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IPM Potential Scenario Customer Bill Analysis

September 25, 2017

Agenda

- **Overview**
- **Analysis Method**
- **Assumptions and Sources**
- **Results**

Overview

- AG's analysis measures potential changes in residential, commercial, and industrial customer electricity bills using the Model Rule Policy Scenario results from ICF
- The following slides present projections
- This analysis provides information for the overall program review process. The scenario specifications do not reflect a preference for or selection of any specific policy
- Our approach and data sources are identical to those used at the time of the 2012 Program Review

Methodology

- **Analysis:**
  - Calculates the *change in* the average monthly electricity bill on a customer class average basis between the IPM Reference Case and Model Rule Policy Scenario
  - Includes adjustment to customer class average consumption each year based on total energy efficiency (EE) savings in that customer class
  - Includes adjustment to the average monthly bill by customer class as a result of investments in direct bill assistance
- **Does not account for:**
  - Savings on customer bills post 2031 due to EE investments made during the IPM modeling period (2017-2031)
  - Savings due to fossil fuel EE investments
  - Reductions in REC costs, which could occur to some extent with higher electricity prices

Methodology – Average Monthly Bill Impact Calculation

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$/kWh x Monthly kWh = $/Month

Energy Rate

- Reflects wholesale electricity prices – affects competitive supply offers and standard offer/default service rates
- Modeled by ICF for reference and policy scenario through 2031
- Prices adjustment to load (GWh) due to investments in energy efficiency
- Same for all customer classes

Delivery (T/D) Rate

- Reflects cost of delivery of electricity to end-use customer, including transmission, distribution, customer charges, etc.
- Based on 5-year averages, using public data reported by distribution companies to EIA
- Calculated for each customer class

Average Monthly Use

- Based on historical consumption, using public data reported by distribution companies to EIA
- Five-year average to smooth out annual weather-driven variations
- Includes adjustment to load (GWh) due to investments in energy efficiency
- Average calculated for each customer class

Average Monthly Bill

- Product of combined customer-class average energy and delivery rates, and average customer class monthly consumption
- Adjusted for direct bill assistance refunds for each customer class

Average Monthly Bill *Impact*

- *Difference* in average monthly bill, between Reference case and Policy Case

Does not account for:

- Savings on customer bills post 2031 due to EE investments made during the IPM modeling period (2017-2031)
- Savings due to fossil fuel EE investments
- Reductions in REC costs, which could occur to some extent with higher electricity prices

Assumptions –
Electricity Rates & Average Monthly Usage

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- **Electricity Rate Assumptions ($/kWh)**
  - **Energy Rates:** IPM model output, include adjustment to load due to investments in energy efficiency
  - **Delivery (T/D) Rate:** 5-year average rates from U.S. Energy Information Association (EIA)
- **Average Monthly Usage Assumptions by rate class**
  - **Historical Usage Data:** 5-year averaged data from EIA
  - Adjustment made to average customer class usage due to investments in energy efficiency

State Assumptions – Projected Proceed Investments

- **Projected Proceed Investments:** States made assumptions on how projected additional proceeds from the Model Rule Policy Scenario may be invested in the following categories:
  - Electric Energy Efficiency
  - Fossil Fuel Energy Efficiency
  - Clean & Renewable Energy
  - Greenhouse Gas Abatement & Climate Change Programs
  - Direct Bill Assistance
  - Administration/Other

State Assumptions – Projected Proceed Investments

- **State Proceed Investments:** The table below provides the breakdown of how each state assumed to invest the additional proceeds in the Model Rule Policy Scenario* (2017-2031).

State	Electric EE Investments	Fossil Fuel EE Investments	Clean & Renewable Energy Investments	GHG Abatement & Climate Change Programs	Direct Bill Assistance	Admin/ Other	Total**
Connecticut	4%	65%	23%	6%	-	1%	**100%**
Delaware	50%	20%	5%	15%	5%	5%	**100%**
Maine	-	73%	-	-	19%	8%	**100%**
Maryland	25%	-	10%	10%	50%	5%	**100%**
Massachusetts	92%	-	-	5%	-	3%	**100%**
New Hampshire	7%	3%	-	-	88%	1%	**100%**
New York	35%	20%	20%	13%	-	12%	**100%**
Rhode Island	50%	-	40%	-	-	10%	**100%**
Vermont	-	98%	-	-	-	2%	**100%**

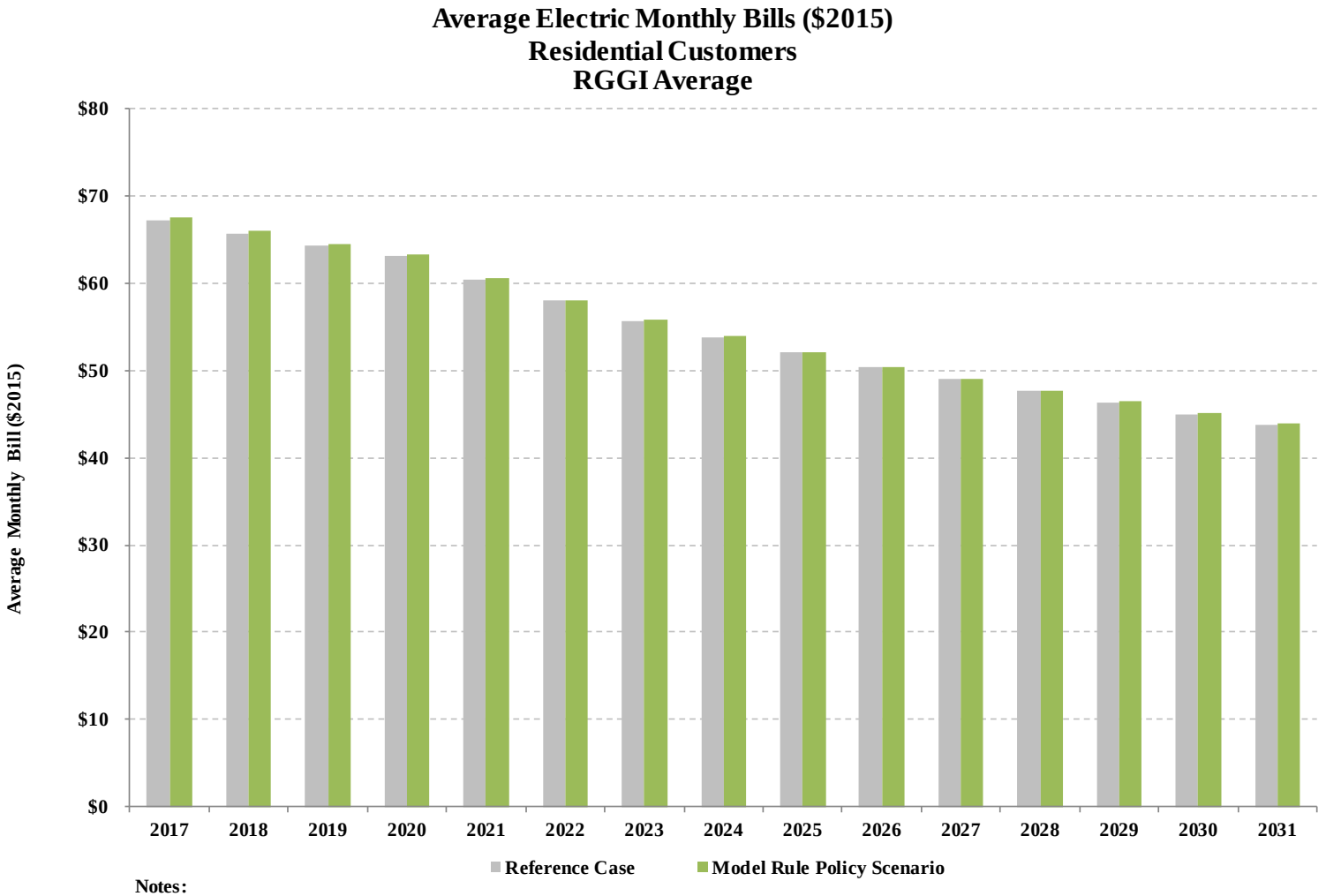
*Data provided by the states via RGGI, Inc.
**Percentages in table may not sum to 100% due to rounding.

Wholesale Energy Prices (RGGI Average) 2017-2031

Results

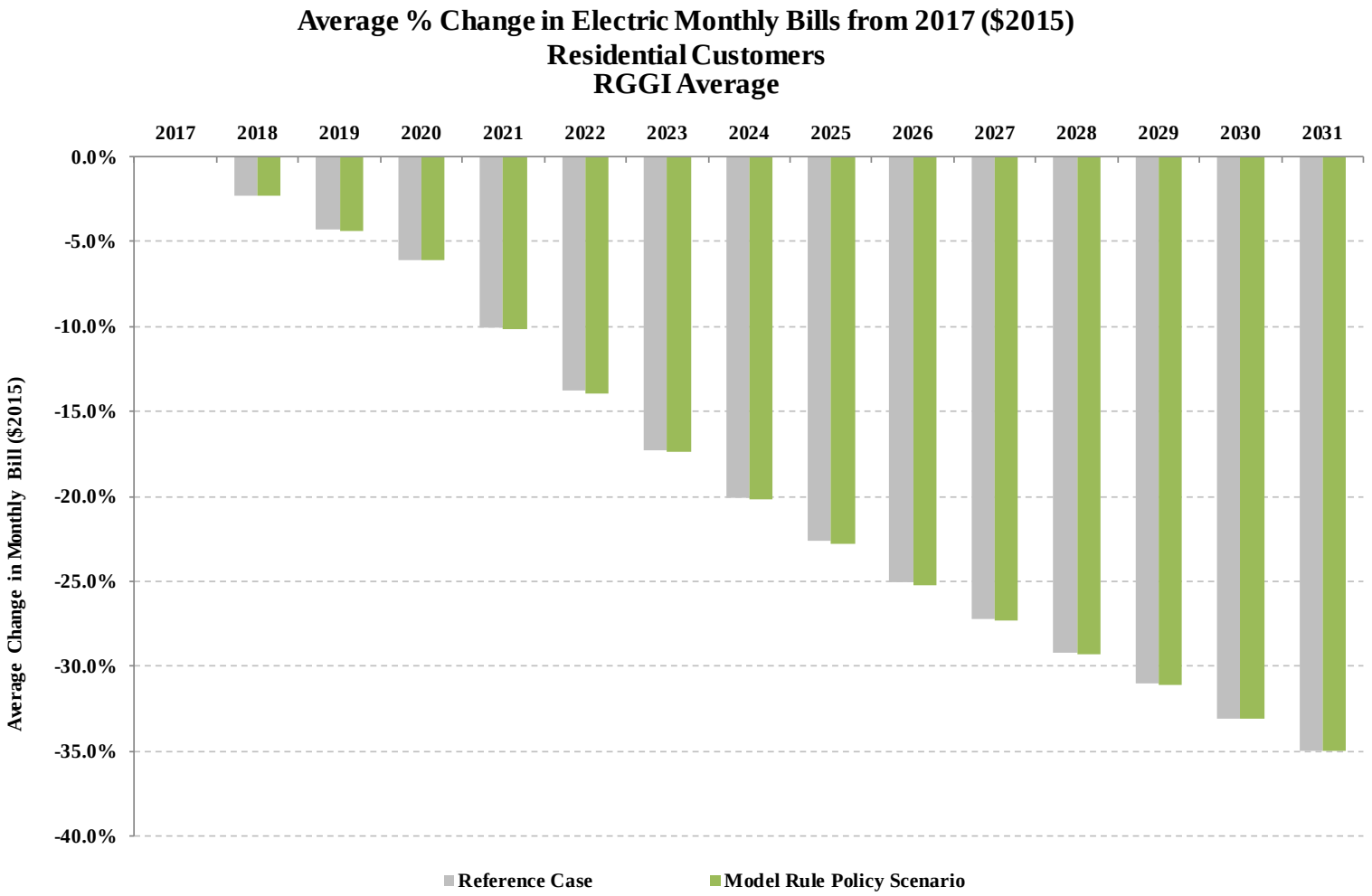
The following slides show results for the reference case and model rule policy scenario from 2017-2031, consistent with the IPM modeling timeline.

Residential Average Bills
IPM Model Rule Policy Scenario & Reference Case (2017-2031)



Notes:
[1] Usage and Delivery rates based on 5-year historical averages from EIA.
[2] Energy rates and avoided load totals based on ICF modeling.

Percent Change in Residential Average Bills Relative to 2017
IPM Model Rule Policy Scenario & Reference Case (2017-2031)



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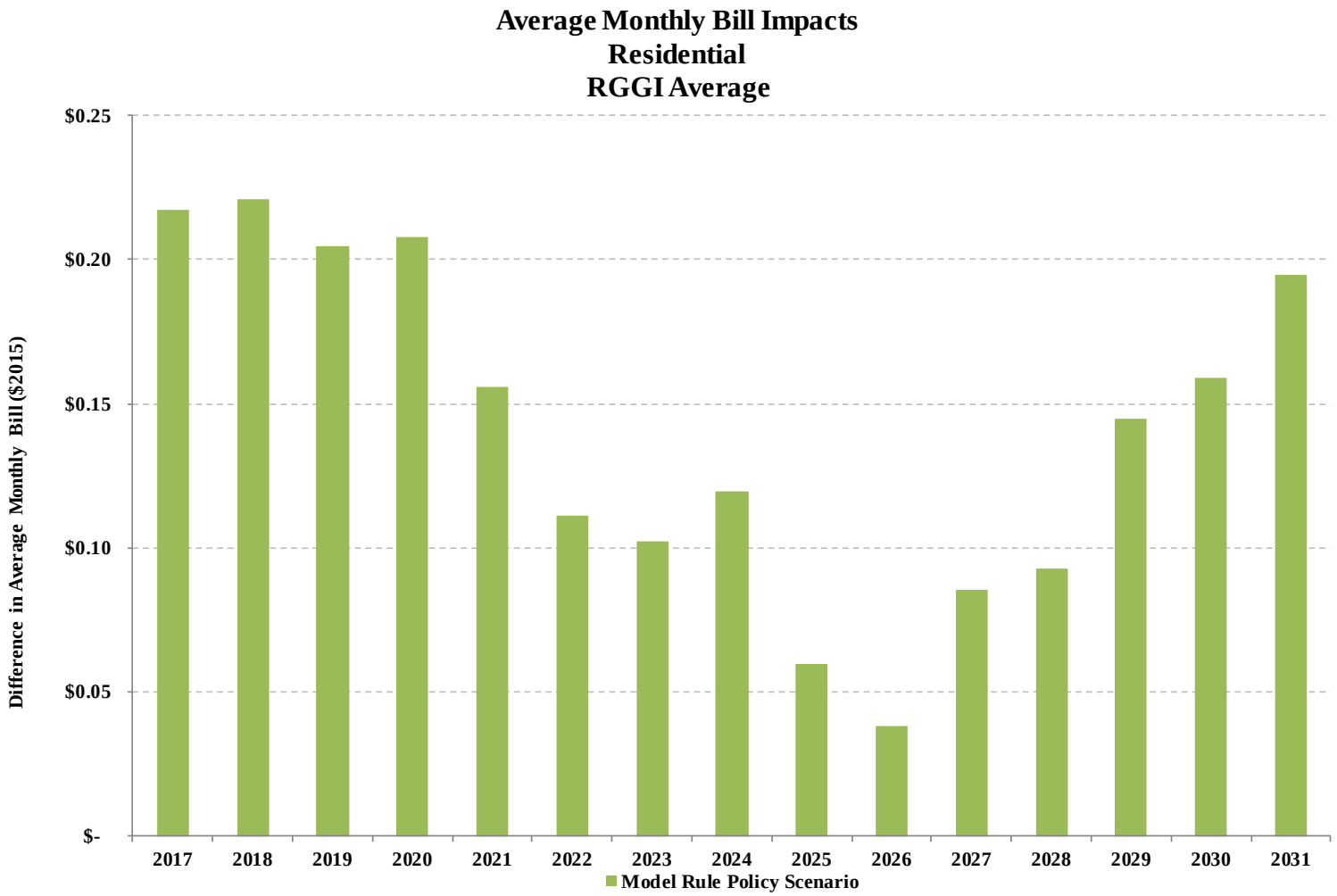
Residential Average Bill Impacts
IPM Model Rule Policy Scenario & Reference Case (2017-2031)



Notes:
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[2] Energy rates and avoided load totals based on ICF modeling.

Regional Average Bill Impacts
IPM Model Rule Policy Scenario Residential Results (2017-2031)

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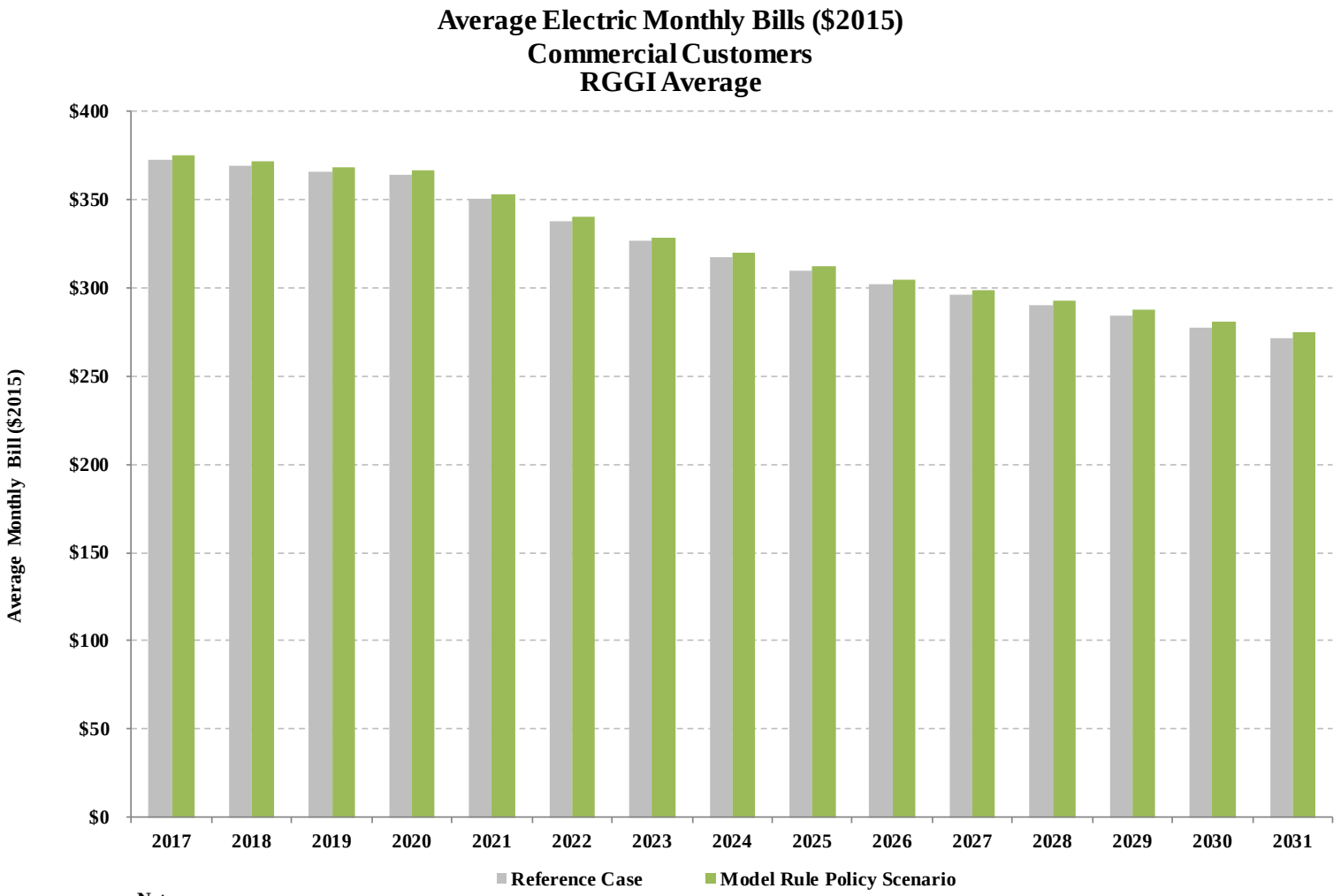
Average Bill Impacts
RGGI Average Residential Customers

	Average Monthly Bill ($2015)		Difference between Reference Case and Scenario Case ($2015) Model Rule Policy Scenario	
Year	Reference Case	Model Rule Policy Scenario	Average Monthly Difference ($2015)	Percent Difference
2017	$ 67.25	$ 67.47	$ 0.22	0.3%
2018	$ 65.71	$ 65.93	$ 0.22	0.3%
2019	$ 64.34	$ 64.55	$ 0.20	0.3%
2020	$ 63.16	$ 63.37	$ 0.21	0.3%
2021	$ 60.48	$ 60.64	$ 0.16	0.3%
2022	$ 57.98	$ 58.09	$ 0.11	0.2%
2023	$ 55.63	$ 55.74	$ 0.10	0.2%
2024	$ 53.76	$ 53.88	$ 0.12	0.2%
2025	$ 52.04	$ 52.10	$ 0.06	0.1%
2026	$ 50.42	$ 50.46	$ 0.04	0.1%
2027	$ 48.97	$ 49.05	$ 0.09	0.2%
2028	$ 47.62	$ 47.72	$ 0.09	0.2%
2029	$ 46.38	$ 46.52	$ 0.14	0.3%
2030	$ 45.00	$ 45.16	$ 0.16	0.4%
2031	$ 43.71	$ 43.90	$ 0.19	0.4%
Average	$ 54.83	$ 54.97	$ 0.14	0.3%

Commercial Average Bills
IPM Model Rule Policy Scenario & Reference Case (2017-2031)

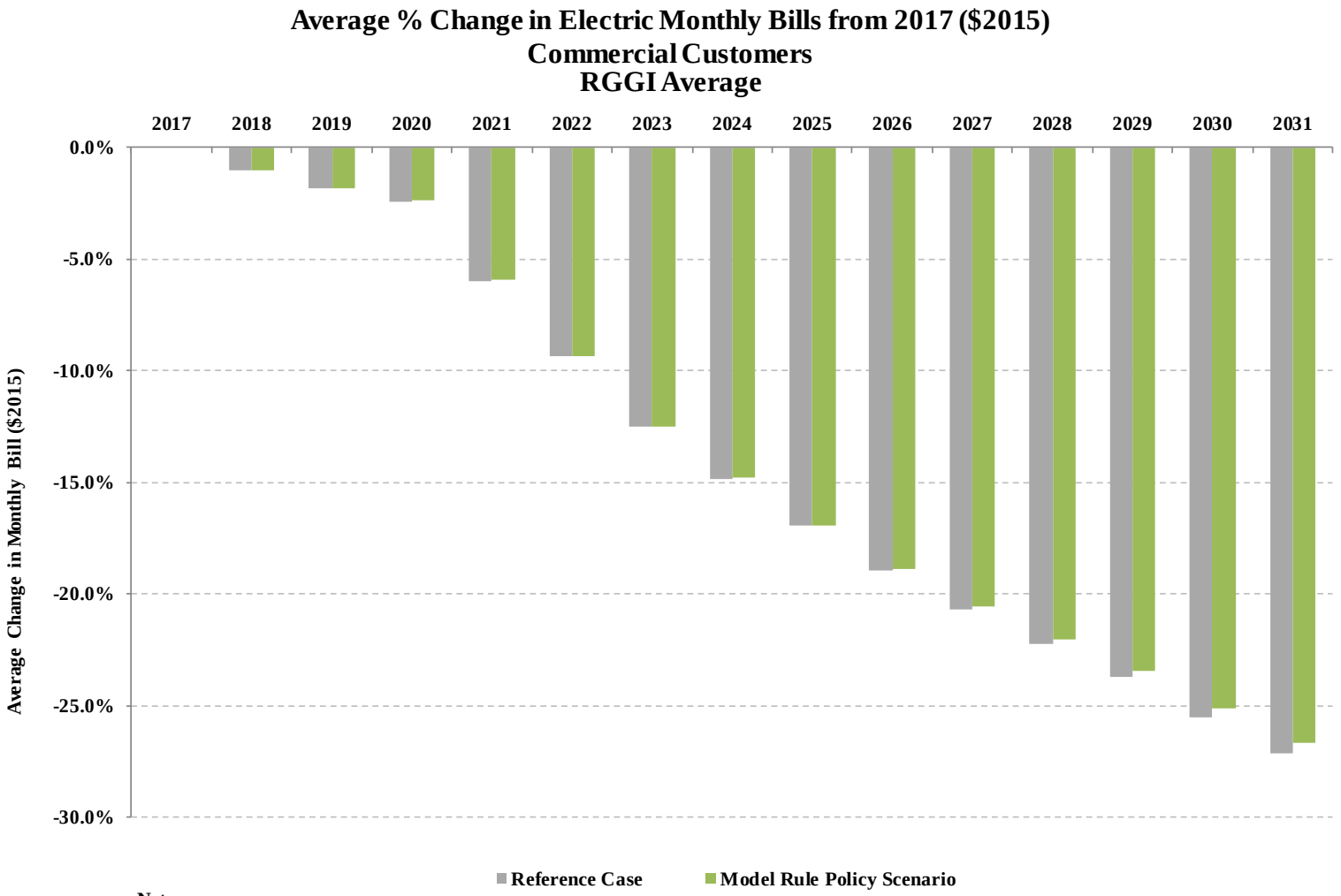


Notes:

[1] Usage and Delivery rates based on 5-year historical averages from EIA.

[2] Energy rates and avoided load totals based on ICF modeling.

Percent Change in Commercial Average Bills Relative to 2017
IPM Model Rule Policy Scenario & Reference Case (2017-2031)



Notes:

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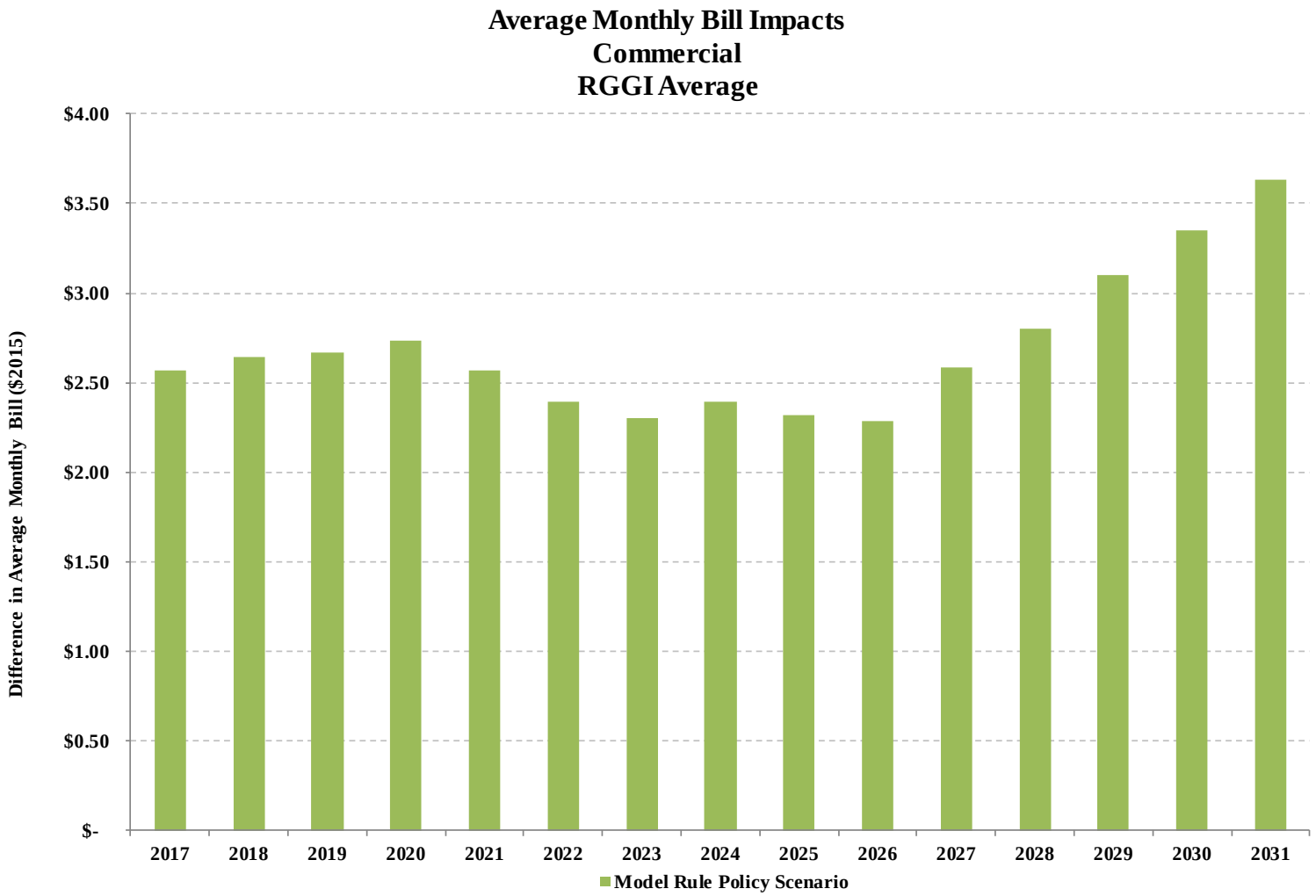
Commercial Average Bill Impacts
IPM Model Rule Policy Scenario & Reference Case (2017-2031)



Notes:
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[2] Energy rates and avoided load totals based on ICF modeling.

Regional Average Bill Impacts
IPM Model Rule Policy Scenario Commercial Results (2017-2031)

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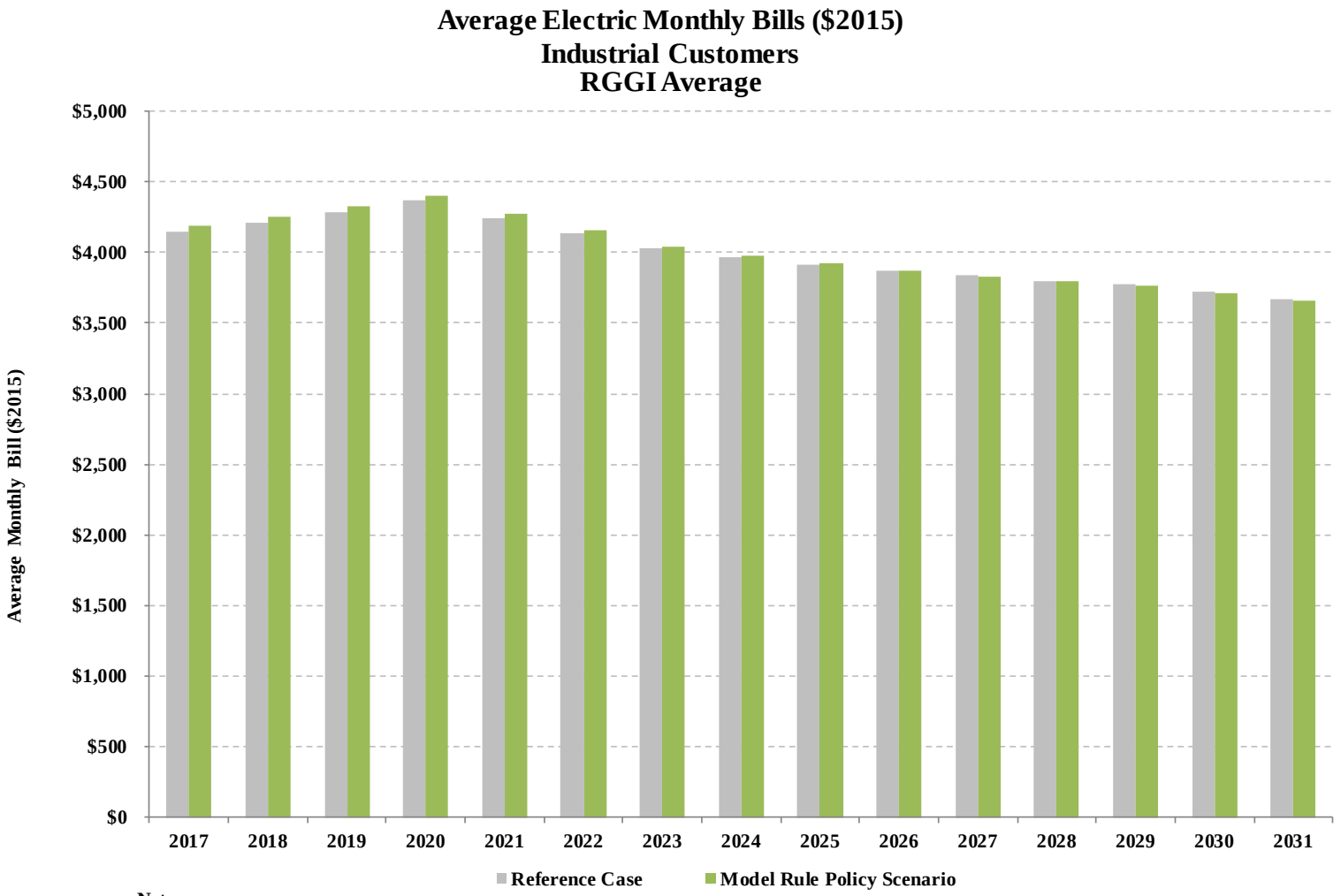
Average Bill Impacts
RGGI Average Commercial Customers

	Average Monthly Bill ($2015)		Difference between Reference Case and Scenario Case ($2015) Model Rule Policy Scenario	
Year	Reference Case	Model Rule Policy Scenario	Average Monthly Difference ($2015)	Percent Difference
2017	$ 372.84	$ 375.41	$ 2.57	0.7%
2018	$ 368.96	$ 371.60	$ 2.64	0.7%
2019	$ 365.94	$ 368.61	$ 2.67	0.7%
2020	$ 363.78	$ 366.51	$ 2.73	0.8%
2021	$ 350.50	$ 353.06	$ 2.57	0.7%
2022	$ 337.99	$ 340.38	$ 2.39	0.7%
2023	$ 326.20	$ 328.50	$ 2.31	0.7%
2024	$ 317.56	$ 319.95	$ 2.40	0.8%
2025	$ 309.59	$ 311.91	$ 2.32	0.7%
2026	$ 302.18	$ 304.46	$ 2.29	0.8%
2027	$ 295.75	$ 298.34	$ 2.58	0.9%
2028	$ 289.84	$ 292.64	$ 2.80	1.0%
2029	$ 284.40	$ 287.51	$ 3.10	1.1%
2030	$ 277.76	$ 281.11	$ 3.35	1.2%
2031	$ 271.55	$ 275.18	$ 3.63	1.3%
Average	$ 322.32	$ 325.01	$ 2.69	0.8%

Industrial Average Bills
IPM Model Rule Policy Scenario & Reference Case (2017-2031)

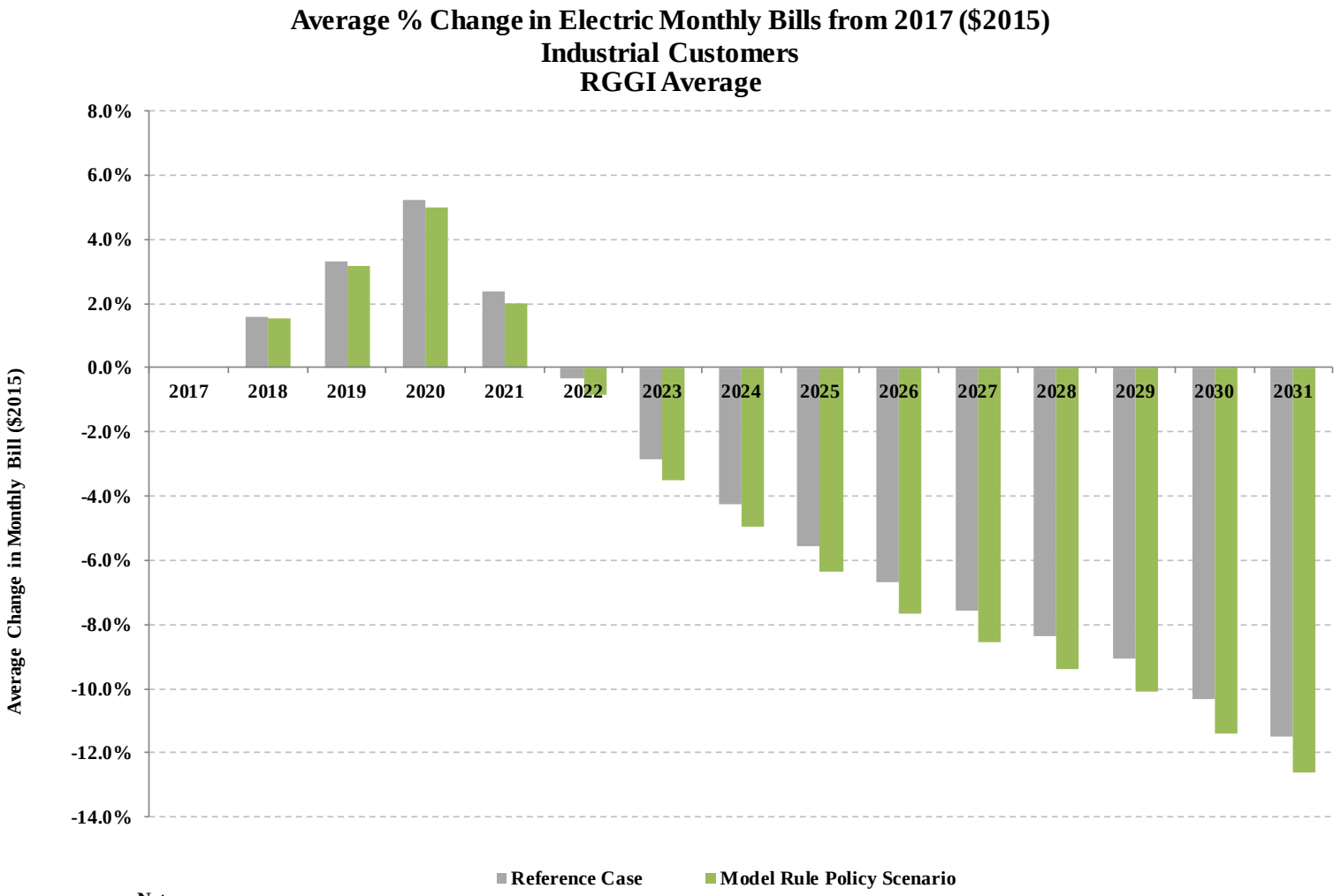


Notes:

[1] Usage and Delivery rates based on 5-year historical averages from EIA.

[2] Energy rates and avoided load totals based on ICF modeling.

Percent Change in Industrial Average Bills Relative to 2017
IPM Model Rule Policy Scenario & Reference Case (2017-2031)



Notes:

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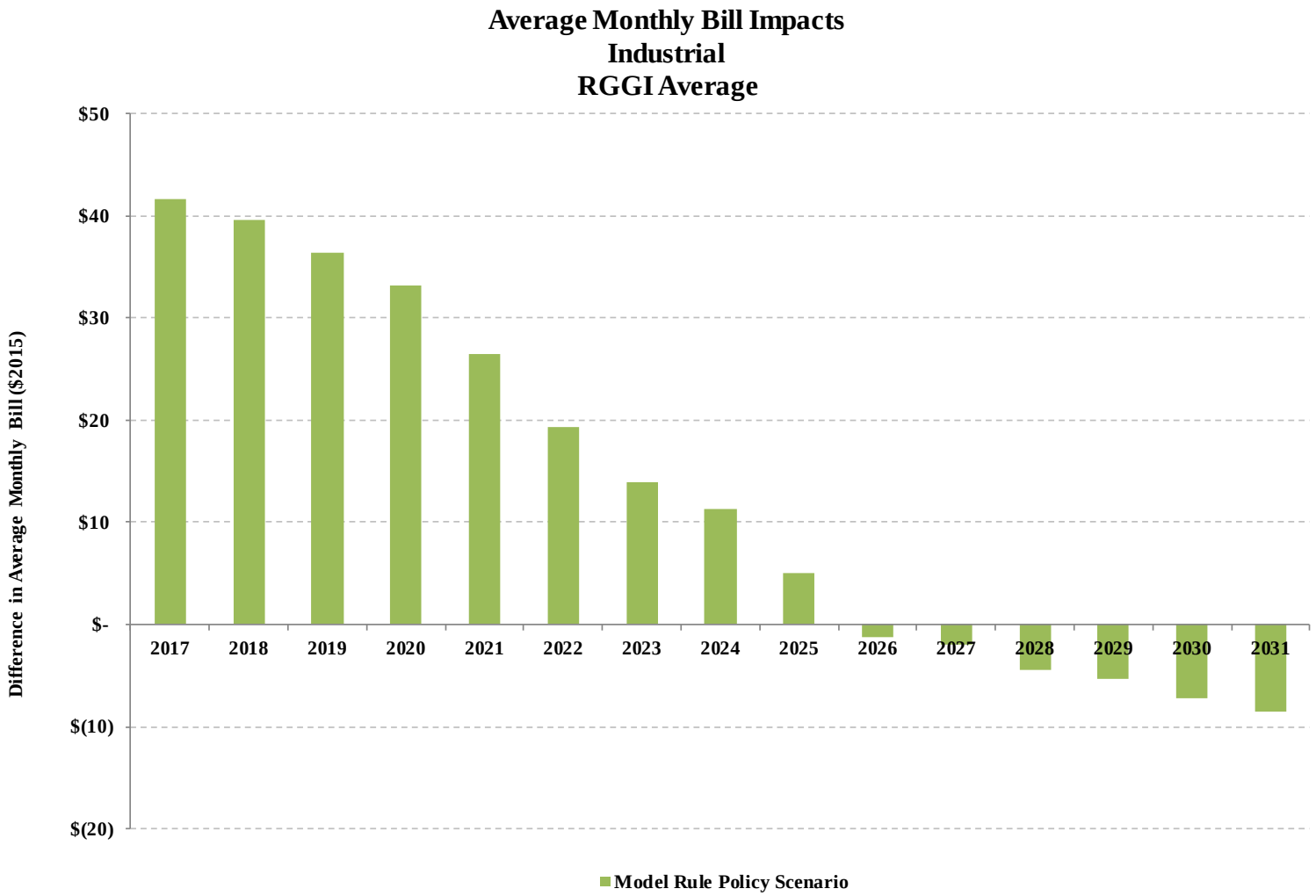
[2] Energy rates and avoided load totals based on ICF modeling.

Industrial Average Bill Impacts
IPM Model Rule Policy Scenario & Reference Case (2017-2031)



Notes:
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[2] Energy rates and avoided load totals based on ICF modeling.

Regional Average Bill Impacts
IPM Model Rule Policy Scenario Industrial Results (2017-2031)

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Average Bill Impacts

RGGI Average Industrial Customers

	Average Monthly Bill ($2015)		Difference between Reference Case and Scenario Case ($2015) Model Rule Policy Scenario	
Year	Reference Case	Model Rule Policy Scenario	Average Monthly Difference ($2015)	Percent Difference
2017	$ 4,147.46	$ 4,189.08	$ 41.62	1.0%
2018	$ 4,213.35	$ 4,252.95	$ 39.60	0.9%
2019	$ 4,285.46	$ 4,321.78	$ 36.32	0.8%
2020	$ 4,364.29	$ 4,397.53	$ 33.24	0.8%
2021	$ 4,246.32	$ 4,272.80	$ 26.49	0.6%
2022	$ 4,134.47	$ 4,153.85	$ 19.38	0.5%
2023	$ 4,028.54	$ 4,042.42	$ 13.88	0.3%
2024	$ 3,970.04	$ 3,981.39	$ 11.34	0.3%
2025	$ 3,917.68	$ 3,922.64	$ 4.96	0.1%
2026	$ 3,869.61	$ 3,868.36	$ (1.25)	0.0%
2027	$ 3,833.29	$ 3,831.33	$ (1.96)	-0.1%
2028	$ 3,800.90	$ 3,796.47	$ (4.43)	-0.1%
2029	$ 3,772.27	$ 3,766.90	$ (5.38)	-0.1%
2030	$ 3,719.36	$ 3,712.19	$ (7.17)	-0.2%
2031	$ 3,669.85	$ 3,661.33	$ (8.52)	-0.2%
Average	$ 3,998.19	$ 4,011.40	$ 13.21	0.3%

Regional Average Bill Impacts
IPM Scenario Summary Results

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RGGI Average Monthly Bill Impact for Years 2017-2031

	Reference Case	Model Rule Policy Scenario	
Customer Class	Average Monthly Bill ($2015)	Monthly Difference ($2015)	Percent Difference
Residential	$ 54.83	$ 0.14	0.3%
Commercial	$ 322.32	$ 2.69	0.8%
Industrial	$ 3,998.19	$ 13.21	0.3%