Availability of refrigerants for heat pumps in Europe
A threat for the heat pump market?

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on fluorinated greenhouse gases

Rainer M. Jakobs

IZW Information Centre on Heat Pumps & Refrigeration

Hannover Duisburg Breuberg Karlsruhe
Germany

Presentations Refrigerants IZW Jakobs

- A) **Availability of refrigerants for heat pumps in Europe**
  6th European Heat Pump Forum 15th May 2013
- B) **Vorschlag für die F-Gas Verordnung, Rückblick, derzeitiger Stand und Ausblick zur Umsetzung**
  Andrea Voigt, EPEE DKV-IZW Veranstaltung zu F-gasen 10.01.2013 Darmstadt
- C) **F-Gas Phase down Extracts from presentation on Chillventa Rossija 2013**
- D) **Extracts from Chillventa 2012 → Refrigerants**
- E) **comments to the proposal F-gas**
- F) **Important links**

A)

Availability of refrigerants for heat pumps in Europe

6th European Heat Pump Forum 15th May 2013

Availability of refrigerants for heat pumps in Europe

A threat for heat pump markets?

Rainer M. Jakobs

IZW Information Centre on Heat Pumps & Refrigeration

Hannover Duisburg Breuberg Karlsruhe

Germany

6th EHPA EUROPEAN HEAT PUMP FORUM | 15 MAY 2013

Availability of refrigerants for heat pumps in Europe

- Introduction
- HP refrigerants
- Requirements on refrigerants
- Selection for the future
- Conclusion

6TH EHPA EUROPEAN HEAT PUMP FORUM

15 MAY 2013

ehpa european heat pump association

F.A.Z. 6.9.09

Residential

Commercial

Industrial

District cooling and heating

Future:
Smart grids
Smart cities

Future: Heating of electric cars and cooling the batteries

Residential HPs Refrigerants

Space Heating + Cooling

Tumble dryer

Domestic Hot Water
Refrigerator
Freezer

Use of aero-geo-+hydrothermal renewable energy sources

ehpa european heat pump association

Commercial Industrial

R-410A

R-134a

R-134a

R-717

R-744

6TH EHPA EUROPEAN HEAT PUMP FORUM

15 MAY 2013

ehpa european heat pump association

Industrial HPs

R-134a R410A R-407C R-717

limit of present, most common HFC: ~ 80 °C

> 80 °C:	**NH_3 –H_2O; NH_3; CO_2**
	Propane, Butane
some HFCs:	**Pentafluorpropan (R245fa)**
	Pentafluorbutan (R365mfc)

Research and development high temperature

R718 R744 R717
Mixtures R717 - R718
HFOs
Mixtures with HFOs

6TH EHPA EUROPEAN HEAT PUMP FORUM
15 MAY 2013

ehpa european heat pump association

Requirements

- Physical properties
- Thermo dynamical properties
- Chemical properties
- Physiological properties
- Economic requirements
- **Ecological properties**

The use of a substance as a refrigerant depends on its properties.

You will never find the requirements on an ideal refrigerant all at once with one fluid. You always have had to make compromises and you have to choose the most suitable fluid appropriate to a certain application.

6TH EHPA EUROPEAN HEAT PUMP FORUM

15 MAY 2013

ehpa european heat pump association

The “Ideal“ Refrigerant

- High (thermodynamic) energy efficiency / COP
  - High enthalpy of evaporation / low mass flow
  - High critical temperature
  - Low vapor density in relation to pressure level
    Low temperature loss with pressure drop
  - Favorable heat transfer coefficients

Indirect emissions
85-95%

- High volumetric cooling-heating capacity
  Low flow volume, small cross sections
- Moderate pressure levels
- No or low temperature glide
- Low global warming potential (GWP)
- Low toxicity, not flammable / explosive
- Good material compatibility

Direct emission
5-15%

TEWI

6TH EHPA EUROPEAN HEAT PUMP FORUM
15 MAY 2013

ehpa european heat pump association

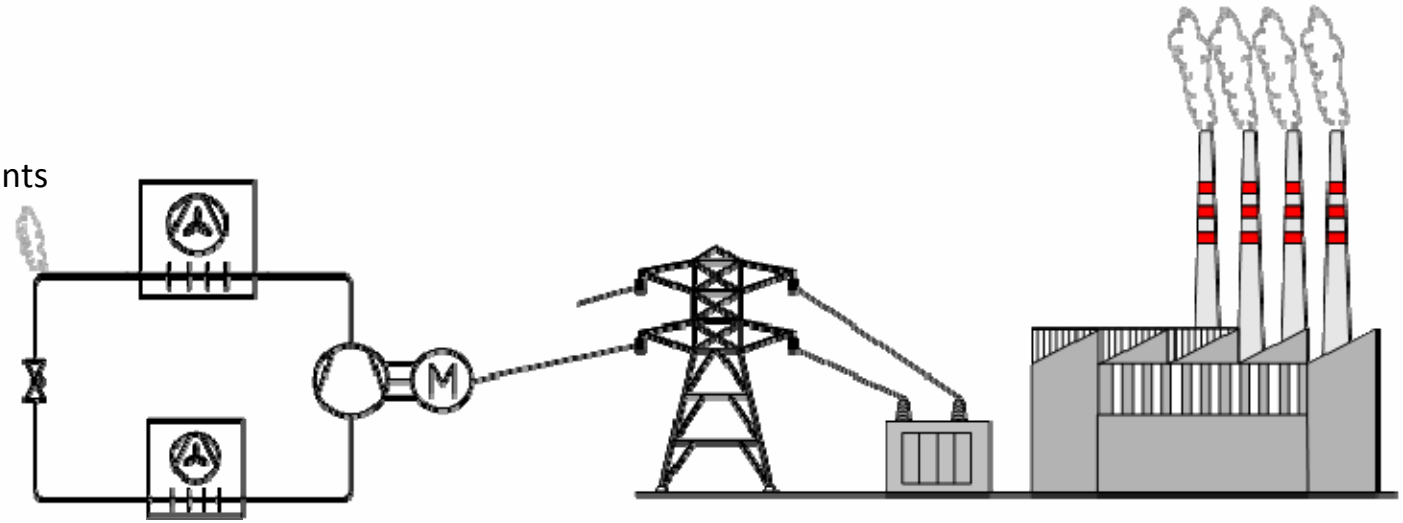
TEWI → CO_2-equiv. Emissions

direct emissions

indirect emissions

exhaust gas CO_2

refrigerants



Relation of the exhaust cloud-areas correspond to the emission effect

6TH EHPA EUROPEAN HEAT PUMP FORUM

15 MAY 2013

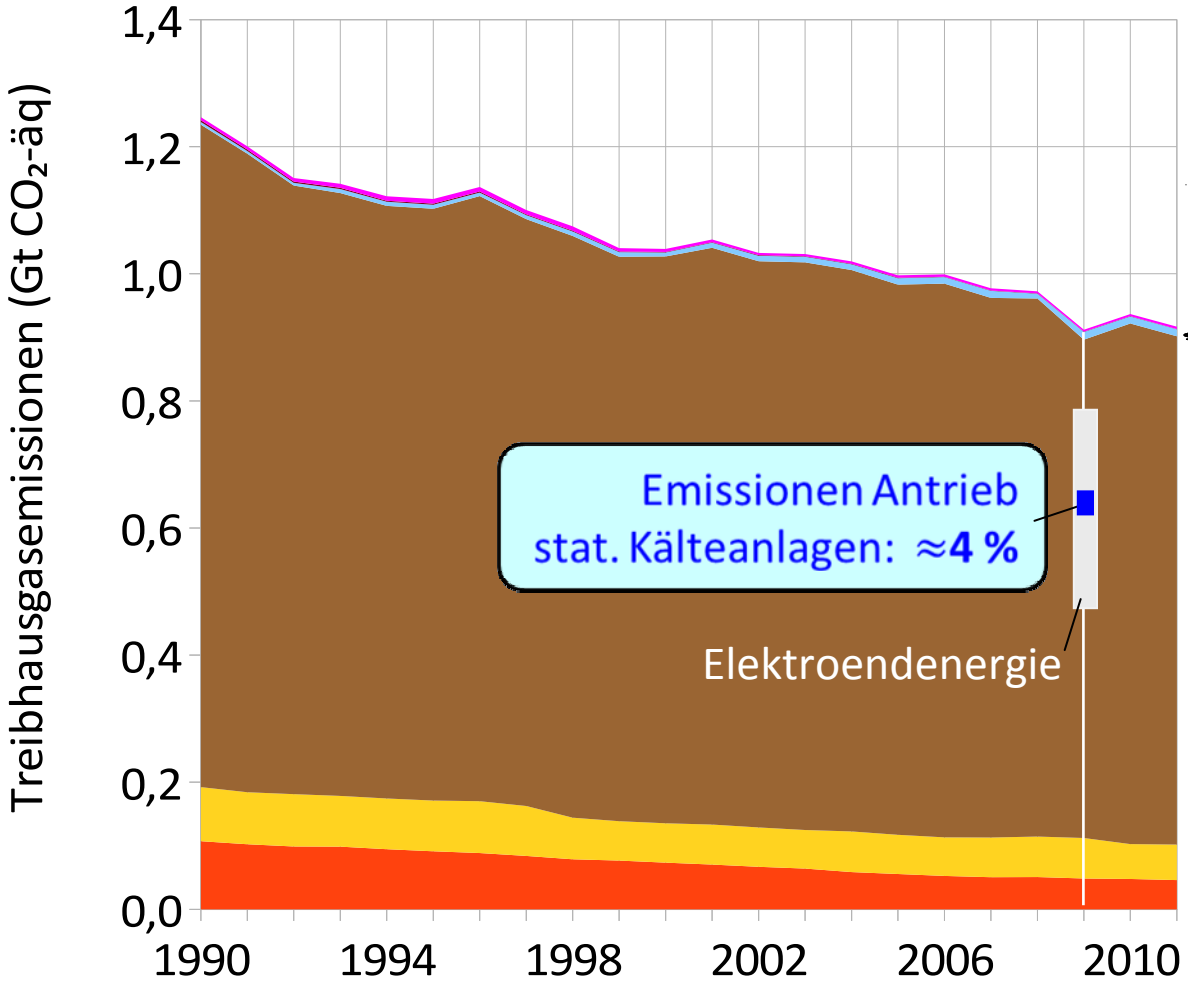
Source: Prof. Dr.-Ing. Michael Arnemann

Hochschule Karlsruhe Technik und Wirtschaft

ehpa european heat pump association

National Greenhouse-Gas-Emissios (Germany)

Source: Umweltbundesamt, eigene Berechnungen



Anteile 2008

0,34 % SF_6

0,05 % PFKW

0,78 % HFKW, sonst. (≈)

≈0,3 % direkte Emissionen Kältemittel aus stat. K.-Anlagen

Σ F-Gase = 1,57 %

86,7 % CO_2

6,5 % N_2O

5,2 % CH_4

Bild: ICE-TEX INGENIEURBÜRO, ergänzt

Source: Prof. Dr.-Ing. Michael Arnemann

Hochschule Karlsruhe Technik und Wirtschaft

ehpa european heat pump association

Refrigerants

R-32 A2L

R-134a

R-290 A3

R-404A R-407C R-410A

R-507

R-600a A3

R-717 B2L

R-744

HFO 1234yf A2L

HFO 1234ze A2L

R-1270 A3

R...

6TH EHPA EUROPEAN HEAT PUMP FORUM

15 MAY 2013

Refrigerants

R-32 A2L

R-134a

R-290 A3

~~**R-404A**~~ **R-407C** **R-410A**

~~**R-507**~~

R-600a A3

R-717 B2L

R-744

HFO 1234yf A2L

HFO 1234ze A2L

R-1270 A3

HFO… Mixtures

6TH EHPA EUROPEAN HEAT PUMP FORUM

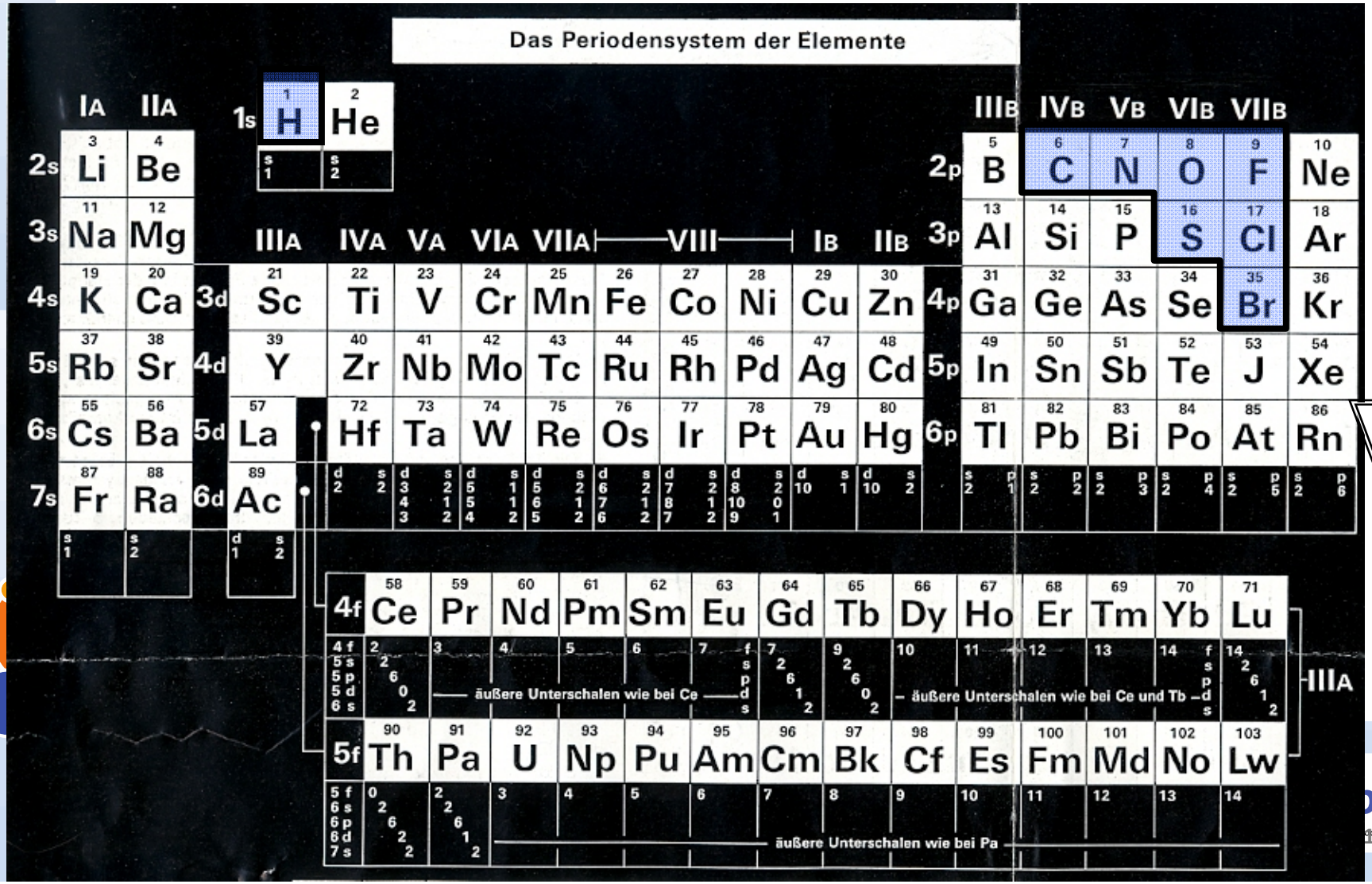
15 MAY 2013

Kältemittel Möglichkeiten
Refrigerants options

... only 8 elements are really suitable for refrigerant molecules

more flammable

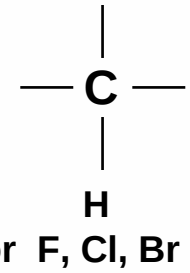
more toxic

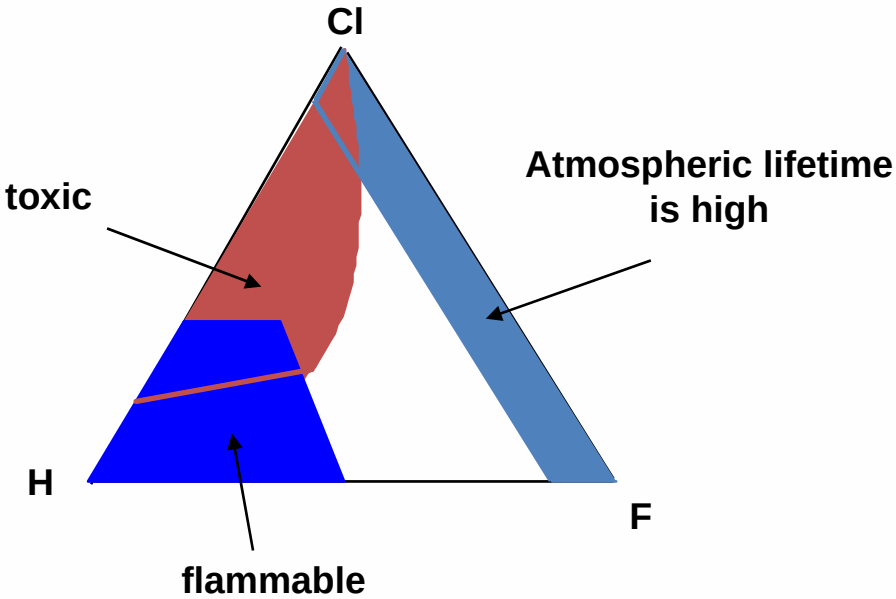


Refrigerants

Base:

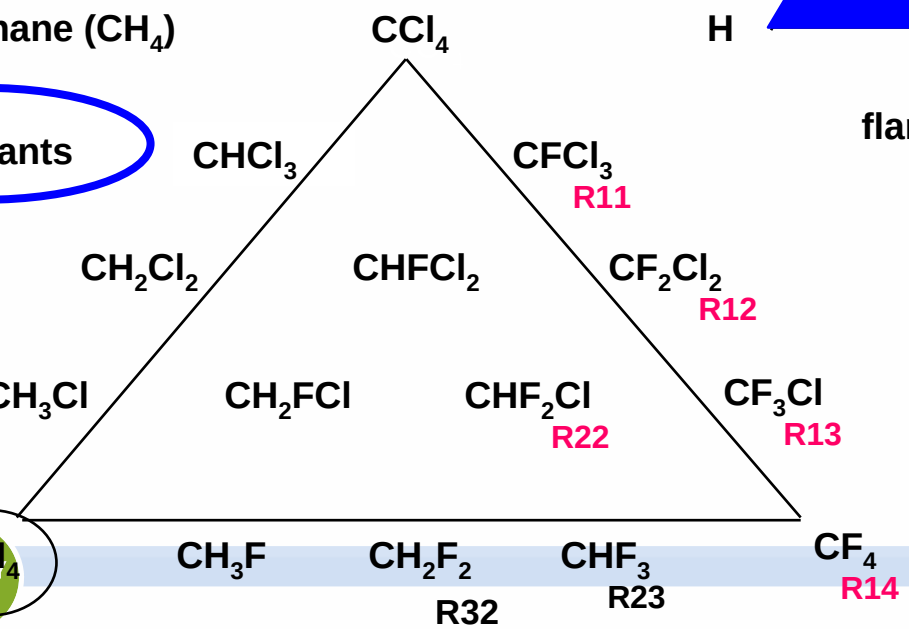
- Methane CH_4
- Ethane C_2H_6
- Propane C_3H_8
- Butane C_4H_{10}





Methane (CH_4)

15 variants



Methane	CH_4:	15 variants
Ethane	C_2H_6:	28 variants
Propane	C_3H_8:	45 variants
Butane	C_4H_{10}:	66 variants

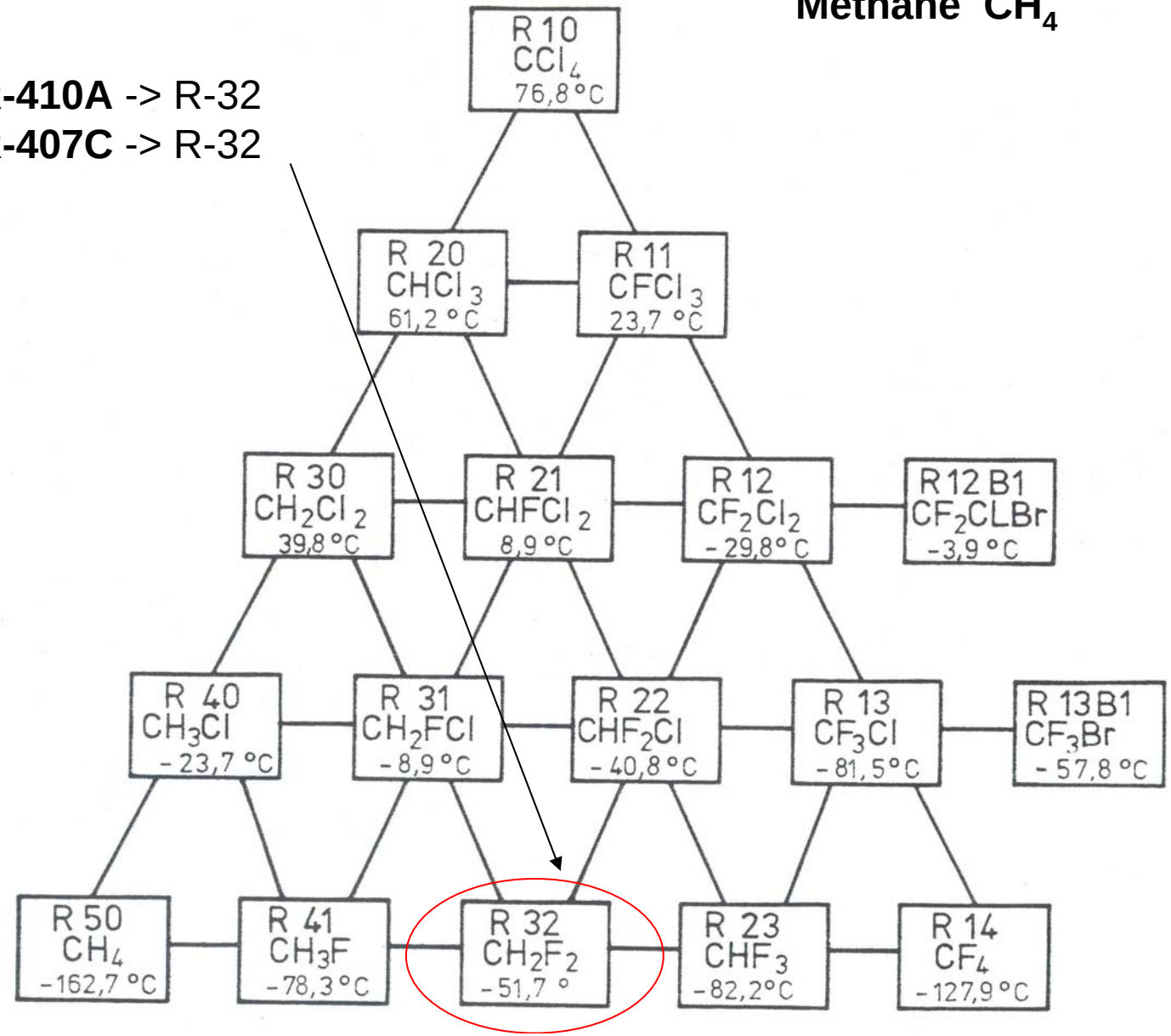
154 substances

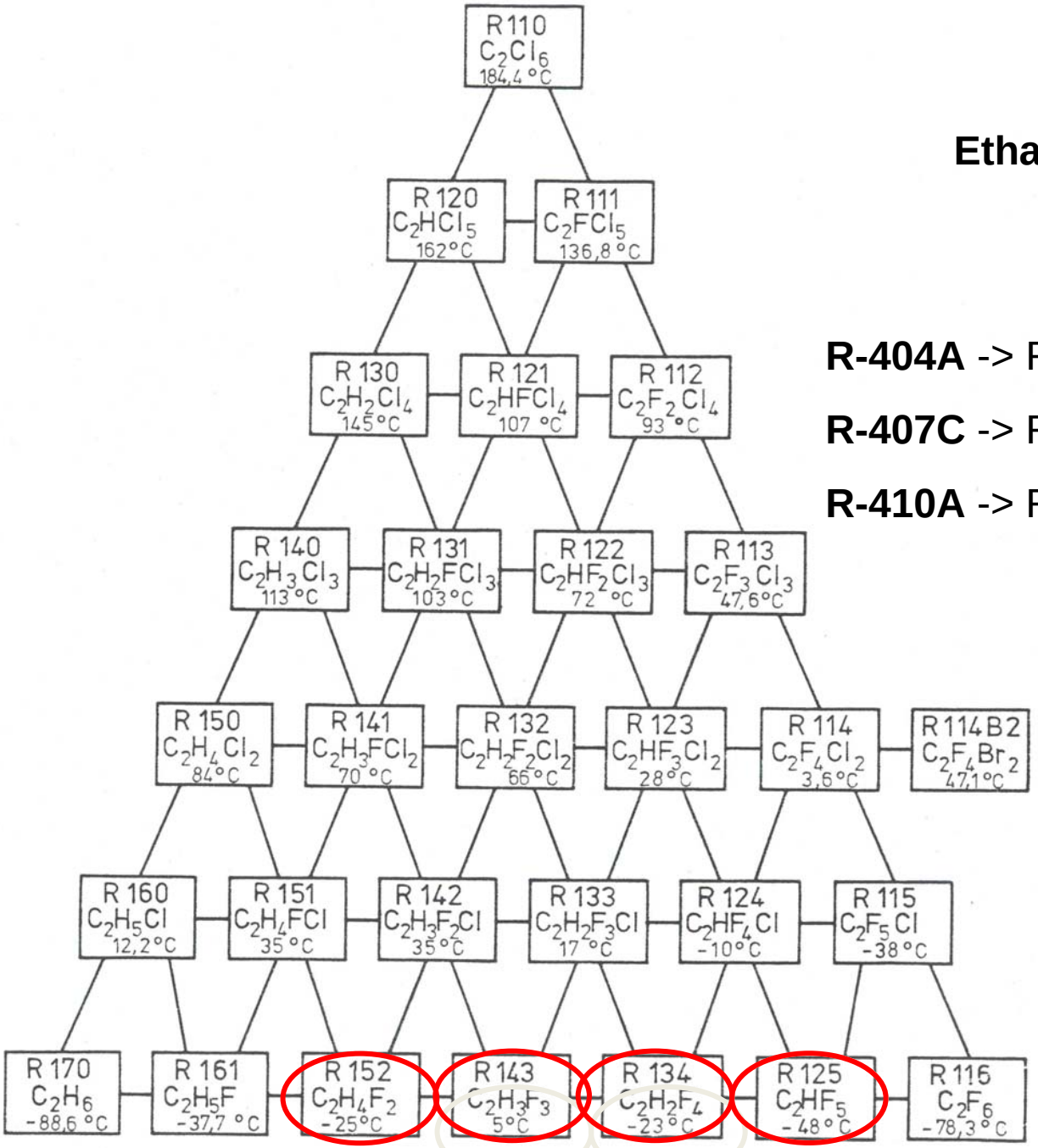
6TH EHPA EUROPEAN HEAT PUMP FORUM
15 MAY 2013

ehpa european heat pump association

R-410A -> R-32
R-407C -> R-32

Methane CH_4





Ethane C_2H_6

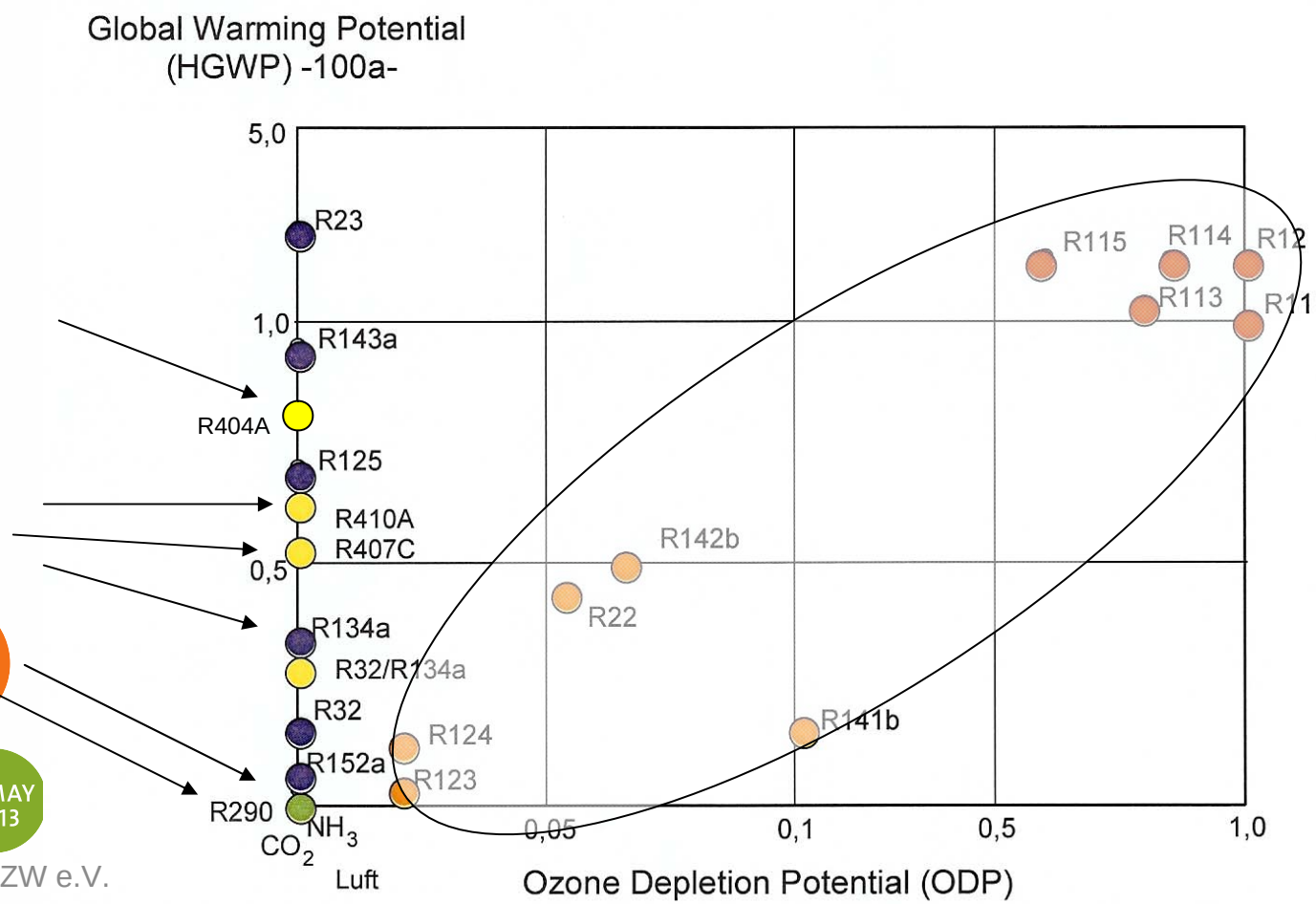
R-404A -> R-143a R-125 R-134a

R-407C -> R-125 R-134a

R-410A -> R-125

Ozone Depletion Potential (ODP) und

Global Warming Potential (GWP)



6TH EHPA EUROPEAN HEAT PUMP FORUM

15 MAY 2013

Conclusion

Very few substances are left for an use as refrigerant

There is no refrigerant which can successfully cope all applications

Not only GWP but other impacts on safety, environment, economy, energy efficiency should be considered when choosing refrigerants

Evaluate not GWP as single figure, but the total GHG emissions -TEWI -

Follow the Refrigerant Strategy:
Careful selection for every single application, minimize refrigerant charge, use hermetic sealed systems, establish standards for installation, maintenance, recovery guideline for leak prevention, reduce energy consumption, …

Do not ban refrigerants! Follow the phase down to certain levels!

Do not waste time on the search and change to other refrigerants
Concentrate on the improvement of the current heat pumps application and replace fossil fuel boilers -> there you can reduce emissions

Heat pump mission is

low or no emission

Thank you for your kind attention

6TH EHPA EUROPEAN HEAT PUMP FORUM

15 MAY 2013

ehpa european heat pump association

The Information Centre on Heat Pumps and Refrigeration IZW e.V.

is a society, which stands for neutral information in Heat Pump- and Refrigeration Technology. IZW contributes to the shaping of political opinion due to objective information and reports. Statements on current topics are given in technical-scientific symposium and publications. The IZW represents with his National Team Germany in the Heat Pumping Programme of the IEA.

Informationszentrum Wärmepumpen und Kältetechnik

D-64747 Breuberg

phone: +49 6163 5717 **Fax: +49 6163 3071**

E-Mail: Email@izw-online.de **Internet: www.izw-online.de**

Hannover Duisburg Breuberg Karlsruhe

6TH EHPA EUROPEAN HEAT PUMP FORUM

15 MAY 2013

ehpa european heat pump association

B)

Vorschlag für die F-Gas Verordnung, Rückblick, derzeitiger Stand und Ausblick zur Umsetzung

Andrea Voigt, EPEE

DKV-IZW Veranstaltung zu F-Gasen
10.01.2013 Darmstadt

DKV / IZW Darmstadt, Januar 2013

Andrea Voigt

EPEE, The European Partnership for Energy and the Environment

www.epeeglobal.org

Overview

1. Who is EPEE ?
2. Who is the EU ?
3. The decision making process in the EU
4. The F-Gas Regulation: What happened so far ?
5. The new F-Gas Proposal: What will happen next ?
6. What are we doing ?
7. What can you do ?

1. Who is EPEE ?

EPEE: The full value chain of the Refrigeration, Air Conditioning and Heat Pump Sector

A major part of the European RAC & HP industry

- **> 200,000 direct employees in Europe**
- **> € 30 billion turnover in Europe**

EPEE
European Partnership for Energy and the Environment

EPEE's main fields of activities

- **Promote Energy Efficiency**
  - **Ecodesign Directive**
  - **Energy Efficiency Directive**
  - **Eco Label and Energy Label**
  - Energy Performance of Buildings Directive
  - Renewable Energies Directive …
- **The F-Gas Regulation and its revision**
  - Maintain and strengthen the F-Gas Regulation
  - Support a technically and economically feasible phase-down
- **Raise awareness on Market Surveillance**
  - Importance of properly enforcing and policing legislation
- **Promote an HVACR association network at EU level**

2. Who is the EU ?

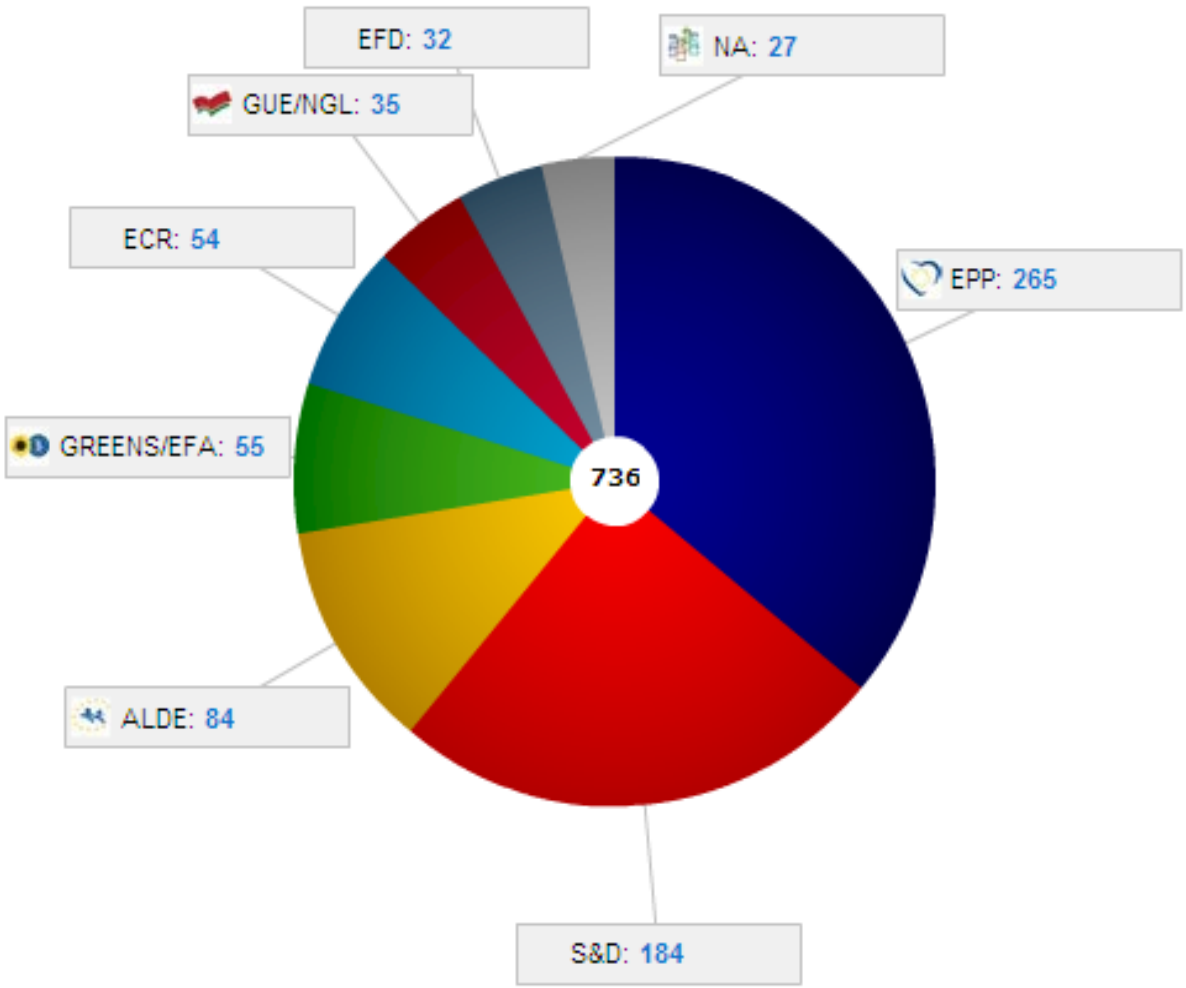
Who is the EU?
The three Institutions

The Commission: Starts policy formulation
•Sole right of Legislative Initiative
•Enforces Community law
•Administers & implements policies & legislation
•Voice of the EU & negotiates international agreements

The Parliament: Co-legislates with the Council
•>700 elected national politicians from 27 Member States
•Elected every five years – next elections in 2014
•Largest political group: conservatives
•Largest delegations: GER, FR; UK; IT; SP; PL
•MEPs work in Brussels, Strasbourg and home const.

The Council: Co-legislates with the Parliament
•Represents the Member States via Ministers and Permanent Representatives
•Amends and adopts proposals
•UK, FR, G (IT, SP, POL) = Key larger countries

The current balance of powers in the EP



EPP: Conservatives & Christians

S&D: Socialists

ALDE: Liberals

Greens: Greens!

ECR: UK conservatives

GUE: Far left

EFD: Eurosceptics + nationalists

The Council of the EU and the Troika

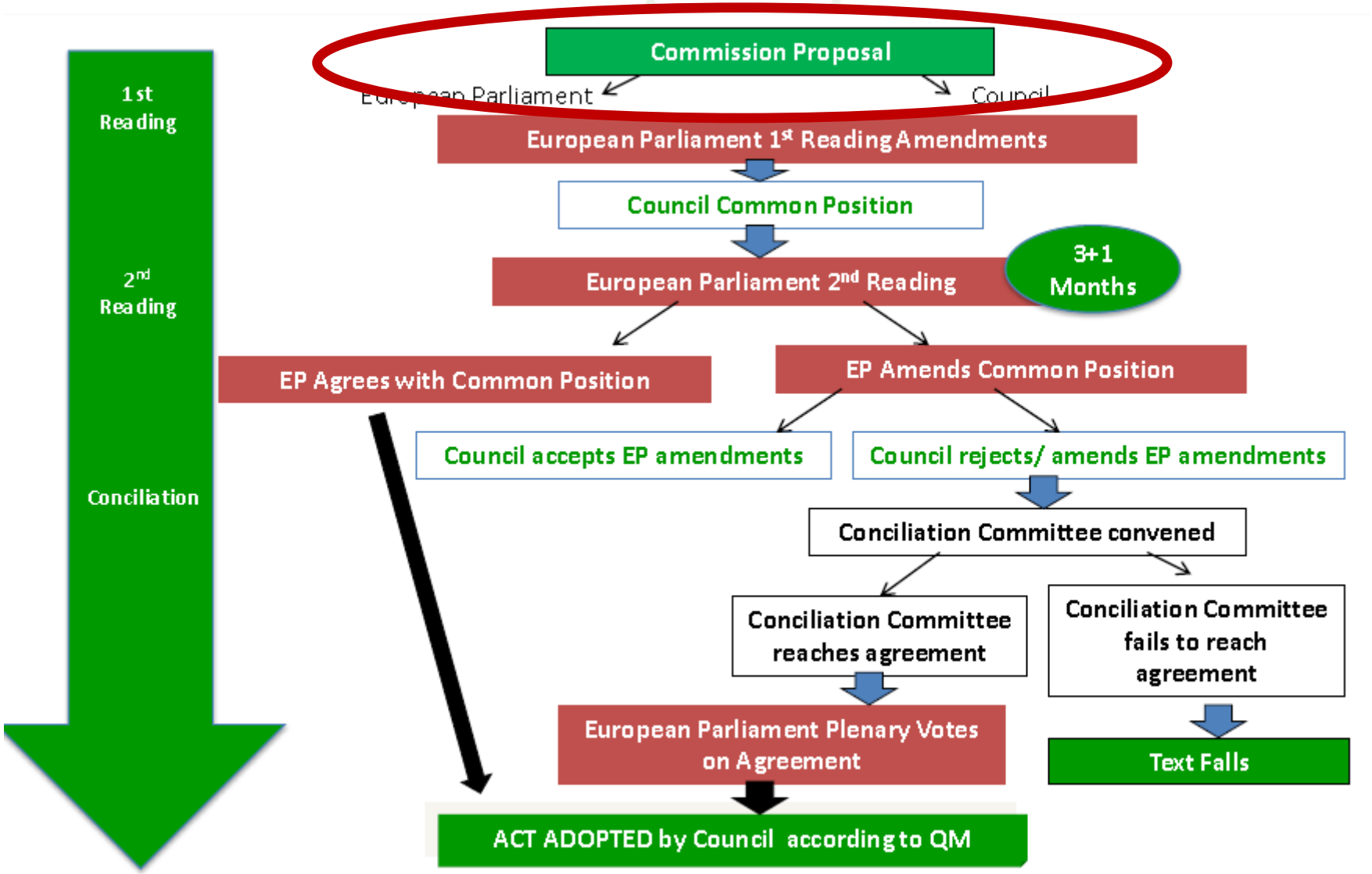
1st 18 months	2nd 18 months	3rd 18 months	4th 18 months
Q1/2 2010: SPAIN	Q3/4 2011: POLAND	Q1/2 2013: IRELAND	Q3/4 2014: ITALY
Q3/4 2010: BELGIUM	Q1/2 2012: DENMARK	Q3/4 2013: LITHUANIA	Q1/2 2015: LATVIA
Q1/2 2011: HUNGARY	Q3/4 2012: CYPRUS	Q1/2 2014: GREECE	Q3/4 2015: LUXEMBOURG

RESPONSIBILITIES

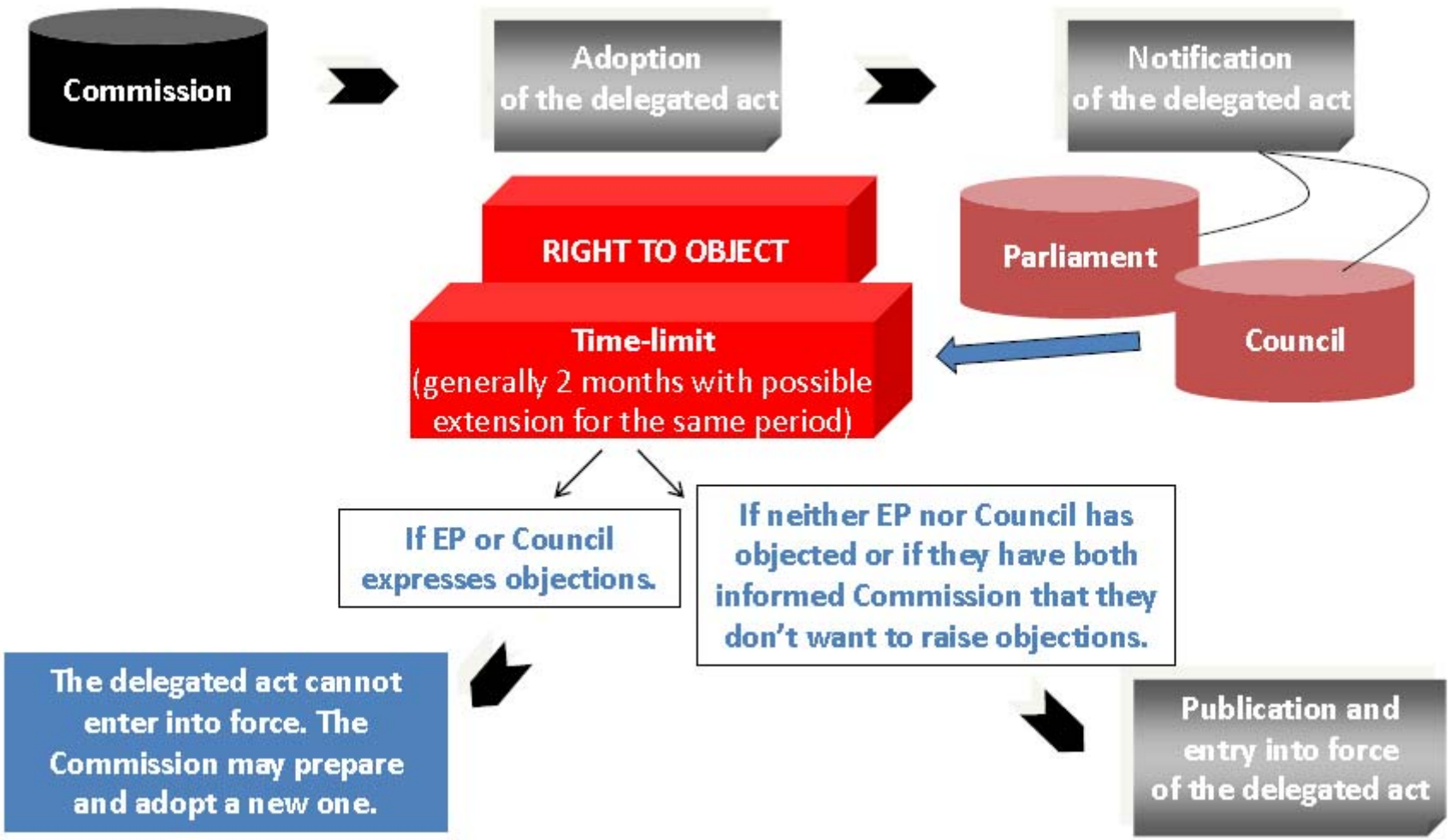
- Sets the specific agenda within Council configurations (except Foreign Affairs) for six month term
- Troika sets common goals for 18 month period
- The Presidency can take issues on or off the agenda
- Organize working groups or events
- Facilitate or hinder compromises

3. The EU Decision-Making Process

Ordinary Legislative Procedure (previously: Co-Decision Procedure)



Delegated Acts



4. The F-Gas Regulation

Embedded in the wider EU picture

DG Energy
Commissioner Oettinger

The Energy Efficiency Action Plan

DG Climate Action
Commissioner Hedegaard

The Roadmap to a low carbon economy in 2050

DG Environment
Commissioner Potocnik

The Roadmap for a ressource efficient Europe

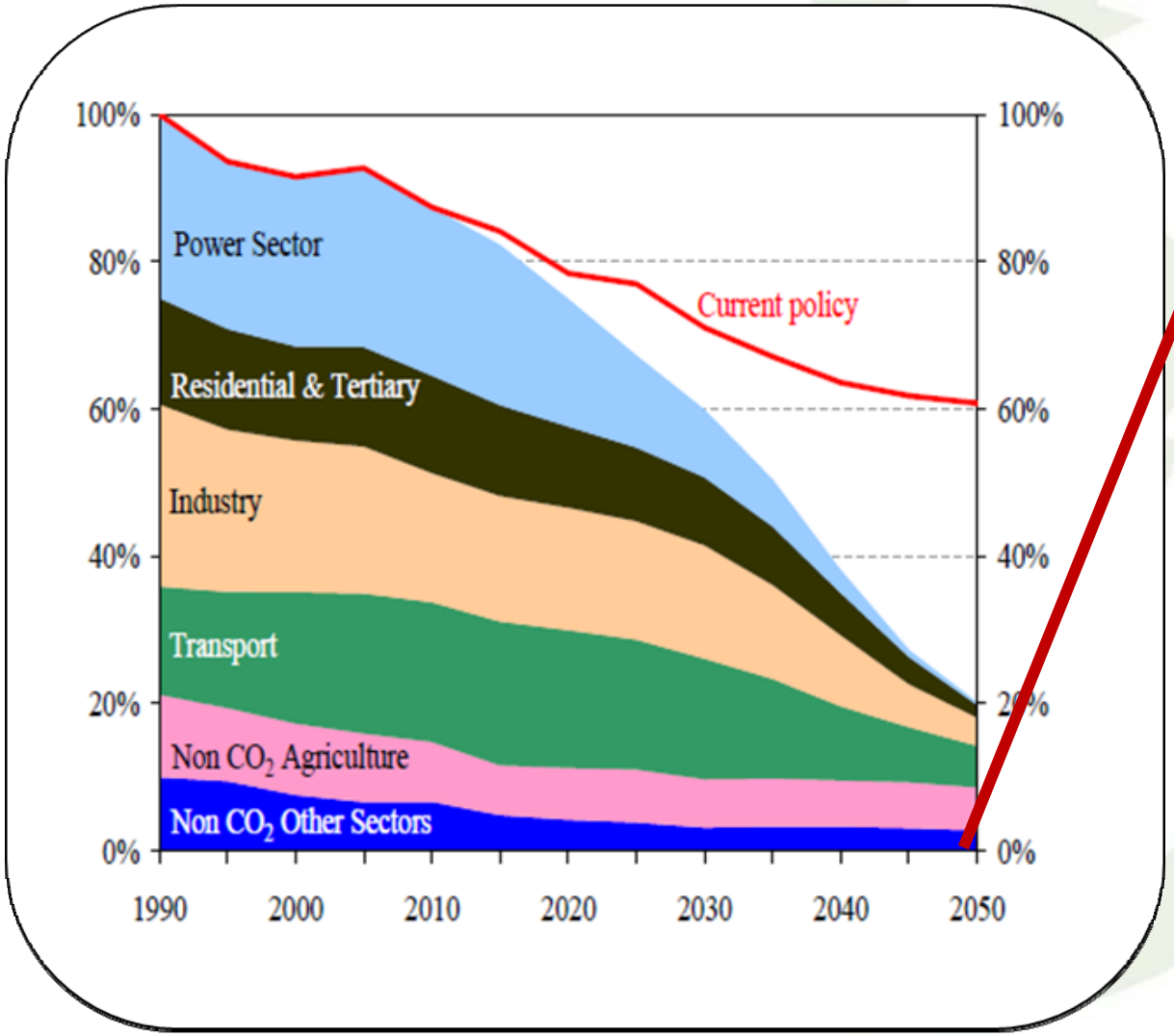
ENERGY EFFICIENCY

- Ecodesign
- EPBD
- EED ...

- F-Gas Regulation
- Renewable Energies Directive..

- WEEE
- RoHS...

F-gas requirements within the EU Low Carbon Roadmap



Gases:

N_2O

Methane

All F-Gases

Target:

2030: -72%

2050: -78%

Why revising the F-Gas Regulation ? The process so far

Art. 10 of the F-Gas Regulation 842 / 2006:

- **By 4 July 2011**, the Commission shall publish a report based on the experience of the application of this Regulation.
- **Where necessary**, the Commission shall present **appropriate proposals** for revision of the relevant provisions of this Regulation.

- Öko-Recherche Report
- Stakeholders

EU Commission report on the need for further action

Yes: Revision

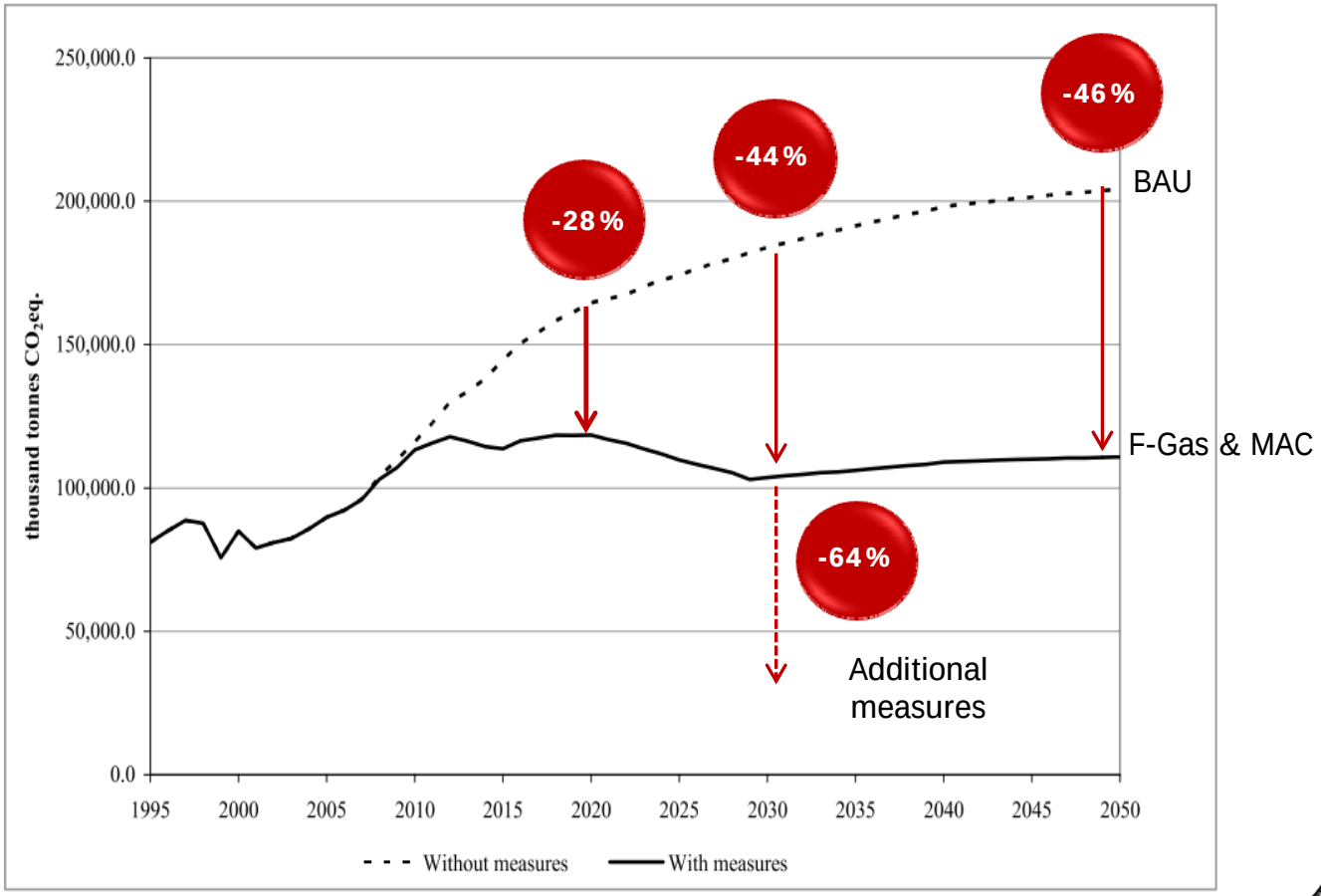
No: Revision

- Öko-Institut Report
- Stakeholders

EU Commission Impact Assessment

EU Commission legislative proposal

The existing F-Gas legislation stabilises emissions



Source: EU Commission report: http://ec.europa.eu/clima/policies/f-gas/docs/report_en.pdf

So what ?

TO ACHIEVE THE LOW CARBON ROADMAP MORE ACTION IS NEEDED

5. The new proposal and next steps

The Current Commission proposal

Phase-down

- Baseline: 2008 to 2011
- 2015: 100%
- 2016 – 2017: - 7%
- 2018 – 2020: -37%
- 2021 – 2023: -55%
- 2024 – 2026: -69%
- 2027 – 2029: -76%
- 2030: -79%

Use Restrictions

- 2015 (GWP > 150): Domestic refrigerators and freezers
- 2017 (GWP > 2500): Hermetically sealed refrigerators and freezers for commercial use
- 2020 (GWP > 150): Hermetically sealed refrigerators and freezers for commmercial use
- 2020 (GWP > 150): Hermetically sealed movable room air-conditioners
- 2020 (GWP > 2500): Servicing/maintenance for f-gases in refrigeration equipment >5to CO2eq

Other provisions

- Extension to transport refrigeration
- Training and certification requirements to be renewed every 5 years
- Ban on pre-charging equipment before its first installation

The Institutional Timeline & Key Decision Makers

2013-2014
Irish Presidency

Council WP meetings
11/01; 22/01; 01/02; 14/02

7 to 9 Council meetings have been scheduled under the Irish Presidency in order to formulate a common position

Council General Approach
June

Kick off ENVI discussions
End Jan

DEADLINE AM ENVI
Feb/March

ENVI Vote
April/June

ENVI report to plenary
April/June

Plenary vote 1st reading

First reading Trialogues Q4 2012

Political first reading agreement Q4/Q1 2014

Kick off TRAN
End Jan

Deadline AM
Feb/March

TRAN Vote
April/May

Council Presidencies

- Jan – June 2013: Ireland
- July- Dec 2013: Lithuania
- Jan – June 2014: Greece
- July- Dec 2014: Italy

ENVI – Lead Committee

Rapporteur: Bas Eickhout (Greens, NL) + Shadow rapporteurs for each political party in the EP

TRAN – Opinion Committee

Rapporteur: Gilles Pargneaux (S&D, FR) + Shadow rapporteurs for each political party

6. What are we doing ?

Our main concerns

1. **The phase-down:**
   Too steep, too quick, too soon
2. **The service & maintenance ban:**
   Impossible to implement and to control
3. **The ban of pre-charging of equipment:**
   Counter-productive and burdensome for Member States
4. **The environmental legal base:**
   Distorts the market
5. **The delegated acts:**
   May touch upon „essential“ elements

The need for reliable data

EPEE funded two studies:

- French ERIE / ARMINES and British SKM Enviros research institutes

Result:

- Emissions can be reduced by 74 million tonnes $CO_{2\text{-eq}}$ versus 2010

How:

- A Phase-Down of -30% in 2020 and of -65% in 2030

EPEE Focus on EU level

EU Commission

DG Climate initiates proposal

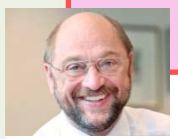
Other DGs need to approve

Adopted proposal

EU Parliament

ENVI Committee approval

Full Parliament approval



Council of EU

Preparatory bodies

COREPER

Ministers of EU member states

DG = Directorate General
ENVI = Environment
COREPER = Committee of permanent representatives

So what ?

CLOSE COOPERATION WITH ASSOCIATIONS ON EU & NATIONAL LEVEL IS KEY

7. What can you do ?

Engaging with national decision makers

1. Input into the national position

- **The Ministry of Environment (BMU) - leader**
  - ➲ Will cooperate closely with the environmental attaché in Brussels (COREPER)

- **„Advisors“ (UBA) and their advisors (Öko-Recherche)**
  - ➲ To define their position, ministries ask for input from third parties, i.e. agencies and consultants.

- **The Ministry of Economy (BMWI)**
  - ➲ To formulate their national position, Member States have to consult with their ministries. For the F-Gas Regulation, the Ministry of Economy plays an important role

- **The political level … „Everything is possible“**

Engaging with national decision makers

2. Input into the European Parliament‘s position

- Members of the EP are elected in their country
  - ➲ They have an interest to be popular !

- The potential link between MEPs and Industry
  - ➲ Companies provide jobs, especially when they have production sites

Have a closer look at the European MEPs from your country, their political and their regional / local background: Talk to them!

Speak with ONE VOICE !

Coordinate your message

Coordinate with us

- We can provide you with data (studies)
- Position papers on various topics
- General leaflets and information material
- Arrange joint meetings, help with contacts

Thank you very much for your attention !

Contact details:

EPEE
46 Avenue des Arts
1000 Brussels, Belgium

email: a.voigt@epeeglobal.org
Web: www.epeeglobal.org

EPEE
European Partnership for Energy and the Environment

C)

F-GAS PHASE DOWN
EXTRACTS FROM PRESENTATION
AT CHILLVENTA ROSSIJA 2013

Chillventa Rossija 2013

To meet the Challenges in the Refrigeration, AirConditioning and Heat Pump Industry in Europe

Dr.- Ing. Rainer M. Jakobs

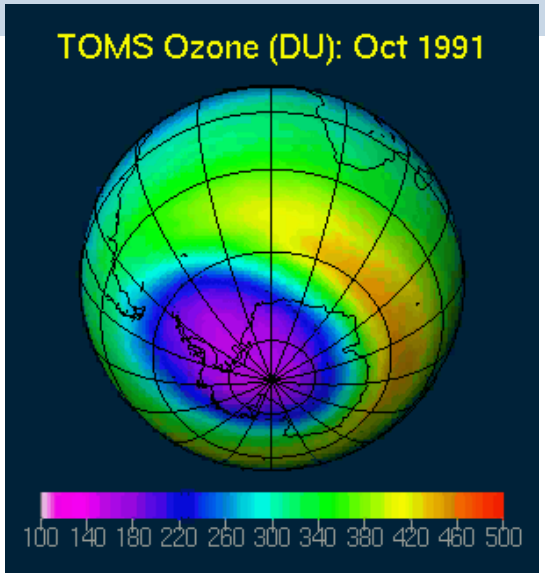
DMJ Consulting Breuberg, Germany,

Information Centre on Heat pumps and Refrigeration IZW e.V.
Board Member of the German Society
of Refrigeration and AirConditioning DKV e.V.

Agenda

- Energy turnaround →Ready for smart grid
- **Refrigerants → F-gas phase down**
- Ecodesign for Energy related products
- Hybrid systems

A better environment…



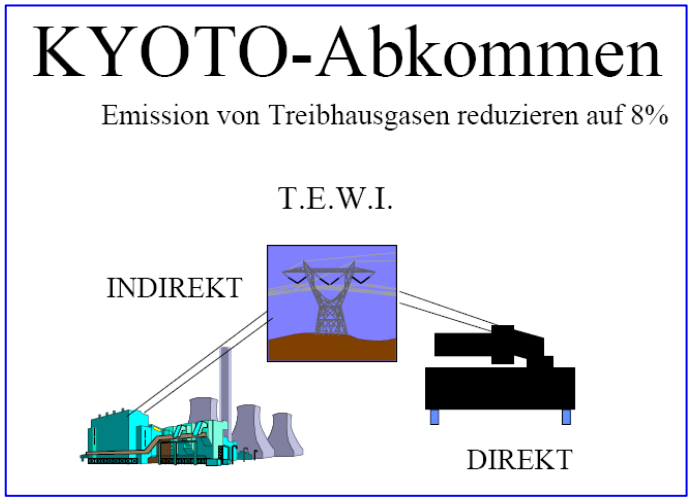
- Schutz der Ozonschicht
  - Montreal-Protokoll 1987

    phase out ozone depleting substances

- Reduzierung der Treibhausgas-Emissionen
  - Kyoto-Protokoll 1997

    control of greenhouse gas emissions

Regulation EU 842/2006
F-Gases



The F-Gas Regulation embedded in the wider EU picture

Source: EPEE

DG Energy
Commissioner Oettinger

The Energy Efficiency Action Plan

DG Climate Action
Commissioner Hedegaard

The Roadmap to a low carbon economy in 2050

DG Environment
Commissioner Potocnik

The Roadmap for a ressource efficient Europe

ENERGY EFFICIENCY

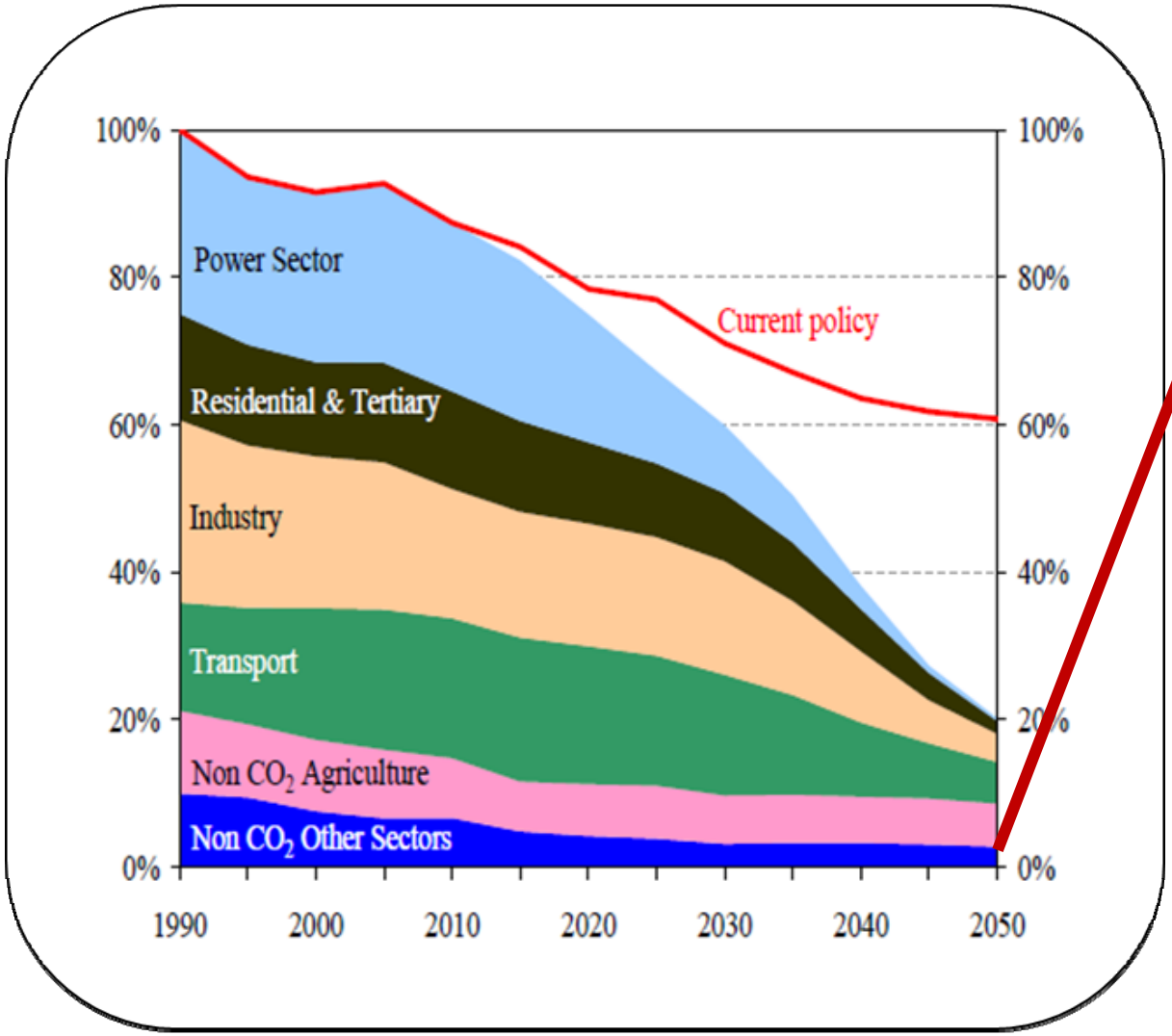
- Ecodesign
- EPBD
- EED ...

- F-Gas Regulation
- Renewable Energies Directive..

- WEEE
- RoHS...

F-gas requirements within the EU Low Carbon Roadmap

Source: EPEE



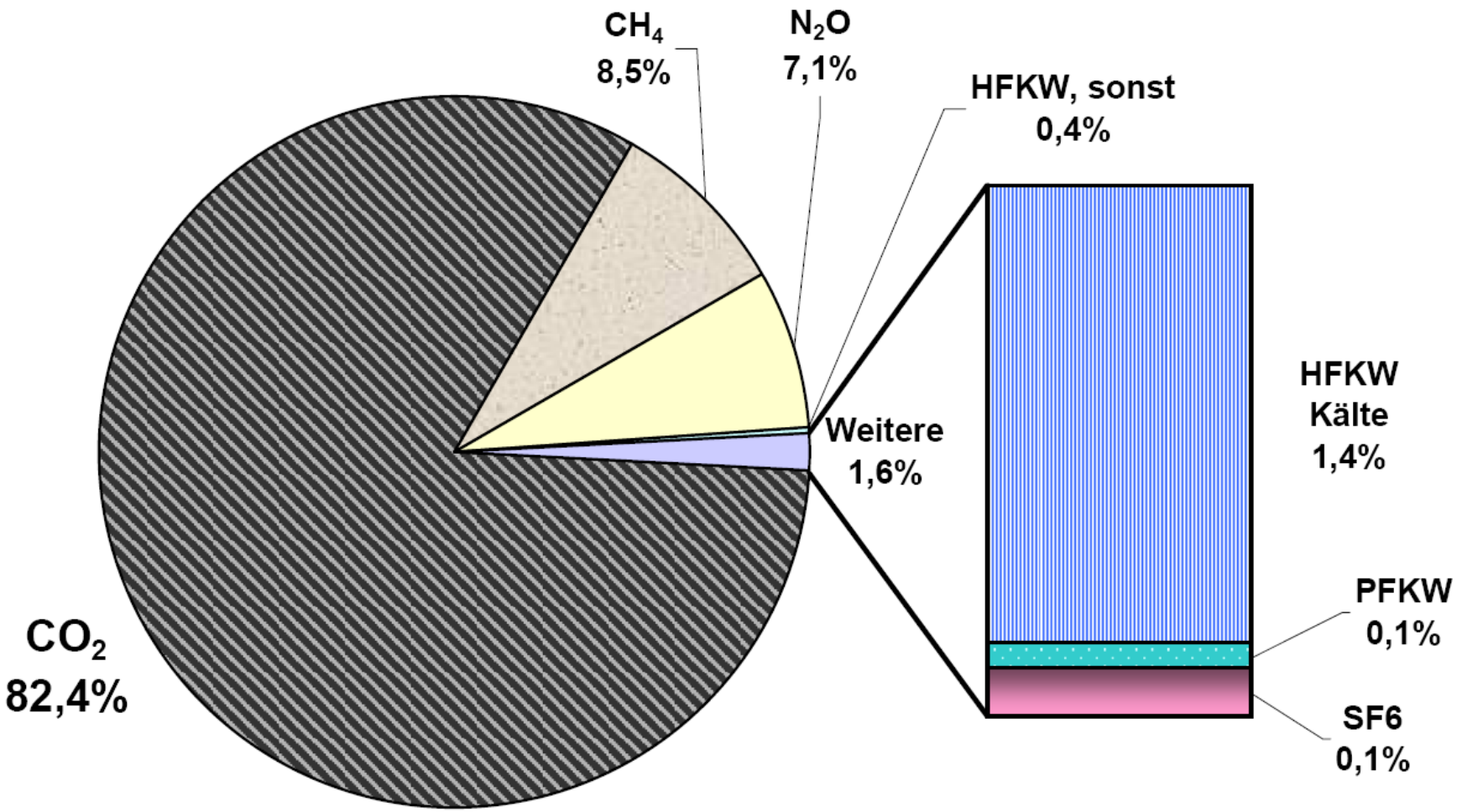
Gases:
N_2O
Methane
All F-Gases

Target:
2030: -72%
2050: -78%

62

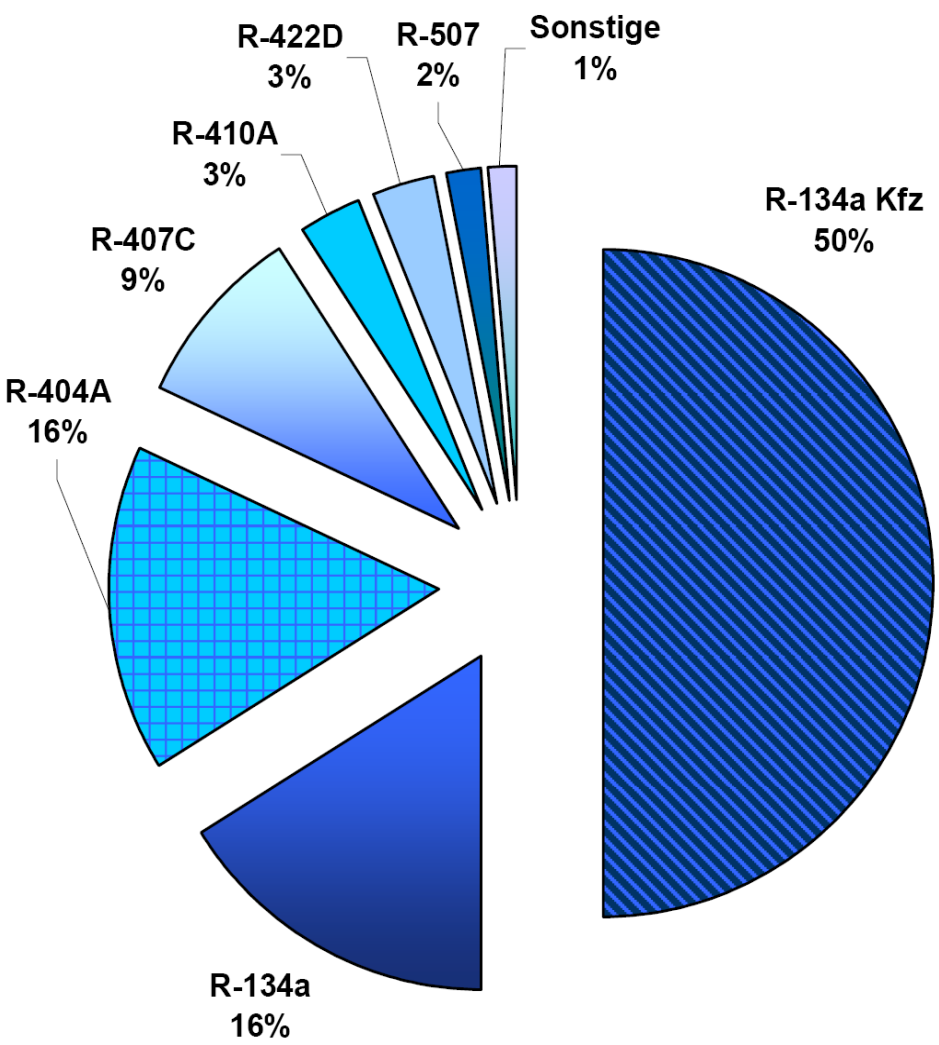
Emissions EU 27 2010 CO_2 equiv.

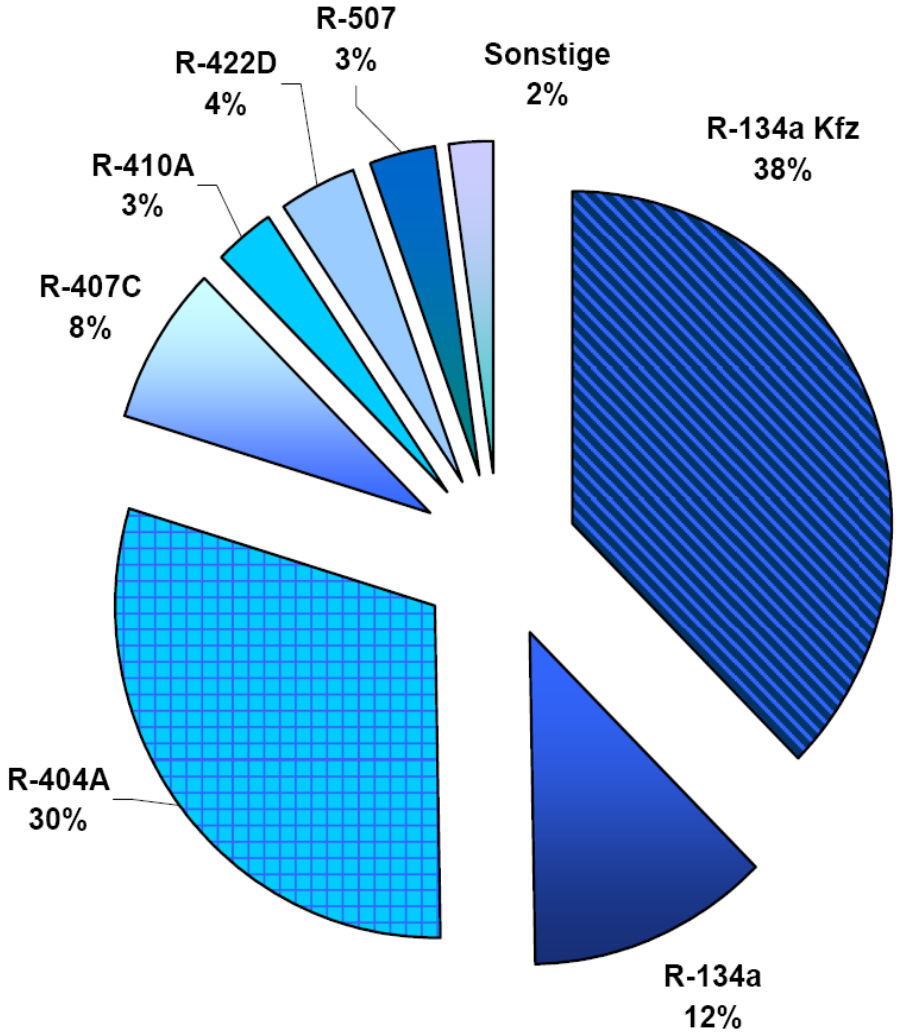
Source: http://unfccc.int/ghg_data/items/3800.php



e.g. F-gases in Germany 2010

metric t CO_2 equiv.





Refrigerants which are widely used

R-32 A2L

R-134a

R-290 A3

R-404A R-407C R-410A

R-507

R-600a A3

R-717 B2

R-744

HFO 1234yf A2L

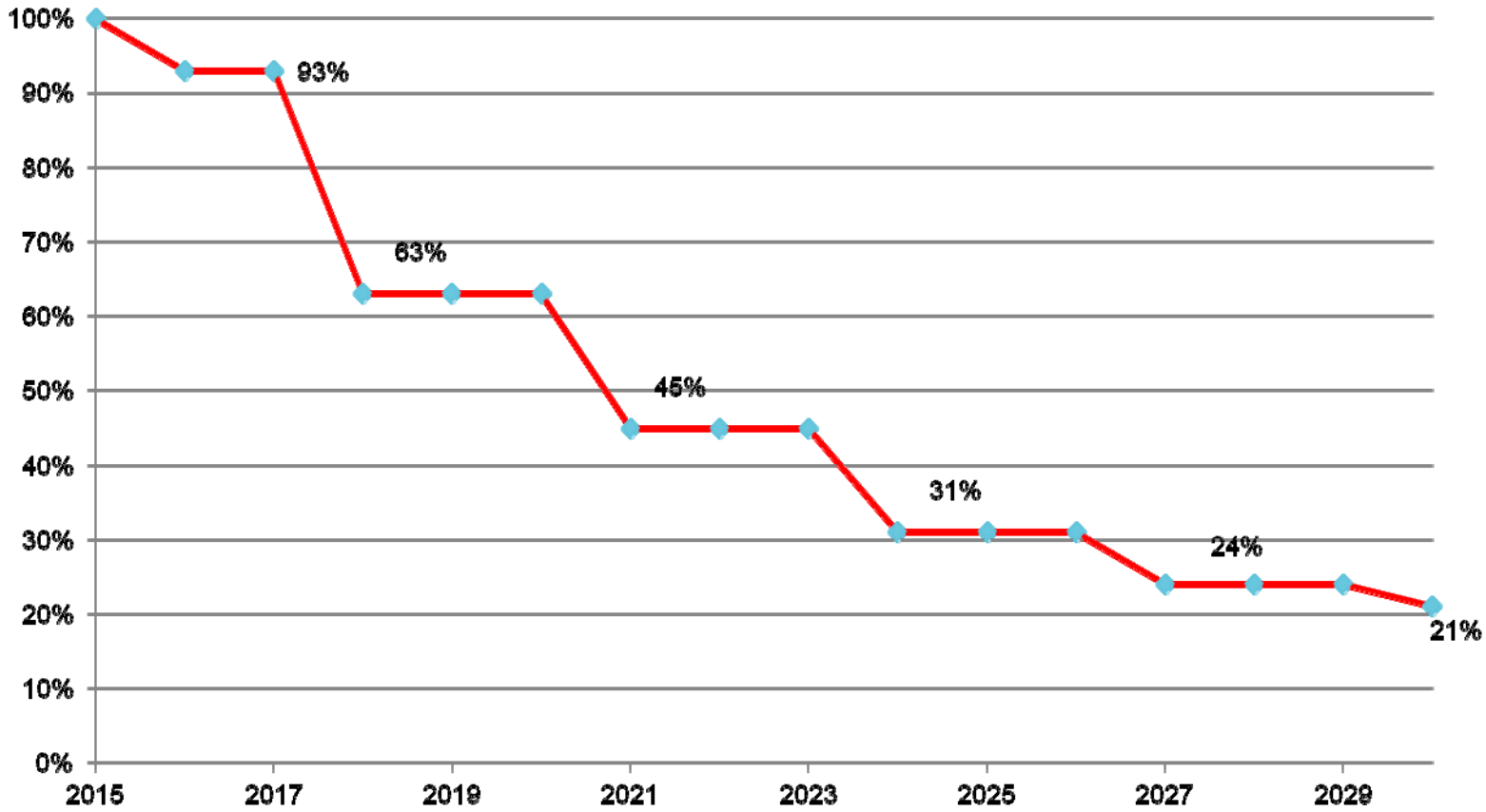
HFO 1234ze A2L

R-1270 A3

R...

Red under the proposal of the F-gas regulation

Refrigerants → F-gas phase down in $CO_{2\ equiv}$ for the EU (proposal)

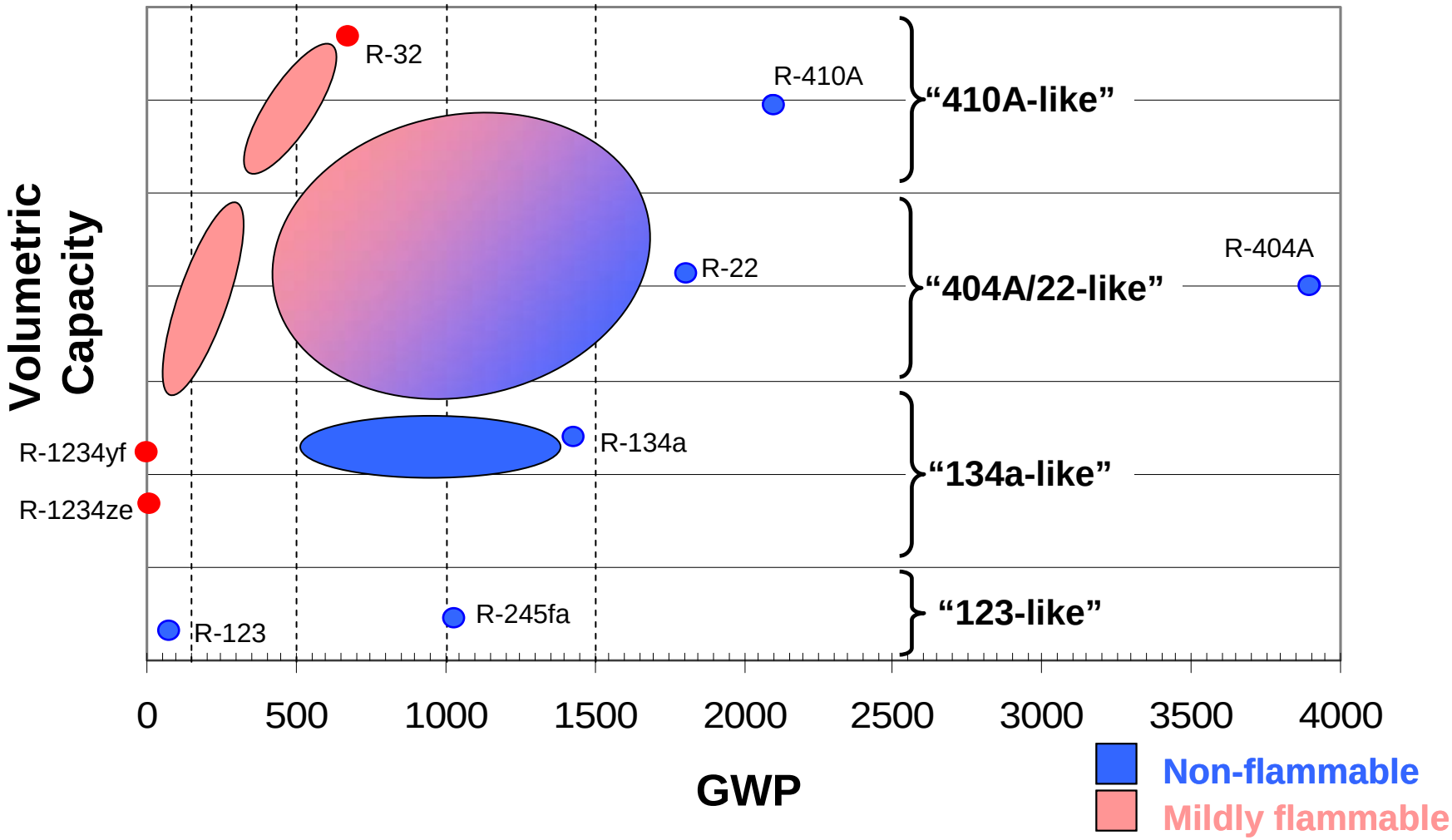


D)

Extracts from Chillventa 2012
→ Refrigerants

Low-GWP Refrigerant Mapping

Quelle:
Forum
Chillventa



Fluorochemical Refrigerants

Quelle: Forum Chillventa 2012

Good performance with superior safety performance

	1930's	1950's	1990's →	2011 →
	CFCs	HCFCs	HFCs	HFOs
	CFC-12	**HCFC-22**	**HFC-134a**	**HFO-1234yf**
	CCl_2F_2	**$CHClF_2$**	**CF_3CH_2F**	**$CF_3CF{=}CH_2$**
Chlorine	**High**	**Less**	**Zero**	**Zero**
ODP	**High**	**Lower**	**Zero**	**Zero**
GWP	**High**	**High**	**High**	**Low**
	Montreal Protocol Phase-out		**F-Gas Control?**	**Meet EU MAC Directive**

Quelle: Forum Chillventa 2012

DuPont™ Opteon® Refrigerants

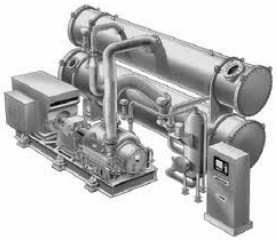
Current Refrigerant	GWP	Leading Lower GWP Candidates - HFO based			
		Non-flammable		Mildly flammable	
		ASHRAE Class 1		ASHRAE Class 2L	
		Name	GWP	Name	GWP
HFC-134a	1430	XP10	~ 600	Opteon® yf	4
HFC-404A	3922	DR-33	~ 1400	DR-7	~ 250
HFC-410A	2088			DR-5	~ 500
HCFC-22	1810			DR-3	~ 150
HCFC-123	77	DR-2	~ 10		

Global Warming Potential; Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report
ASHRAE flammability classifications expected

Honeywell's Solstice™ low GWP refrigerants

Quelle: Forum Chillventa 2012

Solstice™ HFO's			
Current Product	**Non Flammable**	**Mildly Flammable (ASHRAE A2L)**	**Examples of Applications**
HFC-134a GWP=1430		**Solstice yf GWP = 4**	**Auto A/C, Vending, Refrigerators**
		Solstice ze GWP = 6	**Chillers, CO_2 Cascades Refrigerators**
R-123 GWP= 77	**Solstice zd GWP <5**		**Centrifugal Chillers**



Solstice™ HFO's for Low and Medium Pressure Applications

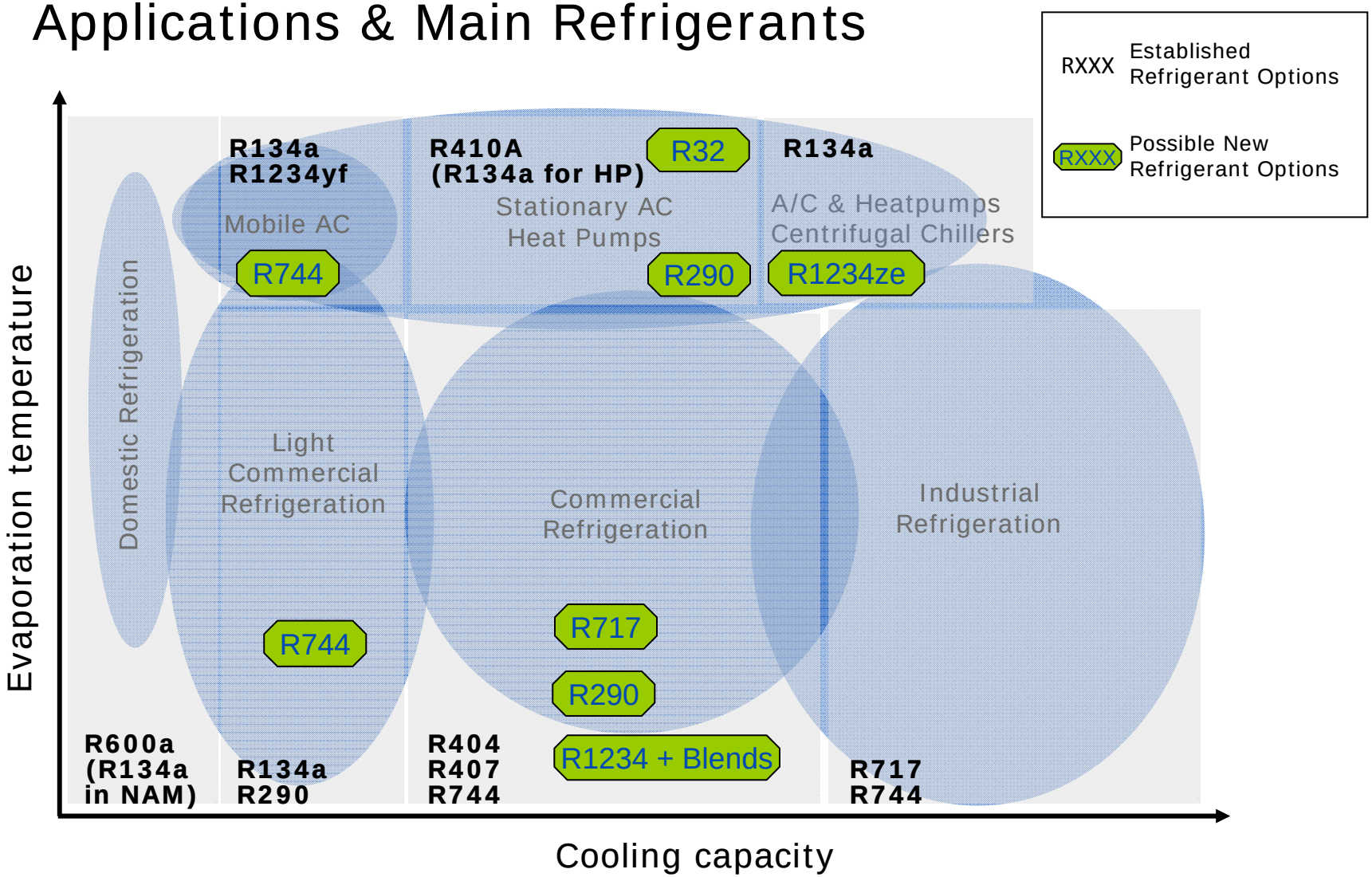
Honeywell's Solstice™ low GWP refrigerant blends

Quelle: Forum Chillventa 2012

Solstice™ HFO Blends			
Current Product	*Solstice™ N Series* Reduced GWP Option Non Flammable (ASHRAE A1)	*Solstice™ L Series* Lowest GWP Option Mildly Flammable (ASHRAE A2L)	Examples of Applications
HFC-134a GWP=1430	N-13 – GWP ~600		Chillers, Med-temp Refrigeration
HCFC-22 GWP=1810	N-20 - GWP ~1000	L-20 - GWP <350	Stationary A/C, Refrigeration
R-404A GWP=3922	N-40 - GWP~1300	L-40 - GWP~200-300	Low-Temp Refrigeration
R-410A GWP=2088		L-41 - GWP <500	Stationary A/C Applications

Solstice™ HFO Blends for Medium & High Pressure Applications

Applications & Main Refrigerants



E)

COMMENTS TO THE PROPOSAL F-GAS REGULATION

Agenda

- Importance of F-Gases
- Proposal
- Links

F-Gase

die kleinste Gruppe der Treibhausgase

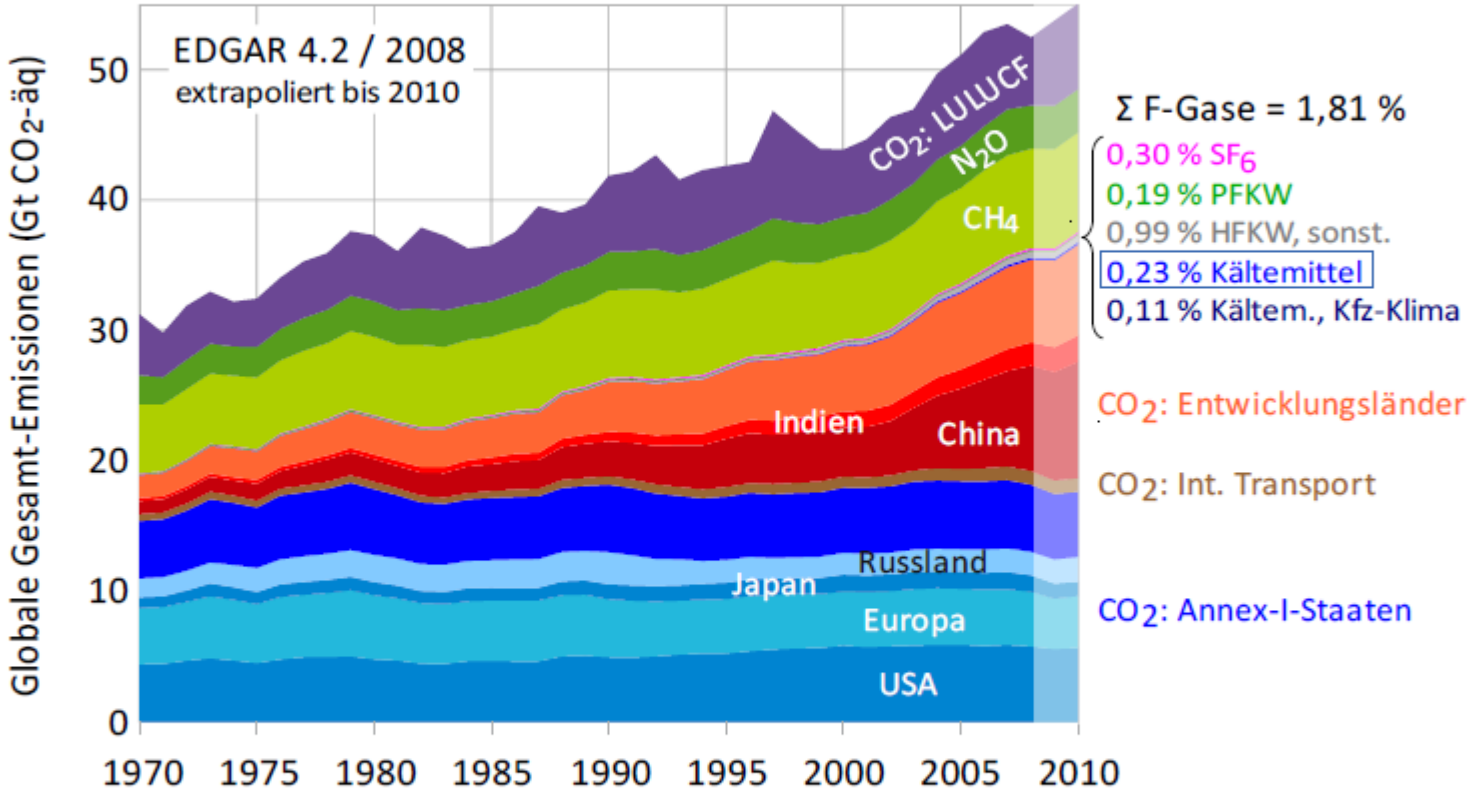
PFKW (voll- oder perfluorierte Kohlenwasserstoffe)	HFKW (teilfluorierte Kohlenwasserstoffe)	SF_6 (Schwefelhexa-fluorid)
• Primäraluminium-produktion	• PU-Hartschäume	• Isoliergas in elektr. Schaltsystemen
• Plasmaätzverfahren	• PU-Integralschäume	• Schallschutzscheiben
• Ausgangsstoff zur PTFE-Herstellung	• PU-Montageschäume	• Autoreifen
• Herstellung von Leiterplatten	• XPS-Dämmstoffe	• Magnesium-Guss
• Halbleiterherstellung	• Feuerlöschmittel	• Spurengas
• Kältemittel (0,1 % der globalen F-Gas-Emiss.)	• Dosieraerosole	• Aluminium-Reinigung
	• allgemeine Aerosole	• Flugzeug-Radar
	• Novelty-Aerosole	• Sportschuhsohlen
	• Lösemittel	• Teilchenbeschleuniger
	• **Kältemittel**	• Starkstrom-Kondensatoren
		• Leiterplattenfertigung
		• Halbleiterfertigung
		• Aluminiumproduktion

Kältemittel: eine von 28 F-Gas-Anwendungen

F-Gase: umfassende Anwendung, Kältemittel sind eine Gruppe

Emissionen: Treibhausgase, global

Quelle: Emission Database for Global Atmospheric Research – European Commission

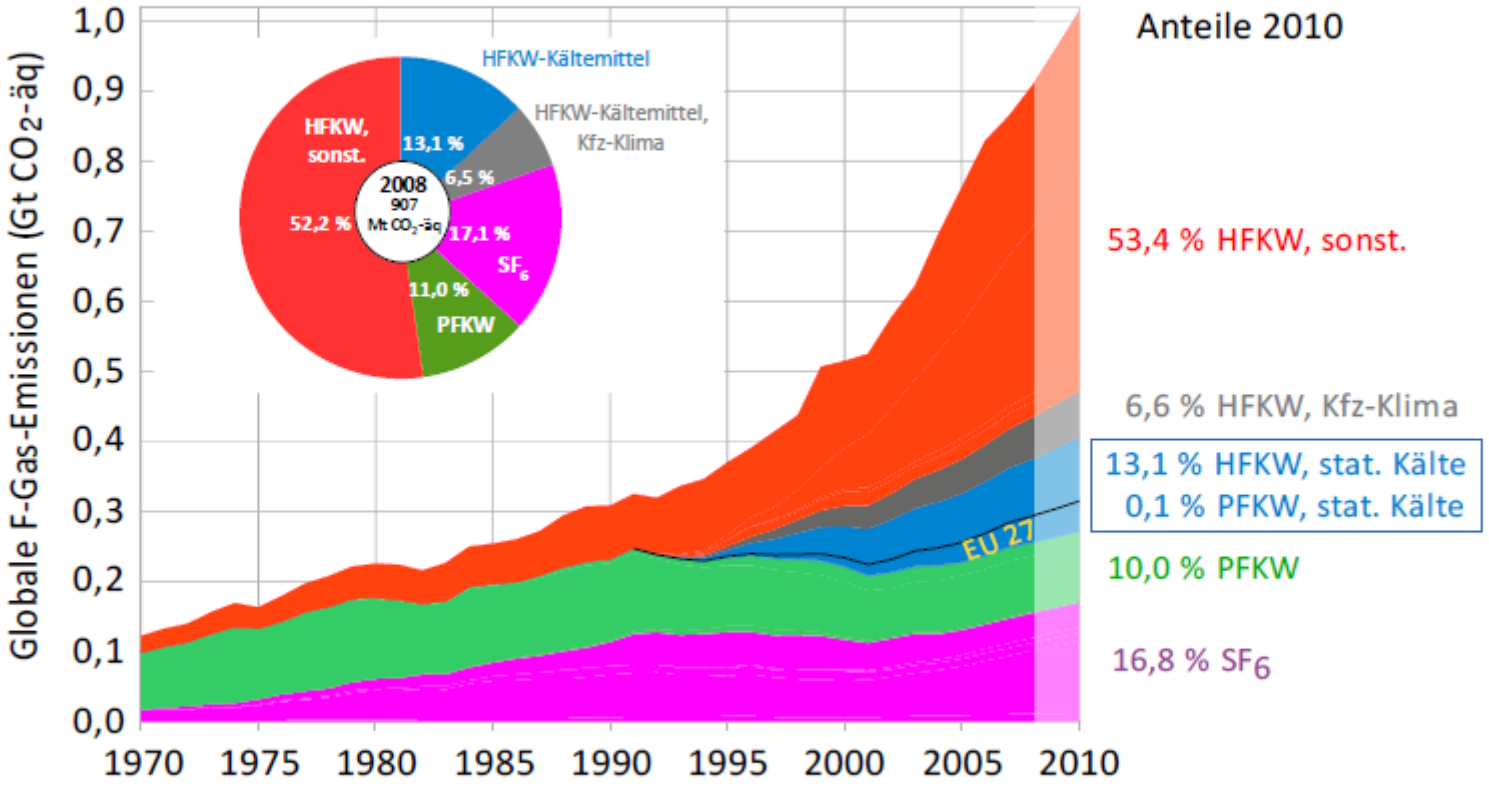


0,23 % der Gesamt-Emissionen stammen aus der stationären Kältetechnik.

Gesamt-Emissionen: durch Kältemittel-Emissionen kaum zu beeinflussen.

Emissionen: F-Gase, global

Quelle: Emission Database for Global Atmospheric Research – European Commission



Anteile 2010

53,4 % HFKW, sonst.

6,6 % HFKW, Kfz-Klima

13,1 % HFKW, stat. Kälte
0,1 % PFKW, stat. Kälte

10,0 % PFKW

16,8 % SF_6

Stationäre Kältetechnik: 13,2 % der F-Gas-Emissionen

Anstieg sonstiger HFKW-Emissionen seit 1990 ≈ 620 %

Korrekte Datenbasis ist notwendig für die richtigen Regelungen

EU Proposal F-Gas Regulation

EUROPEAN
COMMISSION

Brussels, 7.11.2012
COM(2012) 643 final

2012/0305 (COD)

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on fluorinated greenhouse gases

(Text with EEA relevance)

{SWD(2012) 363 final}
{SWD(2012) 364 final}

Legal Base and delegated acts

Checking for leakage

Record keeping

Restrictions on the placing on the market

Labelling and product information

Control of use

Pre-charging of equipment

Reduction of the placing on the market of hydrofluorocarbons

F)

Important links:

files and links

- http://ec.europa.eu/clima/policies/f-gas/legislation/docs/com_2012_643_de.pdf
- http://ec.europa.eu/clima/policies/f-gas/legislation/docs/com_2012_643_en.pdf
- http://europa.eu/rapid/press-release_IP-12-1180_de.htm
- http://ec.europa.eu/clima/policies/f-gas/index_en.htm
- http://www.eea.europa.eu/highlights/potent-greenhouse-gases
- http://www.eea.europa.eu/publications/fluorinated-greenhouse-gases-2011
- http://ec.europa.eu/clima/policies/f-gas/docs/statistical_factsheet_2011_en.pdf

Wichtige Links:

Bericht der Kommission, Brüssel, den 26.9.2011 KOM(2011) 581 endgültig
http://ec.europa.eu/clima/policies/f-gas/docs/report_de.pdf
http://ec.europa.eu/clima/policies/f-gas/docs/report_en.pdf

Vorschlag für eine **VERORDNUNG DES EUROPÄISCHEN PARLAMENTS UND DES RATES über fluorierte Treibhausgase**
http://ec.europa.eu/clima/policies/f-gas/legislation/docs/com_2012_643_de.pdf
http://ec.europa.eu/clima/policies/f-gas/legislation/docs/com_2012_643_en.pdf

PRESSEMITTEILUNG , BRÜSSEL, DEN 7. NOVEMBER 2012 KLIMAPOLITIK: KOMMISSION WILL EMISSIONEN VON FLUORIERTEN TREIBHAUSGASEN ERHEBLICH VERRINGERN
HTTP://EUROPA.EU/RAPID/PRESS-RELEASE_IP-12-1180_DE.HTM
HTTP://EC.EUROPA.EU/CLIMA/POLICIES/F-GAS/INDEX_EN.HTM

EUROPAEN ENVIRONMENT AGENCY

http://www.eea.europa.eu/highlights/potent-greenhouse-gases
http://www.eea.europa.eu/publications/fluorinated-greenhouse-gases-2011

http://ec.europa.eu/clima/policies/f-gas/docs/statistical_factsheet_2011_en.pdf

ZVKKW
http://www.zvkkw.de/30.0.html?&tx_ttnews[pointer]=1&cHash=49c2ae6fca

IPCC
www.ipcc.ch/publications_and_data/ar4/wg3/en/contents.html.

'A roadmap for moving to a competitive low carbon economy in 2050', COM (2011)112.

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52011DC0112:EN:NOT

UN
http://www.uncsd2012.org/thefuturewewant.html

UNEP

http://ozone.unep.org/teap/Reports/TEAP_Reports/teap-may-2009-decisionXX-8-task-force-report.pdf

http://www.unep.org/CCAC/

European Commission

http://ec.europa.eu/europe2020/priorities/sustainable-growth/index_en.htm.

http://ec.europa.eu/enterprise/policies/sme/small-business-act/index_en.htm.

http://ec.europa.eu/enterprise/policies/sustainable-business/ecodesign/index_en.htm.

http://ec.europa.eu/energy/efficiency/index_en.htm.

SKM Enviros, 2012, 'Further Assessment of Policy Options for the Management and Destruction of Banks of ODS and F-Gases in the EU.'

http://ec.europa.eu/clima/policies/ozone/research/docs/ods_f-gas_destruction_report_2012_en.pdf.

Becken et al., 2010. 'Avoiding Fluorinated Greenhouse Gases — Prospects for Phasing Out',

http://www.umweltbundesamt.de/uba-info-medien-e/3977.html

Clodic et al., 2011, '1990 to 2010 Refrigerant Inventories for Europe — Previsions on banks and emissions from 2006 to 2030 for the European Union'

http://www.epeeglobal.org/index.php?id=67&qtype=studies

Position paper AREA: Review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases — pre-charged non-monobloc air-conditioning equipment.'

www.area-eur.be.

Position Papers EPEE:

http://www.epeeglobal.org/index.php?id=67&qtype=position