



Energy Efficiency

Financial Institutions Group

De-Risking Energy Efficiency Investments Project (2016-2017)

THE EEFIG

DE-RISKING ENERGY EFFICIENCY PROJECT

The EEFIG highlighted among others the following problems:

- **Lack of evidence** on the performance of energy efficiency investments makes the benefits and the financial risk harder to assess.
- **Lack of commonly agreed procedures and standards** for energy efficiency investment underwriting increase transaction costs.

The Commission and UNEP FI have taken these recommendations for the implementation and development of energy efficiency related policies, and the project 'the De-risking Energy Efficiency Investments' which addresses these problems through:

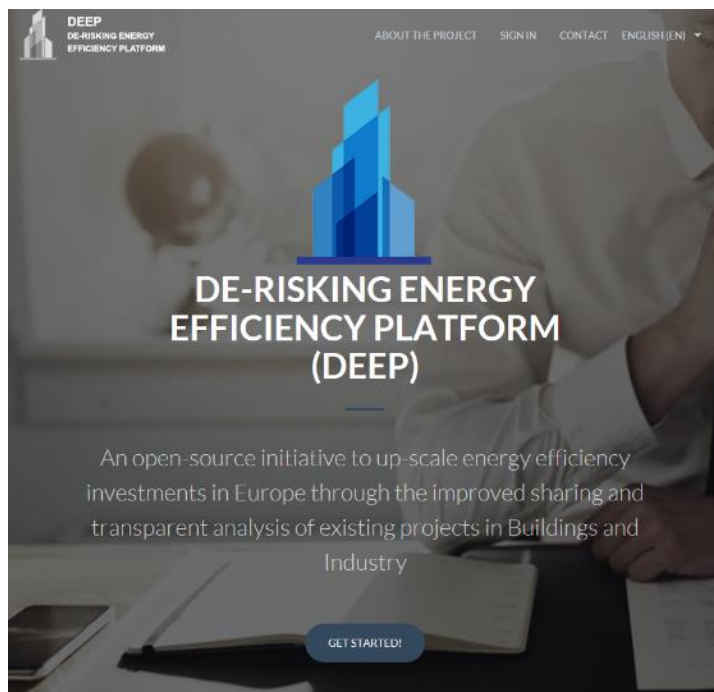
- Creation of an open source database for energy efficiency investments performance monitoring and benchmarking with interpretation of gathered data and investments risk/performance modelling. The database (called “the **EEFIG De-risking Energy Efficiency Platform**” or 'DEEP', www.deep.eefig.eu)
- Development of common, accepted and standardized underwriting and investment framework for energy efficiency investing. A value and risk appraisal framework (called “the **EEFIG Underwriting Toolkit**”, www.valueandrisk.eefig.eu)



DEEP

DE-RISKING ENERGY EFFICIENCY PLATFORM

THE DE-RISKING ENERGY EFFICIENCY PLATFORM (DEEP)



- Launched in 2016 in close coordination with and support of the Commission's launch of the Clean Energy for All Europeans package.
- An open source database for energy efficiency investments performance monitoring and benchmarking.
- Objective is to improve the understanding of the real risks and benefits of energy efficiency investments based on market evidence and track record.
- Translated into English, German, French, Italian, Spanish and Polish.

The data covers (in 20 simple fields and 200 advanced fields):

- Project and sector information
- The energy efficiency investment measures
- Energy consumption data before and after
- Financial indicators
- Qualitative indicators (reasons for investment and benefits realized)

The absolute minimum information for a project to be included in DEEP are:

- Country
- Building/industry
- Measures included
- Investment in EUR
- Energy saving in EUR and/or Energy saving in kWh
- Has the energy saving been independently verified

AVAILABLE DATA (DECEMBER 2017)



Available data for 10,000+ energy efficiency projects (5,152 in buildings and 5,014 in industry), contributed by 25+ data providers.



AVAILABLE DATA (DECEMBER 2017)

	Buildings	Industry	Total Projects
Germany	1,774	2,216	3,990
United Kingdom	435	1,249	1,684
Poland	774	19	793
Austria	97	484	581
United States	182	376	558
Italy		545	545
France	543		543
Belgium	393	57	450
Lithuania	356		356
Ireland	179	2211 projects (~22%) were contributed by The EU Merci Project	179
Bulgaria	177		177
Hungary	68		68
Croatia	44		44
Slovak Republic	35		35
Netherlands		27	27
Latvia	15		15

OVERALL RESULTS (DECEMBER 2017)



DEEP
DE-RISKING ENERGY
EFFICIENCY PLATFORM



Energy Efficiency
Financial Institutions Group

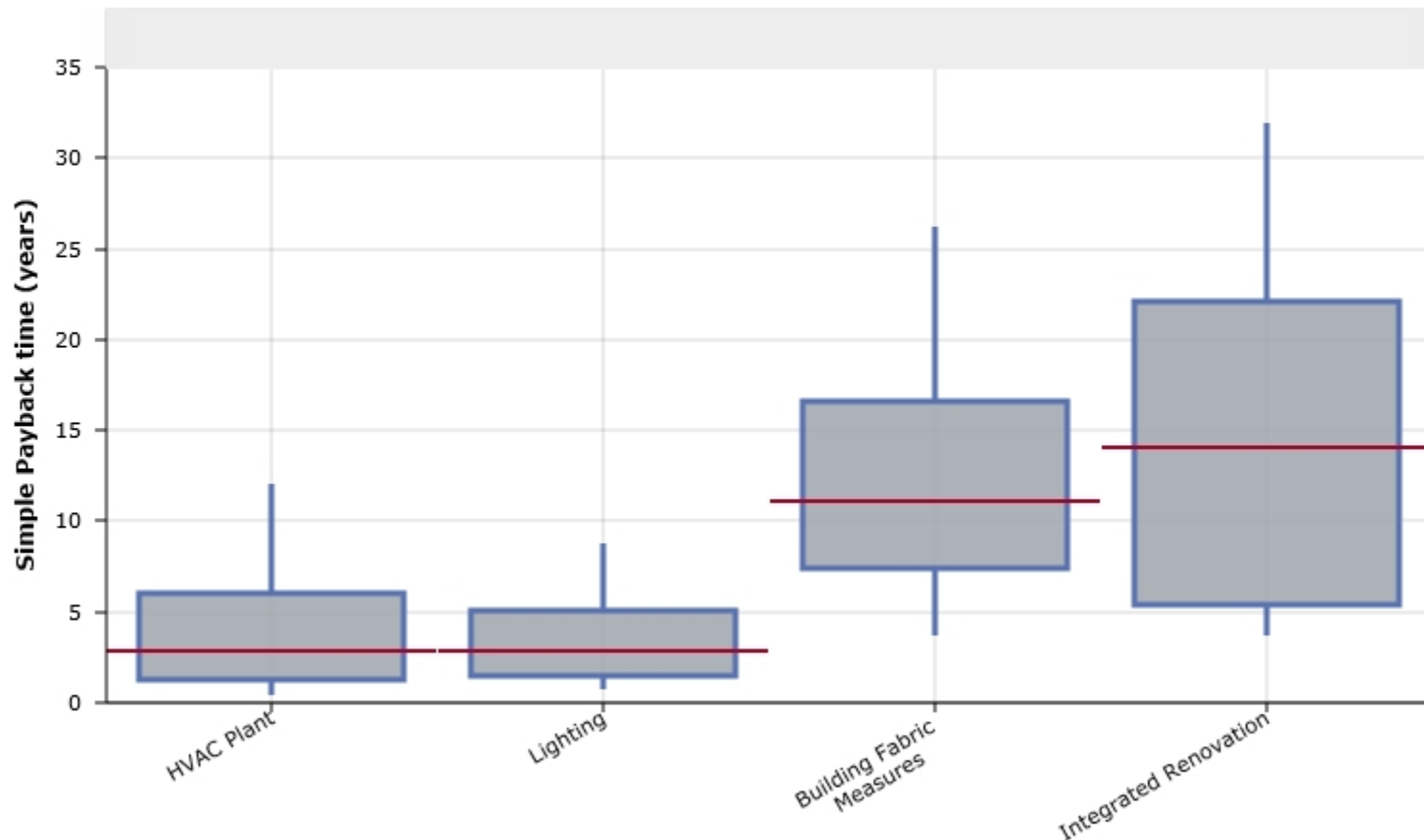


RESULTS FOR BUILDINGS

— PAYBACK PER MEASURE TYPE

HVAC and Lighting projects have a median payback time of around 3 years, whereas Building Fabric Measures have a median payback time of around 11 years.

Distribution of payback time on 10%, 25%, 75% and 90th percentiles - Measure types

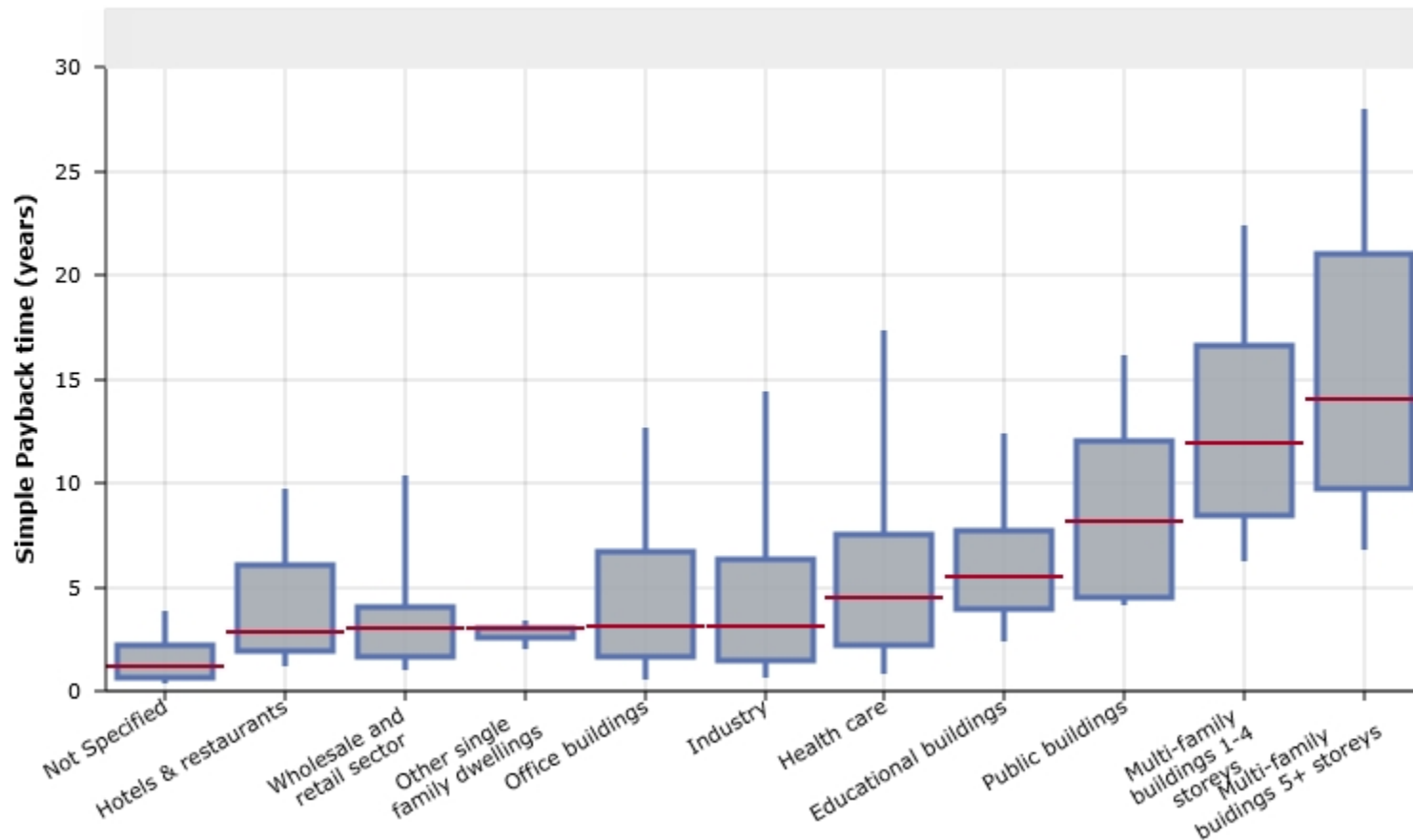


RESULTS FOR BUILDINGS

— PAYBACK PER BUILDING TYPE

Commercial buildings tend to implement shorter pay-back measures (HVAC and Lighting), whereas renovation of multi-family buildings often focus on Building Fabric measures.

Distribution of payback time on 10%, 25%, 75% and 90th percentiles - Building types

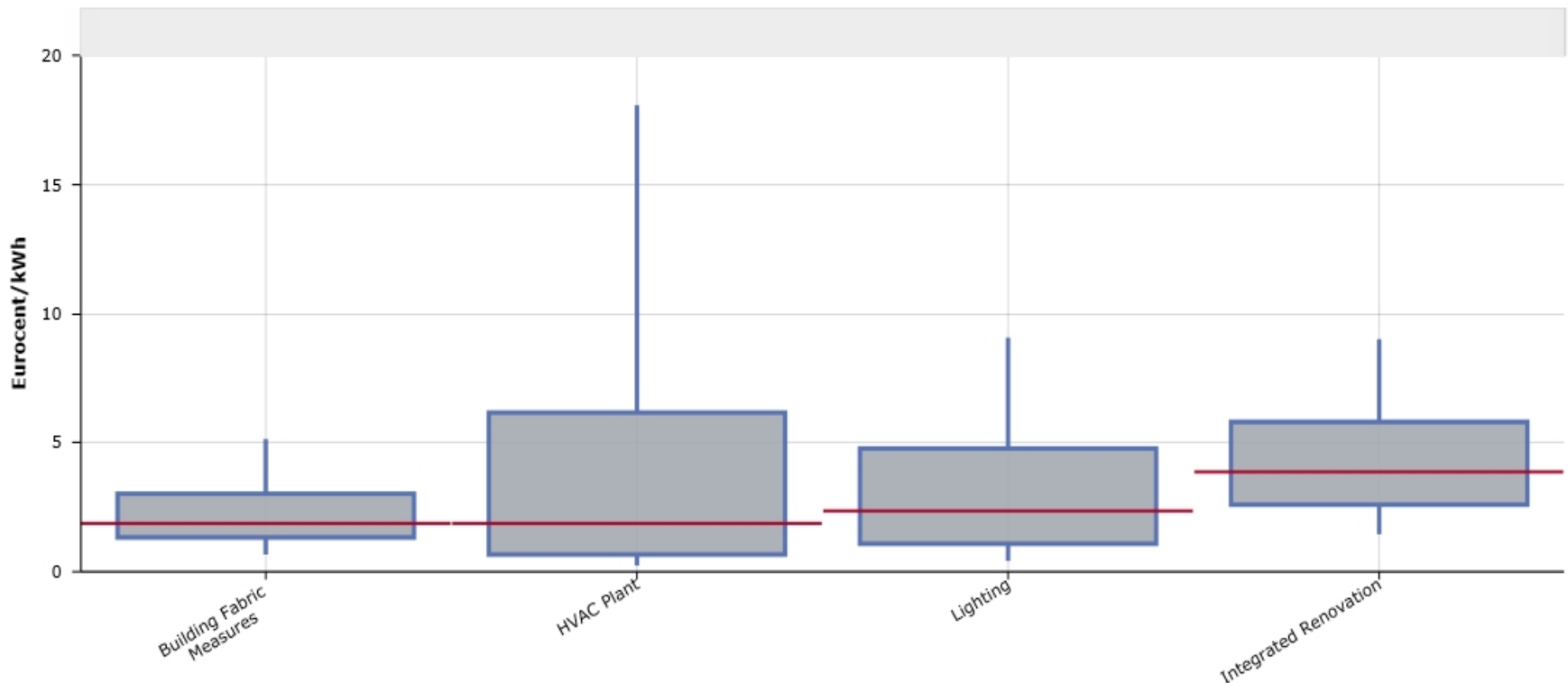


RESULTS FOR BUILDINGS

— AVOIDANCE COST PER MEASURE

The avoidance cost of Building Fabric over the lifetime of a measure compares favourably to the avoidance cost for HVAC and Lighting.

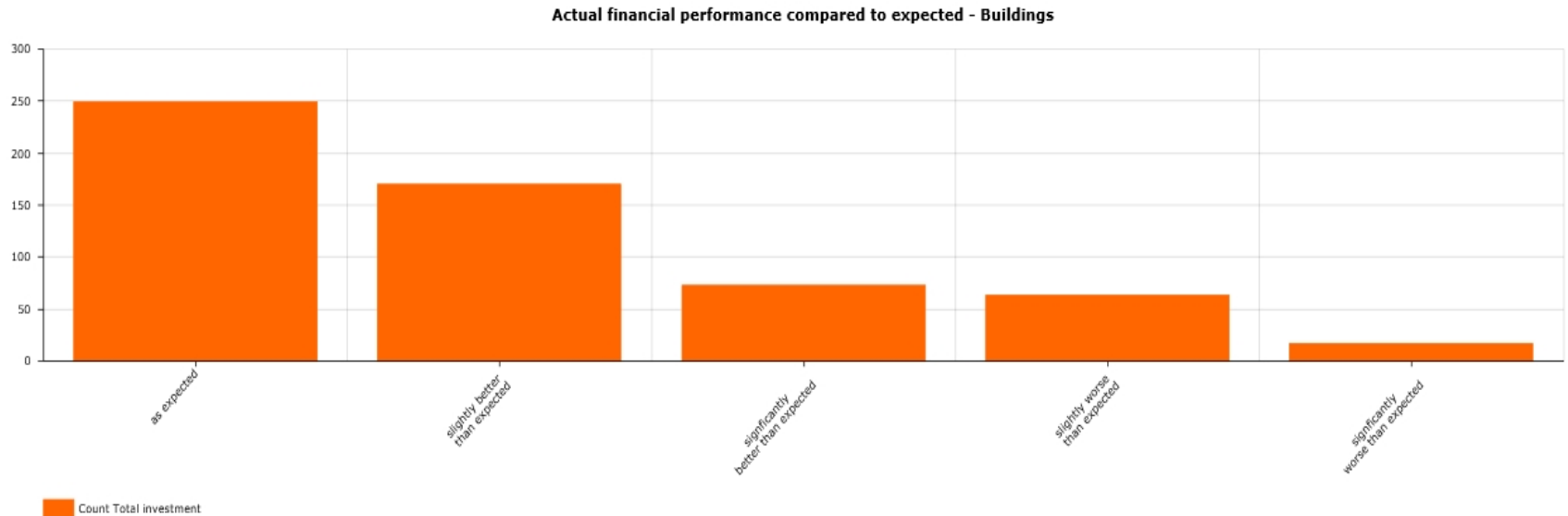
Avoidance cost per measure on 10%, 25%, 75% and 90th percentiles - (Eurocent/kWh)



RESULTS FOR BUILDINGS

— FINANCIAL PERFORMANCE

Building projects on average are perceived to perform on or slightly better than expectations.

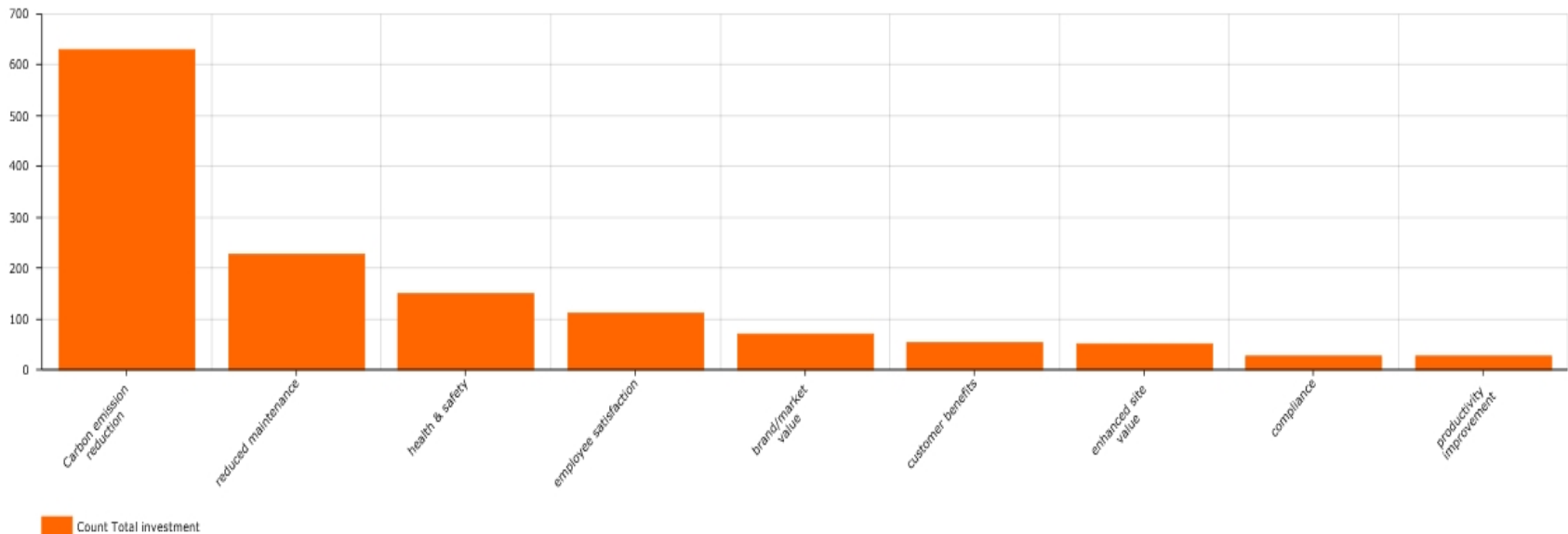


RESULTS FOR BUILDINGS

— ADDITIONAL BENEFITS

Many project owners see carbon emission reductions as a co-benefit from energy renovation, but also that reduced maintenance, health benefits and employee satisfaction are recognized as additional value created by the projects.

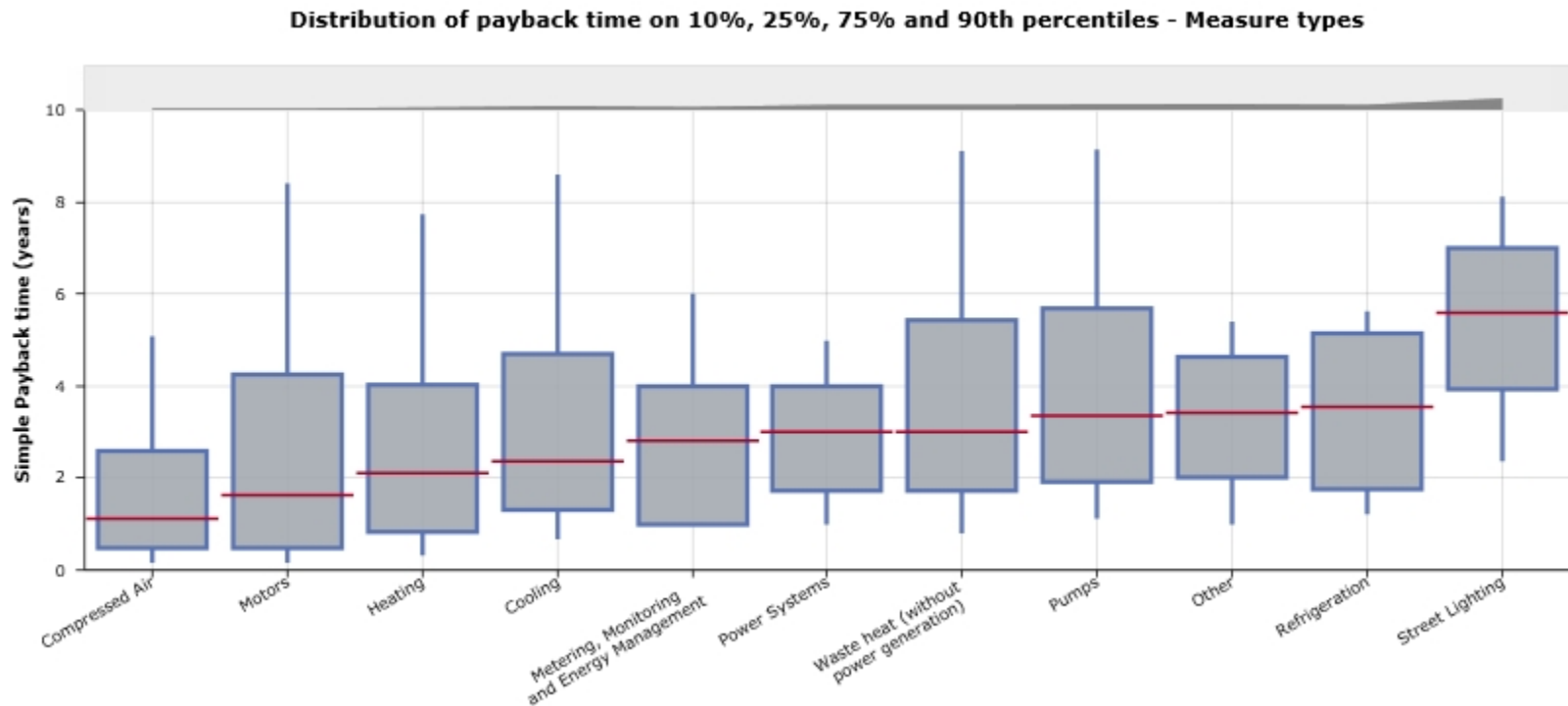
Actual financial performance compared to expected - Buildings



RESULTS FOR INDUSTRY

— PAYBACK TIME PER MEASURE TYPE

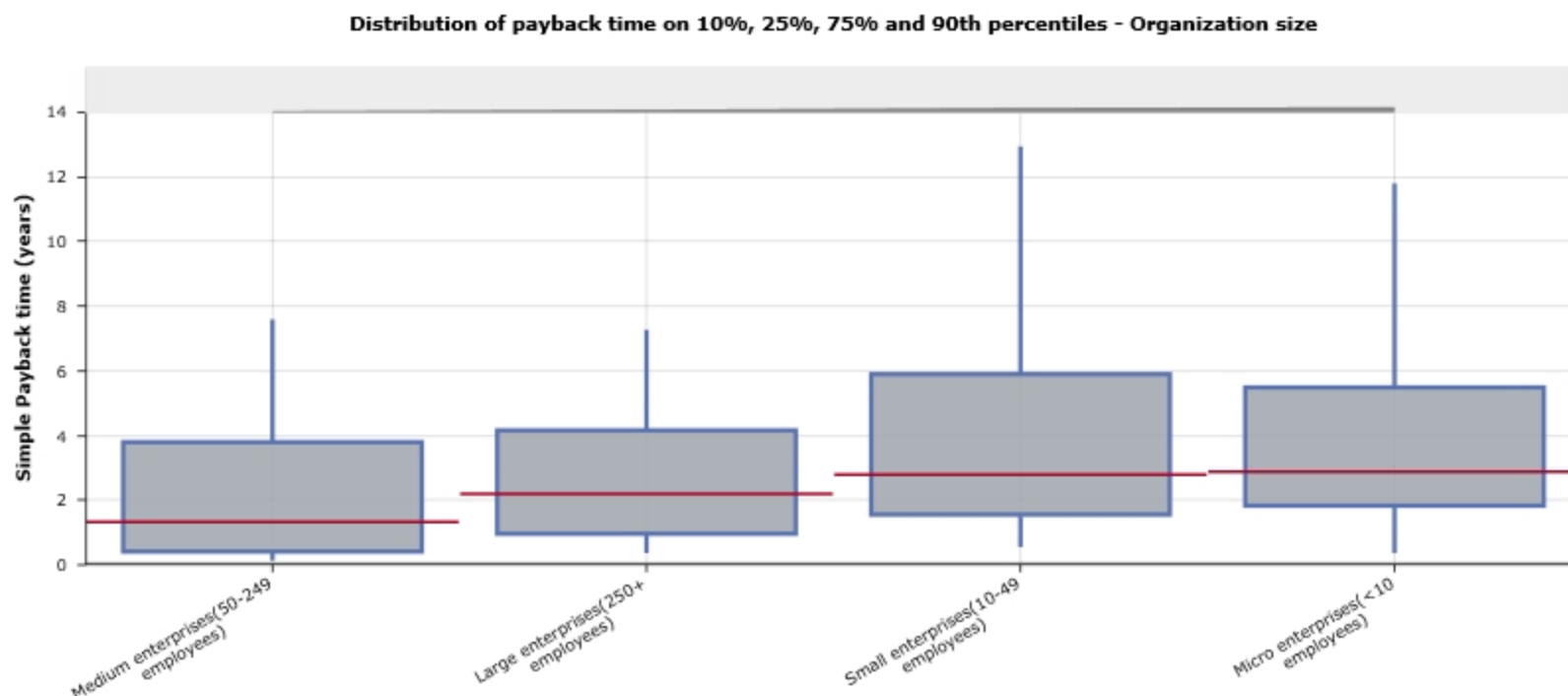
Projects such as compressed air, motors, heating and cooling have median payback times in the range 1 to 2.5 years, whereas projects such as waste heat recovery, pumps and refrigeration have median payback times in the 3-4 year range. This matches common experience and the higher degree of complexity in these kinds of projects.



RESULTS FOR INDUSTRY

— PAYBACK TIME PER ORGANIZATION SIZE

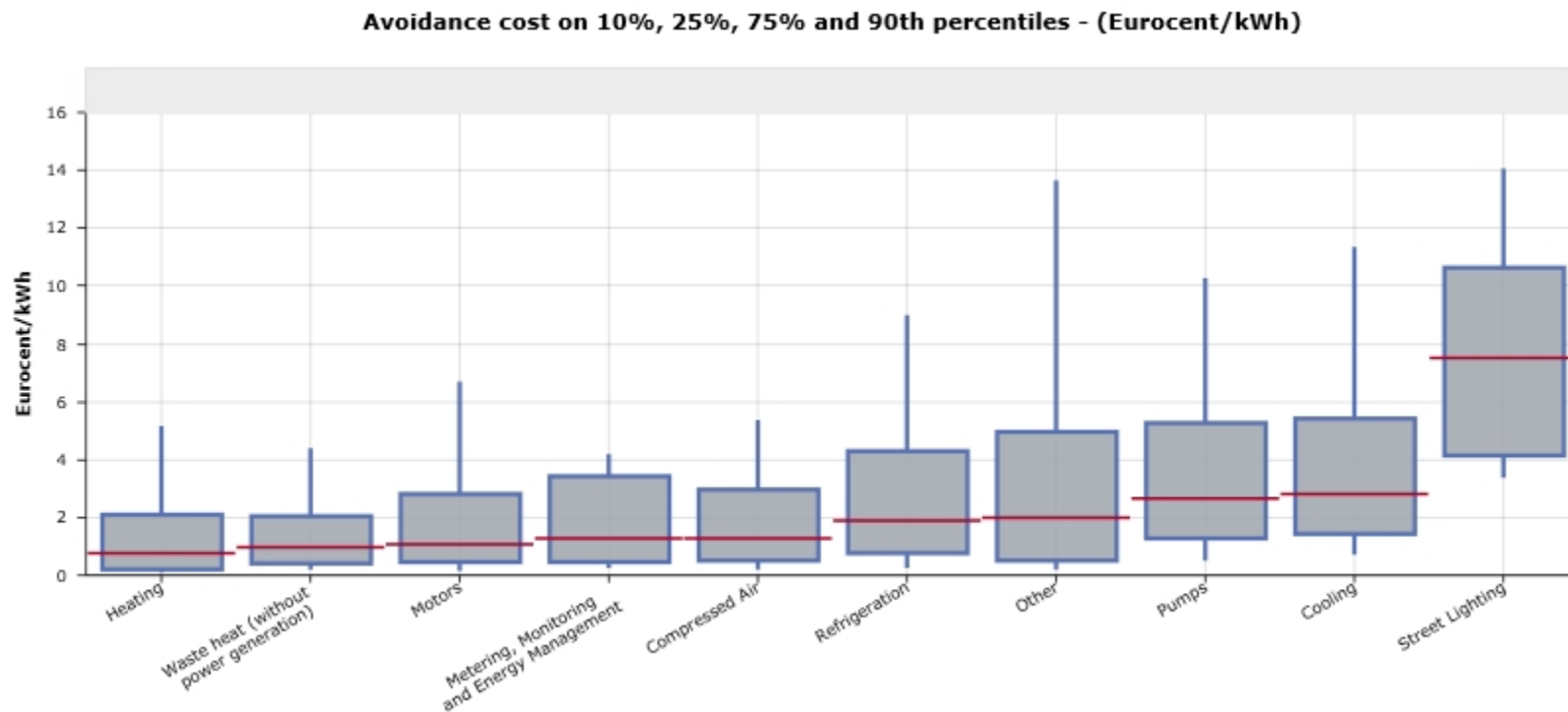
Larger enterprises implement projects with shorter payback time than SMEs. This does not appear to reflect a different selection of types of measures but rather that projects at larger enterprises are more cost effective (due to increasing return to scale). This underlines that SMEs have an additional challenge in relation to energy efficiency investments.



RESULTS FOR INDUSTRY

— AVOIDANCE COST

The median avoidance cost for all measures for which data is available is significantly lower than the basic electricity prices for industrial consumers without taxes and levies in all EU28 countries (even with a 10% discount rate).

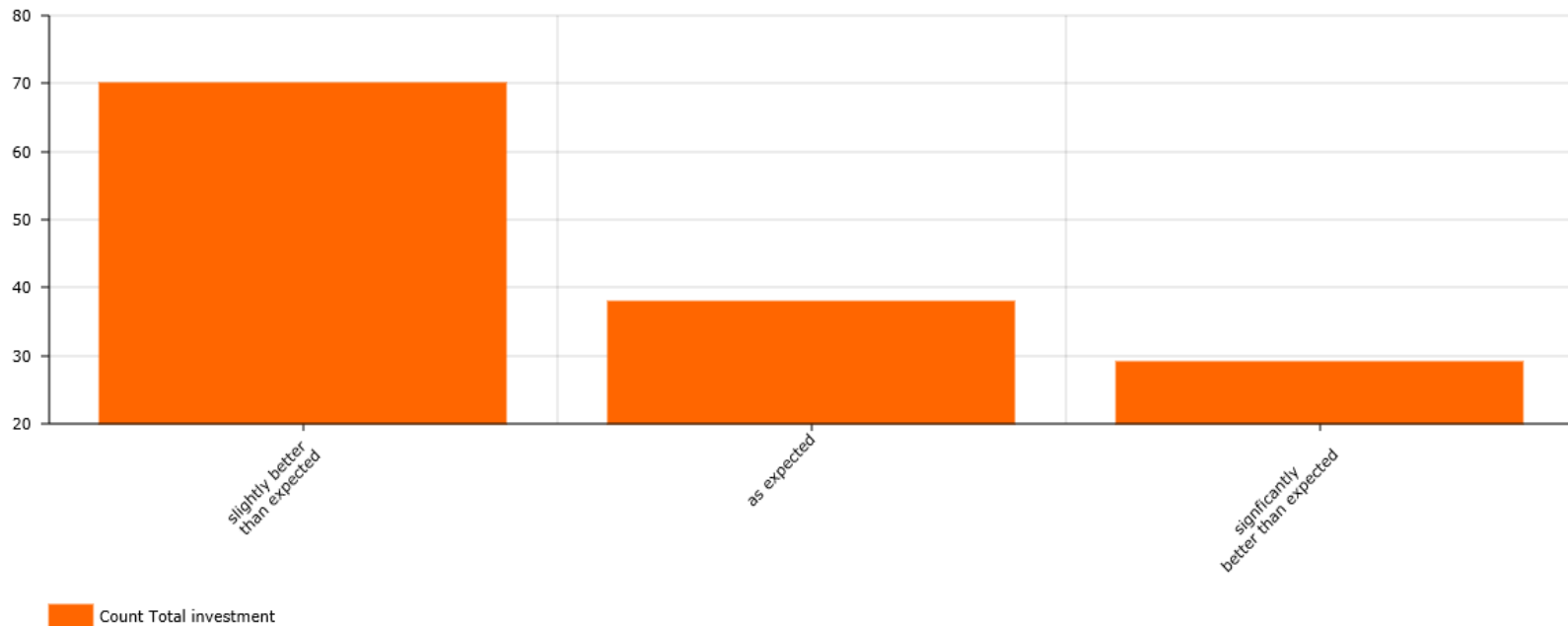


RESULTS FOR INDUSTRY

— FINANCIAL PERFORMANCE

Projects consistently perform on or above expectations which as in buildings is perhaps surprising and worthy of further research.

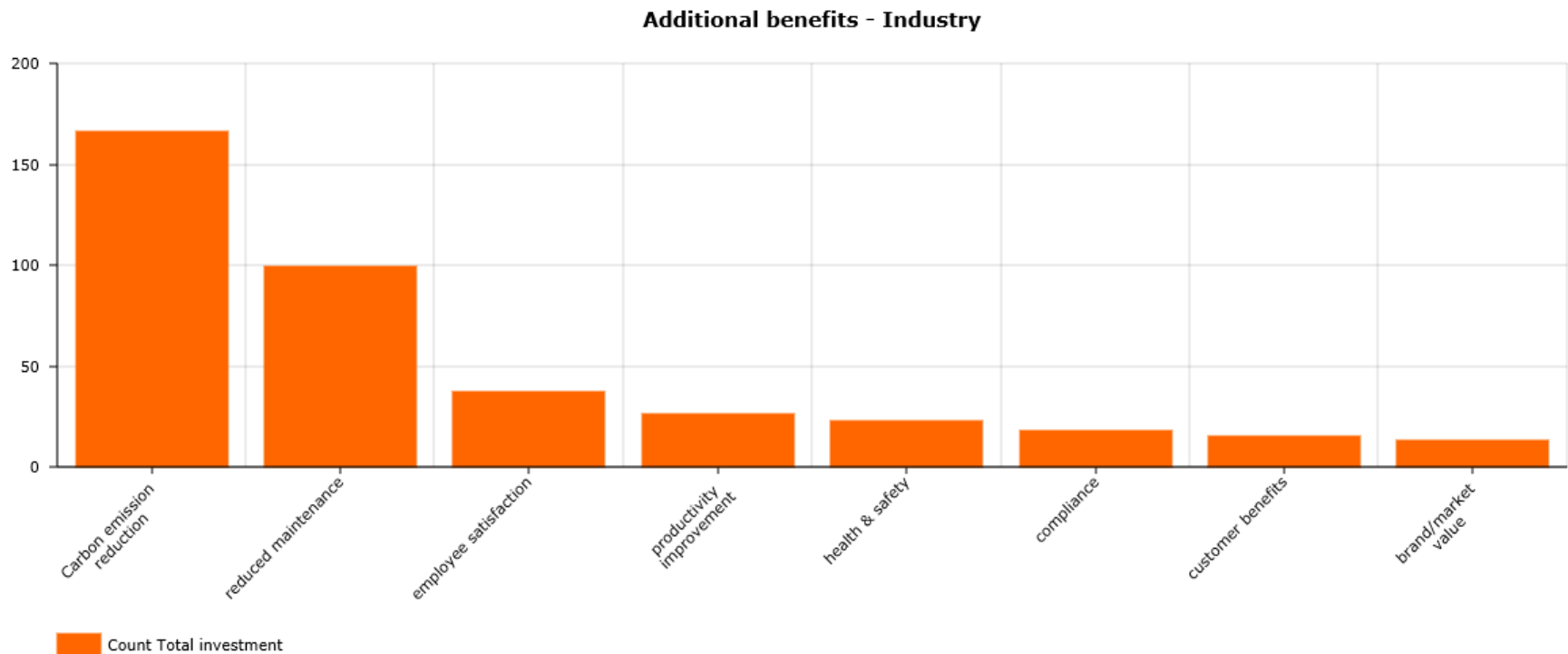
Actual financial performance compared to expected - Industry



RESULTS FOR INDUSTRY

- ADDITIONAL BENEFITS

Project owners see carbon emission reductions as a co-benefit from energy renovation, but also that reduced maintenance, employee satisfaction and productivity improvements are recognized as additional value created by the projects.



THE EEFIG UNDERWRITING TOOLKIT



- Launched at EU Sustainable Energy Week 2017 with keynote speeches by Maroš Šefčovič, Vice-President, Energy Union, European Commission and Erik Solheim, Executive Director, UN Environment.
- Hard copies and on-line (www.valueandrisk.eefig.eu)
- Resources (www.valueandrisk.eefig.eu/resources)
- Translated into English, German, French, Italian, Spanish and Polish

AUDIENCES

- Senior management
- Valuation and risk teams
- Originators & project developers

OBJECTIVE



This Toolkit aims to assist financial institutions to scale up their deployment of capital into energy efficiency. It was compiled with several objectives in mind:

- to help originators, analysts and risk departments within financial institutions better understand the nature of energy efficiency investments and therefore better evaluate both their value and the risks.
- to provide a common framework for evaluating energy efficiency investments and analysing the risks that will allow training and capacity building around standardised processes and understanding.
- to help developers and owners seeking to attract external capital to energy efficiency projects to develop projects in a way that better addresses the needs of financial institutions.
- to foster a common language between project developers, project owners and financial institutions.



1. **“Financial institutions and energy efficiency”**, sets out the arguments why financial institutions should be interested in deploying capital into energy efficiency, namely: business opportunity, risk reduction, Corporate Social Responsibility, and regulatory pressure.
2. **“Financing Energy Efficiency”**, sets out the different ways in which energy efficiency can be financed and the types of structures and contracts that can be used. It is aimed primarily at origination teams and project developers.
3. **“The Project Life Cycle”**, describes the overall process of developing and executing an energy efficiency project.
4. **“Value and Risk Appraisal”**, identifies the various sources of value that can be created by energy efficiency projects (including non-energy benefits).
5. An **on-line Resources** which can be used to access more detailed information on specific topics.

ENERGY EFFICIENCY BENEFITS/VALUES



The Toolkit explains the multiple benefits/values (additional value beyond the pure energy saving) created by energy efficiency projects.

- Energy
 - Savings
 - Reduced impact of energy price volatility
 - Reduced need to spend capex
- Non-energy
 - Asset value
 - Productivity
 - Health & well-being
 - Etc etc
- Non-energy benefits can be much more strategic and attractive to decision makers than just energy savings.
- Financial appraisal needs to identify and value all benefits.



ENERGY EFFICIENCY RISKS AND MITIGATION STRATEGIES



The Toolkit explains the following sources of common risks in energy efficiency projects and discusses possible risk mitigation strategies:

- Performance risks
- Design risks
- Equipment risks
- Operational and maintenance risks
- Weather risks
- Changes in hours of use, production volume and patterns of building usage
- Energy price risks
- Construction risks (and credit risks during construction/installation)
- Risks associated with other costs and benefits
- Regulatory risks
- Consumer credit law risk

FOR MORE DETAILS
- SEE THE ONLINE VERSION



EEFIG UNDERWRITING TOOLKIT

Value and Risk Appraisal for Energy Efficiency Financing

A tool to assist financial institutions to scale up the deployment of capital into energy efficiency



Introduction



Financial Institutions
and Energy Efficiency



Financing Energy
Efficiency



The Project Life Cycle



Value and Risk
Appraisal



Resources



I strongly recommend this toolkit to project promoters, banks, financial institutions and anyone else interested in financing energy efficiency.

Foreword by Maroš Šefčovič, European Commission VP



I recommend this toolkit to any policy maker, investor, business, developer or citizen seeking a more inclusive, green economy.

Foreword by Erik Solheim, UN Environment

<http://eefig.eu/index.php/underwriting-toolkit>



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European
Copper Institute
Copper Alliance



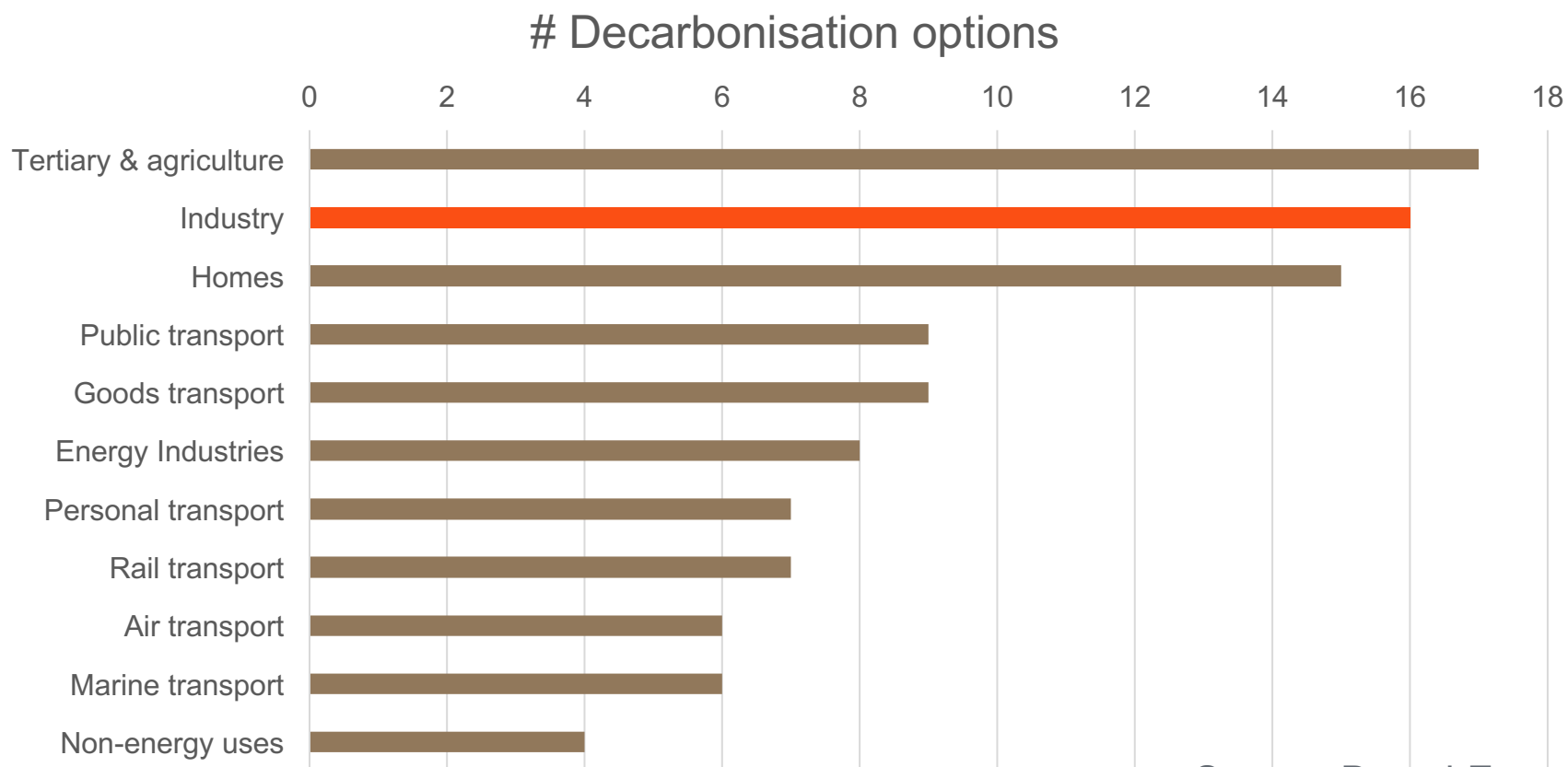
The challenges of decarbonising industry in a decarbonising Europe

Hans De Keulenaer
Final Conference of the EU-MERCI project, January 23, 2018, London



Mapping 20 decarbonisation options for 10 energy sectors

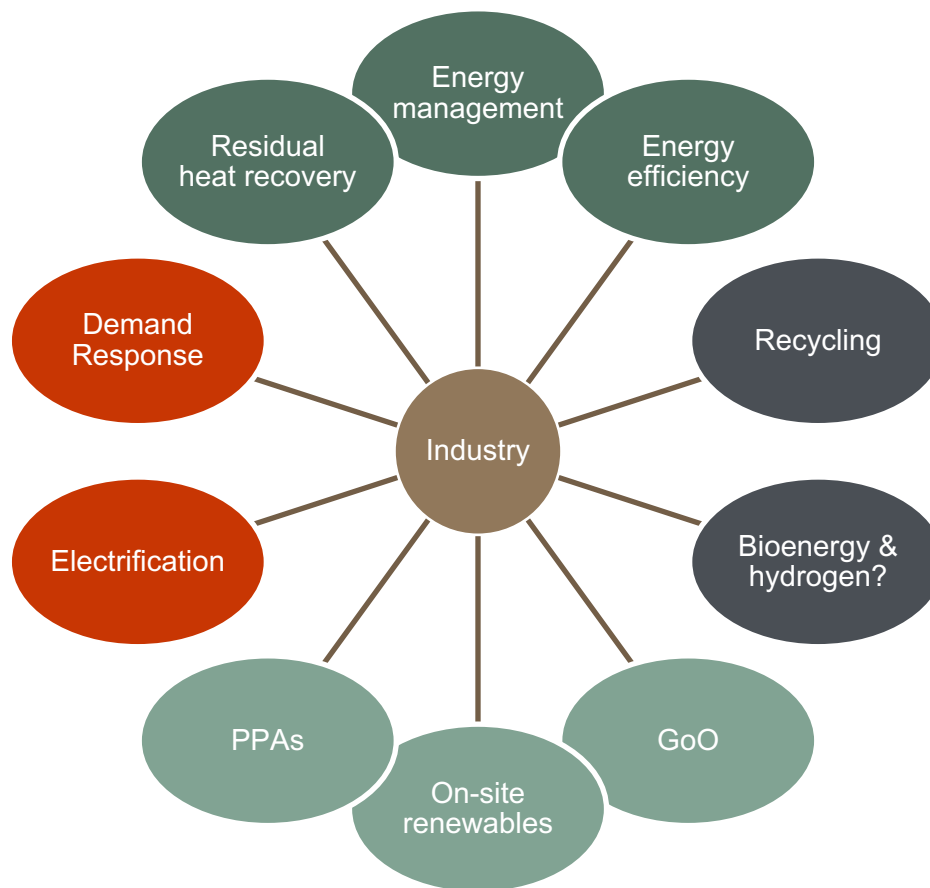
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Source: DecarbEurope

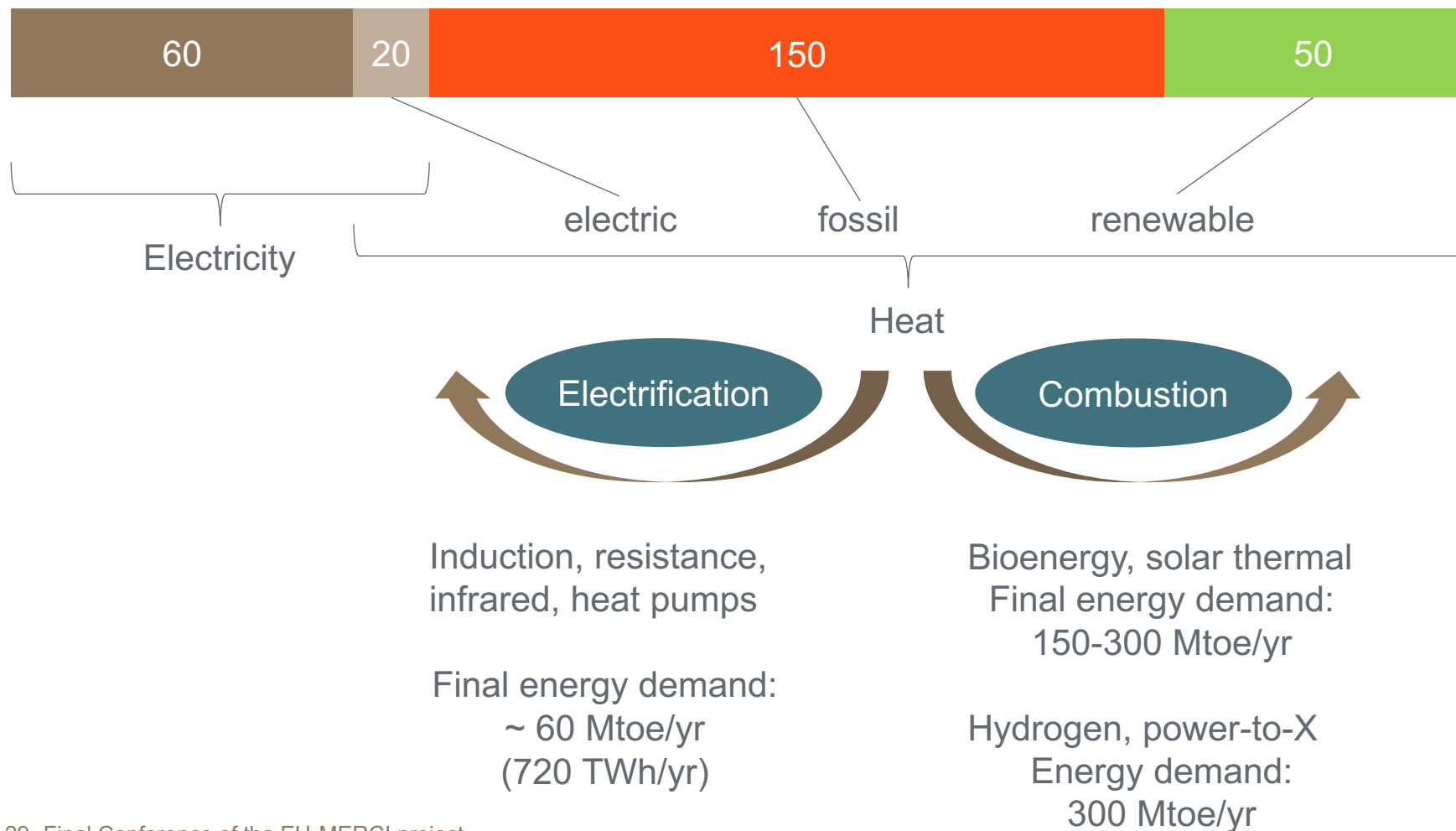
Decarbonization pathways for industry

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Decarbonisation of heat in industry (energy demand in Mtoe/yr)

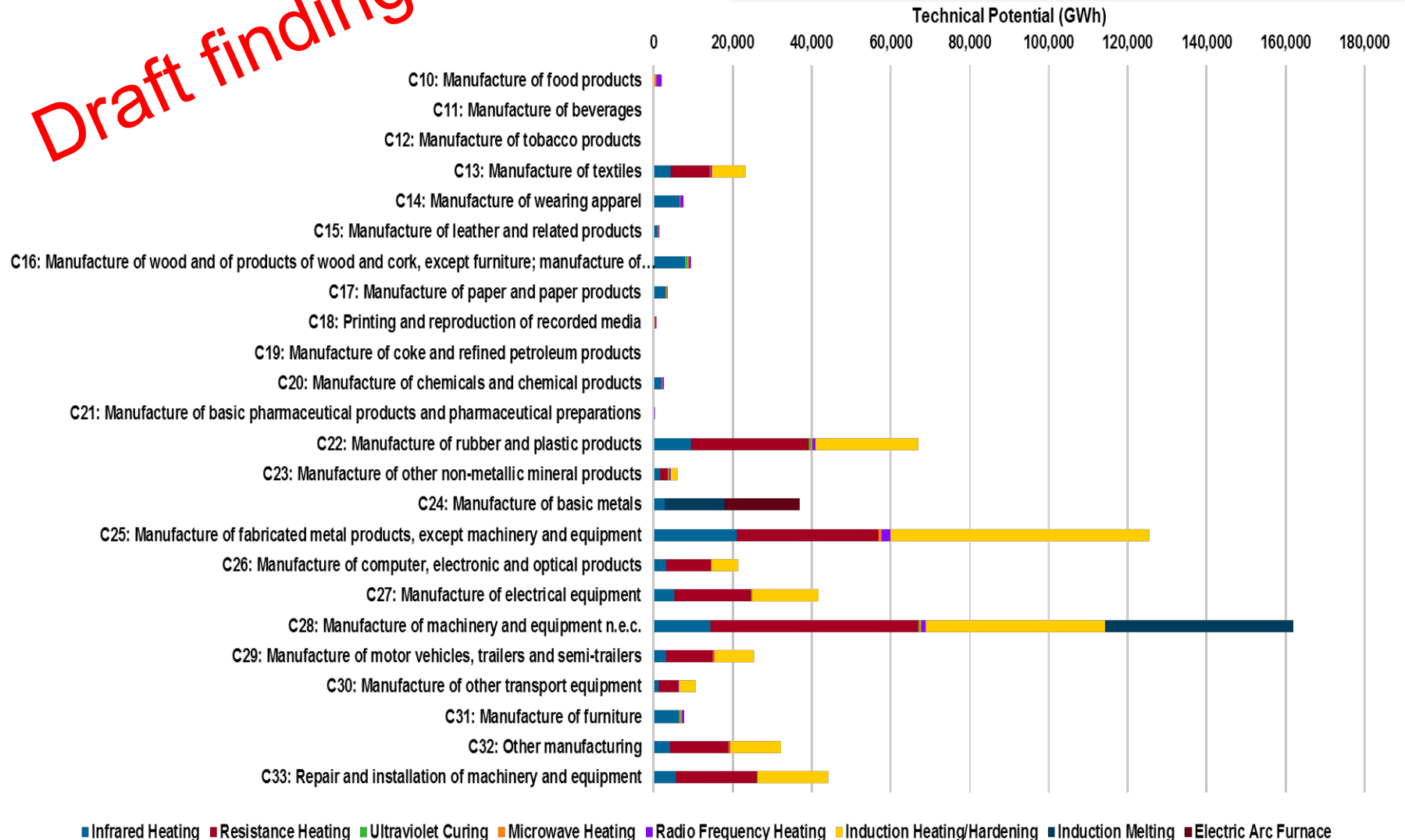
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Technical Potential Results

Draft findings

Technical potential: Considers the full potential regardless of payback



- » the energy consumption / demand and the efficient use of energy, is highly influenced by
 - » **degree of complexity and energy content of** recycling materials / concentrates
 - » environmental and resources **protection obligations**
 - » requirement of **flexible** energy use -> because of increasing volatile RE
 - » customer needs -> **complex products** with special requirements
 - » **site expansions** - new installations, operations, approaches, ...

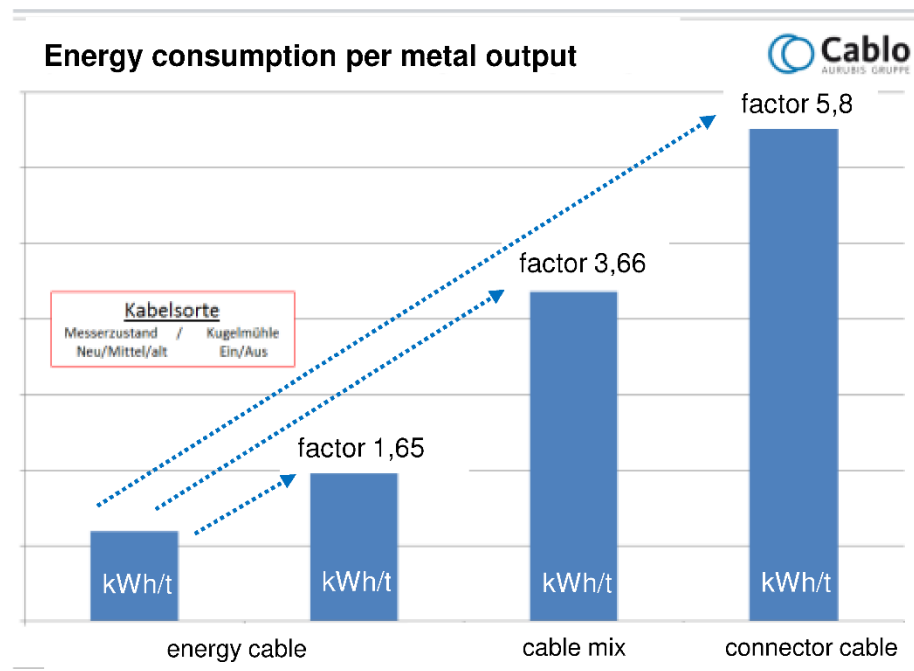


Legally requirements such as binding energy efficiency targets cannot solve such contradictions. The focus should not be on the energy consumption within the industrial process chains, but rather on the life cycle of products.

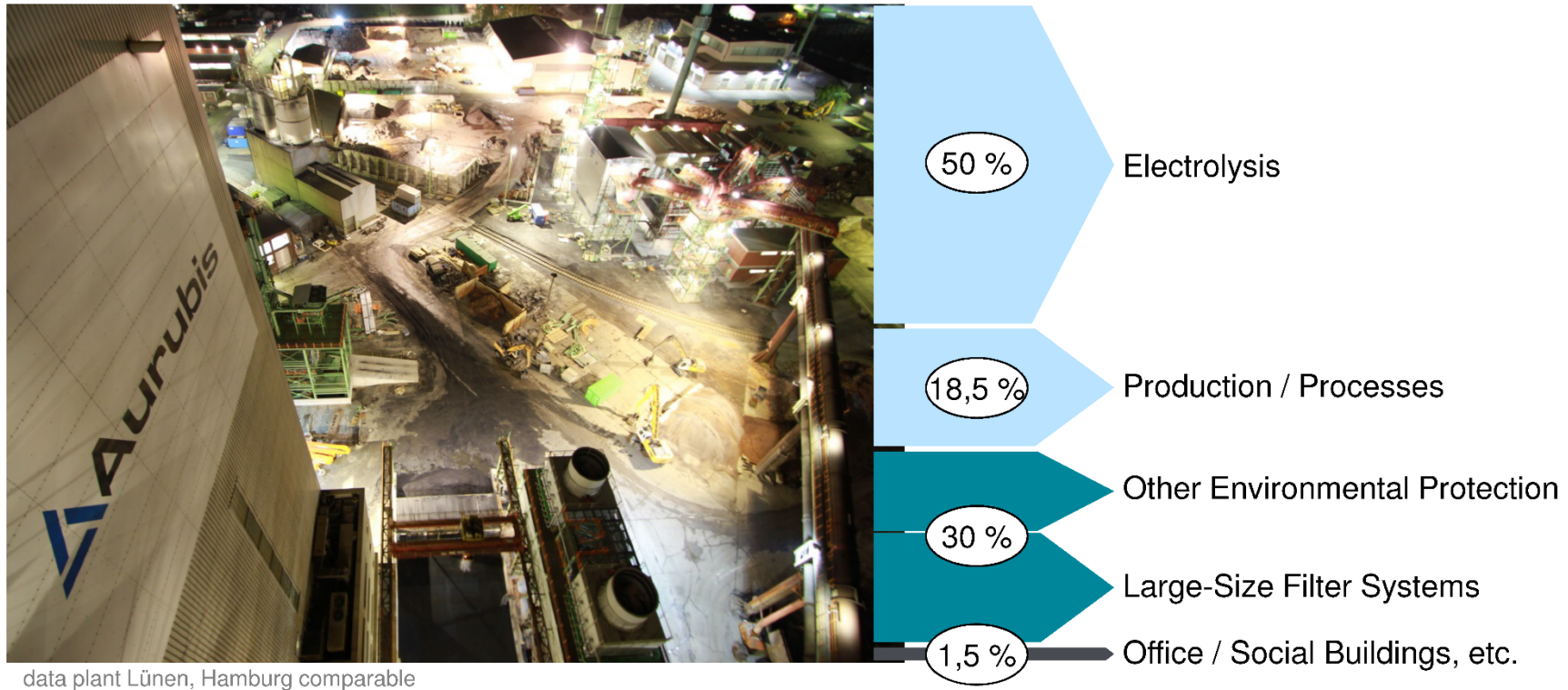
Challenges of energy and resource efficiency

– one demonstrative example

- » Continuous **improvement of energy efficiency** – **contrary effects**
 - » currently the energy efficiency is decreasing (+3 % energy increase)
 - » implemented energy efficiency measures are not visible in the total energy consumption in comparison to the previous year
 - » Reason: energy efficiency is depending on the handling of different types of cables - respectively the availability of the cables on the market

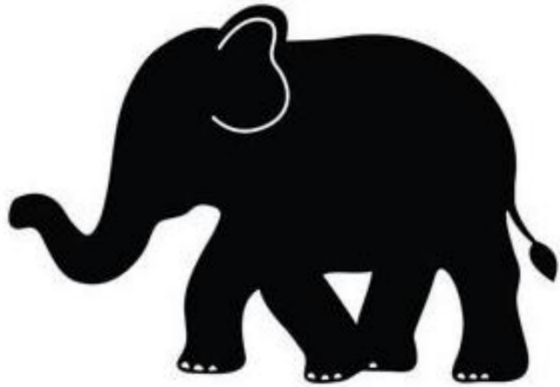


30% of the electricity consumption is needed for environmental measures



On average, about one-third of total capital expenditure in the Aurubis Group has been used for environmental protection.

The battle – demand response audit



5 – 15 days



17.347 €/year



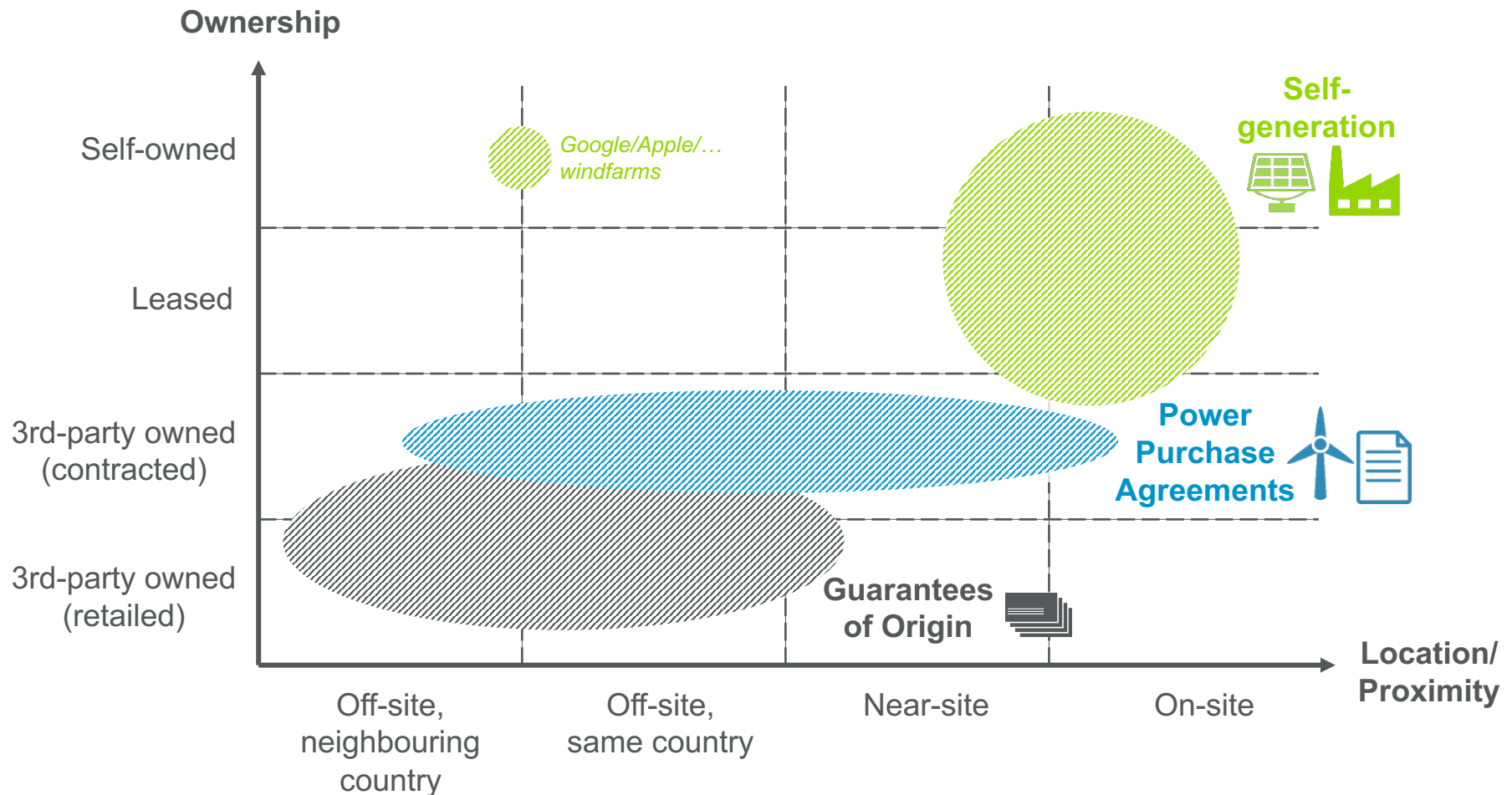
≈ 2 hours



16.988 €/year

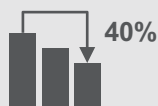


3 RENEWABLE ELECTRICITY SOURCING METHODS: OWNERSHIP AND LOCATION



THEORETICAL VOLUMES OF CERTIFICATE MARKETS IN 2030

Cap-and-trade allowances



GHG emissions

Size

Abatement*

1,333M
EUAs1,333M
tCO₂

In the year 2030, **1,333M** emission allowances are expected to be in circulation within the cap-and-trade system, equalling CO₂ abatement of **1,333M tCO₂**.*

* CO₂ abatement from different certificate schemes are *not additive*, as schemes overlap across sectors. For example, reduction or replacement of electricity consumption arguably does not reduce CO₂ emissions at all, as the power sector underlies the EU-ETS and energy efficiency measures or renewable energy generation have no direct impact on the pre-defined cap. Emission reductions in non-ETS sectors, however, can certainly be considered additional.

Tradable savings obligations



30% Energy efficiency

Size

Abatement*

283M
EECs~ 425M
tCO₂

In the year 2030, the potential volume of Energy Efficiency Certificates within the EU is **283M**, assuming that half of the efficiency target is achieved through Energy Savings Obligations across all sectors. CO₂ abatement depends on the development of emission and primary energy factors. Within the electricity and heating sectors, EECs could bring CO₂ abatement of **415M - 439M tCO₂** in 2030.

Voluntary markets for GOs



Renewable energy

Size

Abatement*

3,245M
GOs~ 1,470M
tCO₂

In the year 2030, the potential volume of Guarantees of Origin for renewable energy within the EU is **3,245M**, if energy tracking systems were introduced in all sectors. CO₂ abatement depends on the development of emission factors of conventional energy. Within the electricity and gas sectors, GOs could bring CO₂ abatement of **1,440M – 1,500M tCO₂** in 2030.

Industry has **many decarbonization pathways**

Carbon impact of **other regulatory requirements** (environment, circular economy) needs to be taken into account

The copper industry has **reduced its unit energy consumption by 60%** since 1990

A **stable investment climate** is needed for industry to map out our decarbonization strategies

Electrification provides a very promising decarbonization pathway, particularly for metal industries

Industry could provide **demand-side flexibility** in the right market framework