

[REDACTED]

From: [REDACTED]
Sent: jeudi 21 septembre 2023 16:18
To: [REDACTED] (CLIMA); [REDACTED] (CLIMA); [REDACTED] (CLIMA)
Cc: [REDACTED]@mecc.mee.com;
Subject: RE: EPEE - thank you for the meeting and some follow-up information

Thank you [REDACTED]

In the footnote on the slide 7 you can see that they already investigate many options and will continue research with mixtures including HFO1132 (E) . This is an example of an HFO that is not PFAS.

You can see that some mixtures are a combination of non-fluorinated (natural) refrigerants with HFOs. The background is to find solutions that are safer than propane, and therefore more widely applicable across all ranges.

From: [REDACTED]@ec.europa.eu>
Sent: Thursday, September 21, 2023 3:58 PM
To: [REDACTED]@epeglobal.org>; [REDACTED]@ec.europa.eu>; [REDACTED]@ec.europa.eu>
Cc: [REDACTED]@eu.panasonic.com>; [REDACTED]@mecc.mee.com>; [REDACTED]@epeglobal.org>
Subject: RE: EPEE - thank you for the meeting and some follow-up information

Dear [REDACTED],

Thanks for the useful discussion earlier this week.

Any information on this would always be of interest, including indeed developments that would concerns PFAS free alternatives.

Kind regards,

From: [REDACTED]
Sent: Thursday, September 21, 2023 3:38 PM
To: [REDACTED] <[\[REDACTED\]@epeglobal.org](mailto:[REDACTED]@epeglobal.org)>; [REDACTED] (CLIMA) <[\[REDACTED\]@ec.europa.eu](mailto:[REDACTED]@ec.europa.eu)>; [REDACTED] (CLIMA) <[\[REDACTED\]@ec.europa.eu](mailto:[REDACTED]@ec.europa.eu)>; [REDACTED] (CLIMA) <[\[REDACTED\]@ec.europa.eu](mailto:[REDACTED]@ec.europa.eu)>
Cc: [REDACTED] <[\[REDACTED\]@eu.panasonic.com](mailto:[REDACTED]@eu.panasonic.com)>; [REDACTED] <[\[REDACTED\]@mecc.mee.com](mailto:[REDACTED]@mecc.mee.com)>; [REDACTED] <[\[REDACTED\]@epeglobal.org](mailto:[REDACTED]@epeglobal.org)>
Subject: RE: EPEE - thank you for the meeting and some follow-up information

Allow me to clarify in addition to slide 7 that the Japanese research also looks at HFOs that are not PFAS.

From: [REDACTED] <[\[REDACTED\]@epeglobal.org](mailto:[REDACTED]@epeglobal.org)>
Sent: Wednesday, September 20, 2023 5:23 PM
To: [REDACTED] <[\[REDACTED\]@ec.europa.eu](mailto:[REDACTED]@ec.europa.eu)>; [REDACTED] <[\[REDACTED\]@ec.europa.eu](mailto:[REDACTED]@ec.europa.eu)>; [REDACTED] <[\[REDACTED\]@ec.europa.eu](mailto:[REDACTED]@ec.europa.eu)>
Cc: [REDACTED] <[\[REDACTED\]@eu.panasonic.com](mailto:[REDACTED]@eu.panasonic.com)>; [REDACTED] <[\[REDACTED\]@mecc.mee.com](mailto:[REDACTED]@mecc.mee.com)>; [REDACTED] <[\[REDACTED\]@epeglobal.org](mailto:[REDACTED]@epeglobal.org)>; [REDACTED] <[\[REDACTED\]@epeglobal.org](mailto:[REDACTED]@epeglobal.org)>
Subject: EPEE - thank you for the meeting and some follow-up information
Importance: High

Dear [REDACTED] Dear [REDACTED] Dear [REDACTED]

First of all, please let me thank you for taking the time to meet with us this Monday, it is much appreciated.

As mentioned by [REDACTED] during the meeting to answer [REDACTED] question on ongoing research activities, some activities are ongoing as already presented by JRAIA at the last Bangkok OEWG meeting, as of slide 7 you can find some updates on ongoing work and assessment: [PowerPoint Presentation \(iraia.or.jp\)](http://iraia.or.jp)

Slide 7 focuses on refrigerant developments for direct expansion ACs, while the following slides deep dive into the NEDO activities (project looking at alternatives, including non PFAs)

2. New refrigerant development (for direct expansion ACs)

High-performance/low-GWP refrigerant required for direct expansion ACs

HFO-based low GWP refrigerants are the **only candidate** for medium- to large split ACs. HFO refrigerants are **subject to the European PFAS proposal**, careful consideration is required so as not to lose an effective means of CO2 reduction.

		R290	CO2	R32, R454B, etc.	New HFO
Small split AC (6kW ≤) 	Safety	Δ (A3)	Δ (high pressure)	○ (A2L)	○ (A2L)
	GWP	○ (<10)	○ (<10)	Δ (<750)	○ (1~150)
	Performance/Economics	○	x (low performance)	○	Δ~○
	challenges	Safety Measure	impractical	Medium GWP	PFAS, Stability, Performance
Medium/Large split AC (<6kW) 	Safety	x (Flammability)	Δ (high pressure)	○	○ (A2L)
	GWP	○ (<10)	○ (<10)	Δ (<750)	○ (1~150)
	Performance/Economics	Δ	x (low performance)	○	Δ~○
	challenges	impractical	impractical	Medium GWP	PFAS, Stability, Performance
VRF 	Safety	x (Flammability)	Δ (high pressure)	○	○ (A2L)
	GWP	○ (<10)	○ (<10)	Δ (<750)	○ (1~150)
	Performance/Economics	x	x (low performance)	○	Δ~○
	challenges	impractical	impractical	Medium GWP	PFAS, Stability, Performance

2. New refrigerant development (for direct expansion ACs)

(Reference) Refrigerants evaluated for thermodynamic properties by NEDO (2018~2022 GWP < 150)

(Reference)	Refrigerants	GWP
	HFO1336mzz(E)	16
	HCFO1224yd(Z)	1
	HFC32/HFO1123/HFO1234yf (21.2/59.5/19.3%), etc.	150
	HFO1123	1
	HFO1123/CF3I (50/50%), etc.	2.5~3.5
	HHC290/HFO1234yf (50/50%), etc.	1
	HFO1123/HC290 (80/20%)	1
	HFO1123/HC290/HFO1234yf (48/12/40%), etc.	1
	HFO1234yf/HFO1336mzz(E) (40/60%)	1
	HFO1234ze(E)/HFO1336mzz(E) (40/60%)	1

From the Final Report of the
Japan Society of Refrigeration
and Air Conditioning Engineers

※HFO1132(E) mixed refrigerant will be evaluated after this year.

Technical problems still remain in terms of performance and the stability of the refrigerant.
In order to solve these problems, NEDO will continue to evaluate refrigerants over several years
and consider their practical application.

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This shows that multiple paths are being investigated, taking into account and finding best solutions with low GWP values towards an HFC phase down, whereas a full F-gas ban would simply stop innovation.

We strongly urge you to consider this as well in your trilogue discussions, especially for the split categories.

We of course remain available to further discuss this and address any of your questions.

Thank you and kind regards,



EPEE – European Partnership for Energy and the Environment

The Voice of the Refrigeration, Air Conditioning and Heat Pump Industry in Europe

Avenue des Arts, 44, B-1000 Brussels

EU Transparency Register Nr. 22276738915-67

 @epeeglobal.org

Website: www.epeeglobal.org

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(+32)  - Fax:
(+ 