WSTW Contribution to ECHA Consultation on PFAS Restriction Proposal

Wiener Stadtwerke (WSTW) as a climate and environment protection corporation highly supports the EU's objective of reaching climate neutrality and safeguarding the environment and health of EU citizens and therefore endorses a planned restriction on PFAS. However, it must also **align with the goals of the EU Green Deal** and the associated reduction of CO2 emissions.

WSTW provides essential services of general economic interest like public transport as well as energy production and supply and is therefore a key player in achieving the Green Deal's objectives, taking significant efforts to reduce CO2 emissions in the energy and transportation sectors (e.g. transitioning to carbon-neutral technologies). The planned PFAS ban should not hinder these aspirations. Infrastructure assets, such as rail vehicles (with a lifespan of 40 years) or switchgears (with a lifespan of up to 60 years) have long lifecycles. Therefore, **excessively short transition periods for the restriction would have significant operational impacts**. A ban on PFAS-containing components or materials with a transition period shorter than 40 years would require the mandatory replacement or modification of affected components and materials in almost all infrastructure assets, leading to substantial disruptions in the provision of essential services.

In the interest of **ensuring a secure supply and providing high-quality, affordable public services** for the citizens in European cities**, there is a need for differentiated and pragmatic solutions in the restriction of PFAS**. It is essential to meet both the technical requirements of the energy and transportation sectors within the context of the climate transition and to ensure the protection of the environment and human health. These solutions should encompass the safeguarding of existing facilities, appropriate transition periods, as well as exemptions and established procedures.

In the energy and transport sectors, a PFAS ban would have a significant impact in the following areas:

- **Refrigeration/heating technology:**
  - Heat Pumps

Decarbonising industry and district heating is a major challenge if we are to meet our targets for reducing CO2 emissions. As a result, the deployment of Heat Pumps (HPs) to decarbonise district heating and industrial heat has been identified as one of the main solutions. The impact of the PFAS ban on Refrigeration, Air Conditioning and Heat Pumps would be twofold:

1) All fluoropolymers fall under the proposed definition in the proposal. These substances such as PTFE, FPM etc are critical to most of the components which makes these systems run efficiently and at best performance.
2) Most F-gases, which are a core part of the full portfolio of refrigerants used on RACHP applications are covered by the proposal. Refrigerants are an essential element for the good functioning of their RACHP components, equipment and systems to heat and cool.

In the case of large high-temperature heat pumps, crucial for the decarbonisation of industry and district heating, special refrigerants called Hydro Fluoro Olefines (HFO, e.g. R1234ze) have been developed in order to replace refrigerants according to the F-Gas Regulation (e.g. R134a). These HFOs allow high temperature ranges combined with a high efficiency. They are not ozone-depleting, have a very low GWP and are in case of accidents not so dangerous compared to alternatives like NH3 (toxicity) or propane (flammability and explosion protection). There are already technical solutions to minimise emissions into the atmosphere. A large number of these HFO-based heat pumps with a lifetime of more than 20 years have been recently installed or are in installation. Because the heat pumps are constructed according to the refrigerants' physical properties, the revamping of the heat pump in order to use natural refrigerants is not possible. It needs to be possible to operate them until the end of their lifetime.

The industrial HP market can be divided into 3 categories depending on heat supply temperature (up to the actual limit of 150°C):
- Standard HPs providing heat up to 85°C
- High-temperature (HT) heat pumps providing heat from 85°C to 100°C
- Very high temperature HPs (VHTs) providing heat between 100 to 150°C.

The F-Gas Regulation, under ongoing review, mandates the progressive phasing out of fluorinated gases, including HFCs used in refrigeration systems. In order to meet these requirements, European industrials developed few years ago HFC-free solutions, today mature or very close to maturity (in the process of being demonstrated) for these three markets.
Most of solutions for the HT and VHT markets (supply temperature > 90°C) are designed to use an HFO-type refrigerant (r1234ze(Z); r1234ze(E); r1233zd(E); r1336mzz(Z)), which belongs to the PFAS family. Manufacturers of industrial HPs have chosen this solution for a number of reasons: Zero ODP, extremely low GWP, limited or zero flammability, non-toxic, optimum performance at target temperatures.

For heat pumps providing heat at high or very high level (> 90°C), **alternative refrigerants to HFO are still non-existent** from a commercial point of view (TRL < TRL 9): the first laboratory demonstrators are under way and the first field demonstrations will see the light of day from

2024/2025 (often using hydrocarbon-type fluids: butane or n-pentane). The use of hydrocarbons will also require time for industries to adapt in order to incorporate these highly flammable refrigerants. The use of water is also an alternative but at laboratory demonstration stage for closed cycles.

- Refrigerants in vehicles

In the transport sector we see a similar picture. In rail vehicles with air conditioning, R134a is used as a refrigerant which is already affected by the planned F-gas regulation. We already face significant shortages and price increases in refrigerants, due to current debates.
When selecting refrigerants, the overall climate performance over the product's lifecycle is crucial. Some alternative refrigerants **require structural changes to components**, such as increasing heat exchanger surfaces, to achieve similar or higher efficiency values. Furthermore, some alternatives lead to higher weight requirements, which have implications for the used infrastructure. Especially in the railway sector flammable alternative refrigerants, which are already used in other areas like refrigerators or automobiles, **cannot be used due to safety reasons**.
Alternative refrigerants are currently being tested for their practicality, but as users we are reliant on equipment manufacturers in this regard.

- **Switchgears:**

Even though there are currently PFAS-free products for gas-insulated electrical switchgear up to 145kV on the market, only one manufacturer can currently serve European switchgear needs now and for the next 10-15 years. The competitors have indicated that there is currently no development strategy for non-PFAS, gas-insulated high-voltage switchgear for the European market. This challenge concerns both the energy and transport sector as both are using an important amount of switchgears in their systems. In times of the both mobility and energy transition and the massive grid expansion required to maximize feed-in capacity from renewables, it would be an economic-political problem to leave the potential switchgear market throughout Europe to just one manufacturer for the next 10-15 years. Transition periods are also not a solution in the medium term and a comprehensive derogation is needed here.

Regarding gas-insulated electrical switchgear above 145kV, there are currently no PFAS-free products ready for the market; especially for circuit breakers, there are currently no discernible development steps at this voltage level. Moreover, there are already physical limits in the development of such switchgear, where even market maturity in the next 10-15 years seems unrealistic at present.

- **Batteries:**

Nickel-cadmium batteries are used for the uninterrupted power supply of infrastructure, especially when the grid power fails. The electrodes are treated with PFAS such as PTFE, TEE-FP, FEP and PFA. These batteries are mainly used to operate light power systems in stations.
Onboard battery systems also provide, for example, emergency power for important safety and control functions, including brakes, smoke detection, emergency lighting and door opening.

- **Proton Exchange Membrane Fuel Cell:**

PFAS are contained in the fuel cells of Hydrogen buses. Hydrogen is one of the most important alternative fuels for zero-emission buses in the coming years. There are already alternatives to PFAS, but they are still far from practical. They are very short-lived and generate more heat than energy. **A ban on PFAS would set the hydrogen industry back 10-15 years**. Therefore, the planned transition period of 6.5 years is too short and would have to be at least 13.5 years.

- **Repair work:**

Maintenance is an important part of lifecycle usage, whereby the cooling agent Novec 649 which is required in the repair of certain vehicle traction inverters. This cooling agent currently has no alternatives and would be subject to the PFAS restriction ban.

- **Wires and cables:**

In railroad traction motors (also tramway and metro), PFAS are contained in the insulation of the wires used to make the winding. These are fundamental elements to make transport technically possible.

- **Electronic components, semiconductors and coatings:**

All railroad products (rolling stock, signaling, infrastructure) require printed circuit boards to ensure operation and safety. Most components on these PCBs use PFAS and fluoropolymers.