

MODELLING FOR INDUSTRIES

In conjunction with permit reviews or control of current permits, industries need to account for their environmental impact, including their contribution of pollutant levels to air quality. We perform calculations of pollutant level contributions and deposition contributions for emissions from separate industries or industrial complexes. In addition, we have extensive experience in performing complete environmental quality reports.

Calculations of air emission dispersion are often used in conjunction with permit reviews in regards to emissions from existing or planned industries. By using dispersion modelling, various emission scenarios can be simulated for combinations of different gases, particles, aerosols and odours from different types of sources. The contribution to air pollutant levels from the industry, together with the local background concentration, is compared to current environmental quality regulations and targets. In this way, one can assess potential exceedances caused by emissions from the industry – see example.

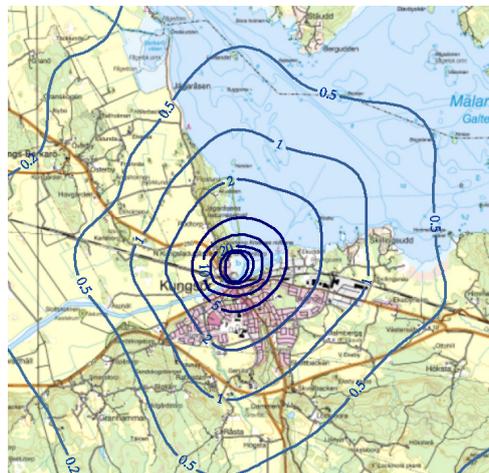
The range of emission sources that can be modelled spans from one separate smokestack to all emissions associated with a particular industry – including transportation with road vehicles, trains and ships. Emissions may vary over time, for example can puff emissions, and emissions that vary according to some meteorological parameter such as temperature, be modelled. Chemical processes, which take place in the atmosphere and in flue gas plumes, depending on the substances that are emitted, are also taken into account by the dispersion calculations.

Model calculations can also be used for optimization of flue gas stacks and to minimize the risk of plume downwash, both in regards to steam and air pollutants – see figure.

CALCULATIONS OF ODOUR

Emissions of particles and different gases from stationary plants (for example energy production and industrial processes) and vehicle exhaust are relatively well defined today.

However, particle emissions from diffusive sources, such as those from open areas without vegetation, stockpiles, stone crushers, loading/unloading of material, transportation on gravel and sand, are often excluded from the calculations regarding total emissions from the industry. IVL has developed a general method to estimate diffusive particle dusting, which currently is refined for specific sources commonly associated with industry and construction sites.



Air pollutant level contribution of nitrogen oxides to air from industry. (Example)



Flue gas plumes from stacks with a height above and within an inversion layer, respectively.

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