

Report on NMVOC for NFR 2D3a – Domestic solvent use including fungicides for 2024–2025

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Introduction

In 2024 and 2025, a study was conducted focused on collecting underlying activity data to improve the level of emission inventory and on developing a methodology including a model emission inventory for sector 2D3a – Use of Solvents in Households for the years 2000, 2005, 2010, and 2015–2024.

Methodological approach to determining NMVOC emissions from households in the Czech Republic

NMVOCs are present in many products commonly found in households. In the Czech Republic, this is a key category for which the Tier 1 approach has been used to date – i.e. estimating emissions using a default emission factor. The methodological approach using the Tier 2a method is described below. Tier 2a is based on compiling an inventory of household products using available national statistics and determining the quantity of solvents in these products. In the case of the Czech Republic, this involves the use of customs statistics and the PRODCOM database of the Czech Statistical Office. Knowledge of the percentage solvent content in products and an emission factor are also required.

Overview of product groups included in the NMVOC household inventory methodology:

- Pesticides – herbicides, fungicides, rodenticides, anti-germination preparations and growth regulators
- Pharmaceutical products – disinfectants
- Cosmetics and toiletries – soaps, shampoos, beauty preparations, perfumes, hairsprays, deodorants, shaving and aftershave preparations, bath and perfume salts
- Household care – washing detergents, cleaning agents, polishes, room fragrancing preparations and essential oils
- DIY – adhesives, solvents and thinners (this group was subsequently excluded)
- Car care – car care products, anti-freeze preparations

Use of customs statistics

Customs statistics in the Czech Republic serve to systematically monitor and evaluate the movement of goods between the Czech Republic and other countries. They include data on imports and exports, which are collected through two systems – Intrastat for trade between Member States of the European Union and Extrastat for trade with non-EU countries. These statistics include information on the type of goods, their quantity, value, origin and destination.

The information is collected by the Customs Administration of the Czech Republic and the data are publicly available at <https://apl.czso.cz/pll/stazo/stazo.stazo> for years 1999 onwards.

Use of the PRODCOM database

The PRODCOM database serves to collect and process data on industrial production in the European Union. It currently contains data for the years 2008–2023.

However, **the structure of the database** is for the detailed processing of the emission inventory **insufficiently detailed. For example, it is not possible to distinguish products that may be available in a variant with a higher or lower solvent content, or even without any solvent content, e.g. water-based variants. Some items**, however, are **not published in the provided database**. These are mainly confidential data marked as I.D. In agreement with representatives of the Czech Statistical Office, some missing confidential data were partially covered by aggregation at a higher level. Supplementing historical data from 2004 backwards will be the subject of further cooperation.

Compiling the NMVOC household inventory

From the above, it follows that the most appropriate approach for obtaining activity data in subcategory 2D3a – Use of Solvents in Households is to use a combination of the PRODCOM database and customs statistics. The PRODCOM database provides information on industrial product production, while customs statistics monitor the movement of goods. By combining these two sources of data, a balance can be created for given products/product groups that makes clear how much of a product remained in the Czech Republic. According to the GB 2023 methodology, these data are suitable for Tier 2 use.

A Final Balance of NMVOC-containing Products was compiled. Solvent contents in individual products (%) were determined on the basis of data from the GB 2023 methodology, from the UK IIR and the study by Zeinali et al. (2011), and compared with data published in the IIR of Slovakia and Slovenia. These values were used to calculate the solvent content in the given products. Emission factor values were taken from the GB 2023 methodology, from the UK IIR and the study by Wooley et al. (1990), and compared with the emission factors of Slovakia and Slovenia.

Reporting preparation

Following the established procedure, a consumption balance of the products of interest was

compiled, the solvent content in the given products was determined, and NMVOC emissions were calculated using emission factors. At present, complete customs statistics for the years 1999–2024 and partial statistics from PRODCOM are available. Given that **certain specific products are designated I.D. – individual, these missing values will be supplemented for groups of products of the same type** (e.g. perfumes and toilet waters or all herbicides). Furthermore, **complete data for the years 2004–2008 and the year 2024 are not yet available, therefore the determined NMVOC emission values are preliminary only**. The **data** obtained and the processed **outputs** show **considerable fluctuations in year-on-year statistics**. Without further consultations with the statistics provider, the balance cannot therefore be finalized for reporting purposes. In particular, this concerns **the statistics and subsequent calculation of emissions from de-icers across the time series, in which the observed fluctuations do not correspond to the statistics on the number of frost days** (see Figures 1 and 2). **A year-on-year step change** was also recorded **for disinfectants** (2008/2009). Obtaining further detailed information on this item, particularly on the production statistics side, will require further consultations with the data provider.

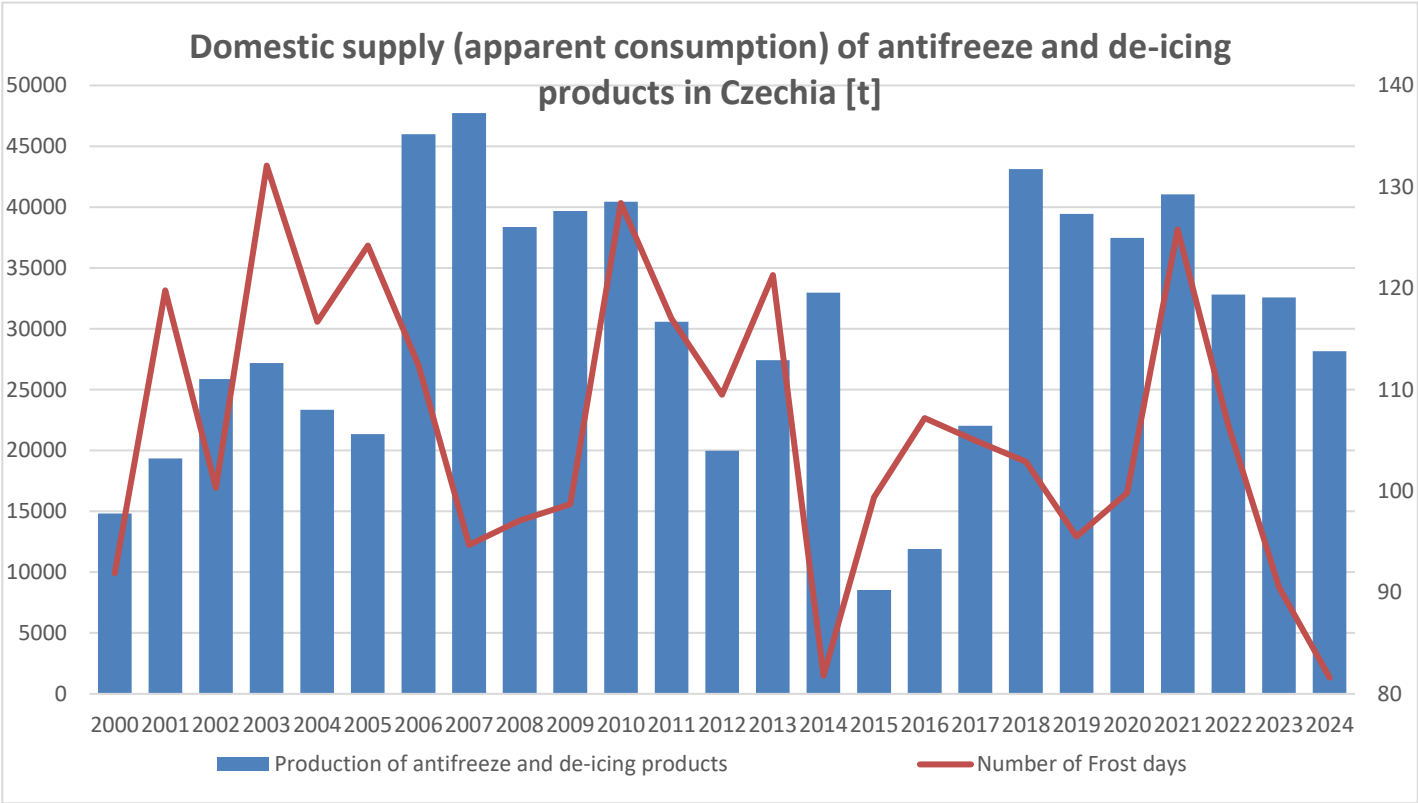


Fig. 1: Domestic supply (apparent consumption) of antifreeze and de-icing products in Czechia.

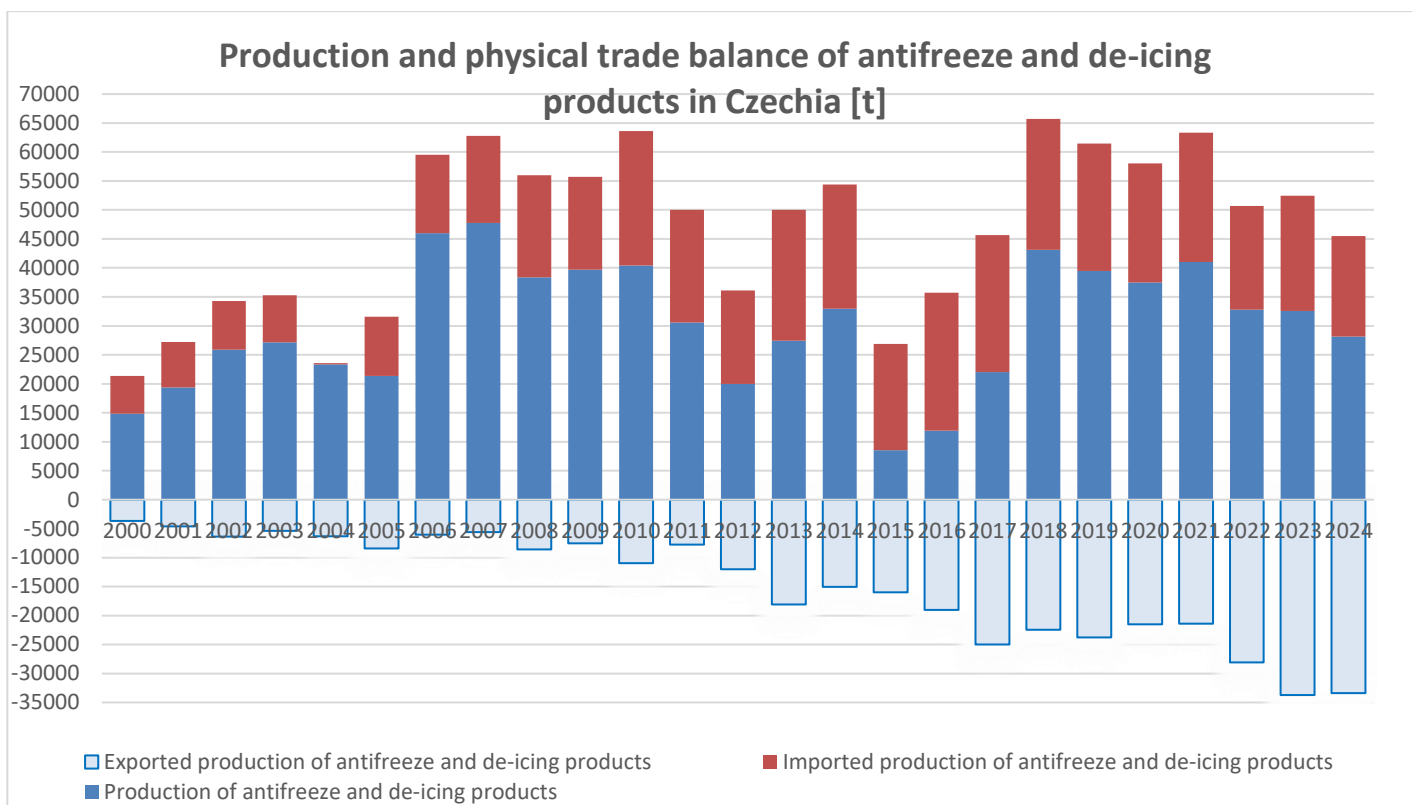


Fig. 2: Production and physical trade balance of antifreeze and de-icing products in Czechia.

Summary

To date, NMVOC emissions from households (category 2D3a) have been reported using Tier 1, whereby a default emission factor related to population size is used. As this is a key category in the Czech Republic’s pollutant inventory, the TERT review found this approach to be insufficient and recommended moving to a Tier 2 approach. Tier 2 involves securing specific activity data.

In the Czech Republic, a combination of the PRODCOM database and customs statistics must be used for the transition to Tier 2. Both databases provide a sufficient number of products/product groups covering all source groups of subsector 2D3a listed in the EMEP/EEA 2023 Guidebook. Individual products/product groups from both databases were selected on the basis of the methodology, a review of the IIR of selected countries and were compared with activity data from Slovakia. The percentage NMVOC contents of individual products were also identified. This selection from both databases and the percentage NMVOC contents will serve as background material for the compilation of new activity data in subsector 2D3a on the use of solvents in households at the Tier 2 level.

As part of the study, background materials were compiled in accordance with Tier 2a. This methodological approach requires a national balance of NMVOC-containing products used in households. Specifically, the study compiled a product balance using exports and imports of products according to customs statistics and domestic production data from the PRODCOM database. Calculations of the NMVOC content of individual products or product groups were also performed and, on this basis, NMVOC emissions were calculated using emission factors according to the GB 2023 methodology.

These preliminary results were compared with emissions from countries with a comparable population size. **Since the preliminary results for the Czech Republic are relatively high, further proposals for refining NMVOC emissions from households are being considered.**

The study also includes a newly designed calculation template that is used to compile NMVOC emissions for the current time series, and which can be updated annually with input data to determine emissions in subsequent years using pre-set calculations.