

EFFECT OF FLUORINATED GREENHOUSE GASES REGULATION ON BIOBANKS – A CASE STUDY USING THE EXAMPLE OF BIOBANK GRAZ

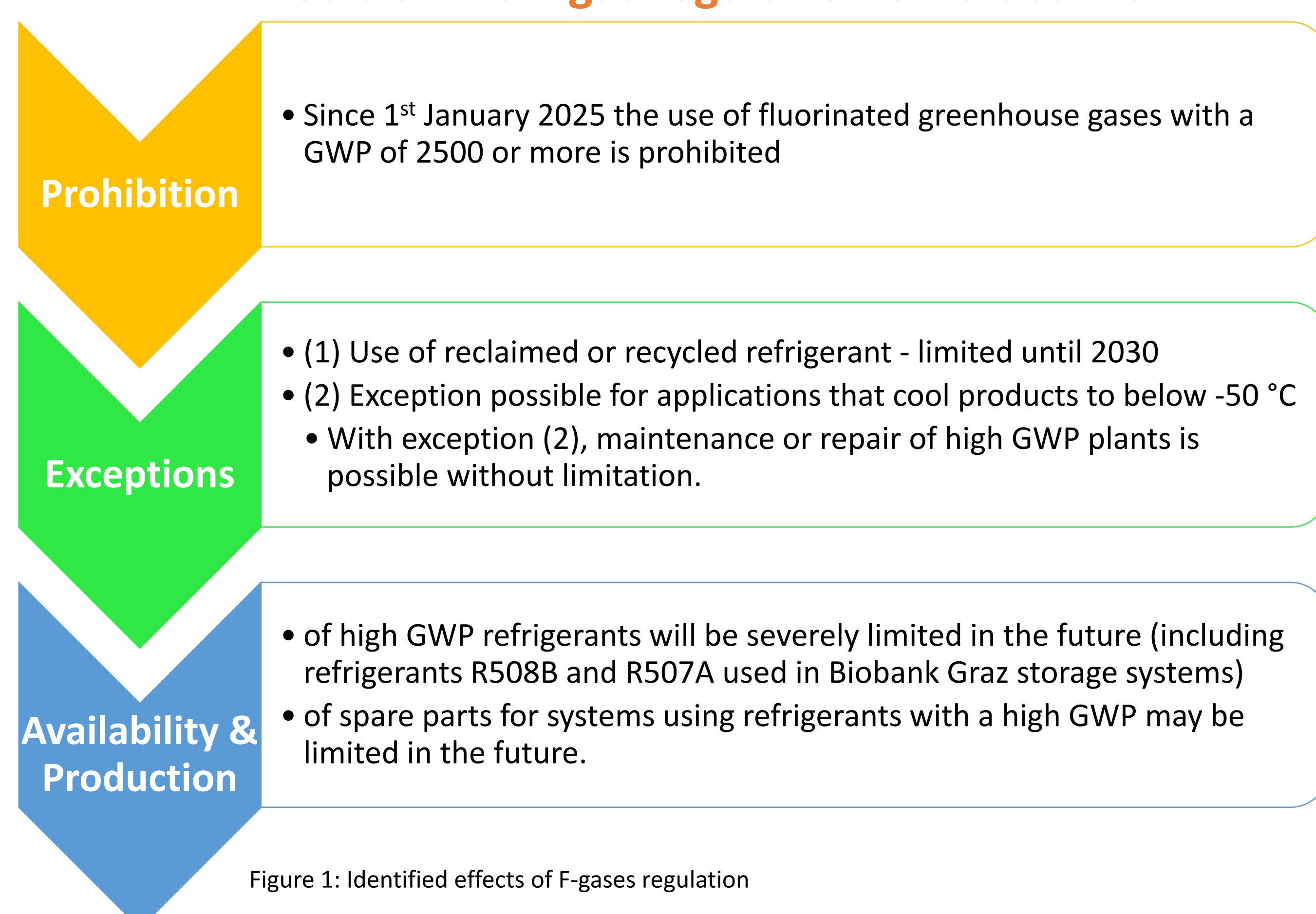
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INTRODUCTION & BACKGROUND

Hydrofluorocarbons (HFCs) are used as refrigerants in freezers or automated storage systems and exhibit strongly divergent but mostly very high [greenhouse warming potentials \(GWP\)](#). The Global Warming Potential is a metric that indicates how much a specific greenhouse gas contributes to global warming compared to carbon dioxide (CO₂). It measures the amount of heat a gas traps in the earth's atmosphere relative to CO₂.

The European Union's "F-gas Regulation (EU) 2024/573" (effective March 11 2024) aims to significantly reduce emissions of climate-damaging fluorinated greenhouse gases. (1–3)

Effects of the F-gas regulation on biobanks



Examples for GWPs of frequently used refrigerants

Information	Refrigerant	Common Name	GWP
Frequently used in the past Phasing out	R404A		3922
	R508B	Freon 95	13214
	R507A		3985
Lower GWP, commonly used phasing out in the future	R452A	Solstice 452A	2140
	R449A	Opteon XP40	1397
	R134A	Tetrafluoroethane	1430
Natural refrigerant options (some still facing technical challenges regarding system design or safety)	R170	Ethane	6
	R290	Propane	3
	R744	Carbon Dioxide	1
	R717	Ammonia	0

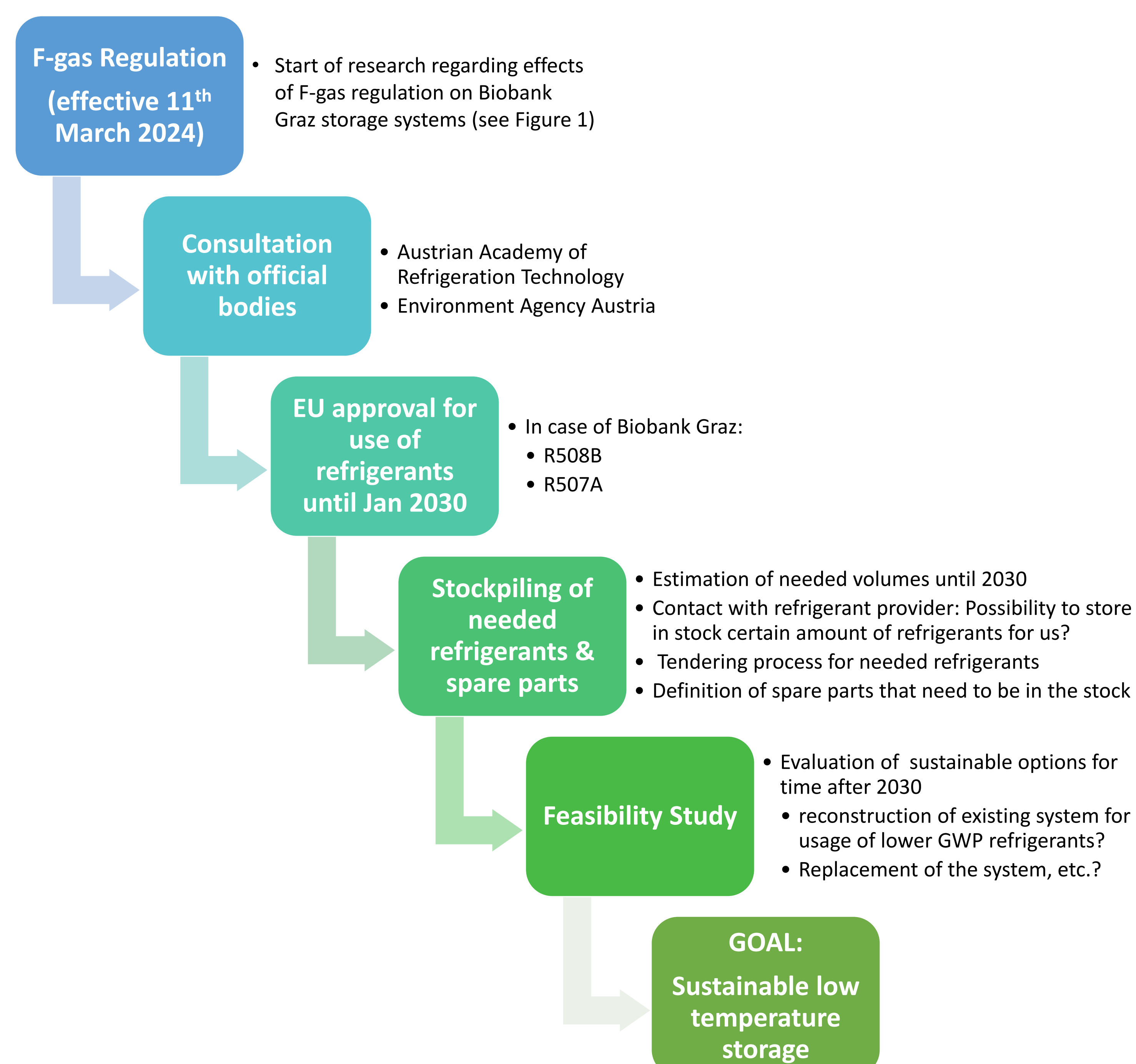
<https://www.infraserv.com/en/services/facility-management/expertise/f-gas/gwp-calculator/>

MATERIAL & METHODS

To implement the regulation, Biobank Graz (a partner of BBMRI.at) collaborated with the Austrian Academy of Refrigeration Technology (4) and the "Environment Agency Austria" (5) to secure an interim solution for the existing storage systems. This included ensuring EU approval for the ongoing use of refrigerants R508B and R507A in existing systems, as well as stockpiling an adequate supply of refrigerant. Figure 2 gives an overview about the process.

RESULTS

Activities needed to keep cooling system in operation and identify sustainable long-term solution



A feasibility study is currently ongoing to detect environmentally sustainable storage solutions that can adapt the existing storage systems and guarantee the security of already collected samples. The study will explore how the existing system could be adapted to sustainable coolants with lower GWPs, with the goal of improving both sustainability and sample storage security.

DISCUSSION & CONCLUSION

Existing storage systems cannot be easily replaced within short time. This makes interim solutions essential that allow enough time for planning sustainable storage facilities that will meet future requirements. Beside energy consumption, it is crucial for biobanks to consider the greenhouse warming potential of the used refrigerant when tendering for a low-temperature storage or buying new freezers and automated freezer systems.

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