

Stockholm's Experience With Reducing GHG Emissions from Transport

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To improve air quality, reduce congestion, and ultimately reduce GHG emissions from transport, Stockholm uses a mix of regulation and charges.

Gaining Support for Congestion Charges

The idea of congestion charges in Stockholm started out with low public support and carried high political risk, a trend not uncommon in many cities. This shifted in a series of events, with the introduction of congestion charges for a trial period only, which was offered as a political compromise. The charge system was carefully designed, using transport models, as a cordon around Stockholm's inner city.

From day one, the charges resulted in substantial congestion reductions, even beyond the charge cordon. And after the trial period ended, Stockholm voted yes in a referendum on permanently re-introducing the charges. At that point, the residents of the Stockholm region had already experienced the congestion reduction and had, somewhat, gotten used to the charges. Other factors that also contributed to public support: communicating the environmental benefits of the system rather than funding or efficiency aspects, earmarking the revenues for transport investments in the region, and ensuring that the automated charge system operated smoothly.

The traffic volume reduction achieved by the charges has remained surprisingly stable over time, considering the rapid growth in the region's population and economy. In 2016, the charge level increased for the first time and a major bypass was included in the system. In response, public support for the charges decreased slightly but remained positive. Today, 12 years after the charges' permanent introduction, their existence is not questioned. The question is rather how the charge system, and other policies that restrain car traffic, should evolve.

Improving Air Quality via Heavy Vehicle Fleet Renewal

Air quality in Stockholm is now continuously improving, and much of this is due to vehicle fleet renewal. Since 1996, a low-emission zone bans the most polluting heavy vehicles from driving in Stockholm's inner city. A national framework determines which heavy vehicles to ban, announcing the successively stricter requirements years in advance. This advance notice gives operators time to plan their fleet, which helps to reduce their adaptation costs and facilitate compliance. Compliance is still limited, however, because manual police controls (and soon parking penalties) are the only enforcement mechanisms.

Heavy vehicles today contribute just over half the nitrogen oxide emissions from transport in Stockholm, but comprise less than 10 percent of traffic. The year 2021 will mark an important step for further improving air quality in Stockholm's inner city: Heavy vehicles will need to comply with the Euro VI emission standard, which reduces nitrogen oxide emissions per kilometer more than 10-fold compared to the current Euro V requirement. Thankfully, the busses operating in Stockholm largely already comply with this coming requirement.

Reducing Greenhouse Gas Emissions through New-vehicle Choices

Cities also have a powerful role in affecting the demand side of vehicle technology change. Firms and households in the Stockholm region purchase one third of Sweden's new vehicles, and they often sell the vehicles to other parts of the country within three years. Stockholm's inner city is also the economic and social center of the region and attracts vehicles from a wide geography: every fourth Swedish vehicle visits the area at least annually, many come only a few times per year. So, regulations in Stockholm have a reach beyond the region itself.

Stockholm also sees how possible regulation for air quality can have negative long-term effect on GHG emissions. This became apparent in 2018, when a public debate regarding a possible ban of diesel cars in central Stockholm – but also other factors and negative international news – contributed to a dramatic drop in the sales of new diesel cars in Sweden, substituted with petrol cars. From a climate perspective, the shift towards new petrol cars is problematic, because petrol engines are less energy efficient than diesel engines. Adding to this, in Sweden, diesel also contains a larger share of biofuel than petrol.

Ultimately, to reduce greenhouse gas emissions the uptake of zero-emission vehicles and reducing urban car use is preferable to both petrol and diesel. Stockholm has not decided on any zero-emission zone yet. The announcement of a zero-emission zone plan – and the specifics involving the how, when, and where – may encourage zero-emission vehicle uptake and charging infrastructure, lower second-hand values of other vehicles, encourage new distribution solutions, and so on. However, the costs for vehicle owners, businesses and visitors can be substantial and need to be weighed against the benefits. Some aspects to consider in limiting these costs would include sufficient pre-notice periods, potential impacts to local streets versus regional traffic flows, integration with other policies, and the alternatives drivers and vehicle buyers will seek under various scenarios.

Differentiated Charges Versus a Ban

One way to substantially lower these downsides is to charge vehicles varying amounts for driving in a zone depending on their emission level, as opposed to introducing a ban. Differentiated charge levels encourage uptake of clean vehicles among regular visitors to the zone, but also among other vehicle buyers via higher anticipated second-hand values for compliant vehicles. Charges discourage trips that are least valuable to travelers, and they provide a pay option to others who want more time to change vehicles or who make infrequent visits that are especially difficult to avoid. Stockholm already has some relevant experience here. During the first years of the congestion charge operation, some alternative fuel cars were exempt from paying the charges. This was intended to stimulate the market introduction of these vehicles and proved effective.

Suggested Next Steps for Cities Contemplating Vehicle Access Regulations

- Start with defining clear objectives and constraints to guide policy planning, versus starting with ready-made answers

- Expect public opinion on congestion charges to improve when their positive effects are experienced. This, of course, requires that the system delivers benefits, which requires effective design, implementation and operation
- Build and maintain public trust. Reduce ambiguity about coming policies. Own the positioning
- Think global on greenhouse gas emissions. Effect size matters. Shape travelers', vehicle buyers' and investor's expectations
- Think local on air pollution. Start with heavy vehicle fleet renewal and enforce these regulations. Reduce (through-passing) traffic in core areas, for example with pricing, bypasses, route-restrictions, parking regulations
- Integrate vehicle access restrictions with other measures. Prioritize space-efficient modes (walk, cycle, transit), efficient goods transport, and space-making in the urban environment. Work towards mixed and compact land-use

To exchange learnings or partner on innovation, Stockholm host study visits, collaborates with peer cities, and looks forward to hearing from more cities. To read more about Stockholm's congestion charge experience, [this FAQ](#) is a good place to start.