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California Air Resources Board
1001 I Street
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Re: Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation

Thank you for the opportunity to provide comments on the proposed amendments to California Cap and Trade program. We fully support CARB's work to reduce greenhouse gas emissions in the state. Covanta is a national leader in developing, owning and operating facilities that convert municipal solid waste ("MSW") into renewable energy (energy-from-waste or "EfW" facilities). We operate two such facilities in California, one located in Stanislaus County and the other located in the City of Long Beach.

We support CARB's proposal to add an exemption from compliance obligations from emissions from the direct combustion of municipal solid waste at the state's three existing waste-to-energy (WTE) facilities for the 2016 and 2017 emission data years. However that the fundamental reasons for the initial exemption are unchanged, we believe that this exemption should continue through the end of the 3rd compliance period in 2020. The rationale for initial exclusion is still valid, as landfills are still excluded from the cap & trade program, and the scientific & policy recognition of the GHG benefits achieved through the diversion of waste from landfill to WTE is stronger than ever. Inclusion of WTE in the cap beginning in 2018 would put WTE facilities at an economic disadvantage relative to landfilling, the financial impacts of which will be direr than in the past, as power prices have continued to slide and the Stanislaus WTE will no longer be considered renewable under state law. Lastly, inclusion of WTE in the cap in 2018 would put California's program in opposition to Ontario's, which has excluded WTE facilities through 2020.

Since the initial exemption of the existing WTE facilities in 2012, the recognition of WTE as a source of GHG mitigation has grown. This GHG mitigation is achieved by displacing grid connected fossil-fuel fired electricity, recovering metals from the waste stream for recycling, and most importantly, by avoiding landfill emissions of methane, a key short lived climate pollutant. The Center for American Progress and Third Way have both reviewed WTE and validated its GHG benefits.[1,2] Recent work, completed by CARB itself, concluded that WTE offers GHG reductions relative to landfilling:

> "Preliminary staff estimates … indicate that combusting waste in the three MSW Thermal facilities in California results in net negative GHG emissions, ranging from -0.16 to -0.45 MT CO2e per ton of waste disposed, when considering that the waste would otherwise be deposited in landfills resulting in higher emissions."[3]

In addition, the Joint Institute for Strategic Energy Analysis (JISEA) operated on behalf of the U.S. Department of Energy's National Renewable Energy Laboratory, the University of Colorado-Boulder, the Colorado School of Mines, the Colorado State University, the Massachusetts Institute of Technology, and Stanford University published a report in 2013 after a review of solid waste management options for Boulder's municipal solid waste concluded WTE was a better option than landfilling:

> "We find that MSW combustion is a better alternative than landfill disposal in terms of net energy impacts and carbon dioxide (CO2)-equivalent GHG emissions.
>
> "Life cycle assessment studies published in the literature have generally been consistent in suggesting that MSW combustion is a better alternative to landfill disposal in terms of net energy impacts and CO2-equivalent GHG emissions. The results from this study match that expectation. In this report, WTE leads to a higher reduction in emissions compared to landfill-to-energy disposal per kWh production."[4]

Here in California, Berkeley Law released a report earlier this year in response to a request from the Governor's office, looking at the merits and demerits of energy recovery options for wastes remaining after reaching the state's 75% recycling goal. The authors conclude that:

> "Harvesting these leftover materials as solid waste energy sources could provide multiple environmental benefits:
> – complementing intermittent renewable energy, such as wind and solar, to offset fossil fuel-based energy sources and associated greenhouse gas emissions; [and]
> – avoiding landfill emissions of methane (a potent greenhouse gas that is 28-34 times as strong as carbon dioxide over 100 years) by diverting wastes to energy, particularly organic wastes;"[5]

Especially relevant, given California's dependence on the cap & trade program in developing its state measures plan to meet the EPA's new Clean Power Plan requirements, is the U.S. EPA's

treatment of WTE under those requirements. WTE is a compliance option for reducing GHG emissions from electricity generation under the CPP. New EfW facilities are eligible to generate Emission Rate Credits (ERCs).[6] Existing facilities are not a covered source and are considered a source of no carbon energy under the program.[7]

This ample additional recognition augments an already extensive list of international governments, NGOs, and researches that recognize the climate benefits of WTE, including the U.S. EPA,[8,9] U.S. EPA scientists,[10] the Intergovernmental Panel on Climate Change ("IPCC"),[11] the World Economic Forum,[12] the European Union,[13,14] CalRecycle,[15] and other researchers.[16,17] EfW facilities generates carbon offsets credits under both the Clean Development Mechanism (CDM) of the Kyoto Protocol and voluntary carbon offset markets.[18,19] Under CDM, more than 40 EfW projects have been registered, with a combined annual GHG reduction of 5 million metric tons of CO_2e per year.[20] To date, three EfW expansions have been validated as carbon offset projects in North America. The Lee and Hillsborough County facilities, operated on behalf of municipal owners in Florida, have been selling carbon credits into the voluntary market for several years.

Concurrently, new data show that the methane emitted by landfills and other sources is even more damaging than previously thought. Methane is the second largest contributor to global climate change.[21] A short lived climate pollutant (SLCP) increasingly under international scrutiny, methane has a much larger climate impact than previously reported and its atmospheric concentrations continue to rise (Figure 5).[22] According to the IPCC's 5th Assessment Report, methane is 34 times stronger than CO_2 over 100 years when all of its effects in the atmosphere are included and 84 times more potent over 20 years.[23]

Fast action to reduce SLCPs, including methane, has the potential to slow down the global warming expected by 2050 by as much as 0.5 Celsius degrees."[24] A failure to address SLCPs, like methane, significantly increases the risk of crossing the 2°C temperature increase threshold widely discussed as most likely to limit severe climate change impacts.[25]

Auspiciously, California has a comprehensive plan to reduce emissions of SLCPs in the form of SB1383 recently passed by the Legislature. We fully support the diversion of organics materials from landfills called for in SB1383 to higher and better uses of this material. Technologies like well-managed composting and anaerobic digestion that generate a usable product returning carbon and nutrients to the soil should be prioritized, however, energy recovery, including the three existing WTE facilities, has an important role to play. WTE facilities are particularly well suited to manage contaminated organic waste streams that can prove problematic for technologies like composting and anaerobic digestion. In addition, diverting organics to WTE realizes significant GHG benefits. A 2016 peer-reviewed paper published in *Environmental Science & Technology* confirms the value that WTE can bring to organics management, concluding that "it is beneficial to divert food waste from a landfill to AD, composting, or WTE but often not beneficial to divert food waste from WTE."[26]

We recognize that the steps the California legislature and CARB have taken to divert organics from landfilling will impact the composition of the waste stream that is managed in WTE. However, we do not think it is appropriate to presume the results of these actions, or their effect on the GHG benefits of WTE relative to landfilling. Most importantly, the benefits of WTE and other diversion technologies like anaerobic digestion and composting is not diminished by the success achieved in landfill diversion, particularly when these technologies will likely play the largest role in that success. Instead, the GHG benefits of these technologies should be evaluated against the baseline scenario without policy actions like SB1383. Additionally, while SB1363 has set a target to reduce organics disposal by 50% by 2020 relative to 2014, it expressly forbids even the adoption of regulations that would implement that target until 2025.

The case for WTE's benefits relative to landfilling have only become stronger over the past four years. As a result, WTE should be excluded through the end of the 3rd compliance period so that WTE facilities would not be put at an economic disadvantage relative to landfilling and the state can continue to rely on their ability to mitigate GHG emissions relative to landfilling. However, CARB should develop a science-based and transparent process to evaluate the net lifecycle GHG impact of organics diversion on the waste streams managed by the state's three WTE facilities as well as the potential impacts of the inclusion of WTE in the cap and trade program on lifecycle GHG emissions from the waste management sector for the post-2020 period.

In light of AB197 and in recognition of other jurisdictions which have successfully achieved significant reductions in the waste management sector through the implementation of an integrated approach, CARB should consider if other policy mechanisms implemented in lieu of cap and trade are more suitable for the sector. The European Union Emissions Trading Scheme (EU-ETS), the largest and longest running carbon cap and trade program, excludes waste management from the cap.[27] In its place, the EU has a set of complementary policies pertaining to the sector, including a landfill directive which calls for a minimum 65% biodegradable waste diversion from landfills to alternatives, including recycling, composting, anaerobic digestion, and WTE.[28,29,30] This integrated approach, entirely outside of the their cap and trade program, resulted in the biggest GHG reductions in any sector in the EU economy on a percentage basis (34%).[31] Just recently affirmed and expanded through the 2015 Circular Economy Package, we believe this type of an approach could be a model for California.

Thank you very much for the opportunity to comment. Please let us know if you have any additional questions and thank you for your work on this important issue.

Sincerely,

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[2] Third Way (2014) *Power Book*: *Energy from Waste*, http://powerbook.thirdway.org/filter-web-app/energy-from-waste, accessed November 26, 2014.

[3] See Table 5 of California Air Resources Board (2014) *Proposed First Update to the Climate Change Scoping Plan: Building on the Framework, Appendix C – Focus Group Working Papers, Municipal Solid Waste Thermal Technologies*

[4] Joint Institute for Strategic Energy Analysis (2013) *Waste Not, Want Not: Analyzing the Economic and Environmental Viability of Waste-to-Energy (WTE) Technology for Site-Specific Optimization of Renewable Energy Options*. http://www.nrel.gov/docs/fy13osti/52829.pdf

[5] Berkeley Law Center for Law, Energy & the Environment (2016) *Wasting Opportunities: How to Secure Environmental & Clean Energy Benefits from Municipal Solid Waste Energy Recovery*. https://www.law.berkeley.edu/research/clee/research/climate/waste-to-energy/

[6] 40 CFR 60.5800

[7] 40 CFR 60.5845

[8] U.S. EPA Webpage, Energy Recovery from the Combustion of Municipal Solid Waste (MSW), accessed September 19, 2016. https://www.epa.gov/smm/energy-recovery-combustion-municipal-solid-waste-msw

[9] U.S. EPA Archived Webpage, Air Emissions from MSW Combustion Facilities, accessed September 19, 2016. https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/airem.html

[10] Kaplan, P.O, J. DeCarolis, and S. Thorneloe, 2009, Is it better to burn or bury waste for clean electricity generation? *Environ. Sci. Technology* 43 (6) pp1711-1717. Available at: http://pubs.acs.org/doi/abs/10.1021/es802395e

[11] EfW identified as a "key mitigation measure" in IPCC, "Climate Change 2007: Synthesis Report. Contribution of Work Groups I, II, and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change" [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp. Available at: http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm

[12] EfW identified as a key technology for a future low carbon energy system in World Economic Forum. *Green Investing: Towards a Clean Energy Infrastructure.* January 2009. Available at: http://www.weforum.org/pdf/climate/Green.pdf

[13] EU policies promoting EfW as part of an integrated waste management strategy have been an overwhelming success, reducing GHG emissions over 72 million metric tonnes per year, see European Environment Agency, *Greenhouse gas emission trends and projections in Europe 2009: Tracking progress towards Kyoto targets* *http://www.eea.europa.eu/publications/eea_report_2009_9*

[14] European Environmental Agency (2008) Better management of municipal waste will reduce greenhouse gas emissions. Available at: http://www.eea.europa.eu/publications/briefing_2008_1/EN_Briefing_01-2008.pdf

[15] CalRecycle. 2012. CalRecycle Review of Waste-to-Energy and Avoided Landfill Methane Emissions. Available at: http://www.calrecycle.ca.gov/Actions/PublicNoticeDetail.aspx?id=735&aiid=689

[16] Weitz, K., Thorneloe, S., Nishtala, S., Yarkosky, S., and Zannes, M. (2002). "The impact of municipal solid waste management on greenhouse gas emissions in the United States." *J. Air Waste Manage.Assoc.*, 52, 1000–1011.

[17] Thorneloe, S., Weitz, K., and Janbeck, J. (2005). "Moving from solid waste disposal to materials management in the United States." *10th Int. Waste Management and Landfill Symp., International Waste Working Group, Padova, Italy.*

[18] Clean Development Mechanism Executive Board: "Approved baseline and monitoring methodology AM0025: Avoided emissions from organic waste through alternative waste treatment processes." Available at: http://www.cdm.unfcc.int/methodologies/DB/3STKBX3UY84WXOQWIO9W7J1B40FMD

[19] Verified Carbon Standard Project Database, http://www.vcsprojectdatabase.org/ See Project ID 290, Lee County Waste to Energy Facility 2007 Capital Expansion Project VCU, and Project ID 1036 Hillsborough County Waste to Energy (WtE) Facility 2009 Capital Expansion Unit 4.

[20] CDM Project Database, project methodologies AM0025, ACM0022, accessed 6/9/2015, https://cdm.unfccc.int/Projects/projsearch.html

[21] See Figure SPM.5 of IPCC (2013) *Summary for Policymakers*. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., *et al.* (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_SPM_FINAL.pdf

[22] World Meteorological Organization (2014), *WMO Greenhouse Gas Bulletin: The State of Greenhouse Gases in the Atmosphere Based on Global Observations through 2013*, 10, September 9, 2014. Available at: https://drive.google.com/file/d/0BwdvoC9AeWjUd0lPWXBMU1VmNGc/view

[23] The IPCC concluded that "it is likely that including the climate-carbon feedback for non-CO_2 gases as well as for CO_2 provides a better estimate of the metric value than including it only for CO_2." See p714 & Table 8-7 of Myhre, G. *et al.* (2013) *Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., *et al.* (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf

[24] Climate and Clean Air Coalition website, accessed 9/2/2014. http://www.unep.org/ccac/Short-LivedClimatePollutants/BenefitsofMitigation/tabid/130286/Default.aspx

[25] Shindell, D. *et al.*, (2012) Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security, *Science*, **335**, 183-189.

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[29] EU (European Union) (1999) Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste. *Official Journal of the European Communities*. L182, 42, 1–19.

[30] EU (European Union) (1994) European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging of waste. *Official Journal of the European Communities*. L365, 10–23.

[31] European Environment Agency, *Greenhouse gas emission trends and projections in Europe 2009: Tracking progress towards Kyoto targets* http://www.eea.europa.eu/publications/eea_report_2009_9