



KET4F-Gas



Reduction of the Environmental Impact of Fluorinated Gases in the Sudoe space using Key **Enabling Technologies**

Ana B. Pereiro (anab@fct.unl.pt)

you can cool it!



Cooperation depends on you www.interreg-sudoe.eu



@interregsudoe #KET4FGas



Research and Innovation

www.KET4F-Gas.eu

Sudoe

KET4F-Gas





KET4F-Gas: Reduction of the Environmental Impact of Fluorinated Gases in the Sudoe Space using Key Enabling Technologies

Execution period: 01/04/2018 – 30/09/2021

General objective: KET4F-Gas is a European project, co-funded by the Interreg Sudoe Programme, that aims at the reduction of the environmental impact of fluorinated gases (F-gases) in the SUDOE area, using Key Enabling Technologies (KETs) to facilitate companies and waste managers to comply with EU F-gas regulations.

Budget:

1 742 800 Euros - 75% European Regional Development Fund (ERDF)

SUDOE area: Portugal, Spain and France

WEBINAR LISBOA 17.09.2021

Soluções para uma Gestão Sustentável de **Gases Fluorados Call To Action**



Partnership

5 Academic Institutions (PT, SP, FR)











4 Industrial Partners (PT, SP)



NOWASTE «





INTERLUN, S.L.

Environmental Federation (FR)



2 Public Foundations (SP)





FUNDACIÓN EMPRESA - UNIVERSIDAD GALLEGA



Public Administration (SP)



Associated partners

Academic Institutions



FCC ambito

Industrial Partners

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European Platform

Non-governmental Organization (NGO)





associação sistema terrestre sustentável









All these news have dates between August and **Effects of Global Warming in SUDOE Area** September of 2021!! **Bloomberg Green** \equiv EL PAIS SPAIN **Climate Adaptation** WEATHER Wildfires Burn in France and Spain Heavy rainfall causes destructive flash floods in Spain ench news Practical Comment Mag People Community What's On Video HOME > FRENCH NEWS > SEVERE FLOODS IN SOUTH-WEST FRANCE AFTER TWO MONTHS' F Two German tourists drowned in rough waters while storms damaged homes, dragged vehicles out to **After Scorching Heatwaves** sea and sent firefighters racing to rescue stranded people Severe floods in south-west A combination of high temperatures, drought and strong winds is making it harder to France after two months' rain in control the blazes 24 hours By Laura Millan Lombrana Water reached up to two metres high in some areas after a record 17 de agosto de 2021, 17:11 WES amount of rainfall. Evacuations took place but no injuries have been CORONAVIRUS ρ VIDEO LIVE SHOWS ►) LIVE (▶) LIVE #AFGHANISTAN #COVID-19 FRANCE AFRICA CULTURE SHOWS FIGHT THE FAKE #AFGHANISTAN #COVID-19 FRANCE AFRICA CULTURE SHOWS FIGHT THE FAKE Crews in southern Spain face 'complex' Coronavirus notice \cdot View the recommendations and information for travellers issued by the French Government \rightarrow Thousands evacuated in southern France as wildfire for 5th day A / Live news wildfire spreads Firefighting crews in southern Spain are looking at the sky for much-needed Portugal battles wildfire as heatwave persists rainfall they hope can help extinguish a major wildfire that has ravaged 7,700 f 🖸 🔽 🎮 hectares (19,000 acres) in five days and displaced some 2,600 people from their homes Issued on: 17/08/2021 - 15:54 By ARITZ PARRA Associated Press F 🈏 🔤 13 September 2021, 12:00 • 3 min read Issued on: 17/08/2021 - 16:30 🔀 INDEPENDENT Subscril NEWS INDEPENDENT TV CLIMATE SPORT VOICES CULTURE PREMIUM COMPARE INDY/LIFE VOLICHERS Portugal one of the most vulnerable to Temperatures hit 40 degrees as Portugal sizzles in extreme heatwave NEWS POLITICS CELEBS climate change Residents of the southern city of Evora are struggling to beat the heat as temperatures soar to 40 degrees Celsius. Mediterranean heatwave roasts Spain "I try to stay at home. I turn on the fan, turn off the lights, close the windows to keep the heat out," one man tells AFP news agency. Mediterranean countries have been sweltering in an extreme heatwave, which is fuelling wildfires and putting people's health at risk. with record high temperatures of 48C Portugal has been highlighted as one of the European The said temperatures recorded in the Mediterranean region this summer go beyond the typical hot, dry In The mercury is rising across Europe with Spain, Italy and France expecting record temperatures but August weather and instead "are extreme, and what we might expect from climate change." countries most vulnerable to climate change. meanwhile places like Turkey are suffering wildfires and flooding www.KET4F-Gas.eu







https://www.epa.gov/ghgemissions/overview-greenhouse-gases http://www.greenpeace.org/eastasia/campaigns/climate-energy/science/other-greenhouse-gases/





F-gases (Refrigerants 3G & 4G)



Synthesized compounds especially designed for different industrial aplications such as **refrigeration and air conditioning**.







Refrigerants installed/used for commercial refrigeration – questionnaire EU 2017



Natural refrigerants: R-744 (CO₂); R-290 (Propane)

KET4F-Gas → Circular Economy







KET4F-Gas tools and solutions

1. KET4F-gas technologies



2. Tool for the selection of Key Enabling Technologies

Learning

Decision-making

Saving time

Trust





1. KET4F-Gas prototypes

Two prototypes based on two different advanced separation processes:

- ✓ Adsorption column
- ✓ Membrane technology

R-410A (near-azeotropic system of pure F-gases R-32 and R-125) is one of the most

used refrigerants in residential and commercial air conditioners



Efficient recovery of R-32 from the high-GWP refrigerant blend R-410A, for reutilization

purposes in novel environmentally-friendly refrigerant mixtures with low-GWP.





1. KET4F-Gas prototypes





Main characteristics:

- ✓ Low energy requirements
- ✓ Easy to apply due to small amount of space required, to their modularity and scalability
- ✓ Low maintenance
- ✓ Long lifetime
- ✓ High separation performance and high R-32 purity (>99%) when both prototypes are used in series





2. Tool for the selection of Key Enabling Technologies

- Allows the **classification of waste** according to the European method (EWL European Waste List)
- Allows a better understanding of the **impact of fluorinated gases**
- Informs about the **best solutions available for F-gases treatment** using Key Enabling Technologies (KETs).

http://www.ket4f-gas.eu/?page_id=1537





Residue Classification

00 Waste Classification

Select a waste source

- 01 Wastes resulting from exploration, mining, quarrying, physical and chemical treatment of minerals
- 02 Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing
- 03 Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard
- 04 Wastes from the leather, fur and textile industries
- 05 Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal
- 06 Wastes from inorganic chemical processes
- 07 Wastes from organic chemical processes
- 08 Wastes from the manufacture, formulation, supply and use (MFSU) of coatings (paints, varnishes and vitreous enamels), adhesives, sealants and printing inks
- 09 Wastes from the photographic industry
- 10 Wastes from thermal processes
- 11 Wastes from chemical surface treatment and coating of metals and other materials; non-ferrous hydro-metallurgy
- 12 Wastes from shaping and physical and mechanical surface treatment of metals and plastics
- 17 Construction and demolition wastes (including excavated soil from contaminated sites)
- 18 Wastes from human or animal health care and/or related research (except kitchen and restaurant wastes not arising from immediate health care)
- 19 Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use
- 20 Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions
- N None of the above









Fluorinated Gas R-410A R-125 (50%); R-32 (50%); Chemical composition / Gases mixture 50% Ê Selection of technologies treatment Global Warming Impact (GWP) 2087,500 Impact level The selected gas is at the point B of the impact scale Α 0 LOW 1 - 3 801 В **IMPACT** С 3 802 - 7 602 MEDIUM **IMPACT** 11 404 - 15 204 F 15 205 - 19 005 HIGH IMPACT G > 19 006





Selection of technologies treatment

| Tre atment technologies | Advanced Materials Advanced Materials - Alternative Solvents; Advanced Materials - Solid Porous Matrices; Advanced Materials - MOFs; Advanced Manufacturing Technologies Advanced Manufacturing Technologies - Membranes; Nanotechnology Nanotechnology - Nanoparticles Suspension; |
|-------------------------|---|
| | |

The KEF-Gas platform is **simple**, **accessible to everyone and free of charge**.

The benefits from the platform include:

- Learning
- Helps on decision-making
- Saving time
- Trust





✓ Good practices handbook for industry and waste managers: EN, PT, FR, ES

Good practices handbook for industry and waste managers

Interreg 🖸

Sudoe



Chapter I Page 4 How does the current F-Gas regulation affect waste managers? A global look from policy to market Chapter 2 Page 12 _____ Do you need to deal with F-Gas waste management? We have the solution! Chapter 3 Page 22 A Success Case - The KET4F-Gas System Chapter 4 Page 36 How does the KET4F-Gas benefit waste managers? Chapter 5 Page 40 FAO Chapter 6 _____ Page 44 _____ Takeaways Chapter 7 Page 48

An overview on F-Gas current situation



✓ Roadmap for the Public Administrations in charge of waste management: EN, PT, FR, ES



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✓ Project videos



https://www.youtube.com/watch?v=E5sP5yrnwCw

https://www.youtube.com/watch?v=9TeAzNobCD4









✓ **Financing catalog,** when available, it will include national and international financing lines.

✓ Objectives of this catalog:

- 1. Identify project financing lines
- 2. Identify opportunities to consolidate and expand the results of the project









































Ana B. Pereiro: anab@fct.unl.pt João M. M. Araújo: jmmda@fct.unl.pt