

# Innovation and its perils in the fire suppression industry

---

Plumis

FSI 2022  
William Makant

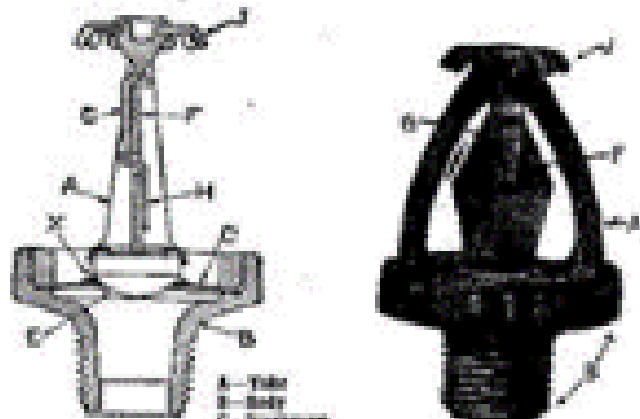




# Great design!

**GRINNELL**  
**AUTOMATIC SPRINKLERS**  
"Standard of the World"

Protect more than \$1,000,000,000 of Business Value



17,000 fires extinguished.  
Average loss \$245

No life ever lost where "Grinnell's" were in commission

Insurance saving and interest, \$425,000,000

General Fire Extinguisher Company  
277 West Exchange St., PROVIDENCE, R. I.



1882

today



# But not ideal everywhere

Spurs a market:  
insurance premium discount



Regulations is required where a there is a  
market failure

“sprinklers not cost effective”

bre

Services from BRE Global Ltd

Certification & Approvals

Services from BRE

Research & Innovation

Testing

Sustainability

BREEAM

Events

BRE Academy

A-Z of services

Search for...

Q

Report: Effectiveness of sprinklers in residential premises



So who needs a  
better life safety  
sprinkler?

**2002**

**‘The research showed that a more sensitive sprinkler was needed to respond faster to both smouldering and fast-developing residential fires’**

**Review of Residential Sprinkler Systems: Research and Standards** by Madrzykowski and Fleming

# 2004

‘The house fires used in these tests were all of a slow-growing type that produced **a lot of smoke but limited heat**. Because sprinklers depend on heat to activate these fires **posed a severe challenge to the sprinklers...**’

An appraisal of the ODPM - BRE Report by the Fire Sprinkler Association

2006

the fire experiments have indicated that **sprinklers alone are unlikely to operate soon enough** to prevent the occupant of a bed being fatally injured or suffering very serious injuries from flames and/or heat.'

Sprinkler Effectiveness in Care Homes by BRE

**2010**

"100% effective" sprinkler system would not equate to a 100% reduction in loss, because **a fire must be present and reach sufficient size to activate the sprinkler system as designed** and thus there will always be a measure of loss in a sprinklered fire.'

A review of sprinkler system effectiveness studies by K Frank



2017

‘We have an aging population with increased vulnerabilities...People **will therefore need to be protected in increasingly more sophisticated ways** than have been used to date for able-bodied people capable of responding to alarms

The causes of fire fatalities and serious fire injuries in Scotland

by BRE

Bored already?



**2018**

**‘These obstacles to water supply for AFSS must be overcome. Water companies in London need to be more consistent in their approach to installation and more innovative in encouraging new technologies to make installing AFSS more feasible.’**

Never again: Sprinklers as the next step towards safer homes  
by the London Assembly

# 2018

‘Neither room protection system tested could provide suppression without producing some hazard to occupants. This is partly **due to the slower activation times of the room protection systems, which resulted in a larger fire prior to activation.**

Investigation of Residential Cooking Fire Suppression  
Technologies by NIST



**2019**

**‘A study of these fatal dwelling fires, where sprinklers were present, found that the circumstances of the fire fell outside the life-saving operating parameters of the system’s design.’**

**Incidence of Deaths and Injuries in Sprinklered Buildings by  
NFSN and NFCC**

Something that acted to suppress the fire  
... and could be put into a dwelling retrospectively

*Stephen Robinson*  
*Head of Fire Engineering*  
*London Fire Brigade*  
*Headquarters July 2008*



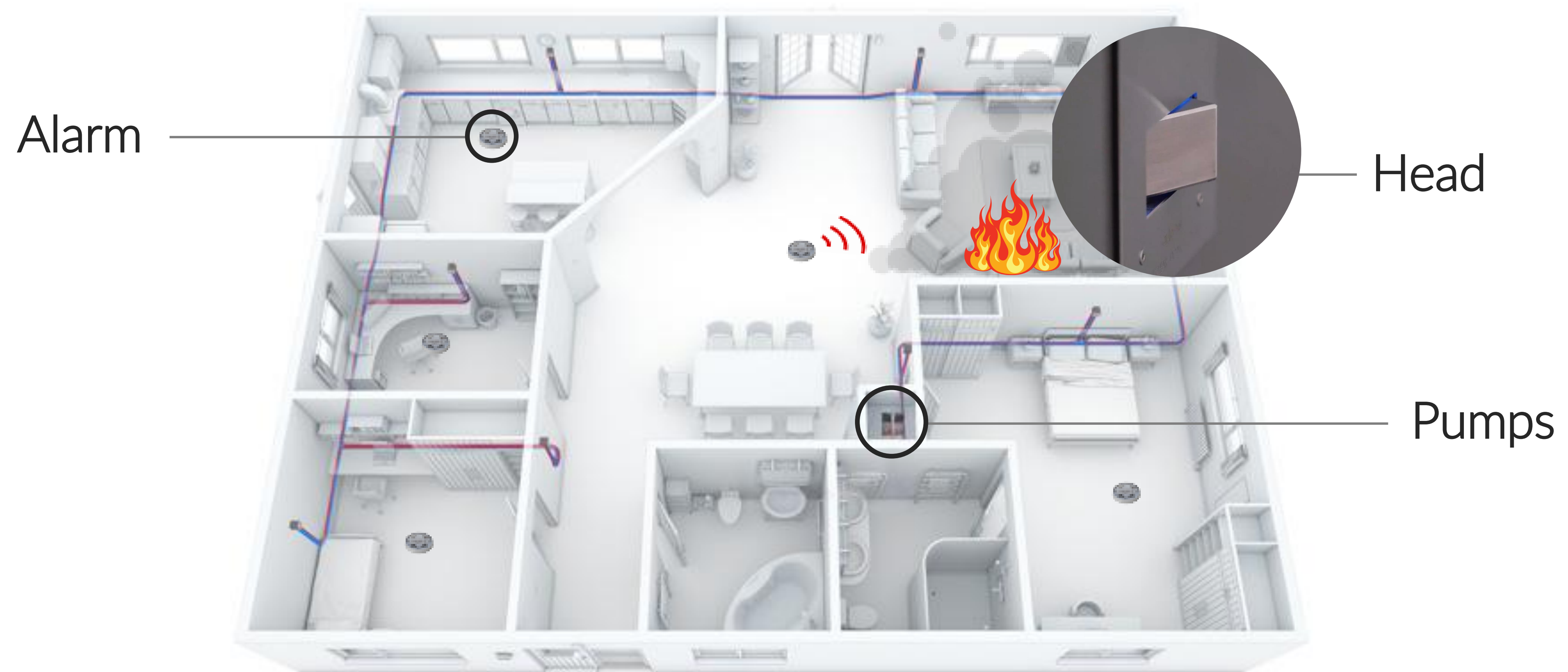




Electronically  
controlled targeted  
watermist

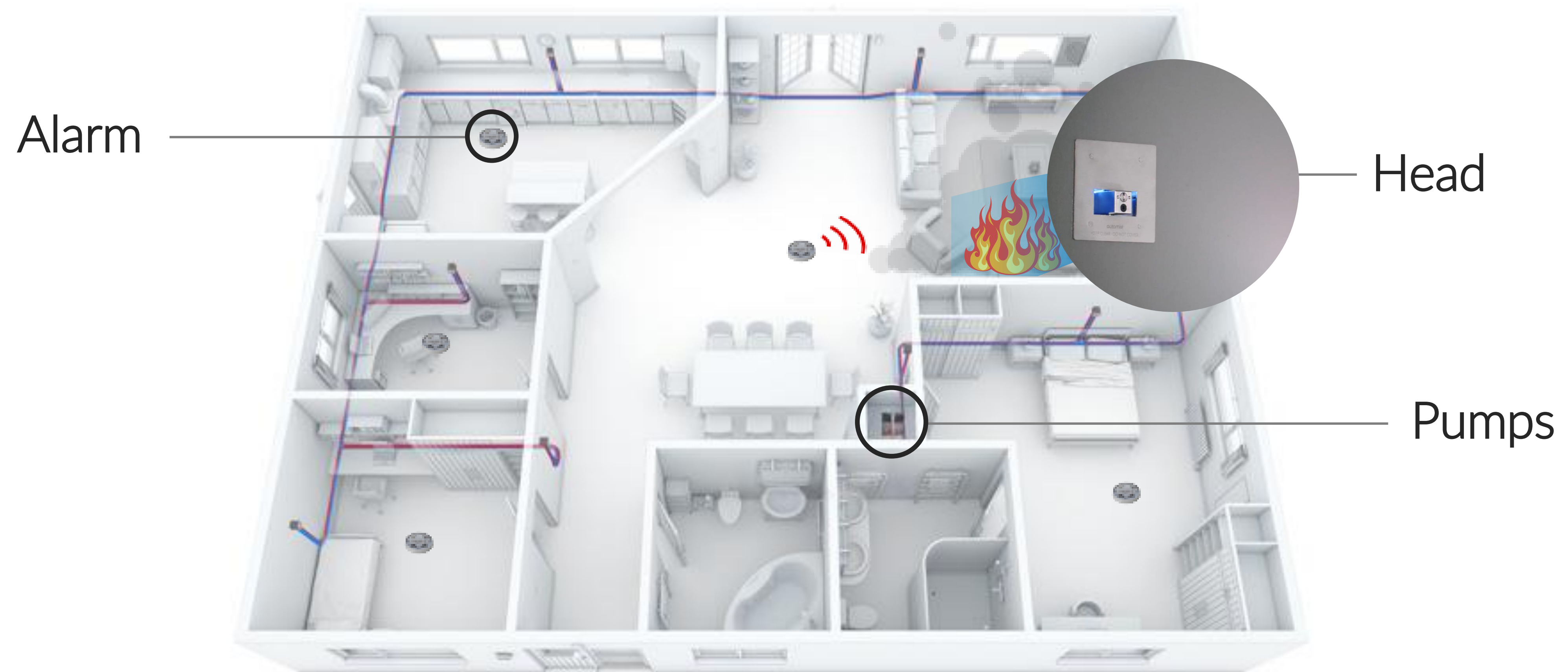


# Smart suppression designed for life safety





# Smart suppression designed for life safety







1.2m  
plywood  
board

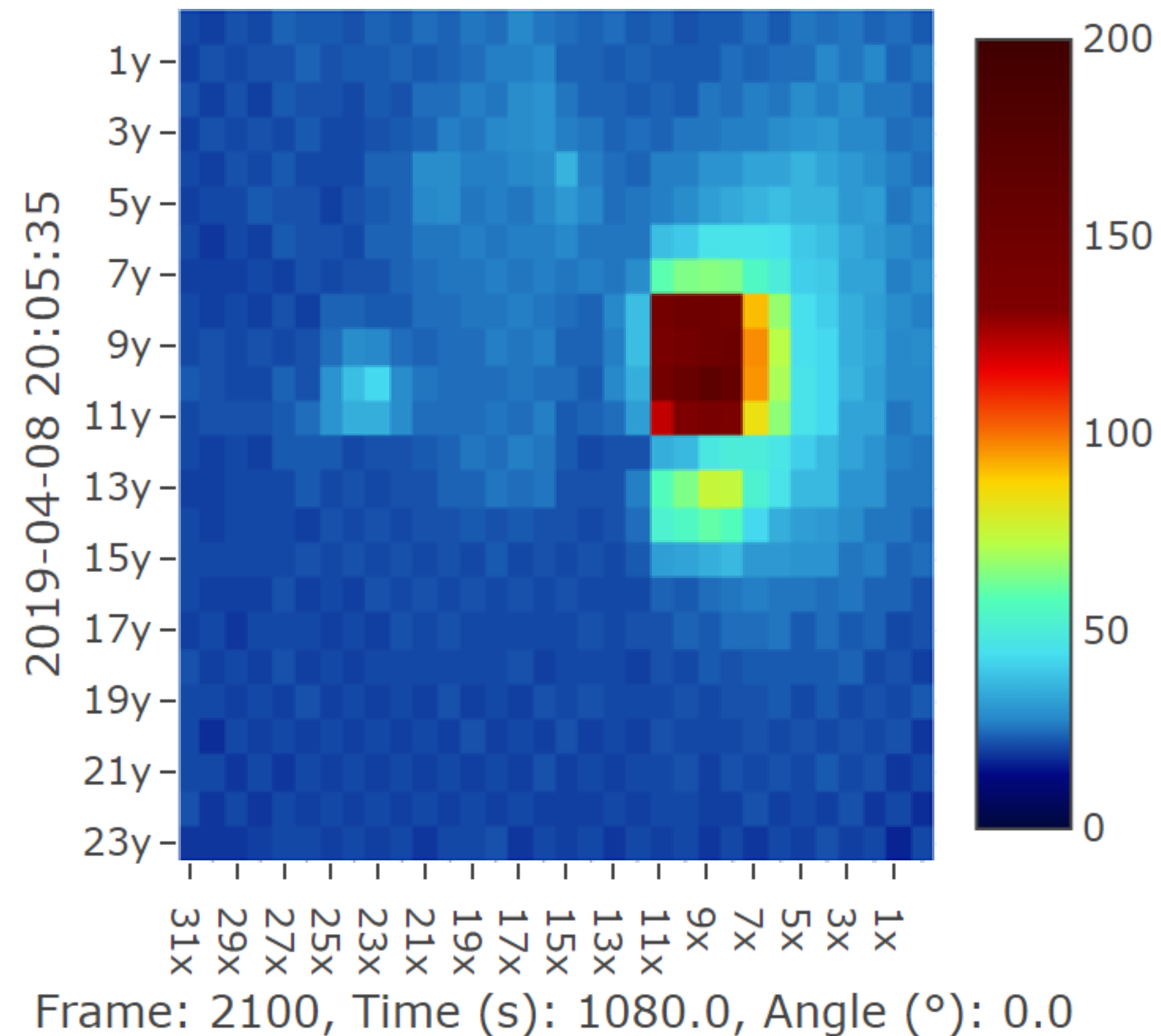


Sped up footage\*



# Double knock activation: Detection + IR thermal imaging

Head 1 Max Temp: 170.0 [22,11]





# Analogous to engines



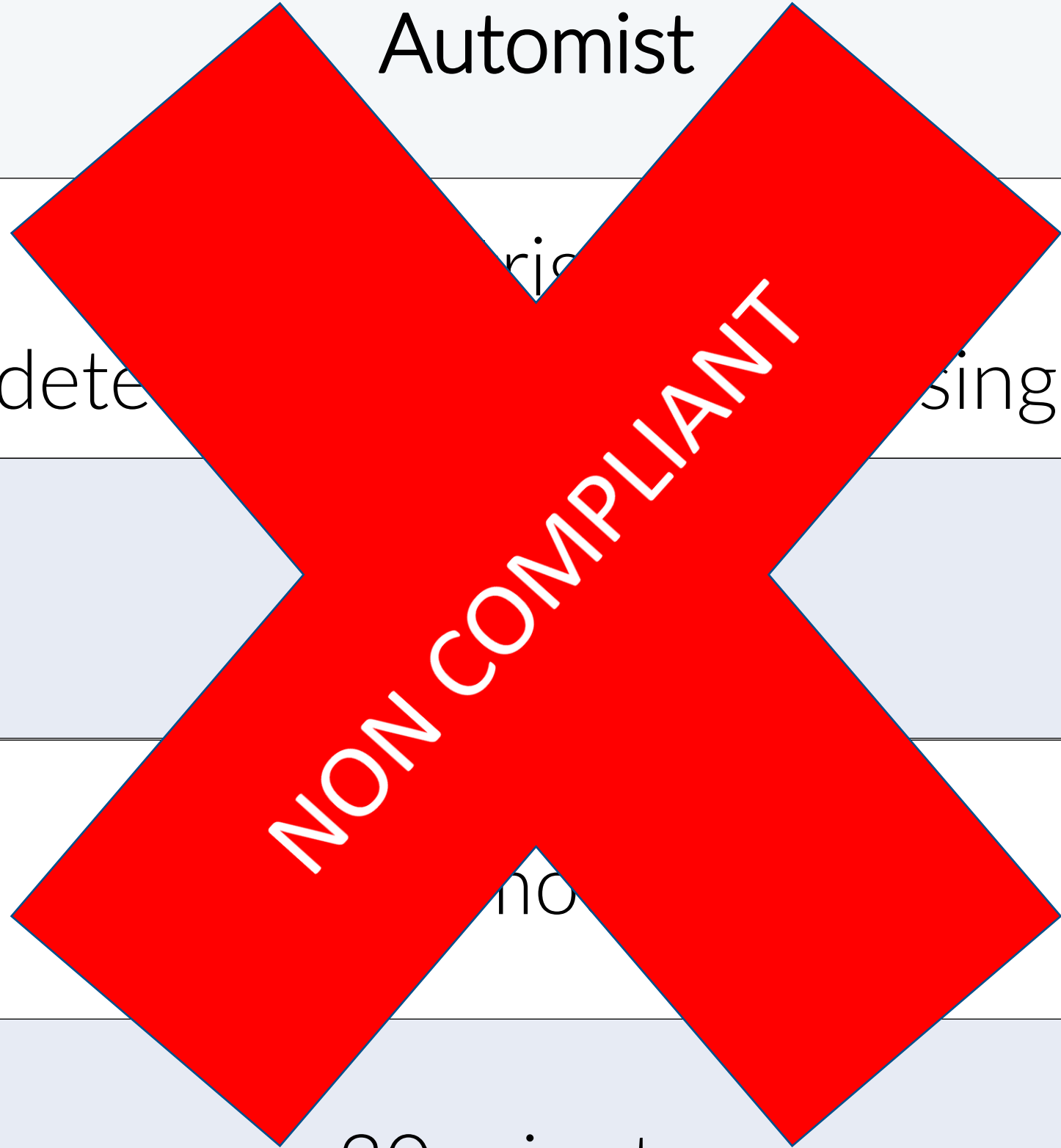


All great right?



# BS 8458 Clause 1 - Scope

	Traditional watermist	Automist
Activation	Glass bulb or fusible link (mechanical thermal)	detected (rising temperature sensing)
System design	Wet pipe	
Nozzle location	Ceiling mounted	no
Minimum run time	10 minutes	30 minutes



# Potential Threats

- ❑ The growing interest in domestic fire suppression has spawned another generation of inventors/entrepreneurs
- ❑ BAFSA welcomes innovation
- ❑ However, some of these products can be more expensive than they at first appear
- ❑ Some may usefully fill a gap in the market
- ❑ But some might not work!



**'Crazy Inventors' really do exist!**

# Backwards looking vs forward looking standards



# The role of standards

## Types of British Standard (clause 9.4 of BS-0:2016)

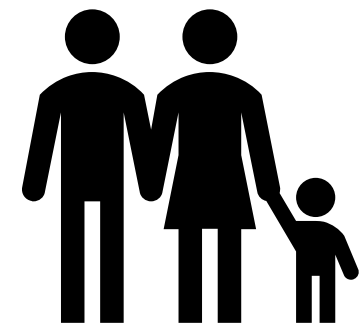
*‘**Specification** gives a coherent set of absolute requirements, each **objectively verifiable**. Suited to giving **performance criteria** demanded of a product...’*

*‘**Code of Practice** recommendations and supporting guidance. Need to be met to support a claim of compliance...**reflects current good practice**...’*

# Code of Practice



# Performance



**Consumer**

Low Voltage Directive  
EMC  
PED  
RoHS  
Radio Equipment Directive



**Fire**

BS 8458  
watermist

BS 9252  
sprinkler

BS 8489  
watermist



# Code of Practice



BS 8458, clause 5:

System actuation should be automatic by **glass bulb or fusible link**, initiated by heat generated by fire

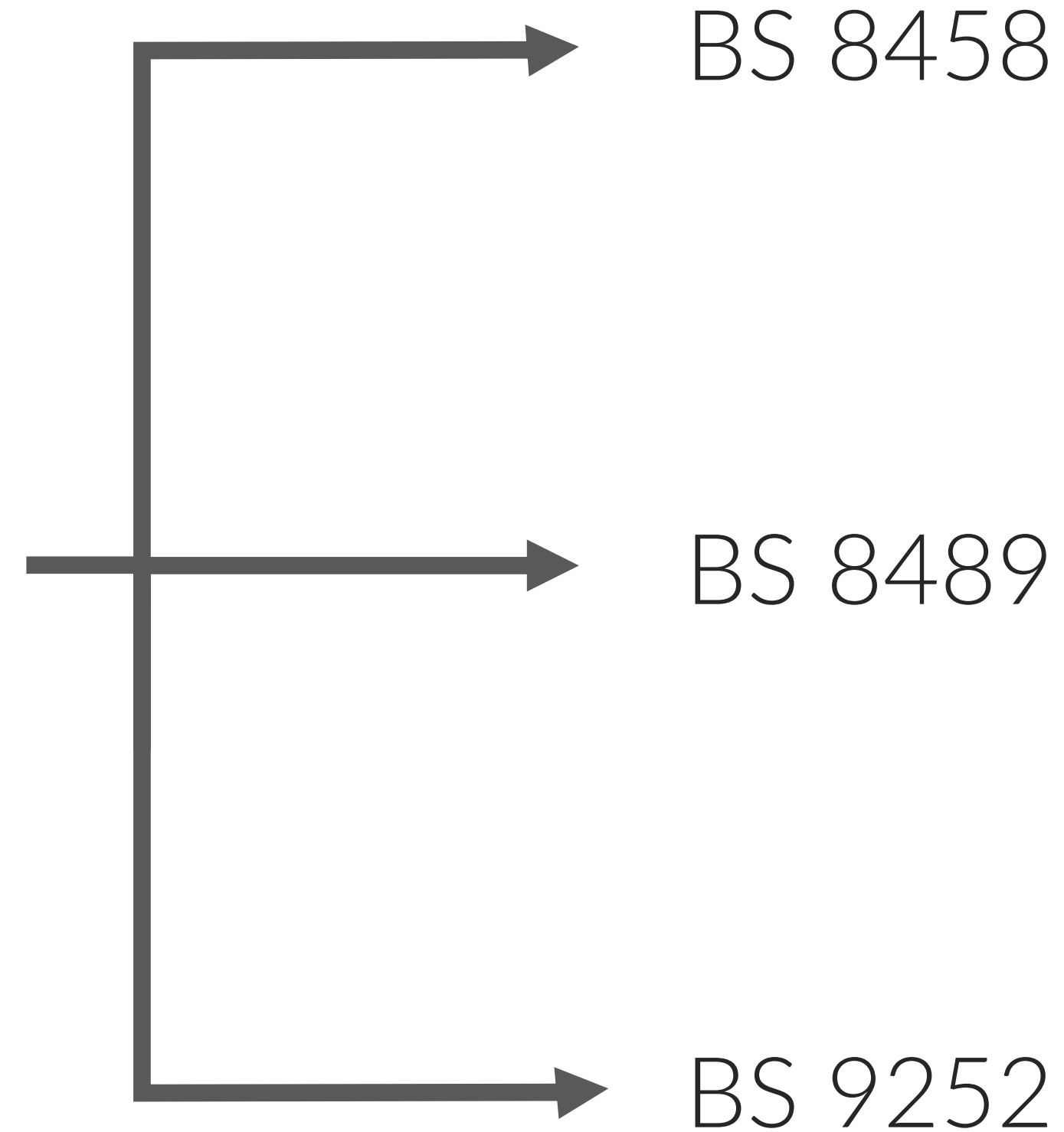
BS 0, Clause 9:

Particularly for the purpose of preventing anticompetitive effects or impeding innovation, whenever possible, provisions are **expressed in terms of performance rather than design or descriptive characteristics.**'

# Backward looking standards



Sprinklers



Technology variations with the same test fire test



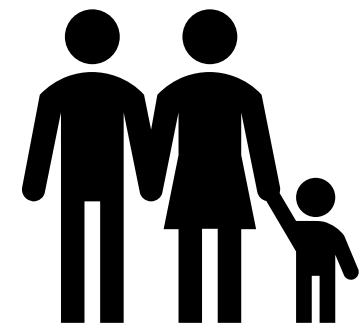
What sets them apart?



Code of Practice



Performance



Consumer

Low Voltage Directive  
EMC  
Product safety  
Radio Equipment Directive  
PED  
RoHS



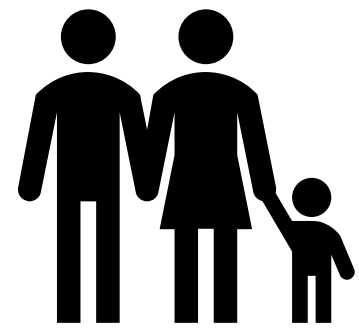
Fire

BS 8458  
watermist  
BS 8489  
sprinkler  
BS 9252  
sprinkler  
consistency  
watermist

Code of Practice



Performance



Consumer

Product safety



Fire

Sprinkler  
consistency

Limit fire spread

Business  
continuity

Survivability in the  
room of origin



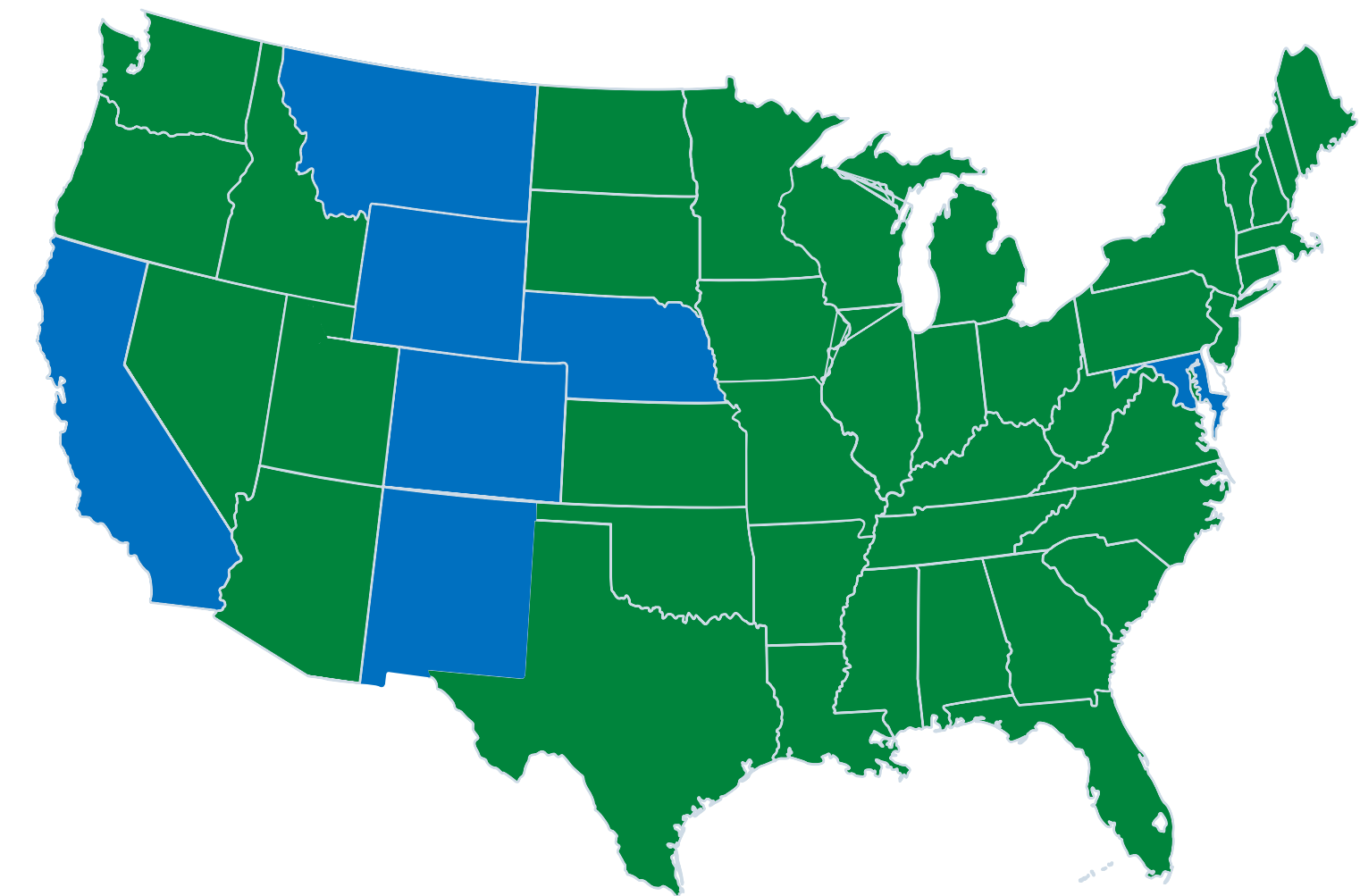
# Can new suppression markets be created?

---

Spurs a market:  
insurance premium discount



Regulations is required where a there is a  
market failure

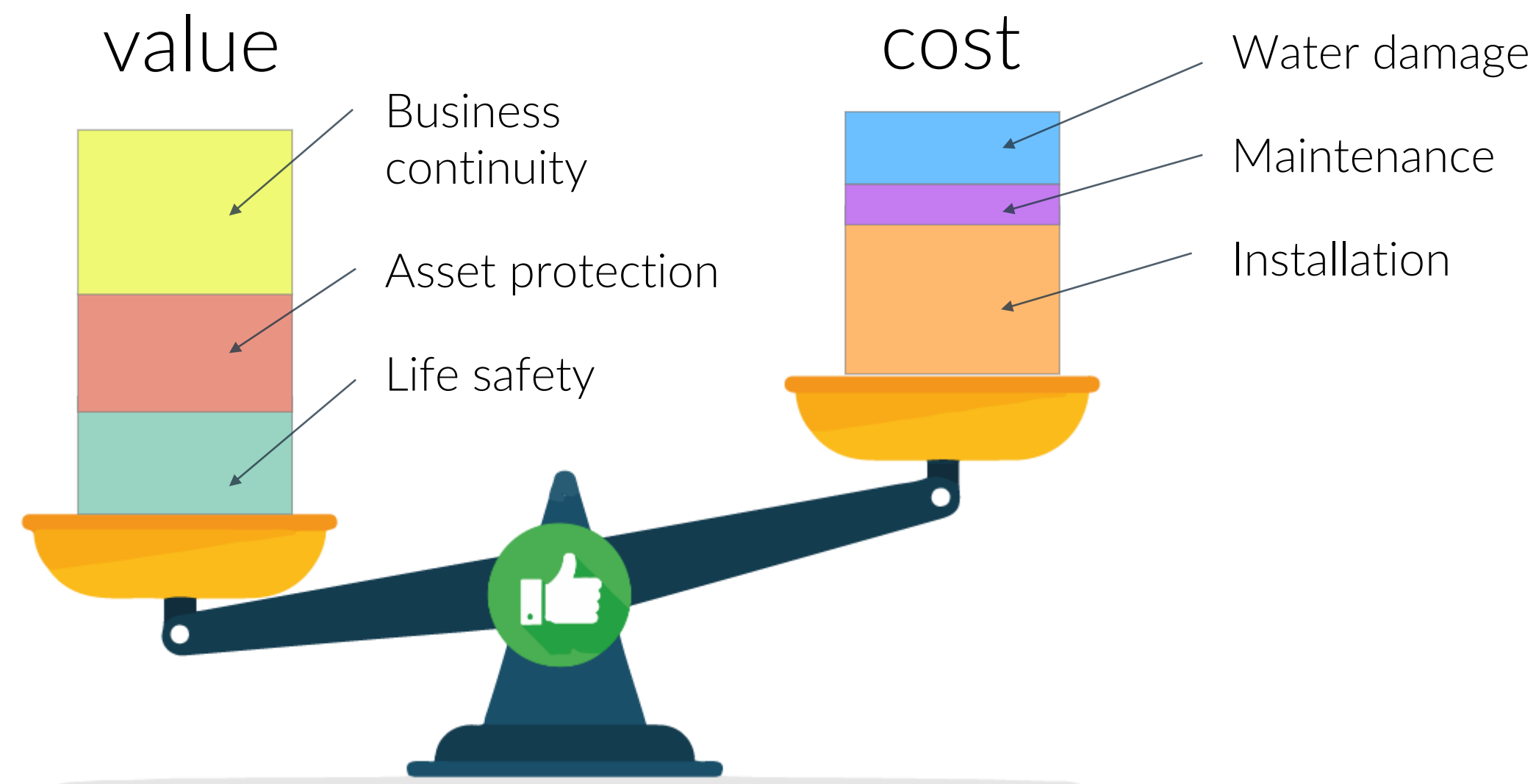


■ US states that have adopted IBC 2003

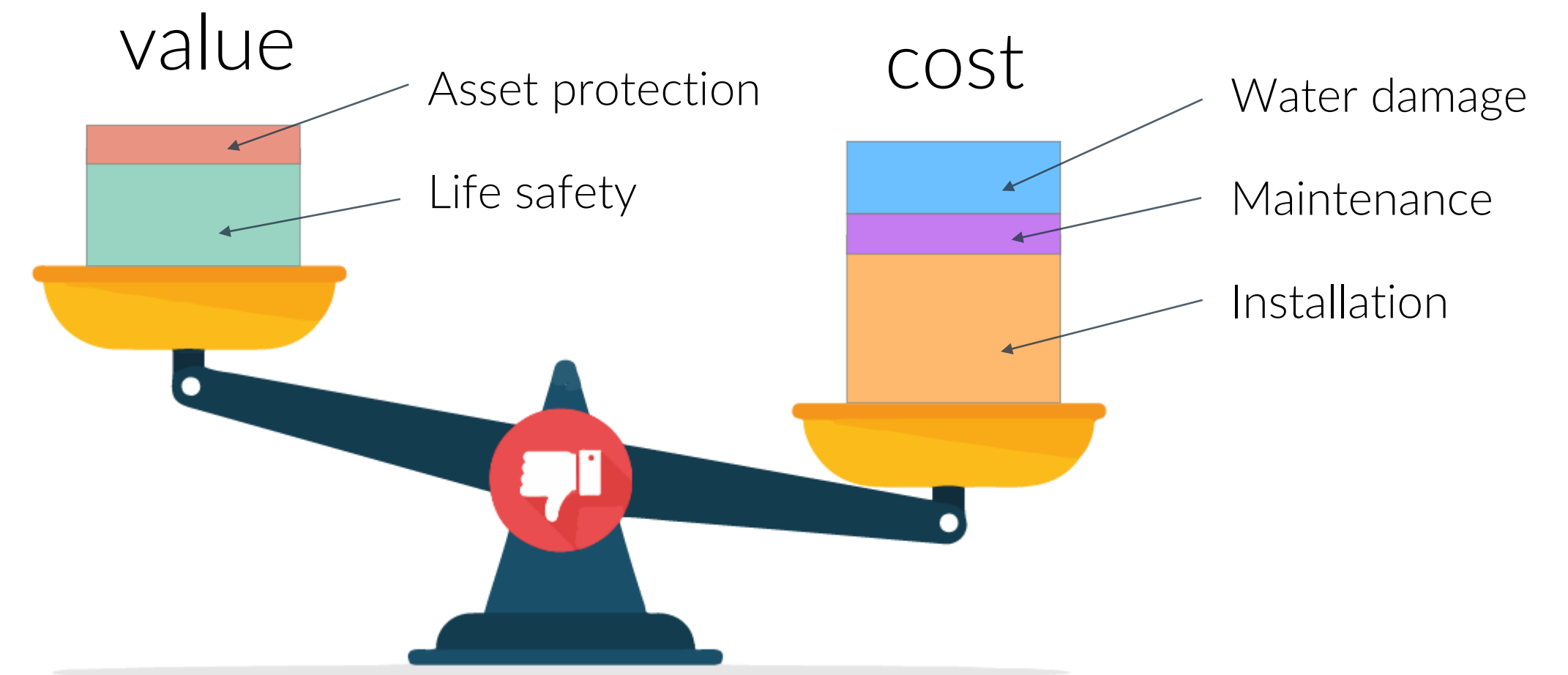


# Regulations compensating for market failure

The industrial market is driven by the customer, as opposed to regulation, as the value outweighs the cost



Industrial sprinkler  
Value driven

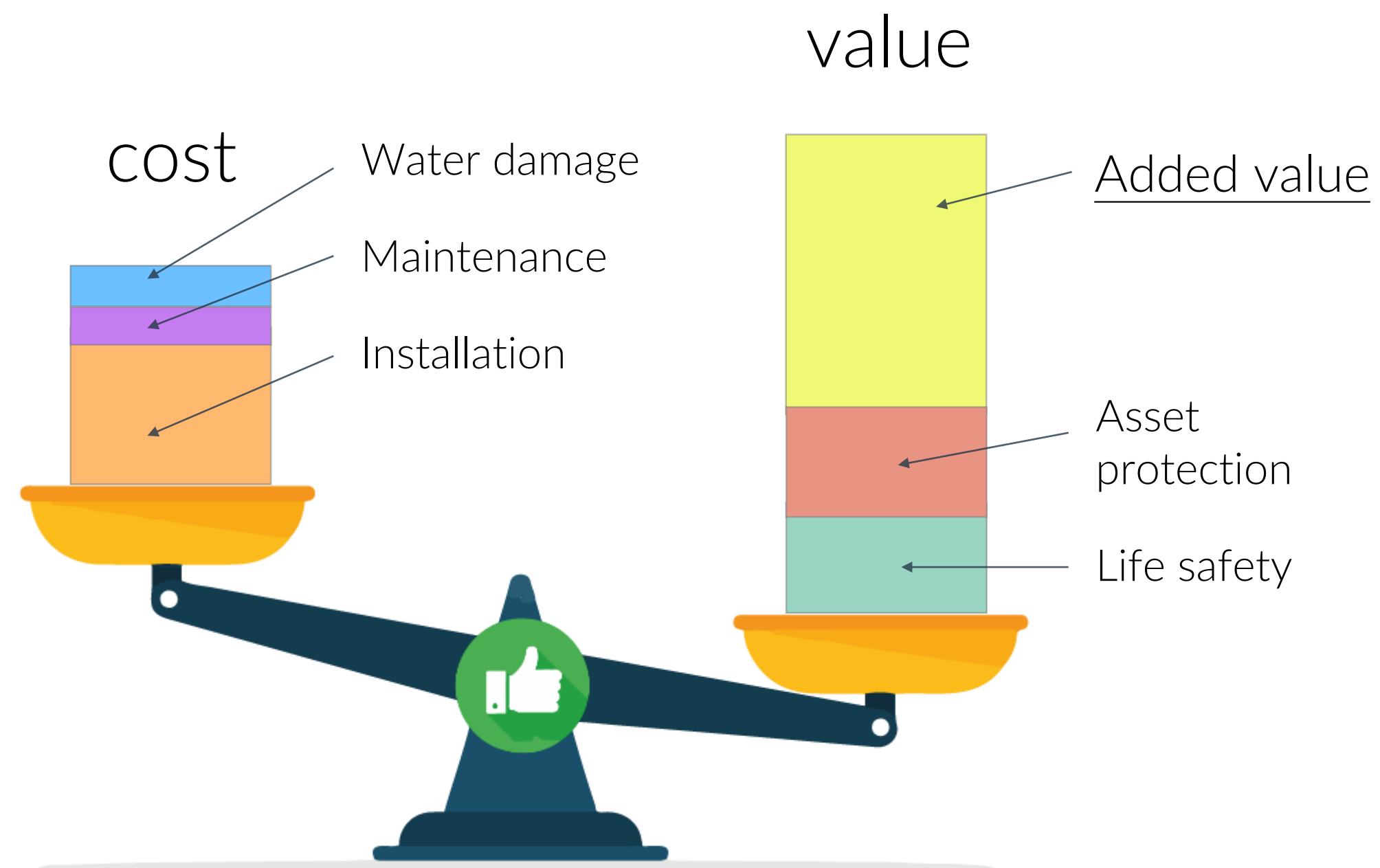


Residential sprinkler  
Regulation driven



# Increased value creates a market

Adoption can be driven by the customer, as opposed to regulation, if the value outweighs the cost



Using the hardware for applications beyond just fire safety



Occupancy analytics



HVAC control



Building management system (BMS)



Security

# Increasing the benefits from fire suppression

Locating people  
in a fire for  
rescue

Intruder detection  
for security



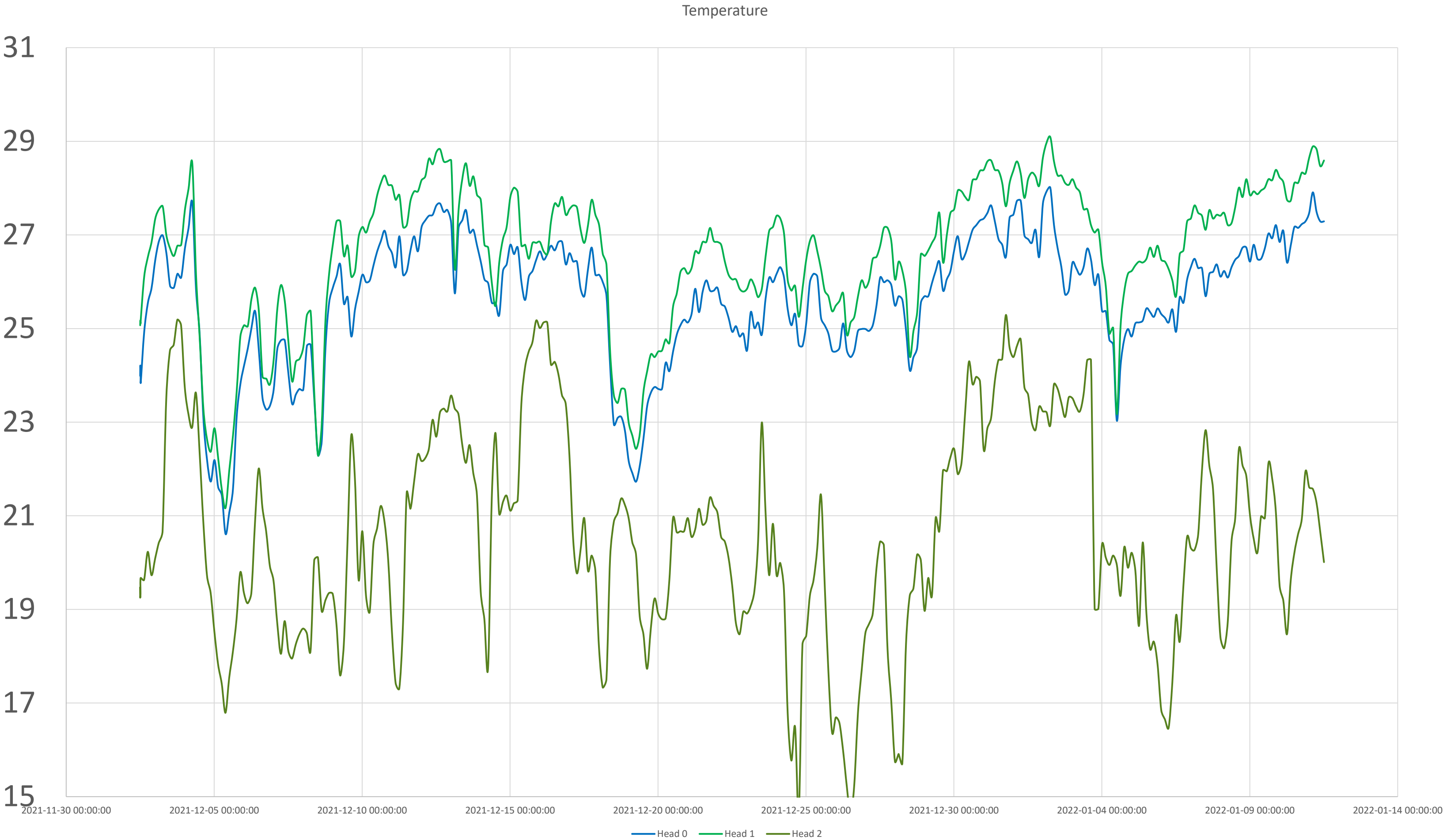
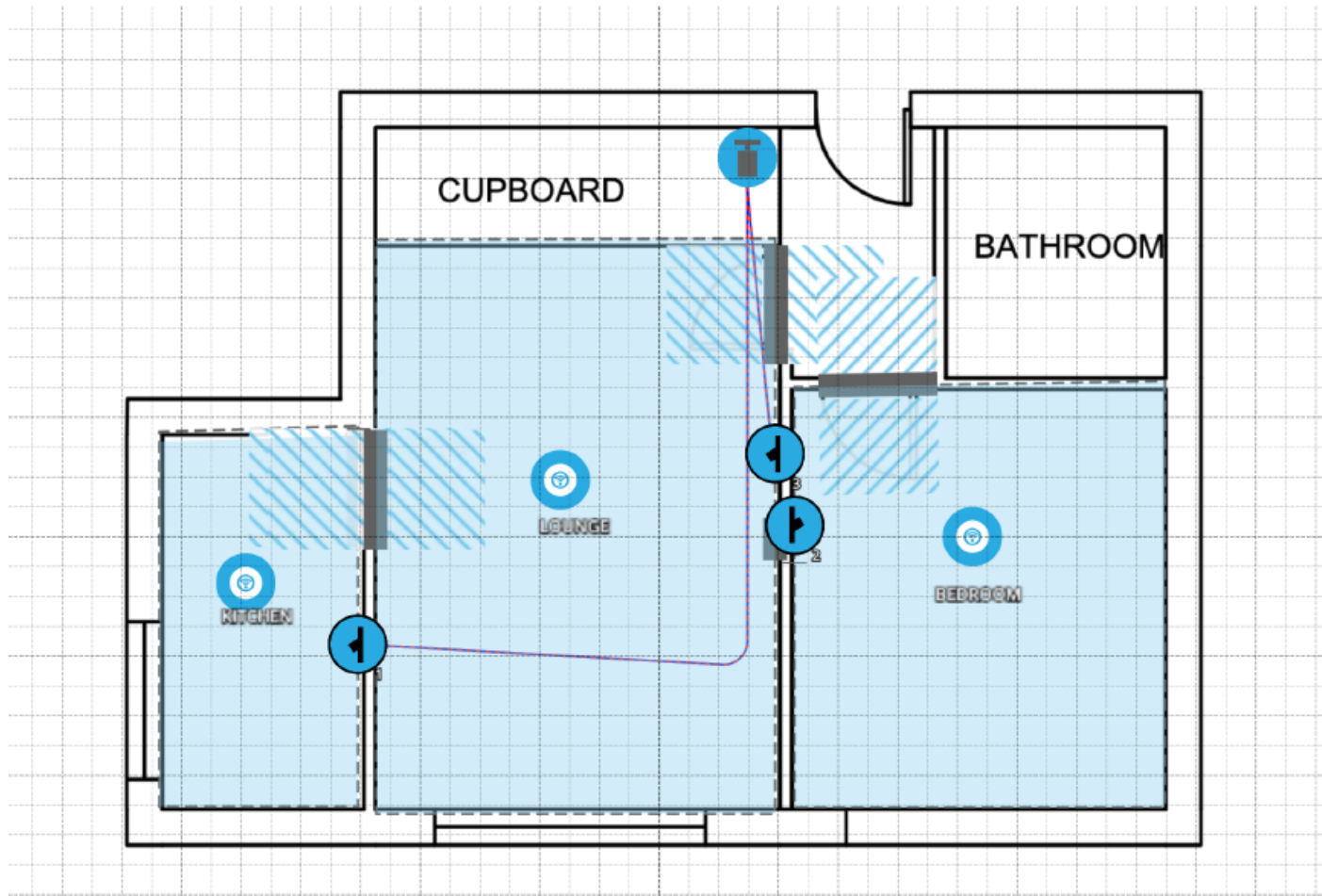
Vulnerable  
persons  
monitoring

Occupancy  
analytics and  
thermal leak  
optimised  
HVAC



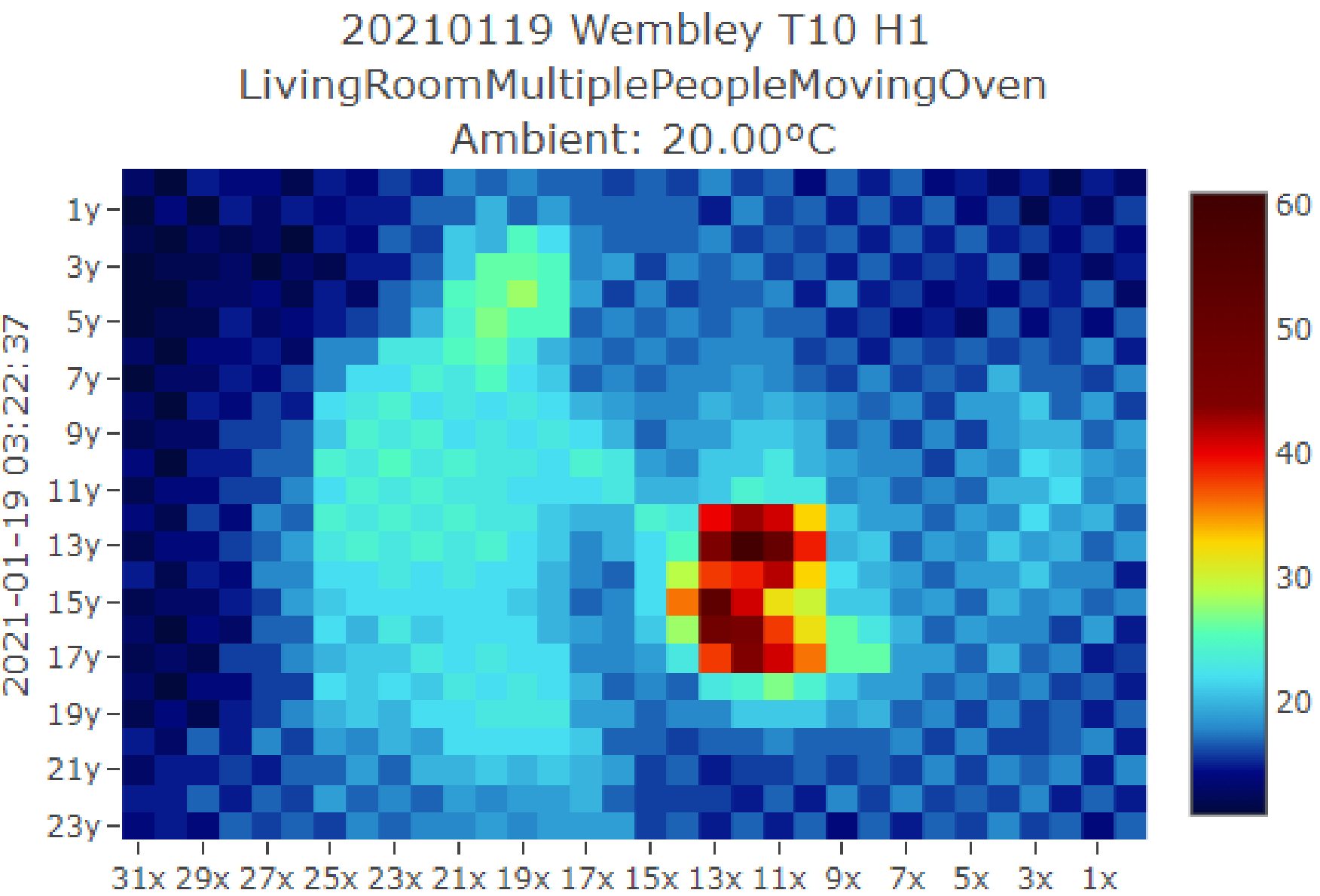


# 41 George St, Dumfries



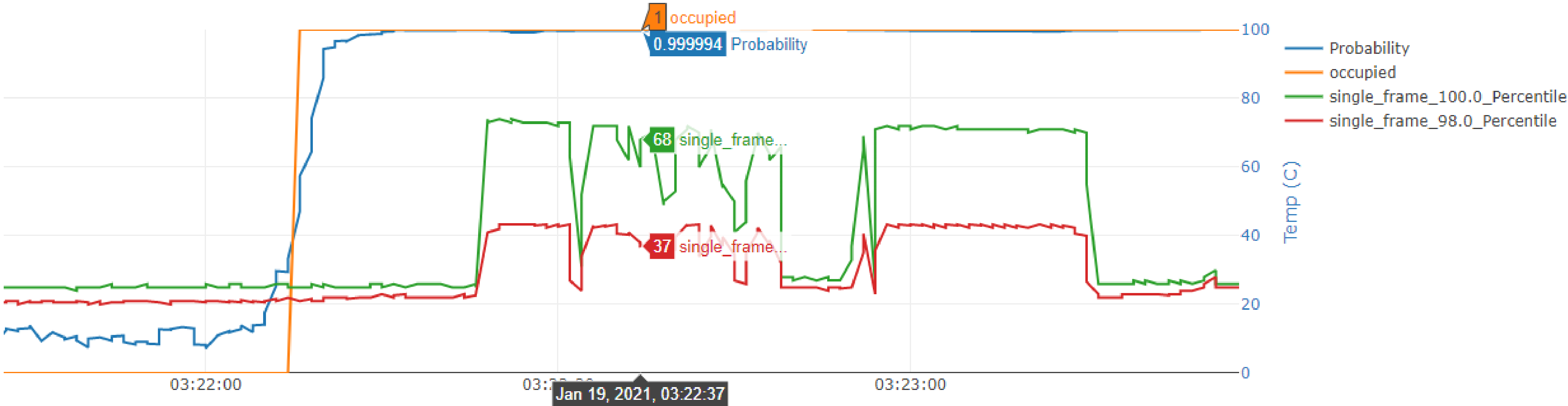


# Occupancy detection validated



20210119\_Wembley\_T10\_LivingRoomMultiplePeopleMovingOven\_H1

Frame: 229, Time (s): 115.0



# The future of fire suppression?



Markets!