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Germany‘s Cooling and Air Conditioning Guideline –

results achieved and outlook

September 26th 2017 – Hans-Peter Klein ,
BMUB - Division KI I 5, Climate Policy and Energy Efficiency, Climate Mitigation Technologies

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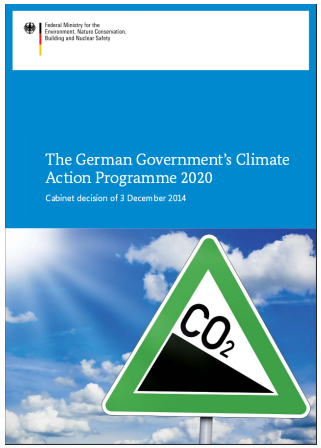
II. CAP 2020 and NCI

Climate Action Programme 2020 (CAP)
set of additional governmental measures from:

- legislation (laws, enactments, i.e. EU-ETS)

To:

- voluntary (non-legislative) measures (incentives; fundings, i.e. by NCI)



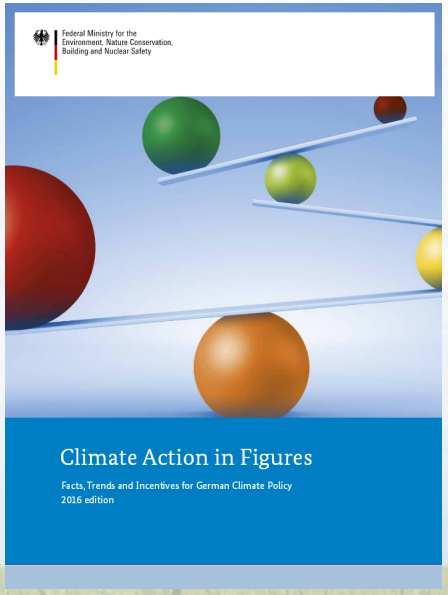
Facts and Trends, see:

www.bmub.bund.de/en/services/publications

https://www.klimaschutz.de/zahlen-und-fakten

National Climate Initiative (NCI)

- various project funding programmes addressing four target groups
  - municipalities and social establishments
  - industry and companies
  - private households (consumers)
  - educational institutions (schools and colleges)



III. Political background

1992 – **UNFCCC** – United Nations Framework Convention on Climate Change
→ limit global warming to 2°C (by the year 2100)

1997 – **Kyoto Protocol** – specific reduction targets for industrialised countries
→ GHG-emissions reducuction by ∅ 8% between 2008-2012 compared to 1990 levels
→ EU burden sharing: specific goals für **Germany: - 21%**

2005 – **EU Emissions Trading System (EU-ETS)** starts

2009 – **EU climate and energy package**
→ 20-20-20 targets for the year 2020
(emissions reduction – renewable energy – energy efficiency)

2010 – **German Energy Concept 2010, framework for „Energiewende“ with several guiding targets**, thereunder GHG-emission reduction
→ of **40% by 2020** compared to 1990 and
→ of 80% to 95% by 2050 compared to 1990

2014 - **German Climate Action Programme 2020**
→ enforces activities to achieve our 2020 targets

IV. Fig. 1: Reduction Goals and Target Paths

GHG-emissions, electricity consumption, primary energy consumption, Germany 2050

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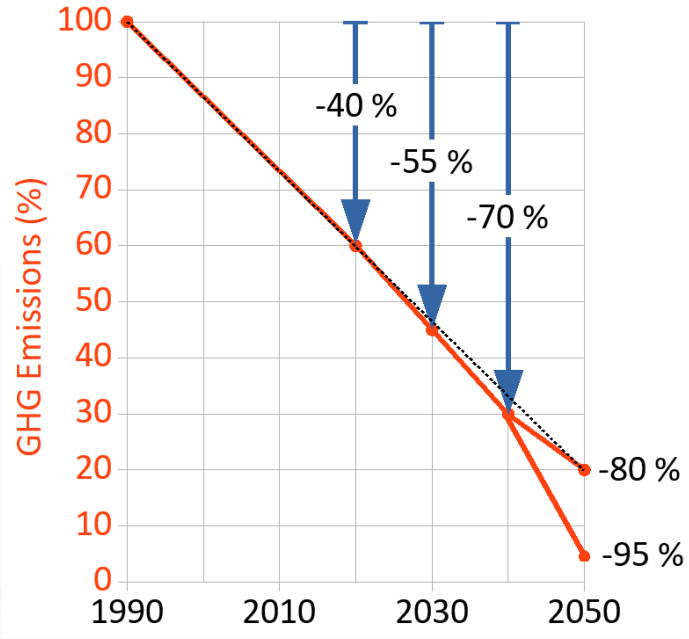

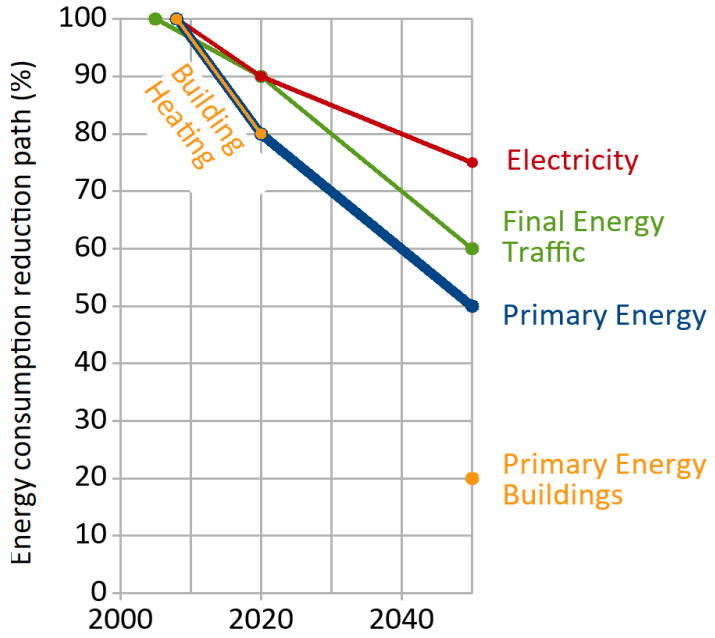

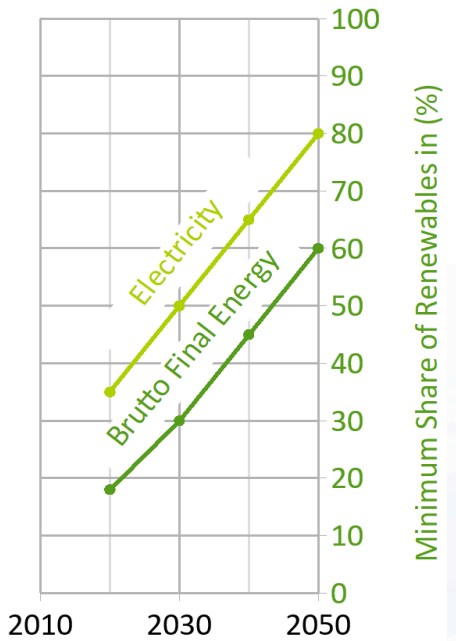

V. NCI- Evaluation Report 2008-2014

Cooling and Air Conditioning Guideline

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Im Auftrag des: Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit

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ifeu Institut für Energie- und Umweltforschung Heidelberg

Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

Hochschule Karlsruhe
Technik und Wirtschaft
University of Applied Sciences

ffu Freie Universität Berlin

prognos

Dr. Hans-Joachim Ziesing

Prof. Dr. Stefan Klinski

Evaluierung der
Nationalen Klimaschutzinitiative

Einzelevaluierungsbericht

Berlin, 20.07.2017

Richtlinie zur Förderung von Maßnahmen an gewerblichen Kälteanlagen („NKI-Kälterichtlinie")

Bericht zum Vorhaben Evaluation, Begleitung und Anpassung bestehender Förderprogramme sowie Weiterentwicklung der Nationalen Klimaschutzinitiative (NKI)

Kennzeichen: 03KSE0002

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The report concludes :

- Evaluation methods
- Achieved results :
  - GHG reductions
  - reductions in electricity consumption
  - subsidies
  - economic effects
  - labor market effects
  - technological development
- Outlook

VI. Fig. 2 : Modern Cooling Systems - Increasing Complexity

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2009

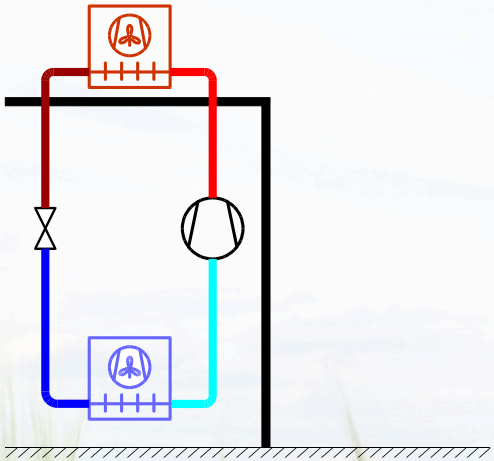
2016 Complex Configuration:

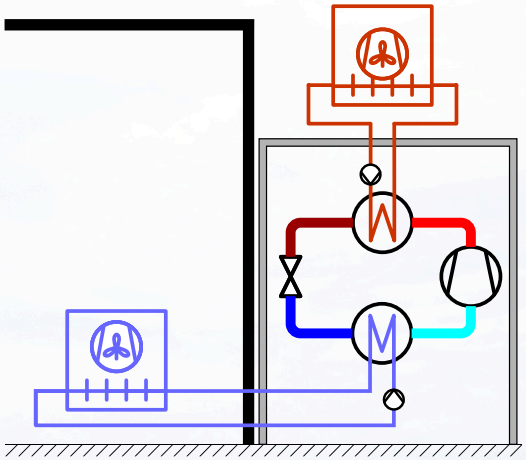
- separate building
- 2nd refrigeration cycle
- heat storage
- cold storage

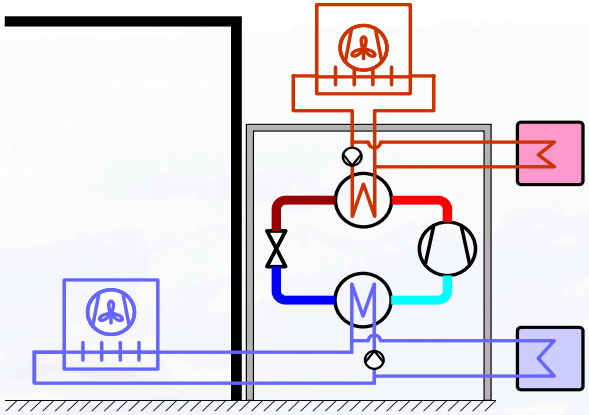
Advanced Configuration:

- separate building
- 2nd refrigeration cycle

Standard Configuration:







VI. Fig. 3: Cumulative governmental Subsidies by type of application, 2009 - 2014

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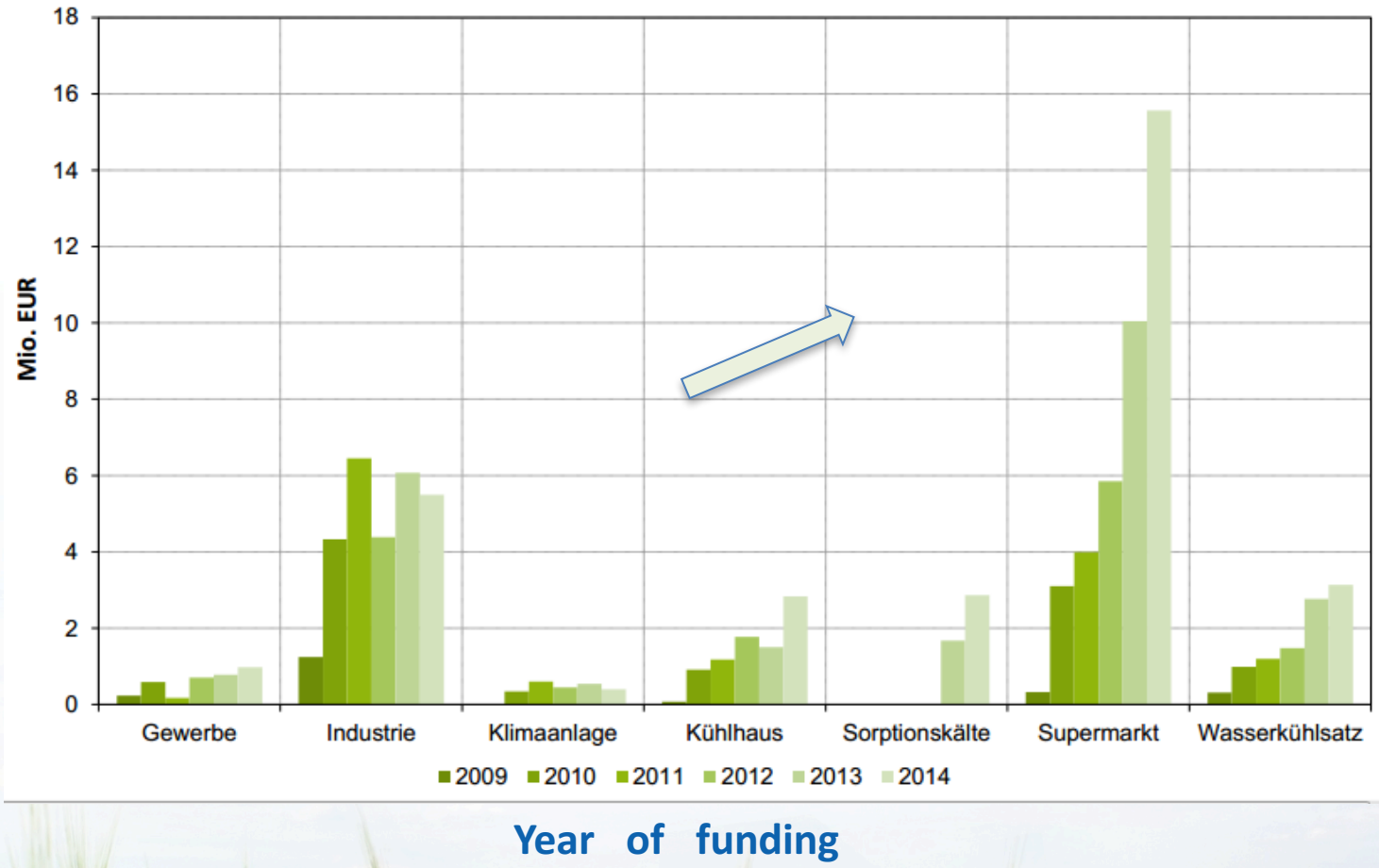

Trade systems

Industrial systems

Air conditioning systems

Cold storage houses

Absorption Chillers

Supermarket appliances

Water coolers

VII. Fig. 4: Kumulative Electricity Consumptions

prior to modernisation, reference cases, subsidized facilities, 2012 - 2014

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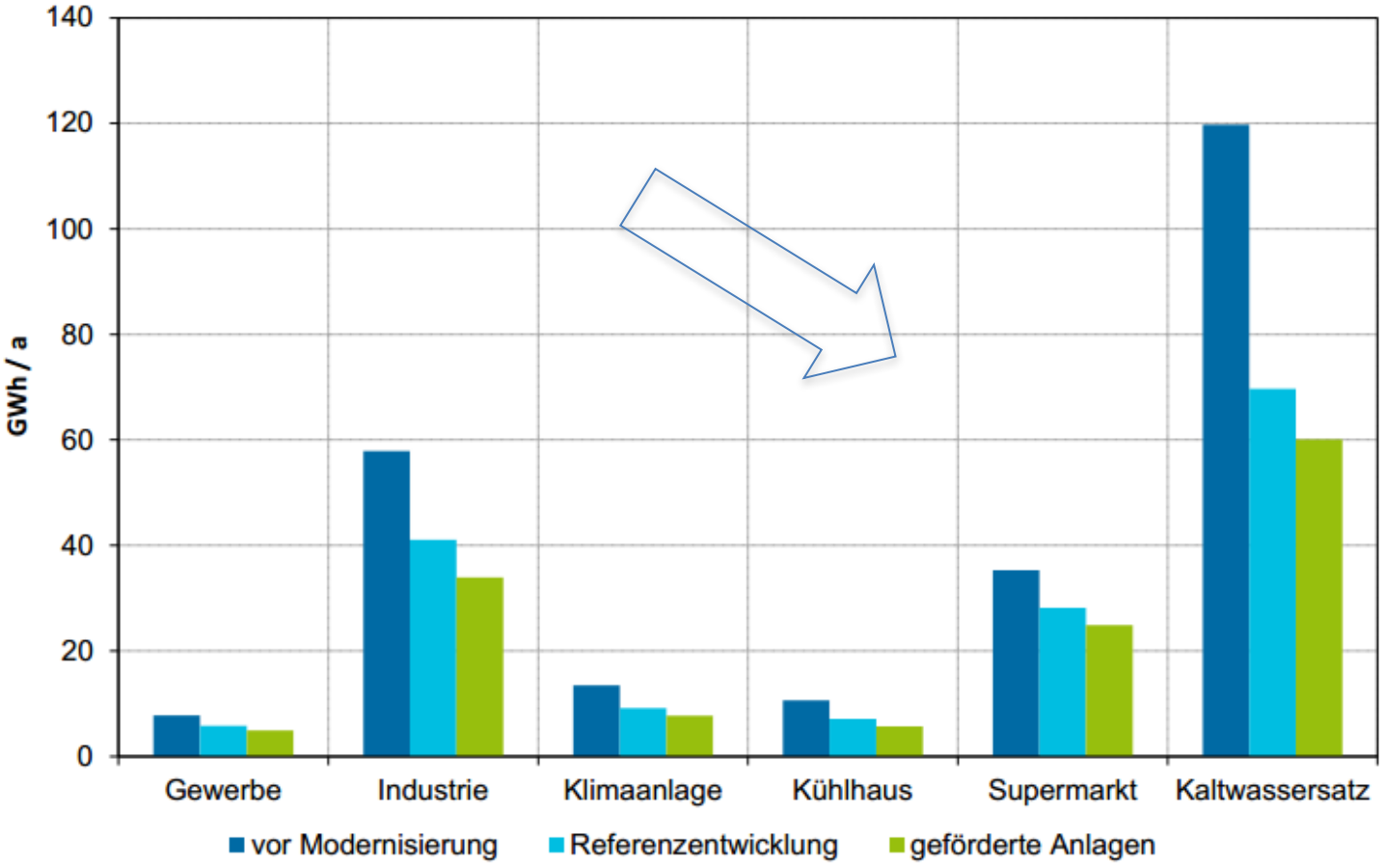

Trade systems

Industrial systems

Air conditioning systems

Cold storage houses

Absorption Chillers

Supermarket appliances

Water coolers

Prior modernisation reference case subsidized facilities

VIII. Fig. 5: GHG – reductions (15 years lifetime)

for different applications 2009-2014

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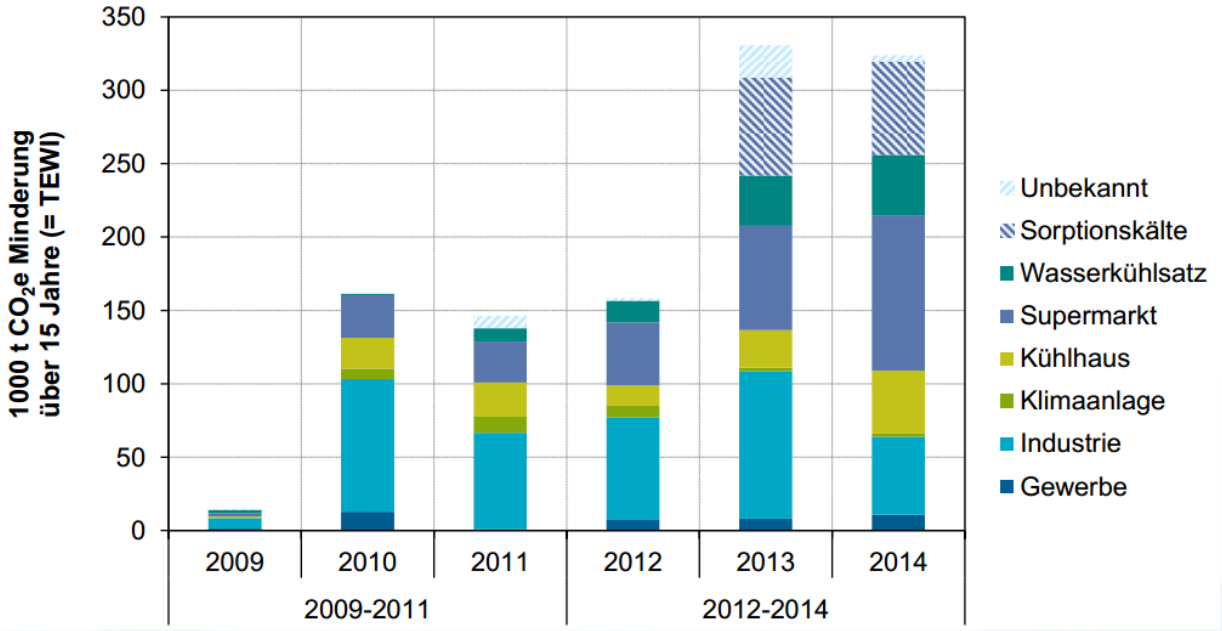

Year of Funding

Kumulative GHG - reductions in lifetime (15 yrs.):

- ca. 1,1 Mio to CO2-equiv. (TEWI)
- 28 funded facilities (2008 – 2009)
- 1698 funded facilities (2008 – 2016)
- 1898 funded facilities by Aug. 31st 2017

Trade systems

Industrial systems

Air conditioning systems

Cold storage houses

Supermarket appliances

Absorption Chillers

Water coolers

Others

IX. Fig. 6 : Governmental Subsidies – Calculation of Funding Sum

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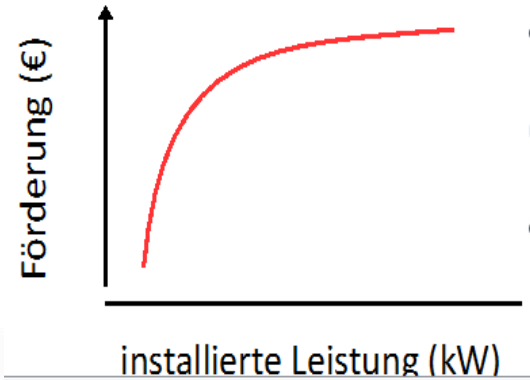

$Förderung = A \cdot C^{(1-B)}$

mit:

C = Kälteleistung bzw. Speicherkapazität

A, B = anwendungs-, anlagenspezifische Koeffizienten

Calculation of Funding Sum:

algorithm considering:

- refrigeration / storage capacity
- application specific coefficient
- plant specific coefficient

Art der Anlage	Koeffizienten bei: Neuerrichtung A	Neuerrichtung B	Vollsanierung A	Vollsanierung B
Kleine Kompressions-Kälteanlagen	1.025	0,4052	768,8	0,4052
Kompressions-Kälteanlagen mit Ammoniak als Kältemittel	21.086	0,7579	21.086	0,7579
Kompressions-Kälteanlagen in Supermärkten	35.256	0,8623	26.442	0,8623
Kompressions-Kälteanlagen in der Gewerbe-, Industriekälte und in sonstigen Anwendungen	1.025	0,4052	768,8	0,4052
Kompressionsanlagen in der Klimakälte	342,7	0,237	285,6	0,237
Kompressionsanlagen in der Klima-				

X. Fig. 7 : Online Application Form –
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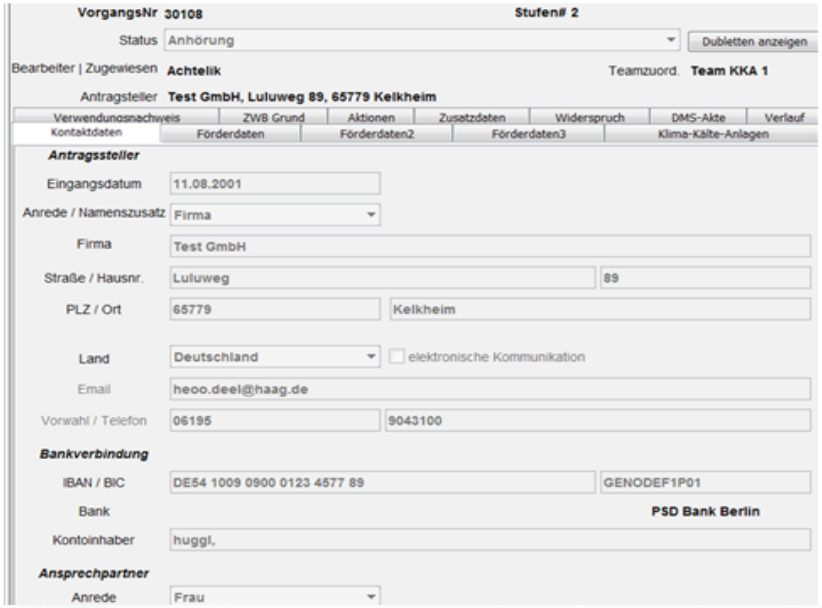

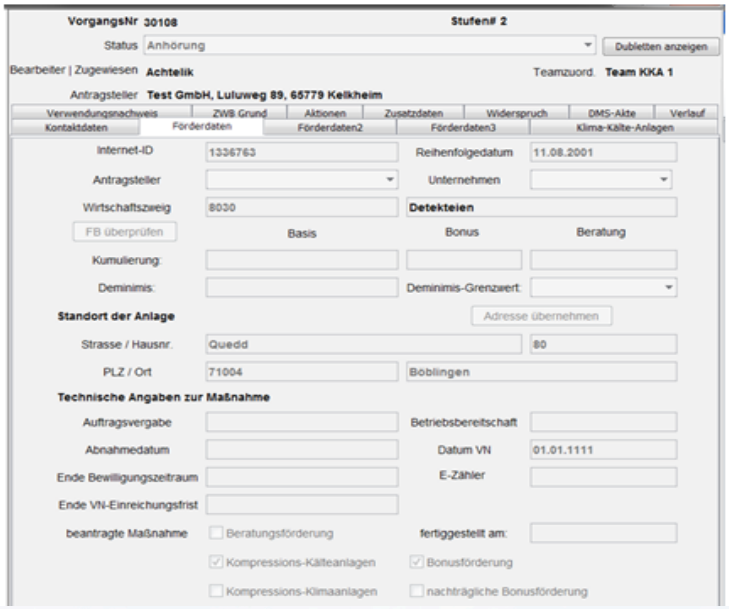

Obligatory Input:
- Administrative Data
- Technical Data
- Subsidy relative Data
- Verification Data

XI. Results + Outlook

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- **Achieved results** :

  - facilitations in administrative process both for
    - applicant
    - administration

  - subsidy policy follows technical progress

  - Last Numbers:

2009 Dec. 31st :	28 funded plants ,	2.5473	Mio € funding sum
2017 Aug. 31st :	1898 funded plants,	145.0608	Mio € funding sum

- **Outlook**
  - next amendmend expected by January 1st 2018
  - New subjects for subsidies
    - evaporative cooler
    - ...
  - German Cooling Award in May 2018

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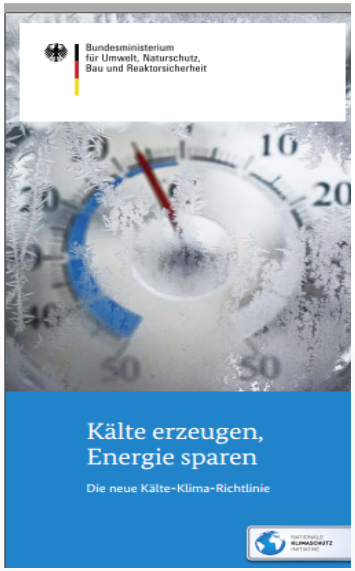

Any questions?

Thank you for your interest!

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