



Emergencies in Downstream (TSOs)
Towards emergencies free network

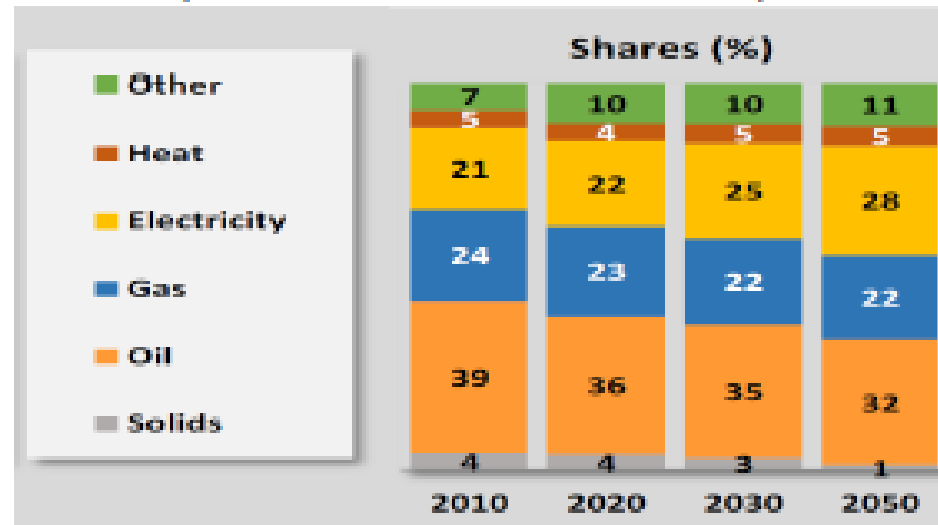
Dr. Georgios D. Panopoulos
President & Managing Director
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1. Gas Transmission Pipeline Developement in SE Europe and Black Sea
2. Emergencies in Transmission Systems (TSOs)
3. Effective Response in Emergencies

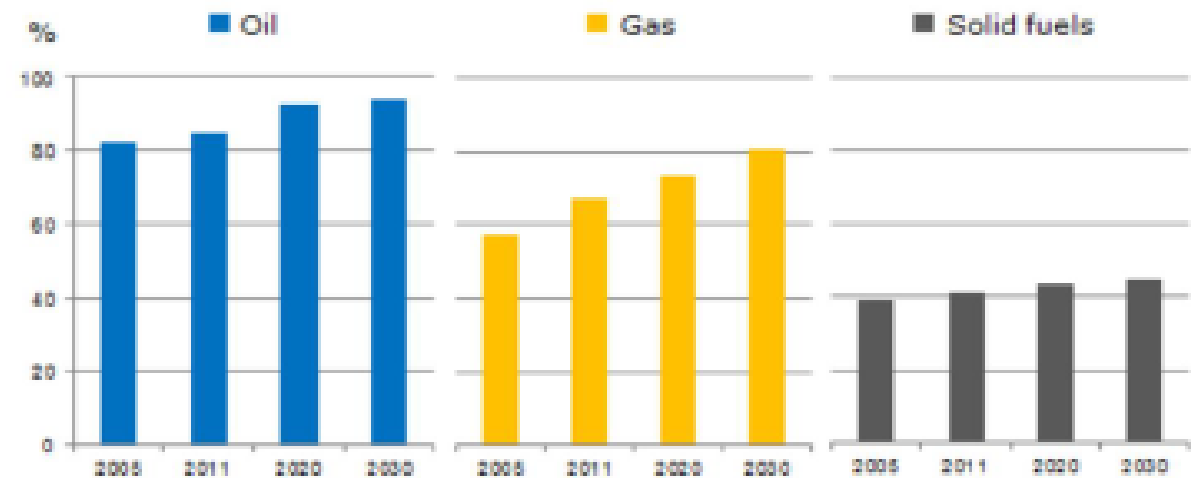
1. Gas Transmission Pipeline Development in SE Europe

EU future energy mix

Final Energy Consumption by Fuel
(EU Reference Scenario 2016)



Share of imported fuel in total EU consumption
("business as usual" scenario)



Source: European Commission

Source: <https://www.entsog.eu>

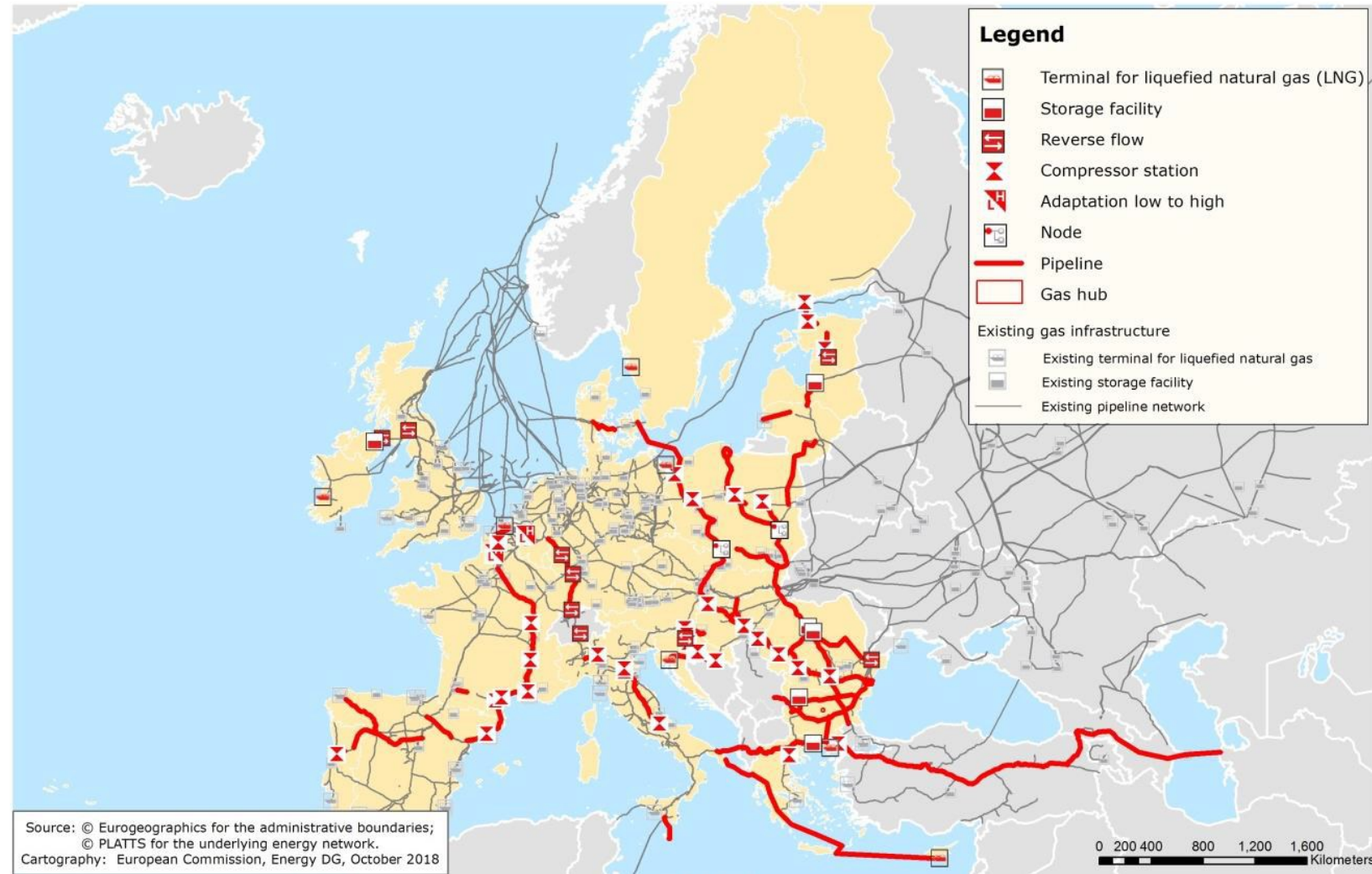
1. Gas Transmission Pipeline Developement in SE Europe



Source: <https://www.entsog.eu>

1. Gas Transmission Pipeline Development in SE Europe

PCIs in Gas



Source: <https://www.entsog.eu>

1. Gas Transmission Pipeline Developement in SE Europe
2. Emergency in Transmission Systems (TSOs)
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2. Emergency in Transmission Systems (TSOs)

Gas incidents

EGIG 9th Report 1970 -2013

Europe counts only one severe gas pipeline incident; Ghislenghien, Belgium, 30 July 2004.

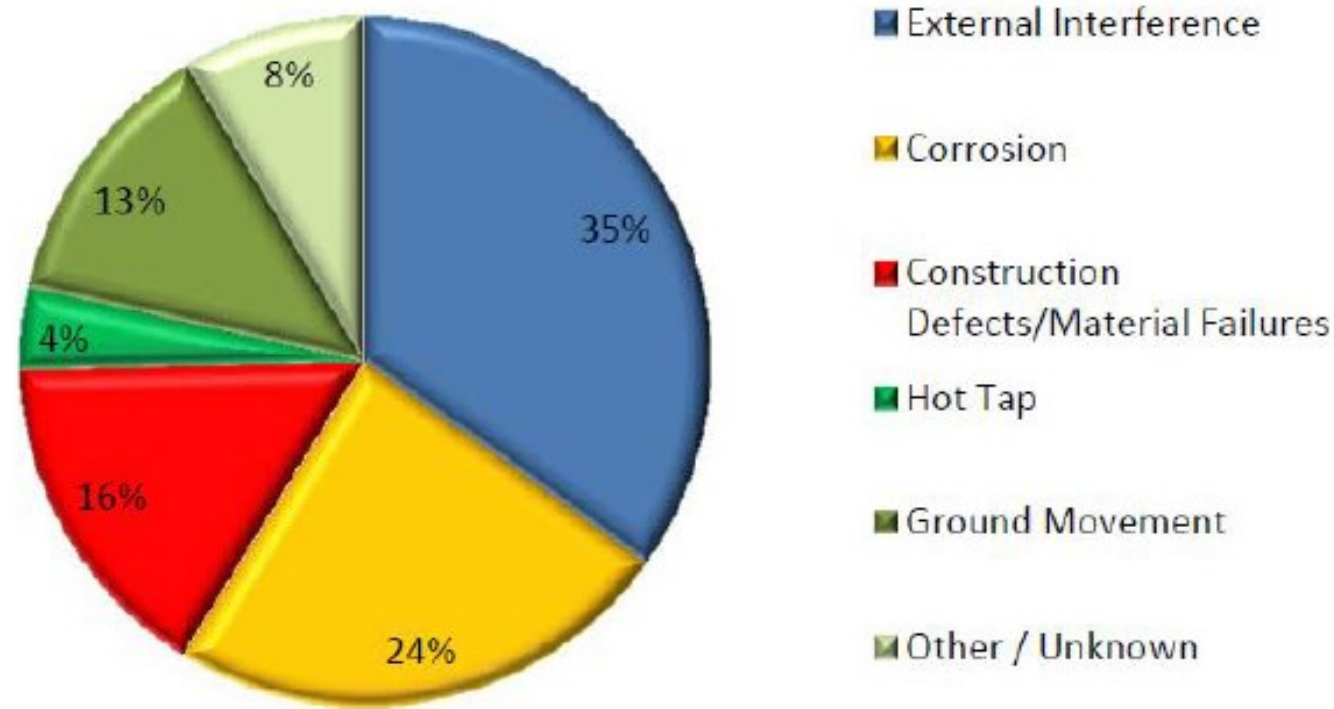


Results: 20 fatalities, 130 wounded with 33 people severely burned and 2 in critical condition and €100 damages.

- In 143,000 km of pipelines, with a total exposure at 3.98 million km·yr, the EGIG database gives 1309 pipeline incidents in the period from 1970-2013.
- The overall incident frequency is equal to 0.33 incidents per year per 1,000 km over the period 1970-2013.
- The 5-year moving average failure frequency in 2013 equals 0.16 per year per 1,000 km.

2. Emergency in Transmission Systems (TSOs)

Gas incidents (EGIG 9th report 1970-2013)



Distribution of incidents (2004-2013)

2. Emergency in Transmission Systems (TSOs)

The Pipeline and Hazardous Materials Safety Administration (PHMSA) classifies the incidents into three categories:

- **Gas transmission and gathering:** Gathering lines take natural gas from the wells to midstream infrastructure. Transmission lines transport natural gas from the regions in which it is produced to other locations, often thousands of miles away. Since 2010, there have been 486 incidents on these types of lines, resulting in 10 fatalities, 71 injuries, and \$620 million in property damage.
- **Oil and hazardous liquid:** This includes all materials overseen by PHMSA other than natural gas, predominantly crude and refined petroleum products. Liquified natural gas is included in this category. There were 1,511 incidents during the reporting period for these pipelines, causing 6 deaths and 15 injuries, and \$1.8 billion in property damage.
- **Gas distribution:** These pipelines are used by utilities to get natural gas to consumers. In just over 40 months, there were 455 incidents, resulting in 42 people getting killed, 183 reported injuries, and \$86 million in property damage.

Source: <https://www.fractracker.org>

2. Emergency in Transmission Systems (TSOs)



2. Emergency in Transmission Systems (TSOs)

What are the consequences?

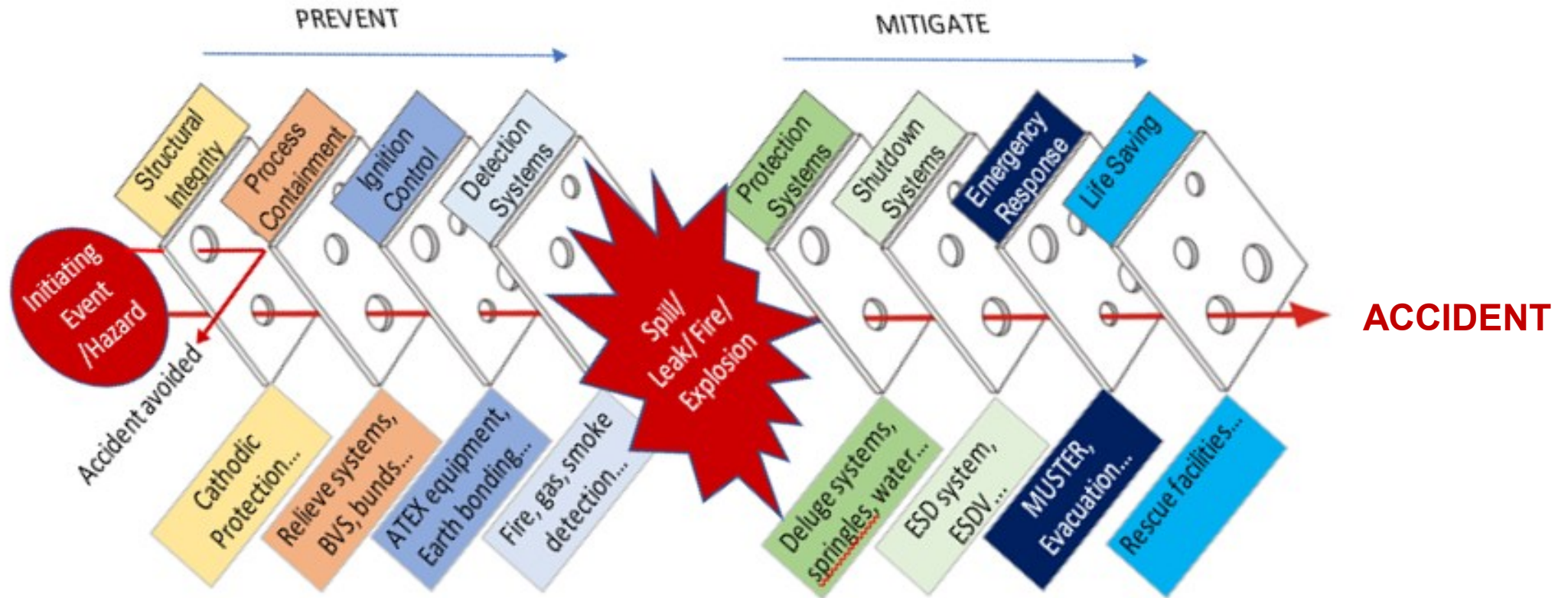
- Casualties (operators, EES, public)
- Environmental impact
- Property damage
- Business Interruption
- Fines and Penalties
- Lawsuits
- Financial losses
- Reputation
- Cross country issues

1. Gas Transmission Pipeline Developement in SE Europe
2. Risks Register in Transmission Systems (TSOs)
3. Effective Response in Emergencies

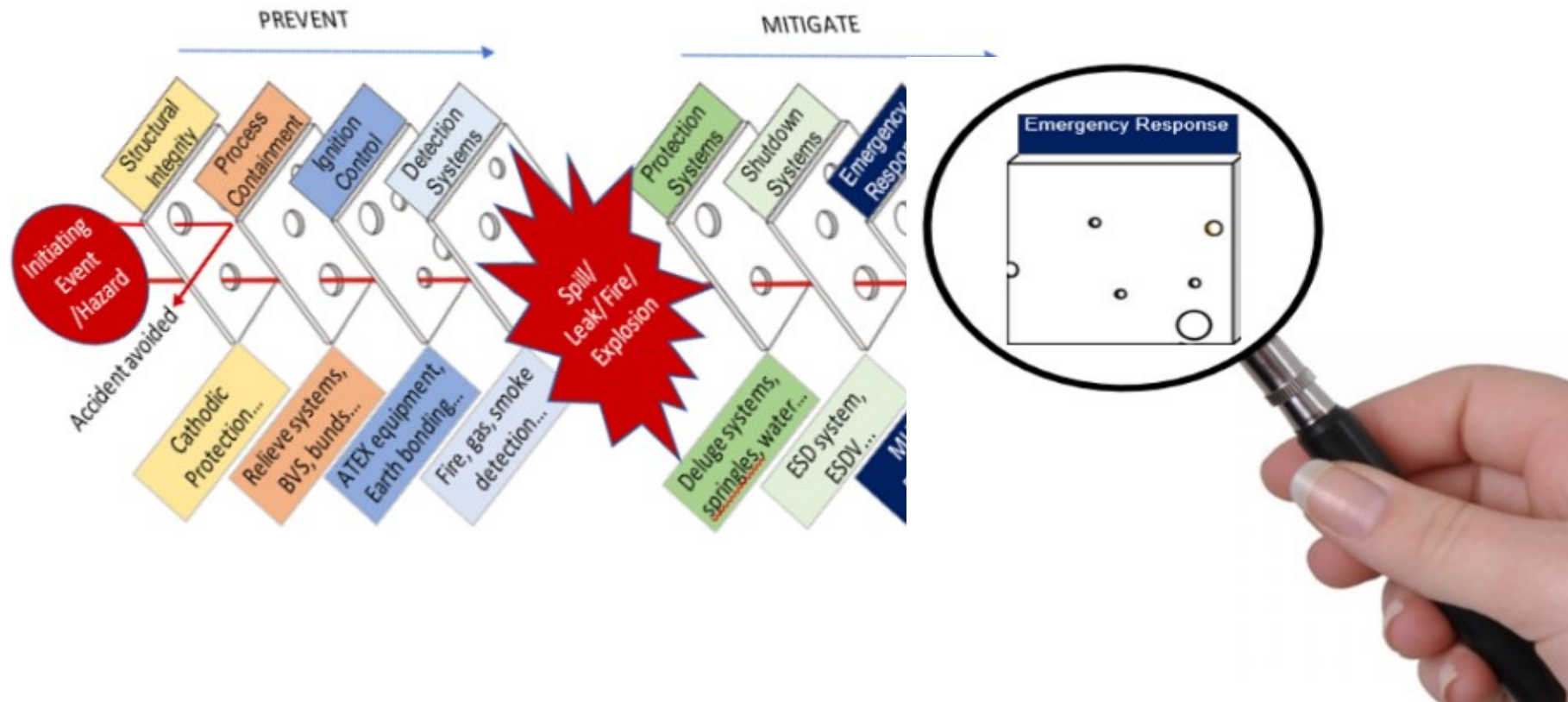
3. Effective Response in Emergencies

Minimising likelihood
and consequences
(ALARP)

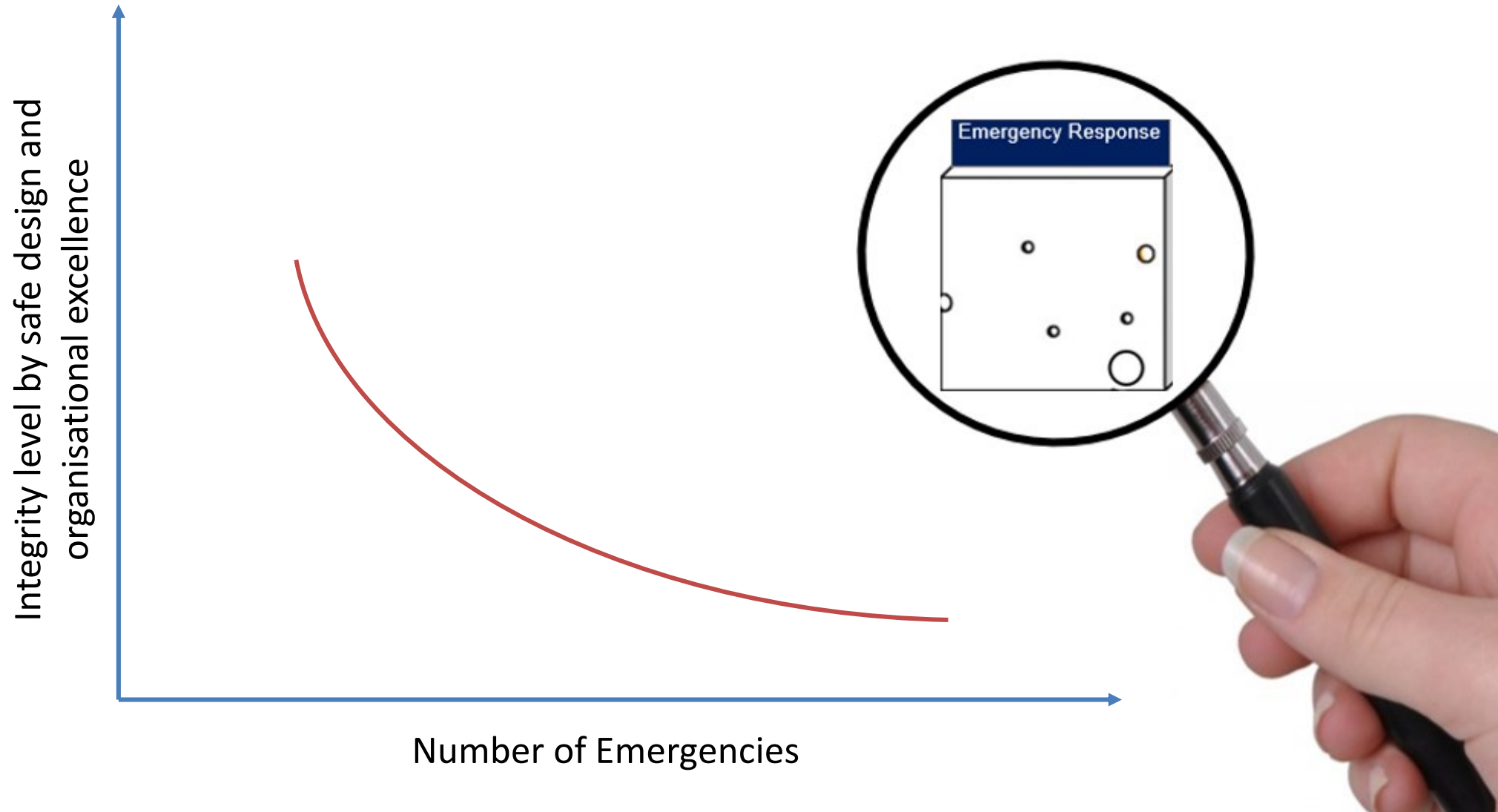
Minimising consequences
and likelihood for
escalation



3. Effective Response in Emergencies



3. Effective Response in Emergencies



3. Effective Response in Emergencies

✓ Key Elements of an Emergency Plan

- ✓ Identification of credible Emergency scenarios
- Emergency classification based on severity (3 Tier system)
- Emergency Response Organisation, roles and responsibilities – Enhanced ERO
- Alert and Notification Procedures
- Emergency Response and Evacuation procedures
- Emergency Response equipment
- Coordination with External Emergency Response Plan
- Coordination with external emergency services (Police, Fire brigade, Ambulance) others (Army, other infrastructure operators) and authorities (local, regional or transborder)
- Media communication procedures
- Post emergency recovery

3. Effective Response in Emergencies

Issues to be considered and effectively been addressed

- Communication continuity
 - Localisation (access, weather, localities (e.g. UXO))
 - Affected or potentially affected external organisations
 - Escalation scenarios
 - Particularities of primary cause if natural (Nat-tech Acc)
 - Language issues
 - Coordination
 - Experience/or trained in simulations
 - Capacity
 - Expertise
 - Specilisation
 - Communication lists (updated)
 - Changes in the area (developments, new ops)
- And apparently media, evacuation needs, control hazardous zones

3. Effective Response in Emergencies

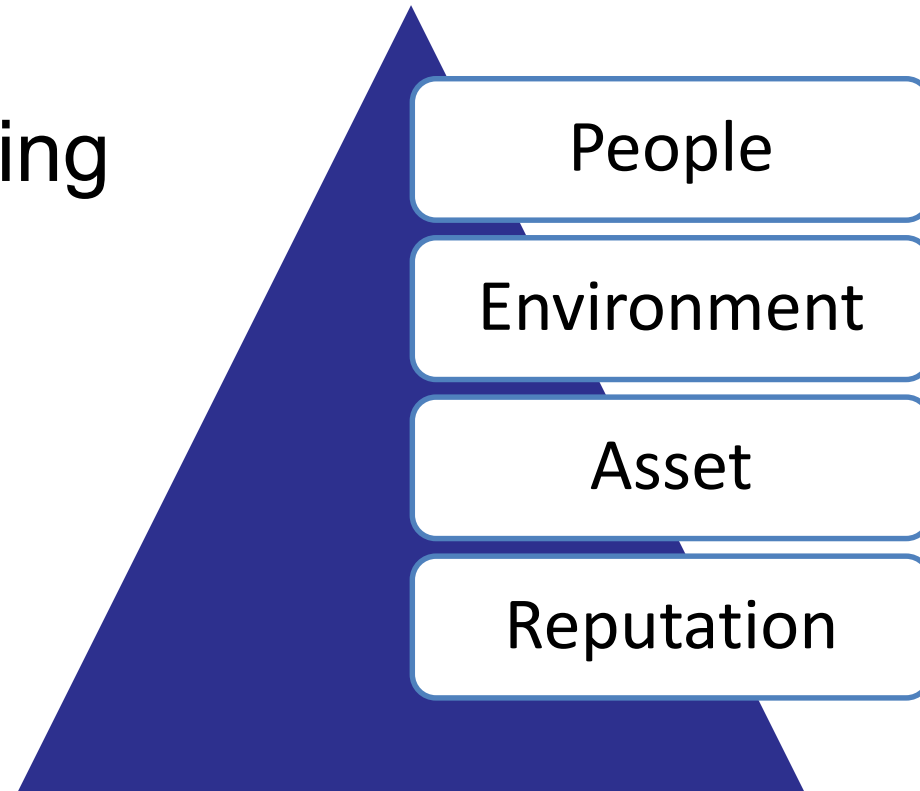
Emergency Response Scenarios

- Process
- Nat-tech acc
- Occupational

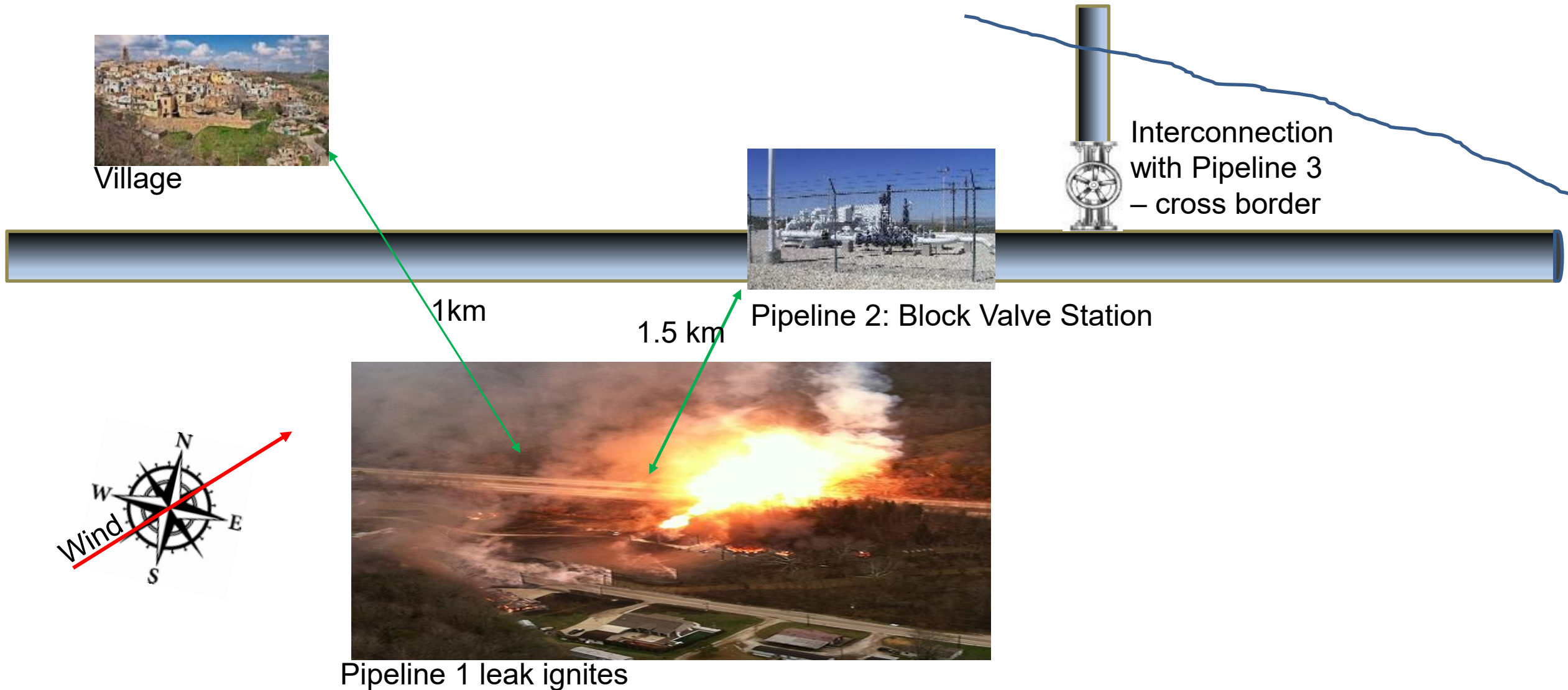


3. Effective Response in Emergencies

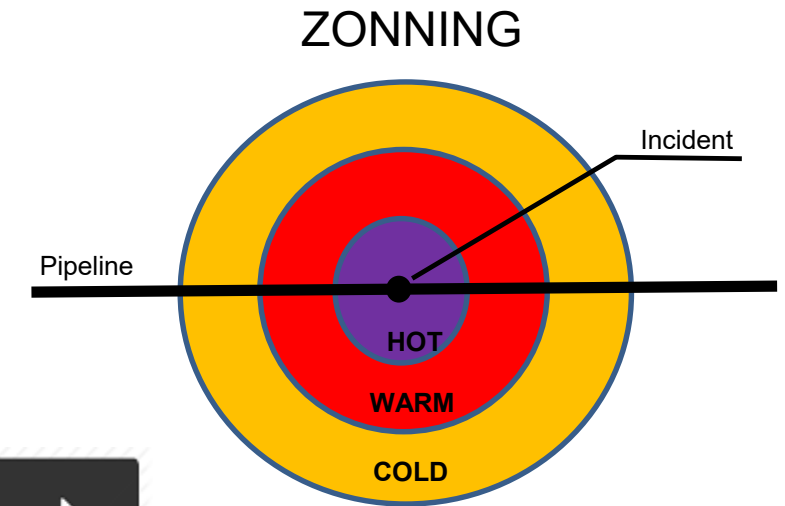
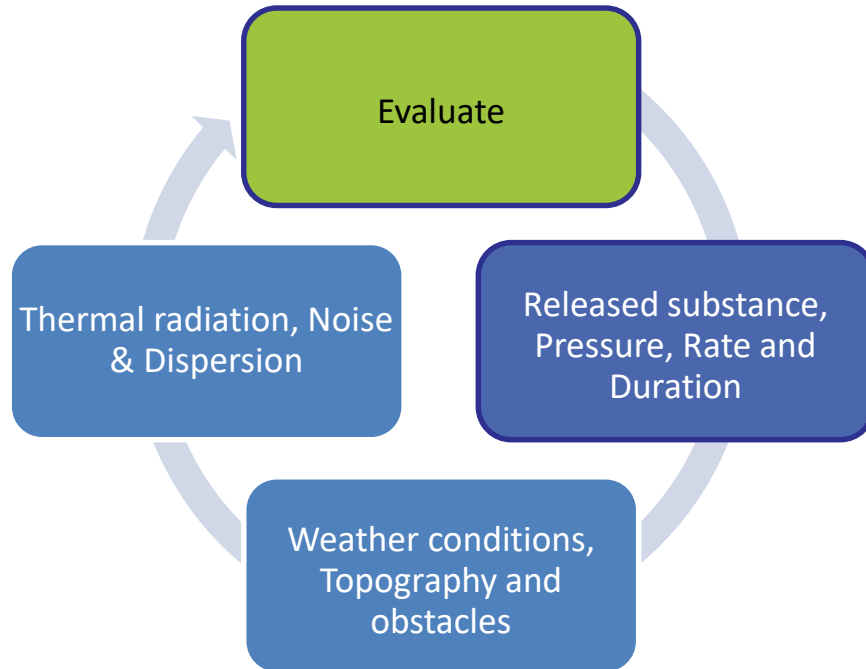
Prioritising
Safety



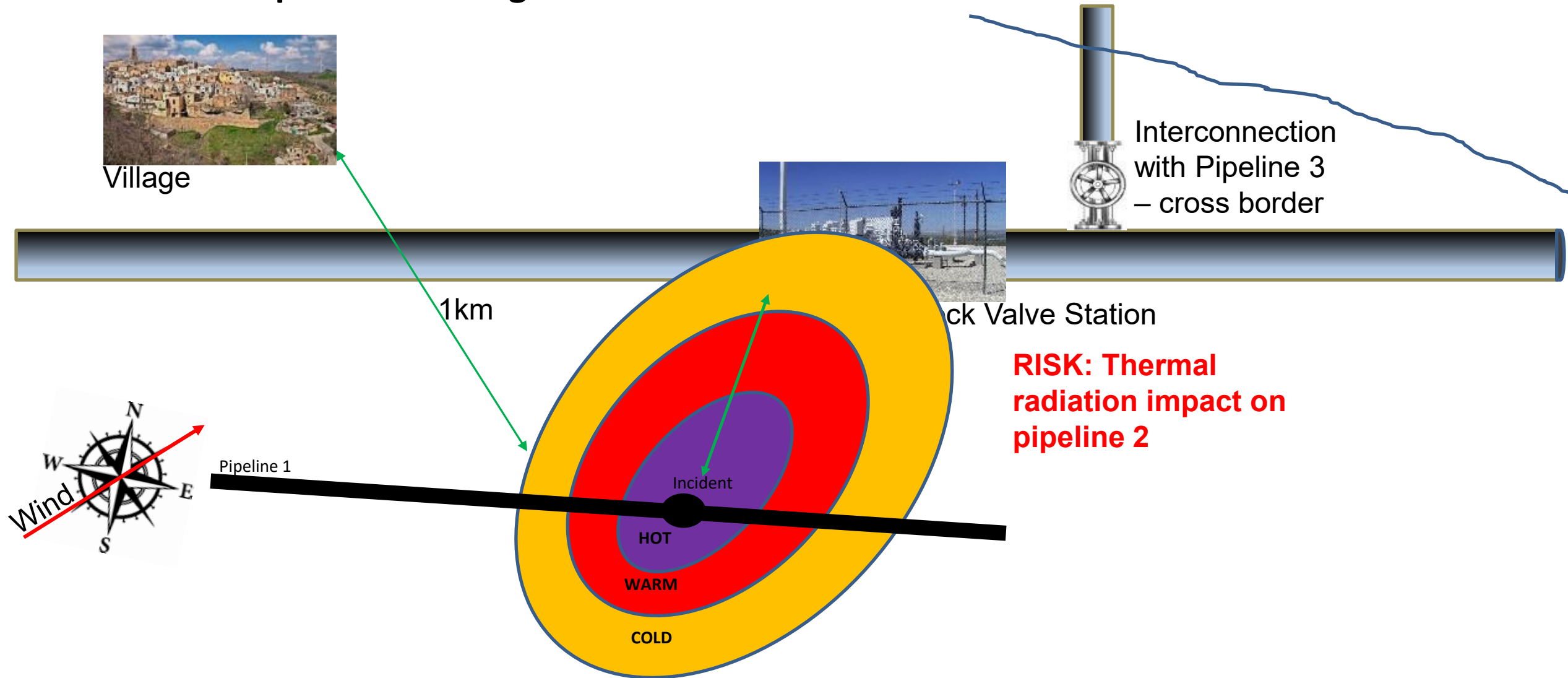
3. Effective Response in Emergencies



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3. Effective Response in Emergencies

Pipeline 1

- Isolate immediately – Close upstream BVS and downstream BVS

Reduce

- Evacuate all in the immediate area
- Notify Internal and External parties.

Internal Notifications – ERT Leader, Duty manager, etc.

External Notifications – Police, Fire brigade, Local Authorities, Civil protection, Municipality, Pipeline 2 Operator, Pipeline 2 Operator

- Evacuate public in surrounded area which may be impacted if changes of wind direction

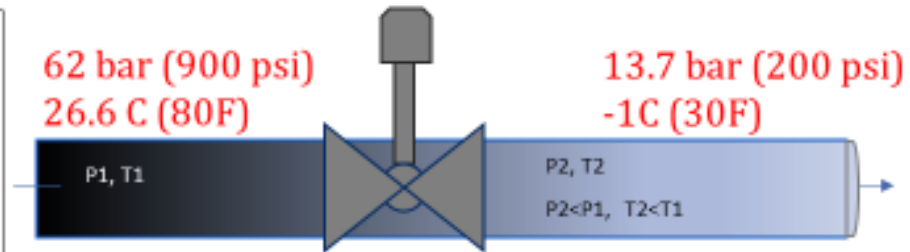
3. Effective Response in Emergencies

Pipeline 2

- Maximum Flow Increase (**JT effect**)
- Be prepared to isolate section
- Notify upstream compressor station to be standby
- Notify Pipeline 3 Operator to be standby

Joule–Thomson effect

A 100 psi pressure drop results in a temperature drop of 6-8 F



Temperature of gas drops
~ 5–23C (42-56F)

Under normal operation it is unwanted, in case of fire however it will protect the pipeline



3. Effective Response in Emergencies

Mobilising resources according to severity

Emergency Level	Impacted area	Scenario/Scale	Resources involved
Tier 1	Facility	Most likely/Minor	Local Resources and EES
Tier 2	Regional	Most Possible/medium	Company Resources, EES and Local Authorities
Tier 3	Cross Country	Worst Case/major	Company Resources, EES and Cross Country Resources

3. Effective Response in Emergencies

Pre-assigned Roles and Responsibilities

Emergency Level	Role	Responsibility
Tier 1	Emergency Response Team Leader	Leads the organizational response and serves as a liaison with outside emergency response agencies Coordinate with Tier 1 team and EES.
	Emergency Response Team	Initial emergency procedures. Apply containments measure and restore safety
Tier 2	Incident Management Team	Coordinate operations with Tier 1 team
Tier 3	Crisis Management Team	Coordinate with cross country resources, responsible for restoring Business continuity

3. Effective Response in Emergencies

Ensure all
personnel
involved in
an
Emergency
are :

Trained for the specific conditions

Equipped appropriately (PPEs and rescue/escape equipment and materials)

Provided with transportation capacity enough to evacuate all

Supported by a team of first aiders with full capacity in equipment and materials to provide Advance Life Support (ALS)

3. Effective Response in Emergencies

To end the
Emergency
confirm:

No Leak (either controlled or section is emptied);

Leaked gas has fully dispersed and diluted to become neutral (>5%)

Any fire is extinguished (total quantity of the gas is burned)



*Safety is a key element
of civilisation*

MANAGEMENT FORCE Group

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Towards emergencies free network

Thank You!

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