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BACKGROUND DOCUMENT ON PROPOSED NEW AND AMENDED REGULATIONS

310 CMR 7.00

310 CMR 60.00

Air Pollution Control for Stationary and Mobile Sources

**Regulatory Authority:
M.G.L. c 21A, § 2, 8 & 16
M.G.L. c. 111, §§ 2C, 142A – 142E
M.G.L. c. 21N, §§ 3(c), 3(d), & 7**

December 16, 2016

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I. SUMMARY

The Massachusetts Department of Environmental Protection (MassDEP) is proposing six new regulations and amendments that limit or reduce greenhouse gas (GHG) emissions in Massachusetts. These regulations, which target emissions from multiple categories of sources, are described in this background document. The regulations address sulfur hexafluoride (SF₆) emissions from gas-insulated switchgear (Section II. A.), methane (CH₄) emissions from the natural gas distribution network (II. B.), GHG emissions from electricity generation (II. C.) and carbon dioxide (CO₂) emissions from the transportation sector (II. D. and II. E.). Section I of this document offers background and context for this regulatory package, including information on relevant legislation, court decisions, and Governor Baker's Executive Order, and concludes with a short summary of the six regulations. Section II provides a detailed technical description of each regulation or amendment. Sections III – V describe MassDEP's impact analyses, implications under the Massachusetts Environmental Policy Act (MEPA), and information about the public comment process.

A. Background

MassDEP is proposing the new regulations and amendments to 310 CMR 7.00 *Air Pollution Control* and 310 CMR 60.00 *Air Pollution Control for Mobile Sources*, in accordance with the following mandates: (1) M.G.L. c. 21N, §§ 3(c), 3(d) and 7, commonly known as the Massachusetts Global Warming Solutions Act (GWSA), (2) the Massachusetts Supreme Judicial Court's May 2016 decision in Kain v. Department of Environmental Protection, which clarifies the intent and requirements of the GWSA, and (3) Governor Baker's September 2016 Executive Order 569. MassDEP also proposes these regulations pursuant to its statutory authority at M.G. L. c. 21A, §§ 2, 8 and 16 and M.G.L. c. 111, § 2C and 142A – 142E.

Global Warming Solutions Act

The GWSA, codified at M.G.L. c. 21N, was signed into law in August 2008 to address the challenges of climate change. As noted by the Supreme Judicial Court, the GWSA was developed:

...against the backdrop of an emerging consensus shared by a majority of the scientific community that climate change is attributable to increased emissions, as well as perceptions in the Commonwealth that national and international efforts to reduce those emissions are inadequate. See Executive Office of Energy & Environmental Affairs, Massachusetts Clean Energy and Climate Plan for 2020 at 8 (Dec. 29, 2010); Executive Office of Energy & Environmental Affairs, Determination of Greenhouse Gas Emission Limit for 2020 at 1 (Dec. 28, 2010) (Secretary's Determination). See also Massachusetts v. Environmental Protection Agency, 549 U.S. 497, 505 (2007) (petition by Massachusetts, with other States, local governments, and private organizations, arguing

Environmental Protection Agency abdicated responsibility under Clean Air Act to regulate emissions of four greenhouse gases, including carbon dioxide.

See *Kain v. DEP*, 474 Mass. 278, 281-82 (2016). The *Kain* court went on to note that “[t]he act established a comprehensive framework to address the effects of climate change in the Commonwealth by reducing emissions to levels that scientific evidence had suggested were needed to avoid the most damaging impacts of climate change. Executive Office of Energy & Environmental Affairs, Commonwealth of Massachusetts Global Warming Solutions Act 5-Year Progress Report at 17 (Dec. 30, 2013) (Progress Report).” *Id.*

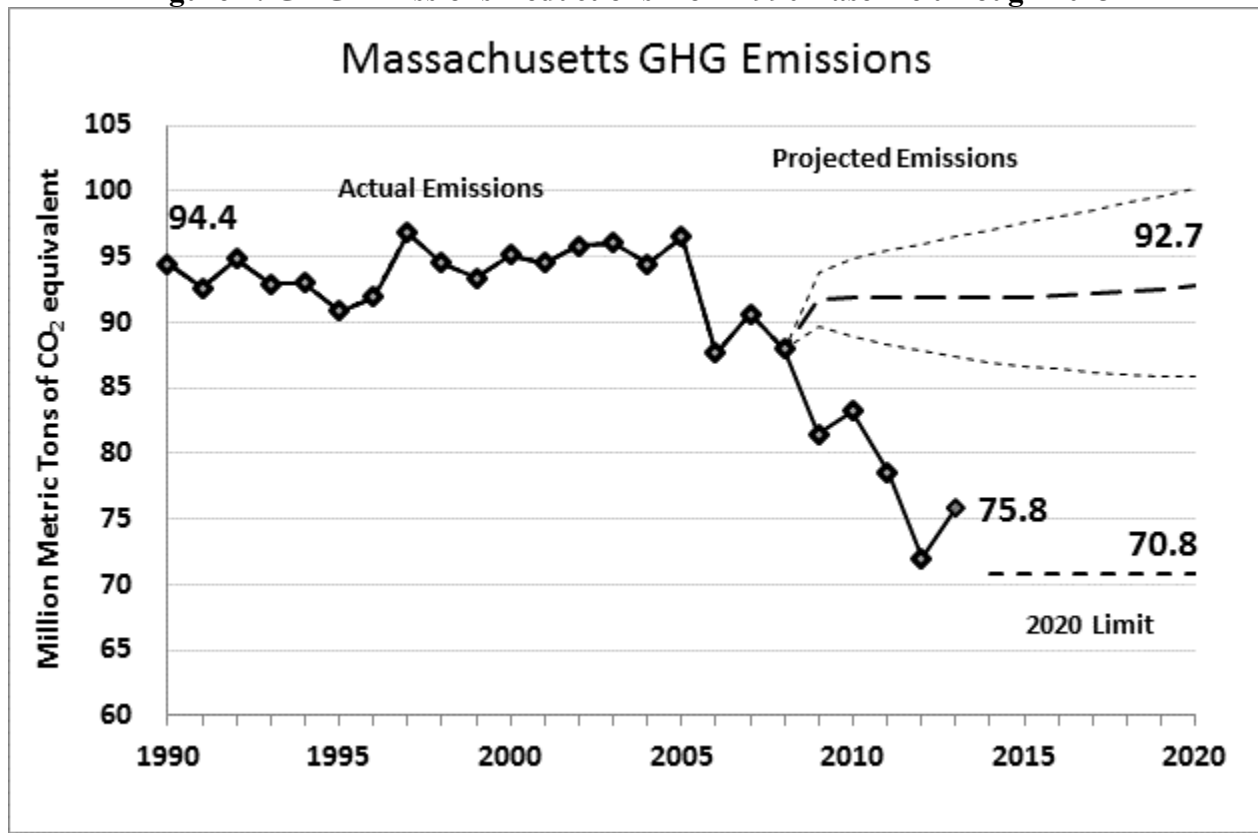
The GWSA requires a reduction of greenhouse gas (GHG) emissions in the Massachusetts GHG inventory to “a 2050 statewide emissions limit that is at least 80 per cent below the 1990 level.” See M.G.L. c. 21N, § 3(b)(4). In accordance with the GWSA, the Secretary of the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) set a statewide GHG emissions reduction limit of 25%¹ and also issued the *Massachusetts Clean Energy and Climate Plan for 2020* (2020 CECP) in 2010, which established strategies and policies to achieve the 2020 limit. EEA updated the 2020 CECP (2020 CECP Update, dated December 31, 2015) to add new policy strategies and revise or eliminate others to ensure the 2020 limit would be met. In July of 2016, MassDEP issued an updated GHG Inventory as directed by the GWSA and continues to provide annual GHG Inventory updates.²

EEA and its agencies, including MassDEP, have implemented the 2020 CECP strategies since 2010, and these strategies have resulted in substantial progress towards the 2020 limit - an overall reduction of GHG emissions of 19.7% below 1990 GHG emissions levels through 2013.³ This means that an additional 5.3% reduction in GHG emissions must be achieved by the end of the year 2020. This is summarized by the following Figure 1, taken from the Massachusetts GHG inventory:

¹ December 28, 2010 Secretary of Energy and Environmental Affairs’ Determination of Greenhouse Gas Limit for 2020 at <http://www.mass.gov/eea/docs/eea/energy/2020-ghg-limit-dec29-2010.pdf>.

² *Statewide Greenhouse Gas Emissions Level: 1990 Baseline and 2020 Business As Usual Projection Update*, July 2016, at <http://www.mass.gov/eea/docs/dep/air/climate/gwsa-update-16.pdf>.

³ 2013 is the latest year for which MassDEP has complete GHG emissions data.

Figure 1: GHG Emissions Reductions from 1990 Baseline through 2013⁴

Kain v. DEP Decision

To achieve the 2020 limit, MassDEP was directed by the Supreme Judicial Court in the Kain v. DEP decision to implement additional regulations that complied with the requirements of Section 3(d) of the GWSA to ensure that the 2020 limit was met. Section 3(d) provides as follows:

The department shall promulgate regulations establishing a desired level of declining annual aggregate emission limits for sources or categories of sources that emit greenhouse gas emissions.

On May 17, 2016, the Supreme Judicial Court issued a ruling interpreting the meaning of M.G.L. c. 21N, §3(d) for the first time, holding that Section 3(d):

... requires the department to promulgate regulations that address multiple sources or categories of sources of greenhouse gas emissions, impose a limit on emissions that may be released, limit the aggregate emissions released from each group of regulated sources or categories of sources, set emission limits for each year, and set limits that decline on an annual basis.

⁴ Page 7 of <http://www.mass.gov/eea/docs/dep/air/climate/gwsa-update-16.pdf>.

See *Kain v. DEP*, 474 Mass. 278, 300 (2016). In its ruling, the court made clear that MassDEP must promulgate regulations that achieve progress in meeting the GWSA 2020 limit and the regulations must set enforceable limits on each category of sources selected.⁵ In addition, the court held that the enforceable GHG emissions limits must be an annually declining mass-based limit, not a rate-based emissions limit. See *Kain* at 287-289. Moreover, the court held that the GHG emissions limits must include aggregate limits on the entire chosen category of sources so that any new source would be included within the annually declining mass-based limit for the category. *Id.* Finally, the *Kain* court ruled that the annually declining aggregate GHG emissions limit must cause reductions of emissions within the borders of Massachusetts. In summary, MassDEP must be guided by these essential requirements in crafting the regulations that it proposes under Section 3(d) of the GWSA by creating GHG emissions limits that: (1) are mass-based limits; (2) decline annually; (3) limit the aggregate emission levels of existing and new sources within a category; (4) are enforceable; and (5) ensure reductions within Massachusetts.

Executive Order 569

To ensure the directives of the Supreme Judicial Court would be met in a timely manner and to achieve other goals related to climate change, Governor Baker issued Executive Order 569 on September 16, 2016.⁶ The Executive Order states in part in section 2:

The Department of Environmental Protection shall promulgate final regulations that satisfy the mandate of Section 3(d) of [M.G.L. c. 21N] by August 11, 2017, having designed such regulations to ensure that the Commonwealth meets the 2020 statewide emissions limit mandated by the GWSA....

[T]he Department of Environmental Protection shall:...revise the Global Warming Solutions Act requirements for the Massachusetts Department of Transportation set forth in 310 C.M.R. 60.05 to establish declining aggregate emission limits...consider limits on emissions from, among other sources or categories of sources, the following: (i) leaks from the natural gas distribution system; (ii) new, expanded, or renewed emissions permits or approvals; (iii) the transportation sector or subsets of the transportation sector, including the Commonwealth's vehicle fleet; and (iv) gas insulated switchgear;

The Executive Order directed MassDEP to finalize a public hearing draft of Section 3(d) regulations no later than December 16, 2016, along with the notice associated with these

⁵ *Kain*, 474 Mass. 278 at 300 (“The purpose of *G.L. c. 21N* is to attain actual, measurable, and permanent emissions reductions in the Commonwealth, and the Legislature included § 3 (d) in the statute to ensure that legally mandated reductions are realized by the 2020 deadline.”); however, the Court made clear that Section 3(d) regulations could be combined with other types of measures to achieve the 2020 limit. See *Kain* at 285 (“Thus, to reach the twenty-five per cent reduction level by 2020, the Commonwealth would have to implement additional measures to achieve approximately seven per cent in further emissions reductions. The parties agree that these reductions need not be attributable solely to regulations passed pursuant to § 3 (d), but rather recognize that a variety of policies and programs, including actions taken under other statutory programs, such as the Green Communities Act, *G. L. c. 7, § 9A*, may produce measurable reductions.”)

⁶ Executive Order 569 at <http://www.mass.gov/governor/legislationexecorder/execorders/executive-order-no-569.html>.

regulations as required by Section 5 of Chapter 30A of the General Laws. MassDEP must also hold a public hearing no later than February 24, 2017.

Therefore, MassDEP is proposing regulations for new programs, along with revisions to existing regulations, under the authority of Section 3(d) to achieve GWSA goals. MassDEP is also proposing, pursuant to other statutory authority, including Section 3(c) of the GWSA, other regulations needed to work with the proposed Section 3(d) regulations to achieve the 2020 and 2050 limits. Two of these regulations (the Clean Energy Standard and Reducing Greenhouse Gas Emissions from Electricity Generating Facilities) are designed to work together to provide additional incentives to capture more clean energy for the Commonwealth and include enforceable emissions limits on electric generating units that will ensure achievement of the policies included in the 2020 CECP and the 2020 CECP Update.

As part of MassDEP's ongoing stakeholder engagement regarding these proposed regulations and compliance with the GWSA, Kain v. DEP, and Executive Order 569, MassDEP held stakeholder meetings on November 2, 3, and 7, 2016. In addition, MassDEP provided discussion draft regulations and solicited stakeholder comment on the drafts. These comments have been read and considered, and several are directly addressed in this background document. The written comments received are available on the MassDEP website.⁷

In addition to proposing these regulations, MassDEP will likely consider proposing fees for the new and amended regulations to support MassDEP's implementation of the regulations. Any fees would be proposed in a separate rulemaking process.

B. GHG Emission Reductions Overview

The GWSA strategies that have already been implemented pursuant to the 2020 CECP and the 2020 CECP Update are expected to continue to achieve significant reductions in GHG emissions. In the transportation sector, these strategies include the Low Emission Vehicle Program.⁸ In the electric sector, these strategies include the Renewable Portfolio Standard program under the authority of the Department of Energy Resources (DOER),⁹ and all cost effective Energy Efficiency programs developed under the auspices of the Energy Efficiency Advisory Council (EEAC) and affirmed by the Department of Public Utilities (DPU) as per the Green Communities Act of 2008.¹⁰ The proposed regulations are expected to result in GHG emission reductions for the Commonwealth as well. The reductions that are expected to be achieved between 2013 and 2020 from 2020 CECP strategies and the proposed MassDEP regulations are summarized in Table 1:

⁷ Comments submitted by the comment deadlines are available at:

<http://www.mass.gov/eca/agencies/massdep/air/climate/section3d-comments.html>

⁸ MassDEP Low Emission Vehicle standards, including annually declining GHG emissions standards, are at 310 CMR 7.40.

⁹ 225 CMR 14.00, promulgated pursuant to the Green Communities Act, M.G.L. c. 25A, § 11F.

¹⁰ DPU-approved energy efficiency plans and orders at <http://www.mass.gov/eca/energy-utilities-clean-tech/energy-efficiency/energy-efficiency-activities/> and proceedings of the EEAC at: <http://ma-eeac.org/>.

Table 1: Projected GHG Emissions Reductions from 1990 Baseline (after 2013 and through 2020) and Indication of Likely Contribution from Proposed MassDEP GWSA Regulations

MassDEP Regulation	New or Draft Amendment?	Section 3(d)?	Estimated Reductions 2013 - 2020 (% of 1990)
Transportation Sector Regulations			3.1%
Vehicle GHG Standards	N/A (Existing)	No	
Requirements for MassDOT	Amend	Yes	
State Vehicle Fleet	New	Yes	
Electricity Sector Regulations			4.0%
Clean Energy Standard for Retail Sellers	New	No	
Generator Emissions Limits	New	Yes	
Methane Leaks from Gas Distribution System	New	Yes	0.05%
Gas Insulated Switchgear	Amend	Yes	0.01%
Total			7.2%

Transportation Sector

Pursuant to GHG inventory completed under the GWSA, the transportation sector has been found to be the single largest sector of GHG emissions in Massachusetts. In 2013, transportation represented approximately 40.8% of Massachusetts GHG emissions. Between 1990 and 2013, GHG emissions in the Massachusetts transportation sector increased, in contrast to reductions seen in other sectors (e.g., electricity, residential, commercial, industrial, and agriculture).¹¹

In order to meet the Kain mandate to achieve GWSA goals, MassDEP calculated a conservative projection of GHG emissions reduction expected by 2020 from all 2020 CECP Update transportation policies and the two proposed regulations in the transportation sector. These include gains from MassDEP's non-Section 3(d) regulation for low emission vehicle standards, including the annually declining GHG emissions standards that are part of that regulation. See

¹¹ Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2013, with Partial 2014 data, July 2016. <http://www.mass.gov/eea/agencies/massdep/climate-energy/climate/ghg/greenhouse-gas-ghg-emissions-in-massachusetts.html>.

310 CMR 7.40. The expected transportation sector GHG emissions reductions from MassDEP policies and proposed regulations between 2013 and 2020 are shown in Table 2 below:

Table 2: Transportation Sector – Expected GHG Emissions Reductions from 1990 Baseline (after 2013 and through 2020)

Source of Reductions	Estimated Reductions 2013 – 2020 (% of 1990)
Vehicle GHG Standards (310 CMR 7.40) (Calculated in a manner consistent with the 2020 CECP Update)	3.1%
Requirements for Transportation	0.01%
State Vehicle Fleet (310 CMR 60.06) (Reflects potential purchases of efficient/electric vehicles)	<0.01%
Total	3.1

Table 2 describes the 3.1% in expected GHG emissions reductions from the three MassDEP transportation sector policies and their contribution towards achieving the GWSA 2020 limit.¹² MassDEP has refined calculations developed for the 2020 CECP Update and expects that GHG emissions reductions from its LEV program regulations after 2013 through 2020 will be approximately 3.1%. The LEV program has already achieved significant GHG emissions reductions since GHG standards were first incorporated into the program in 2009 and, additional substantial reductions are expected from the LEV standards which were significantly strengthened in 2015. In addition, MassDEP has estimated 0.01% for additional GHG emissions reductions from its two proposed transportation sector regulations in this rule-making. While gains from improvements in the state agency-owned and leased passenger vehicle fleet may be small, the Governor recognized in his Executive Order 569 that addressing the state vehicle fleet is important to demonstrate leadership by the Commonwealth. The Commonwealth has lead by example many times in implementing environmentally proactive and protective policies that have been emulated later by the private sector.

Electric Sector

The electric sector is the second largest sector of GHG emissions in Massachusetts. In 2013, emissions from generating the electricity used by Massachusetts homes and businesses represented approximately 21.5% of Massachusetts GHG emissions. From 1990 to 2013, GHG emissions in the Massachusetts electric sector decreased 42%. However, over time, the 2020 CECP Update envisions the transportation and building heating sectors electrifying to displace petroleum, such that the electric sector will subsume other sectors (e.g., transportation,

¹² Note that the Kain Court expressly ruled that MassDEP could structure policies that including non-Section 3(d) policies and regulations to achieve the GWSA 2020 limit. *See Kain v. DEP*, 474 Mass. 278, 285 (2016).

residential, commercial and industrial) and become an even more important focus of GHG reduction efforts.¹³

MassDEP has refined calculations developed for the 2020 CECP Update to estimate additional electric sector reductions as shown in Table 3 below:

Table 3: Electric Sector –Expected GHG Emissions Reductions from 1990 Baseline (after 2013 and through 2020)

Source of Reductions	Estimated Reductions 2013 – 2020 (% of 1990)
Coal Fired Power Plan Retirements (Net of gas generation increase compensating for Brayton, Salem, Mt. Tom, Pilgrim shutdowns)	- 0.2%
New Renewable Energy ¹⁴ (Estimate reflects RPS compliance and surplus in-region renewables)	2.0%
All Cost Effective Energy Efficiency + Appliance Standards (Net of projected 2020 electric vehicle load)	2.2%
Total	4.0%

Table 3 describes the 4.0% expected GHG emissions reductions from MassDEP electric sector policies. Three policies considered in this rule-making will contribute towards achieving the GWSA 2020 limit, and are balanced by expected impacts of large power plant retirements that will occur between now and 2020. MassDEP expects that net GHG emissions effects of large power plant retirements will result in a net small increase in GHG emissions of approximately 0.2%. MassDEP has consulted with DOER and expects DOER's ongoing and successful Renewable Portfolio Standard, along with additional new renewable energy that can likely be procured for the Commonwealth, to achieve additional GHG emissions reductions of 2.0% through 2020. MassDEP has also consulted with DOER and DPU and expects that GHG emissions reductions of at least 2.2% will occur as a result of the ongoing efforts by DPU, the EEAC and the Energy Efficiency Program Administrators to achieve emission reductions through energy efficiency programs and reduced demand for electric power. This is a conservative estimate based on the assumption that the 3-year plans beginning in 2019 remain the same in terms of stringency as the 2016-2018 3-year plans, even though that stringency may be increased. These clean energy resources would be ensured by MassDEP's proposed electric sector regulations in this rule-making.

¹³ Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2013, with Partial 2014 data, July 2016. <http://www.mass.gov/eea/agencies/massdep/climate-energy/climate/ghg/greenhouse-gas-ghg-emissions-in-massachusetts.html>.

¹⁴ MassDEP is working with DOER to refine this estimate, particularly with regard to the amount of surplus in-region renewables that may be available for use in complying with the clean energy standard.

In summary, MassDEP has designed this package of proposed regulations to achieve an estimated 7.2% total reductions in GHG emissions in order to meet the 5.3% GHG emissions reductions needed between 2013 and 2020 to meet the GWSA 2020 limit. In addition, MassDEP has designed some of these proposed regulations to continue past 2020 to chart a course to achieve the 2050 GWSA limit.

Designing these regulations to reduce emissions by more than the required 5.3% (i.e., 7.2%) will help control for variables that could result in additional electric power demand or increases in vehicle miles traveled. The most significant of these variables is weather, which can result in high demand for heating in colder than normal winters and high electricity demand for cooling during warmer than normal summers. Similarly, vehicle miles traveled is influenced by many factors outside the agency's control, such as gasoline prices. Therefore, to ensure that the GWSA 2020 limit is achieved with a reasonable degree of certainty, MassDEP believes it should include measures to reach a percentage of reductions beyond the required 5.3%. MassDEP seeks comment on the individual elements as well as the overall effectiveness of this group of proposed regulations to meet 2020 limits.

These new and amended regulations include the following:

Reducing Sulfur Hexafluoride Emissions from Gas-Insulated Switchgear (GIS) 310 CMR 7.72 (Amended)

The proposal would:

- Establish a mass-based, annually declining aggregate limit on sulfur hexafluoride (SF₆) emissions from active gas-insulated switchgear (GIS) owned by large utilities.
- Establish an aggregate limit on the same utilities.
- Prevent increases in SF₆ emissions that could otherwise occur due to use of additional GIS equipment.
- Maintain the stringency of the existing program by retaining the SF₆ leak rate.

Reducing Methane Emissions from Natural Gas Distribution Mains and Services 310 CMR 7.73

The proposal would:

- Establish mass-based, annually declining limits on methane emissions from mains and services for individual natural gas distribution system operators with a Gas System Enhancement Plan (GSEP) order from DPU.
- Establish mass-based, annually declining aggregate limits on total methane emissions from mains and services owned by all gas operators with a GSEP.

Clean Energy Standard (CES) 310 CMR 7.75

The proposal would:

- Establish obligations on retail electricity sellers to provide an annually increasing percentage of power from clean energy sources.

- Define clean energy based on a GHG emissions-based performance standard, regardless of the technology used to generate the electricity.
- Capture additional low- and zero-emissions generation technologies that are not included in the existing Renewable Portfolio Standard program as implemented by DOER.
- Set the stringency of the clean energy standard to support achieving the power plant GHG emissions limits set by 310 CMR 7.74.

Reducing GHG Emissions from Electricity Generating Units (EGUs) **310 CMR 7.74**

The proposal would:

- Establish a mass-based, annually declining limit on GHG emissions from power plants in Massachusetts, ensuring reductions associated with current electricity sector policies in the 2020 CECP Update will occur in Massachusetts. These include new clean energy supplies, energy efficiency, and the proposed Clean Energy Standard (CES) regulation at 310 CMR 7.75.
- Establish a process for apportioning the aggregate limit on total GHG emissions among existing and new power plants in Massachusetts.
- Include a mechanism for power plants to earn and use over-compliance credits (OCCs), providing compliance flexibility.

Global Warming Solutions Act Requirements for Transportation **310 CMR 60.05 (Amended)**

The proposal would:

- Establish mass-based, annually declining aggregate limits on carbon dioxide (CO₂) emissions from the combustion of fuels in mobile equipment owned by MassDOT and the MBTA and of heating fuels at MassDOT and MBTA facilities.
- Establish mass-based, annually declining aggregate targets on CO₂ emissions from the transportation sector in the Commonwealth.
- Require MassDOT to calculate and report on whether its CO₂ emissions limit was achieved each year, and implement supplemental measures if its limit is not met.

Carbon Dioxide Emission Limits for State Fleet Passenger Vehicles **310 CMR 60.06**

The proposal would:

- Establish mass-based, annually declining limits on CO₂ emissions from the passenger vehicle fleet owned or leased by each Secretariat in the Executive Branch in the Commonwealth.
- Establish mass-based, annually declining aggregate limits on total CO₂ emissions from the entire passenger vehicle fleet owned or leased by the Executive Branch.
- Require each Secretariat to report annually on their passenger and non-passenger vehicle fleets, including whether the annual CO₂ emissions limit on their passenger vehicle fleet was achieved.

Miscellaneous Related Amendments

The proposal includes amendments to the GHG Reporting Program at 310 CMR 7.71(9) to conform to changes to retail seller GHG emission reporting required in 310 CMR 7.75.

II. DETAILED DISCUSSION OF REGULATIONS

A. Reducing Sulfur Hexafluoride in Gas-Insulated Switchgear (GIS): 310 CMR 7.72

1. Overview

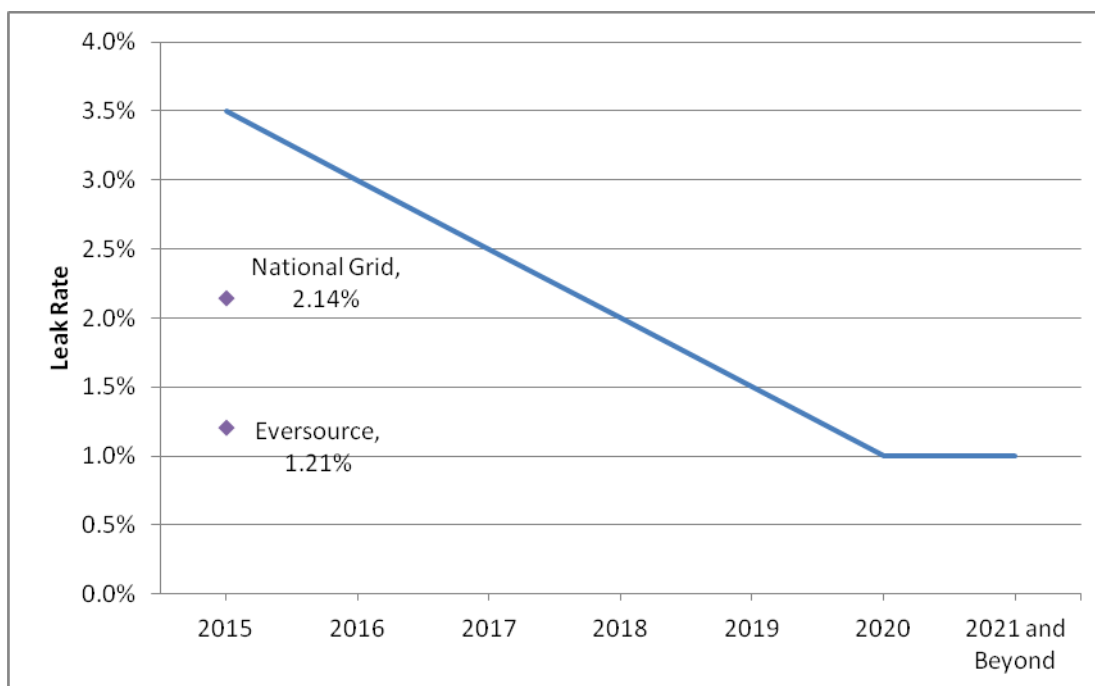
Pursuant to the authority in M.G. L. c. 21A, §§ 2 and 8, M.G.L. c. 21N, § 3(d) and M.G.L. c. 111, § 2C and 142A – 142E, among other authorities, the Massachusetts Department of Environmental Protection (MassDEP) is proposing amendments to 310 CMR 7.72: *Reducing Sulfur Hexafluoride Emissions from Gas-Insulated Switchgear*. The current regulation controls emissions of sulfur hexafluoride (SF₆) from gas-insulated switchgear (GIS) by requiring that all newly-manufactured GIS put into use after January 1, 2015 has a 1.0% maximum annual leak rate, and that federal reporting GIS owners comply with a declining maximum annual allowable emission rate for all active GIS. The proposed amendments maintain the stringency of the existing program and also: (1) establish mass-based, annually declining limits on aggregate SF₆ emissions from GIS for each company that is subject to the existing declining emission rate, (2) prevent increases in aggregate SF₆ emissions that could occur due to deployment of additional GIS equipment, and (3) provide consistency with M.G.L. c. 21N, § 3(d) of the Massachusetts Global Warming Solutions Act (GWSA) and the Kain v. DEP decision. In particular, the Supreme Judicial Court noted with respect to the existing regulation at 310 CMR 7.72 that, to comply with the requirements of M.G.L. c. 21N, § 3(d), the regulation had to impose a mass-based annual declining SF₆ emissions limit on the “aggregate” of all existing and potentially new GIS equipment at the facilities of regulated sources, namely the GIS-owning companies subject to the regulation. See Kain at 294-295.

SF₆ is a potent greenhouse gas (GHG) with a long atmospheric lifetime. A commonly used metric to express the impact of a GHG on the Earth’s climate is its global warming potential (GWP). By this measure, SF₆ is 23,900 times more potent than carbon dioxide (CO₂), the most common GHG, which is assigned a GWP of 1. The term GIS refers to equipment that is used in high-voltage electrical systems to control the flow of electrical current. SF₆ is used in GIS because of its unique electrical and thermal properties that make it an excellent insulator; however, SF₆ can leak from closures and joints in the equipment and be released into the atmosphere. MassDEP is confident that the leakage of SF₆ from GIS can be reduced over time because participants in the United States Environmental Protection Agency’s (EPA’s) voluntary SF₆ Emission Reduction Partnership for Electric Power Systems have successfully demonstrated a number of

strategies, including equipment replacement and the deployment of new technology to detect and repair leaks, that have yielded significant emission reductions.¹⁵

By April 15, 2016, GIS owners required to file annual reports with US EPA (two in Massachusetts, Eversource and National Grid) and as per 310 CMR 7.72, submitted annual reports in compliance with the existing regulation. The companies were in compliance with the 3.5% maximum leak rate required for 2015; the combined leak rate for both companies was 1.62%. The figure below depicts the companies' 2015 leak rates compared to the regulation's declining maximum leak rate through 2020.

Figure 1: Maximum and Actual SF₆ Emission Leak Rates



2. Description of the Proposed Amendments

a) Maximum Annual SF₆ Emission Rate: 310 CMR 7.72(5)

MassDEP is proposing to include a mass-based, annually declining aggregate limit on SF₆ emissions from the two companies that are subject to the emission rate requirement from 2018 through 2020. This aggregate limit would include any potential new GIS equipment added to Massachusetts companies subject to the regulation. The proposal retains the rate limits in order to maintain the stringency of the original regulation. However, the declining aggregate limit is added to ensure that aggregate emissions decline over time, as directed by the Kain decision.

¹⁵ <https://www.epa.gov/f-gas-partnership-programs/electric-power-systems-partnership>. MassDEP appreciates that the two largest users of SF₆ in GIS in Massachusetts, National Grid and Eversource, participate in this program.

In addition, MassDEP proposes to set individual, company-specific limits on total SF₆ emissions from 2018 through 2020. These emissions limits were calculated based on the total SF₆ capacity of GIS reported to MassDEP by the two federal reporting GIS owners for 2015. Each company's 2015 capacity was increased by 5% per year through 2020 to accommodate expected growth in deployment of GIS equipment over that timeframe. Each year's total calculated inventory was then multiplied by the maximum emission rate set forth in 310 CMR 7.72(5) for 2018 – 2020.¹⁶

Table 1: Maximum Allowable SF₆ Emission Rate and Aggregate Limit by Year, 2015-2020

Calendar Year	Maximum Allowable SF ₆ Emission Rate	Aggregate Limit*
2015	3.5%	-
2016	3.0%	-
2017	2.5%	-
2018	2.0%	5,984
2019	1.5%	4,713
2020	1.0%	3,299

* Calculated based on the federal reporters' total 2015 SF₆ inventory from active GIS of 258,466 lbs.

The annual company-specific and aggregate limits were calculated according to the following formula:

$$\text{Inventory} \times \text{Emission Rate} \times (1 + ((\text{CY} - 2015) \times 0.05)) = \text{Annual limit on SF}_6 \text{ emissions}$$

- Inventory = 2015 SF₆ inventory (aggregate or company-specific)
- CY = Calendar year for which emissions are being reported
- Emission Rate = Maximum allowable SF₆ emission rate for the CY being reported

The tables below show the declining annual emission limits for the regulated federal reporters subject to 310 CMR 7.72(5).

Table 2: Maximum Annual SF₆ Emissions - National Grid

Calendar Year	Maximum Allowable SF ₆ Emissions (lbs.)
2018	2,644
2019	2,082

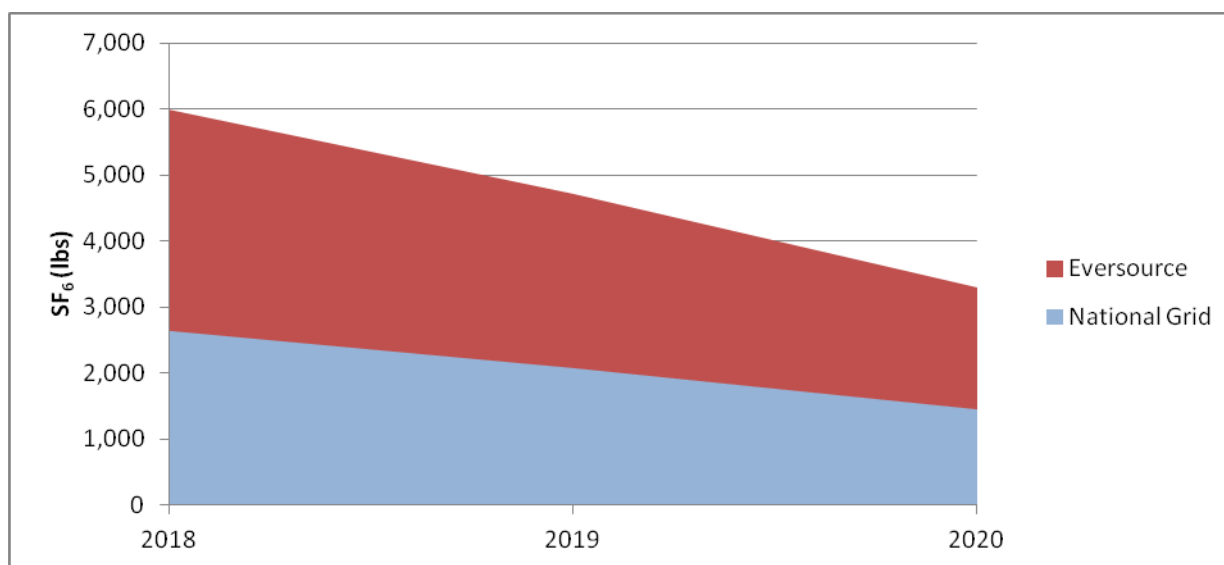
¹⁶ Incorporating a 5% growth rate as a proxy for changes in equipment and company-wide deployment of GIS results in limits that MassDEP believes are achievable by both companies under several scenarios regarding growth and deployment of new equipment. Information provided by Eversource during the stakeholder process notes that new GIS equipment can have a guaranteed maximum leak rate of 0.1% per year. MassDEP's analysis shows that the company's proposed 2020 limit is achievable when accounting for this leak rate for new equipment and an expected growth of SF₆ capacity of over 150% from 2015 to 2020, as stated in the company's comment letter.

2020	1,457
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Table 3: Maximum Annual SF₆ Emissions – Eversource

Calendar Year	Maximum Allowable SF ₆ Emissions (lbs.)
2018	3,340
2019	2,632
2020	1,841

While the current regulation's maximum emission rates establish limits on the amount of SF₆ that may be emitted relative to the total amount of SF₆ contained in the companies' GIS equipment, the declining emission limits limit the absolute amount of SF₆ that may be emitted each year from all regulated sources. The chart below shows the aggregate emissions permitted under the declining annual limit, as a sum of each federal reporter's individual limit.

Figure 2: Proposed Limit – Pounds of SF₆

MassDEP seeks comment on all aspects of this proposal, including whether the proposed limits are achievable given likely growth in deployment and emission rates of new equipment. MassDEP also seeks comment on how to address new acquisitions, by the regulated companies, of other companies that own GIS equipment, transfers of GIS equipment ownership between companies, and other conditions that would affect the company-specific or aggregate limits. MassDEP also seeks comment on whether it is appropriate to end the aggregate limit at the end of 2020, given two known variables: (1) there are technological limits on achievable leak rates; and (2) there is a high probability of a need for electric transmission companies to add new GIS equipment to the system to transmit power from new clean energy sources. MassDEP also welcomes information on other factors that it should consider in setting the stringency and duration of SF₆ limits. In addition, MassDEP is considering whether to assess fees for submittals of the required

certifications. Any fees would be proposed and finalized in a separate rulemaking process.

b) Economic Impacts

MassDEP expects only minimal economic impacts from the proposed regulation. The proposed SF₆ emissions limits are designed to track planned emissions reductions based on the existing declining leak rate emissions limits in the current regulation. Therefore, the limits should be consistent with planned acquisitions by the regulated companies and achievable given expected new equipment leak rates.

c) Annual Reporting Requirements: 310 CMR 7.72(6)

MassDEP believes the form used for demonstrating compliance with the emission rate limit in the existing regulation will be sufficient to demonstrate compliance with the proposed SF₆ emissions limit requirement due to 310 CMR 7.72(6)(b)6., which requires the companies subject to the regulation to include in their reports “the number of pounds of SF₆ emitted from GIS equipment....”

B. Reducing Methane Emissions from Natural Gas Distribution Mains and Services: 310 CMR 7.73

1. Overview

Pursuant to the authority in M.G. L. c. 21A, §§ 2 and 8, M.G.L. c. 21N, § 3(d) and M.G.L. c. 111, § 2C and 142A – 142E, among other authorities, MassDEP is proposing a new regulation aimed at reducing methane (CH₄) emissions from natural gas distribution mains and services in the Commonwealth. The regulation, 310 CMR 7.73: *Reducing Methane Emissions from Natural Gas Distribution Mains and Services*, would establish mass-based, annually declining aggregate limits on methane emissions from main and service lines owned by gas operators with Gas System Enhancement Plans (GSEPs), consistent with M.G.L. c. 21N, § 3(d) of the Massachusetts Global Warming Solutions Act. This emissions reduction action is a strategy in the *Massachusetts Clean Energy and Climate Plan for 2020 Update*.

The primary ingredient of natural gas, methane can leak from the pipelines and systems used during distribution to homes and businesses. In the atmosphere, methane is a potent contributor to global warming, with a GWP roughly 25 times that of carbon dioxide. In recent years, increasing attention has been paid to leaks from the aging natural gas distribution system in Massachusetts, which result in methane emissions into the atmosphere.

In 2014, the Massachusetts Legislature enacted M.G.L. c. 164, §§ 144 and 145 giving gas system operators direction on addressing leaks from Massachusetts’ aging pipeline infrastructure. Under M.G.L. c. 164, § 144, the gas companies must address three grades of leaks:

(2) A Grade 1 leak shall be a leak that represents an existing or probable hazard to persons or property. Grade 1 leaks require repair as immediately as possible and continuous action until the conditions are no longer hazardous. ...

(3) A Grade 2 leak shall be a leak that is recognized as non-hazardous to persons or property at the time of detection, but justifies scheduled repair based on probable future hazard. The gas company shall repair Grade 2 leaks or replace the main within 12 months from the date the leak was classified. ...

(4) A Grade 3 leak shall be a leak that is recognized as non-hazardous to persons or property at the time of detection and can be reasonably expected to remain non-hazardous. The gas company shall reevaluate Grade 3 leaks during the next scheduled survey, or within 12 months from the date last evaluated, whichever occurs first, until the leak is eliminated or the main is replaced. ...

See M.G.L. c. 164, § 144(b).

M.G.L. c. 164, § 145 permits gas companies to submit GSEPs to the Massachusetts Department of Public Utilities (DPU). These plans “include a timeline for removing all leak-prone infrastructure on an accelerated basis specifying an annual replacement pace and program end date with a target end date of either (i) not more than 20 years, or (ii) a reasonable target end date . . .” The following gas operators have submitted GSEPs to the DPU: Boston Gas Company d/b/a National Grid, Colonial Gas Company d/b/a National Grid, Bay State Gas Company d/b/a Columbia Gas of Massachusetts, The Berkshire Gas Company, Fitchburg Gas and Electric Light Company d/b/a Unitil, Liberty Utilities (New England Natural Gas Company) Corp. d/b/a Liberty Utilities, NSTAR Gas Company d/b/a Eversource Energy.¹⁷ Under the GSEPs, the gas operators have plans in place to replace or improve their aging or leaking natural gas infrastructure by 2034, except for Eversource, whose GSEP establishes plans to replace or remove their entire aging or leaking natural gas infrastructure by 2038. GSEPs are expected to lead to a decline in methane emission leaks, and the resulting reductions are the basis of the declining annual emission limits proposed under this regulation.

In 2016, the Legislature passed Session Law: Chapter 188 of the Acts of 2016, an Act to Promote Energy Diversity (“Energy Bill”). Section 13 of the Energy Bill requires the DPU, in consultation with MassDEP, to “open an investigation to establish specific criteria for the identification of the environmental impact of gas leaks that have been classified as Grade 3 . . . and to establish a plan to repair leaks that are determined to have a significant environmental impact.” The DPU has opened that investigation in consultation with MassDEP and is in the process of developing an approach to identify and repair Grade 3 leaks that have a significant environmental impact. The DPU is further required, in consultation with MassDEP, to “promulgate rules regarding the timeline and acceptable methods for remediation and repair of a Grade 3 leak determined to have significant environmental impact.” MassDEP expects that in addressing such leaks, gas operators will be able to accelerate the decline in emissions of methane from

¹⁷ Blackstone Gas Company did not submit a GSEP because its distribution system contains no leak-prone infrastructure.

natural gas infrastructure and thereby improve their ability to comply with the declining emissions required by this regulation. MassDEP will continue to consult with DPU, and consider whether and how the results of DPU's investigation and subsequent regulation should be coordinated with MassDEP's proposed and final regulation 310 CMR 7.73.

1. Description of the Proposed Regulation

a) Applicability

This regulation will apply to Massachusetts gas operators with a GSEP approved by the Massachusetts Department of Public Utilities pursuant to M.G.L. c. 164, § 145. Specifically, the regulation will apply to CH₄ emissions from all active mains and services of gas operators with GSEPs. "Main" means a distribution line that serves as a common source of supply for more than one service, and "Service" means a distribution line that transports gas from a common source of supply to an individual customer, to two adjacent or adjoining residential or small commercial customers, or to multiple residential or small commercial customers served through a meter header or manifold. A service ends at the inlet of the customer meter or at the connection to a customer's piping, whichever is further upstream, or at the connection to customer piping if there is no meter. This definition of service excludes customer meters, so as to correspond to the infrastructure sampled in establishing the service line emission factors in Table 9 (see further citations for the derivation of the Table 9 emission factors below).

b) Maximum Individual Annual CH₄ Emission Limits: 310 CMR 7.73(4)(a)

MassDEP is proposing to include limits on CH₄ emissions from active mains and services for calendar years 2018, 2019 and 2020, for each gas operator with a GSEP, as listed in Tables 1 through 7 below. Under the proposed regulation, a maximum annual emission limit for each such operator is expressed in metric tons of carbon dioxide equivalent. The limits were determined by summing the emissions for each material type in Table 9 below. The emissions for each material type were calculated by multiplying the emissions factors in Table 9 by the miles of main and number of services of each material type for each year for each operator. A spreadsheet detailing the calculation of the proposed limits is attached as Appendix A.

Gas operators are required to publically report miles of main and number of services annually to the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA); the most recent such report was for 2015, but MassDEP proposes to update the limits for each operator in the final 310 CMR 7.73 regulation, incorporating company-specific 2016 data which will be public in spring 2016.

Replacement of miles of main and number of services was accounted for consistent with each gas operator's DPU GSEP submittals.¹⁸ MassDEP proposes to update the limits for each operator in final 310 CMR 7.73, incorporating any relevant changes resulting from DPU's review of the GSEPs filed October 31, 2016.

Growth in the miles of main and number of services was accounted for in Tables 1-8, consistent with the gas operator public comment letter submitted as part of the stakeholder process for establishing this regulation.¹⁹ MassDEP will continue to work with DPU on reviewing those growth projections and requests comment on the assumptions behind the growth projections. MassDEP is aware that gas operators also submit Forecast and Supply Plans and Gas Expansion Plans to DPU, and proposes to update the limits for each operator in final 310 CMR 7.73, incorporating any relevant changes resulting from DPU's review of such plans.

MassDEP seeks comment on the assumptions and methodology of how the CH₄ emission limits were calculated and on the CH₄ emission limits themselves.

Table 1: Maximum Annual CH₄ Emission Limits – Boston Gas Company d/b/a National Grid

Calendar Year	Maximum Allowable CH ₄ Emissions (metric tons of carbon dioxide equivalent)
2018	105,604
2019	102,124
2020	98,184

Table 2: Maximum Annual CH₄ Emission Limits – Colonial Gas Company d/b/a National Grid

Calendar Year	Maximum Allowable CH ₄ Emissions (metric tons of carbon dioxide equivalent)
2018	11,452
2019	10,601
2020	9,824

Table 3: Maximum Annual CH₄ Emission Limits - Bay State Gas Company d/b/a Columbia Gas of Massachusetts

Calendar Year	Maximum Allowable CH ₄ Emissions (metric tons of carbon dioxide equivalent)
2018	29,150
2019	27,194
2020	25,109

Table 4: Maximum Annual CH₄ Emission Limits – The Berkshire Gas Company

Calendar Year	Maximum Allowable CH ₄ Emissions (metric tons of carbon dioxide equivalent)
2018	4,019
2019	3,800
2020	3,655

¹⁸ The initial DPU GSEP orders can be found at <http://www.mass.gov/eea/energy-utilities-clean-tech/natural-gas-utility/gas-system-enhancement-plan-orders.html>. The DPU dockets for these and subsequent orders can be accessed at <http://web1.env.state.ma.us/DPU/FileRoom/dockets/bynumber> as dockets 14-130 through 14-135, 15-GSEP-01 through 06 and 16-GSEP-01 through 06.

¹⁹ Comments at <http://www.mass.gov/eea/docs/dep/air/gwsa-email-comments11-23-16.pdf>, pages 344-369.

Table 5: Maximum Annual CH₄ Emission Limits – Fitchburg Gas and Electric Light Company d/b/a Unitil

Calendar Year	Maximum Allowable CH ₄ Emissions (metric tons of carbon dioxide equivalent)
2018	2,107
2019	1,998
2020	1,906

Table 6: Maximum Annual CH₄ Emission Limits – Liberty Utilities (New England Natural Gas Company) Corp. d/b/a Liberty Utilities

Calendar Year	Maximum Allowable CH ₄ Emissions (metric tons of carbon dioxide equivalent)
2018	6,291
2019	5,855
2020	5,420

Table 7: Maximum Annual CH₄ Emission Limits – NSTAR Gas Company d/b/a Eversource Energy

Calendar Year	Maximum Allowable CH ₄ Emissions (metric tons of carbon dioxide equivalent)
2018	28,685
2019	27,043
2020	25,412

c) Maximum Aggregate Annual Declining Limits: 310 CMR 7.73(4)(b)

In addition, MassDEP is proposing to include limits on aggregate CH₄ emissions from all active mains and services for calendar years 2018, 2019 and 2020 from all gas operators with GSEPs. Under the proposed regulation, a maximum annual emission limit for all such operators is expressed in metric tons of carbon dioxide equivalent. Table 8 shows the aggregate limit for these emissions, which is the sum of the limits for the individual gas operators in Tables 1 through 7.

Table 8: Maximum Annual CH₄ Emission Limits from Mains and Services of Gas Operators named in Tables 1 through 7

Calendar Year	Maximum Allowable CH ₄ Emissions (metric tons of carbon dioxide equivalent)
2018	187,307
2019	178,617
2020	169,509

MassDEP requests comment on whether the annual limits in Tables 1 to 8 should extend until the end of the GSEP schedule of each gas operator with a GSEP (i.e., 2022 for Colonial, 2038 for Eversource, and 2033 for the other five operators), or end at an earlier date. MassDEP requests comment on whether it is accurate to project individual gas operator emissions two decades from now, or whether limits should instead be specified until, for example, 2020, and an additional five years of limits be added every five years, or at some other frequency.

d) Economic Impacts

MassDEP expects minimal economic impacts from 310 CMR 7.73 beyond those already expected from implementation of the GSEP orders because MassDEP has designed the proposed regulation with emission limits aligned with the GHG emissions reductions resulting from the gas operators' GSEPs.

e) Annual Reporting: 310 CMR 7.73(5)

By April 15, 2018 and on April 15th of each year listed in Tables 1 through 7, each gas operator must submit an annual report to MassDEP for emissions that occurred during the previous calendar year. The report must contain, among other things:

- The miles of mains and number of services owned, leased, operated, or controlled by the gas operator and located in Massachusetts by each material type listed in Table 9, as recorded in the annual report to PHMSA; and
- The number of metric tons of CH₄, in carbon dioxide equivalents, by each material type listed in Table 9, emitted from mains and services owned, leased, operated, or controlled by the gas operator and located in Massachusetts during the year, as calculated by multiplying the miles of mains and number of services by the appropriate emission factor in Table 9.

The emission factors in Table 9 are derived from the most up-to-date data sources, as described on page 18 and in footnotes 23 and 24 of the July 2016 *Statewide Greenhouse Gas Emissions Level: 1990 Baseline and 2020 Business As Usual Projection Update*.²⁰ These emission factors were recently updated as part of a nationwide effort coordinated by the Environmental Defense Fund, to improve understanding of emissions across the natural gas supply chain. Washington State University's Laboratory for Atmospheric Research led a nationwide field study to better characterize and understand methane emissions associated with the delivery of natural gas. Researchers quantified methane emissions from facilities and pipes operated by 13 utilities in various regions. National Grid was among the cosponsors of the study, and sampling occurred in the following municipalities served by National Grid: Braintree, Burlington, Milton, Norwood, Acton, Ayer, Quincy, Waltham, Wellesley, and Weymouth. Cooperation was also provided by Eversource.

²⁰ Available at <http://www.mass.gov/eea/docs/dep/air/climate/gwsa-update-16.pdf>.

Table 9: Methane Emission Factors by Material Type

Mains	Metric tons of carbon dioxide equivalent/mile-year
Cast or wrought iron	28.663225
Ductile iron	
Copper	
Steel, cathodically unprotected and uncoated	20.281978
Steel, cathodically unprotected and coated	
Other	
Steel, cathodically protected and uncoated	1.804054
Steel, cathodically protected and coated	
Plastic	0.215583
Services	Metric tons of carbon dioxide equivalent/service-year
Steel, cathodically unprotected and uncoated	0.129589
Steel, cathodically unprotected and coated	
Cast or wrought iron	
Ductile iron	
Other	
Steel, cathodically protected and uncoated	0.055982
Steel, cathodically protected and coated	
Plastic	0.005136
Copper	0.121920

The gas operators report miles of main and number of services to PHMSA annually by type of material. However, gas operators have on occasion discovered discrepancies between the material of main and services listed in their records, and that found in the field. MassDEP requests comment on whether and how MassDEP should account for such discrepancies in assessing compliance with the limits in Tables 1 through 7.

The gas operators update their GSEP plans in filings with the DPU on October 31 of each year. The updates reflect the most recent construction plans, which are influenced by many factors, including, for example, the need to coordinate with municipal paving schedules, or a need to prioritize unexpected emergency repairs. In assessing compliance with the limits in Tables 1 through 7, MassDEP requests comment on whether and how MassDEP should account for any acceleration or deceleration of the DPU-approved GSEP schedule for replacement or removal of leak prone infrastructure.

While the limits proposed in Tables 1 through 7 account for expected growth in miles of main and number of services (as discussed above), it is possible that the actual growth will be greater or less than accounted for. In assessing compliance with the limits in Tables 1 through 7, MassDEP requests comment on whether and how MassDEP should account for higher or lower than expected growth.

C. Electricity Sector Regulations (Clean Energy Standard: 310 CMR 7.75 & Reducing Greenhouse Gas Emissions from Electricity Generating Units: 310 CMR 7.74)

MassDEP is combining its discussion of the two regulations proposed to reduce emissions from electricity generators in Massachusetts. These two regulations are designed to work in tandem to achieve GHG emissions reductions from power plants in Massachusetts to approximately 4 million metric tons of CO₂ equivalent (MMT CO₂e) below 2013 levels in 2020 and to assist in meeting the 2050 GHG emissions limit of at least 80% reductions from 1990 levels as mandated by the GWSA. Briefly, the two proposed electric sector regulations are:

- 310 CMR 7.75 - would require retail sellers of electricity consumed in Massachusetts to purchase increasing amounts of clean energy for use by their customers. Increasing use of clean energy would reduce GHG emissions by reducing the need to operate fossil fuel-fired power plants serving the regional electric grid, including power plants in Massachusetts.
- 310 CMR 7.74 - would establish a declining annual aggregate mass-based limit on GHG emissions from large fossil fuel-fired power plants in Massachusetts. Without such a limit, emissions reductions occurring because of 310 CMR 7.75 and other similar policies could occur anywhere in the regional electric grid. Therefore, 310 CMR 7.74 is necessary to ensure that emissions are reduced in Massachusetts.

As discussed below, MassDEP has consulted with the EEA Secretary and DOER in structuring these proposed regulations and seeks additional input from such agencies throughout the process of finalizing the regulations. In addition, the regulations are designed to complement the existing Renewable Portfolio Standard (RPS) and Regional Greenhouse Gas Initiative (RGGI) programs.

(1) Clean Energy Standard: 310 CMR 7.75

1. Overview of Clean Energy Standard: 310 CMR 7.75

Pursuant to M.G.L. c. 21A, §§ 2 and 8, M.G.L. c. 21N, § 3(c) and M.G.L. c. 111, §§ 142A – 142E, among other authorities, MassDEP is proposing a new regulation to increase the percentage of electricity sold to consumers in Massachusetts that is generated using clean energy. The regulation, 310 CMR 7.75: *Clean Energy Standard* (CES), would set a sales portfolio standard to require retail electricity sellers to annually demonstrate the use of clean energy to generate a specified percentage of their electricity sales. As required by M.G.L. c. 21N, § 3(c), MassDEP has designed the proposed regulation “in consultation with the department of energy resources, based on consumption and purchases of electricity from the regional electric grid, taking into account the regional greenhouse gas initiative and the renewable portfolio standard.” As detailed below, the CES would include clean energy sources outside of Massachusetts,

and complement the RGGI²¹ and RPS programs.

The proposed CES would implement the *Clean Energy Standard* strategy described in the *Massachusetts Clean Energy and Climate Plan for 2020 Update*. The purpose of the CES is to reduce Massachusetts' reliance on fossil fuel-fired electric power plants by increasing the use of clean energy, namely low- and zero-emissions power generation technologies, to generate electricity. As emissions from combustion of fossil fuels at electric power plants are a significant fraction of Massachusetts' total GHG emissions, the CES will contribute to achieving the 2020 and 2050 GHG emissions reductions required by the GWSA. The CES will also support efforts to reduce emissions from transportation and space heating sectors by providing clean electricity that can be used to power electric vehicles and heat pumps in buildings.

Massachusetts' primary clean energy program is the Department of Energy Resources' (DOER's) Renewable Portfolio Standard (RPS). The RPS requires delivery of increasing percentages of renewable energy to electricity customers of Massachusetts. The proposed CES draws on DOER's experience implementing RPS, and is designed to be compatible with, and complementary to RPS. In particular, while the CES would be similar to RPS in that it would require the delivery of clean energy, it would differ from RPS in that it would rely on an emissions-based performance standard to identify eligible technologies.²² As all RPS-eligible technologies meet the emissions-based CES qualification requirement, all RPS-eligible technologies will qualify as clean energy under the CES and contribute to the reduction of GHG emissions. However, the CES includes additional clean generation technologies that are not eligible for RPS, and will therefore ensure support for more technologies that have the potential to contribute to the emission reduction requirements of the GWSA, including innovative technologies that may not have been demonstrated at utility scale as yet. The CES would also be compatible with the contracting process required under the 2016 Session Law passed by the Legislature: Chapter 188 of the Acts of 2016, an Act to Promote Energy Diversity ("Energy Bill") which includes requirements to solicit significant additional hydro and wind power resources for the Commonwealth over the next decade.²³

Like RPS, the proposed CES allows the use of clean energy generated outside of Massachusetts for compliance.²⁴ This is consistent with the GWSA requirement that EEA and MassDEP must address emissions that occur when electricity imported from out of state is used in Massachusetts, and the requirements of M.G.L. c. 21N, § 3(c), that MassDEP design emissions limits with respect to consumption and purchases of power from the "regional grid." This approach is also consistent with MassDEP's GHG

²¹ The purpose of RGGI is to reduce emissions from fossil fuel-fired power plants. The CES complements RGGI by supporting the development of alternative energy sources.

²² Additional information about the RPS program is available on DOER's web site at <http://www.mass.gov/eca/energy-utilities-clean-tech/renewable-energy/rps-aps/rps-and-aps-program-summaries.html>.

²³ <http://www.mass.gov/governor/press-office/press-releases/fy2017/governor-baker-signs-comprehensive-energy-diversity-law.html>.

²⁴ Note that proposed 310 CMR 7.74 includes complementary requirements to ensure that reductions occur in Massachusetts.

reporting program for retail electricity sellers, which requires revisions to ensure that emissions reports fully reflect the impact of the CES on GHG emissions. Proposed revisions to those regulations are included in 310 CMR 7.74 and are described below.

b) Description of the Proposed Regulation

The proposed regulation would require retail electricity sellers to annually procure clean energy credits (CECs, referred to as “clean energy attributes” in the proposed regulation), denominated in megawatt hours (MWh), corresponding to a percentage of electricity sales (the “standard”). Because of the many similarities between the CES and RPS, MassDEP is proposing regulatory language for the CES that is, in many cases, identical to language used in the RPS regulation. Using similar language will ensure that the CES will be compatible with the RPS, and simplify compliance for retail sellers subject to both programs. Reviewers unfamiliar with the RPS program and regulation may review information about RPS available on DOER’s web site.²⁵

c) Applicability

The proposed regulation would apply to all retail electricity sellers in Massachusetts, including investor-owned distribution companies, competitive suppliers, and Municipal Light Plants (MLPs)²⁶. The CES would apply to the same companies and MLPs that currently report GHG emissions to MassDEP pursuant to 310 CMR 7.71(9). The regulation would also apply to any clean energy generators that choose to apply to create CECs, including generators outside of Massachusetts.

d) Requirements for Retail Electricity Sellers

i. Compliance

MassDEP is proposing to require retail electricity sellers to comply with the CES using CECs. The number of CECs that would be required each year would be calculated by multiplying the annual electricity sales for the year by the standard for the year. Creation, transfer, and submission of CECs would occur within the same NEPOOL-GIS²⁷ tracking system that is used to track renewable energy credits (RECs) used to comply with RPS. This system has worked well for the RPS program and can easily be adapted for the CES. Any RECs eligible to be used for compliance with Massachusetts RPS Class I requirements would also be eligible to be used for compliance with the CES. (RPS Class I is the component of the RPS program that supports construction of new renewable energy generation.)

²⁵ Available at <http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/rps-aps/>.

²⁶ A gradual phase-in of the full CES requirement will occur between 2021 and 2050 to enable MLPs to comply more easily with the CES requirements.

²⁷ NEPOOL-GIS is the New England Power Pool Generation Information System. See <http://www.nepoolgis.com>.

ii. 2018 – 2050 Standard Setting

For 2018, 2019, and 2020, the standard would be set at 16%, 18%, and 20% of total electricity sales, respectively. This standard appears appropriate and achievable given the RPS standards for those years of 13%, 14%, and 15% and the fact that DOER has identified additional RPS-eligible RECs available over that time frame in amounts that correspond to an additional 3% - 5% of sales.

For years 2020 – 2050, the standard would increase by 2% per year until it reaches 80% of each retail sellers' electricity sales portfolio in 2050. Over this time, the CES would complement the RPS program and the Energy Bill by supporting the acquisition of clean energy that cannot be counted toward RPS compliance. Such clean energy would include energy that is not considered "renewable" under the RPS regulation, and the portion of available "surplus" RPS-eligible energy that exceeds the RPS standard.

Importantly, the RPS standard would account for more than half of the CES standard in every year (i.e., 45% vs. 80% in 2050); thereby guaranteeing that RPS-eligible renewable energy remains the primary requirement for procuring clean energy. MassDEP is not proposing a standard of 100% in 2050 because existing resources, including clean and possibly a small amount of emitting generation, may remain in operation in 2050. MassDEP seeks comment on all aspects of standard-setting, including whether the 2050 standard should be set higher than 80%.

iii. Standard Setting for MLPs

Because MLPs are not included in the RPS program, the standard will be established somewhat differently for MLPs, as described below. In 2050, consistent with the GWSA requirement to address all electricity emissions, MLPs will be required to deliver the same percentage of clean energy as all other retail sellers. However, because MLPs are not subject to the RPS program, and are therefore not currently required to deliver renewable energy that can count toward CES compliance, the standard will be adjusted downward for MLPs by subtracting out a fraction of the RPS component of the non-MLP standard. MLPs also have longer financial planning and approval timeframes than private utilities. A gradual phase-in of the full CES requirement will occur between 2021 and 2050 to enable MLPs to comply more easily with the CES requirements.

The proposed phase-in schedule for MLPs is:

- For 2018 – 2020, a standard of zero will be used for the purpose of allowing MLPs to create and bank CECs.
- For 2021 – 2049, the standard for MLPs would be lower than for other retail suppliers to account for the fact that the MLPs are not subject to RPS. (For example, in 2021, MLPs would be subject to 6% plus a small fraction (1/30) of the 16% for non MLPs. The same process would be use for later years, except that the fraction would increase by 1/30 each year until reaching 29/30 in 2049.
- The MLP standard would reach 80% in 2050 (the standard for other retail electricity sellers). The regulation includes a table listing the annual standard for each year for MLPs and other electricity sellers.

Alternatively, MassDEP requests comment on whether the standard for MLPs should always be discounted by the full amount of the RPS standard for the year. For example, under this approach if the CES in 2050 is 80%, and the RPS Class I requirement is 45%, the standard for MLPs would be 35%.

MassDEP is aware that some MLPs have ownership and contractual relationships with low- and zero-emissions generation sources, including relationships that allow MLPs to sell RECs to electricity sellers that are subject to RPS. Except in cases where RECs are sold, MassDEP is proposing to allow MLPs to subtract MWh associated with these contractual and ownership interests from the calculation of the number of CECs required for compliance. For the purpose of completing this calculation, low and zero-emissions resources not associated with RECs would include only MWh generated by nuclear power plants and hydroelectric resources that are not eligible for RPS, consistent with what has been reported to MassDEP by MLPs under MassDEP's GHG emissions reporting program. Alternatively, MassDEP requests comment on whether ownership of and contractual relationships with low- and zero-emissions generation sources should be allowed to be used to meet the annual standard, instead of subtracting MWh associated with these contractual and ownership interests from the calculation of the number of CECs required for compliance. MassDEP is not proposing to allow subtraction of MWh for which RECs have been sold to third parties, to avoid double counting of the non-emitting attributes of these MWh, but seeks comment on whether this is the correct approach.

iv. Compliance Flexibility

MassDEP recognizes that including an alternative compliance payment (ACP) option would allow electricity sellers to comply with the CES if the number of CECs available in a particular year is insufficient to allow full compliance using CECs. Pursuant to M.G.L. c. 21N, §§ 4 and 7, MassDEP is proposing to include an ACP option in the CES, and to set the ACP amount equal to 50% of the RPS ACP amount for each year. Setting the ACP at 50% of the RPS Class I ACP amount will establish a consistent relationship between corresponding components of the two programs and send a clear market signal that renewable energy remains the preferred source of clean energy. MassDEP proposes to use the proceeds from ACP payments to further the Commonwealth's climate adaptation and mitigation goals, including administration of such programs.

MassDEP is requesting comment on whether an ACP option is necessary, particularly for 2018 – 2020. Not having an ACP during this time period could be appropriate because DOER has identified a surplus of RPS-eligible RECs that can be used to comply with the CES, and because of the importance of meeting 2020 GWSA emission limit. MassDEP notes that, under this option, retail electricity sellers could choose to make additional ACP payments to DOER, which would count toward CES compliance. The ability to make such payments would ensure that CEC prices could not rise above the RPS ACP amount.

In addition, MassDEP is seeking comment on whether the proposed CES program would achieve its goals and allow sufficient flexibility for regulated parties with the banking provisions (discussed below), and whether the addition of multi-year compliance periods would be appropriate or necessary for the CES.

e) Eligible Clean Energy Generators

MassDEP proposes to qualify electricity generators for the CES using an emissions-based threshold. MassDEP is proposing to limit the CES eligibility to new clean energy generation built after 2010, to acknowledge any efforts after the December 2010 publication of the 2020 CECP. Specifically, MassDEP would adopt an identical threshold to the one used by DOER to qualify biomass fueled generators for the RPS program: generators would be required to demonstrate emissions at least 50% lower than the most efficient natural gas-fired power plant on a lifecycle basis. MassDEP would make the determination on a case-by case basis, but anticipates that the following non-RPS eligible technologies may qualify if they satisfy other eligibility criteria which regard to location and vintage:

- Large hydroelectric generators.
- Nuclear power plants.
- Fossil fuel-fired power plants that use carbon capture and sequestration (CCS) to reduce emissions to the required level.

This list of potentially qualifying technologies is consistent with research reviewed by the Intergovernmental Panel on Climate Change (IPCC), which has published estimates of lifecycle emissions of various generation technologies.²⁸ The IPCC lists a range of estimates for each technology. For nuclear power, the maximum listed estimate is less than one third of the minimum estimate for natural gas, and the median estimates differ by a factor of 40. The other technologies show broader ranges but also appear very likely to qualify assuming emissions are not at the upper end of listed ranges.

All RECs usable for compliance with RPS Class I could also be used as CECs to demonstrate compliance with the CES, so RPS-eligible generators would not be required to separately demonstrate eligibility to MassDEP (even if they operated before the earliest CES eligibility date of 2010). Generators eligible for DOER's Alternative Energy Portfolio Standard (APS) program would be able to create CECs if they separately qualify for the CES. Because the CES, as proposed, would not include existing low and zero-emissions generators, RPS Class II resources would not be eligible to create CECs.

²⁸ Table A.III.2 | Emissions of selected electricity supply technologies (gCO₂eq/kWh), p. 1335, in Schlömer S., T. Bruckner, L. Fulton, E. Hertwich, A. McKinnon, D. Perczyk, J. Roy, R. Schaeffer, R. Sims, P. Smith, and R. Wiser, 2014: *Annex III: Technology-specific cost and performance parameters*. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Available at http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_annex-iii.pdf.

Use of an emissions-based threshold would have several advantages:

- Consistency with the goal of reducing emissions by at least 80% from 1990 levels by 2050, as required by the GWSA.
- Consistency with RPS qualification requirements for biomass, so that biomass generators that do not qualify for RPS would also not qualify for CES.
- Utility for determining carbon capture and sequestration (CCS) eligibility (by providing a performance standard for determining the required capture efficiency of the carbon capture technology).

As noted above, MassDEP is proposing to limit the CES eligibility to new clean energy generation built after 2010, to acknowledge any efforts after the December 2010 publication of the 2020 CECP. Allowing generators existing before 2010 to qualify would likely result in significant resource shuffling and windfall profits, as these certificates could be moved among accounts used for CES compliance without any corresponding change in generation or emissions. MassDEP also notes that existing low and zero-emissions generators already benefit from the incentives created by the RGGI since, unlike their competitors, they do not need to purchase allowances.

MassDEP acknowledges that the loss of existing low and zero-emissions generators prior to 2050 could make it more difficult to achieve GWSA-required emissions reductions. MassDEP also acknowledges concerns raised during its stakeholder process for the potential that, by providing incentives for new generators that could compete with existing low and zero-emission generators, the CES has the potential to reduce the profitability of existing generators to some degree over time. In order to address this issue, MassDEP is proposing to include a regulatory requirement for MassDEP to complete an analysis in 2017 of options for including existing low and zero-emissions generators in the CES. This analysis will also consider unique issues that could arise for MLPs that have ownership or contractual interests in existing low or zero-emitting generators, the appropriateness of including existing nuclear power plants, treatment of technologies currently included in DOER's RPS Class II program for existing generators, and whether the CES can be better aligned with the contracting process specified in the Energy Bill.

Excluding existing resources from the CES would not be sufficient to prevent resource shuffling with respect to transmission of electricity from Canada. Currently, electricity imported from Canada is an important source of clean electricity for Massachusetts, but the ability to import additional electricity from Canada is limited by the amount of transmission capacity. Resource shuffling could occur if new hydroelectric generation resources were to displace existing hydroelectric resources as the source of the electricity traveling through existing transmission lines. In this case, CES compliance could occur without any change in the amount of clean energy available for use in Massachusetts. In order to prevent this from occurring, MassDEP is proposing to require that clean energy imported to Massachusetts from outside New England demonstrate, using NERC tags, that the electricity was imported into New England through transmission capacity that came online after 2017, including through upgrades to existing transmission lines. This provision will ensure that, in order to be counted toward compliance with the CES, new

eligible generation sources provide for the delivery of the electricity to Massachusetts. MassDEP requests comment on whether this provision is necessary and adequate, and on whether there may be other ways to ensure that the CES results in the delivery of additional clean energy to Massachusetts.

Regarding biomass and bioenergy, combined heat and power, and small non-RPS eligible hydroelectric generation, this proposal takes an approach that recognizes the diversity of technologies and policies in place. Specifically, MassDEP is not proposing to allow non-RPS-eligible landfill gas, bioenergy, and small hydroelectric generators to participate in the CES. This approach will ensure that the CES does not reduce the incentive to develop renewable generators that are fully RPS-compliant, and also avoids administrative costs associated with MassDEP evaluating qualification applications covering RPS-eligible technology categories. MassDEP is attempting to strike a similar balance for technologies addressed in the APS program, such as combined heat and power (CHP), but seeks comment on whether it may be appropriate to explicitly exclude them from the CES program as is proposed for non-RPS eligible landfill gas, bioenergy, and small hydroelectric generators. MassDEP acknowledges the range and complexity of issues surrounding bioenergy, CHP, and small hydropower systems, and welcomes comments from stakeholders regarding the treatment of these technologies under the CES, and whether the proposed regulatory language requires further clarification.

f) Other CES Design Elements

Treatment of MLPs, stringency, and generator eligibility are the key differences between the CES and DOER's RPS program. The general structure and regulatory language are otherwise very similar to RPS. Proposed CES provisions that are similar to, or identical to, aspects of the current RPS regulation, are briefly discussed below.

- **Geographic Eligibility** - MassDEP is proposing that eligible generators be limited to generators located in New England or adjacent control areas, as is the case for RPS, with one exception: Generators that deliver clean energy into New England or an adjacent control area through a dedicated transmission line would be eligible to participate in the CES as if they are located in the control area to which the energy is delivered. This requirement will ensure deliverability to New England through an identifiable transmission path, but also maximize the potential for competition among clean energy generators to reduce program costs. MassDEP is requesting comment on all issues related to geographic eligibility, including whether eligibility should be strictly limited to New England and adjacent control areas, whether it may be possible to address the requirement for a clean energy unit to deliver its electricity to New England for use in Massachusetts using NERC tags without otherwise restricting the location of the generation, and whether capacity requirements can be met by generation units outside New England and adjacent control areas.
- **Banking of CECs** – For consistency between the RPS and CES programs, MassDEP is proposing banking provisions for all electricity sellers that are identical to those included in the RPS program. However, MassDEP is requesting comment on whether limitations on banking, such as on the number of years over

which credits can be banked, are appropriate and necessary for the CES to ensure GHG emissions reductions needed to comply with the 2020 and 2050 GWSA limits, and whether consistency with RPS with regard to banking is advantageous.

- RPS provisions related to aggregation of small generators, behind the meter generation, third party meter reading, incremental generation, and repowered, relocated, and replacement generation are not proposed for inclusion in the CES regulation because they appear to be relevant only for generation technologies included in the RPS program or for existing generators that are not eligible for the CES. As noted above, these technologies could only create RECs through DOER's RPS program, but the RECs could be counted toward compliance with the CES.
- Statement of Qualifications – MassDEP is proposing to use qualification procedures based on RPS requirements for CES resources that do not qualify for RPS. MassDEP requests comment on whether it may be possible and desirable to implement the CES without a statement of qualification process, for example if MassDEP can proactively identify and label eligible generators within the relevant tracking systems with assistance from the generators.

MassDEP also notes that this proposal does not directly address two key electric system programs: energy storage and energy efficiency. While important, incorporation of these programs is beyond the scope of the proposed CES. Furthermore, MassDEP is already relying on gains from these sources to achieve the reductions proposed in the companion regulation, 310 CMR 7.74, *Reducing Greenhouse Gas (GHG) Emissions from Electricity Generating Facilities*. Massachusetts is already a national leader in both areas, with energy efficiency policies that have earned Massachusetts first place in the American Council for and Energy Efficient Economy's national ranking for six years in a row, and an alternative energy portfolio standard program that includes provisions to accommodate new storage technologies.

MassDEP will also likely consider implementing fees for the CES. Any fees would be proposed and finalized in a separate rulemaking process.

g) Greenhouse Gas Reporting

The Global Warming Solutions Act required MassDEP to have retail sellers of electricity report GHG emissions associated with the generation of electricity used in Massachusetts. MassDEP established an approach for retail sellers to report GHG under regulation 310 CMR 7.71(9).²⁹ Retail sellers have reported annual GHG emissions for years 2008 and 2010 through 2013. MassDEP posts summaries of the reported emissions online.³⁰

²⁹ Additional information is available in the Technical Support Document published when these requirements were finalized, which is available on the Clean Energy Standard web page at

<http://www.mass.gov/eea/agencies/massdep/climate-energy/climate/ghg/ces.html>.

³⁰ <http://www.mass.gov/eea/agencies/massdep/climate-energy/climate/approvals/ma-greenhouse-gas-emissions-reporting-program.html#4>.

In order to harmonize reporting of GHG emissions and compliance with the CES, MassDEP is proposing to move the GHG emissions reporting requirements for retail sellers of electricity from 310 CMR 7.71(9) to the CES regulation at 310 CMR 7.75(9). In addition, MassDEP proposes two substantive changes to reporting of GHG emissions by retail sellers of electricity.

First, the current GHG reporting regulations allow, but do not require, retail sellers to report GHG emissions consistent with each retail seller's use or ownership of particular RECs or generating units. MassDEP proposes to require GHG emissions reporting to reflect emissions associated with the fuel shown on the certificates that retail sellers retire in their subaccounts in the regional certificate tracking system so that reporting under the CES and for retail seller GHG emissions is aligned. MassDEP requests comment on whether it is appropriate to require GHG emissions reporting that reflects the particular RECs, CECs, and generating units that each retail seller uses, as documented in the regional tracking system, and in long-term contracts or ownership documentation.

The second substantive change to the reporting of GHG emissions by retail sellers is to propose a fixed date by which retail sellers must report emissions each year, specifically, September 15 of the second year after the end of each calendar year. The current reporting regulation requires MassDEP to notify retail sellers of the submittal deadline each year. This approach was chosen because at the time the reporting requirement was established, there was uncertainty as to the availability of the underlying data needed to report GHG emissions. MassDEP now has experience with the timing of data availability and is confident data will be available to allow retail sellers to meet the proposed submittal deadline. Also, it has been confusing to retail sellers to not have a fixed reporting date each year, causing sellers to inquire as to the deadline, creating additional administrative overhead for sellers and MassDEP. MassDEP requests comment on the appropriateness of specifying a fixed reporting date, and on the proposed date.

h) Economic Impacts

DOER and MassDEP estimate that the direct costs to retail electricity sellers of purchasing additional RECs in 2018 – 2020 could amount to approximately 1% of electricity bills. Between 2020 – 2030 contracts required by the Energy Bill are expected to deliver adequate quantities of clean energy that can count toward CES compliance, so there should not be an incremental cost of CES compliance. Later year costs are highly uncertain, but given the GWSA requirement to reduce emissions by at least 80% by 2050, whether or not a CES is in place, any incremental clean energy costs are more appropriately attributed to the larger GWSA mandate than the CES.

i) Program Review

The proposed regulation would require MassDEP to complete a review of the program in 2021, including an opportunity for public comment. A primary purpose of this review would be to evaluate the standard in consideration of the latest information about clean energy supply and the 2030 emission limit that will have been established pursuant to GWSA.

(2) Reducing GHG Emissions from Electricity Generating Units: 310 CMR 7.74

2. Overview of Reducing GHG Emissions from EGUs: 310 CMR 7.74

Pursuant to the authority in M.G. L. c. 21A, §§ 2 and 8, M.G.L. c. 21N, § 3(d) and M.G.L. c. 111, § 2C and 142A – 142E, among other authorities, The Massachusetts Department of Environmental Protection (MassDEP) is proposing a regulation, 310 CMR 7.74: *Reducing Greenhouse Gas (GHG) Emissions from Electricity Generating Facilities*. The regulation would establish a declining limit (i.e., a “cap”) on GHG emissions from large EGUs in Massachusetts, from 2018 through 2050, along with a system of transferable over-compliance credits (OCCs) that can be retained for use in future years.

The purpose of the regulation is to ensure that the impacts of clean energy programs, including energy efficiency programs and programs that support renewable energy, are fully reflected in reductions in GHG emissions from in-state electricity generation facilities and in MassDEP’s GHG inventory. MassDEP uses this inventory to determine compliance with state-wide GHG emissions limits established pursuant to the GWSA.

Clean energy policies often reduce GHG emissions indirectly by reducing demand for electricity from emitting EGUs, so resulting reductions in stack emissions may occur anywhere within New England’s interconnected power grid. This proposed regulation would complement existing policies and the proposed Clean Energy Standard, by ensuring that an appropriate portion of these reductions occur in Massachusetts to meet the requirements of the Kain decision.³¹ In other words, the regulation is designed to maximize the direct environmental benefit of clean energy policies for citizens in Massachusetts.

a. Description of the Proposed Regulation

i. Applicability and Emissions Reporting

The proposed regulation would apply to all Massachusetts EGUs reporting GHG emissions to the U.S. Environmental Protection Agency (EPA) pursuant to 40 CFR Part 98 Subpart D, which covers the electricity generation category (except for waste to energy facilities). MassDEP is proposing to base applicability on EPA’s GHG reporting program because: (1) covered facilities generate the largest percentage of GHG emissions in the power generation sector, (2) MassDEP would be able to rely on EPA’s reliable reporting protocols and procedures, and (3) all GHGs would be covered.

The list of existing facilities subject to 310 CMR 7.74 is included in the *Individual Facility Limits* section below. MassDEP requests comment on whether this is the correct

³¹ The Supreme Judicial Court ruled that RGGI regulations at 310 CMR 7.70 did not comply with Section 3(d) of M.G.L. c. 21N because the regulations did not “ensure mass-based reductions in carbon dioxide emissions from power plants in the Commonwealth.” See Kain at 297-298. Therefore, to comply with Section 3(d), MassDEP must structure regulations that limit GHG emissions from electric generating facilities within the borders of Massachusetts.

list of facilities, including whether it may be appropriate to exempt any facilities that have a primary purpose other than electricity generation and whether EPA's GHG reporting program is appropriate for determining applicability. For the purpose of complying with 310 CMR 7.74, a new unit at an existing facility would be treated as a separate new facility.

a) Aggregate GHG Emissions Limit

The proposed regulation would establish an aggregate GHG emissions limit of 9,119,126 million metric tons of carbon dioxide equivalent (MMT CO₂e) for the 2018 calendar year. As discussed below, the proposed limit was selected for consistency with other clean energy and energy efficiency policies. Planned EGU retirements were also accounted for, consistent with the analysis included in the 2020 CECP Update. In particular, in establishing the 2020 aggregate limit, MassDEP used its most recent GHG emissions inventory (2013) as a starting point, and then identified the following changes that will occur in Massachusetts by 2020:

- Coal-fired power plants that emitted 3.82 MMT CO₂e in 2013 will have ceased operation.
- Changes in generation and load listed in the table below will largely cancel out by 2020, resulting in approximately no net change in operations of, or emissions from, the remaining fleet of EGUs in Massachusetts.

Table 1: Change in Generation or Load, 2013-2020

Change in Generation or Load – 2013-2020	Million MWh
Total generation from retiring power plants (Mount Tom, Salem Harbor Station, Brayton Point, and Pilgrim) was 9.5 million MWh in 2013, and will fall to zero in 2020.	- 9.5
New clean energy generation, as required by the Renewable Portfolio Standard and proposed Clean Energy Standard, will deliver approximately 5 million MWh of additional clean energy by 2020. ³²	+ ~ 5
Energy efficiency programs and appliance standards will reduce electric load by approximately 5 million MWh between 2013 and 2020, net of increased load from electric vehicles. ³³	+ ~ 5
Total (Net) Change	~ 0

Therefore, MassDEP is proposing an aggregate limit on emissions from large EGUs in Massachusetts of 8.66 MMT CO₂e for 2020, a reduction of 3.82 MMT CO₂e from total 2013 emissions from covered facilities (12.48 MMT CO₂e).³⁴ Setting the limit in this

³² This estimate assumes full compliance with the RPS program, and includes surplus in-region renewable energy that DOER has identified as available from 2018 to 2020.

³³ 2020 CECP Update, <http://www.mass.gov/eea/docs/eea/energy/cecp-for-2020.pdf>, Figure 9, p. 36.

³⁴ One commenter in the stakeholder process suggested a lower 2020 limit of 6.75 MMT CO₂e. This suggestion appears to rely on the assumption that all reductions between 2013 and 2020 need to be achieved by 310 CMR 7.74.

manner, consistent with projected electricity sector changes from policies included in the 2020 CECP Update, will ensure that the required reductions are achievable in Massachusetts.

In order to establish limits for other years, MassDEP is proposing that the aggregate limit decline by 2.5% each year. The first compliance year would be 2018, so the 2018 limit would be established such that reductions equal to 2.5% of the 2018 limit in 2019 and 2020 would yield a limit of 8.66 MMT CO₂e in 2020. Over the long term, reducing the limit by 2.5% of the 2018 limit each year would result in a 2050 limit of approximately 2 MMT CO₂e, consistent with the need, identified in the 2020 CECP Update, to work toward a “fully decarbonized” electric sector while allowing for some continued use of natural gas-fired generation as may be necessary to ensure reliability.

Table 2: Aggregate Limit by Select Years, 2018-2050

Year	Aggregate limit (MMT CO ₂ e)
2018	9.12
2019	8.89
2020	8.66
2030	6.50
2040	4.33
2050	2.17

MassDEP seeks feedback on all aspects of limit setting, including whether additional reductions are possible without interfering with the reliable operation of the regional power grid. In considering issues related to reliability, MassDEP requests that commenters consider: MassDEP’s intent in designing the proposed EGU limits, which is to control emissions from EGUs in Massachusetts; the need for compatibility with other electricity sector programs that reduce emissions, such as RGGI and RPS; experience with other allowance trading programs that may be similar to the OCC mechanism described below, including RGGI;³⁵ and the ability of the electric grid to shift generation among power plants in New England at times of low and moderate electricity demand.

For purposes of the public comment draft, MassDEP has not adopted that comment because other policies included in the 2020 CECP Update, such as vehicle GHG standards, will reduce emissions between 2013 and 2020.

MassDEP will continue to consider input on the appropriate level of limits.

³⁵ MassDEP notes that this experience has included requirements to simultaneously manage multiple allowance-holding requirements, and diverse allowance distribution approaches, associated with several pollutants, such as SO₂ and NO_x.

b) Individual Facility Limits

In order to ensure compliance with the annually declining aggregate limit, the regulation would establish separate limits for new and existing EGUs, the sum of which would be equal to the aggregate limit. The proposed regulation includes a table listing new and existing facility limits, and is reproduced below. The spreadsheet used to calculate facility limits is included as Appendix C.

Table 3: Aggregate Limits by Select Years, 2018-2050

Year	Aggregate GHG Emissions Limit	Existing Facility Aggregate GHG Emissions Limit	New Facility Aggregate GHG Emissions Limit
2018	9,119,126	7,619,126	1,500,000
2019	8,891,148	7,391,148	1,500,000
2020	8,663,170	7,163,170	1,500,000
2021	8,435,192	6,935,192	1,500,000
2022	8,207,213	6,707,213	1,500,000
2023	7,979,235	6,479,235	1,500,000
2024	7,751,257	6,251,257	1,500,000
2025	7,523,279	6,023,279	1,500,000
2026	7,295,301	6,095,301	1,200,000
2027	7,067,323	5,904,823	1,162,500
2028	6,839,345	5,714,345	1,125,000
2029	6,611,366	5,523,866	1,087,500
2030	6,383,388	5,333,388	1,050,000
...	(- 2.5% of 2018 /yr)		
2040	4,103,607	3,428,607	675,000
...	(- 2.5% of 2018 /yr)		
2050	1,823,825	1,523,825	300,000

In order to address emissions from new facilities, the limit includes an annual aggregate new facility limit for each year. The new facility limit would remain constant at 1.5 MMT CO₂e for 2018 – 2025, and then fall to a level consistent with an annual decline of 2.5% of 2018 emission each year thereafter.³⁶ In determining the size of this limit, MassDEP considered likely emissions of known potential new facilities and the fact that the operation of these facilities is desirable because of their efficiencies and quick start capabilities. However, MassDEP does not consider it necessary to set the new facility limit equal to the full amount of anticipated emissions because new facilities can obtain over-compliance credits if they emit more than their assigned limits.

As described below, any portion of the new facility limit not assigned to new facilities in any year would be credited proportionally to existing facilities as OCCs. For example, if

³⁶ MassDEP has increased the size of the new facility limit from the 1.0 MMT that was included in stakeholder materials shared in November 2016. This change was made in response to stakeholder comments on the size of the new facility limit, including comments citing the potential emissions of new facilities, and comments noting that new facilities can comply with 310 CMR 7.74 using OCCs.

the only subject facilities that operate in a particular year are existing facilities that are assigned limits at the beginning of each year, then the entire new facility limit would be available for use for compliance by those facilities.

After accounting for the 2018 new facility limit of 1.50 MMT CO₂e, the remaining 7.62 MMT CO₂e of the aggregate limit would be apportioned among existing facilities. A similar process must occur for each subsequent year. Specifically, MassDEP is proposing to apportion the existing facility portion of each year's limit based each facility's average electricity output over a three year period, in accordance with the following process:

- For years 2018 – 2025, existing facility limits would be determined based on the facility's average portion of 2013 - 2015 electrical output. Numerical limits for each facility would be included in the regulation to ensure certainty regarding facility limits over the early years of the program.
- For years 2026 – 2050, each facility's limit would be established five years in advance using the most recently available data. For example, 2026 limits would be established in 2021 using 2018 – 2020 data.

This limit setting approach would recognize the efficiency of some EGUs and provide a mechanism to adjust facility limits to acknowledge trends in dispatch across the EGU fleet. MassDEP seeks comment on this method of apportioning the existing facility portion of the aggregate limit among existing facilities, and how it compares to other options, including the option that was shared with stakeholders in November 2016, with regard to simplicity, incentives, etc.

In particular, MassDEP requests comment on the appropriate amount of notice for updating facility limits, i.e., should 2026 – 2050 limits be specified three years in advance instead of five. In addition, MassDEP seeks comment on whether the timeline should acknowledge emissions reductions that occur when an EGU reduces its capacity factor. For example, if a particular facility transitions to a lower capacity factor as it is increasingly relied on to “back up” variable renewable generation, a longer time before limits were adjusted would mean that EGU could earn OCCs for a longer period of time. In addition, extending the timeline before limits are updated would provide facilities certainty regarding their limits further in advance. A related issue is whether limits should be established each year on a rolling basis, as proposed for years after 2025, or whether it would be better to establish limits for a five year period once every five years (e.g., 2026 – 2030 limits would be established in 2021).

MassDEP also seeks comment on whether there may be advantages to allocating allowances instead of establishing individual facility limits, or possibly distributing allowances through an auction.

Table 4 below lists percentages used to apportion emissions among facilities for 2018 – 2025, along with the data that were used to calculate them.³⁷ Different percentages (as specified above) would be used for later years, but the process would be the same:

³⁷ MassDEP is working to QA electrical output data, which could result in minor revisions to these percentages and the associated limits specified in the regulation. The Brayton Point, Salem Harbor, and Mount Tom power plants are not included in the calculation because they will not operate in 2018.

electricity generation data would be used to determine each facility's fraction of the annual limit, and that fraction would be multiplied by the existing facility limit for the year to determine each facility's limit. MassDEP used a three-year period to address variations in facility operations, but received requests from facilities for different approaches where the 2013 – 2015 time period may not be appropriate. MassDEP seeks comment on other options, such as using the three highest values across a four year time period.

Table 4: Facility Limit Calculations

Facility Name	2013-2015 Average Generation (MWh)	% of Total Generation
ANP Bellingham Energy Company, LLC	2,238,927	12%
ANP Blackstone Energy Company, LLC	2,049,400	11%
Bellingham	507,609	3%
Berkshire Power	1,137,483	6%
Canal Station	265,266	1%
Cleary Flood	131,311	1%
Dartmouth Power	125,833	1%
Deer Island Treatment	2,584	0%
Dighton	859,904	4%
Fore River Energy Center	3,236,599	17%
Kendall Square	1,219,559	6%
MASSPOWER	791,485	4%
Medway Station	4,172	0%
Milford Power, LLC	387,564	2%
Millennium Power Partners	1,723,289	9%
Mystic	3,945,784	21%
Pittsfield Generating	208,106	1%
Potter (Braintree Electric)	63,569	0%
Stony Brook	179,176	1%
Tanner Street Generation	95,400	0%
Waters River	4,131	0%
West Springfield	39,933	0%

For new facilities with less than ten years of operational history, a different process would be used to apportion limits from within the new facility limit for the year.³⁸ In general, facilities would receive limits at the end of the year equal to their emissions, so that they would not earn, or be required to purchase, OCCs. Any portion of the new facility limit not assigned to individual new facilities for a particular year would be credited to existing facilities in proportion to their assigned limits as OCCs. If, on the

³⁸ Ten years was chosen to establish a facility as existing because that is the amount of time that a new facility would require to complete the limit-setting process. For example, if a facility began operating in 2017, its first three full years of generation data would be 2018 - 2020. Its 2026 limit (as an existing facility) would be set in 2021 using the 2018 - 2020 output data. During 2021 - 2025 it would remain a new facility and receive its limit after the end of each year from the new facility aggregate limit.

other hand, the new facility limit for a year was not large enough to accommodate GHG emissions from all new facilities, new facility limits would be adjusted downward proportionally as necessary to avoid exceedance of the new facility limit for the year.

c) Over Compliance Credits (OCCs)

MassDEP is proposing to create a system of transferable OCCs that can be used for compliance by facilities. This will provide flexibility to facilities for compliance while ensuring the enforceability of the aggregate limit.

The proposed regulation includes three ways in which OCCs would be created:

- When a new or existing facility's emissions are less than its limit for a particular year
- When a facility retires or is no longer required to report GHG emissions to EPA
- When total new facility emissions are less than the new facility limit

OCCs would be transferable to another facility or could be retained for use in future years.

Facilities would be required to use OCCs, including OCCs obtained from other facilities, or retained from past years, to offset any emissions in excess of their limit. Detailed requirements for creating, retaining, transferring, and using OCCs are provided in the proposed regulatory text.

MassDEP is not proposing to allow entities other than large power generating facilities to retain or transfer OCCs. This restriction is consistent with MassDEP's intent for the proposed regulation, which is to enforce in-state reductions that are projected to occur because of other policies, not to create a market for emission reductions that would overlap with the RGGI program.

MassDEP also seeks comment on whether the OCC provisions should include additional flexibility options, or limitations. For example, facilities could be allowed to comply using over-compliance credits "borrowed" from the next year, subject to the restriction that they be replaced at a two-to-one rate at the next year's compliance deadline. Multi-year compliance periods and restrictions on retention of OCCs across compliance years could also be considered.

d) Compliance, Recordkeeping, Verification, and Enforcement

Facilities would need to comply with two deadlines each year: an emissions reporting deadline (April 15th) and a compliance deadline (August 15th). Separate deadlines for emissions reporting and compliance are necessary to allow facilities to create and transfer OCCs in advance of the compliance deadline, and to allow MassDEP to assign limits to new facilities and distribute OCCs created because of over compliance with the new facility limit.

The regulation includes detailed reporting requirements, including a list of items that must be included in reports, electronic reporting requirements, and certification

requirements. Sections of the regulation also address recordkeeping, verification, and enforcement.

e) Economic Impacts

The proposed regulation is not expected to have significant economic impacts beyond those expected because of the existing energy efficiency, RPS and other 2020 CECP Update electric sector policies as well as impacts from the proposed CES regulation. Any incremental costs would be associated with ensuring that reductions caused by these Massachusetts policies that might otherwise occur elsewhere in New England occur in Massachusetts. Such costs are expected to be minimal because of the flexibility inherent in the regional electric grid to shift generation among EGUs in New England during times of low demand.

The new regulation would also complement RGGI. RGGI is a regional program that encourages large EGUs to reduce emissions by requiring them to purchase allowances. Incentives created by RGGI provide an additional reason to reduce emissions beyond levels that would otherwise occur because of Massachusetts' energy efficiency and clean energy policies. These incentives make it less likely that the new regulation will require reductions beyond those expected from other policies, and therefore minimize cost impacts.

MassDEP has designed reporting, monitoring and record-keeping requirements in a streamlined manner to take advantage of existing requirements, such as the U.S. EPA GHG reporting program.

f) Program Review

The proposed regulation would require MassDEP to complete a review of the program in 2021, including an opportunity for public comment. A primary purpose of this review would be to evaluate post-2020 reduction requirements considering new information about expected clean energy supply, GHG emissions inventory data, the 2030 emission limit that will have been established pursuant to GWSA, and whether restrictions on retention and use of OCCs over time may be necessary to ensure that reductions occur in Massachusetts as required by the GWSA. The program review would also address options for revising the process for assigning facility limits, such as possibly eliminating the new facility limit after 2022.

g) Declining Emissions Limits in Existing Plan Approvals 310 CMR 7.74(12)

MassDEP is proposing to replace declining annual CO₂e emissions limits that appear in a large power generating facility's plan approval issued pursuant to 310 CMR 7.02, with the requirements of 310 CMR 7.74, including the GHG emissions limits assigned to facilities under 310 CMR 7.74(4). This will remove any confusion for the owners or operators of applicable facilities in determining which limit to comply with.

D. Global Warming Solutions Act Requirements for Transportation: 310 CMR 60.05

1. Overview

Pursuant to the authority in M.G. L. c. 21A, §§ 2 and 8, M.G.L. c. 21N § 3(d) and M.G.L. c. 111, § 2C and 142A – 142E, among other authorities, MassDEP is proposing amendments to the existing *Global Warming Solutions Act Requirements for the Transportation Sector and the Massachusetts Department of Transportation* (proposed to be renamed to *Global Warming Solutions Act Requirements for Transportation*) (310 CMR 60.05) in accordance with Governor Baker’s Executive Order 569 and the Kain decision to set mass-based annually declining GHG emission limits and targets for the transportation sector. MassDEP is proposing to add declining annual aggregate CO₂ targets for the transportation sector, reflecting CO₂ reductions from vehicles that travel throughout Massachusetts due to programs such as 310 CMR 7.40 *Low Emission Vehicle Program*.

MassDEP is further amending 310 CMR 60.05 to set declining annual aggregate limits on the Massachusetts Department of Transportation (MassDOT) to limit the amount of CO₂ that is emitted from the combustion of fuels in mobile equipment owned by MassDOT and the MBTA and of heating fuels at MassDOT and MBTA facilities.

Currently, 310 CMR 60.05 requires MassDOT and Metropolitan Planning Organizations (MPOs) to evaluate and track CO₂ emissions and impacts in the regional transportation plans (RTPs), transportation improvement programs (TIPs) and the statewide transportation improvement programs (STIPs), building on an existing federally mandated transportation conformity planning process. Additionally MassDOT is required to demonstrate its achievement of CO₂ emissions reduction commitments and targets stated in the 2020 CECP.

2. Description of the Proposed Amendments

The proposed amendments to 310 CMR 60.05 require MassDOT to calculate and report reductions in aggregate CO₂ transportation emissions each year from 2018 through 2020 as indicated in 310 CMR 60.05(6).

The Department is proposing the following amendments to the existing 310 CMR 60.05:

- Establishes aggregate MassDOT transportation GHG emission limits for calendar years 2018, 2019 and 2020 at 310 CMR 60.05(6) and establishes aggregate transportation GHG emission targets at 310 CMR 60.05(7), as listed in the following tables.

Table 310 CMR 60.05(6): Maximum Annual Aggregate MassDOT Transportation GHG Emissions

Calendar Year	Maximum Allowable Aggregate MassDOT Transportation GHG Emissions (million metric tons of CO ₂)
2018	0.299
2019	0.294
2020	0.289

Table 310 CMR 60.05(7): Maximum Annual Aggregate Transportation GHG Emissions

Calendar Year	Maximum Allowable Aggregate Transportation GHG Emissions (million metric tons of CO ₂)
2018	24.582
2019	24.122
2020	23.682

- Requires MassDOT to quantify and report aggregate MassDOT transportation GHG emissions annually by March 1, to demonstrate whether MassDOT has achieved the aggregate MassDOT transportation GHG emission limits in Table 310 CMR 60.05(6). These limits replace the previous 310 CMR 60.05 reference to the 2020 CECP.
- Requires MassDOT to quantify and report aggregate transportation GHG emissions annually by July 1.
- Provides a mechanism to address any exceedance of the aggregate MassDOT transportation GHG emission limits. MassDOT shall, in consultation with the Department identify, quantify, and implement supplemental measures that will achieve the aggregate MassDOT transportation GHG emission limits.

When a fuel such as gasoline or diesel is combusted, three GHGs (CO₂, methane and nitrous oxide) are emitted. While all three GHGs are reduced when fuel use is lowered, the vast majority of the GHGs are in the form of CO₂, the quantity of which is easily calculated because fuels contain known amounts of carbon. In contrast, the avoided methane and nitrous oxide emissions are dependent on engine technology, size, efficiency, temperature, etc. and are more complicated to determine. For simplicity, MassDEP proposes that this regulation address quantities of CO₂, because it can be most easily estimated to ensure compliance with the emission limits and targets, though methane and nitrous oxide emissions are reduced along with CO₂ when fuel use is lowered. Therefore, establishing declining mass-based limits and targets for CO₂ in vehicles will be a reasonable surrogate for total GHGs. The Massachusetts GHG inventory includes all three GHGs, and will reflect lower emissions of all three GHGs as the vehicle fleet reduces fuel use over time.

The aggregate transportation GHG emission targets have been calculated based on the transportation network model traditionally used to calculate carbon monoxide and ozone precursors. MassDEP worked with MassDOT to ensure correct mobile source inputs for emission analysis. The aggregate MassDOT transportation GHG emission limits have been calculated based on Fiscal Year 2015 MassDOT fuel use, and decline at the same rate as the targets determined from the transportation network model. MassDEP proposes

to update the limits in the final 310 CMR 60.05 regulation, incorporating 2016 data. MassDEP requests comment on the assumptions and methodology of how the GHG emission limits and targets were calculated and on the limits and targets themselves.

E. Carbon Dioxide Emission Limits for State Fleet Passenger Vehicles: 310 CMR 60.06

1. Overview

Pursuant to the authority in M.G. L. c. 21A, §§ 2 and 8, M.G.L. c. 21N, § 3(d) and M.G.L. c. 111, § 2C and 142A – 142E, among other authorities, MassDEP is proposing a new regulation, 310 CMR 60.06 – *CO₂ Emission Limits for State Fleet Passenger Vehicles*, that sets limits on greenhouse gas emissions from passenger vehicles owned and leased by Commonwealth Executive Offices, in order to satisfy the mandate of Executive Order 569 and the Kain decision. Although a Fuel Efficiency Standard for the State Fleet³⁹ became effective in September 26, 2016 (applying to vehicle acquisitions made by each Executive Branch State agency or acquired through the Office of Vehicle Management), it does not address the requirement in Section 3(d) of the GWSA or the Kain decision for mass-based annually declining limits on CO₂ emissions from such vehicles.

This regulation will also support the multi-state memorandum of understanding (MOU)⁴⁰ that commits eight states on the East and West coasts to putting 3.3 million zero-emission vehicles (ZEVs) on the road by 2025. Massachusetts' portion of the 3.3 million target is approximately 300,000 vehicles, with Executive Offices' portion being on the order of some 1,200 vehicles.

Implementation of the State Passenger Vehicle Fleet CO₂ limit regulation is expected to achieve a reduction of <0.01% in overall GHG emissions in Massachusetts from 1990 levels. Although this is not a significant amount of reduction, it is an important step for the Commonwealth to show its commitment to a greener vehicle fleet. When the Commonwealth “leads by example,” it creates a vision for other public and/or private fleets to follow.

2. Description of the Proposed Amendments

The purpose of the new regulation 310 CMR 60.06 is to achieve CO₂ emission reductions from certain passenger vehicles owned or leased by the Commonwealth. MassDEP is proposing that the State Fleet CO₂ Limit regulation consists of five components: 1) Executive Offices are the regulated entities responsible for compliance; 2) mass-based limits are set on CO₂ emissions from the fleet of passenger vehicles for each Executive Office and decline each year; 3) a mass-based annually declining aggregate limit is set on

³⁹ As detailed at the following links: <http://www.mass.gov/eea/grants-and-tech-assistance/guidance-technical-assistance/leading-by-example/initiatives.html#transportation> and <http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/osd/office-of-vehicle-management.html>.

⁴⁰ <http://www.mass.gov/eea/docs/dep/air/priorities/zev-mou-final.pdf>.

the total Executive Branch passenger vehicle fleet; 4) each Executive Office must report certain information on passenger and non-passenger vehicles, and CO₂ emissions from passenger vehicles to MassDEP; and 5) each Executive Office must comply with monitoring and recordkeeping requirements.

a) Executive Offices as Regulated Entities

MassDEP is proposing to regulate the eight Executive Offices of the Commonwealth under 310 CMR 60.06. The regulation defines “Executive Office” as: “the Executive Office of Administration and Finance (A&F), the Executive Office of Education (EOE), the Executive Office of Energy and Environmental Affairs (EEA), the Executive Office of Health and Human Services (EOHHS), the Executive Office of Housing and Economic Development (EOHED), the Executive Office of Labor and Workforce Development (EOLWD), the Executive Office of Public Safety and Security (EOPSS), and the Massachusetts Department of Transportation (MassDOT), including the agencies, boards, bureaus, commissions, committees, councils, departments, divisions, groups, guards, homes, laboratories, libraries, offices, police, programs, systems, trusts, universities and other entities within each Executive Office, the Massachusetts Water Resources Authority, the Massachusetts Clean Energy Center, and entities whose Board of Directors includes the Secretary of an Executive Office pursuant to appointment by the Governor or to the requirements of a Massachusetts General or Session Law.”

MassDEP chose Executive Offices as the regulated entities, in part, because Executive Order 569 mandated that the Secretary of each Executive Office “shall designate an existing employee to serve as the Secretariat’s Climate Change Coordinator.”

Each of the Executive Offices listed above is required to calculate and report its annual CO₂ emissions for passenger vehicles it owns or leases. In addition, each of the Executive Offices is required to track and report the number and type of non-passenger vehicles it owns or leases.

MassDEP requests comments on whether there should be a threshold number of vehicles (e.g., 15 or 20) below which an Executive Office should not be subject to 310 CMR 60.06. For example, the Executive Office of Labor and Workforce Development reports having two passenger vehicles. With a larger fleet, an Executive Office can plan and budget vehicle acquisitions over several years; this flexibility is not available to Executive Offices with very small fleets.

b) Limits on Annual CO₂ Emissions from Passenger Vehicles

This new regulation would require each Executive Office to calculate and reduce its annual CO₂ emissions from passenger vehicles that it owns or leases. At this time, MassDEP is proposing CO₂ limits on passenger vehicles only. When passenger vehicles need to be replaced, there are many options and advanced technology vehicles (hybrids, plugins, electric vehicles, etc.) available in today’s market to select alternative types of vehicles to reduce CO₂ emissions. In addition, Executive Offices may also use a variety

of approaches to substitute other activities for passenger vehicle trips in order to meet the limit, including increased use of teleconferences, car-pooling, car-sharing, and transit passes to go to meetings and events in order to reduce passenger vehicle miles traveled. This gives Executive Offices the flexibility to choose solutions that work best for their agencies to achieve compliance with the regulation. The proposed definition in 310 CMR 60.06(2) of “passenger vehicle” is:

Passenger Vehicle means any motor vehicle with a gross vehicle weight rating of less than 10,000 pounds designed primarily for transportation of persons and having a design capacity of 12 persons or less. Passenger vehicle does not include transit vehicles or vehicles with special features enabling off-road operation and use, including but not limited to, pickup trucks, cargo vans, emergency vehicles, test vehicles, non-road vehicles.

Non-passenger vehicles provide a wide range of necessary features to Commonwealth agencies, including off-road, emergency response, snow plowing, etc., for which appropriate advanced technology vehicle options may not be available. In order to allow time to develop a better understanding of the non-passenger vehicle needs of Commonwealth agencies, and to investigate the advanced technology vehicle options and other strategies available to reduce non-passenger vehicle emissions, MassDEP is proposing to require each Executive Office to submit information on their use of non-passenger vehicles. Once MassDEP has gathered and compiled the information submitted by each Executive Office, MassDEP will analyze the feasibility of CO₂ emission limits for non-passenger vehicles and determine possible next steps.

As discussed with respect to the proposed amendments to 310 CMR 60.05, when a fuel such as gasoline or diesel is combusted, three GHGs (CO₂, methane and nitrous oxide) are emitted. While all three GHGs are reduced when fuel use is lowered, the vast majority of the GHGs are in the form of CO₂, the quantity of which is easily calculated because fuels contain known amounts of carbon. In contrast, the avoided methane and nitrous oxide emissions are dependent on engine technology, size, efficiency, temperature, etc. and are more complicated to determine. For simplicity, MassDEP proposes that this regulation limit quantities of CO₂, because it can be most easily estimated to ensure compliance with the emission limits, though methane and nitrous oxide emissions are reduced along with CO₂ when fuel use is lowered. Therefore, establishing declining mass-based limits for CO₂ in vehicles will be a reasonable surrogate for total GHGs. The Massachusetts GHG inventory includes all three GHGs, and will reflect lower emissions of all three GHGs as the state fleet reduces fuel use over time.

Each Executive Office must track and/or record the amount and types of fuel used for its passenger vehicle fleet for each calendar year in order to calculate its CO₂ emissions. The amount of fuel used will be multiplied by a conversion factor to determine the CO₂ in pounds emitted per year. Each Executive Office’s passenger vehicle CO₂ emissions must not exceed the allowable limits listed in Tables 1 through 8 below and in the proposed

regulation. In addition, the aggregate emissions for the eight Executive Offices must not exceed the allowable limits listed in Table 9.

MassDEP requests comment on whether Executive Offices should be allowed to comply jointly with the Table 9 limit, perhaps allowing a lower cost of overall compliance, for example, when one Executive Office is able to replace more vehicles than another in a given year.

A number of assumptions were made in calculating the Executive Office limits:

- Passenger vehicles will be replaced after 10 years;
- Replacement vehicles will have an average fuel efficiency of 32 miles per gallon, consistent with the Fuel Efficiency Standard for the State Fleet mentioned above;
- In order to have a declining limit, in years for which no replacement vehicles are anticipated, a 0.5% decrease in fuel use is assumed; and
- The end year of 2025 was chosen to be consistent with the 8-state ZEV MOU discussed above.

Executive Offices may choose to utilize the Operational Services Division (OSD) to manage their vehicles. MassDEP obtained 2015 gasoline usage from OSD for those state vehicles it manages. MassDEP obtained odometer readings and/or fuel use for a number of other state vehicles through the Climate Change Coordinator required for each Executive Office by Executive Order 569. However, MassDEP's initial analysis of the data indicates that the data set is not yet complete. MassDEP presents draft limits in Tables 1 through 8 below, but proposes to update the limits for each Executive Office in the final 310 CMR 60.06, incorporating 2016 vehicle use data. A spreadsheet detailing the limit calculation methodology is attached as Appendix B.

MassDEP seeks comment on the assumptions and methodology of how the CO₂ emission limits were calculated and on the CO₂ emission limits themselves.

Massachusetts agencies may need to acquire new passenger vehicles to fulfill new federal or state statutory or regulatory responsibilities. In such a case, MassDEP requests comment on whether or how to address such increased vehicle need, including whether it is reasonable to expect Executive Offices to acquire all non-emitting (i.e., electric) vehicles in order to stay within their CO₂ limits.

Table 1: Maximum Annual CO₂ Emission Limits – Executive Office of Administration and Finance (A&F)

Calendar Year	Maximum Allowable CO ₂ Emissions (metric ton)
2018	31.0
2019	26.9
2020	26.8
2021	24.5
2022	24.4
2023	24.3
2024	24.1
2025, and each calendar year thereafter	24.0

Table 2: Maximum Annual CO₂ Emission Limits – Executive Office of Education (EOE)

Calendar Year	Maximum Allowable CO ₂ Emissions (metric ton)
2018	4.57
2019	4.55
2020	4.53
2021	4.51
2022	4.48
2023	4.46
2024	4.44
2025, and each calendar year thereafter	3.29

Table 3: Maximum Annual CO₂ Emission Limits – Executive Office of Energy and Environmental Affairs (EEA)

Calendar Year	Maximum Allowable CO ₂ Emissions (metric ton)
2018	969
2019	952
2020	944
2021	925
2022	865
2023	859
2024	797
2025, and each calendar year thereafter	770

Table 4: Maximum Annual CO₂ Emission Limits – Executive Office of Health and Human Services (EOHHS)

Calendar Year	Maximum Allowable CO ₂ Emissions (metric ton)
2018	434.2
2019	415.5
2020	413.7
2021	405.7
2022	403.7
2023	400.8
2024	400.7
2025, and each calendar year thereafter	398.7

Table 5: Maximum Annual CO₂ Emission Limits – Executive Office of Housing and Economic Development (EOHED)

Calendar Year	Maximum Allowable CO ₂ Emissions (metric ton)
2018	106.3
2019	105.7
2020	103.2
2021	102.7
2022	102.1
2023	101.6
2024	62.8
2025, and each calendar year thereafter	62.4

Table 6: Maximum Annual CO₂ Emission Limits – Executive Office of Labor and Workforce Development (EOLWD)

Calendar Year	Maximum Allowable CO ₂ Emissions (metric ton)
2018	1.403
2019	1.396
2020	1.389
2021	1.382
2022	1.375
2023	1.368
2024	1.361
2025, and each calendar year thereafter	1.354

Table 7: Maximum Annual CO₂ Emission Limits – Executive Office of Public Safety and Security (EOPSS)

Calendar Year	Maximum Allowable CO ₂ Emissions (metric ton)
2018	824
2019	820
2020	812
2021	792
2022	779
2023	754
2024	659
2025, and each calendar year thereafter	655

Table 8: Maximum Annual CO₂ Emission Limits – Massachusetts Department of Transportation (MassDOT)

Calendar Year	Maximum Allowable CO ₂ Emissions (metric ton)
2018	355
2019	354
2020	352
2021	350
2022	347
2023	322
2024	312
2025, and each calendar year thereafter	302

Table 9: Maximum Annual Aggregate CO₂ Emission Limits from passenger vehicles owned or leased by Executive Offices named in Tables 1 through 8

Calendar Year	Maximum Allowable CO ₂ Emissions (metric ton)
2018	2725
2019	2681
2020	2657
2021	2606
2022	2527
2023	2467
2024	2261
2025, and each calendar year thereafter	2217

The Executive Offices shall use the following equations specified in 310 CMR 60.06(5) to determine the amount of CO₂ emitted per year:

- a. For gasoline fueled vehicles:
 $\text{lbs. CO}_2 \text{ emitted/year} = \text{gallons of gasoline used} * 19.8416 \text{ pounds of CO}_2/\text{gallon of gasoline}$
- b. For diesel fueled vehicles:
 $\text{lbs. CO}_2 \text{ emitted/year} = \text{gallons of diesel used} * 22.38 \text{ pounds of CO}_2/\text{gallon of diesel}$
- c. For natural gas fueled vehicles:
 $\text{lbs. CO}_2 \text{ emitted/year} = \text{thousand cubic feet of natural gas used} * 121.25 \text{ pounds of CO}_2/\text{thousand cubic feet of natural gas}$

c) Reporting Requirements for Passenger and Non-passenger Vehicles

To demonstrate compliance with the limits in Tables 1 through 8, each Executive Office shall submit a report to MassDEP by March 1, 2018 and annually thereafter that includes its passenger vehicle CO₂ emissions. The report must be signed and certified by the Climate Change Coordinator or authorized Executive Office official. If the Executive Office uses the same methodology and format used to report such information to DOER and/or the Massachusetts Operational Services Division (OSD) on these vehicles, that report may be submitted to MassDEP to satisfy this requirement.

To assist MassDEP in determining the feasibility of CO₂ emission limits for non-passenger vehicles, each Executive Office shall submit two reports to MassDEP, including information such as what the vehicle is used for (for example, snow plow, street sweeper, bus, emergency response, off-road use), and the amount of fuel and the miles the vehicle travels annually. The first report will cover calendar year 2016 and must be submitted by November 1, 2017, and the second report will cover calendar year 2017 and must be submitted by March 1, 2018. If the Executive Office uses the same methodology and format to report such information to DOER and/or OSD on these vehicles, that report may be submitted to MassDEP to satisfy this requirement. The report must be signed and certified by the Climate Change Coordinator or an authorized Executive Office official.

d) Economic Impacts

Economic impacts to Executive Offices are not expected to be significant, because, as vehicles reach end of life and need to be replaced, there are increasing numbers of efficient models and technologies available, becoming standard equipment over the years. As efficient technologies become more widespread, prices decline due to economies of scale and price competition among equipment producers. In addition, reduction of fuel usage and implementation of any supplemental strategies that reduce vehicle miles traveled will result in some cost savings.

III. IMPACT ANALYSIS

A. Impacts on Cities and Towns

Most of the proposed regulations do not apply to municipalities and will not negatively affect them. While the proposed Clean Energy Standard regulation at 310 CMR 7.75 would apply to some MLPs, the regulation applies equally to all retail sellers of electricity in the Commonwealth whether privately or publicly owned. Communities that own retail sellers of electricity (i.e., MLPs) would be subject to the regulation, and the economic impacts described in the Clean Energy Standard section of this background document (II. C. 1.) would apply. However, the sale of electricity, which municipalities may voluntarily undertake, is not a mandated municipal service. Therefore, costs associated with operation of a power plant are not mandated costs subject to the restrictions of Proposition 2 ½ (Town of Norfolk v. Department of Environmental Quality Engineering, 407 Mass 233 (1990)).

B. Agricultural Impacts

The proposed regulations are not expected to have any negative impacts on agricultural production in Massachusetts. Positive impacts may result from reduced GHG emissions. For example, it is possible that increases in the frequency of extreme weather events that can destroy crops could be avoided if GHG emissions are reduced.

C. Source Reduction

Air toxics are a group of chemical air contaminants, defined by the EPA, that are associated with significant environmental impacts or adverse health effects such as cancer, reproductive effects and birth defects. MassDEP controls air toxics through air quality programs and reduces the use of toxics through its Toxics Use Reduction Program. The proposed amendments will decrease air toxics by reducing GHG emissions on a state-wide basis.

D. Small Business Impact Statement

The proposed regulations are expected to affect large businesses, municipalities and state agencies. No additional costs or requirements are imposed on any small businesses by the

proposed regulations. A Small Business Impact Statement has been filed with the Secretary of the Commonwealth and is available on Secretary's website.

IV. MASSACHUSETTS ENVIRONMENTAL POLICY ACT (MEPA)

The proposed new regulations and amendments are exempt from the "Regulations Governing the Preparation of Environmental Impact Reports," 301 CMR 11.00, in that no MEPA review threshold set forth in 301 CMR 11.03 is met or exceeded. In addition, these proposed amendments do not reduce standards for environmental protection, nor do they reduce opportunities for public participation in review processes or public access to information generated or provided in accordance with the regulations. [See MEPA review threshold pertaining to promulgation of regulations at 301 CMR 11.03(12)].

V. PUBLIC HEARINGS AND COMMENT

M.G.L. Chapter 30A requires MassDEP to give public notice and provide the opportunity for public review and comment on the proposed amendments and background and technical information. To this end, a public hearing will be held in accordance with the procedures of M.G.L. Chapter 30A. The hearing notice and proposed amendments are available on MassDEP's website at: www.mass.gov/eea/agencies/massdep/news/comment/. For further information, please contact Jordan Garfinkle at 617-292-5904 or jordan.garfinkle@state.ma.us.

Appendix A. Calculation of Gas Operator Limits for 310 CMR 7.73

Appendix B. Calculation of Executive Office Limits for 310 CMR 60.06

Appendix C. Calculation of EGU Emission Limits for 310 CMR 7.74