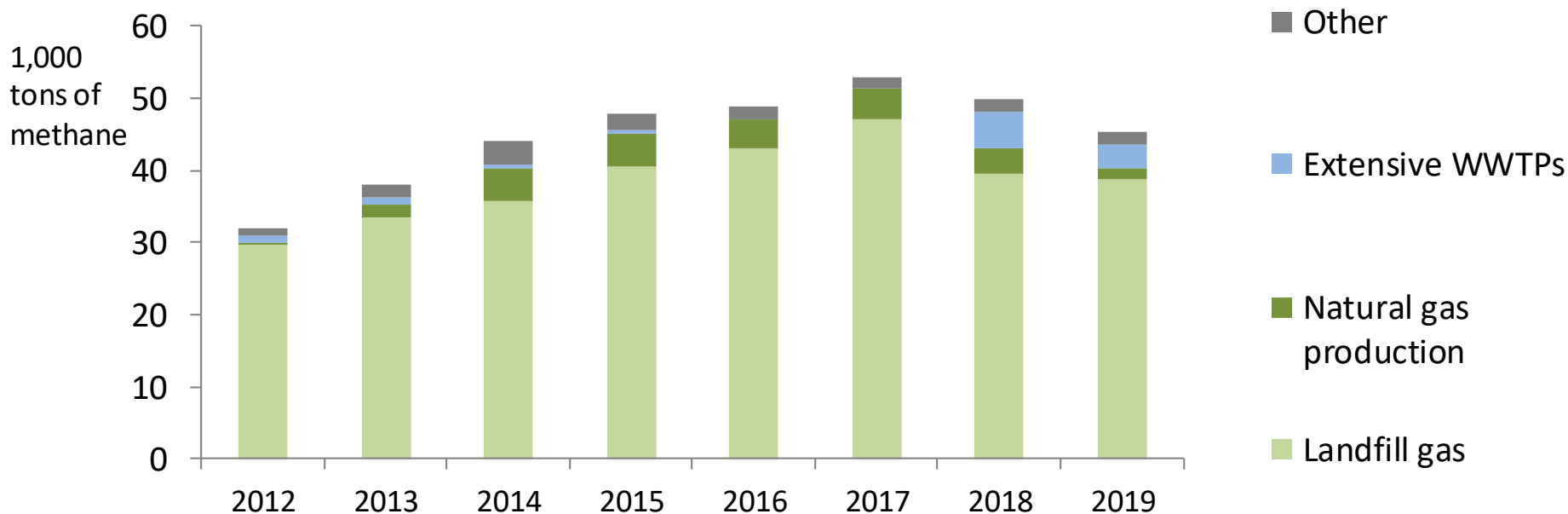
While CO2 emissions from the energy industry have decreased in developed countries in 2019, mainly due to reduced use of coal (by 15%), as well as renewable energy use, mild weather, and moderate vegetation, CO2 emissions in Israel increased by 1.5%, as the rate of renewable energy use increased from 3% to only 5% in 2019, while the rate of increase in fuel consumption, including natural gas, is higher.



Methane: 9% decrease in emissions in 2019

Multi-Year PRTR trend

These data include Leviathan emissions.* The reduction is a result of installation of an emissions recovery system in the Tamar rig in March 2019, as well as installation of extensive wastewater treatment plants. The reduction in landfill gas emissions in 2018 is due to an improvement in the collection of landfill gas in the Efaa landfill. The increase in emissions from extensive WWTPs in 2018 is the result of the update of the guidelines for calculating emissions.

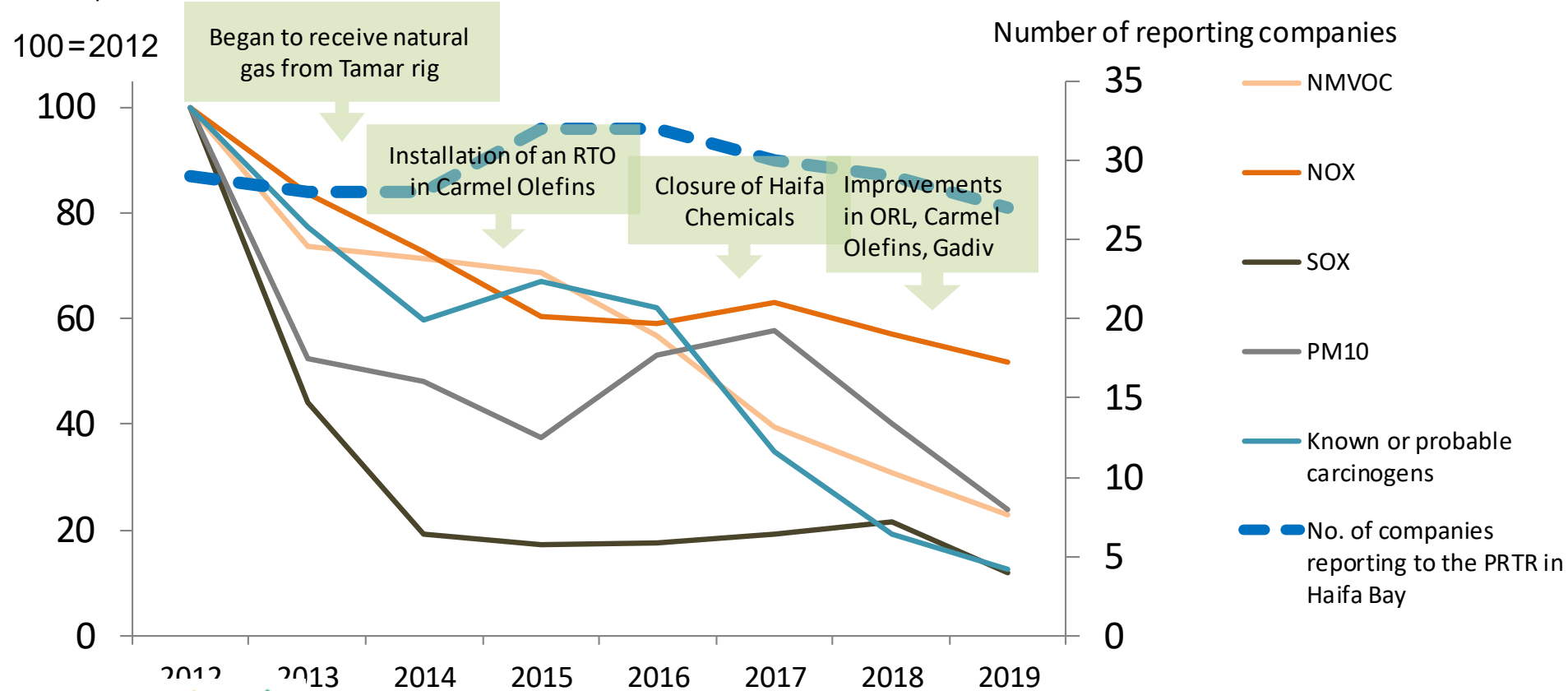


* Includes Leviathan testing period, from Nov. 18 to Dec. 31, 2019. Leviathan is exempt from reporting to the PRTR under section 3 (f) of the PRTR Law, as it is in its first year of operation. These data are based on an annual report submitted to the MoEP, in accordance with Leviathan's air emission permit.



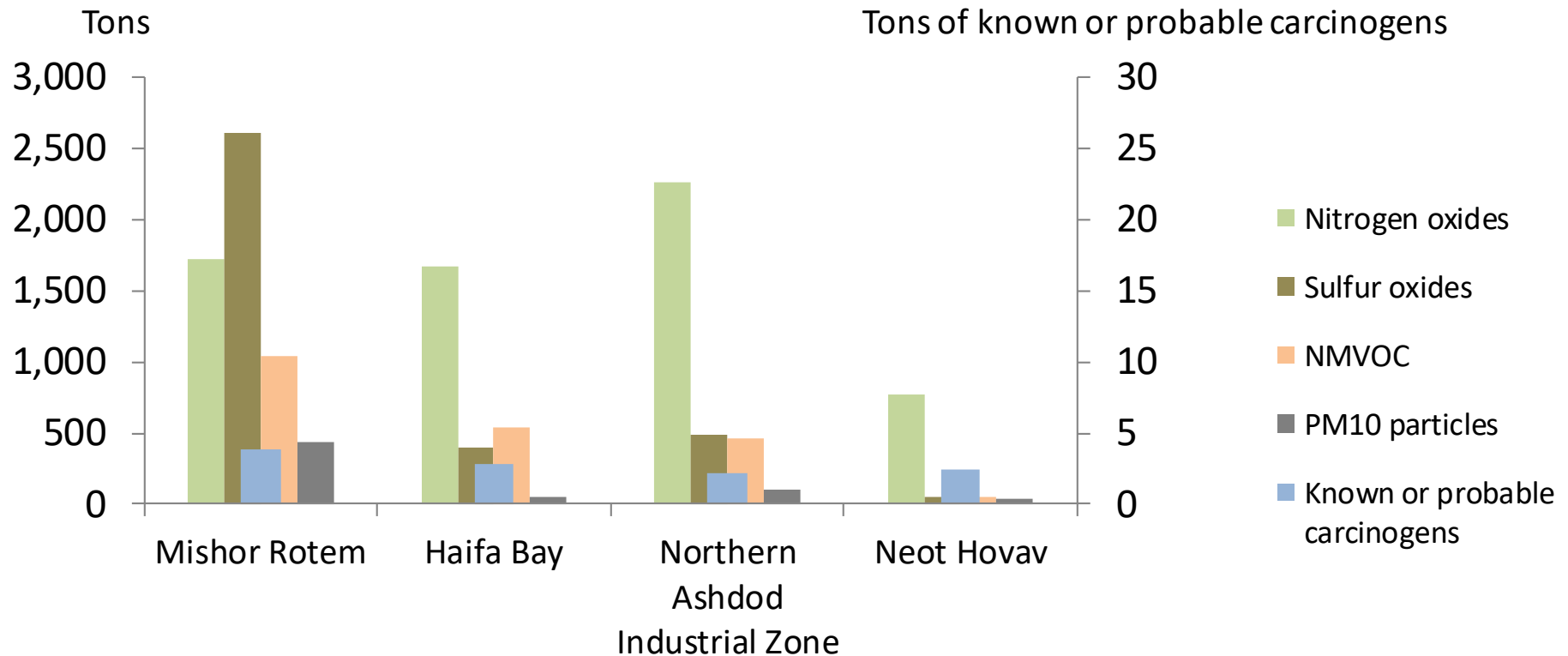
Haifa Bay: 48% to 88% decrease in emissions to the air, since 2012

In 2019, NMVOC emissions from ORL decreased by 44%, following the implementation of the MoEP's requirements to: reduce emissions at the tank farms (by painting them white to reduce tank heating, installing gaskets, etc.), repair equipment leaks, reduce gas flow to torches by 75%. At the Carmel Olefins facility, equipment leaks were reduced by connecting storage tanks to a CTO. At Gadiv, NMVOC and benzene emission sources were connected to treatment facilities and emissions from equipment components were reduced.



Comparison of pollutant air emissions in industrial areas

This graph shows the industrial areas in Israel with the highest number of companies that report to the PRTR, excluding Ashkelon (because Ashkelon's emissions are mainly affected by the Rutenberg power plant).



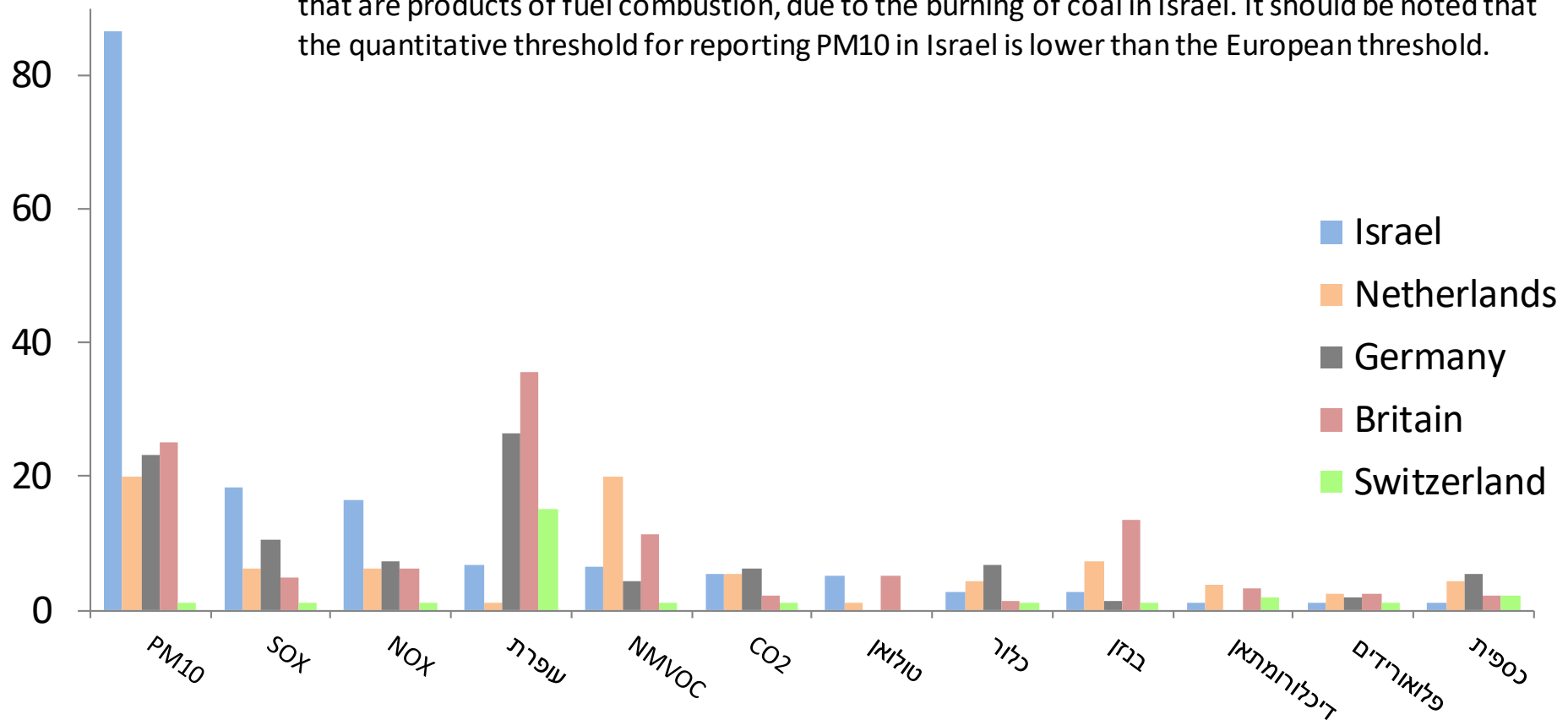
The Rotem Amfert Negev factory in Mishor Rotem reduced sulfur oxide emissions by 45% (2,157 tons) in 2018-2019, due to MoEP demands. The plant also reduced NMVOC emissions by 23% (200 tons) and PM10 emissions by 42% (173 tons).



Per capita emissions in Israel vs. emissions reported in W. Europe in 2018

International comparison

This relative comparison shows that per capita emissions in Israel are mainly high in pollutants that are products of fuel combustion, due to the burning of coal in Israel. It should be noted that the quantitative threshold for reporting PM10 in Israel is lower than the European threshold.



In this relative comparison, emissions of pollutants to the air per capita are presented in the Israeli PRTR, compared to emissions per capita in Germany, the UK, the Netherlands, and Switzerland. Data for these countries for 2019 have not yet been published.



In 2019

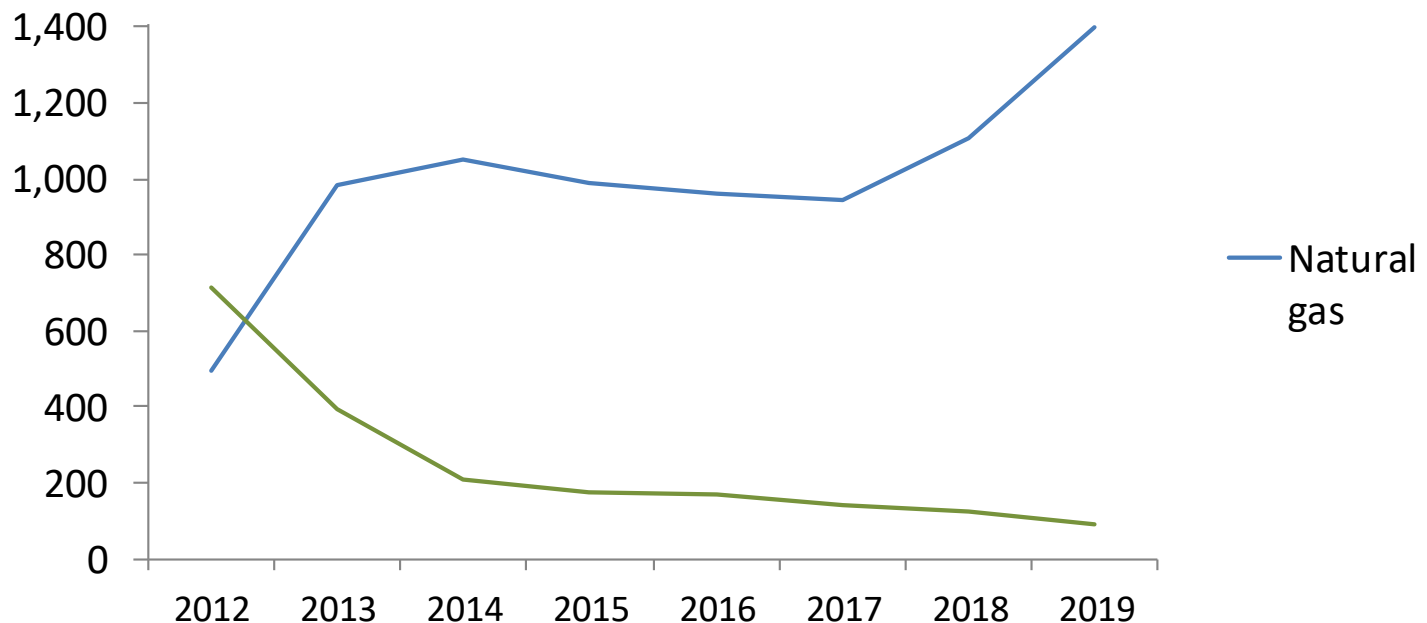
- **26% increase in natural gas consumption**
- **27% increase in fuel oil consumption**

Multi-Year PRTR trend

New

In 2019, an additional 30% of the natural gas distribution pipeline (158 Km) were deployed, and 13 new natural gas consumers were added. Consumption of fuel oil decreased 88% since 2012. Natural gas consumption increased 182% since 2012.

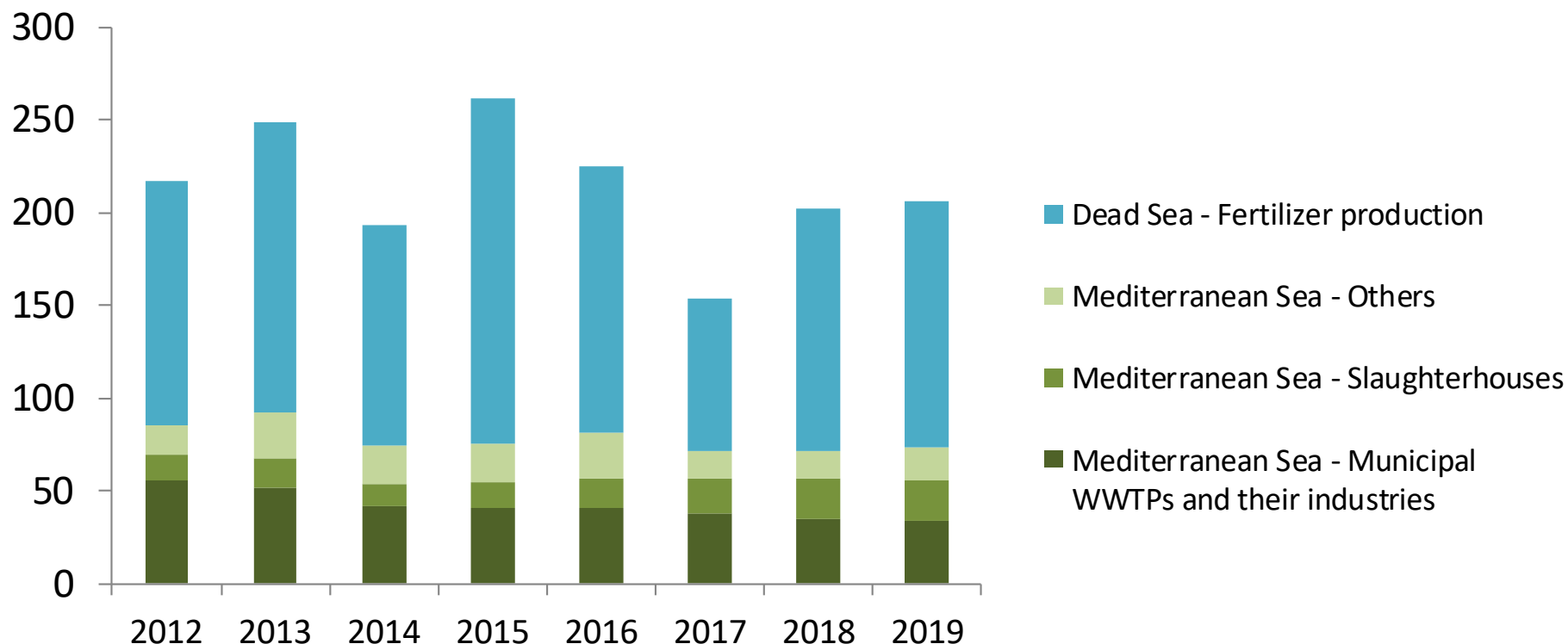
1,000=1 ton oil



Discharges to the Sea in the PRTR

99.8% of discharges to the Dead Sea in all years, and 90% of discharges to the Mediterranean in 2019, are salts (chloride and sodium). The rest of the pollutants are mainly general organic carbon and general nitrogen.

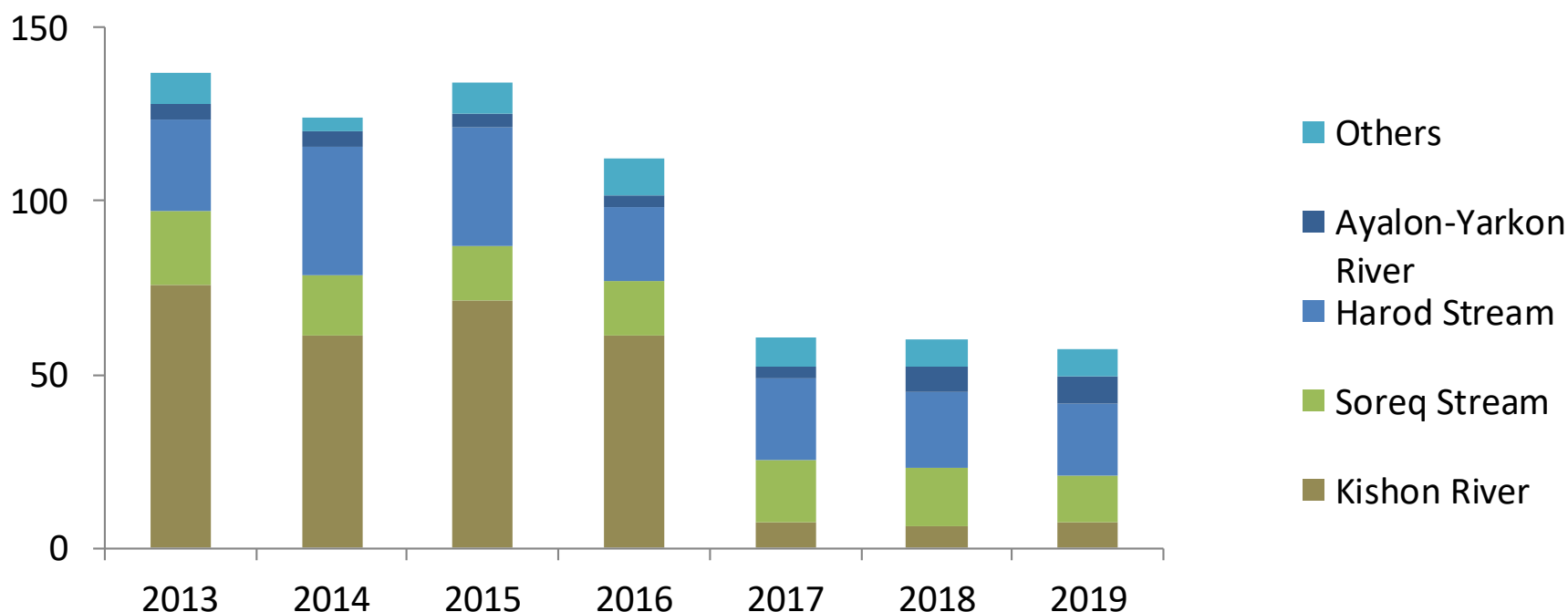
Thousands of tons



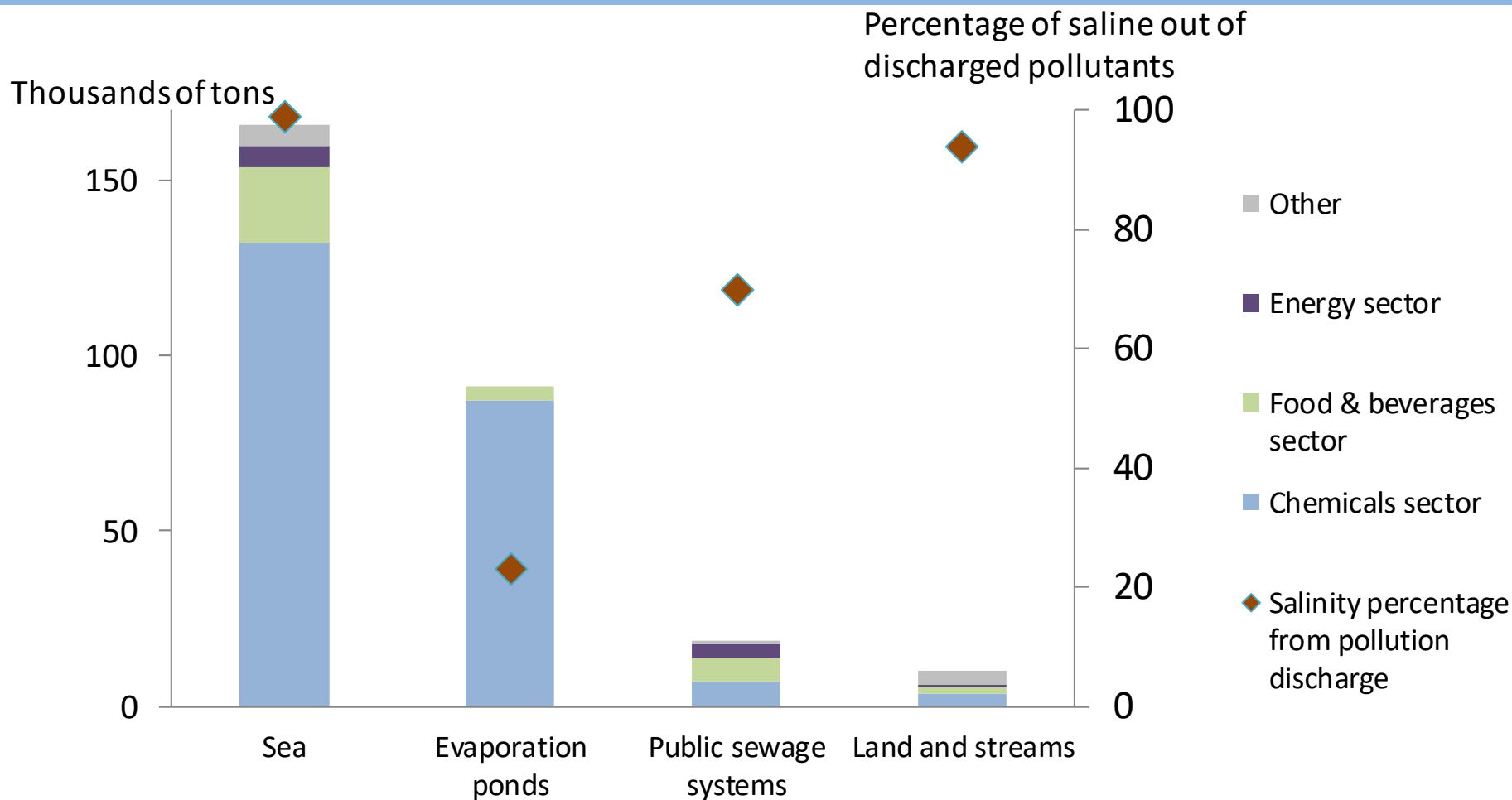
Discharges to rivers & streams

85% of the pollutants discharged into streams are salts. The rest are mainly general organic carbon and general nitrogen. The significant reduction in discharges to the Kishon River in 2017 was a result of the closure of the Haifa Chemicals plant.

Thousands of tons



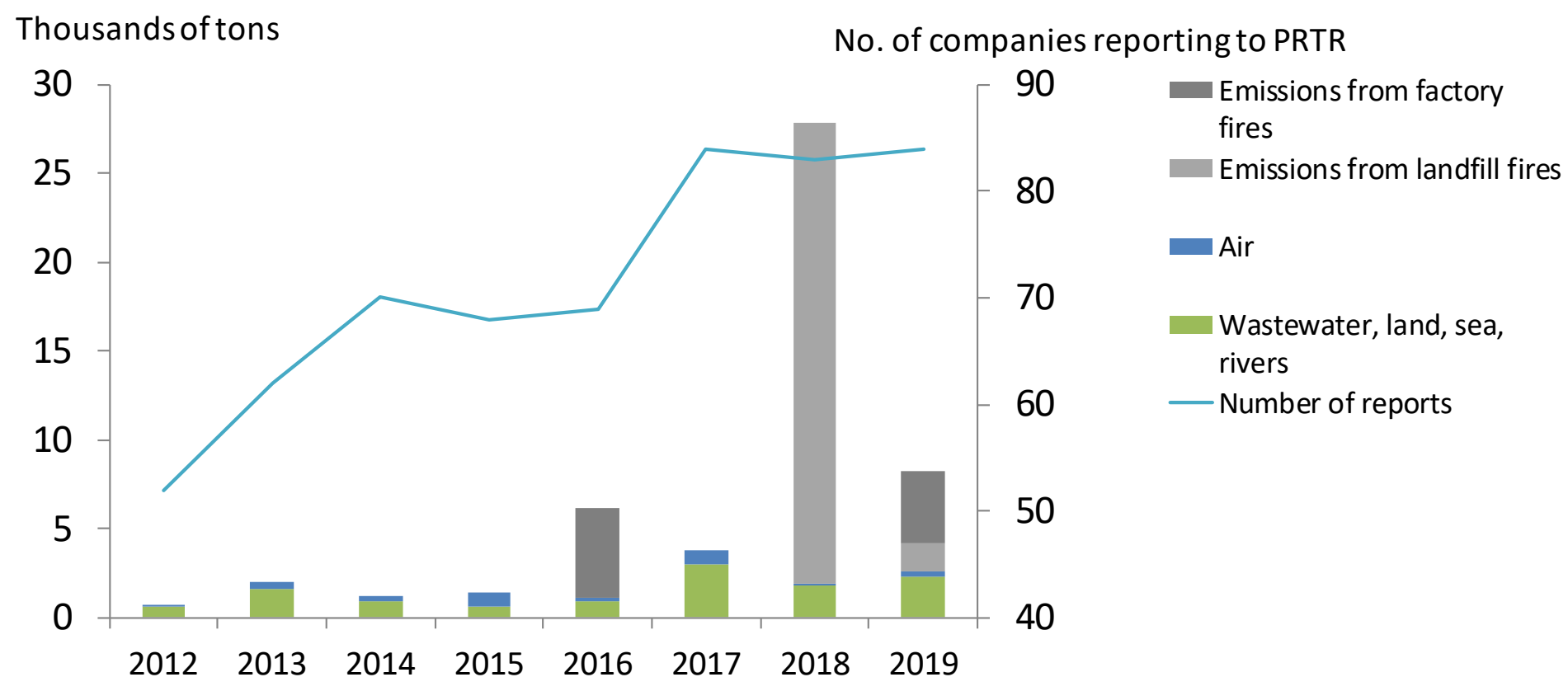
Industrial wastewater discharge* goals



*Discharges to evaporation ponds located in factory areas are not reported to the PRTR. The source of these data is findings regarding discharges to evaporation ponds compiled by the Ministry of Environmental Protection. The graph does not include discharges from the waste industries, sewage treatment, and animal husbandry.



70% decrease in emissions and discharges during a malfunction

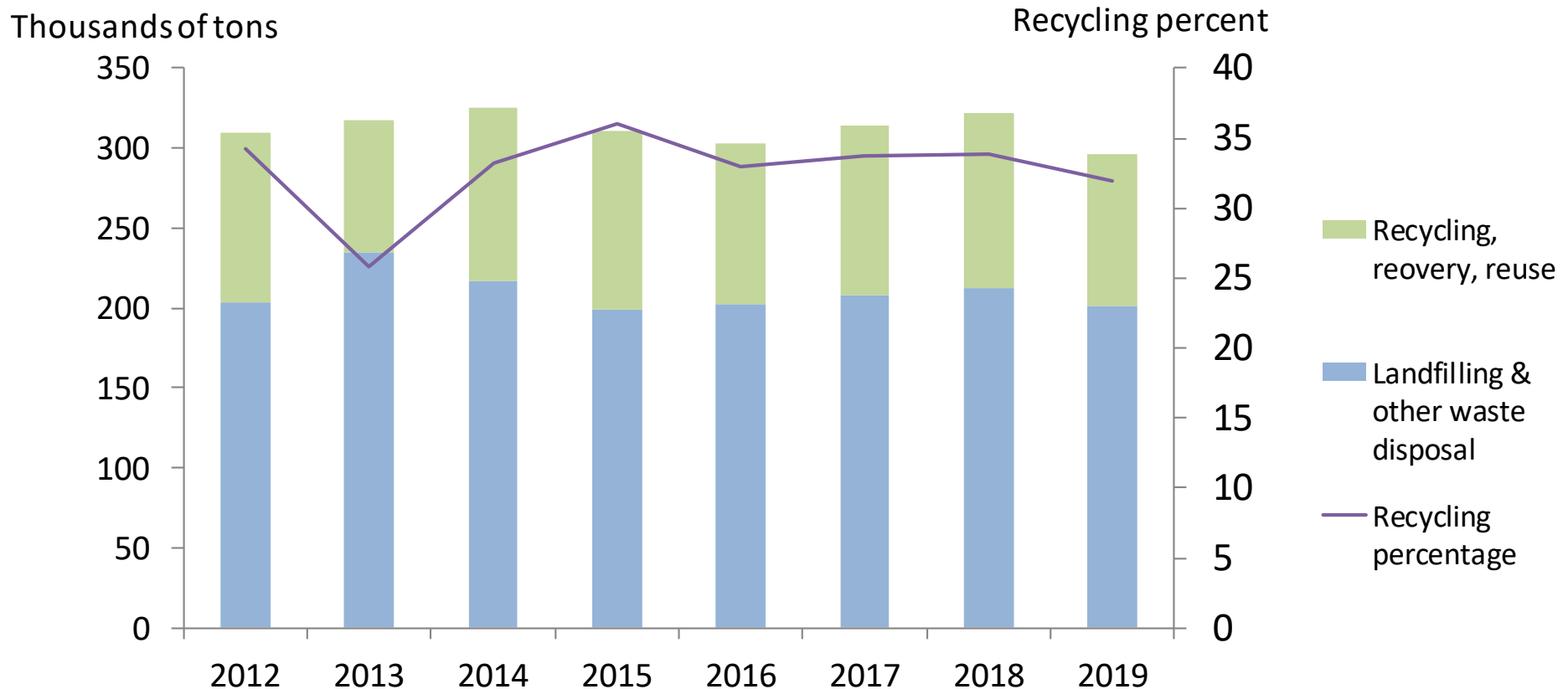


In 2018, there were large fires in the Ada, Dudaim, and Yeruham landfills. In 2019, there were smaller fires in the Afa and Hagal landfills. The internal fire in the Yeruham landfill continued in 2019, though that landfill didn't have to report to the PRTR because it closed. Discharges from malfunctions in 2019 constituted 0.5% of total discharges. Emissions to the air from malfunctions in 2019 constituted 0.01% of total emissions to air.



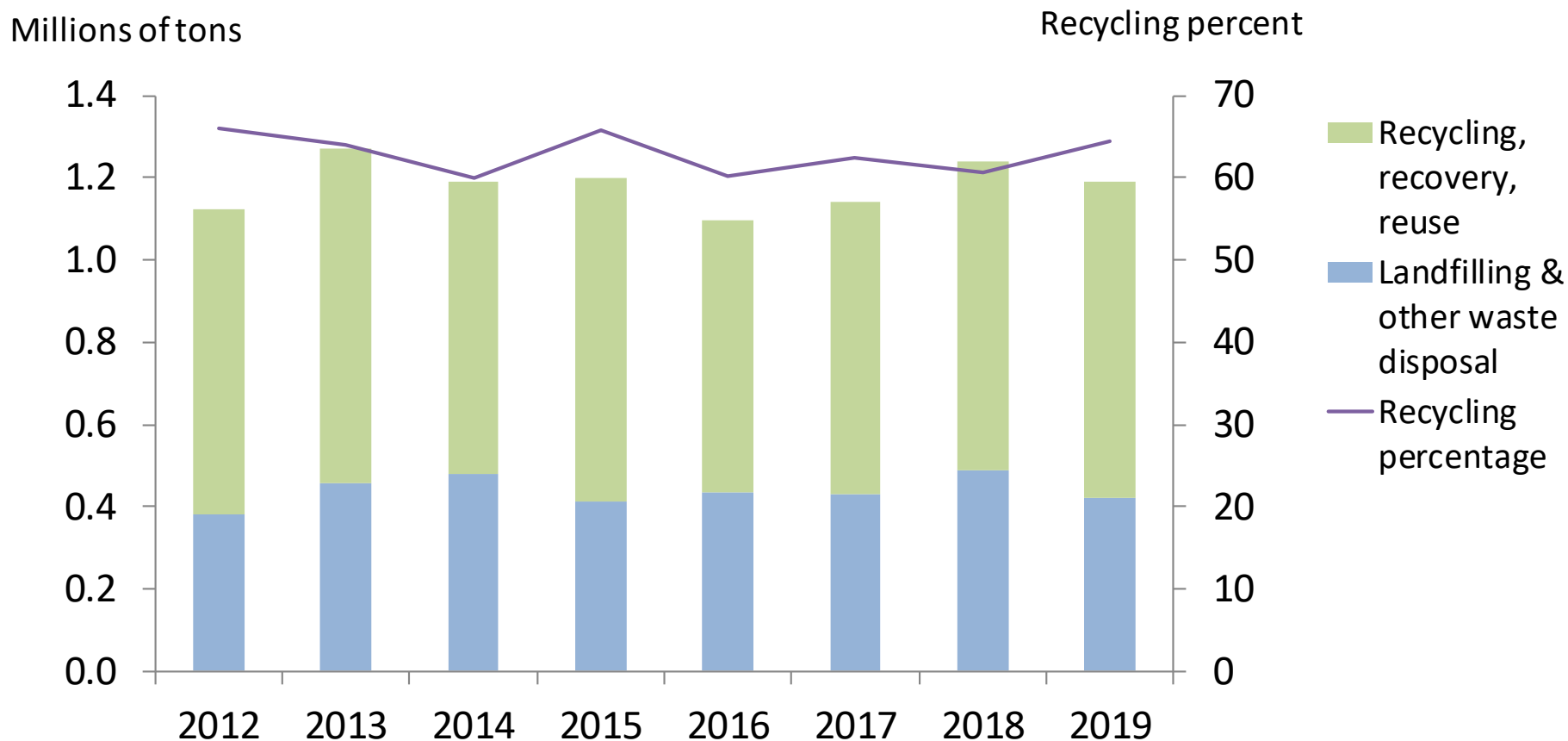
Transfer of hazardous waste

2% decrease in percent of recycling in 2019, in the wake of the closure of the Biosol facilities in Neot Hovav



Transfer of non-hazardous industrial waste in the PRTR

This graph does not include coal ash from power plants, waste from the agricultural sector, waste treatment, and wastewater treatment.

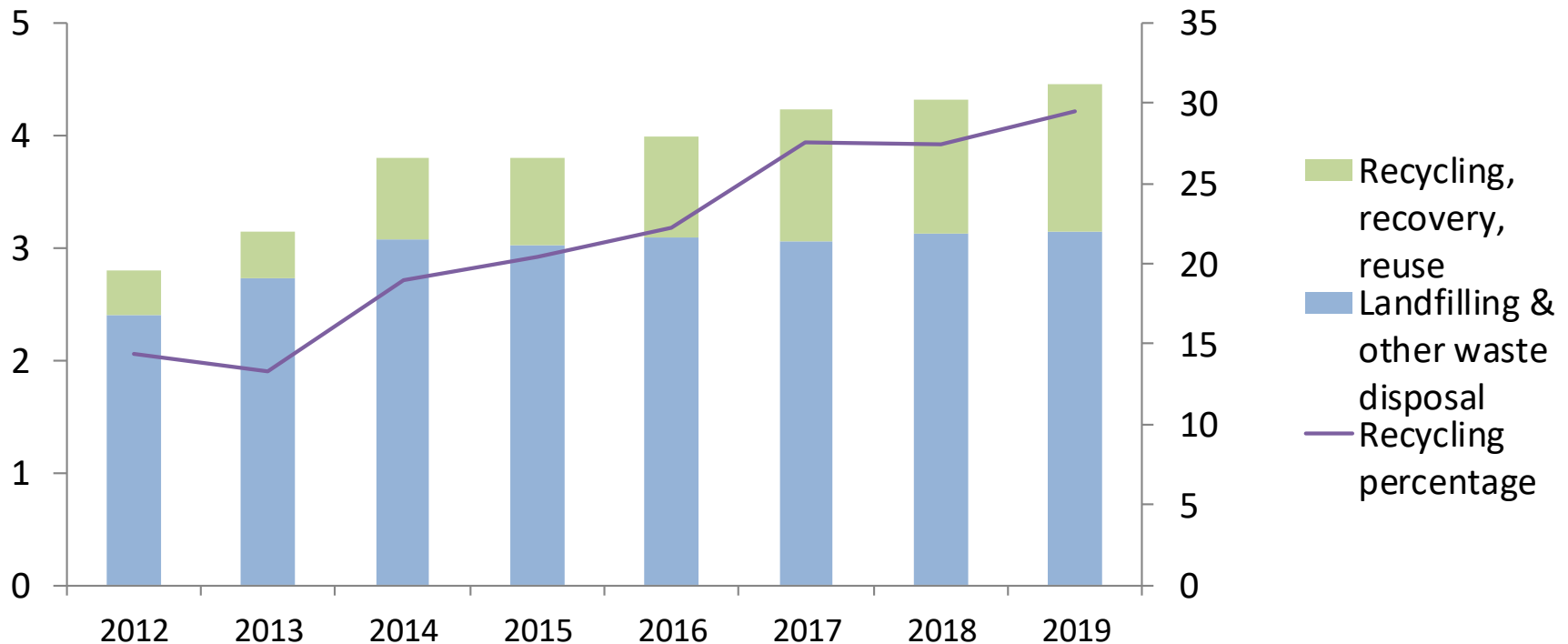


Increase of 2% in municipal waste recycling in the PRTR in 2019

The increase in the recycling rate from 27.5% to 29.5% is due to the increase in the volume of activity of the RDF facility in the Hiriya Recycling Park.

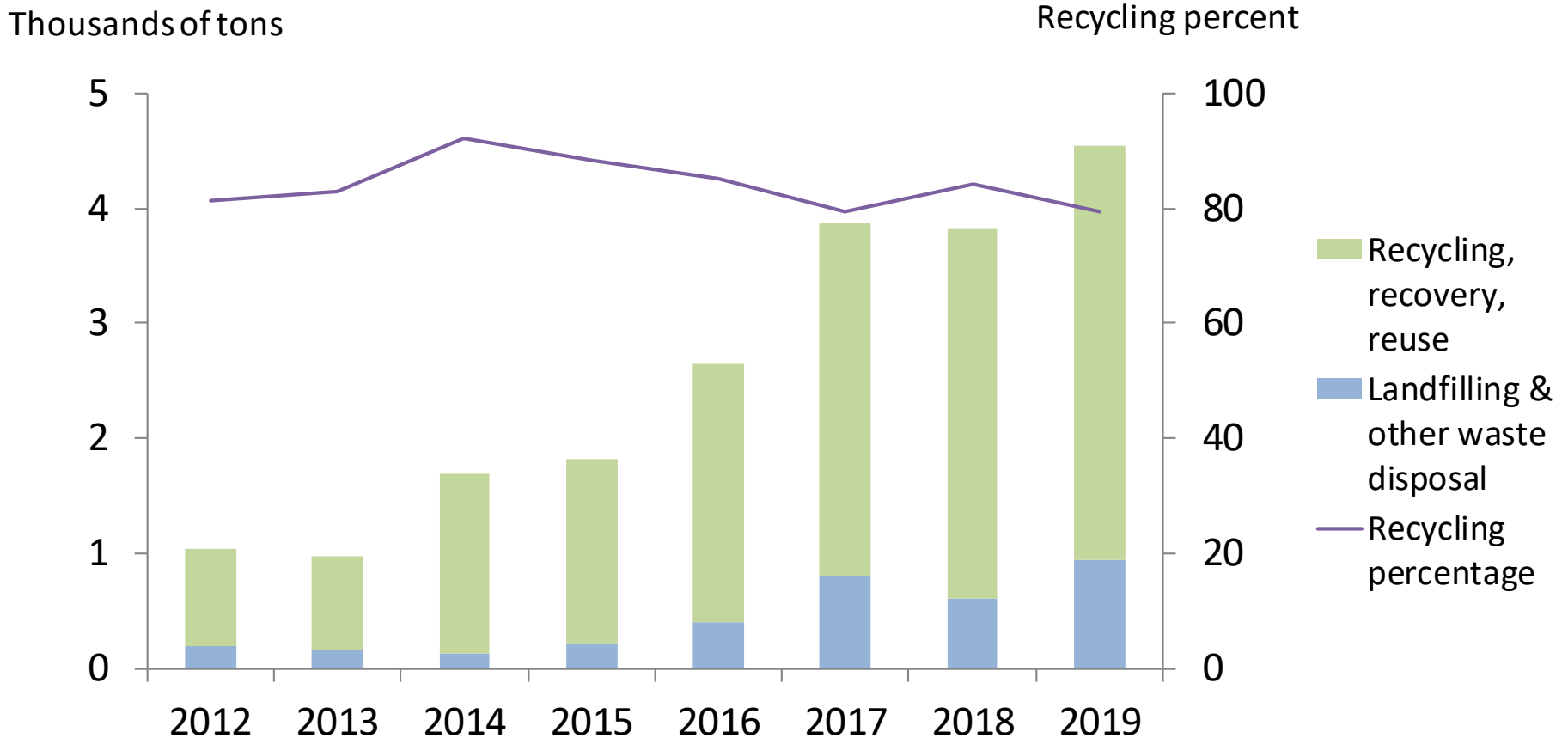
Millions of tons

Recycling percent



38 The graph includes municipal waste transports through transit stations only (and the RDF facility in the Hiriya Recycling Park). It does not include direct waste transfers to landfills.

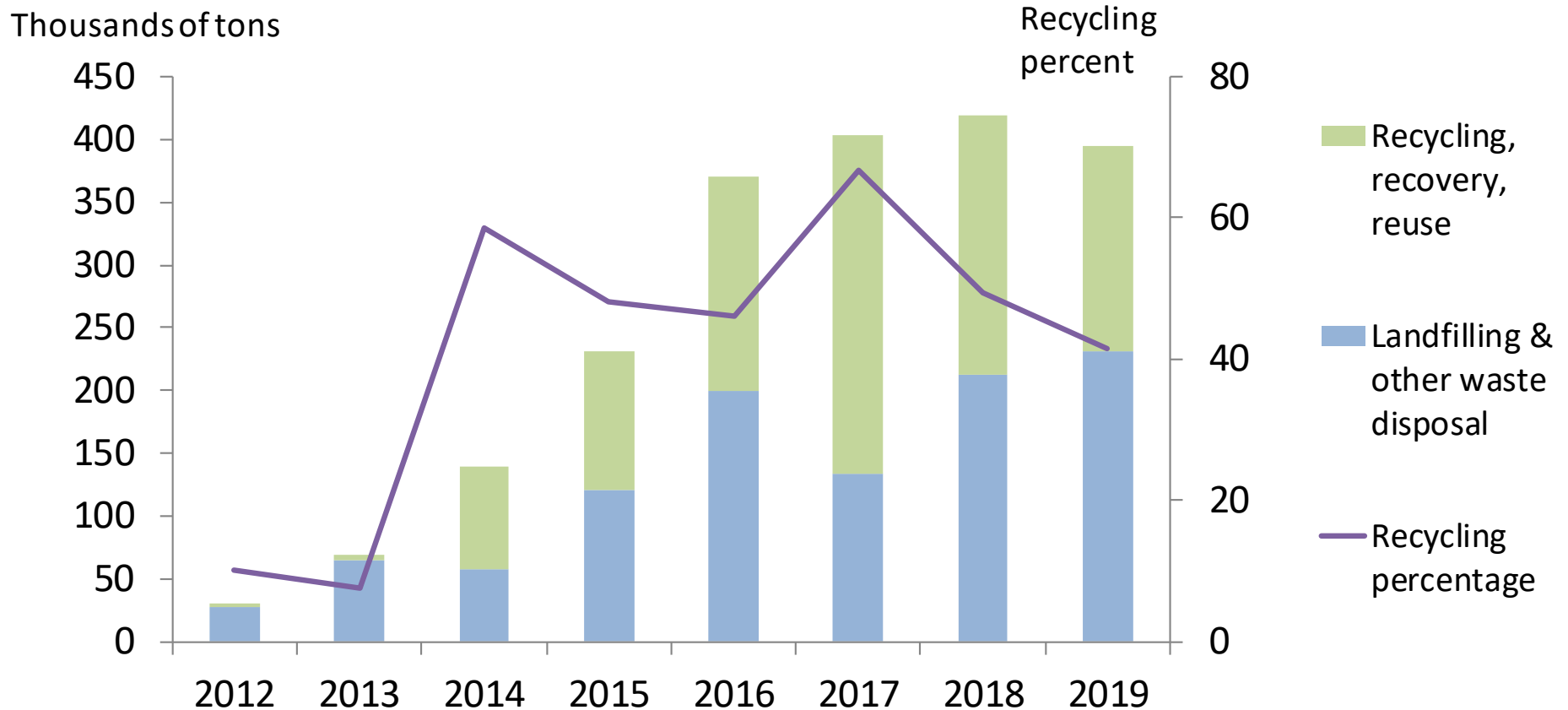
Construction waste transit station: 19% increase in collection in 2019



The graph includes waste transfers through transit stations only. It does not include direct waste transfers to landfills.



Transit station for dry, solid waste



The graph includes waste transfers through transit stations only. It does not include direct waste transfers to landfills. Waste decreased in 2019 due to non-reporting of one of the solid waste transit stations.

