



EiIF Presentation

TIPCHECK Experience

POTENTIAL ENERGY SAVINGS IN EUROPE USING INSULATION

First lessons from industrial energy audits

www.eiif.org



The EiiF Foundation

- EiiF was established in 2009 by **8 Founding Partners** as a non-profit Foundation.
- Nowadays, it comprises **more than 60 leading** industrial insulation companies from global player size to small and medium-sized companies.



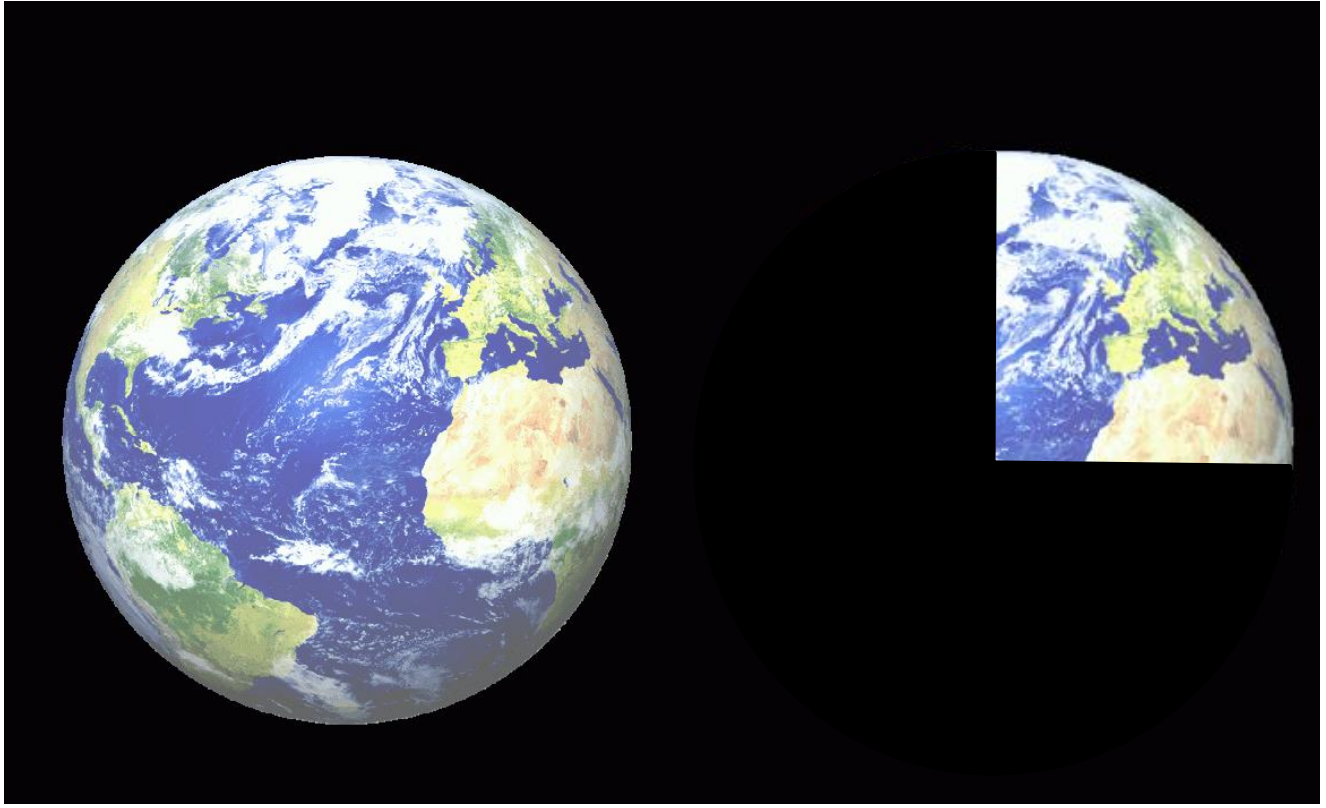


Future Challenges?

2010:
we were
consuming
roughly

1.25 earth's

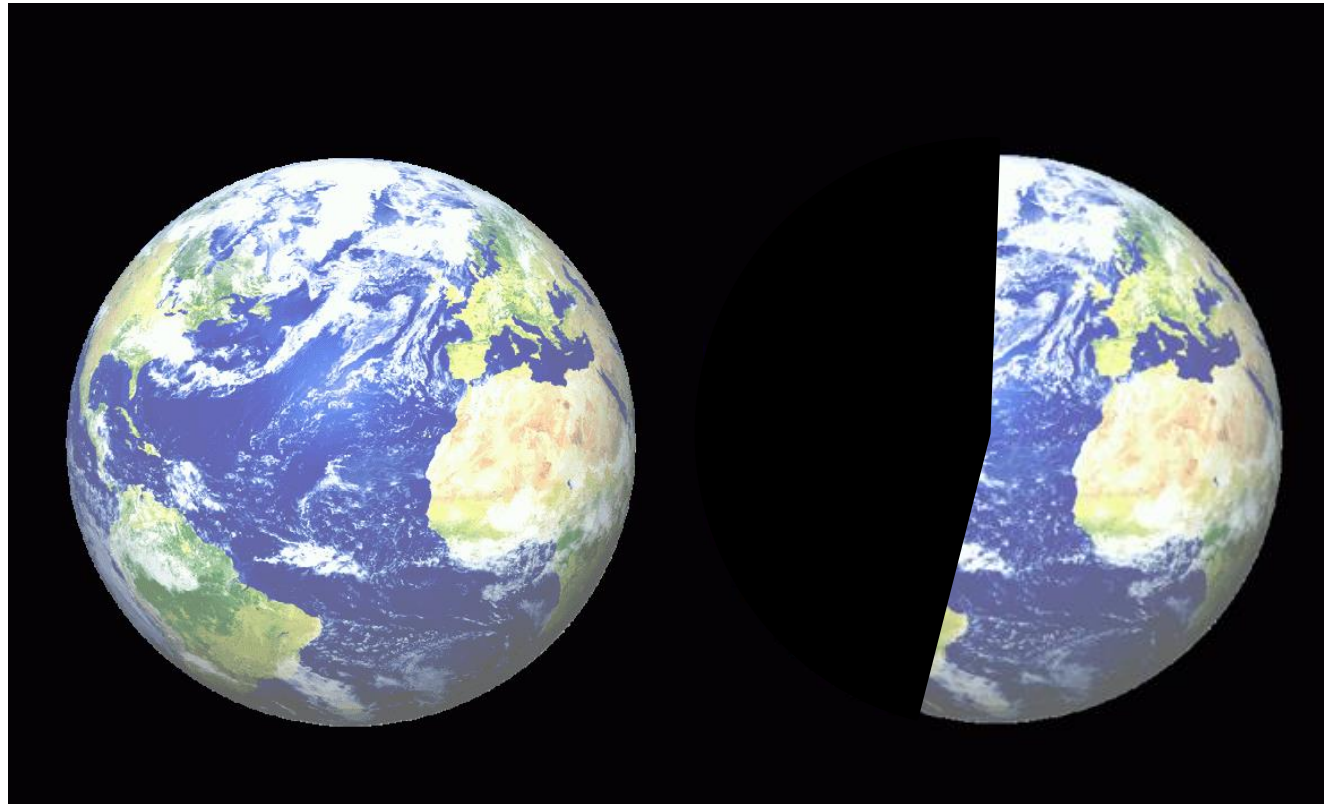
worth of
resources.



Future Challenges?

Today humanity
already uses the
equivalent

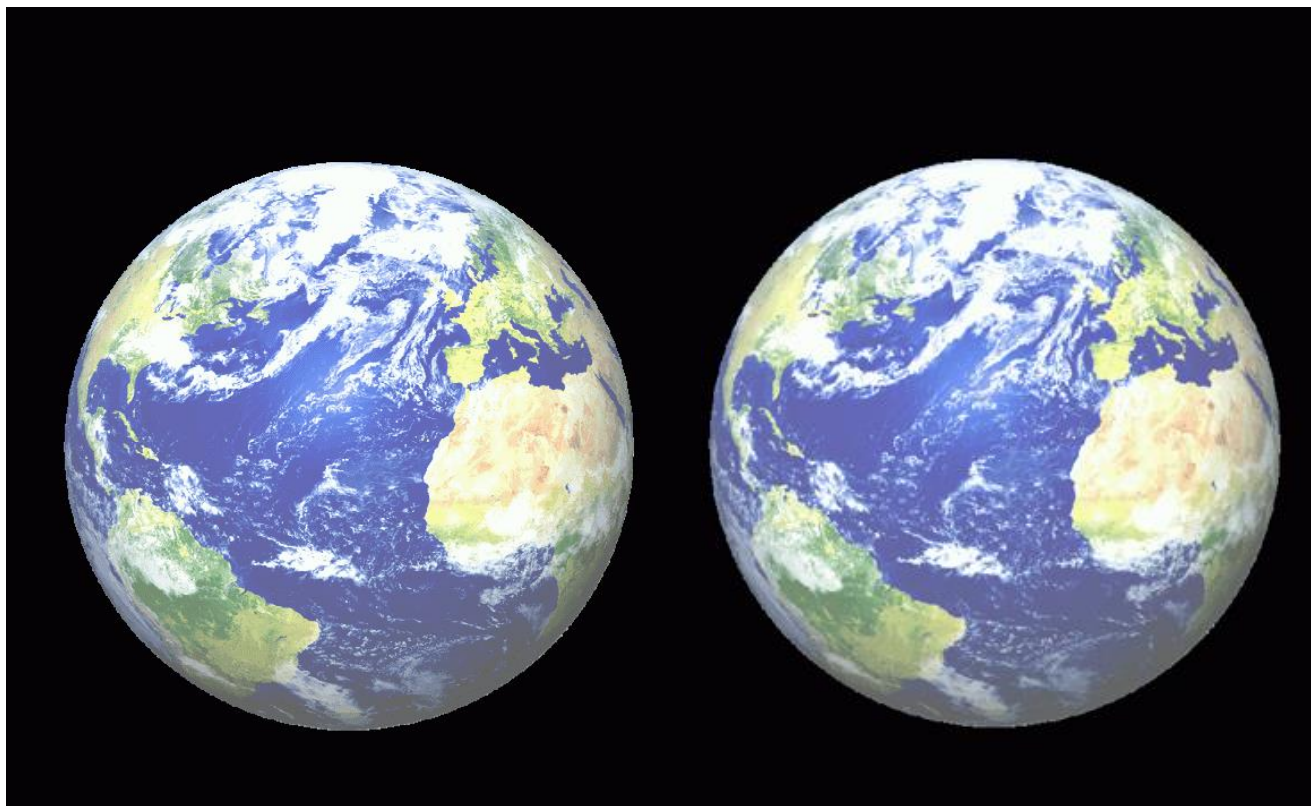
of 1.6 planets.



Source: http://www.footprintnetwork.org/en/index.php/GFN/page/world_footprint/

Future Challenges?

- Moderate UN scenarios suggest that if current population and consumption trends continue, by the **2030s**, we will need the **equivalent of two Earths**.
- If China consumes at the rate that the US population does (2010), we need **two new earths just for Chinese consumers**.



Source: http://www.footprintnetwork.org/en/index.php/GFN/page/world_footprint/

Why Energy Audits

The Challenge:

We need to learn how to **use less** and therefore have to learn **how to produce more from less.**

Article 8/EED:

Energy audits and energy management systems

1. Member States shall promote the availability to all final customers of high quality energy audits which are cost-effective [...]

Why Energy Audits Specialised on Industrial Insulation

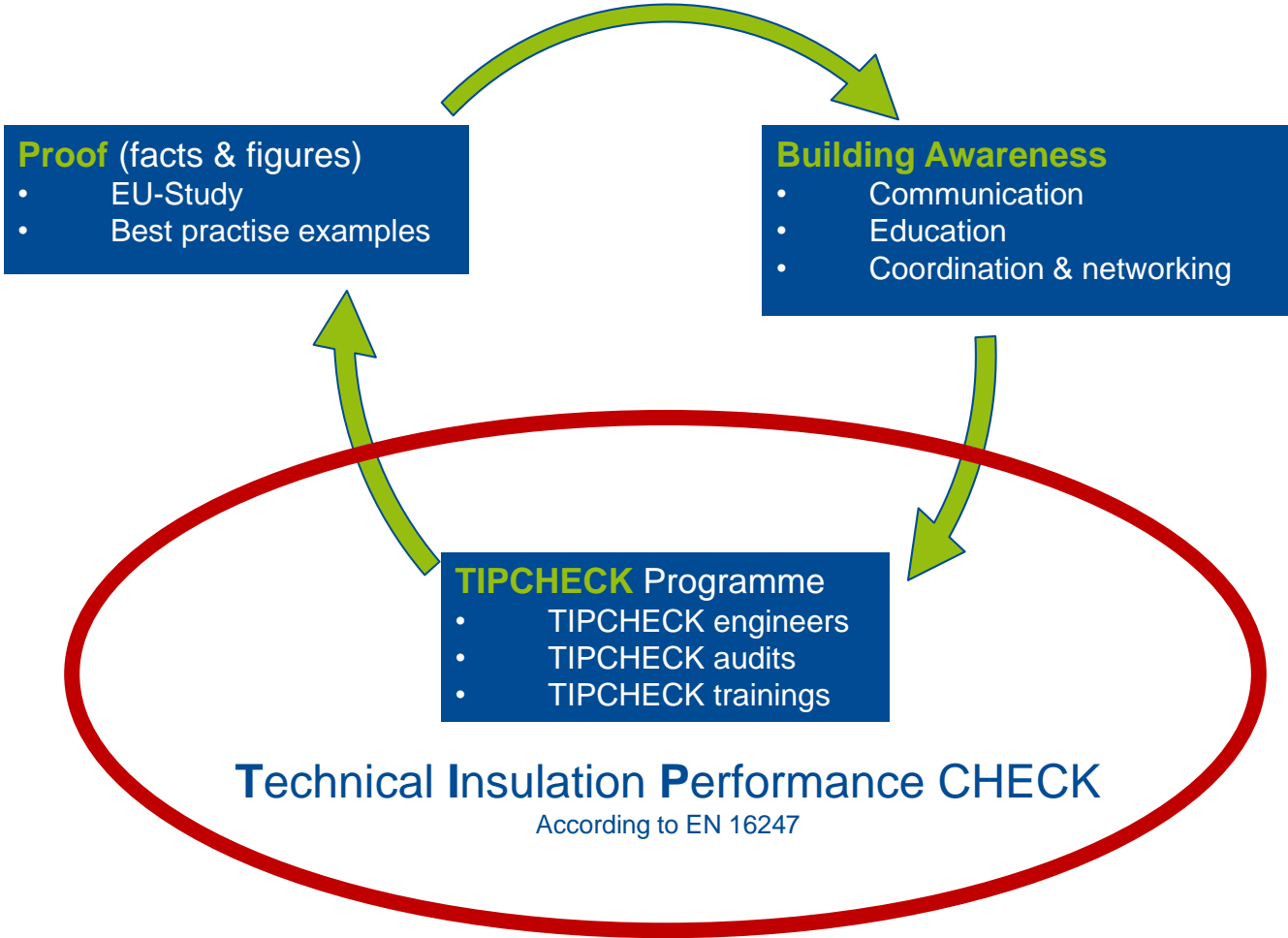
Industrial insulation is a cross-cutting technology offering Multiple Benefits:

- ✓ Reduces Safety Risks for Personnel and Equipment
- ✓ Improves Working Environments
- ✓ Increases Energy Efficiency
- ✓ Reduces Emissions
- ✓ Improves Process Efficiency
- ✓ Improves Competitiveness

- ✓ **Reduces Costs**



The EiiF Strategy Building on a Spiral Development



TIPCHECK Case Study #1- Refinery

Refinery – Oil Storage tank roof 60 °C

Key facts:

- Very old and damaged insulation inside the tank roof
- Huge CUI problems - sheets of the roof heavily corroded
- Need for the client to replace it
- **BUT:** The owner considered to rebuild the roof without any insulation as he wanted to avoid CUI problems in the future.



TIPCHECK Case Study #1- Refinery

Refinery – Oil Storage tank roof 60 °C

- **TIPCHECK result:** Without insulation the energy loss would be

~9,500 MWh / € 430.0000 per year.

- An insulation of only 30 mm thickness on the roof, applied with a technical solution which helps to avoid future CUI

problems, **reduces the energy loss by 80%** offering a

payback time of less than 2 years.



TIPCHECK Case Study #1- Refinery

Refinery – Oil Storage tank roof 60 °C

- **TIPCHECK result:** Without insulation the energy loss would be

~9,500 MWh / € 430.0000 per year.

- An insulation of only 30 mm thickness on the roof, applied with a technical solution which helps to avoid future CUI problems, **reduces the energy loss by 80%** offering a

Final decision: the owner decided to insulate the new roof



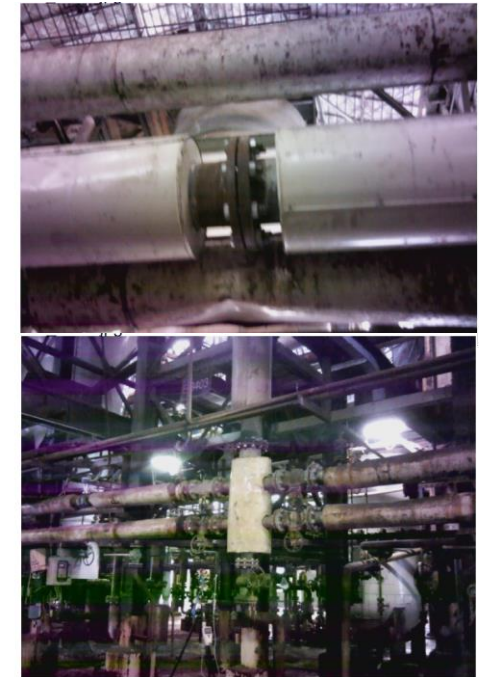
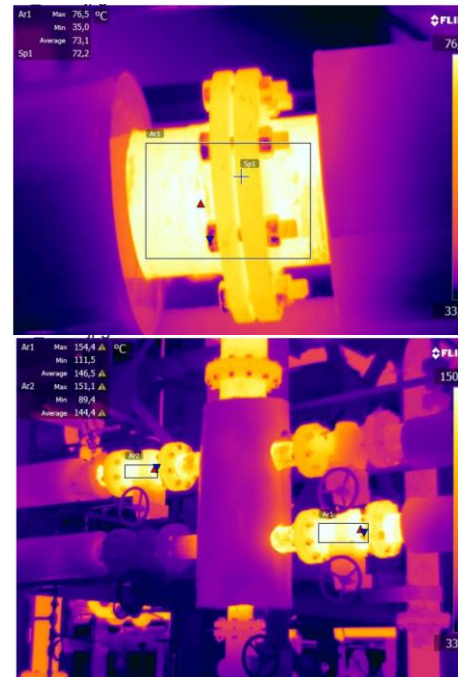
payback time of less than 2 years.

TIPCHECK Case Study #2 : Chemical Plant

Chemical Plant:

Key facts:

- Flanges and valves not insulated
- Old and damaged insulation partly in place.
- TIPCHECK scope:
 - ✓ Identify the saving potential of un-insulated parts and analyze the remaining performance of old and damaged insulation



TIPCHECK Case Study #2 : Chemical Plant

Key Findings:

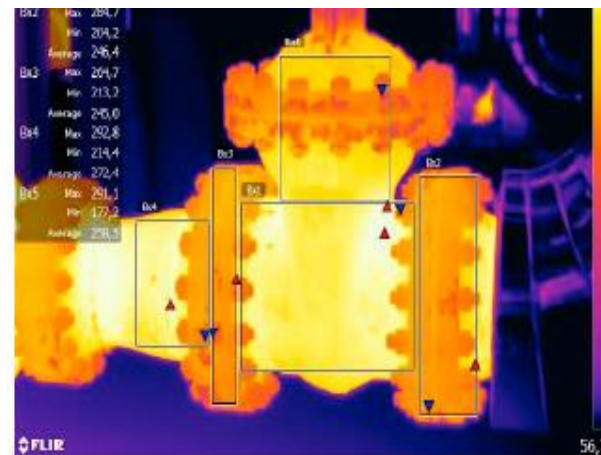
- **650 m** of piping with missing or damaged insulation
- **300** un-insulated pairs of flanges
- **160** un-insulated valves
- **3** un-insulated tanks
- Process temperature range: from **75 °C/170 °F** to **150 °C/300 °F**
- Savings potential: **11.100 MWh/year**
& € 200.000/year
- CO2 emission reduction potential: **2.240 ton/year**
- **Payback time less than 1 year**



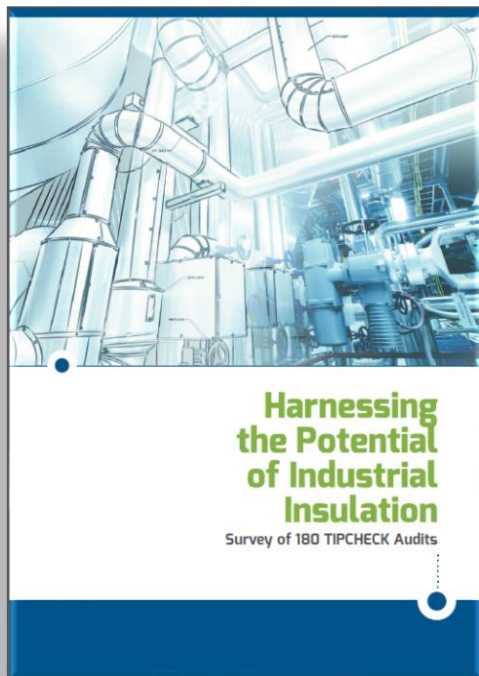
TIPCHECK Case Study #3

Focus on a very often un-insulated high temperature valve

- 12' un-insulated valve
- Process temperature: **260 °C/500 °F**
- Savings potential: **114 MWh/year**
- CO2 emission reduction potential: **51 ton/year**
- **Payback time less than 1 year**



Lessons learnt: Evaluation of 180 Thermal Energy Audits



- TIPCHECK – Thermal Energy Audits
 - Technical Insulation Performance Check
- Survey of 180 energy audits at 180 industrial plants
- Publication: May 2016 (already in its 2nd Edition)
- Download on www.eiif.org

Lessons learnt: Delivering Multiple Benefits Everywhere

The “First Lesson Learnt” from our 180 TIPCHECK Audits in the same number of plants in Europe and abroad:

The savings potential exists across all:

- ✓ Regions
- ✓ Sectors
- ✓ Equipment
- ✓ Operating temperatures



Lessons learnt: 180 TIPCHECKs – The Results at a Glance

The annual energy savings potential identified was:

> 750.000 MWh/year (2,7 PJ/year)

Resulting in an estimated CO₂ emission reduction potential of:

> 500.000 t CO₂

Equivalent to the annual **greenhouse gas emissions** of almost:

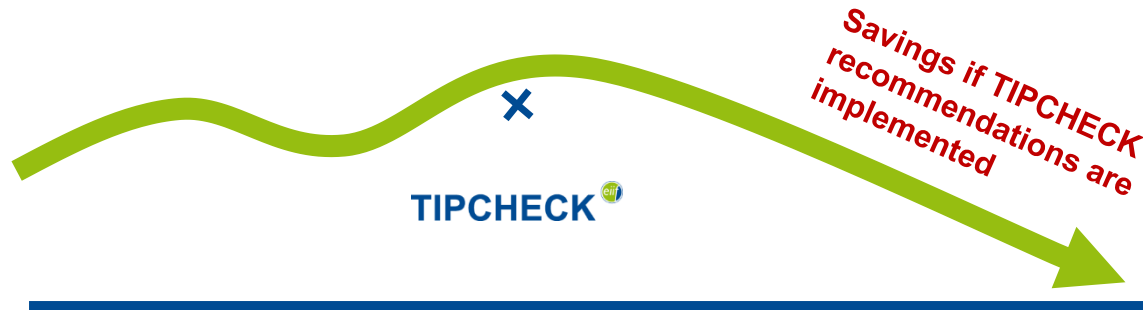
~ 110.000 cars.

180 TIPCHECK – The Results at a Glance

Resulting in a TIPCHECK-identified cost **saving potential** for industry of at least:

€ 23,5 million

Energy / Production Costs



180 TIPCHECK - The Results at a Glance

After a TIPCHECK audit:

- 3 out of 4
- (75%) industrial clients have either already invested or plan to invest in the near future (for example, at the next turnaround) in insulation to remediate existing insulation deficiencies.



The EIF software calculates the cost-effectiveness of insulation solutions

6 Presentation of the Results

The final step in the TIPCHECK protocol involves the presentation of results to the client. This allows the TIPCHECK engineer to personally describe the details of the data collection and analysis steps and to discuss the results and conclusions face-to-face with the clients—which provides the best opportunity to answer questions that may arise.

QUALITY CONTROL

EIF is vitally interested in maintaining the quality and integrity of TIPCHECK reports. To do so, EIF conducts random quality checks on TIPCHECK reports—and any client can request such a quality check—in which case, the TIPCHECK engineer who created the report is obliged to provide EIF with the information necessary to evaluate its quality.



5 Creation of the TIPCHECK Report

One of the most important features of the TIPCHECK audit is the tailored report that the engineer creates to communicate the audit results to the client. This report is designed to consistently identify thermal losses (and the associated CO₂ emissions) due to the current insulation and to reveal the energy and CO₂ savings potential of both "cost-effective" and "energy-efficient" insulation levels⁽³⁾. In addition to providing background information and a detailed description of the audit methodologies, the TIPCHECK report offers specific recommendations as well as a plan and implementation schedule for any proposed actions. The report may also include additional issues, such as worker safety risks from the current insulation levels, but the main body of the report focuses solely on the energy savings and CO₂ reduction potential of recommended actions.



⁽³⁾ "Cost-effective" insulation levels are defined as those for which the insulation minimizes the total costs of insulation and heat loss. "Energy-efficient" levels are those which result in 25% less heat loss than the cost-effective levels.



180 TIPCHECK - The Results at a Glance

- Based on the implementation rate (55% have implemented 100%, 13% have implemented parts, and 14% are considering implementation),

The TIPCHECK programme has already resulted in annual **energy savings** of: **> 500.000 MWh/year => (1,8 PJ/year)**

Resulting in an estimated **CO₂ emission reduction** of: **> 370.000 t CO₂**

Equivalent to the annual **greenhouse gas emissions** of: **~ 80.000 cars.**

TIPCHECK - The results at a glance

Implemented insulation improvements resulting from the first 119 realised TIPCHECK audits (68% of all TIPCHECK audits) represent

Insulation Business

€ 20 million

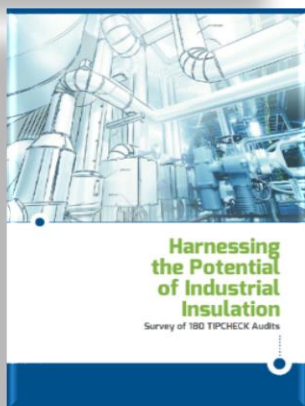
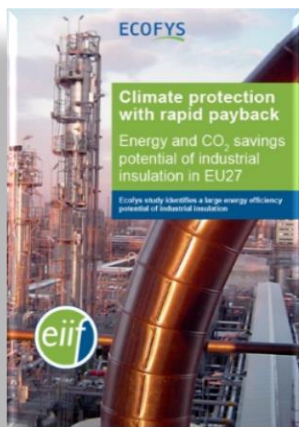
in insulation business



Lessons learnt: Audits Help to Tap “Hidden Potentials”

- Typical reaction after a first facility walkthrough of a TIPCHECK client:
 “You don’t know, what you don’t know, until you know”
- TIPCHECK clients are **not necessarily and always aware, how much energy they are wasting.**
- They usually are **not aware how easy and quick** it is to **stop the energy waste** with properly **insulated** systems/installations.
- Energy is **not the core business** of most industrial players but a necessary means to manufacture their products – whatever it is...

Future Challenges: Ecofys EU Study (2012)



The annual cost-effective savings potential is
620 PJ

=

The Energy consumption of
10 million households

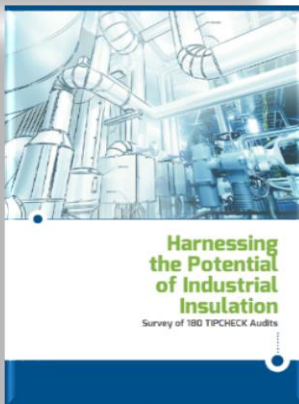
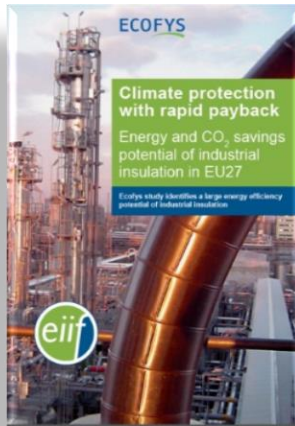
180 TIPCHECKS

Realised with a success rate of 75%
annual cost-effective savings of

=

1,8 PJ/year

The Future Challenge for TIPCHECK



Lessons learnt:

100 TIPCHECKs realise ~ 1 PJ

To realise the 620 PJ we will need to carry out:

62'000 TIPCHECKS

!

Future Challenges

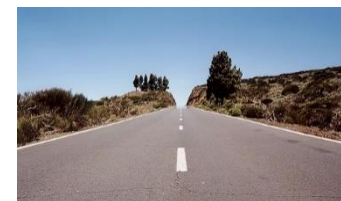


- **Only 1,8 PJ of the energy saving potentials** were realised from the **2,7 PJ** identified in the first 180 TIPCHECKs
- **0,9 PJ = 1/3** of the total identified potential is **not being tapped** by industry despite being cost-effective to implement

Advocacy Activities of EiiF

- **Article 8 of the Energy Efficiency Directive needs to be improved:**

- Combining the energy audit obligation with
 - **a mandatory requirement** and
 - **incentives**



to implement recommended improvements which are possible through existing technologies that offer short payback periods of less than 3 years.

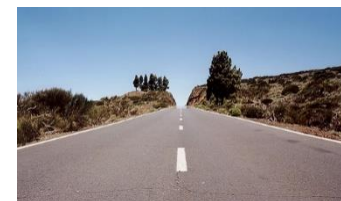
- **Incentives could furthermore be linked to an ambitious timeframe of 1-2 years** in which the identified energy saving potentials shall be realised **in connection with the next planned maintenance**.
- Member States should continue to develop national programmes* **to assist SMEs with an intensive energy use above a defined level** to undergo energy audits and to consequently implement the recommendations at their next available opportunity.

*(including soft loans, fiscal and other State Aid rule compliant incentives,)

Advocacy Activities of EiiF

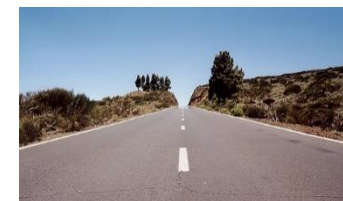
- Why?

- An energy audit without the obligation to tap the identified energy saving potentials doesn't necessarily lead to energy savings.
- TIPCHECK experience shows that **one third of the identified potentials remain untapped despite being cost-effective.**
- A mandatory requirement to take action within an ambitious timeframe with the support of incentives will **make energy performance improvements a high priority** leading to improved energy productivity and increased competitiveness of Europe's industry.



Advocacy Activities of EiiF

- ✓ **Without mandatory requirements** to take action to tap the audited energy efficiency potentials,
- ✓ **Without the extension of energy audits to SMEs** with an intensive energy use,
- ✓ **Without encouraging programmes and incentives** to do this in an ambitious timeframe...



...We fear that large parts of the (cost-effective) energy efficiency potentials in Europe's industry **will remain untapped.**

Advocacy Successes

- Driven by the initiative of EiiF the following subsidy programmes have been established:

In Germany

Einzelmaßnahmen
Merkblatt für Anträge nach 3.1.1 der Richtlinie für Investitionszuschüsse zum Einsatz hocheffizienter Querschnittstechnologien vom 29. April 2016



Quelle: © Fotolia.com/branex

In France

CERTIFICATS D'ECONOMIES D'ENERGIE

ANNEE 7
Certificats d'économies d'énergie
Opération n° IND-UE-18

Isolation thermique des parois planes ou cylindriques sur des installations industrielles (France métropolitaine)

3. Conditions pour la délivrance de certificats
La mise en place est réalisée par un professionnel.

Les performances de l'isolation thermique des installations sont déterminées à partir de la résistance thermique simplifiée R' définie comme le quotient de l'épaisseur d'isolant installée par sa conductivité thermique à respectivement -40, 0, 200 et 450°C selon la plage de température du fluide de l'installation calorifugée.

Pour les tuyauteries ou les équipements cylindriques de diamètre inférieur à 508 mm (ou 20"), la résistance thermique simplifiée R' est supérieure ou égale à :

- 3,3 m².K/W pour une température de fluide T telle que -60°C < T ≤ 0°C ;
- 1,6 m².K/W pour une température de fluide T telle que 40°C < T ≤ 100°C ;
- 2,0 m².K/W pour une température de fluide T telle que 100°C < T ≤ 200°C ;
- 2,3 m².K/W pour une température de fluide T telle que 300°C < T ≤ 600°C.

Pour les surfaces planes ou les tuyauteries et équipements cylindriques de diamètre supérieur ou égal à 508 mm (ou 20"), la résistance thermique simplifiée R' est supérieure ou égale à :

- 4,3 m².K/W pour une température de fluide T telle que -60°C < T ≤ 0°C ;
- 2,1 m².K/W pour une température de fluide T telle que 40°C < T ≤ 100°C ;
- 2,4 m².K/W pour une température de fluide T telle que 100°C < T ≤ 200°C ;
- 2,6 m².K/W pour une température de fluide T telle que 300°C < T ≤ 600°C.

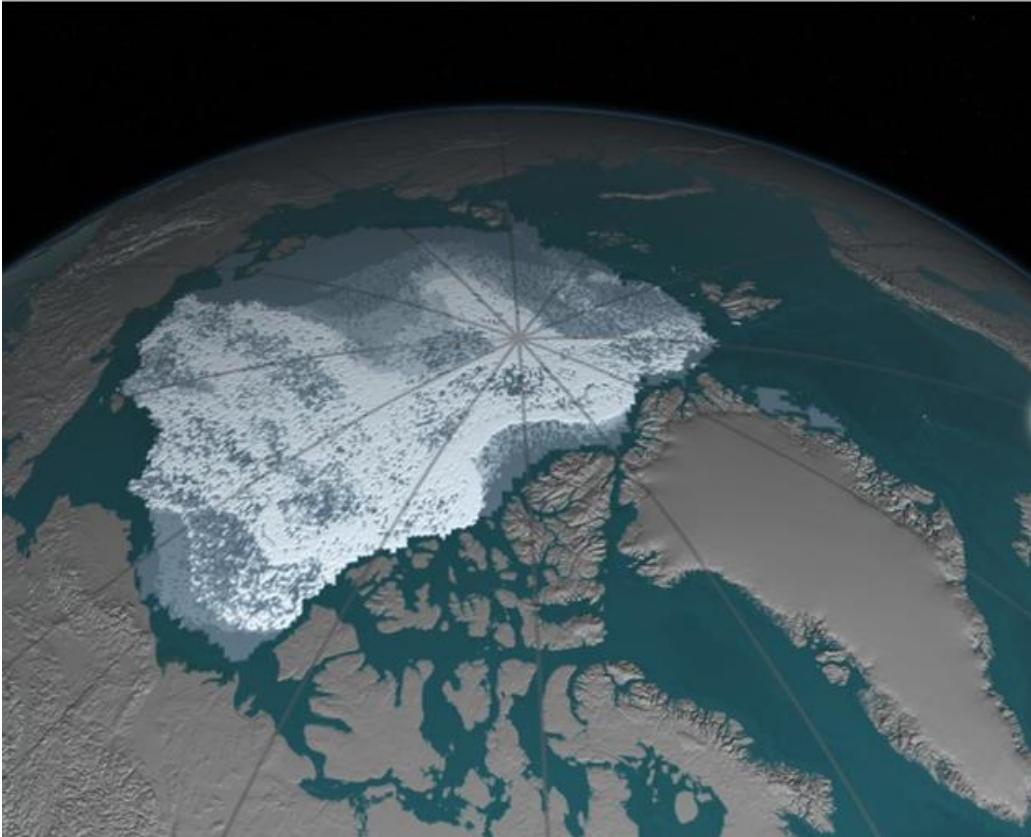
La preuve de réalisation de l'opération mentionnée la mise en place d'une isolation sur une installation industrielle avec les marque et référence du matériau isolant ainsi que, selon le cas, la quantité posée en mètres carrés (pour les





Marine Ice is Shrinking Dramatically in the Arctic...

1984



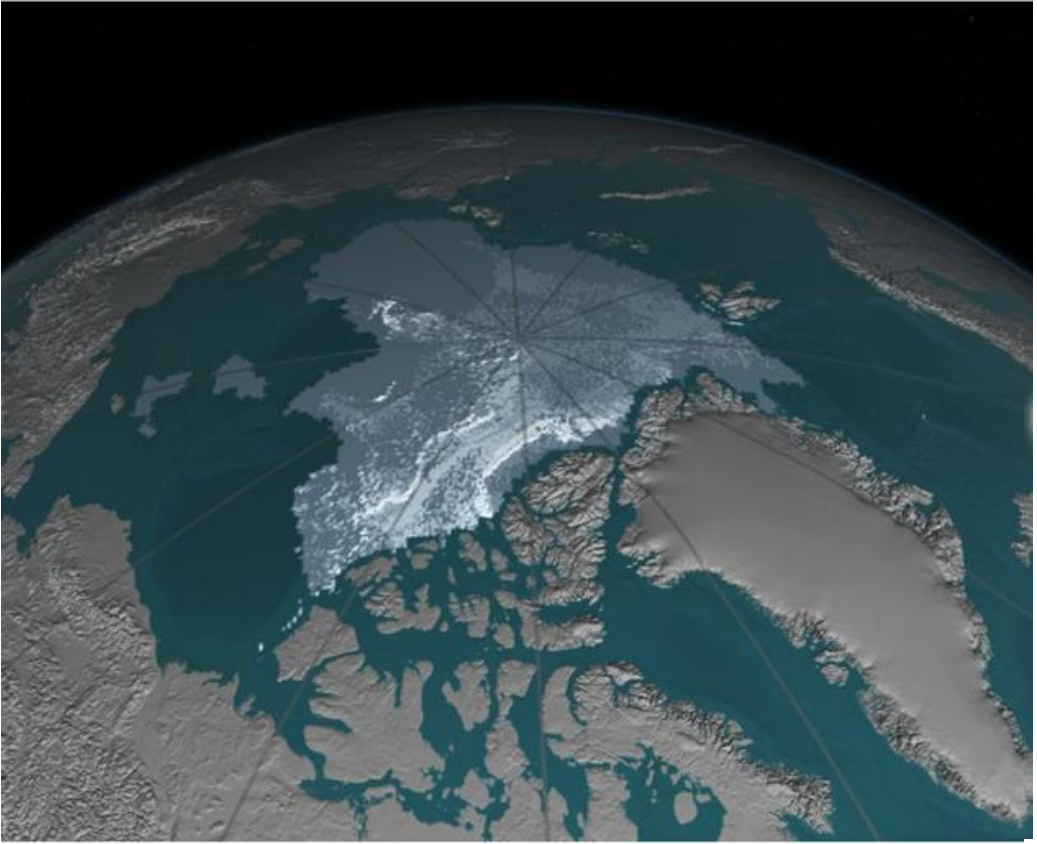
Source:
<http://www.spiegel.de/wissenschaft/natur/klima-globales-meereis-schrumpft-dramatisch-a-1122089.html>





Marine Ice is Shrinking Dramatically in the Arctic...

2016



Source:
<http://www.spiegel.de/wissenschaft/natur/klima-globales-meereis-schrumpft-dramatisch-a-1122089.html>

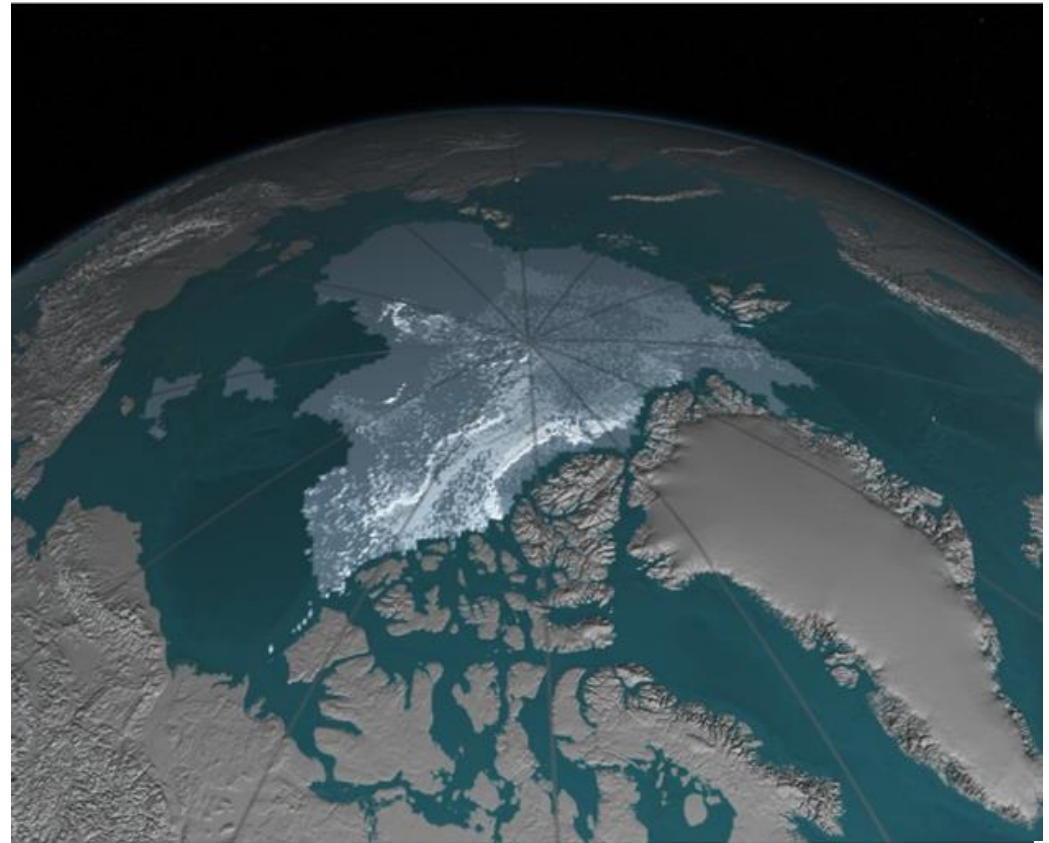


Marine Ice is Shrinking Dramatically in the Arctic...

2016

- ✓ **We need to take action now.**
- ✓ **No time to lose...**

Source:
<http://www.spiegel.de/wissenschaft/natur/klima-globales-meereis-schrumpft-dramatisch-a-1122089.html>



Ice Shrinking in the Arctic...

- The Guardian, 24 August:

Russian tanker sails through Arctic without icebreaker for first time

Climate change has thawed Arctic enough for \$300m gas tanker to travel at record speed through northern sea route



The Christophe de Margerie carried a cargo of liquefied natural gas from Hammerfest in Norway to Boryeong in South Korea in 22 days.

theguardian



Thank You For Your Attention

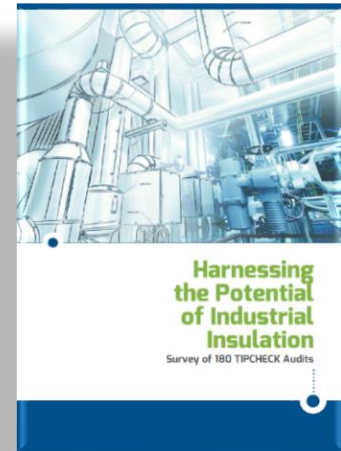
European Industrial Insulation Foundation

Avenue du Mont-Blanc 33
1196 Gland (Geneva)
Switzerland

Andreas Gürtler
Foundation Director

T: +41 22 995 00 - 70
F: +41 22 995 00 - 71
E: andreas.guertler@eiif.org

www.eiif.org



Survey of 180 thermal
energy audits in EU industry

Download on www.eiif.org

