

# FIRE SAFETY AND SUSTAINABILITY IN STRATEGIC INDUSTRY SECTORS

*How can Flame Retardants  
contribute?*

WEDNESDAY 15 NOVEMBER 2023  
11.00 - 13.00 CET

ONLINE

# Welcome & Introduction

Adrian Beard & Esther Agyeman-Budu

Cefic sector group 

The European Chemical Industry Council, AISBL – Rue Belliard, 40 - 1040 Brussels – Belgium  
Transparency Register n°64879142323-90



# Housekeeping



- ✓ Keep your microphone muted during the session.
- ✓ Turn off your camera for the duration of the meeting.
- ✓ Use the chat feature to ask questions.
  - ✓ Question and answer sessions are scheduled after each presentation and during the panel discussion.
  - ✓ If your question is not addressed during the session, please email it to [pinfa@cefic.be](mailto:pinfa@cefic.be)
- ✓ A Mentimeter exercise will follow the coffee break, the link is in the chat.
- ✓ For technical issues, contact your IT support.
- ✓ Note that the event will be recorded.
- ✓ Kindly refrain from asking questions related to pricing and production volumes.



# COMPETITION LAW

## CHECKLIST FOR MEETINGS



Ensure strict performance in areas on:

### Oversight / Supervision

- Have a Cefic/Sector Group Secretariat representative at each meeting
- Consult with appropriate counsel on all questions which might be related to competition law
- Limit meeting discussions to agenda topics
- Provide each attendee with a copy of this checklist, and have a copy available for reference at all meetings

### Recordkeeping

- Have an agenda and minutes which accurately reflects the matters which occur
- Ensure the review of agendas, minutes and other important documents by appropriate staff or counsel, in advance of distribution
- Fully describe the purposes, structures and authorities of the groups

### Vigilance

- Protest any discussion or meeting activities which appear to violate this checklist
- Ask for those activities to be stopped so that appropriate legal check can be made by counsel
- Dissociate yourself from any such discussion or activities and for the attendees, leave any meeting in which they continue (and have it minuted)

This checklist is for the conduct of Cefic-sponsored meetings. Prohibited discussion topics apply equally to social gatherings incidental to those meetings. The checklist is not exhaustive.

Contact: Quentin Silvestre, Senior Legal Advisor at [qsi@cefic.be](mailto:qsi@cefic.be)



in fact or appearance, discuss or exchange information not in conformity with competition law, including for example on:

### Prices, including

- Individual company/industry prices changes, price differentials, discounts, allowances, credit terms, etc
- Individual company data on costs, production, capacity (other than nameplates capacities), inventories, sales, etc

### Production, including

- Plans of individual companies concerning the design, production, distribution or marketing of particular products, including proposed territories or customers
- Changes in industry production capacity (other than nameplates capacities) or inventories, etc

### Transportation rates

- Rates or rate policies for individual shipments, including basing point systems, zone prices, freight, etc

### Market procedures, including

- Company bids on contracts for particular products; company procedures for responding to bid invitations
- Matters relating to actual or potential individual suppliers or customers that might have the effect of excluding them from any market or influencing the business conduct of firms towards them, etc
- Blacklist or boycott customers or suppliers



# Phosphorus, Inorganic and Nitrogen Flame Retardants Association



# Pinfa Members (EU, China & North America)



# Meet the team



Adrian Beard  
Chairman



Thomas Futterer  
Vice-Chairman



Christian Panofen  
Vice-Chairman



Heiko Tebbe  
Vice-Chairman



Esther Agyeman-budu  
SG Manager



Francesca Filippini  
SG Manager

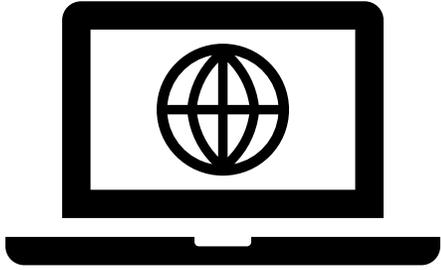


Hannane Haddouch  
Assistant



Chris Thornton  
Communications





[www.pinfa.org](http://www.pinfa.org)



[www.linkedin.com/company/  
pinfa-sector-group-of-cefic/](http://www.linkedin.com/company/pinfa-sector-group-of-cefic/)



[twitter.com/pinfa\\_eu](https://twitter.com/pinfa_eu)

## Pinfa website and social media

# Agenda

Welcome & Introduction	Adrian Beard, pinfa Esther Agyeman-budu, pinfa
Why is fire safety important for strategic industry sectors?	Sander Kroon, pinfa
Megatrends and Fire Safety – Internet of Things and E-Mobility	Jürgen Troitzsch Fire & Environment Protection Service
3D Printed Fire-Retardant Materials: Opportunities and Challenges	Henri Vahabi Université de Lorraine
Testing Challenges in Fire Safety	Eric Guillaume Efectis
Fire Safety and EV	Franck Gyppaz Nexans
The importance of fire safety in E&E-Products for the All Electric Society	Mike Adamik Phoenix Contact
Panel discussion and Q&A	Adrian Beard pinfa
Wrap up & Conclusion	Adrian Beard pinfa
Closure	Adrian Beard pinfa



# Speakers



Mike ADAMIK  
PHOENIX CONTACT GmbH & Co.KG



Eric GUILLAUME  
EFECTIS



Frank GYPPAZ  
NEXANS



Jürgen TROITZSCH  
FIRE & ENVIRONMENT PROTECTION SERVICE



Henri VAHABI  
UNIVERSITÉ DE LORRAINE



# Moderators



Adrian BEARD



Sander KROON



Esther AGYEMAN-BUDU



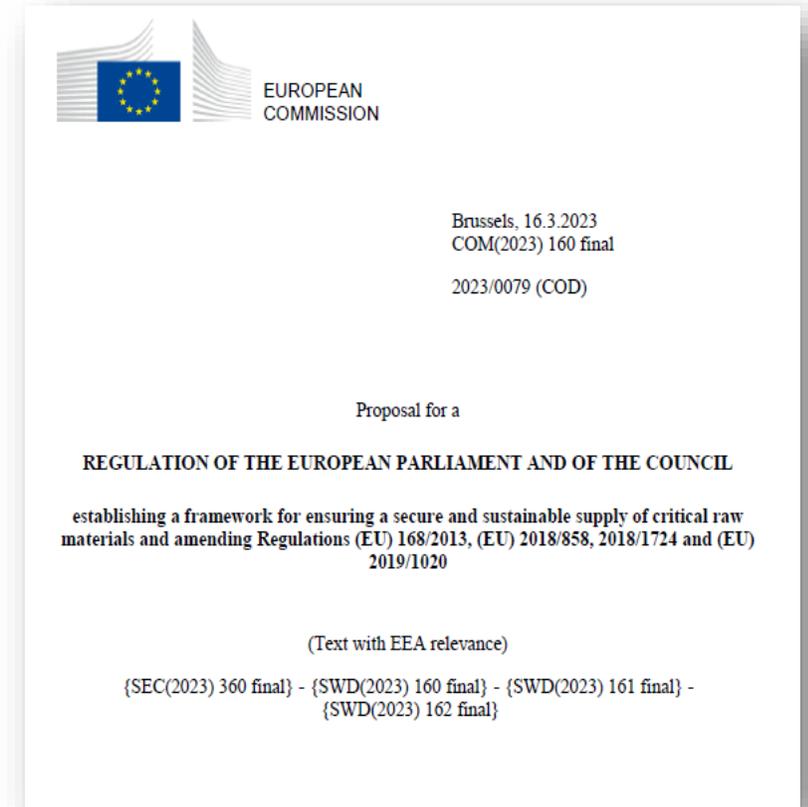
# Why is fire safety important for strategic industry sectors?

Sander Kroon

# Fire safety and strategic technologies

## STRATEGIC TECHNOLOGIES FIRE RISKS

- Increasing use of flammable materials :
  - advanced polymers and composites needed for lightweighting, design miniaturisation, electrical insulation
  - thermal insulation for Green Buildings
- New fire risks related to batteries
- Increased electrical fire risk with
  - miniaturisation (concentrates energy)
  - ubiquitous and permanently-on electronics (internet of things, standby)



# Fire safety and strategic technologies

Data centers



Solar panels



Fire risks in

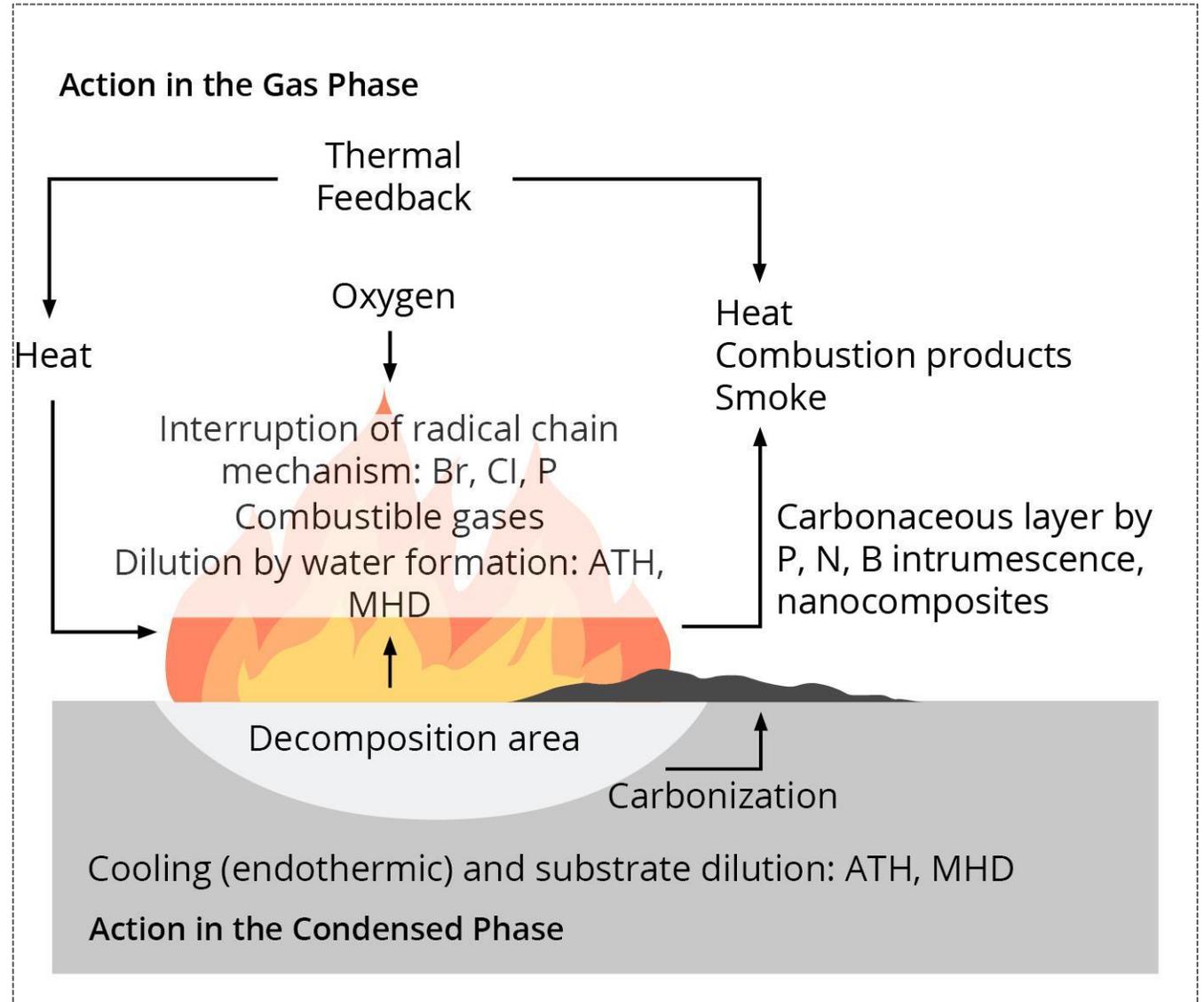


E-mobility



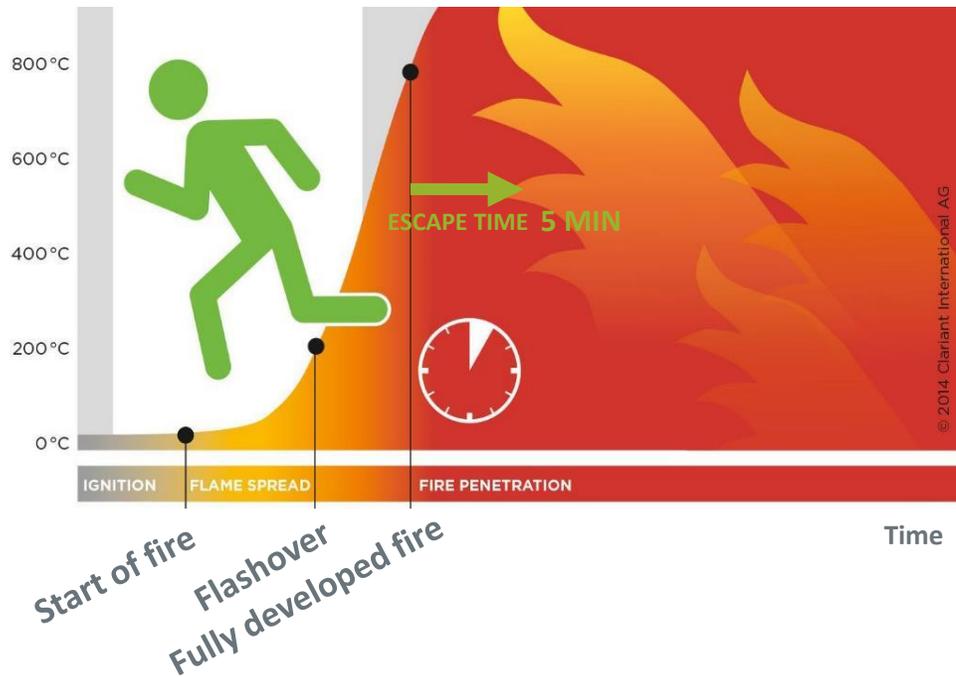
Battery Grid Storage

# PIN Flame Retardants Inhibit Ignition and Combustion



# Flame Retardants: Increasing Escape Time and Fire Safety

Without Flame Retardants



With Flame Retardants



# When innovation sparks fire risks, we ignite protection !

- As our world becomes increasingly reliant on strategic technologies, it's crucial to address the fire risks associated with these innovations.
- One effective way to mitigate fire risks in the context of strategic technologies is through the use of PIN flame retardants.





# Meet Jürgen

- Consultant Fire and Environment Protection Service FEPS



# **Megatrends and Fire Safety**

## **IoT and E-Mobility**

**European Fire Safety Week**  
**PINFA Session**  
**Fire safety and Sustainability in Strategic Industry Sectors**  
**15 November 2023**

## Introduction

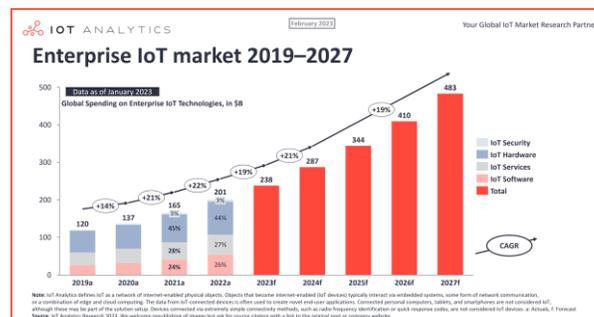
The **Internet of Things (IoT) and e-mobility** are 21<sup>st</sup> century essential technologies with exponential growth.

The quickly growing number of physical objects in IoT and the exponential growth of e-vehicles are new challenges that **require adapted fire safety regulations and standards** to better protect lives and property

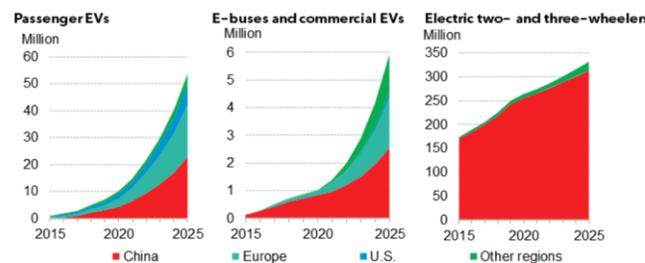


## Markets

Market studies show that the number of **connected IoT devices** is expected to globally grow **from 6 billion in 2015 to around 30 billion in 2025**, implying a substantial growth of electrical devices.



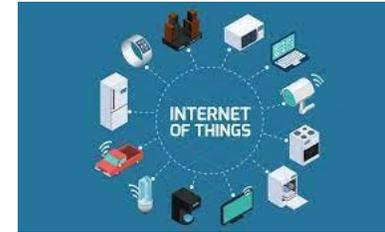
For e-vehicles, until **2025** the global passenger **e-vehicles fleet is estimated to grow to over 50 million**, e-buses to around 6 million, and electrical two- and three-wheelers to over 300 million units.



Source: BNEF. Note: Two-wheelers includes mopeds, scooters and motorcycles, excludes e-bikes.

## Increased Fire Hazard for Products in:

- **Internet of Things IoT**
  - electrical devices
  - appliances
  
- **E-Mobility**
  - car interiors
  - electrical powertrain
  - batteries
  - charging stations



Source: Bundesarbeitsgruppe



Source: Sika.com

## Flammability of Products Used in IoT

- IoT devices increasingly **consume energy** and are **potential ignition sources**
- Appliances and control devices **recalls show** that **fire safety requirements** are often **not met**
- **One of the main causes** for fires resulting from malfunction (overheating, electrical components failure, etc.) is the **use of non-flame-retarded plastics**
- **Can specific regulations and monitoring help?**



Sources: [imartcity.com](http://imartcity.com)

IMAC

[onehourairftworth.com](http://onehourairftworth.com)

## Fire Safety of E-Vehicles

- **Car interiors**

**Old (1972) and low** fire safety requirements for **car interiors (FMVSS 302/ISO 3795)** mandatory. Fire safety needs of modern road vehicles not considered. No changes to be awaited soon.



- **Electrical powertrain**

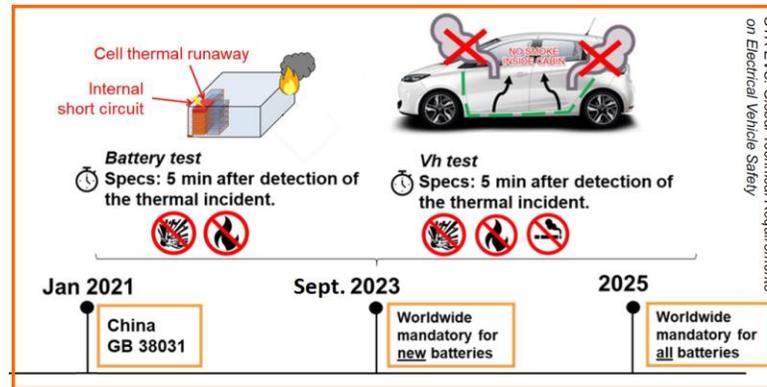
UNECE Regulation 100 Annex 8E for vehicle approval with mandatory **large-scale fire test for Rechargeable Energy Storage System (RESS)**



## Fire Safety of E-Vehicles

- **Batteries**

Technical requirements focus on **mechanical, thermal and electrical abuse tests** and are part of the **roadmap** requirements for **Electrical Vehicle Safety**



Source: Renault

- **Charging stations**

**Enclosures, plugs and sockets** must meet different UL (open flames USA) and IEC (glow wire Europe) flammability tests.



## Conclusions

- The **megatrends IoT and e-mobility** currently transform our world
- The **exponential growth of products** in IoT and e-mobility represent an **increased fire hazard**
- **Fire safety regulations and tests have to be adapted to these new challenges**
- **Electrical products used in IoT may have too low fire safety levels** (recalls show that non-flame-retarded plastics are a major cause of fires). **Adapt requirements and monitoring**

## Conclusions (2)

- The **existing** car interiors requirements **do not address** the **fire safety** needs of **modern road vehicles**. More stringent tests discussed, but no changes in regulations so far
- For **E-vehicles**, the mandatory **UNECE 100** large-scale fire test for Rechargeable Energy Storage System **improves fire safety**
- Mandatory **E-battery runaway** ( $\leq 5$  min) test will include **smoke** formation inside cabin. Important step for **better fire safety**
- **Charging stations:** Enclosures, plugs and sockets must meet different flammability tests in world regions (USA: UL open flames and Europe: IEC glow wire). Worldwide **solution for optimal fire safety needed**

# Questions & Answers





# Meet Henri

- Associate professor



**UNIVERSITÉ  
DE LORRAINE**

European Fire Safety Week : Wed. 15 Nov. 2023

# 3D Printed Fire-Retardant Materials: New Opportunities and Challenges

Henri Vahabi

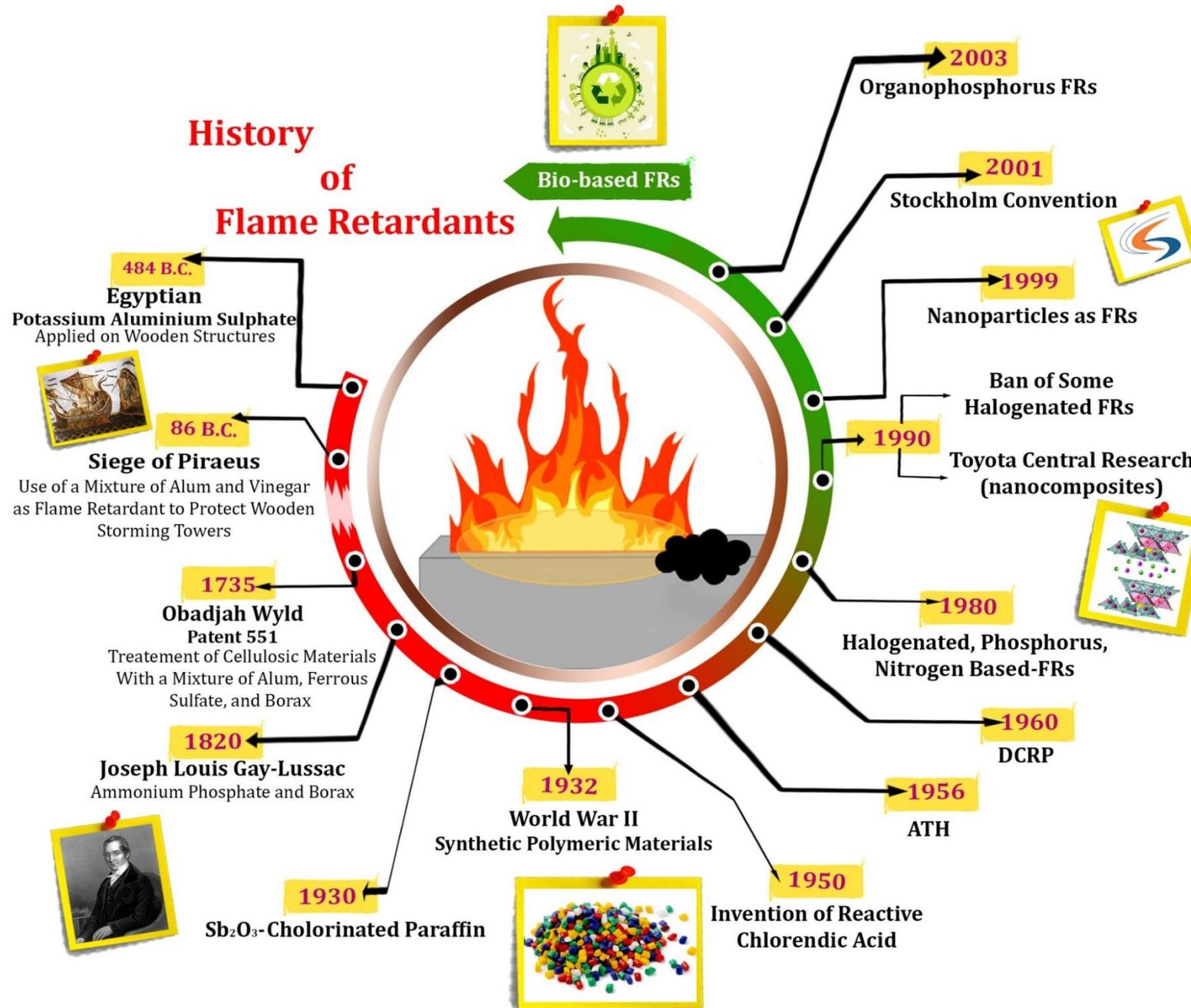
*University of Lorraine, LMOPS, Metz, France*



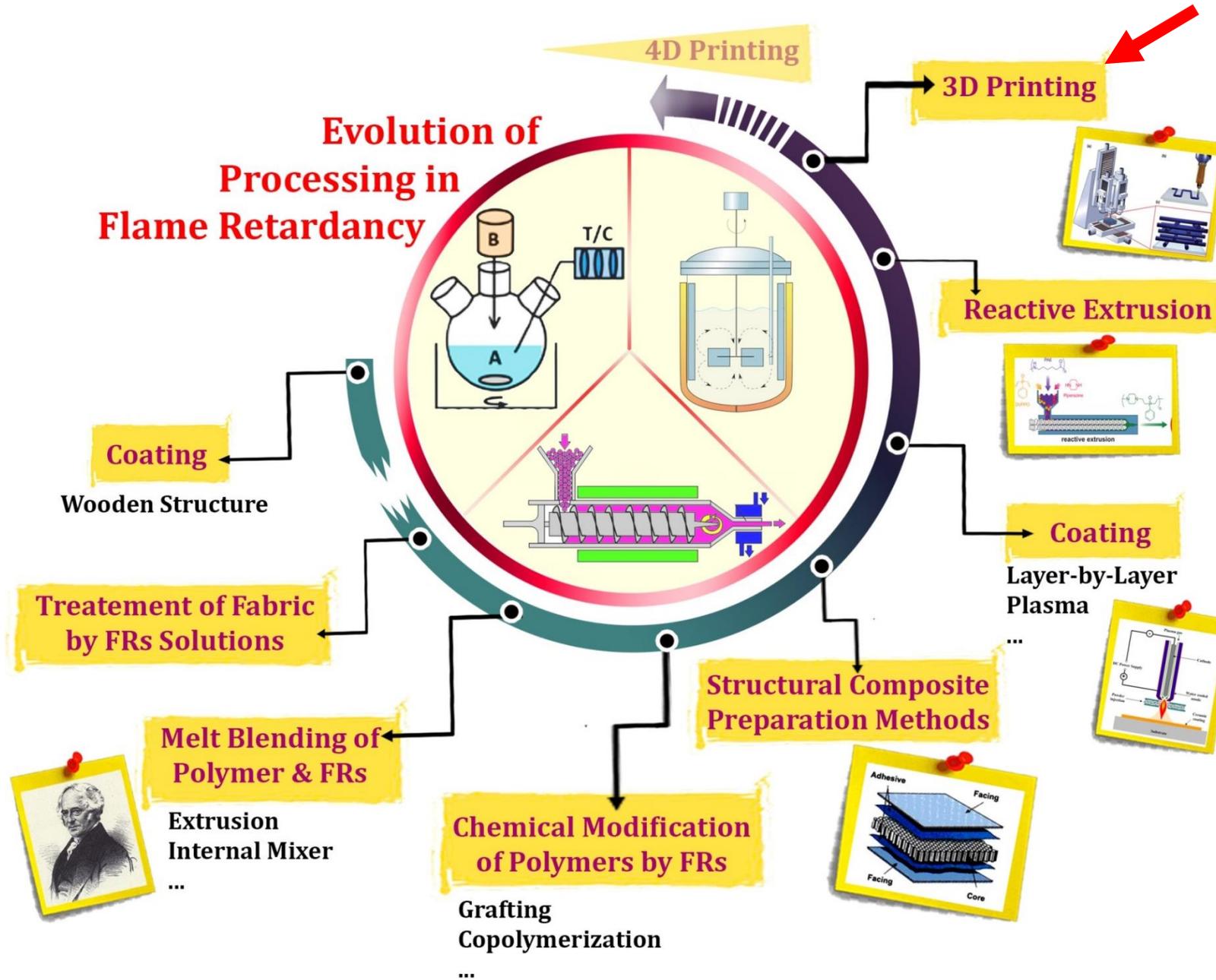
henri.vahabi@univ-lorraine.fr



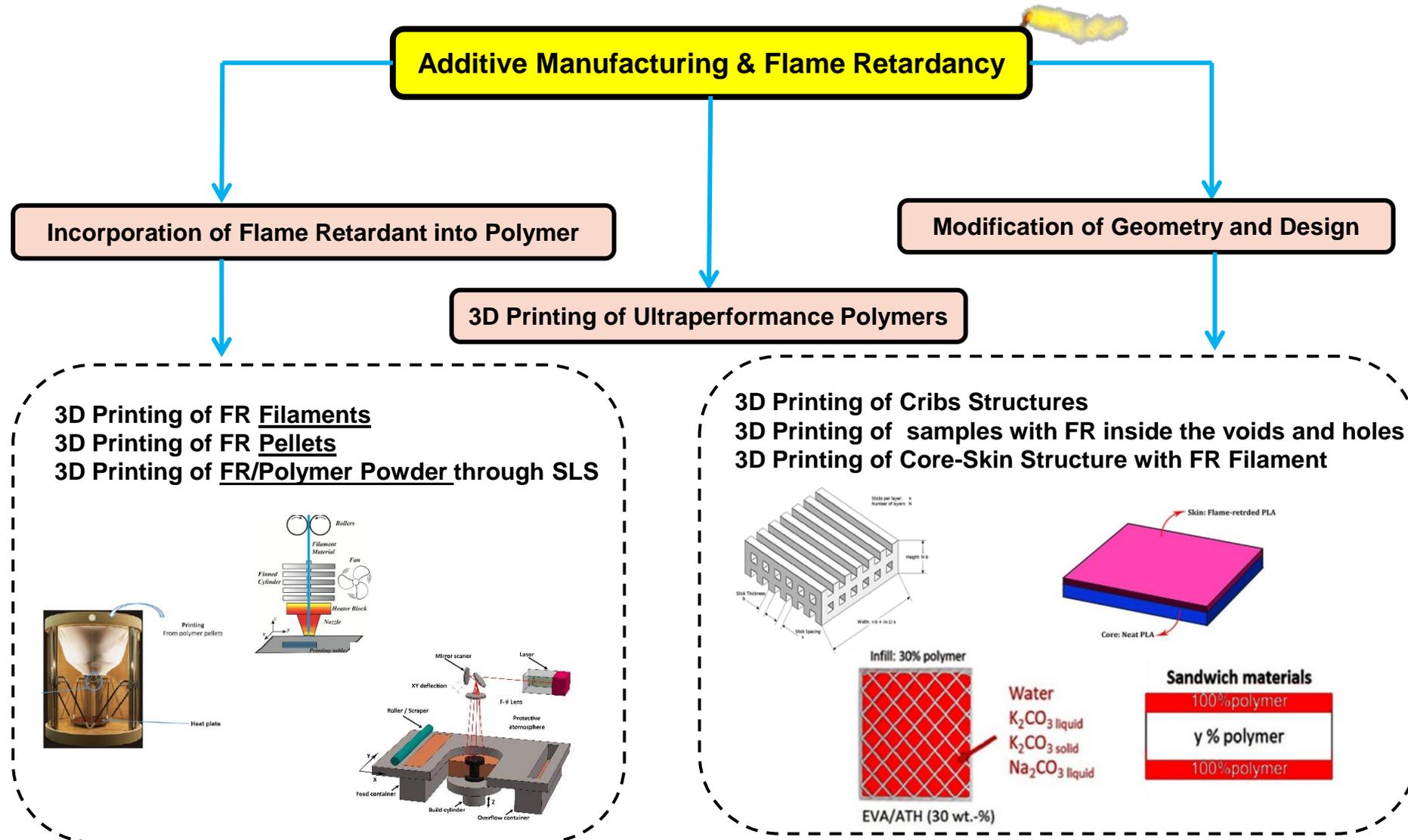
# History of Flame Retardants



# Evolution of Processing in Flame Retardancy



# 3D printing and Flame Retardancy



# Opportunities

- All advantages of 3D printing...
- +
  - Customized & Localized flame retardancy
  - Material innovation
  - New way of FR combinations, synergisms
  - Overcome the problem of FR dispersion
  - Specific solutions for different applications
  - Complex geometries
  - Less FR materials waste, more sustainable

# Challenges

- **Lack of knowledge on the influence of 3D printing on FR properties**
- **New applications substituting metals and other non-combustible materials => increasing Fire Risks**
- **Changes in FR properties due to variation in printing parameters:**  
infill density, layer thickness and orientation, ...
- **Changes in FR properties due to variation in printer types**
- **FR selection & solutions for additive manufacturing**
- **New regulations, standards, instructions/legislation, and testing methods for flame-retardant 3D printed materials =>**

*e.g.: Blue Card program*

# Questions & Answers





# Meet Eric

- M.Sc. Specialist Plastics



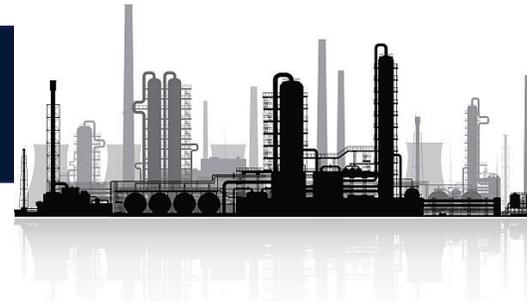


# FIRE SAFETY WEEK

## TESTING CHALLENGES IN FIRE SAFETY

Eric GUILLAUME, General Manager, Efectis France

## FROM PROCESS...



- Introduce biobased sources of carbon
- Introduce environmental free fillers, e.g. flame retardants
- Integrate new production techniques, e.g. additive manufacturing
- Integrate new threats, e.g. lithium batteries
- Impact of recent disasters on regulations
  - Inventory of substances
  - Estimation of emission factors
  - New tools, e.g. ISO 26367 series



## ... TO STORAGE...

- Development of engineering approaches
- Development of innovative fire suppression systems (e.g. oxyprivation, water mist) – shall be adapted to the risk
  - Need of test methods, e.g. ISO/TS 5660-5
- Impact of PV panels on roofs
  - e.g. CEN TC127 WG5 NWI



*Example of oxygen-controlled tests (FPA)*

## ... TO TRANSPORTATION / LOGISTICS...

- UN 38.3 ST/SG/AC.10/11/Rev.5
- Road transportation:
  - ADR (accord relatif au transport de marchandises dangereuses par route)
- Air transportation:
  - DGR (dangerous goods regulation) from ICAO (organisation de l'aviation civile internationale)
  - Guide LBSG (lithium battery shipping guidelines) from IATA (international air transport association)
- Marine: IMDG Code (international maritime dangerous goods) from IMO

## ...TO MARKETS...

- Fire tests are done on end-use products
- Matters/materials can be assessed individually, e.g. UL94 yellow cards, but this doesn't cover end-use
- Main regulations:
  - Building: CPR
  - Transportation:
    - Railways: Interoperability directive
    - Marine: IMO SOLAS II-2

## ...TO MARKETS...

- Building sector (France)
  - Actions undergoing to change regulations to accomodate wood. Will impact also plastics and composites
  - Focus on end-use products. Case of facades
- Marine and railways
  - Increase in use of composite structures
  - Definition of level of protection (active and passive)
  - Policy of selection of materials, e.g. railways

## ...TO END OF LIFE

- Re-use challenges
  - How to re-test or certify re-used products?
- Recycle challenges
- Compost / energetic valorization





# Conclusions

# CHALLENGES IN TESTING

- Increasing complexity of products
- Integration of new functions, e.g. batteries/smartgrid, sensors
- Interactions between products
  - Cavity walls
  - Photovoltaic panels BIPV + BAPV
- Risk assessment – significance of tests
  - Reference scenarios for test methods
  - Development of performance based test methods and standards, to support new generation of regulations



*Example of Broof T3 test on complex roof + BAPV*

**THANKS FOR YOUR ATTENTION**

Any questions ?

Suivez-nous | Contacter nous :



**1972 - 2022**

**Efectis**

« Efectis est un acteur mondial de l'incendie et couvre l'ensemble de l'expertise en sécurité incendie en matière d'essais et de modélisation, de certification, d'inspection, de formation et d'expertise. »

# Questions & Answers

# COFFEE BREAK



Cefic sector group 





# Meet Franck

- Fire Safety Systems Design Lab Manager





# Fire Safety and Sustainability

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ELECTRIC CABLES/SYSTEMS

FRANCK GYPPAZ / NOVEMBER 15, 2023

# NEXANS AT A GLANCE

Nexans gives everyone the opportunity to electrify the future

**Nexans, the leader in the design and manufacture of cable systems and services**, is paving the way for the new era of safer, renewable, decarbonized, and accessible electrification.

With a clear vision to become the leading player in global electrification, Nexans concentrates its efforts on supplying **high-quality cables and comprehensive services that cover the entire value chain**.

From energy production and transmission to distribution and usage, **Nexans is committed to supporting the global flow of electricity**.



The company also manages activities from which it is gradually withdrawing

Headquarter in **Paris**

**28,000** employees

**Worldwide** sales presence

Manufacturing sites in **42 countries**

## 2022 Group Financials

Revenues<sup>(1)</sup> of **€6.7bn**

EBITDA **€599m**

ROCE of **20.5%**

Normalized Free Cash Flow of **€393m**

Nexans is listed on Euronext Paris, compartment A.

<sup>(1)</sup> Sales at standard metal price

# NEXANS ELECTRIFY THE WORLD TODAY AND TOMORROW

## GENERATION & TRANSMISSION

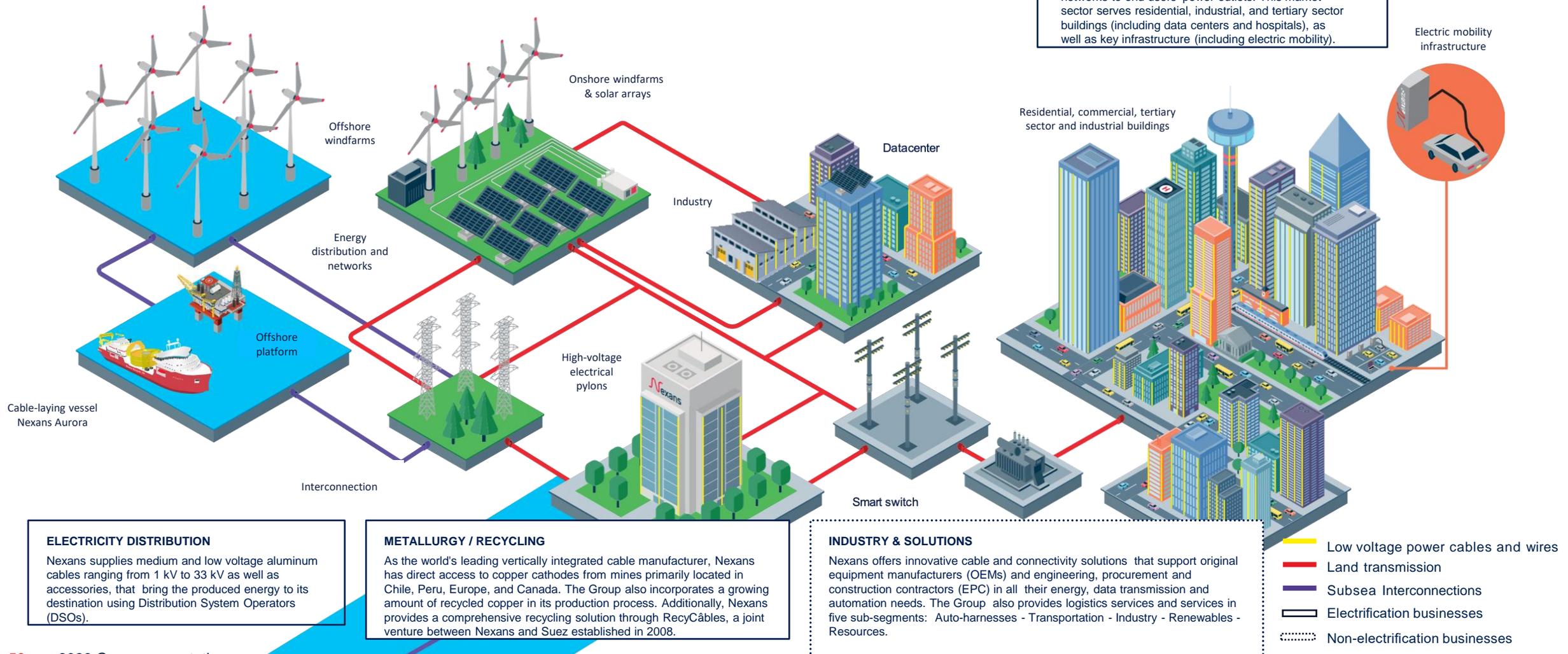
Nexans supplies high voltage cables and services, spanning energy generation (wind, solar, hydropower, or nuclear) to cross-border interconnections for efficient energy distribution.

## TELECOM & DATA\*

Nexans specializes in the design, production, and marketing of copper and optical fiber network infrastructures. The group's comprehensive solutions include plug-and-play cabling and connection systems for private networks, spanning three key segments: LAN cables and systems, Telecom infrastructure, and Special telecom.

## USAGE

Nexans designs, manufactures, and distributes low-voltage cables (<1kV) and related accessories for electrical systems, connecting energy distribution networks to end users' power outlets. This market sector serves residential, industrial, and tertiary sector buildings (including data centers and hospitals), as well as key infrastructure (including electric mobility).



## ELECTRICITY DISTRIBUTION

Nexans supplies medium and low voltage aluminum cables ranging from 1 kV to 33 kV as well as accessories, that bring the produced energy to its destination using Distribution System Operators (DSOs).

## METALLURGY / RECYCLING

As the world's leading vertically integrated cable manufacturer, Nexans has direct access to copper cathodes from mines primarily located in Chile, Peru, Europe, and Canada. The Group also incorporates a growing amount of recycled copper in its production process. Additionally, Nexans provides a comprehensive recycling solution through RecyCâbles, a joint venture between Nexans and Suez established in 2008.

## INDUSTRY & SOLUTIONS

Nexans offers innovative cable and connectivity solutions that support original equipment manufacturers (OEMs) and engineering, procurement and construction contractors (EPC) in all their energy, data transmission and automation needs. The Group also provides logistics services and services in five sub-segments: Auto-harnesses - Transportation - Industry - Renewables - Resources.

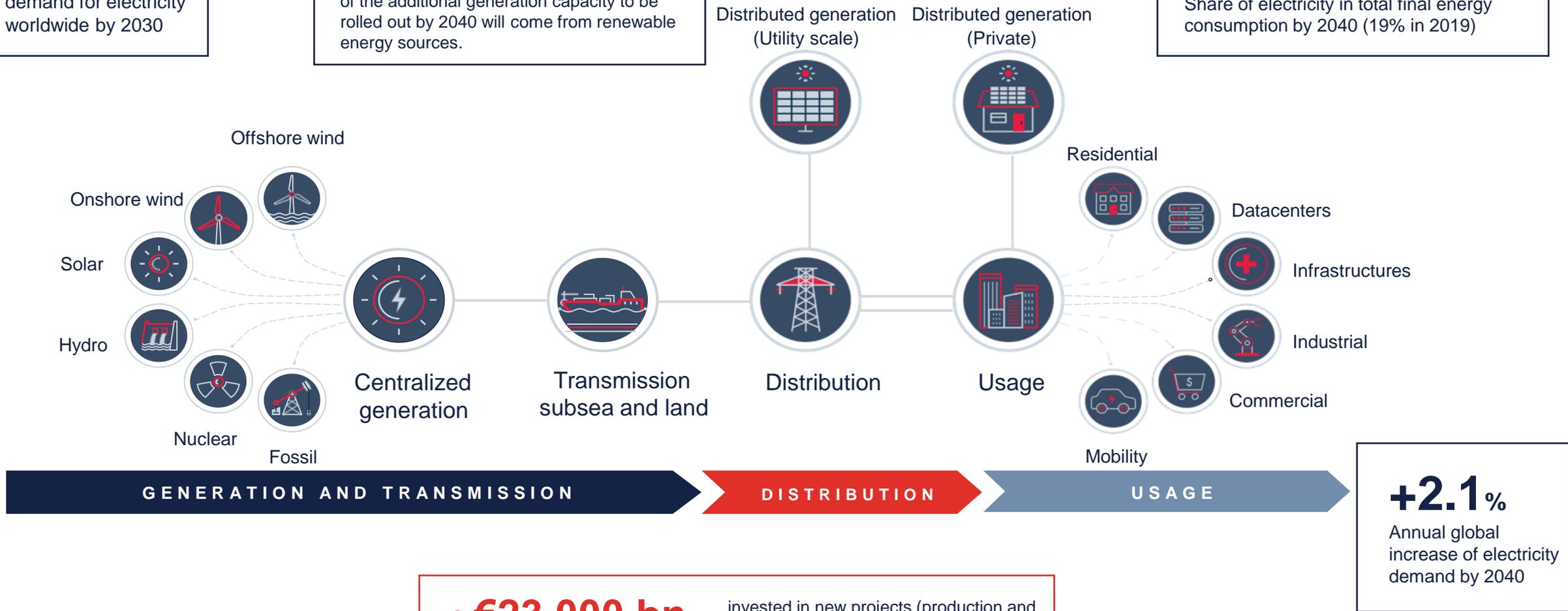
# OUR STRATEGY: ELECTRIFYING THE FUTURE

Nexans, pure player of electrification

**+ 20%**  
demand for electricity worldwide by 2030

**~ 80%**  
of the additional generation capacity to be rolled out by 2040 will come from renewable energy sources.

**31%**  
Share of electricity in total final energy consumption by 2040 (19% in 2019)



**GENERATION AND TRANSMISSION**      **DISTRIBUTION**      **USAGE**

**+2.1%**  
Annual global increase of electricity demand by 2040

**~€23,000 bn** invested in new projects (production and networks) by 2040

48 countries (1/6)

3.3 B peoples (42%)

4.0 M Fires / year

20 700 fatalities

74 per day  
83% in residential fire

71 410 severe injuries

195 per day  
60% in residential fire

32% structure fire

24% residential

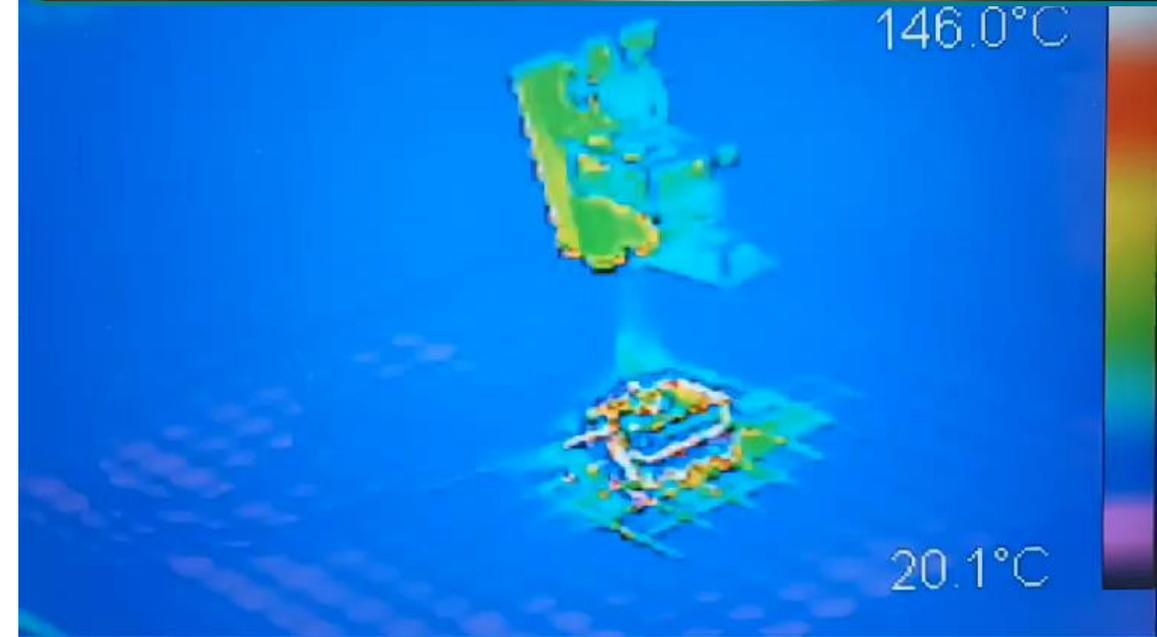
**13 - 25% electric fires**

**Our ecosystem has a strong Responsibility**

## USE CASE

Electric vehicles

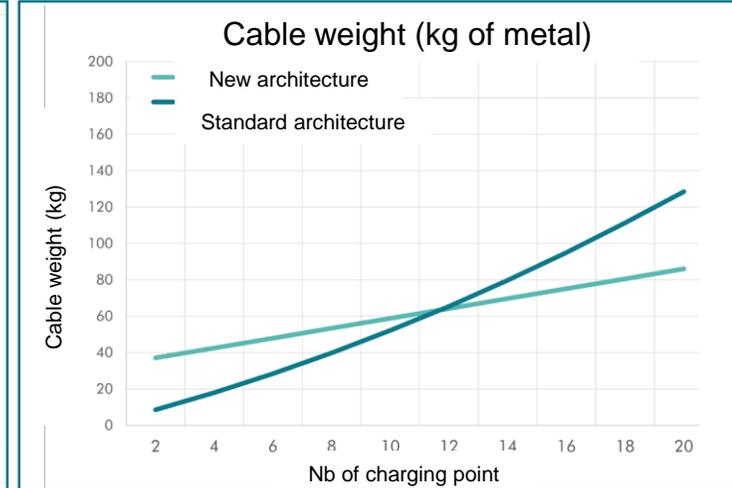
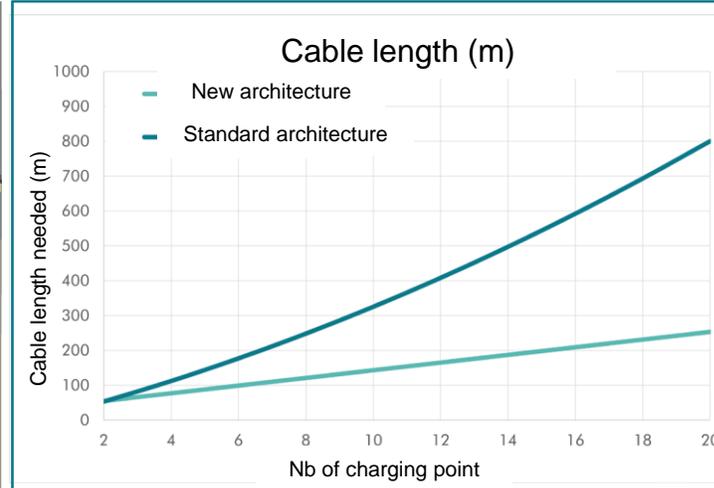
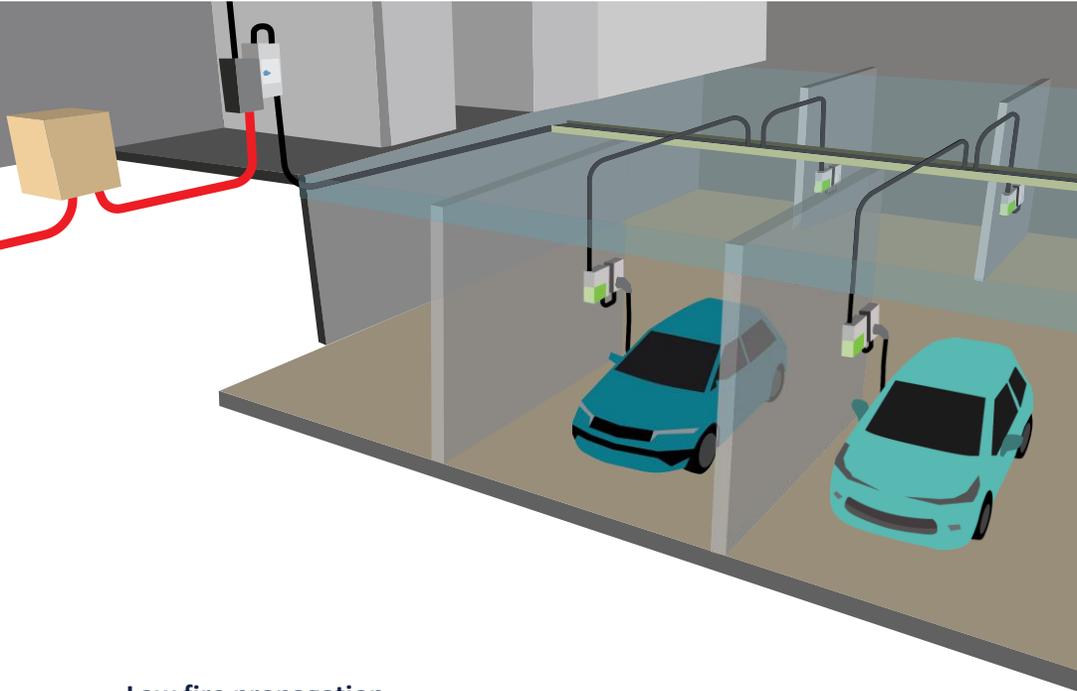
- **Underground parkings** are **sensitive to fire risk**.  
In 2015, a blaze was reported in 41% of underground parkings.  
61% of them were related to vehicle fires.
- **Firefighters** also highlight the **increased complexity** and danger when acting on fires in underground parkings.  
This is due to a very rapid horizontal propagation of fire which combines with vertical extension through joints and ducts.  
They also observed a strong production of smoke preventing intervention and invading the upper floors causing possible victims
- It has been also shown that **the presence of electric vehicles induces new risks linked to the possible thermal runaway of batteries**



# USE CASE

Innovative Electrical System

## Innovative Electrical system for EV charging



For 10 charging points, the new architecture leads to install

- 2 time less cable (m)
- 4 time less for 20 charging points

For more than 10 charging points, the new architecture is more competitive in term of weight. Therefore, less material.

Low fire propagation  
Low Heat Release  
Low Smoke Emission  
To reduce the horizontal and vertical propagation in buildings

Smoke not acid nor corrosive  
Not affecting the evacuation, safety of people nor the intervention of firefighters  
No damage of the structures

**Cca-s1,d1,a1**

Very low smoke release  
Low impact on the visibility during evacuation and intervention of firefighters

Low flaming droplets  
No secondary fire that would increase the fire propagation  
Limited risk for firefighters



# CONCLUSION

## FIRE SAFETY AND SUSTAINABILITY

- ❑ Our ambition to reach the Net Zero Ambition will be achieved only through Electrification
- ❑ This means a massive installation to come of electric cables in our environment involving possible increase of the fire risks. Flame retardant system will be key.
- ❑ This risk will increase with new usages like EV (solar, BESS...)
- ❑ Enablers
  - ❑ Innovation in the electrical architecture
  - ❑ Innovation in cable designs, compounds
  - ❑ Partnerships with our ecosystem to propose integrated systems
- ❑ Risks, we will have to manage
  - ❑ the raw material scarcity to ensure a business continuity
  - ❑ the reliability of the performance
  - ❑ the change from a component to a system approach



# Meet Mike

- M.Sc. Specialist Plastics



Empowering the All Electric Society 

confidential



Welcome

# The Importance of Fire Safety in E&E-Products for the All Electric Society



Continuous growth together

# Company headquarters and competence centers



**Headquarters**  
Blomberg | Germany

# 11



## Production sites

Germany | China | Taiwan |  
India | Poland | Sweden |  
Switzerland | Turkey |  
Argentina | Greece | USA

# 100,000



## Products

# 22,000



## Employees worldwide



# 75%



## Sales abroad

# 25%



## Sales in Germany

## Group Executive Board:

Frank Stührenberg (CEO)  
Axel Wachholz (CFO)  
Frank Possel-Dölken (CDO)

Dirk Görlitzer (COO, President BA ICE)  
Torsten Janwlecke (COO, President BA DC)  
Ulrich Leidecker (COO, President BA IMA)



# 10,200



## Employees in Germany



# 1923



## Founded in Germany



# TODAY



## Present in more than 100 countries



Over  
**100,000**  
 innovative  
 products





**Energy**



**Industry  
Automation**



**Infrastructure**



**E-Mobility**

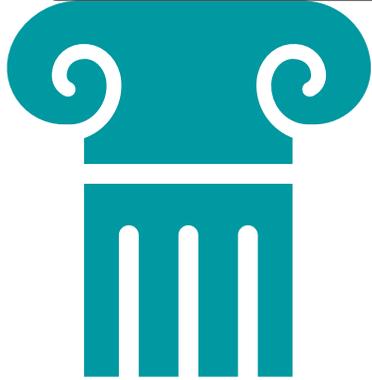


**Process  
Automation**



**Building  
Technology**

# Fire Safety requirements



## International Standards

- IEC 60335-1 Household and similar electrical appliances - safety - General requirements
- UL 1977 Component Connectors for Use in Data, Signal, Control and Power Applications
- UL 1703 Flat-Plate Photovoltaic Modules and Panels



## Special Customer needs

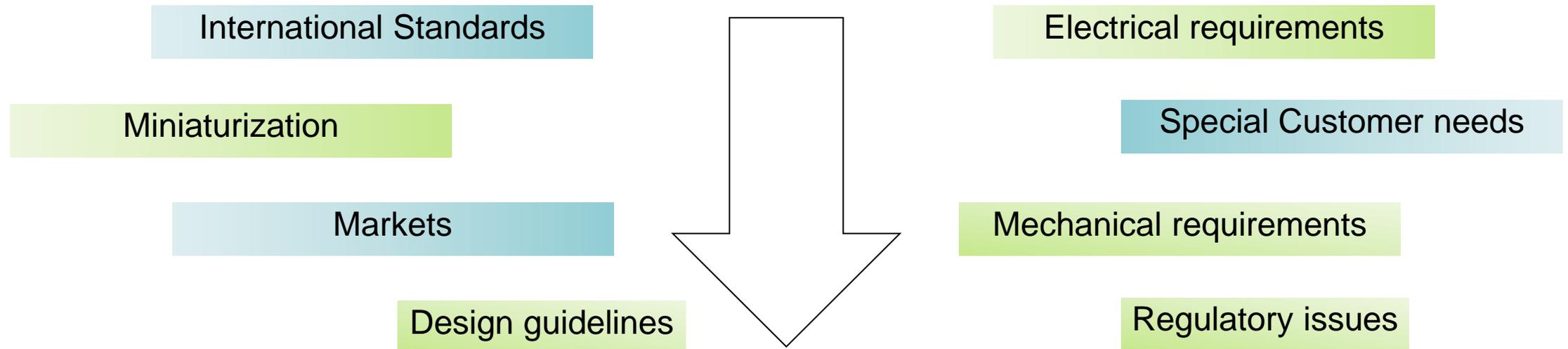
- UL 94 Test for Flammability of Plastic Materials for Parts in Devices and Appliances
  - Halogen free materials
  - Silicon free materials
  - PFAS free materials



## Markets

- Railway
- Infrastructure – Tunnels

# The Importance of Fire Safety in E&E-Products for the All Electric Society



**careful and conscious choice of plastic materials for our products**



Thank you for  
your time

Do you have some  
questions?

# Questions & Answers



## Mentimeter exchange



- Weblink:  
<https://www.menti.com/alxt5f1ysg1o>
- The code **2479 6278**



# Wrap up & Conclusion

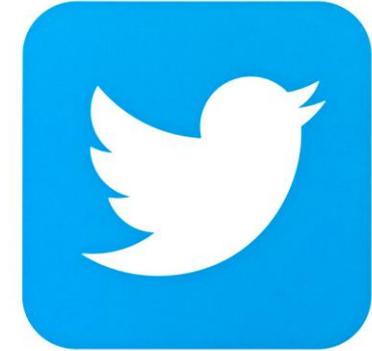




[www.pinfa.org](http://www.pinfa.org)



[www.linkedin.com/company/  
pinfa-sector-group-of-cefic/](http://www.linkedin.com/company/pinfa-sector-group-of-cefic/)



[twitter.com/pinfa\\_eu](https://twitter.com/pinfa_eu)

**Connect with us :)**



# Thank you.

**Contact:**

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**About Cefic**

Cefic, the European Chemical Industry Council, founded in 1972, is the voice of large, medium and small chemical companies across Europe, which provide 1.2 million jobs and account for 15% of world chemicals production. Cefic members form one of the most active networks of the business community, complemented by partnerships with industry associations representing various sectors in the value chain. A full list of our members is available on the Cefic website.

Cefic is an active member of the International Council of Chemical Associations (ICCA), which represents

chemical manufacturers and producers all over the world and seeks to strengthen existing cooperation with global organisations such as UNEP and the OECD to improve chemicals management worldwide

