



Oregon Department of Environmental Quality

Scenarios Analysis

Gasoline Dispensing Facility Emissions 2022 Rulemaking Advisory Committee Meeting #1

Contact: Heather Kuoppamaki, heather.kuoppamaki@deq.oregon.gov

Introduction

DEQ is considering changes to the rules applicable to Gasoline Dispensing Facilities (GDFs), often referred to as gas stations. Part of DEQ's process for beginning this rulemaking was to compare the cost and efficiency of various pollution control equipment that can be installed on gas station storage tanks and dispensers. There are two main categories of emissions controls at gas stations. 'Stage I', 'vapor balance' or 'Stage I vapor balance' refers to emission controls associated with the storage tanks at a gas station. 'Stage II', 'vapor recovery system', or 'Stage II vapor recovery system' refers to emission controls associated with the dispensing of gasoline into a motor vehicle 'at the pump'.

DEQ analyzed eight different scenarios of potential changes to vapor control requirements at GDFs. These scenarios examined changes to the Stage I and Stage II requirements, where applicable. In this paper, DEQ provides analysis of potential emissions and estimated costs for implementing each scenario. The intent of this analysis is to prompt discussion with the Rulemaking Advisory Committee on potential rule changes to the GDF control requirements. GDF control requirements can be found in Oregon Administrative Rules chapter 340 divisions [242 \(Portland area Stage II requirements\)](#) and [244 \(statewide GDF requirements\)](#).

At this point, DEQ assumed GDFs with current air quality permits would be subject to the control requirements. However, it may be useful to consider varying levels control requirements depending on how much gasoline is dispensed at the GDF.

Control summary

Currently Stage I controls (controls at the storage tank) are required state-wide at stations with tanks that are 250 gallons or larger *and*:

- Have an annual throughput of 480,000 gallons or more;
- Have a monthly throughput of 100,000 gallons or more; or
- Are located in the Portland Metro area with an annual throughput of 120,000 gallons or more.

Stage I controls are also required at stations in the Portland-Vancouver Air Quality Management Area (AQMA), Salem-Keizer AQMA, and Medford-Ashland AQMA on gasoline storage tanks with a capacity of 1,500 gallons or more.

Stage II controls (controls at the pump/dispenser) are currently only required at stations in the Portland Metro area (Clackamas, Multnomah, and Washington Counties) that have an annual throughput of 600,000 gallons or more. In rare situations, a facility outside of this tri-county area may elect to install a Stage II system.

Details of control requirements are provided in a separate white paper, titled Gasoline Dispensing Facility Vapor Emissions Rulemaking 2022 Controls Summary.

Scenarios

DEQ analyzed eight scenarios of potential changes to control requirements. These scenarios looked at changes to the Portland Metro area requirements and the statewide requirements. The potential control changes that were examined are listed below with more details provided in the Controls Summary white paper. Table 1 summarizes the combination of control requirements included in each scenario.

- Stage I EVR controls
- Low permeation hoses and ECO nozzles
- Remove all Stage II controls
- Remove incompatible Stage II controls
- Convert incompatible Stage II controls to compatible Stage II controls

Table 1: Control requirements by scenario

Scenario	State-wide		Portland Metro
	Stage I	Hoses and nozzles	Stage II
1	No change	No change	No change
2	No change	No change	Removed entirely
3	EVR	No change	Removed entirely
4	No change	No change	Compatible remains as-is. Incompatible are removed.
5	EVR	No change	Compatible remains as-is. Incompatible are removed.
6	EVR	Low permeation hoses and ECO nozzles required	Compatible remains as-is. Incompatible converted to compatible.
7	EVR	Low permeation hoses and ECO nozzles required	Compatible remains as-is. Incompatible are removed.
8	No change	Low permeation hoses and ECO nozzles required	Compatible remains as-is. Incompatible are removed.

Costs

To examine costs, DEQ used five “Model GDFs” that represent the range of GDFs across the state that are subject to the regulations. These “Model GDFs” are presented in Table 2.

Table 2: Model GDFs used for cost estimating

	GDF 1	GDF 2	GDF 3	GDF 4	GDF 5
Throughput Range (gal/mo)	Below 25,000	25,001 – 50,000	50,001 – 100,000	100,001 – 200,000	200,001 and up
Throughput Range (gal/yr)	Below 300,000	300,001 – 600,000	600,001 – 1,200,000	1,200,001 – 2,400,000	2,400,001 and up
Est. number of dispensers	2.5	3.25	6.5	9.75	12
Portland Metro					
Approx. number of stations	43	62	142	107	57
Total throughput	6,245,000	27,971,000	125,972,000	176,059,000	286,246,000
% of statewide stations	10%	15%	35%	26%	14%
% of statewide throughput	1%	4%	20%	28%	46%
Non-Portland Metro (the rest of the state)					
Number of stations	251	176	204	131	91
Total throughput (gal/year)	37,086,000	77,253,000	176,253,000	215,942,000	422,902,000
% of statewide stations	29%	21%	24%	15%	11%
% of statewide throughput	4%	8%	19%	23%	46%

Costs included one-time costs associated with modifying the “Model GDFs” for each scenario. These costs were estimated primarily using online searches of equipment vendors. Table 3 provides estimated unit costs (per dispenser or per UST) and estimated annual costs. DEQ then annualized the up-front costs over a 10-year period to get an estimated annual cost for each Model GDF for each scenario, provided in Table 4.

Table 3: Estimated upfront costs and annual costs for control requirements.

Action	Scenario	Item	Equipment	Installation	Total
Remove all Stage II ^a	2, 3	Removal costs	--	\$2,000	\$2,000
		Annual O&M	--	--	(\$1,000)
Remove incompatible Stage II ^a	4, 5, 6, 7, 8	Removal costs	--	\$1,000	\$1,000
		Annual O&M	--	--	(\$500)
Convert incompatible Stage II to compatible Stage II	6	Nozzles	\$500	\$300	\$800
Add low perm hose and ECO nozzle	6, 7, 8	Hoses	\$700	\$0 ^b	\$900
		Nozzles	\$300	\$0 ^b	\$400
		<i>Total upfront costs</i>	<i>\$1,000</i>	<i>\$300</i>	<i>\$1,300</i>
		Annual O&M	--	--	\$0 ^b
Stage I EVR	3, 5, 6, 7	P/V valve	\$400	\$80	\$480
		Spill containment	\$1,000	\$500	\$1,500
		Drop tube & overfill	\$1,100	\$440	\$1,540
		Rotatable adaptor	\$350	\$70	\$420
		Tank Test	--	\$855	\$855
		<i>Total upfront costs</i>	<i>\$2,850</i>	<i>\$1,945</i>	<i>\$4,795</i>
Annual O&M	--	--	\$750		
Stage II EVR ^c	--	Total upfront costs	\$15,000	\$3,000	\$18,000
	--	Annual O&M	--	--	\$1,000

- a. Annual O&M costs for removal of Stage II controls is negative because of the cost savings. The removed equipment no longer requires testing.
- b. Installation and O&M costs for low perm hoses and ECO nozzles are estimated to be the same as existing, pre-EVR hoses and nozzles.
- c. DEQ included estimated costs for Stage II EVR but did not include these systems in any of the scenarios due to costs.

Table 4: Model GDF total annual cost (inspections and maintenance and annualized up front costs) over a 10 year period

Scenario	Descriptions	Model GDF				
		1	2	3	4	5
1	Stage I and Stage II as-is	\$-	\$-	\$-	\$-	\$-
2	Stage I as-is; remove all Stage II	\$(186)	\$58	\$1,116	\$2,174	\$2,906
3	Stage I EVR; remove all Stage II	\$3,087	\$3,331	\$4,389	\$5,447	\$6,179
4	Stage I as-is; remove incompatible Stage II	\$110	\$293	\$1,087	\$1,880	\$2,429
5	Stage I EVR; remove incompatible Stage II	\$3,384	\$3,567	\$4,360	\$5,154	\$5,703
6	Stage I EVR; all Stage II compatible, low perm hose and ECO nozzle	\$5,346	\$5,818	\$7,862	\$9,906	\$9,948
7	Stage I EVR; low perm hose and ECO nozzle, remove incompatible Stage II	\$4,652	\$5,066	\$6,858	\$8,650	\$8,517
8	Stage I as-is; low perm hose and ECO nozzle, remove incompatible Stage II	\$697	\$1,056	\$2,611	\$4,167	\$5,244

Emissions Forecasting

DEQ used EPA’s estimated ORVR penetration data, along with EIA Motor Gasoline Forecast, and current rates of ORVR vehicles by county to estimate throughput and emissions based on each scenario. Figure 1 shows the emissions forecasts by control type. Controls specific to the Portland Metro area are not included in this figure.

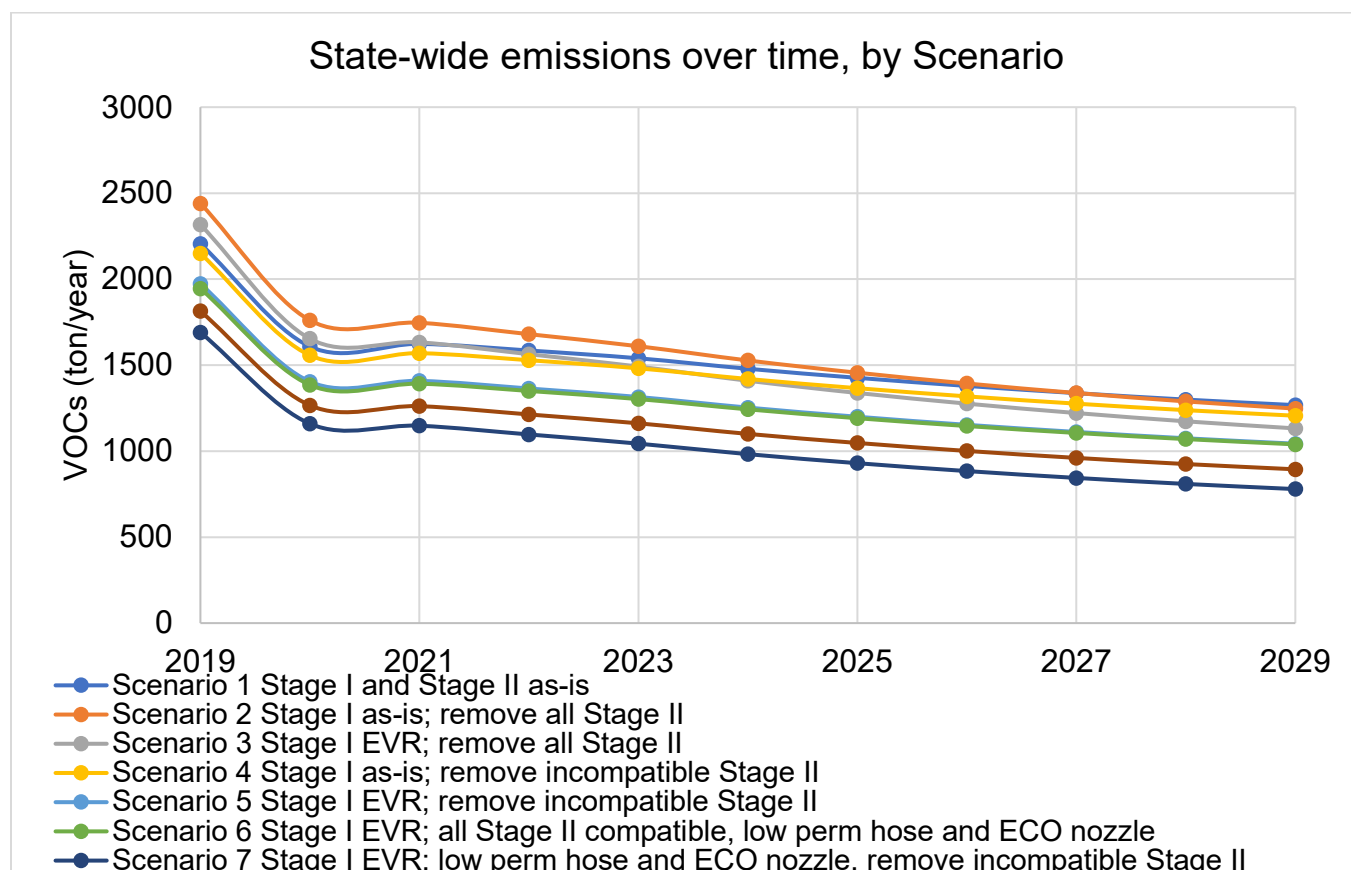


Figure 1: State-wide Gas Station Emissions Forecasts by scenario.

Cost per emissions reduction

To look at a future costs to emissions, DEQ used EPA's estimated ORVR penetration data, along with U.S. Energy Information Administration (EIA) Motor Gasoline Forecast, and current rates of ORVR vehicles by county to estimate throughput and emissions based on each scenario (Figure 1) and compared these emissions to costs estimated above.

Figure 2 shows the estimated emissions in 2029 versus the estimated annual costs for implementing the various scenarios. DEQ split Figure 2 into four roughly equal quadrants to look at total cost versus total emissions of the eight scenarios. The scenarios with the lowest costs also have the highest emissions. As shown in this figure, Scenario 8, which includes a combination of removing incompatible Stage II controls and requiring low permeation hoses and ECO nozzles provides for relatively lower emissions with a lower cost.

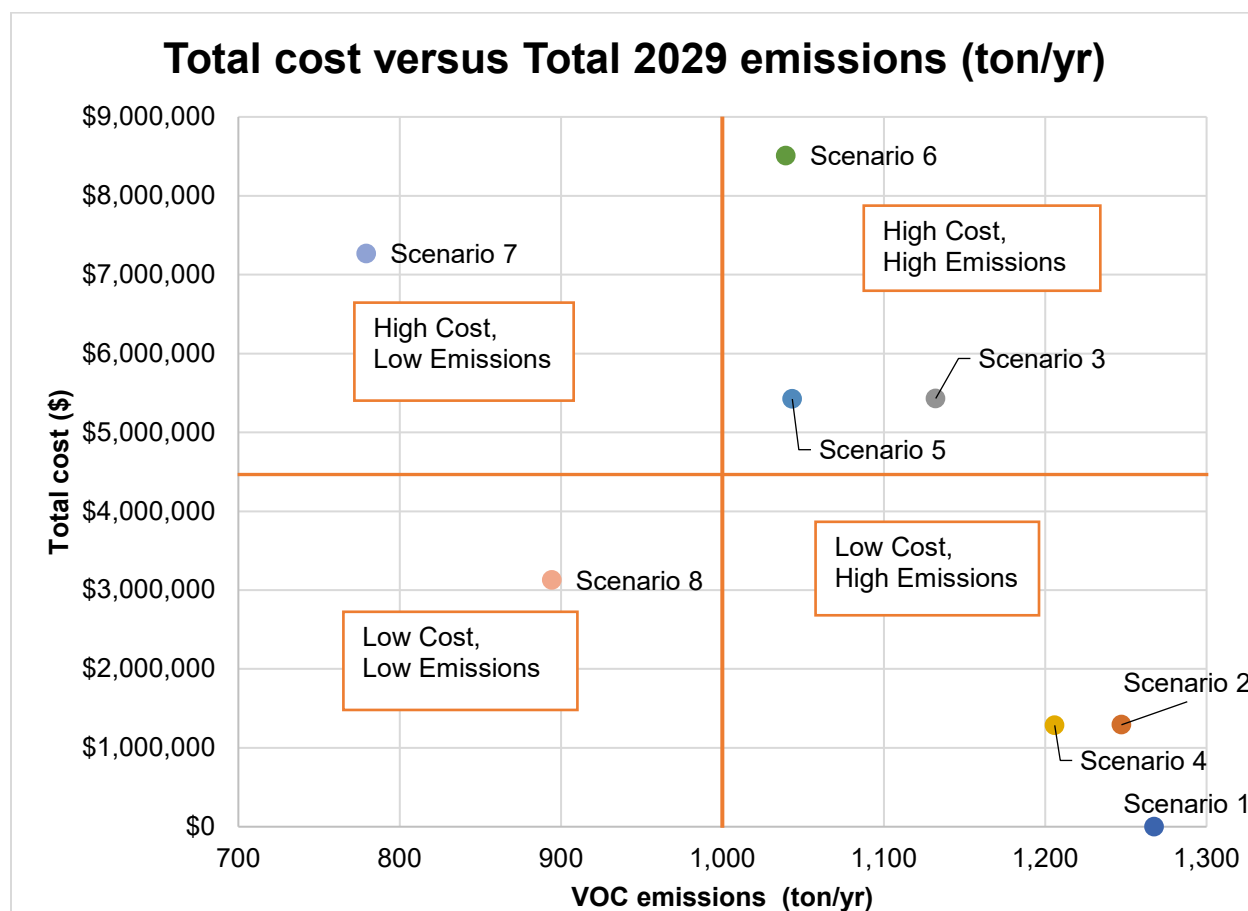


Figure 2: VOC emissions versus cost, state-wide

Alternate formats

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email deqinfo@deq.oregon.gov.