# Energy Efficiency and the Ukrainian paradox

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**Kiev, 23rd March 2014, Workshop on Energy Efficiency in Buildings and Advanced District Heating**

# AGENDA

- **Paradox:** the situation in Ukraine has led to a renewed interest in energy efficiency in the frame of the high-level discussions on a 2030 climate and energy framework
- District heating and energy security
- Facts and figures – district heating and CHP in Germany
- Strategy for the sector: German experience, policy recommendations and the independence of the sector
- “give me 3 minutes for proving that IEA projects on district heating make sense”

# ENERGY SECURITY VS. SECURITY OF SUPPLY

- IEA definition: uninterrupted availability of energy sources at an affordable price
- risk due to

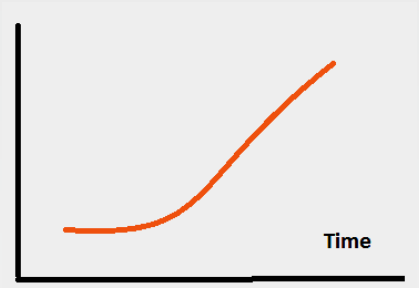
*poor energy efficiency*

*the limited number of suppliers and supply routes*

*rising prices*

# CONTRIBUTION OF DISTRICT HEATING. A LOGICAL SEQUENCE

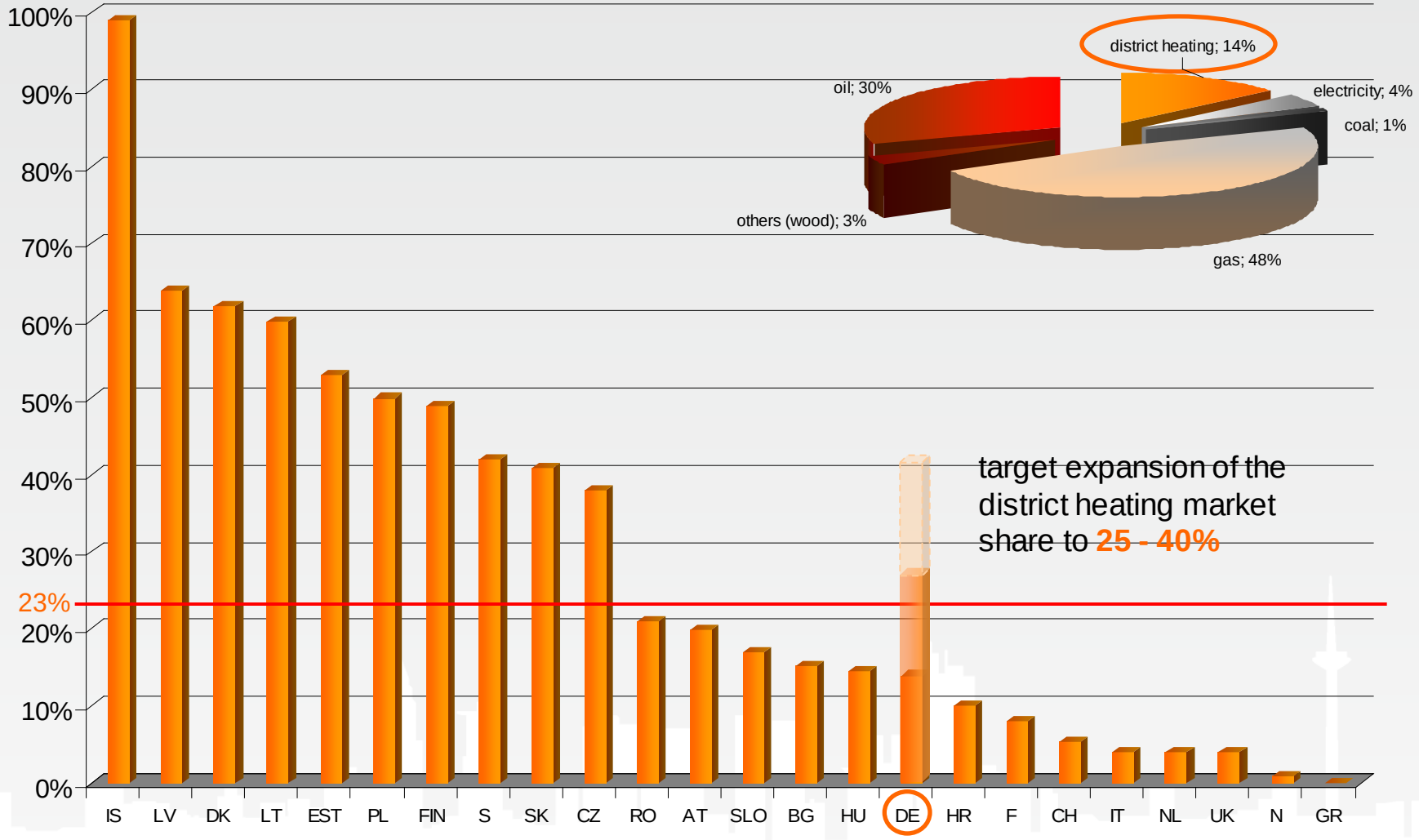
More efficiency in DH sector (CHP) + renewable energy ⟶
reducing primary energy use ⟶ reducing energy imports and




enhancing energy security at the desirable level

- Energy efficiency calculated by: primary energy factor
- More relevant in Ukraine (DH covers cca. 60 % of heat and hot water demand, 39 % of citizens were supplied by DH in 2012) than in Germany

## … District Heating market share

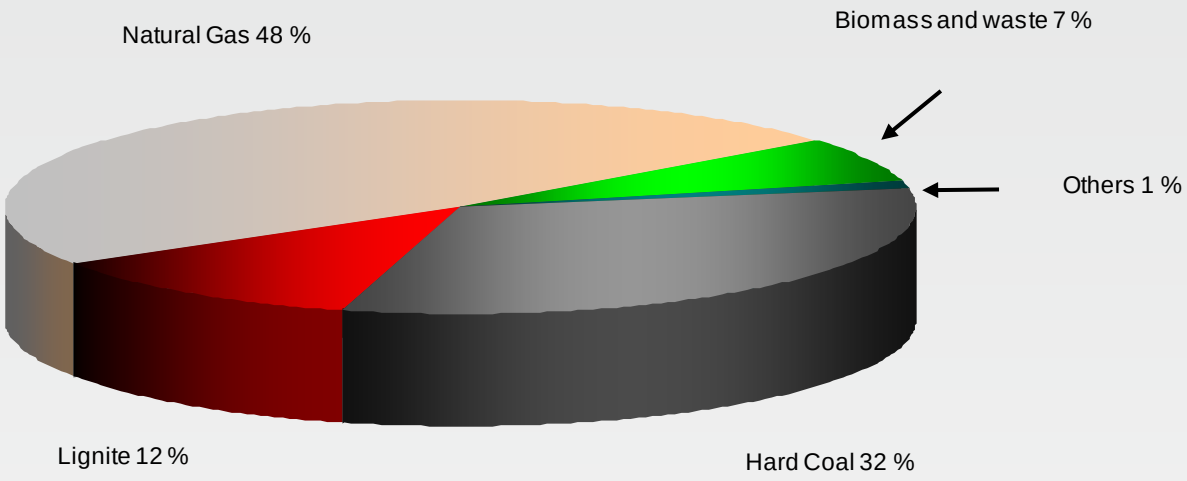




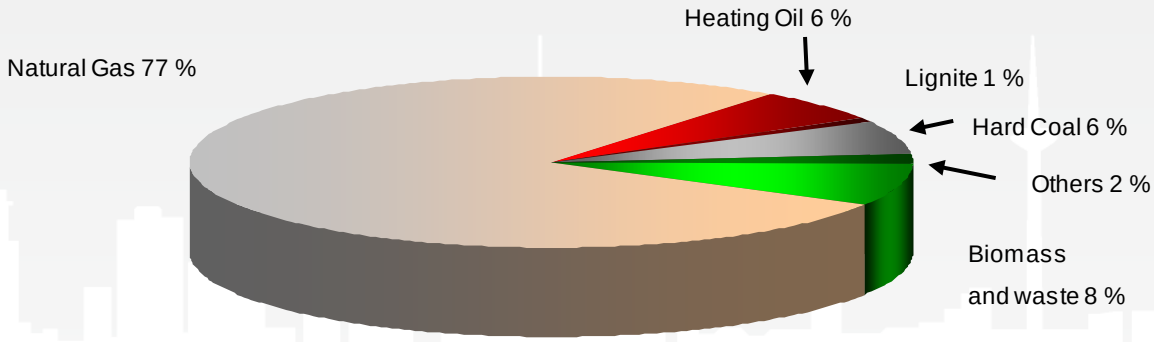

source: AGFW / EHP / DEStatis

# FACTS AND FIGURES – DISTRICT ENERGY IN GERMANY

## Fuel use in CHP 411.915 TJ

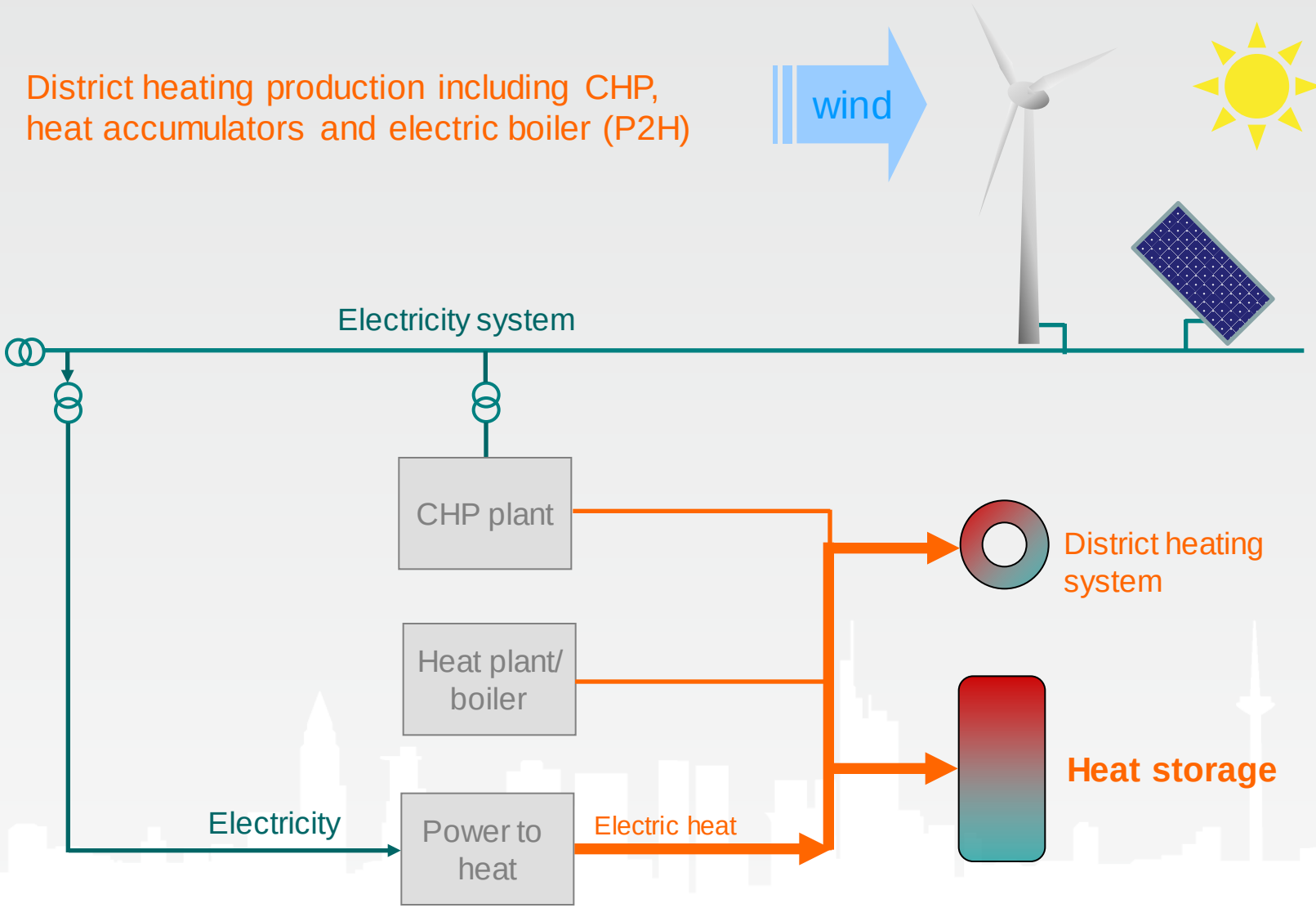



## Fuel use in heat only installations 52.240 TJ



## Rise proportion of RES in gross final energy consumption

District heating production including CHP, heat accumulators and electric boiler (P2H)



# THE BEST GERMAN LAW SUPPORTING CHP AND DH

## The CHP Act (German KWKG) - today

- Increasing the share of CHP electricity in Germany to 25% until 2020
- Grid operators pay a fixed premium for CHP electricity (1,5 for conventional CHP to 5,11 ct/kWh for Micro-CHP) on top of the market price for a limited time
- Additional premium for CHP plants that take part in the EU Emissions Trading System (+ 0,3 EUR ct/ kWh)
- Support for district heating (DH) grids (30% of the construction costs) based on CHP as heat sinks within this support system
- Costs for the support are shared among all electricity consumers (currently 0.002 – 0.05 ct/kWh)
- Support for thermal storage (heating and/or cooling) used in conjunction with CHP plants for the integration if renewable energy sources in the energy system

# What can you do with a 3000-page-book?

*Dead Souls by Nikolai Gogol*

*Under Western Eyes by Joseph Conrad*

*The White Guard by Mikhail Bulgakov*

*The Radetzky March by Joseph Roth*

*Requiem by Anna Akhmatova*

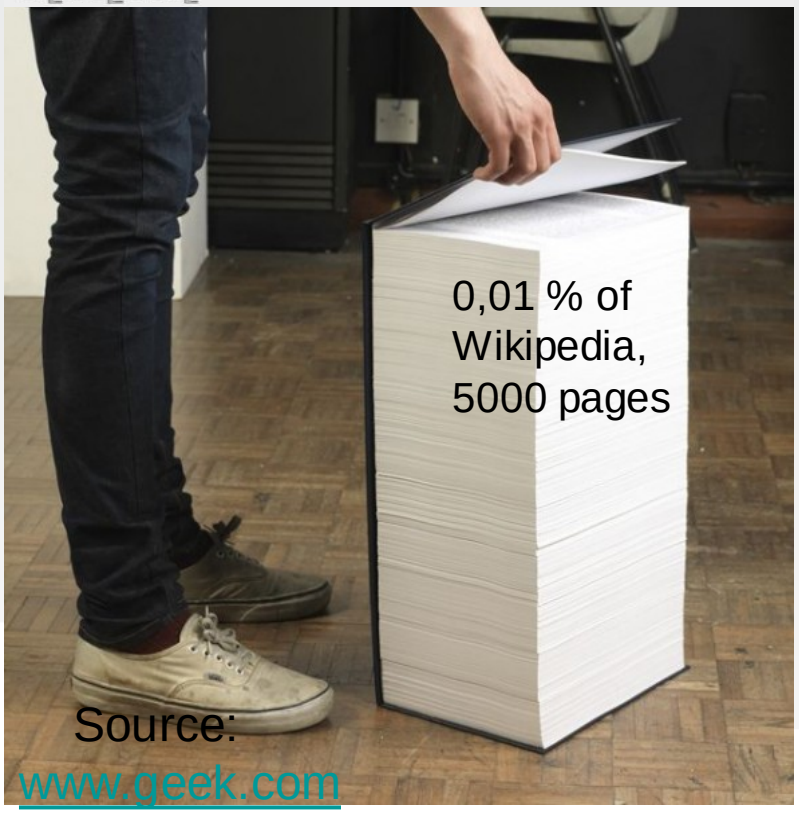
*The Passion According to GH by Clarice Lispector*

*Report form the Besieged City by Zbigniew Herbert*

*Suite Francaise by Irene Nemirovsky*

*combined*

*2000 pages*




Source: www.geek.com

# » Code of Practice

*Example*

AGFW RULES AND STANDARDS

AGFW

**AGFW Worksheet FW 401 – Part 2**

**Design and installation of preinsulated bonded pipes for district heating networks**
**- System description -**

**December 2007**

Replaces the version issued in February 1999

*Earlier versions:* *Plastic bonded pipes for district heating networks, 1983*

*Shallow installation of plastic bonded pipes for district heating networks, 1984*

AGFW | Der Energieeffizienzverband für Wärme, Kälte und KWK e. V.

AGFW

emarks

nevision of the European stan-2000, 448:2003, 488:2003 and he publication of the new stan-41:2003 and EN 14419:2004, s of worksheets has been up-

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Modification

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Contents



AGFW Rules and Standards: FW_401_2_A_0712 - 3 -

AGFW

## 3 Description of the installation method

### 3.1 Description and function

The bonded pipe system consists of a steel service pipe and a polyethylene (PE) outer casing which are held firmly together by a layer of rigid polyurethane foam insulation. The steel pipes are welded together. The outer casings of the pipes and system components are sealed and held together by casing joints. Figure 1 shows the basic structure of a bonded pipe and a pipe joint.

Heating or cooling of the water causes the pipe to move in the ground. Because they are rigidly connected, the service pipe and the outer casing always move as a single unit. Because the service pipe and outer casing are bonded together, they also jointly absorb external loads, such as those caused by the earth above them or by traffic.

When the pipe is filled, changes in its length are inhibited because any axial movement causes significant friction between the outer casing and the soil. Starting from an exposed end of the pipe, this friction accumulates along the length of the pipe. If free movement is possible, the friction reduces the pipe movement and, if the pipe is long enough, it can be sufficient to completely suppress movement in the middle section. This fixed section of the pipe is called the adhesion zone. It forms what is known as a natural anchor. On pipes with no adhesion zone and consistent covering, the middle point of the pipe is the natural anchor.

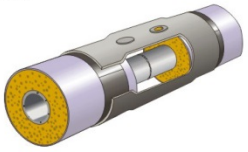


Figure 1: Illustration of the structure of a bonded pipe and a casing joint

Figure 2 illustrates this process depending on a defined temperature difference ΔT.

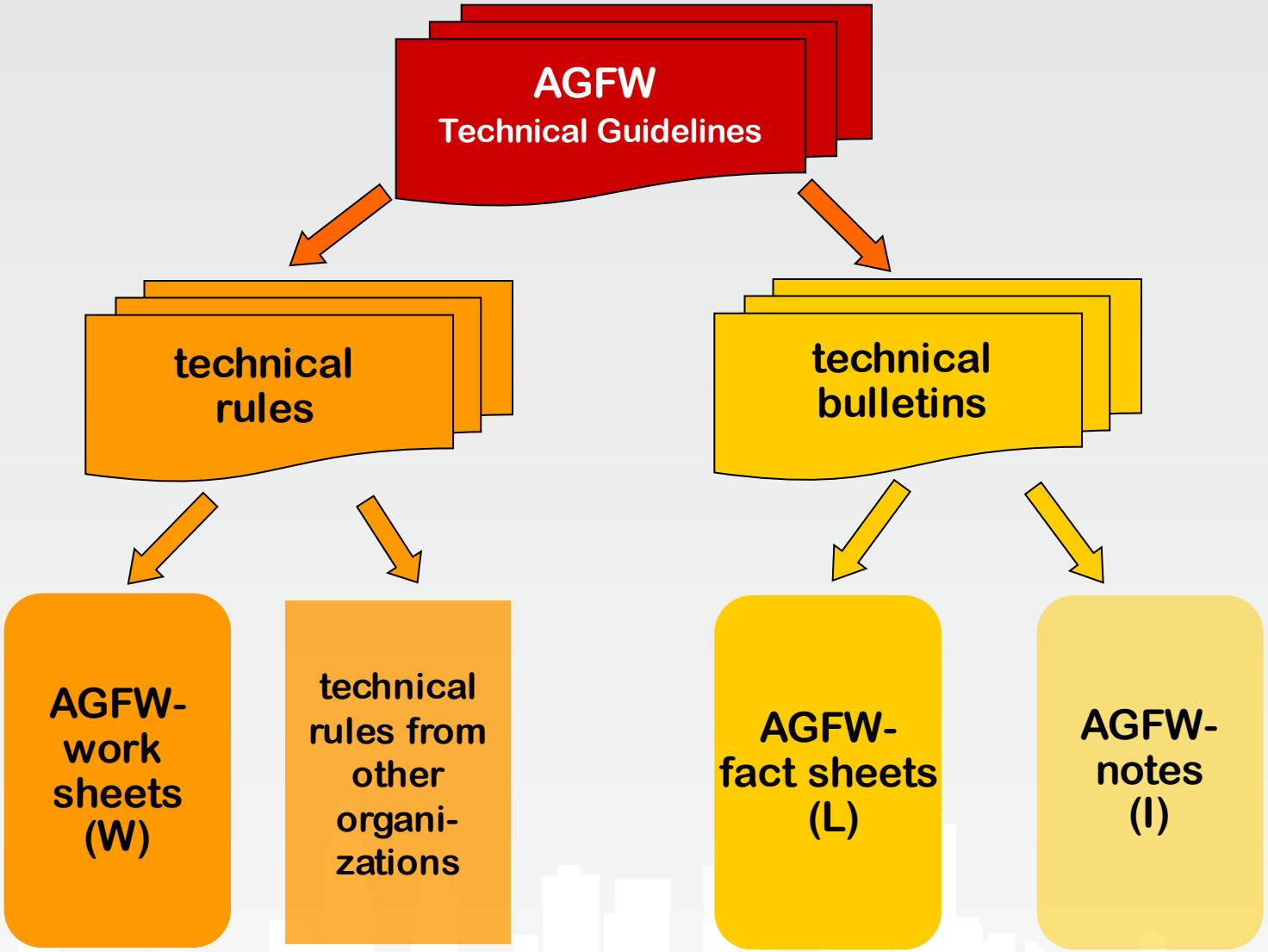
- Case 1 shows the change of length Δl along the length of the pipe "L" as a temperature-dependent movement of the pipe in the theoretical case where these is no inhibition due to friction. Because there is no friction, the result is the theoretical expansion; no axial stress arises in the pipe here.
- Case 2 shows the movement of a filled pipe of the same length. In the sliding zone (G), in other words the zone where pipe movement occurs, there is friction, which accumulates as the length of the pipe increases. After the pipe length G, it reaches a level equal to the force caused by the movement of the steel pipe. From this point on, no pipe movement is possible.
- Case 3 shows that the lengthening caused by thermal expansion and the shortening caused by the generated compressive force are inversely equal.

- 6 - AGFW Rules and Standards: FW_401_2_A_0712

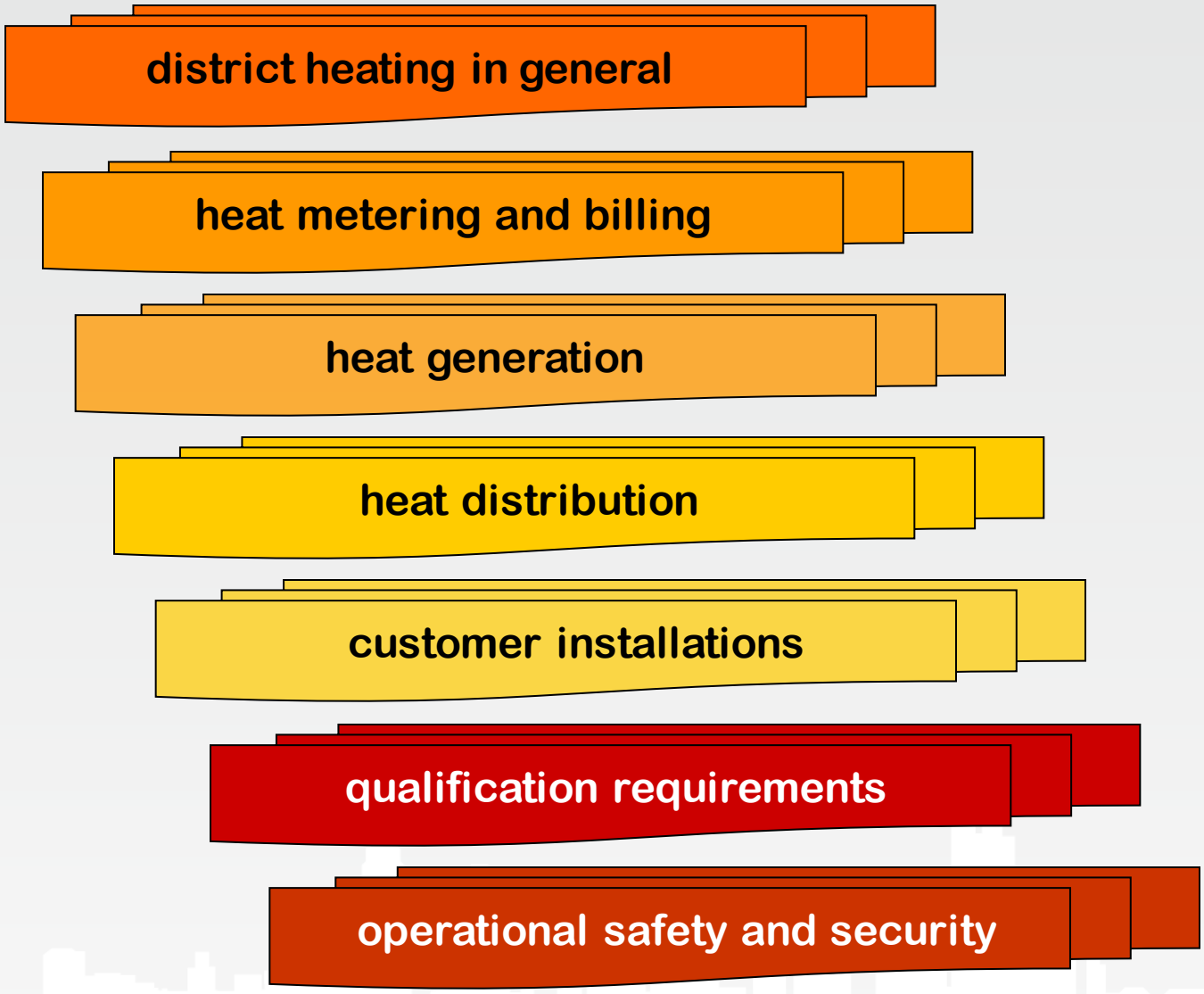
## »Why technical guidelines – our Target:

Technical self-administration of the sector as the foundation of lobbying activities.

## Code of Practice - Structure



# Code of Practice - Structure / seven main fields



## What does „compilation of the Code of Practice“ imply?

**The AGFW Acknowledged Code of Practice is the result of a continuous cooperation of a multitude of voluntary employees from the public utility companies and the full-time employees of the association.**

**Some facts:**

- Approximately 1,000,000.00 EUR worth of underlying technical expert reports
- About 10 employees of the AGFW office in „Engineering and Standardization“ as well as „Organizational and Operational Safety“
- About 700 employees from public utility companies are organized in 50 committees for the generation of the technical guidelines and the standardization

# THOUGHTS ON POLICY RECOMMENDATIONS

- Similarities in the ownership: most DH systems in Germany are owned by multi-utilities (in German: Stadtwerke) providing electricity, natural gas, water, waste management.
- Privatization issues: the law on privatisation does not allow privatisation of district heating assets and pipelines cannot be privatised, the law on heat encourages private-sector participation in the DH sector, the trend in Germany: Remunicipalisation (putting energy infrastructure back into public hands)

- Supporting legal framework? Lean

- Reforming DH sector was not done on the same scale as power sector reforms – DH systems have been transferred to local authorities, improving policy issues within local authorities will contribute to better policies for DH
- Cost allocation between power and heat production – if all benefits are allocated to electricity, heat produced at CHP plats is sometimes more expensive than that produced in heat-only boilers

# GERMAN LESSONS RELEVANT FOR CONSIDERATIONS IN UKRAINE

1. Standardized heat supply contracts according to Ordinance on general conditions for the supply of District Heating (AVBFernwärmeV)
2. Most of the partners of DH utilities are: companies, collection payment rate almost close to 100%
3. No price regulation, no tariffs.

**Independence of the district heating sector through technical knowledge**

# RECENTLY COMPLETED IEA PROJECTS

**'Towards 4th generation district heating (4GDH)'**

Shows systems can successfully be run at much lower supply temperatures

**'Integrating renewable energy and energy from waste'**

Enables customers and businesses to devise strategies for renewable energy and waste heat in district heating networks

**'Improved maintenance strategies for district heating pipelines'**

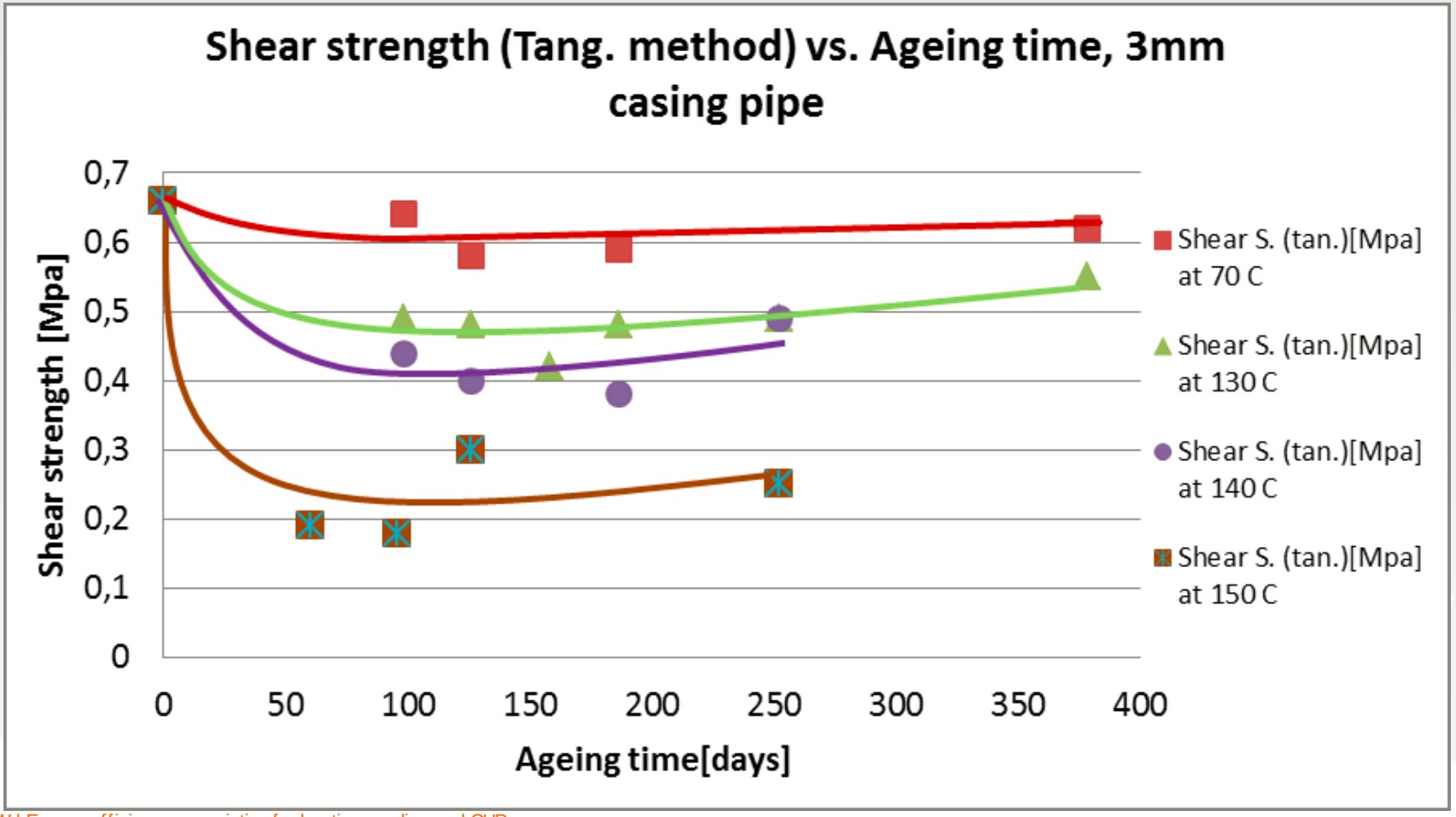
Produced a tool that will enable a marked improvement in risk management for district heating DH companies

**'Calculation tool for primary energy factors in DHC systems.'**

The tool provides a quick and precise assessment of PEF and GHG indicators for specific DHC systems.

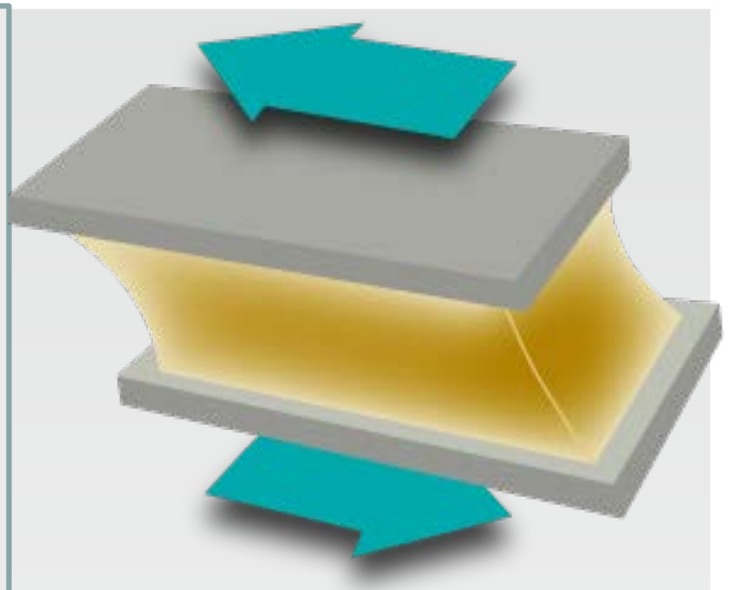
# STRATEGIES ON THE MAINTENANCE OF DISTRICT HEATING SYSTEMS

Hypothesis that the degradation of PUR is caused by thermo-oxidation due to oxygen diffusion through PE casing **WAS NOT** confirmed. The shear strength decreases fast at the beginning and then reaches a constant value which depends on temperature but not time.



"Honey, I'm making a deposit into our retirement savings."

**In bed**, it's 6AM you close your eyes for 5 minutes, it's 7:45. **At the meeting**, it's 1:30, close your eyes for 5 minutes, it's 1:31.



**5 messages to share**

Before and After

# Marriage

http://beforeandafterstuff.com

Happy Independence Day!!!!!

Happy Inde.. mm.. forget it..

Source: 2014independenceday.com

# *Thank you for your kind attention.*

# AGFW - WHO WE ARE

- **AGFW** is the independent and impartial association in Germany promoting energy efficiency, (district) heating, cooling and CHP at national and international levels

- **AGFW** reunites more than 500 (regional und municipal) district energy suppliers, consultants, personalities and industrial operators of this industry (component and system manufacturers, manufacturing and assembling companies, testing institutes, …) in Germany and Europe

- **AGFW** represents over 95 % of the heat load connected to German district heating systems – the largest scale in Western Europe.

- **AGFW** means over 40 years of experience in this field. Established 1971 we have a long and distinguished track record of delivering energy efficiency solutions to our members and to the society