

Zero Routine Flaring

Achieving 2030 Target

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We
**PLAY
BIG**

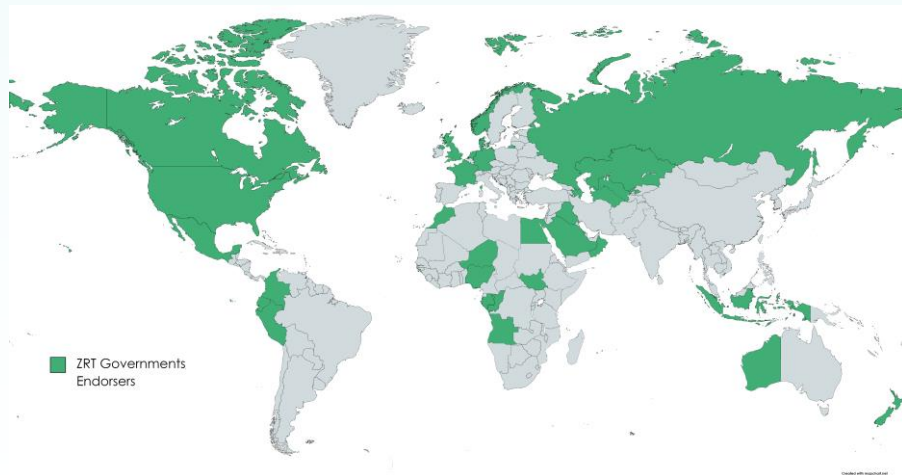
We thrive on
**EMOTIONAL
AGILITY**

**Courageously
tackling the greatest
challenge of our time,
to bring our world the
energy it needs in the
most responsible
way ever imagined**

We are
**FANATICAL
ABOUT
PERFORMANCE**

We are built on
**INFINITE
THINKING**

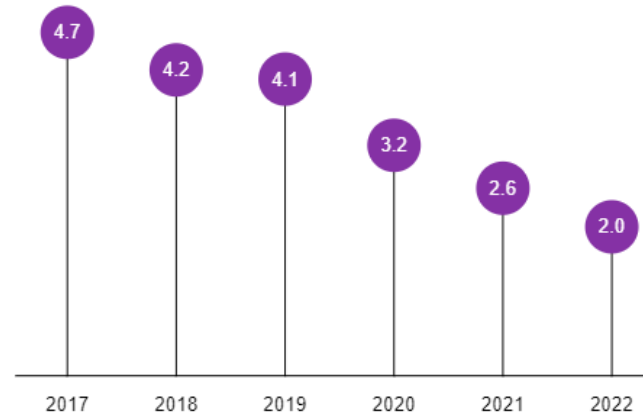
World Bank - Zero Routine Flaring by 2030



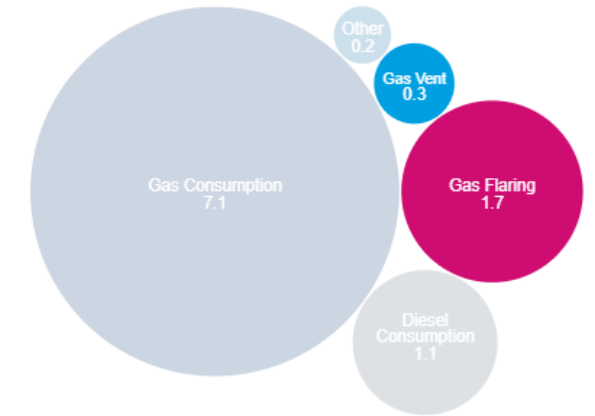
UKCS Flaring



GHG By Year (MtCO2e)

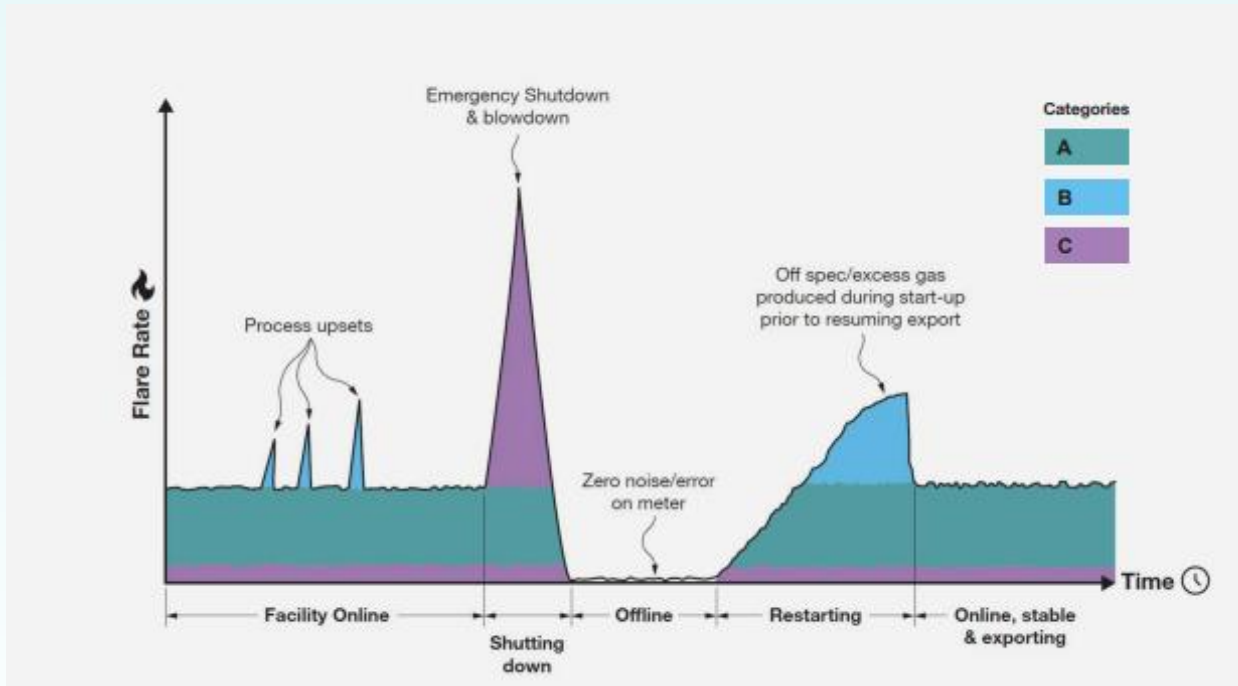


GHG by Source (MtCO2e)



<https://www.nstauthority.co.uk/the-move-to-net-zero/flaring-and-venting/>

Defining Routine Flaring



https://www.nstauthority.co.uk/media/7647/flaring-and-venting-guidance_june-2021-final.pdf

NSTA

Aligned to the World Bank Definition

- Cat A – Routine Flaring, “Streams for the safe operation of the asset based on its current design and operating at optimum efficiency”
- Cat B – Non-Routine Flaring, “Flaring and venting occurring during normal operations beyond levels optimum for the installation”
- Cat C – Safety Flaring, “Emergency disposal and gas streams required specifically for the operation of safety critical/elements”

UK Emission Trading Scheme (ETS)

- Free allowance for Safety Flaring

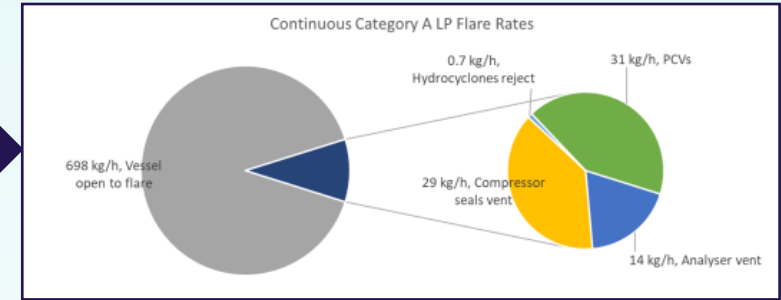
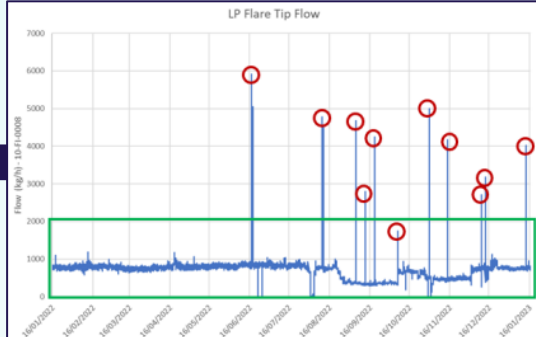
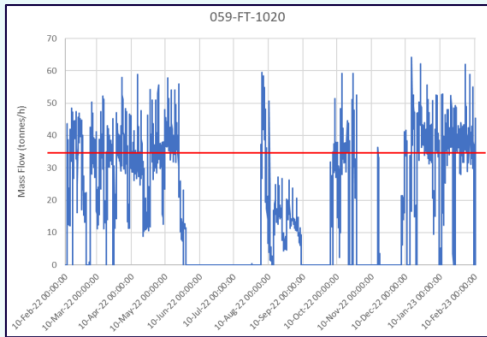
“...flaring can be considered as safety flaring if all three following conditions are met:

1. The flaring is required by relevant permit for safety reasons **AND**
2. The combustion takes place in a unit open to atmospheric disturbances (the combustion in other units is not covered) **AND**
3. The amounts of process or residual gases are highly fluctuating.

Flare Abatement and Flare Gas Recovery Systems

Flare Abatement

Quantify & Categorise



Reduce

Routine Flaring:

- Optimise operations
- Redesign/Alternative Equipment

Non-Routine Flaring:

- Optimising of non-standard operating procedures
- Optimisation of process control to minimise process upsets
- Alternative Depressurisation routes for Planned Maintenance

Safety Flaring:

- Minimise Purge Rates
- Alternatives to normal lit flare
- Replacing HC Blanketing gas with N2
- Optimise Trip Set-points

Recover

Individual Source

- New Pipework Required (potentially narrower)
- Multiple small compressors required
- Potentially High CAPEX / OPEX
- No Cat B/Cat C benefit

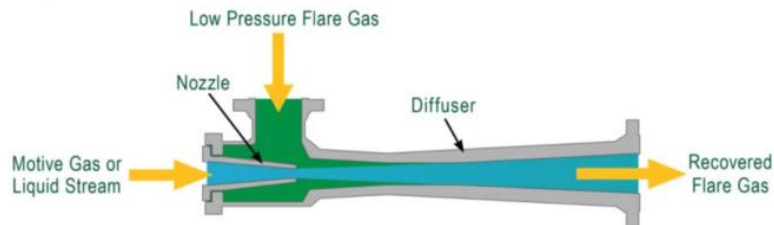
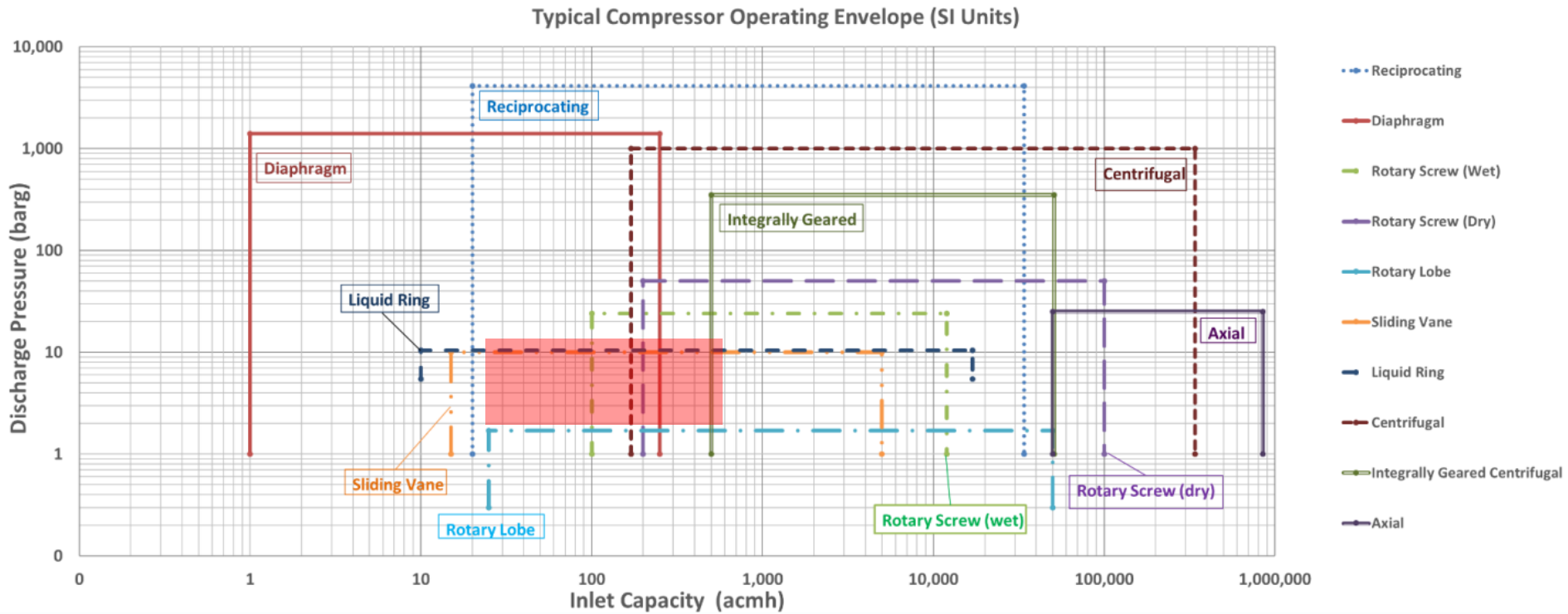
Vapour Recovery Unit

- Single Compression System (potentially multiple stages)
- New Gas Gathering Pipework Required (potentially large diameter)
- No Cat B/Cat C benefit

Flare Gas Recovery System

- Makes use of existing flare header
- Single Compression System (potentially multiple stage)
- Modifications to Flare System
- Cat B/Cat C benefit

FGRS/VRU - Technology Selection

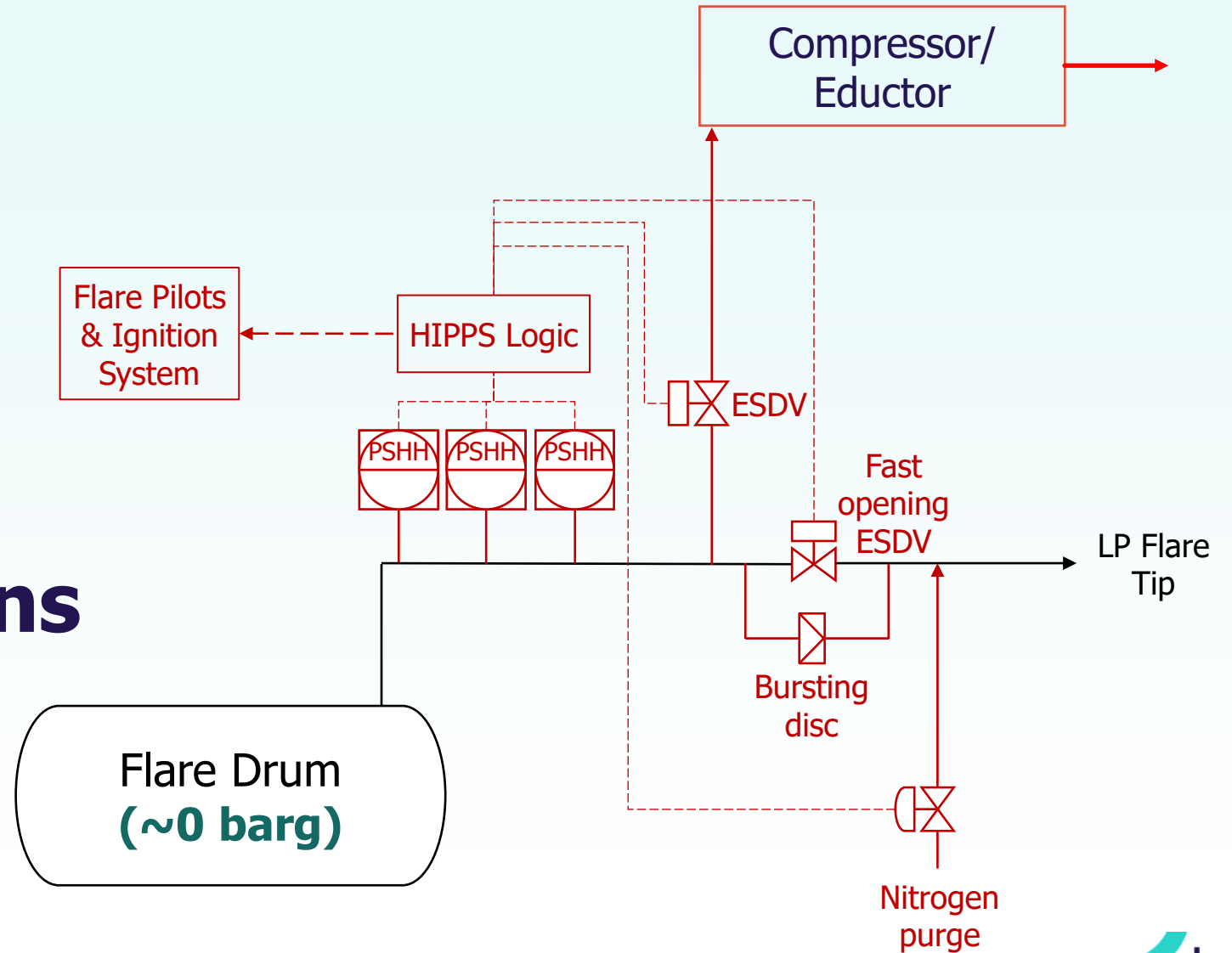


FGRS Supporting Equipment

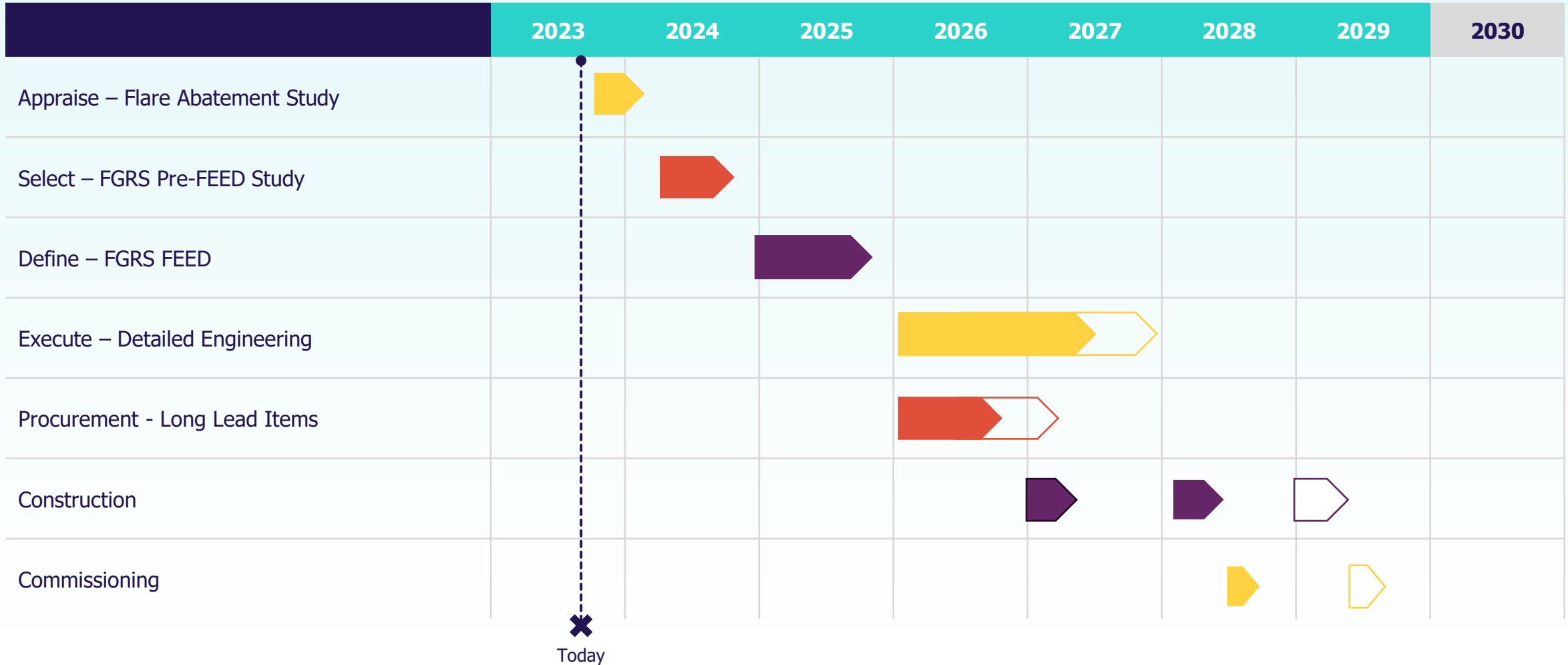
- Fast/Reliable Switch from unlit to lit flaring operation
- Overpressure Protection Control Layer
 - Fast Opening ESDV
 - HIPPS Response
- Overpressure Protection Reactive Layer
 - e.g. Bursting Disc/PSV
- On Demand Ignition System
- Flare Purge of Flare Stack during non-flaring operation

Other Considerations

- Disposal for non gas exporting facilities
- Blending back of HC/Non-HC streams
- Meeting Export Spec / Fuel Gas Requirements
- Reliability
- Back-pressure on flare header



Roadmap to 2030



THANK YOU

OEUK Decarbonisation Conference 2023

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