

refining & marketing



The future of refining in Europe

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Agenda

- ✓ **World and Europe oil products demand and supply**
- ✓ eni answers for current crisis
- ✓ Need for institutional support to refining

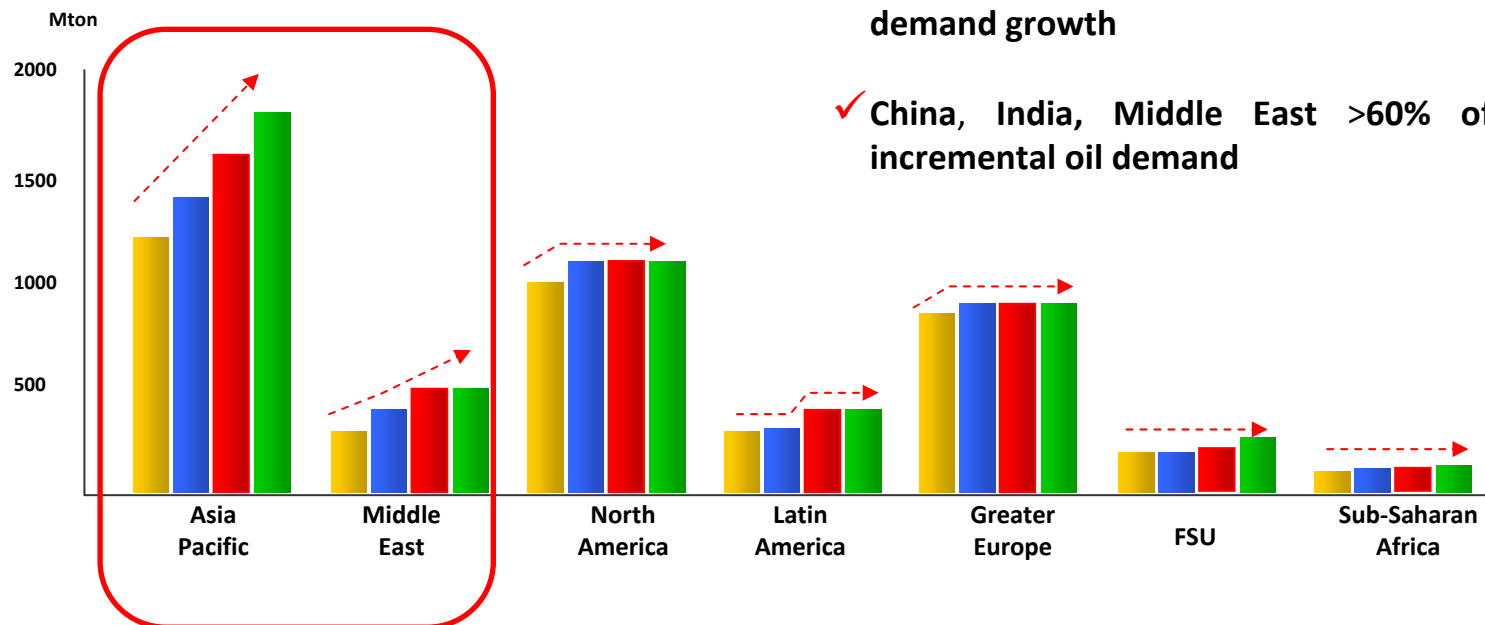
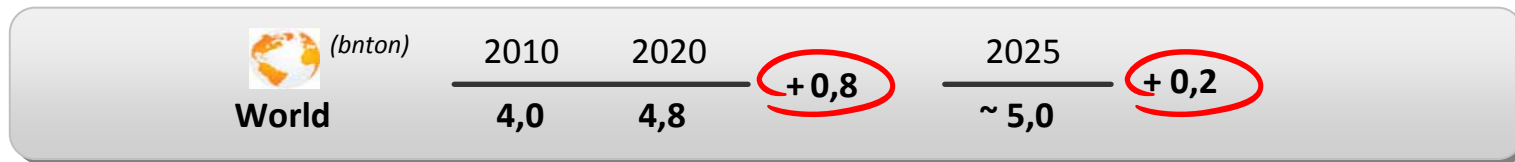


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World demand growth driven by Far East, transports remain fundamental

Market challenges



- ✓ Demand driven by **transports**
- ✓ ~70% (670 Mton) **middle distillate** increase by 2025

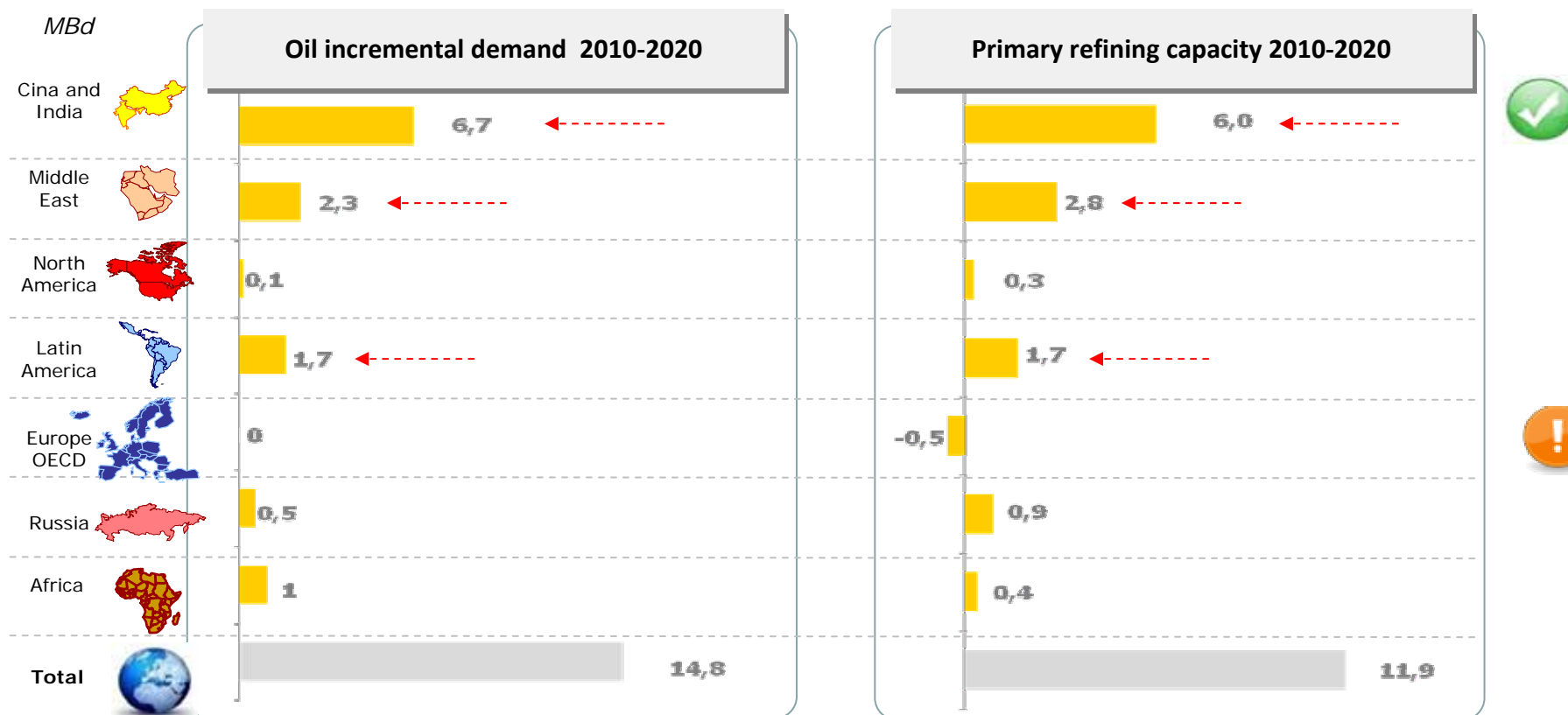


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Far and Middle East leads the way in world demand growth and new refining capacity additions...

Market challenges



New refining capacity in Asia, Middle East and Latin America

Mature economies are reducing refining capacity of ~ 2 Mb/d in next 5 years of which Europe is closing for more than 600 kbd with no foreseen new investments

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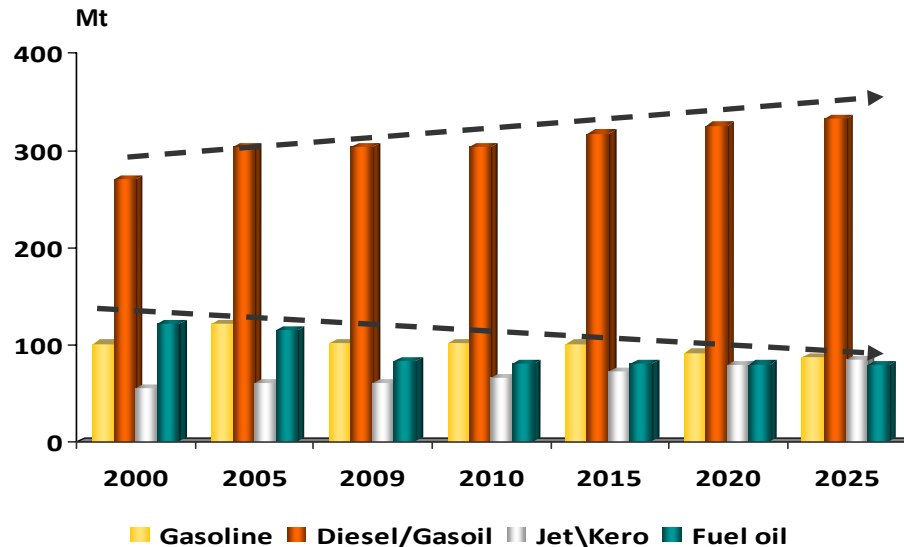
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* Includes other not specified geographical areas

Europe – steady demand growth in the future lead by transports

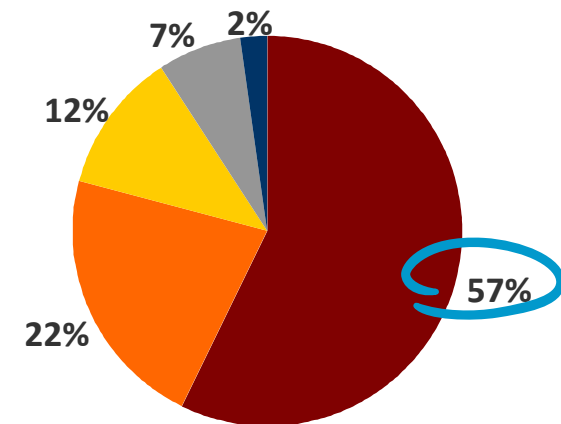
Market
challenges

Oil products demand



	2010	2015	2020	2025
Gasoline	100	100	90	85
Diesel/Gasoil	305	320	325	330
Jet\Kero	60	70	80	85
Fuel oil	82	80	79	78
	547	570	574	578

- ↓ Lower consume of gasoline
- ↑ Growth of diesel/gasoil demand
- ↑ Growth of jet/kero demand
- ↓ Drop of fuel oil use in:
 - inland
 - bunker
- ↑ Demand increase for maritime diesel/gasoil



■ Transports
■ Petrochemicals
■ Civil Uses Services Agriculture
■ Industry
■ Thermoelectrical

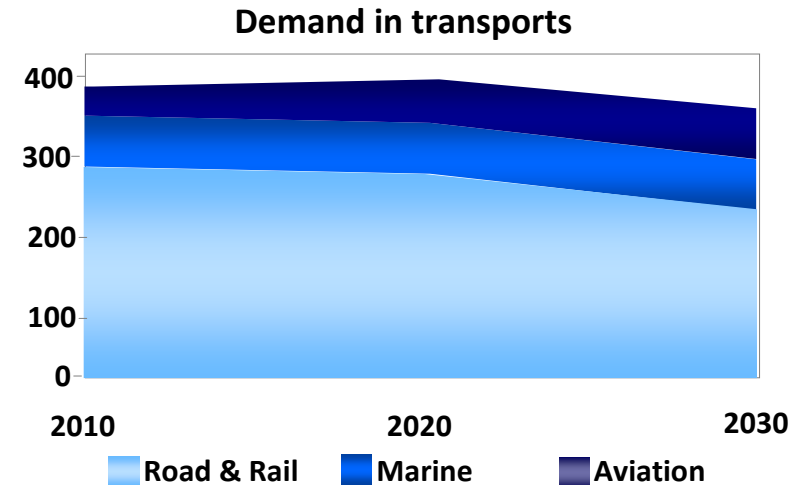
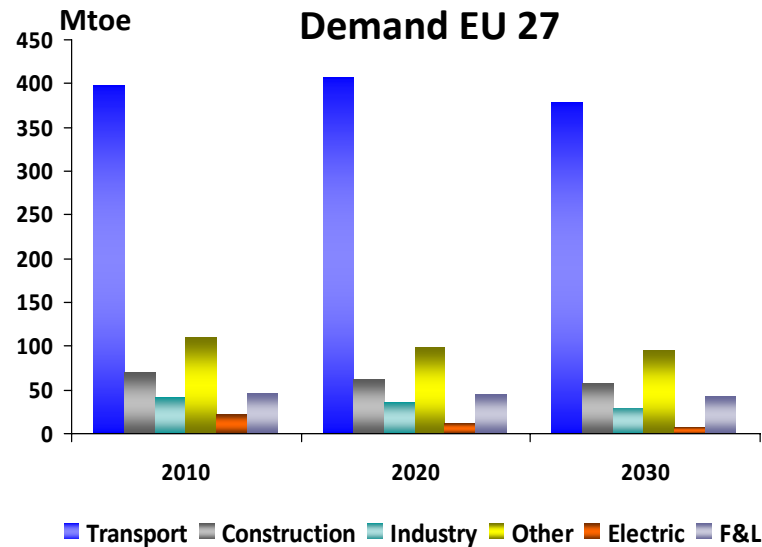
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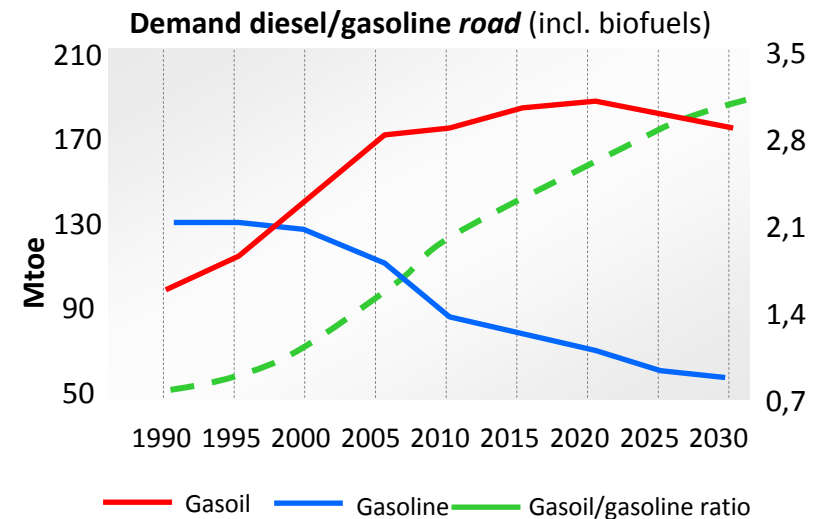
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Europe – growing dieselization, ratio gasoil/gasoline reversing

Market
challenges



- ✓ **Global demand decreasing of ~ 10%**
- ✓ **Road transport oil products demand reducing**, partially compensated by that for **aviation and marine**
- ✓ Estimate by 2030 road transport gasoline and diesel demand: trend **gasoil consumption** in EU **double vs gasoline**



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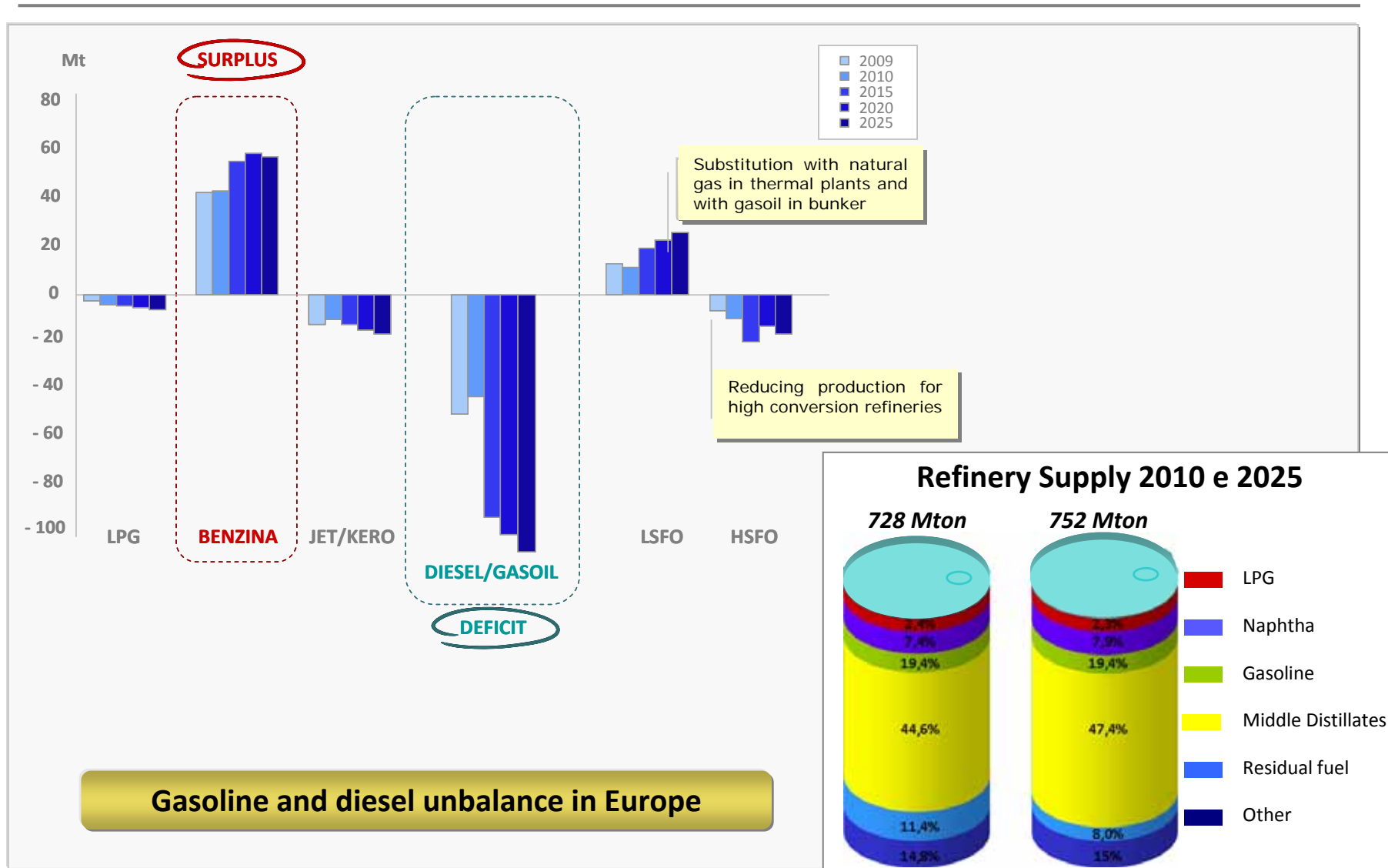


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Fonti: elaborazioni eni su dati WM, Parpinelli, IEA

Europe - supply not matching demand

Market challenges



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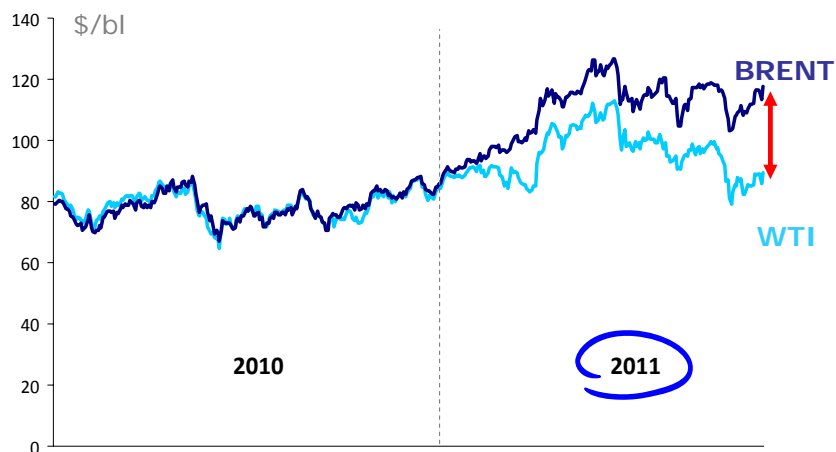
Source: eni elaboration on WM, Parpinelli data

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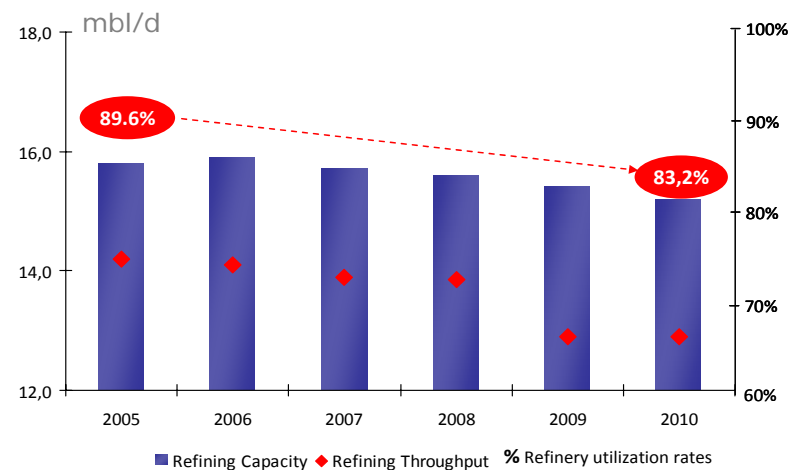
Europe – structural market changes

Market challenges

Oil prices (WTI vs BRENT)



Refining capacity, throughput and utilization rates



New operators

TRADING HOUSES



INDEPENDENTS



NOCs



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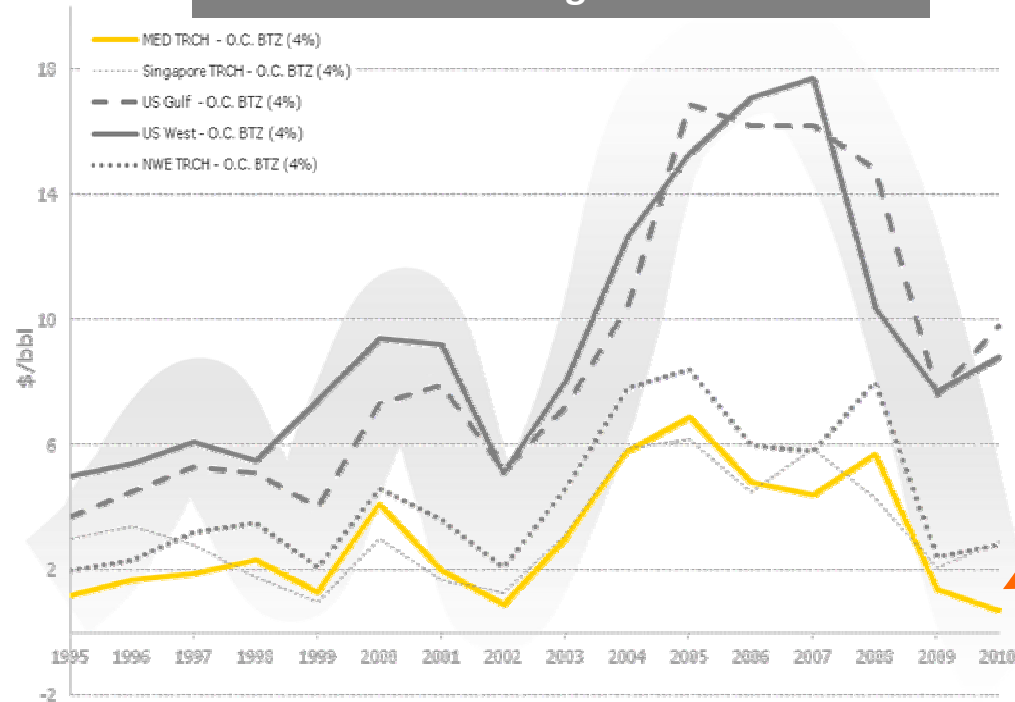
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Fonti: elaborazioni eni su dati WM, Parpinelli

Europe –disadvantages vs big refineries in Asia and Middle East

Market
challenges

Contribution margins benchmarks



(1) Margini di contribuzione benchmark (\$/bbl) = margine di riferimento FOB al netto dei costi variabili per utilities (- 4% O.C. BTZ)

Med Refineries margins structurally lower, mainly for:

- ✓ **Surplus of refining capacity**
- ✓ **Asia and Middle East refineries competition**
 - ✓ *More competitive, with big plants highly complex*
 - ✓ *Lower labour costs*
 - ✓ *Lower maintenance costs*
 - ✓ *Environmental regulations less severe*
 - ✓ *Fiscal advantages*
- ✓ **Old and mature plants** (realized mainly in '60, with high maintenance costs)
- ✓ **Severe environmental rules** (emission trading, biofuels)



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Europe – what to expect in the next future

Market
challenges



Optimization and rationalization of
EU refining system

Supply /demand balance

- ✓ Consumptions reduction
- ✓ Gasoline exports to USA reduction
- ✓ Refining overcapacity
- ✓ Unbalance: gasoline surplus, diesel shortage

System constraints

- ✓ Severe environmental constraints (biofuel, CO2, authorization iter)
- ✓ High labour costs
- ✓ Diseconomy of scale
- ✓ Plants maturity



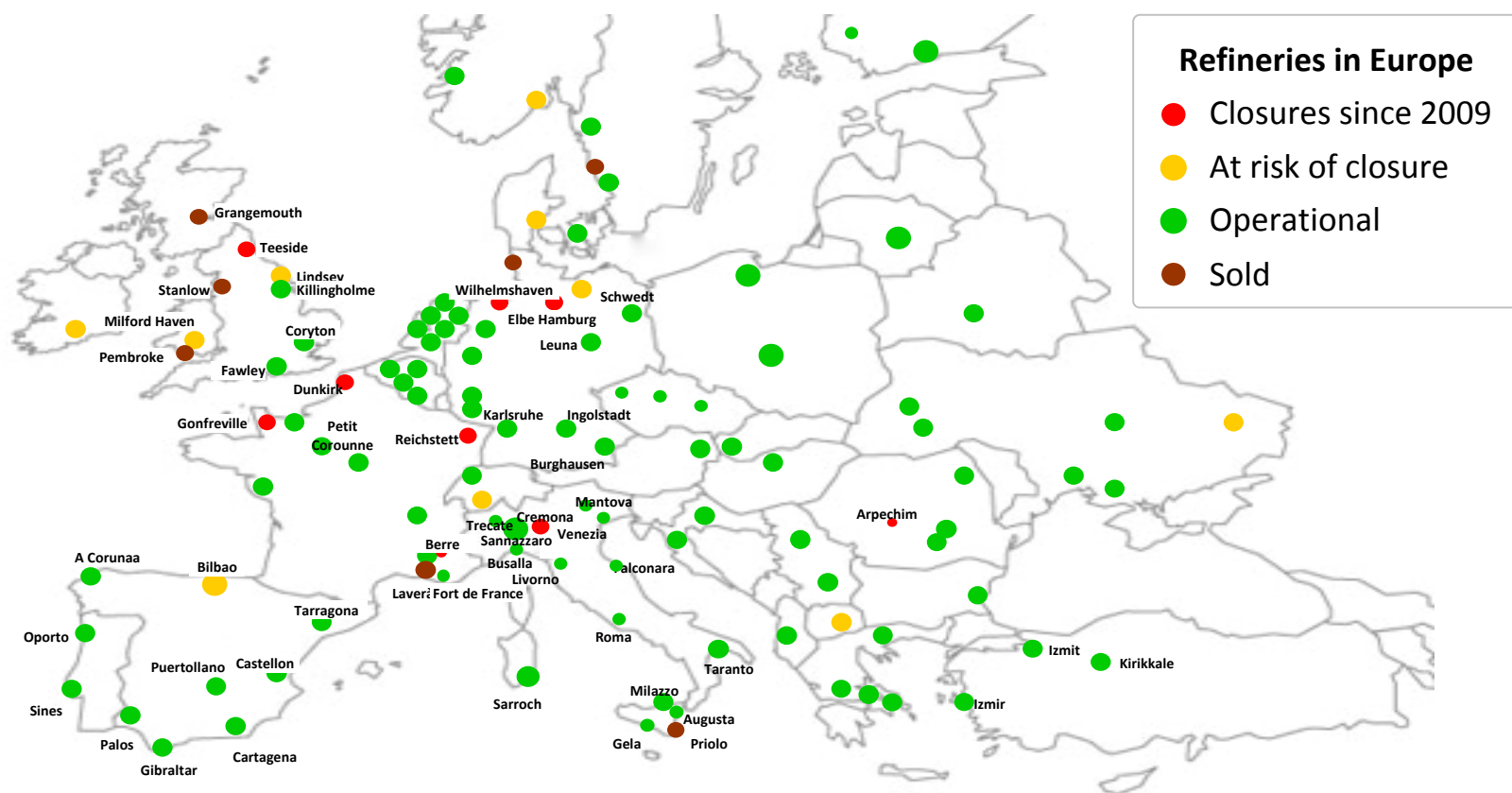
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Europe – A rationalization process ongoing since 2009

Market challenges

- ✓ **9 refineries closed** ~ 30 Mton capacity (further 11 a at risk)
- ✓ **9 refineries sold** (from “major” to independents or to state companies of producing countries - ~ 45 Mton)



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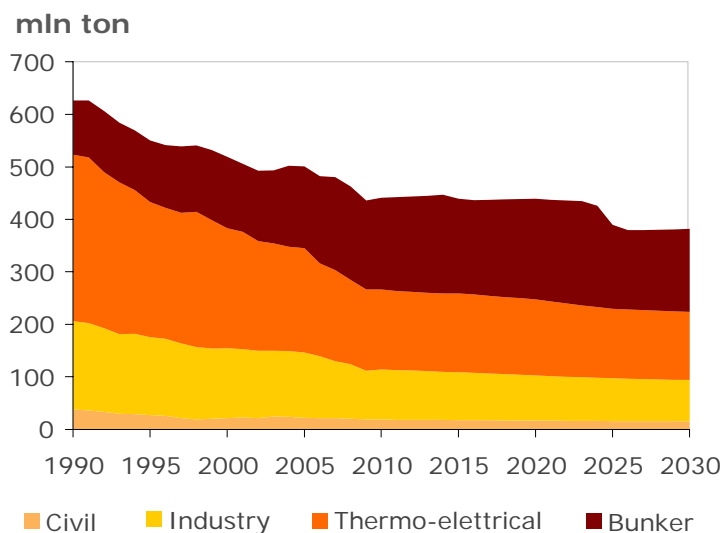
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Bunker: gradual fuel oil substitution with middle distillates

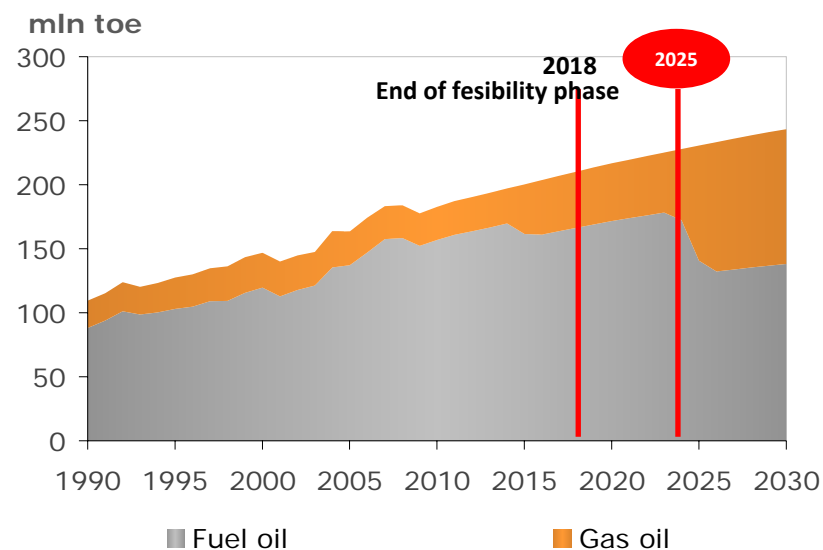
Market challenges

FO consume for thermo-electrics and industry drops gradually, while it is expected growing in bunker for international maritime commerce at least until 2025

Fuel oil consume by sector



Oil consume for bunker



0,5% for extra-ECAs in 2020 subject to a feasibility to be completed within 2018
In case of negative results limit postponed to 2025



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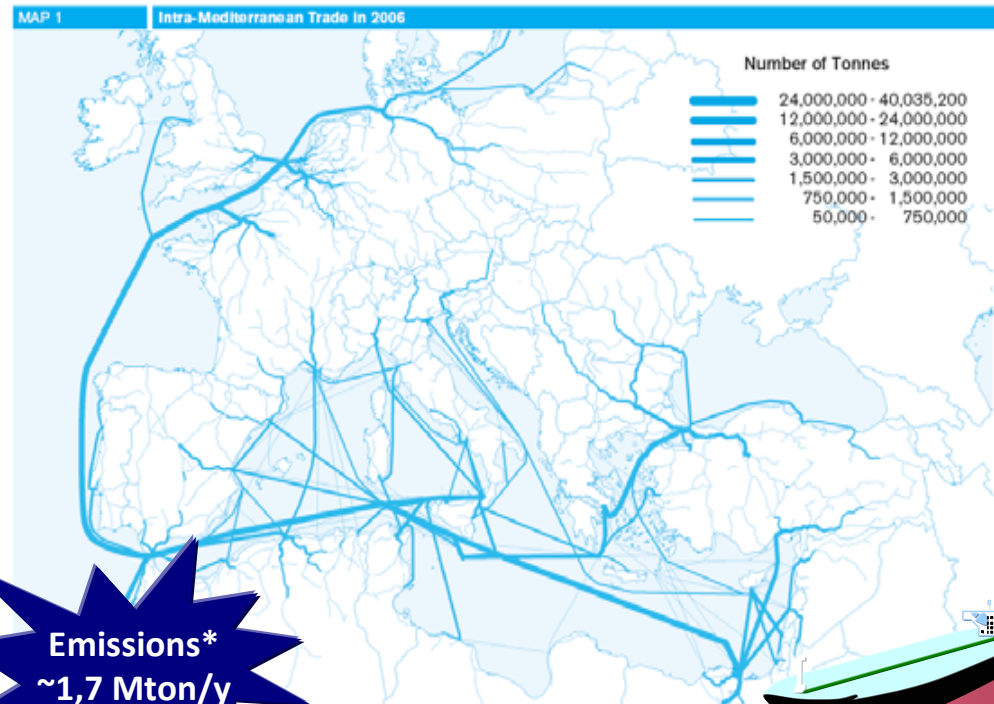
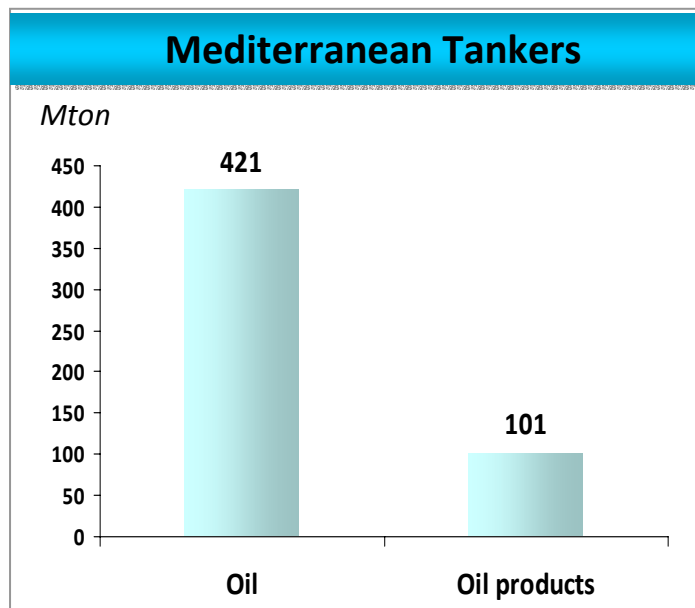
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The Mediterranean Sea

Market
challenges

1% of world water surface, a third of world's merchant shipping traffic

- ✓ ~ **1/3 of world's total merchant shipping traffic** either trades to seaports or passes through the Mediterranean
- ✓ Med is **less than 1% water surface of the planet**



Emissions*
~1,7 Mton/y

- ✓ **Over 200.000 merchant vessels of over 100 gross tonnage** are believed to cross the Mediterranean Sea each year
- ✓ More than **2000 ferries, 1500 cargo ships and 2000 local commercial craft** (including 300 tankers*) operate permanently in the Mediterranean



Source: adpted from David Hughes "Mediterranean Round-up"
worldbunkering, 31 May 2010

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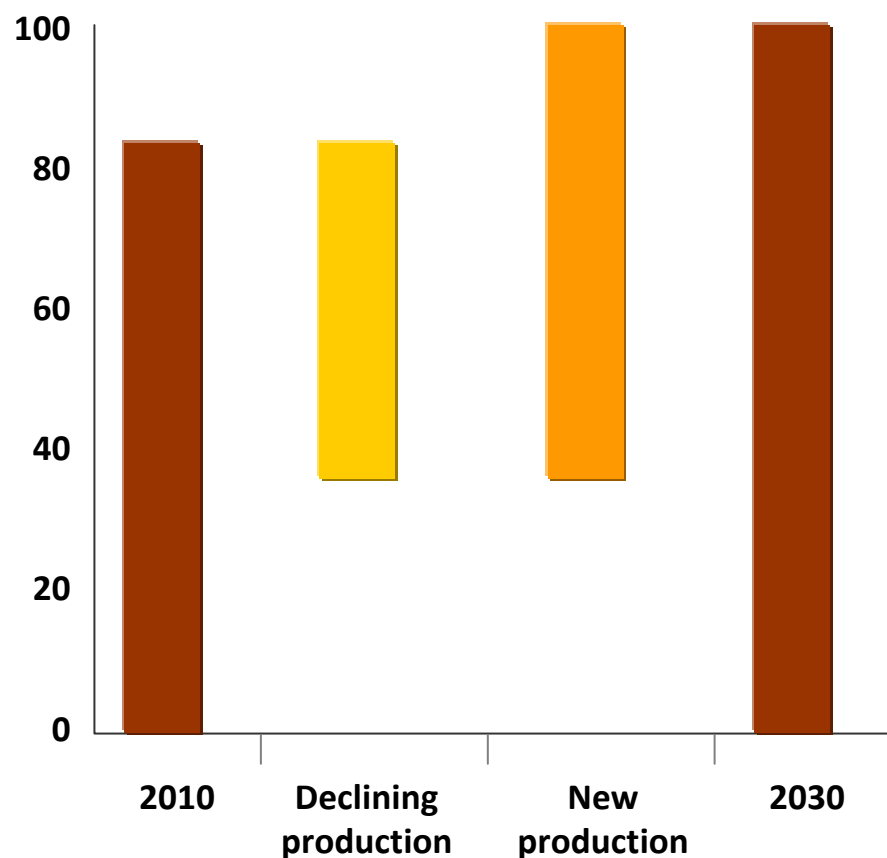
*Sox

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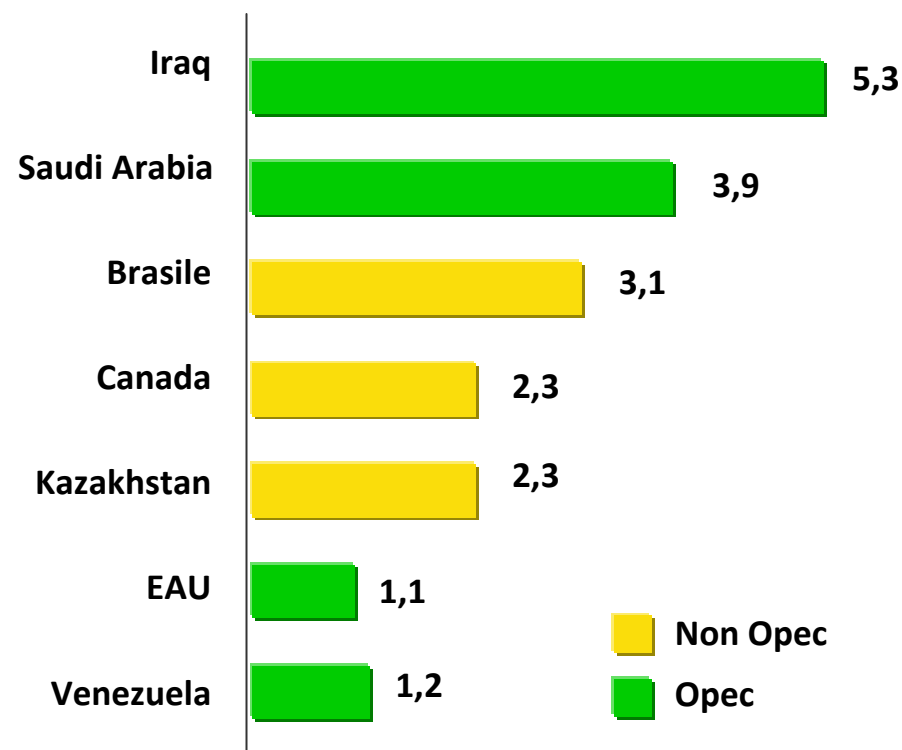
World oil supply by 2030 mainly from OPEC and unconventional

Market challenges

Oil production (Mbl/d)



Incremental oil production by 2030 (Mbl/d)

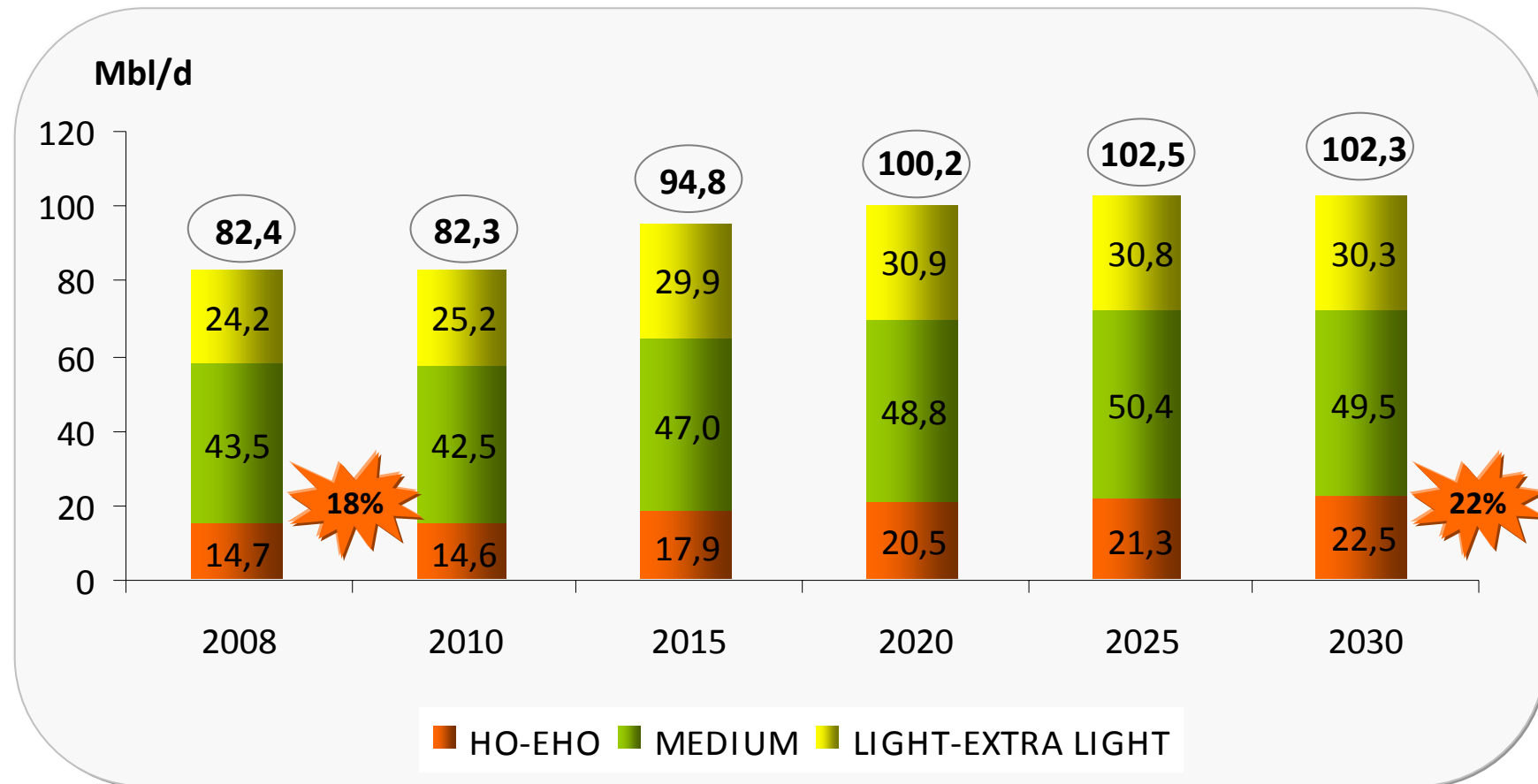


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Feedstock quality World heavy oil supply growing

Market
challenges



Heavy and extra heavy crude growth 2008-2020 **+ 5,8 Mb/d**
 2008-2030 **+7,8 Mb/d**



* Oil + NGL

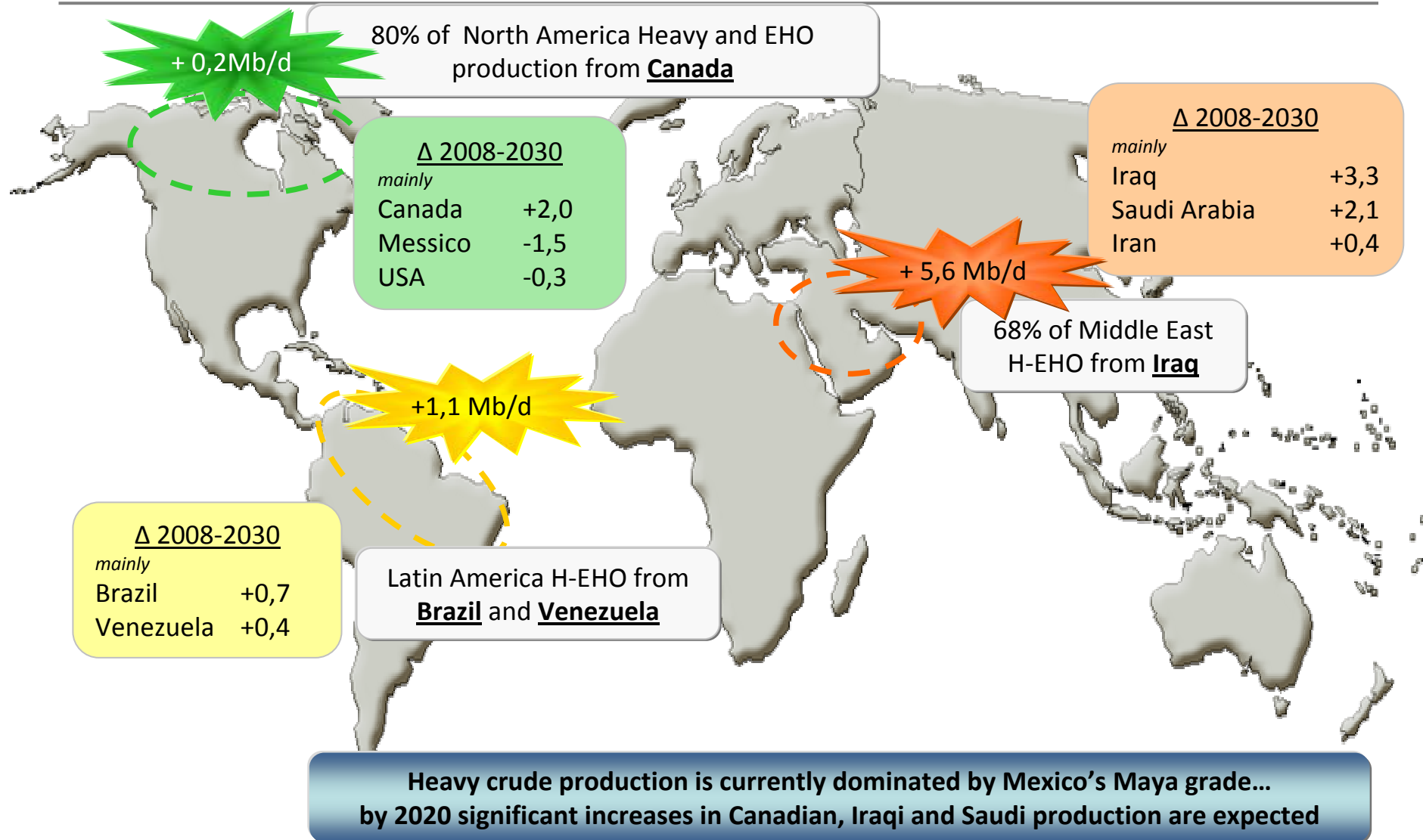
Source: WoodMackenzie

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Heavy oil production concentrated in three regions

Market challenges



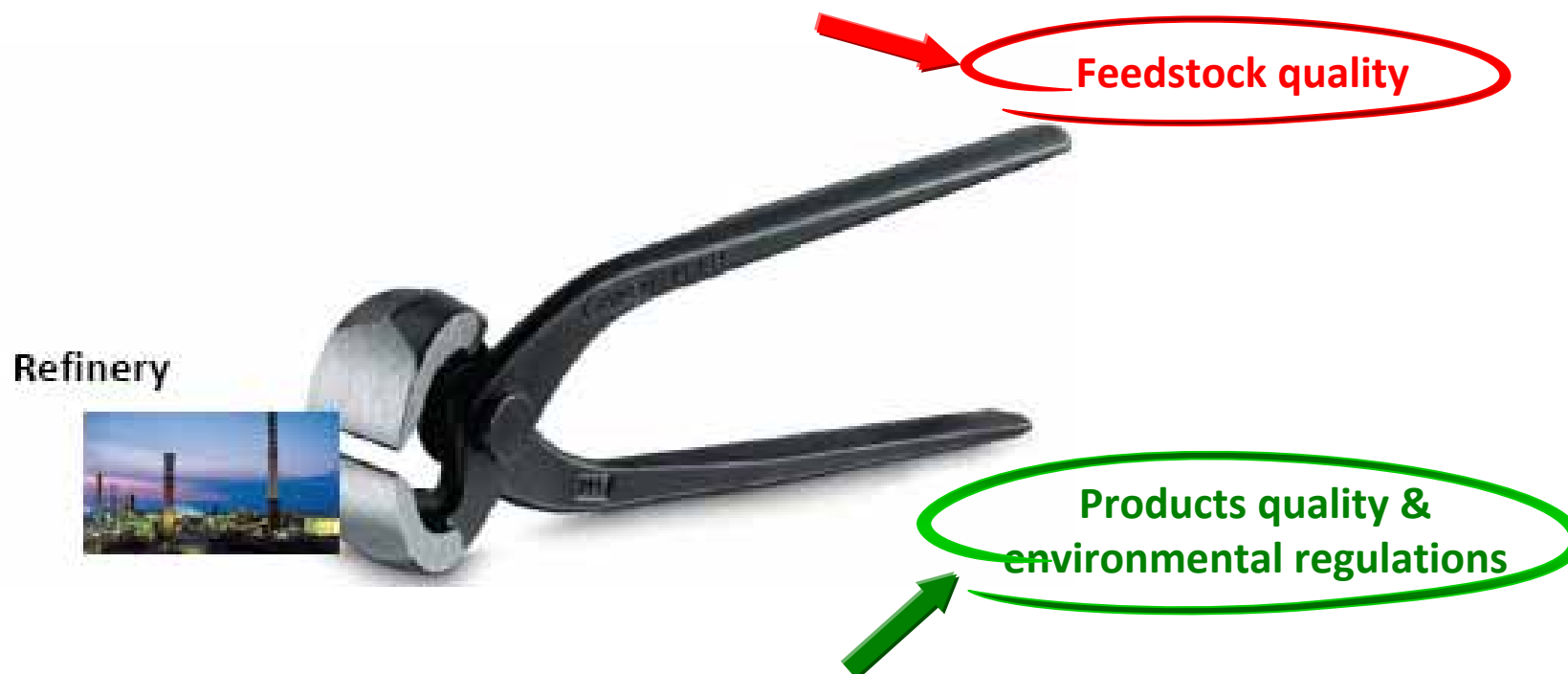
Source: WoodMackenzie

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The refinery constraints

Heavier crude oil quality means refinery configuration and crude mix should be optimized, taking into account for cut costs and profitability



Fuel mix demand and quality changed over time together with specifications, set by legislation rules



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Agenda

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eni main leverages: integration, flexibility, efficiency and technological leadership

Integration

- ✓ *Production cycles integration among refineries to advantage of synergies and maximize conversion plants use*
- ✓ *Interchange of semi-finished and residues*
- ✓ *Integrated planning*

Flexibility

- ✓ *Adaptation of production to mix requirements*
- ✓ *Max runs for heavy /sour crude*
- ✓ *Increase % of spot crude purchase*

Technological leadership

- ✓ *Process and environmental technologies*
- ✓ *Fuel quality*

Efficiency

- ✓ *Fix costs, maintenance, energy consumptions reduction*
- ✓ *Logistics (rationalization depots/ contracts re-negotiation)*



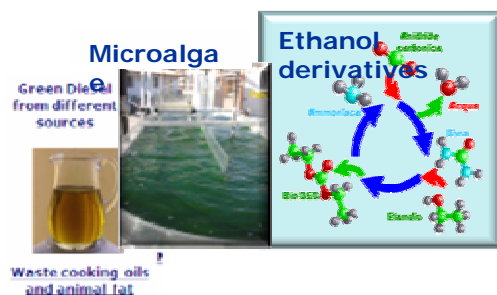
Technological leadership

Fuels and lubricants

- ✓ **New lubricants and fuels “Blu+”** developed. Studies ongoing to distribute **gasoil “Milan Formula”** to all the sale network

Biofuels

- ✓ **Hydrotreating technology of vegetable oils** (Ecofining™, eni-UOP),
- ✓ Testing for producing **biodiesel of 2° generation** from **microalgae** ongoing at Gela refinery
- ✓ **Derivatives from bio ethanol** have been studying to bypass problems deriving from direct ethanol use



Tecnologie ambientali

Pilot plant for **treating, reducing and inactivating refinery waste/muddies**, (less than 97%)



Refining processes

- ✓ **Total conversion** (EST project)
- ✓ **New catalyst** systems for **improving hydrotreating processes** (Pro “Milan Formula”)
- ✓ **New proprietary technology** of **high efficiency for hydrogen production**



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Technologies for Petroleum Residue Upgrading

Several commercial technologies conversion of vacuum residua to lighter products

Increase of low H/C of residua to higher H/C of products via thermal or catalytic:

carbon rejection (thermal)

Coking offers high feedstock flexibility
but

- ↓ poorer quality of distillates
- ↓ loss of liquid yield,
- ↓ ca. 30% wt of low value coke



>90 M TPY petcoke produced worldwide



hydrogen addition (catalytic)

Fixed/Moving bed (low metals content feed)
Ebullating bed (relatively higher metals feed)
but

- ↓ limits the maximum conversion achievable
- ↓ fuel oil remains a fatal product



9 M BPSD fuel oil produced in the world



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Eni believes in flexibility and complexity and is developing a breakthrough technology: EST

Eni's answers

Eni Slurry Technology (EST) A breakthrough technology



UPSTREAM

- ✓ Valorization of unconventional oil
- ✓ Upgrading bitumen produced from the world huge reserves

DOWNSTREAM

- ✓ Upgrading refinery configuration
- ✓ Producing additional distillates from residues ("zero fuel oil – zero coke"), without increasing topping capacity

It also provides the necessary "fit" between the rigidity of supply and variability of refined products demand



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The first industrial plant at Sannazzaro



End of 2012



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Agenda

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Refining support measures

Assets protection and strengthening

Supporting measures

Protection

- ✓ **Green labeling** for EU oil products and **traceability** for imports
- ✓ Less penalizing **CO2** emissions rules
- ✓ Standardization of **environmental/energy** rules and authorization **iter**
- ✓ **Fiscal incentives** and innovative mechanism for sites **re-conversion and reclamation**

Strengthening

- ✓ **Fiscal advantages and incentives** favouring **investments** (hydrocracking e deep conversion)
- ✓ **JV or merging** initiatives promotion
- ✓ **Safety valves** and **outplacement incentives**
- ✓ **Support** to EU **proprietary technologies**
- ✓ **Slowing down biofuels** rules application and **speeding up gasoil for bunker use**

Coordinated actions with category associations under the aegis of national and EU institutions



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Conclusions

- ✓ Oil will remain the primary energy source at least for the next 30 years
- ✓ The European Med refining scenario is gloomy and probably will continue in the next future
- ✓ Existing unbalances on products and oil side require max flexibility
- ✓ The technological leverage is crucial to provide flexibility and relaunch the refining business, as well as integration and efficiency leverages
- ✓ Eni has developed a proprietary technology which will be crucial in the competitive environment of the next future. Maximum value to the technology with heavy and extra heavy oil, low gas prices and no emission costs
- ✓ Assets rationalization is necessary to change the production structure
- ✓ Actions aiming to discourage “unfair” competition and preserve a strategic sector are needed
- ✓ Environmental boost should be addressed in a rational and concrete way for the community well-being