

CLINGENDAEL
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Long-term Prospects for Northwest European Refining

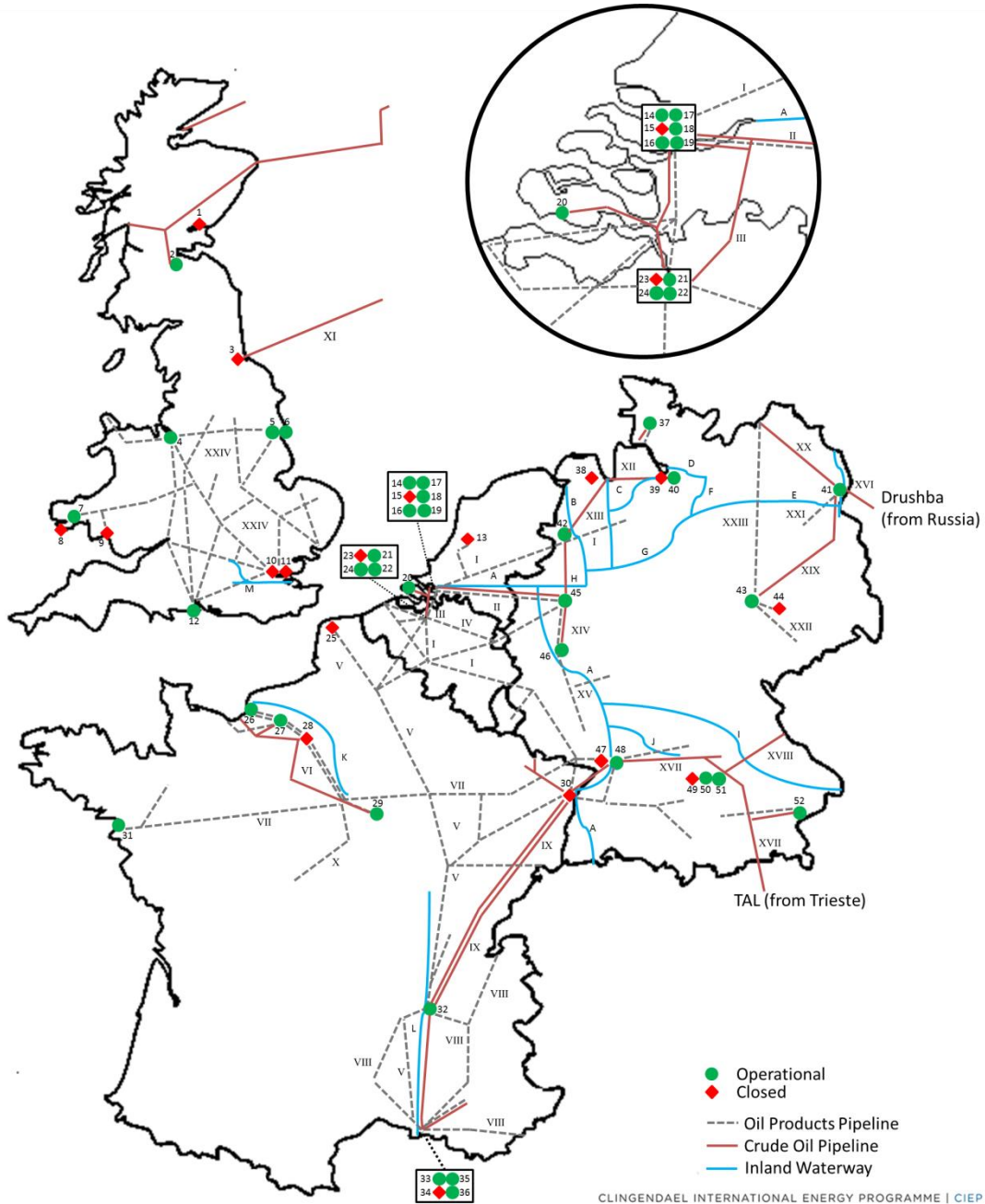
Asymmetric Change: A Looming Government Dilemma?



Refining Conference
May 12th, 2016

Outline

- **Introduction of the NWE Refining Study**
- **Must-Run Scenario – Assumptions & Methodology**
- **Must-Run Scenario – Last Men Standing**
- **Closure-Constrained Scenario – Assumptions & Methodology**
- **Closure-Constrained Scenario – A New Lease of Life**
- **Implications**



Introduction of the NWE Refining Study

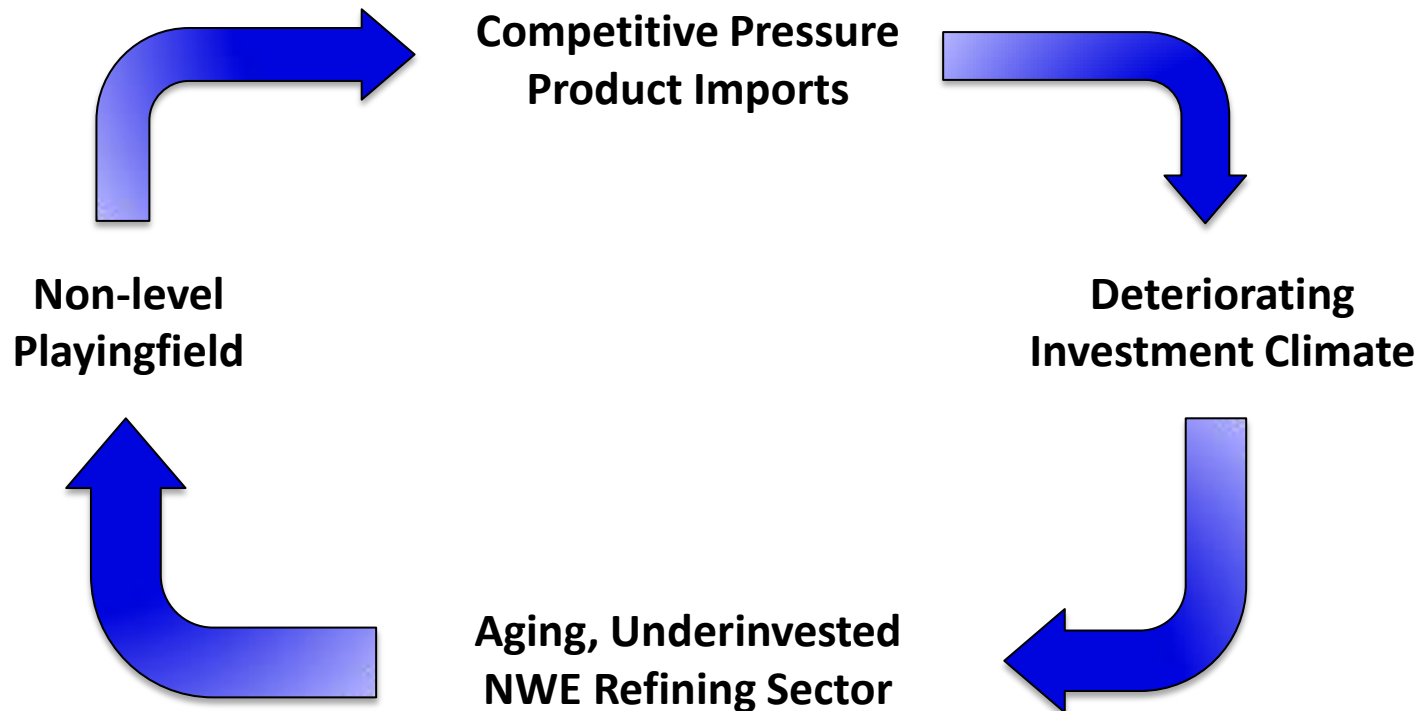
- How does the post-2025 NWE refining landscape look like?
 - Under pressure from imports (export-oriented advanced source refineries)
 - Under pressure from a transition away from fossil fuels (NWE ahead of the curve)

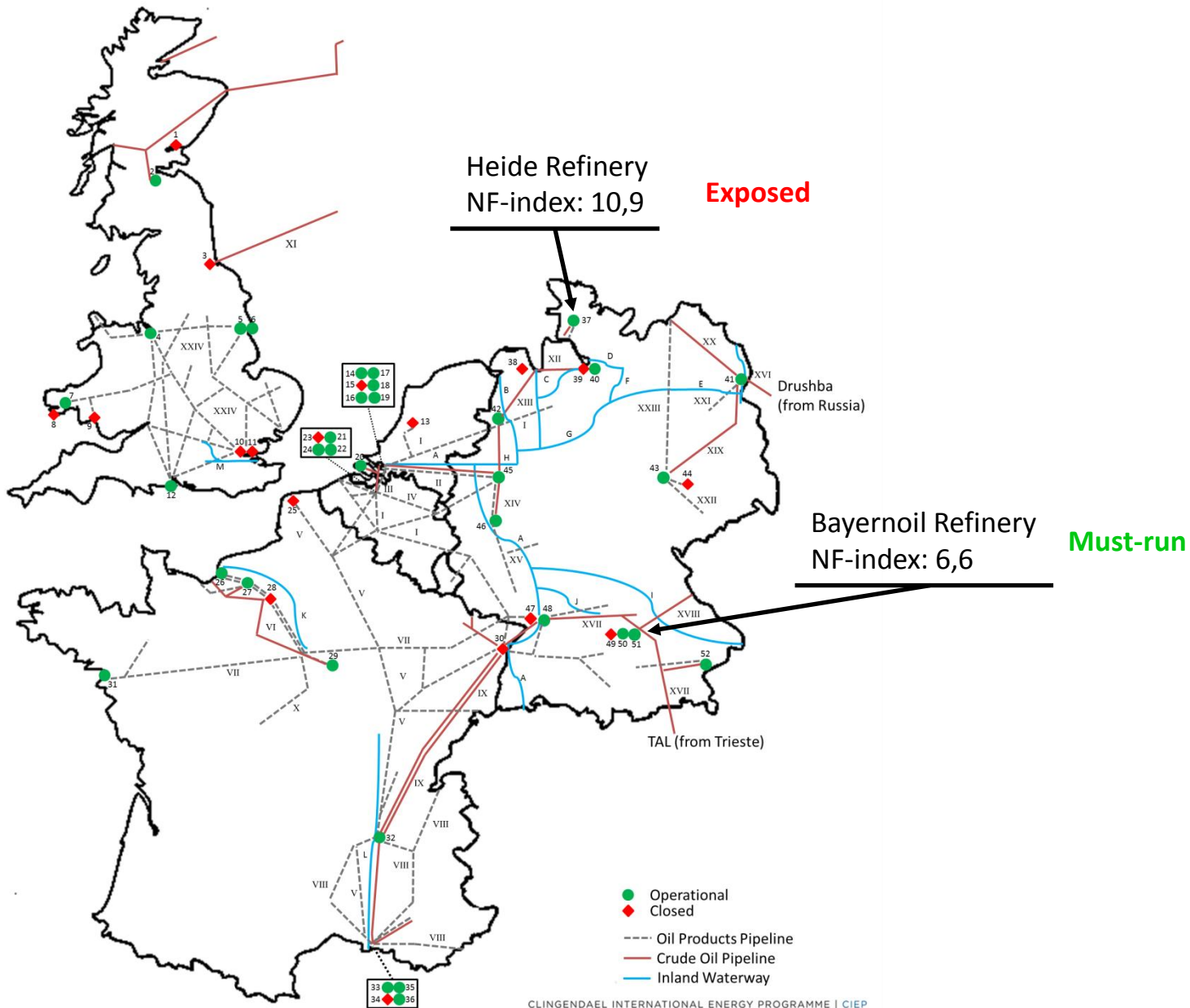
- What-if scenario analysis:
 - Must-run scenario (last men standing refineries + discounting barriers-to-exit)
 - Closure-constrained scenario (must-run scenario moderated by barriers-to-exit)

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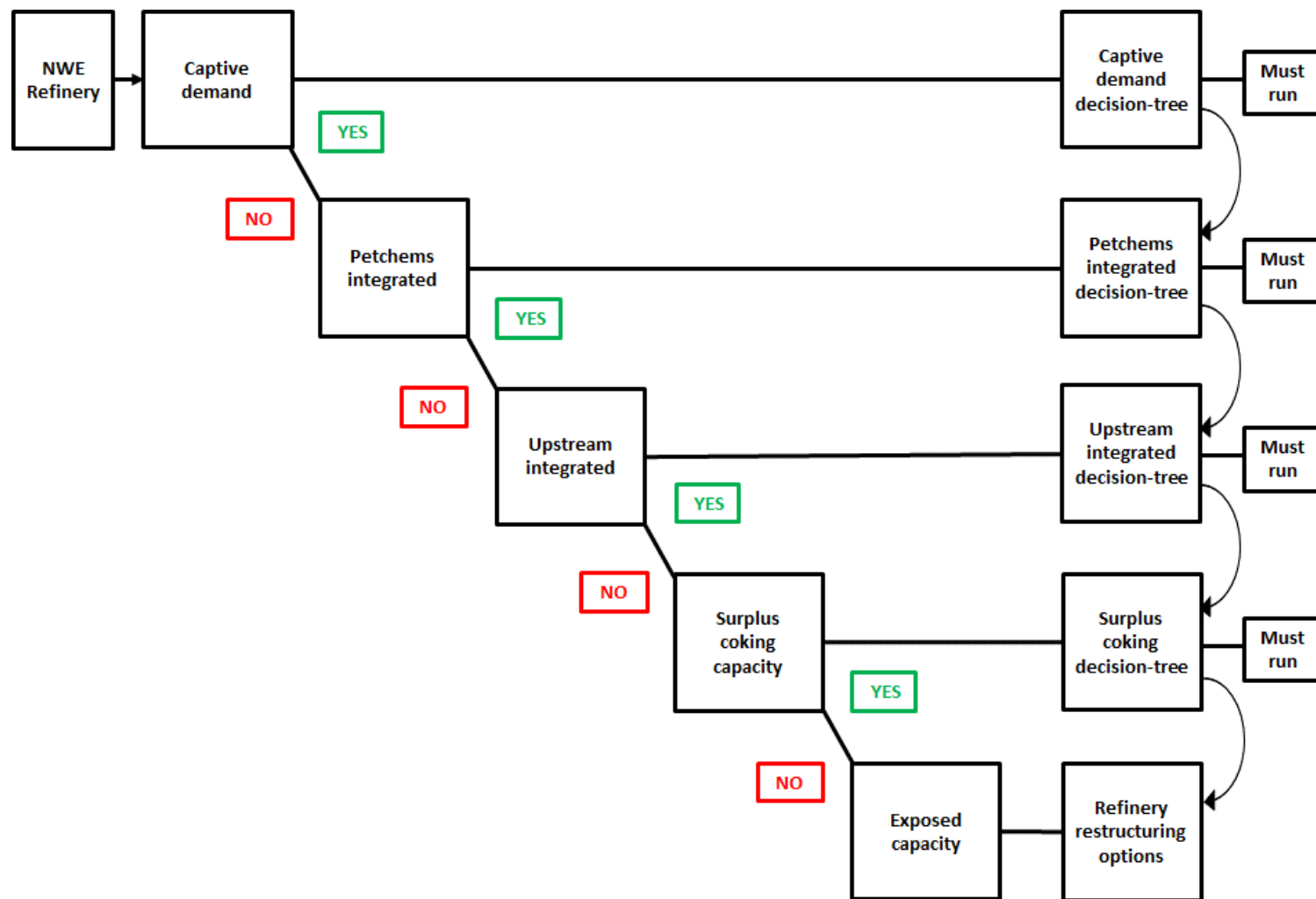
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Assumptions & Methodology – Negative Feedbackloop





Assumptions & Methodology – Must-Run Categories



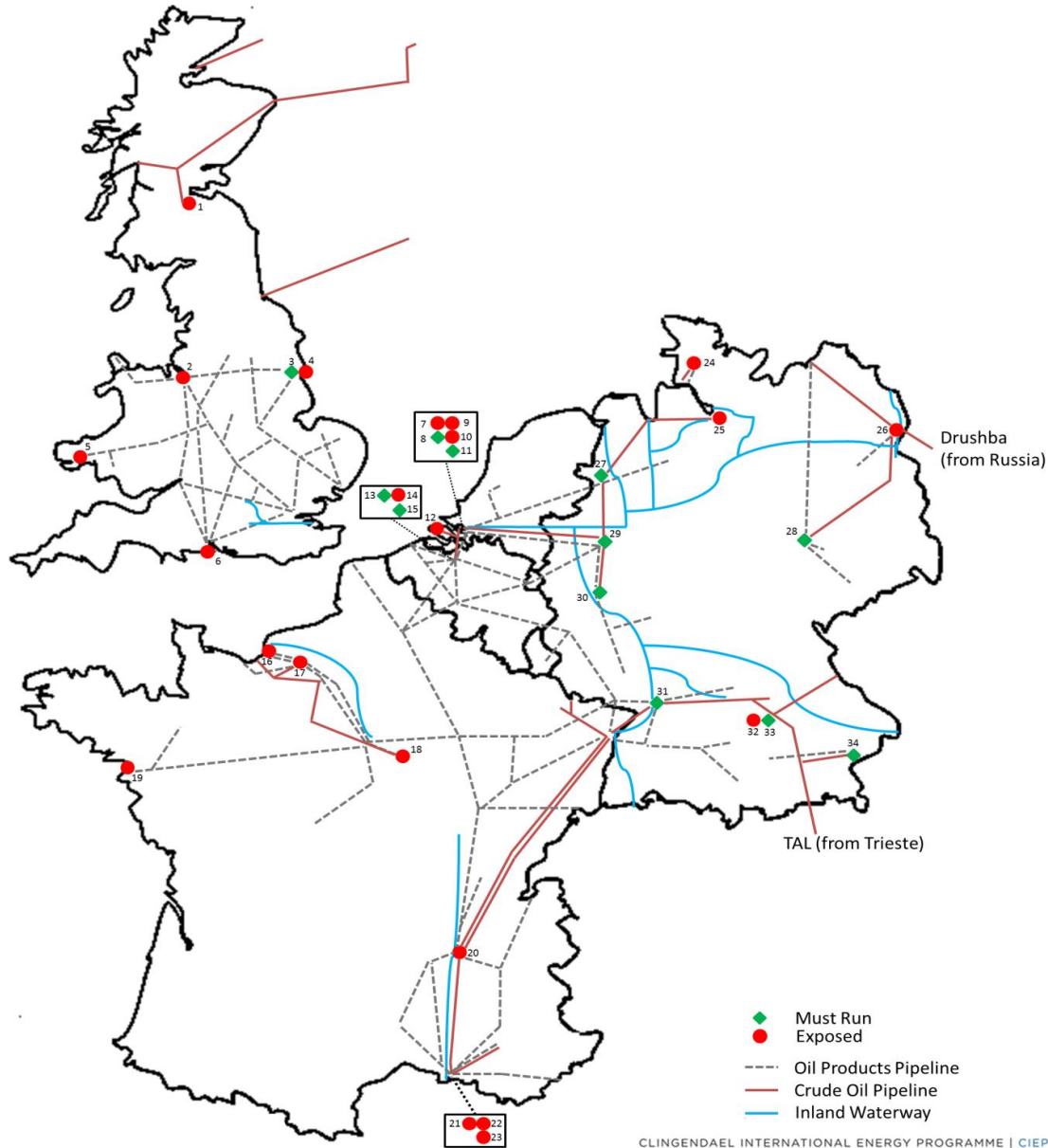
Assumptions & Methodology – Must-Run Characteristics

Must-run Category	Must-run Characteristic	Description
Captive Demand	Inland location	<ul style="list-style-type: none"> The refinery must be located inland
	Crude pipeline connection	<ul style="list-style-type: none"> The refinery must be connected to an inland crude pipeline
	Product pipeline lacking or constrained	<ul style="list-style-type: none"> A lack of product pipelines serving the refinery's hinterland Existing product pipelines are constrained Constraints can be technical, economical, or in terms of control
	Inland waterway lacking or constrained	<ul style="list-style-type: none"> A lack of inland waterways serving the refinery's hinterland Existing inland waterways are draft/DWT constrained
	Crude to product pipeline conversion constrained	<ul style="list-style-type: none"> Not viable to convert the existing crude to a product pipeline. Constraints can be technical, economical, or in terms of control
	Refining capacity locally intra-marginal	<ul style="list-style-type: none"> Refinery supply matches captive demand If local refinery supply exceeds captive demand, other local refineries are likelier to close

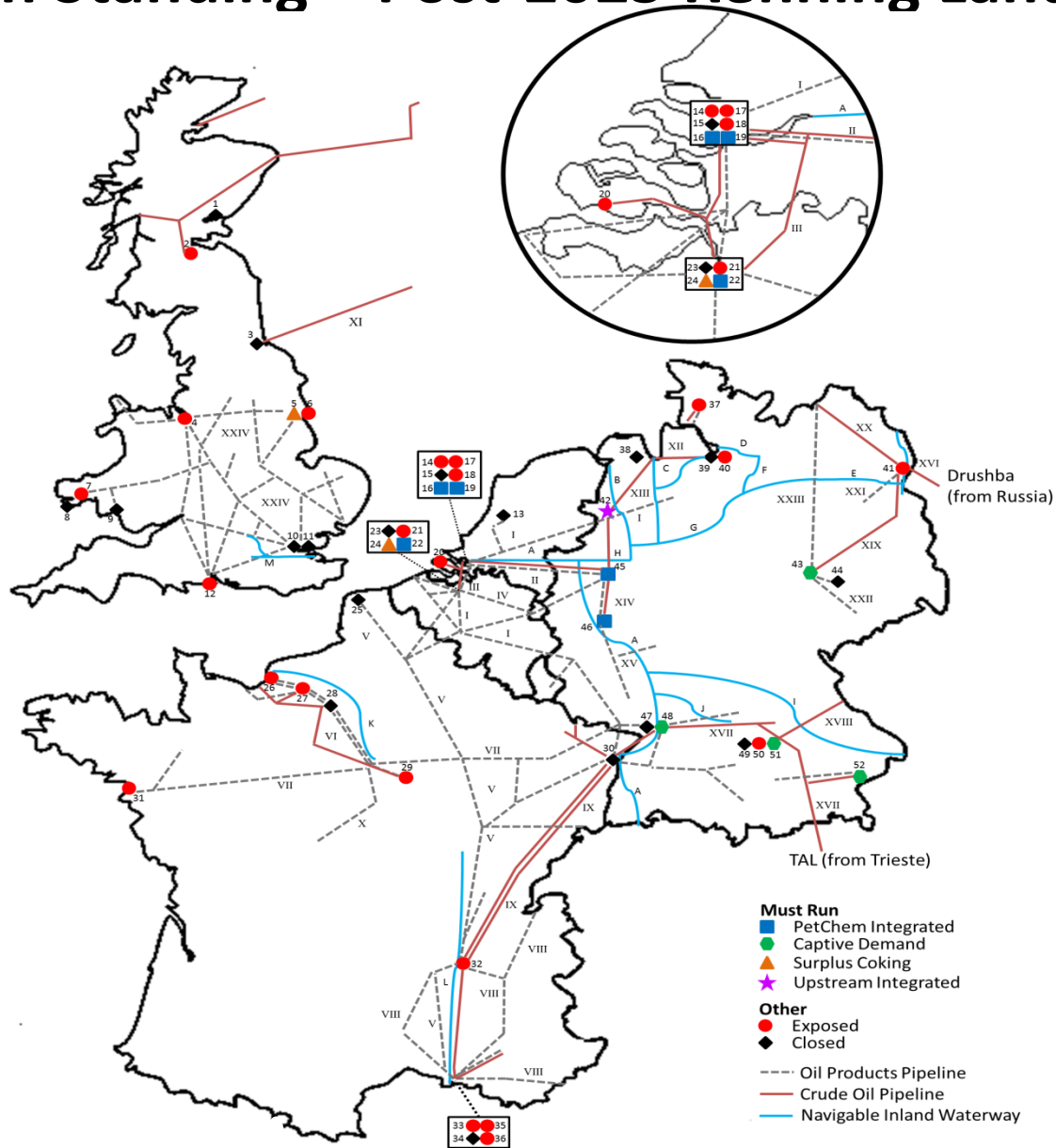
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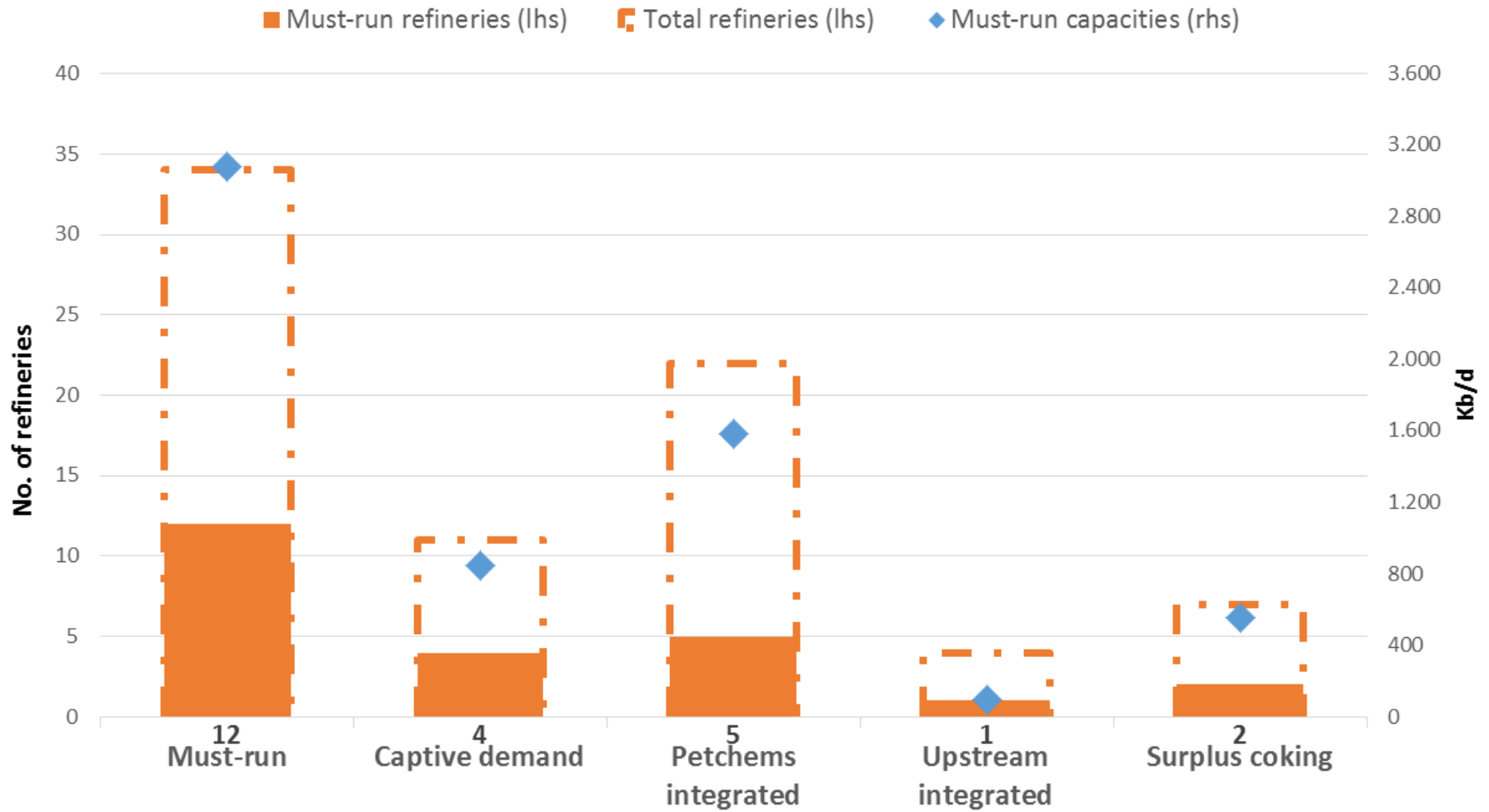
Last Men Standing – Post-2025 Refining Landscape



Last Men Standing – Post-2025 Refining Landscape



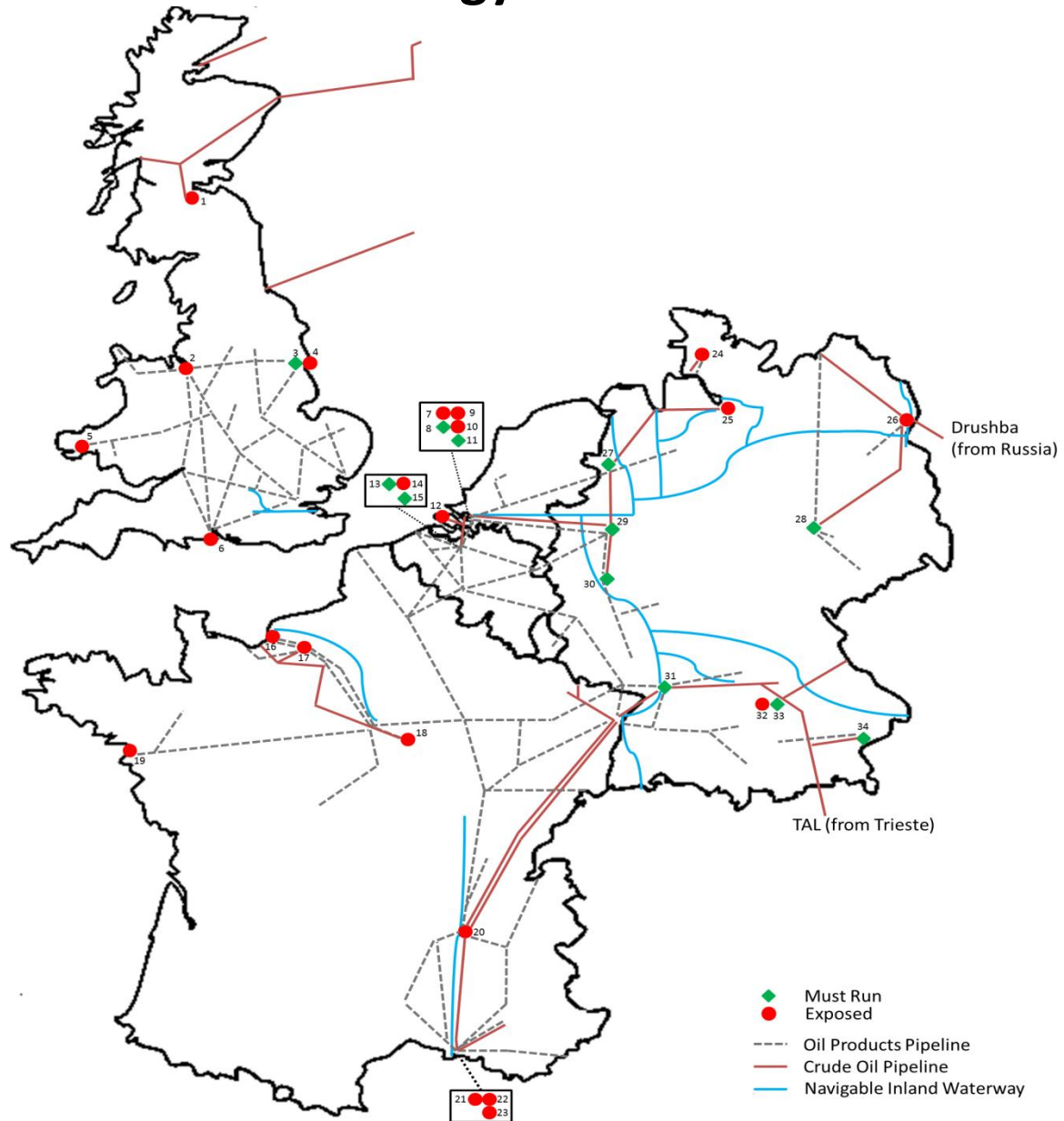
Last Men Standing – Post-2025 Refinery Landscape



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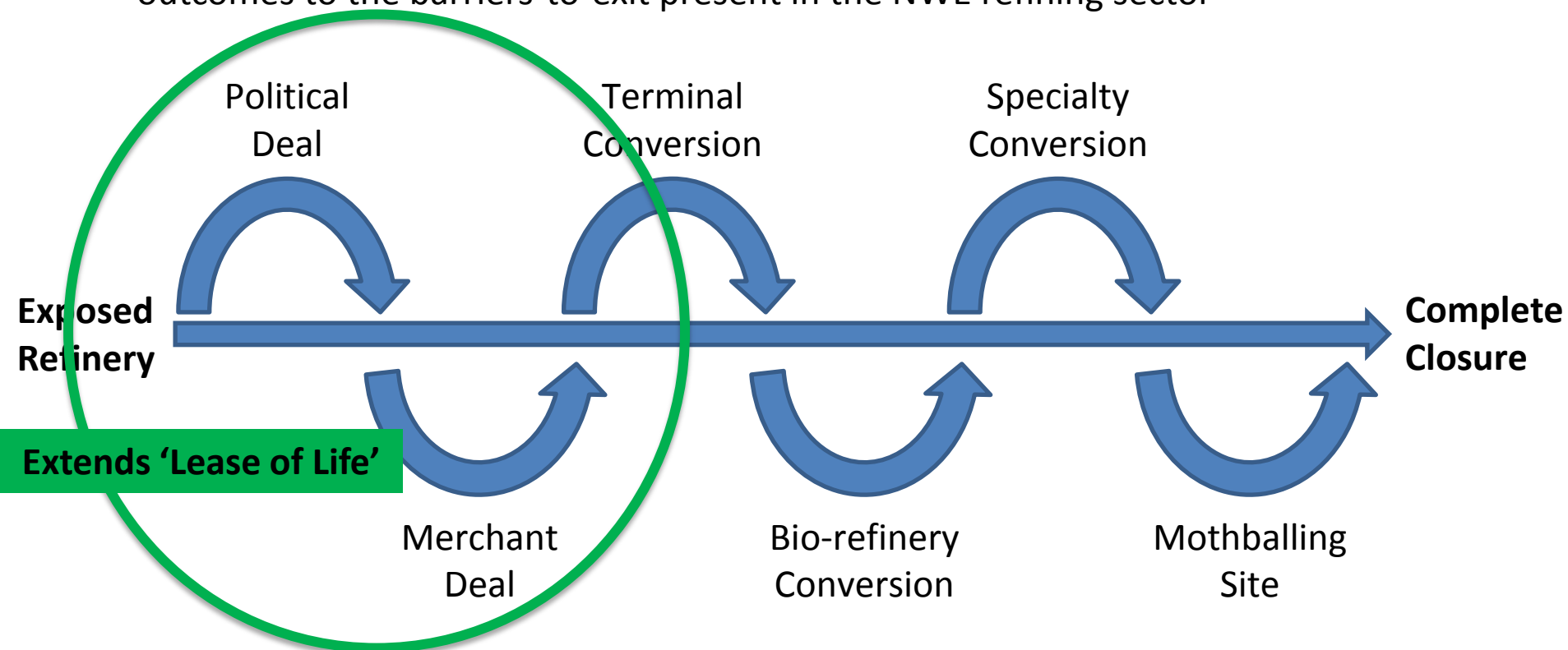
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Assumptions & Methodology – Must-run Scenario Map



Assumptions & Methodology – Closure Constraints Background

- Significant barriers-to-exit ensure that NWE refiners avoid complete refinery site closures at almost any cost
- The “closure-constrained” scenario explores the sensitivity of the “must-run” scenario outcomes to the barriers-to-exit present in the NWE refining sector



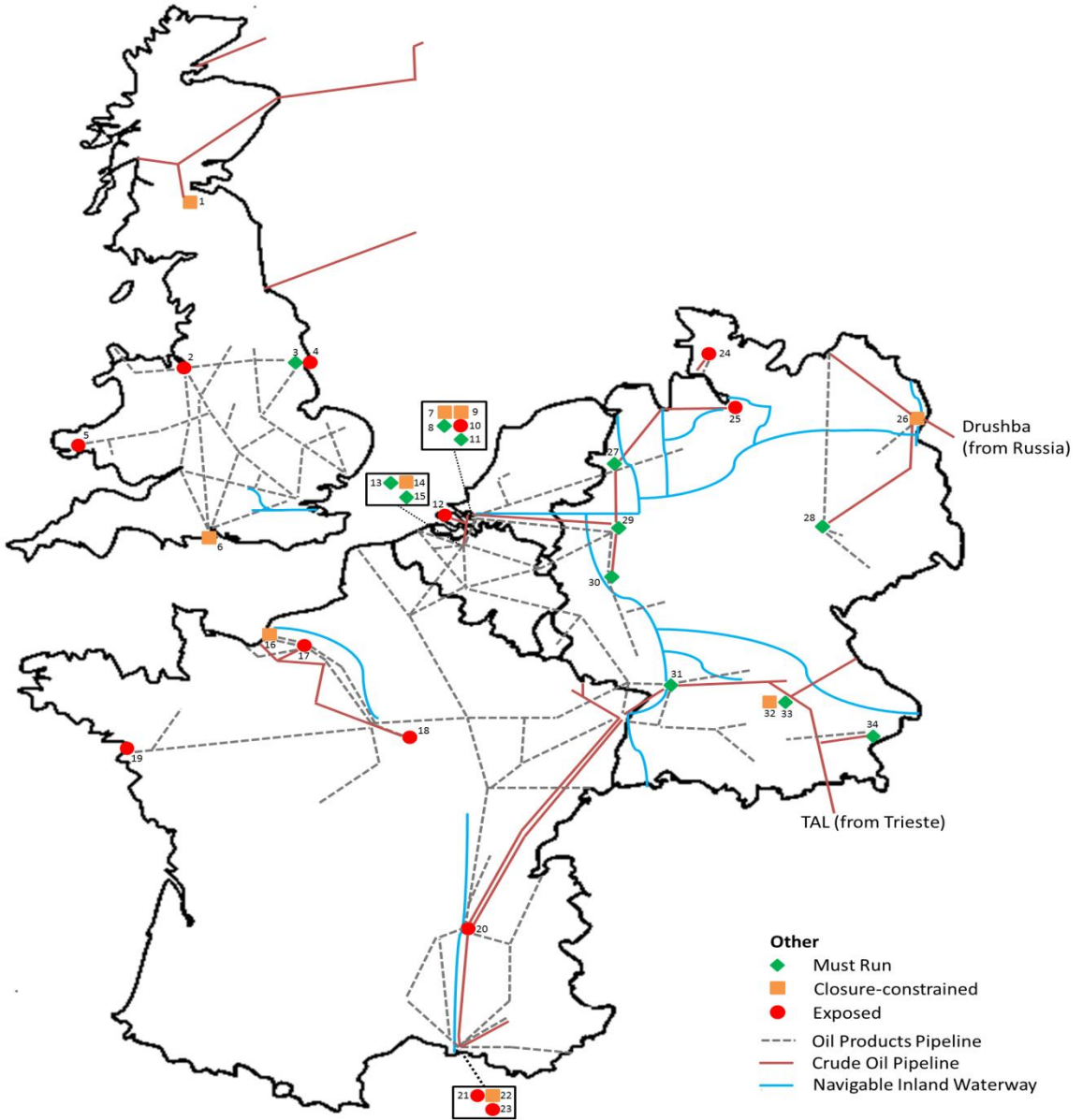
Assumptions & Methodology – Political Deal Candidates

Closure constraint	Refinery characteristics	Description
Economic footprint	Strategic to economically significant cluster	<ul style="list-style-type: none"> The refinery closure is likely to handicap the survival chances for an economically significant cluster Refinery closure is likely to have significant economic fall-out
	Last remaining cluster	<ul style="list-style-type: none"> Region lacks long-term competitive refining/chemical clusters The government is incentivised to protect the last remaining cluster
Security of supply	Last remaining refinery	<ul style="list-style-type: none"> Expected to be the last operational refinery in the country/region Security of supply incentivise government support
	Connected to military purpose pipeline network	<ul style="list-style-type: none"> The military purpose pipeline connection ensures that the refinery closure will impact a country/region's defense capabilities
Security of demand	Majority owned by a crude long NOC	<ul style="list-style-type: none"> Majority ownership by a crude long NOC suggests an important role for the refinery in securing stable crude oil demand
	Direct crude pipeline connection	<ul style="list-style-type: none"> A crude pipeline connection to the NOC's production assets reinforces the refinery's role in securing crude oil demand

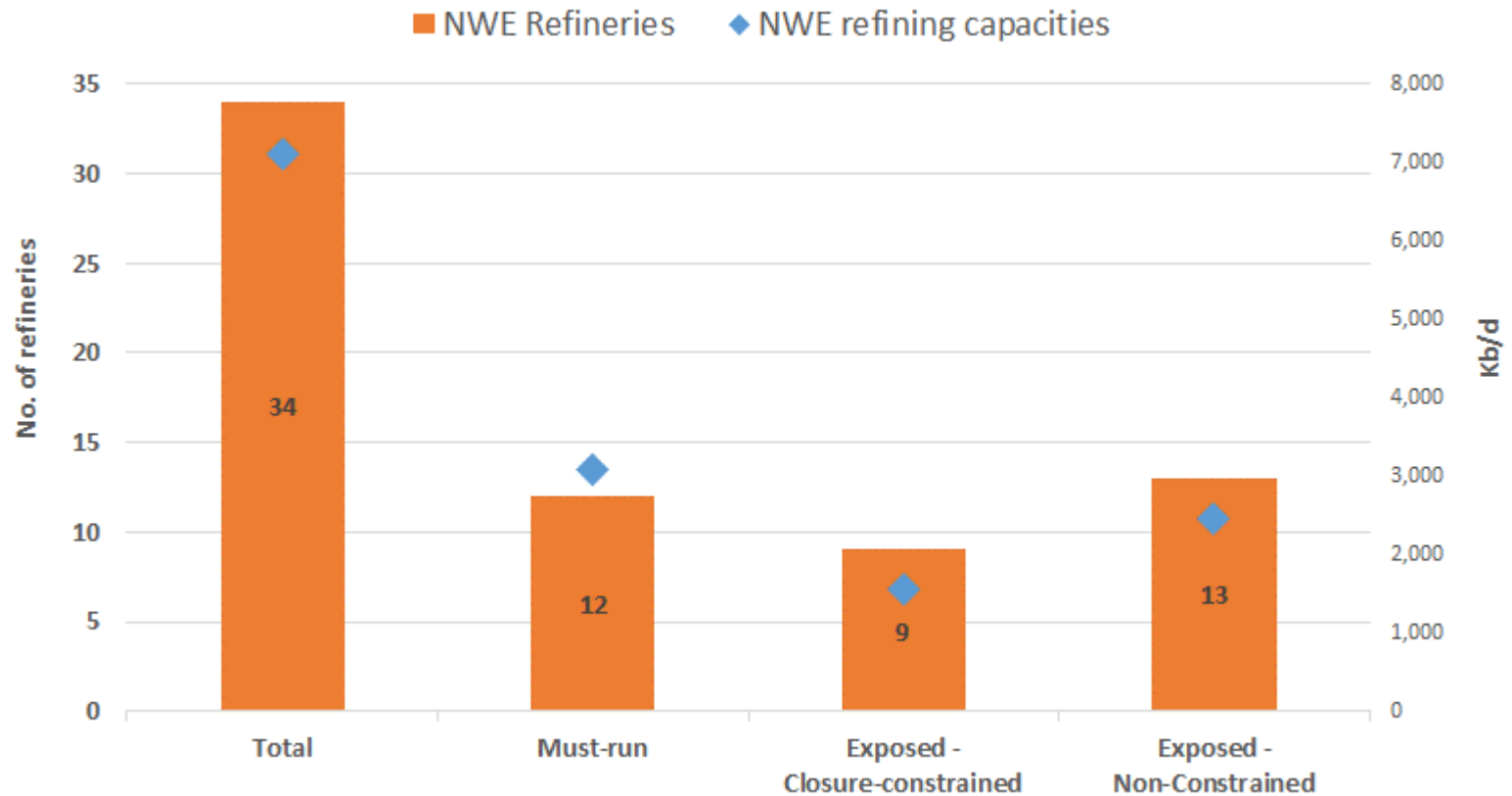
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A New Lease of Life – Post-2025 Refining Landscape



Last Men Standing – Post-2025 Refining Landscape



- > 30% of refining capacity expected to close in the long-run
- 9 out of 22 exposed refineries are closure constrained
- Operational refining capacity reduces to ~ 4.5 Mb/d

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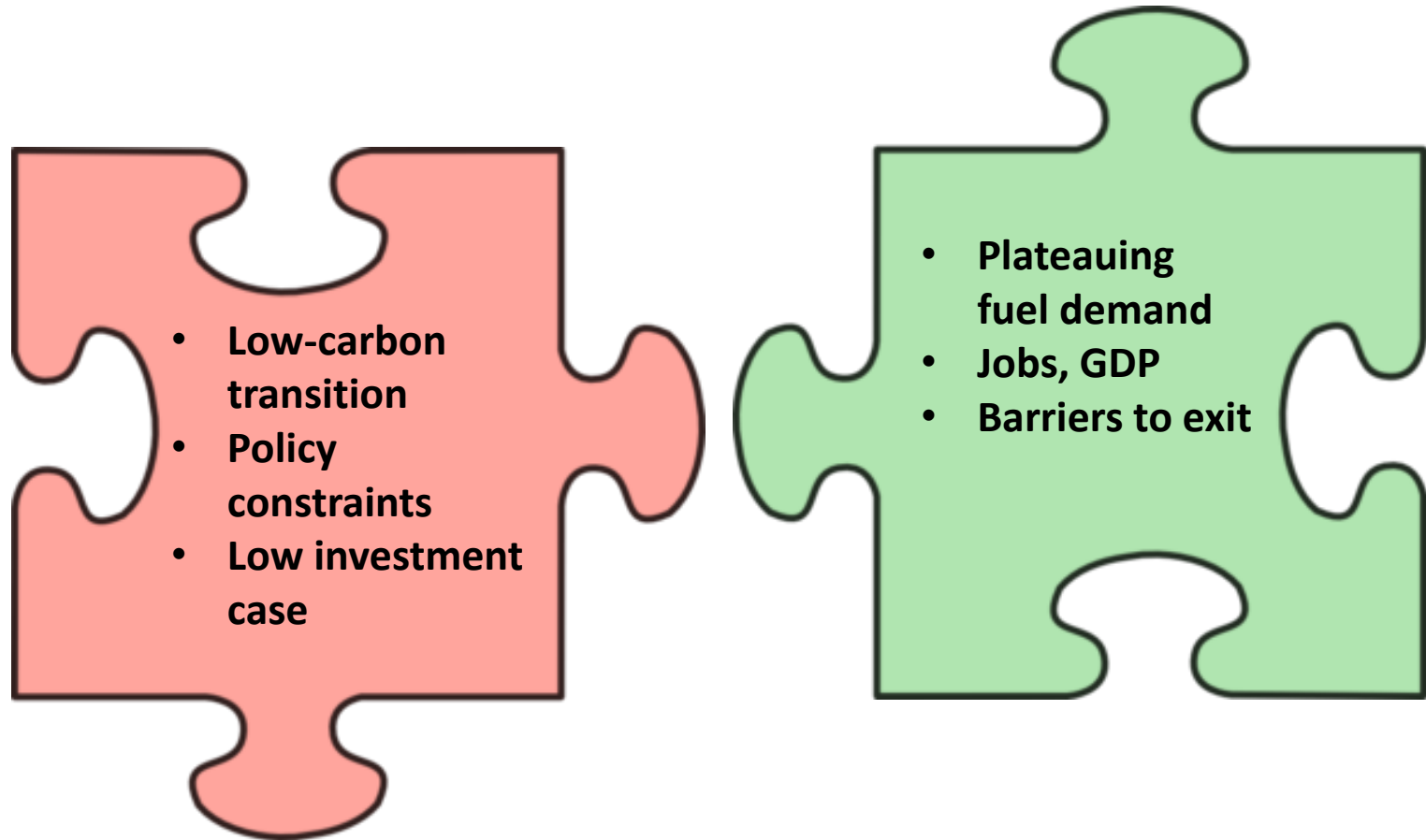
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Implications – Security of Supply

- Global refined product supply centres seem equally diverse as crude producers
 - Global supplier diversity (HHI) of 15.3 (product) and 14.6 (crude)
- Optionality of refining
- Strategic sectors (e.g. NATO, Hospitals, ...)
- Merchant refineries as ‘swing producer’?

Implications – Refining Legacy

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Kickstart a discussion on future of NWE refining

Thank you

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