

## **Appendix: Methodology to Estimate Emissions from Electricity and Natural Gas Use in Homes in Lane County**

*Updates include requests for clarification from NW Natural*

### **Electricity**

**Starting average home use:** 0.66 MT CO<sub>2</sub>/year is the baseline annual average home emissions for Lane County residences. This average was generated using the average Lane County's electricity use of 11,131 kWh<sup>1</sup>/year as developed by Oregon Dept of Energy's 2020 Biennial Energy Report, and the weighted mix of the seven electric utilities that serve Lane County using 2018 energy mix data, for which the emissions factor is 0.06 MT CO<sub>2</sub>/MWh. This average electricity use is the most locally relevant and robust publicly available data. More accurate estimates that remove any other energy source in the home (solar, natural gas<sup>2</sup>, other) are not readily available. Other estimates identified for average residential electricity were 12,400 KWh<sup>3</sup> from 2016, although this also does not guarantee no other energy sources are present in a home (gas, solar, other).

### **Reductions Assumptions**

The analysis assumed a linear reduction in emissions until the grid must be 100% carbon free in 2040 according to the current rulemaking for OR HB 2021<sup>4</sup>. A simplified, linear reduction was applied, as the timing for new renewable electricity infrastructure coming online is unknown. The analysis followed the reductions requirements of the RPS and HB 2021.

The electricity grid emissions reduction projections reflect only changes in the energy mix (supply-side reductions), not efficiency gains (demand side reductions). New data on new appliances, funding, and incentives from the seven local electrical utilities is unavailable to incorporate into the modeling. As with natural gas, electricity demand-side efficiency upgrades are expected.

### **Natural Gas**

#### **Average Home Gas Use Assumptions**

The 3.2 MT CO<sub>2</sub>/residence/year is calculated based on data collected from [the September 2021 NW Natural presentation](#) (slide 50) to the Public Utility Commission of Oregon.

The initial modeled emissions reduction focuses only on supply-side changes based on the replacement of fossil fuels with renewable fuels, which are under the direct control of NW Natural. It excludes reductions in demand created by appliance upgrades or other efficiencies measures; these investments will come from homeowners with rebates and/or incentives from the [Energy Trust of Oregon](#).

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<sup>1</sup> <https://www.oregon.gov/puc/utilities/Documents/COVID-19-ODOE-2020-BER-County-Profiles-Supplement.pdf>

<sup>2</sup> The available estimates for number of residences in Lane County that have utility gas, ODOE estimates 18% and the American Communities Survey (US Census 2019) estimates 16.3%. Accurate numbers are not publicly available.

<sup>3</sup> [https://www.nwcouncil.org/sites/default/files/final\\_comparisonofresidentialuse\\_rates\\_bills\\_2016-12\\_1.pdf](https://www.nwcouncil.org/sites/default/files/final_comparisonofresidentialuse_rates_bills_2016-12_1.pdf)

<sup>4</sup> <https://olis.oregonlegislature.gov/liz/2021R1/Measures/Overview/HB2021>

## **Emissions Reductions Assumptions**

The expectation for renewable fuels in Lane County was developed by NW Natural in a memo<sup>5</sup> and states the following:

"The figures in the table to the left are based upon NW Natural's draft base case compliance plan with the Oregon Department of Environmental Quality's Climate Protection Program that was presented to a public audience at the Oregon Public Utility Commission. See <https://edocs.puc.state.or.us/efdocs/HAC/um2178hac114551.pdf> for a presentation of this work. This projection is an estimated allocation of Lane County's current share of conventional and renewable natural gas deliveries in Oregon (including deliveries on transportation rate schedules). The emissions trajectory is from the draft rules of the Climate Protection Program; the final rules (see OAR 340-271-0900 Table 4) have a more aggressive emissions reduction requirement for natural gas utilities in Oregon (50% reduction from baseline by 2035 and 90% by 2050) than the draft rules (45% by 2035 and 80% by 2050) that these projections were based".

The analysis assumed linear reductions over time, according to NW Natural's renewable energy percentage estimates (see footnote 5). As the percentage of renewable natural gas in the system is increased, a corresponding decrease in residential emissions was calculated.

## **Additional Column which includes projections for demand-side reductions supplied by NW Natural**

NW Natural projects to achieve nearly 50% of their decarbonization goal through reduced demand due to energy efficiency and weatherization improvements. NW Natural supplied data for the 2022-2050 period.

The final column presents this data, which includes both supply-side reductions and demand-side reductions. The demand-side reductions will require residential properties to invest in energy efficiency, weatherization, and new appliance investments. Available rebates and/or incentive programs are to encourage these actions.

According to NW Natural:

"The emissions trajectory is from the draft rules of the Climate Protection Program; the final rules (see OAR 340-271-0900 Table 4) have a more aggressive emissions reduction requirement for natural gas utilities in Oregon (50% reduction from baseline by 2035 and 90% by 2050) than the draft rules (45% by 2035 and 80% by 2050) that these projections were based. This trajectory includes a mix of emissions reduction activities including incremental energy efficiency, dual-fuel heating systems, renewable natural gas, renewable hydrogen, and renewable hydrogen derived synthetic natural gas and does not include the additional emissions reductions resulting from NW Natural's Smart Energy carbon offset program."<sup>6</sup>

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<sup>5</sup> NW Natural Memo 2.10.22 " Lane County 2020 Natural Gas loads and emissions with Forecast memo Final"

<sup>6</sup> NW Natural Memo 2.10.22 " Lane County 2020 Natural Gas loads and emissions with Forecast memo Final"

## Updated Data Table with Demand Reductions

Year	Electricity grid emissions reductions*	All Electric Residence MT CO <sub>2</sub> per year	Natural Gas renewable supply projections for Lane County	Gas Residence ** MT CO <sub>2</sub> per year with Supply Reductions	Gas Residence ** MT CO <sub>2</sub> per year with Supply and Demand Reductions
2022		0.7	1%	3.2	3.2
2025		0.4	4%	3.1	2.7
2030	80%	0.13	10%	2.9	2.1
2035	90%	0.08	29%	2.3	1.5
2040	100%	0.0	44%	1.8	1.2
2050	100%	0.0	83%	0.5	0.8
Cumulative GHG Emissions (one residential household)		<b>4.3</b>		<b>58.3</b>	<b>48.5</b>

\* Emissions reductions from baseline as required by HB 2021

\*\* Gas emissions only – home electricity emissions excluded for simplicity

\*\*\* Renewable supply + residential efficiency upgrades. Data provided by NW Natural