

Zero-Emission Construction Sites

- Changing the way we build in cities

Public procurers are increasingly determined to reduce emissions from construction sites. The Big Buyers Initiative working group of leading European cities share key opportunities for construction contractors and machine manufacturers interested in joining the movement for clean construction, with a focus on Non-Road Mobile Machinery (NRMM). Will the market rise to the occasion to supply the necessary innovation?

1. Transitioning to zero-emission equipment makes business sense.

Competitive advantage of being first movers on the market, which strengthens the reputation of manufacturers and contractors for both innovation and climate action.

★ Demand for zero emission equipment is increasing. Cities in the Big Buyers Initiative have announced clear carbon neutrality targets and transition measures for the construction sector, which are already affecting procurement minimum requirements and award criteria for public buildings and works. To not lose out on public contracts, market actors should move now on fossil- and emission-free solutions.

Costs can be avoided by taking a proactive approach to EU Stage regulations for Non-Road Mobile Machinery, which are increasing standards on NOx and PM. There is a high probability that CO₂ emissions will be included in stage regulations in the next five years. If investment is made in emission-free equipment now, this machinery **will comply with EU regulations long-term.**

Electric equipment has in some cases shown **time savings in construction projects.** In the city of Copenhagen, the city's Noise Unit permitted longer working hours for a civil works project due to the quiet electric equipment used on-site. Longer working hours cut the total construction time by 50%, causing significant project savings which compensated for the 20% higher initial cost of using electric machinery.¹

Although the initial investment cost is higher for electric NRMM, life-cycle analysis has shown that their **operation and service costs are lower** than diesel-driven NRMM, in part because electric motors are much more efficient than combustion engines.²

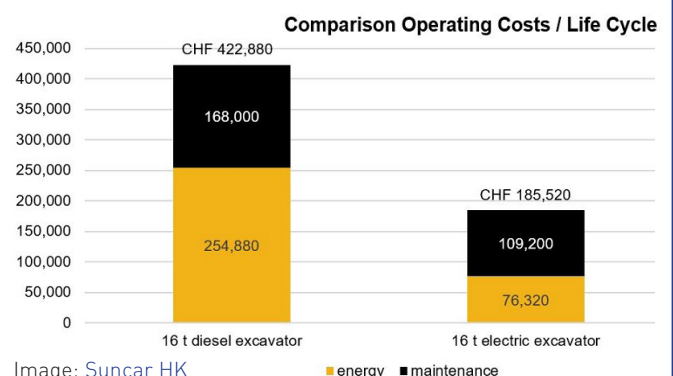
★ Fuel savings - A 25-ton diesel excavator consumes approximately 284,000 L of diesel. Depending on the price of diesel and of electricity, an electric 25-ton excavator produces fuel cost savings of between €100,000 to €240,000 over the lifetime of the machine.

★ Reduced maintenance - Electric machines have fewer moving parts and require less servicing, avoiding the need for oil changes and replacing air filters. It is estimated that electric machinery has a 50% longer lifetime than diesel machinery.

¹ www.gsv.dk/cases/emmissionsfri-byggeplads

² www.klimaoslo.no/wp-content/uploads/sites/88/2019/06/Perspectives-on-zero-emission-construction.pdf

Life cycle analysis shows that operational costs of an electric driven 16t excavator were 44% lower compared to a diesel driven 16t excavator





2. Cleaner construction is the right thing to do - for workers and society.



Improved air quality on and around construction sites benefits construction workers and citizens.

- ★ In London, 9% of PM_{2.5}, 4% of PM₁₀, and 6% of NO_x emissions come from the exhaust fumes of construction machinery.³ Inner cities are combating poor air quality, and construction, as one of the last remaining industries in urban centres, will have to clean up too.
- ★ Air pollution causes around 400,000 premature deaths per year in Europe, and 90% of European city-dwellers are exposed to harmful levels of air pollution.⁴ Exhaust emissions and particles, such as those from conventional NRMM, are known to cause health problems. By using electric solutions, the health of construction workers would therefore benefit from avoided exposure to fossil combustion engines and their resulting pollutants.



Reduced noise for a better working and living environment.

- ★ Noise from construction sites impacts the wellbeing of construction workers and the neighbourhood surrounding the site. Much noise on construction sites comes from generating electricity through diesel pumps, heating or drying of materials, and traffic to, from, and within the site.
- ★ Zero-emission equipment produces significantly less noise and vibration, which reduces the impact on

workers' health and reduces nuisance to those living or working in the vicinity. Estimates show electric heavy-duty machinery creates 5 to 10 times less noise than diesel equivalents.⁵ As restrictions are put in place by public authorities to ensure quality of life in urban centres, construction contractors should play their part in creating clean and quiet sites.

3. Construction emissions reductions are necessary for our common future.

Investing in zero-emission solutions supports the move away from fossil fuels and reduction of greenhouse gas emissions, in alignment with local, national and international climate action targets. Carbon neutrality ambitions cannot be achieved without emissions reductions from the construction sector.



- ★ In Oslo, construction machinery accounts for 18% of the city's total CO₂ emissions and for 30% of traffic emissions - this is greater than all of Oslo's emissions from passenger cars and light duty vehicles.⁶
- ★ In 17 EU countries, construction machinery and equipment emitted 20MtCO₂ in 2018. This is higher than the total national emissions of 5 EU Member States (Slovenia, Luxembourg, Cyprus, Latvia and Malta).⁷

3 <https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory--laei--2016>

4 www.eea.europa.eu/themes/air/intro

5 <https://network.bellona.org/content/uploads/sites/3/2018/06/ZEC-Report-1.pdf>

6 www.oslo.kommune.no/politics-and-administration/smart-oslo/projects/zero-emission-construction-sites

7 Bellona Zero Emission Construction Sites Factsheet 2020



See to believe: Videos show zero-emission construction machinery in action [in Oslo](#) and [in Copenhagen](#).



What is the Big Buyers Initiative for Zero-Emission Construction Sites?



The Big Buyers Initiative working group on Zero-Emission Construction Sites brings together the cities of Amsterdam, Brussels, Budapest, Copenhagen, Helsinki, Lisbon, Oslo, Trondheim and Vienna to promote zero-emission construction sites, focussing on alternatives to conventional diesel-driven construction machines. These cities work together as big public buyers to develop and pilot innovative sustainable procurement approaches in order to reduce the environmental impact of construction activities and encourage market innovation.

Key contacts

ICLEI Europe

Kaitlyn.Dietz@iclei.org

Climate-KIC

Anders.Vestergaard-Jensen@climate-kic.org

Bellona Foundation

Mark@bellona.org



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