Refinery and petrochemical outlook
New developments in the processing area

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ORLEN

Agenda

Macroeconomic perspective

New developments in the processing area

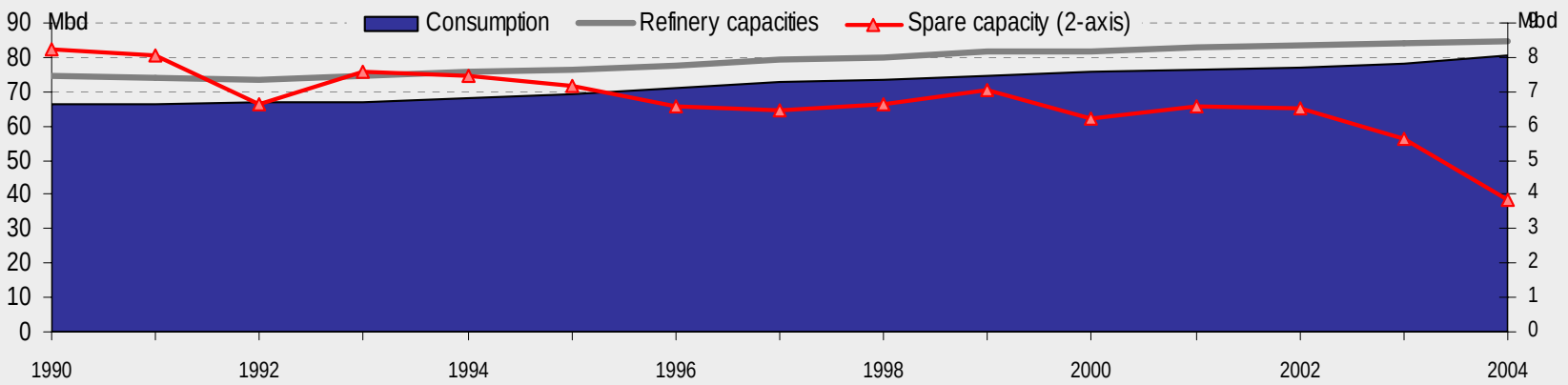
Supplementary slides

Macroeconomic environment for refining investment

Market trends

- Trend of declining spare capacity
- Over the same period, refining margins have increased
- No short term solutions, given the time it takes to design, build, and commission a new refinery
- Long-term forecasts of high crude prices (over $50 bbl) and high refining margins create a good investment environment for the industry. Fears that new-build refineries could lead to overcapacity, and thus a period of low returns, are not confirmed by expert opinion*
- However, market perceptions of refining capacity shortages are that the European market requires investments in upgrading capacity, rather than the building of new capacity

Global refining capacity vs demand



** Source: 2005 BP statistics review*

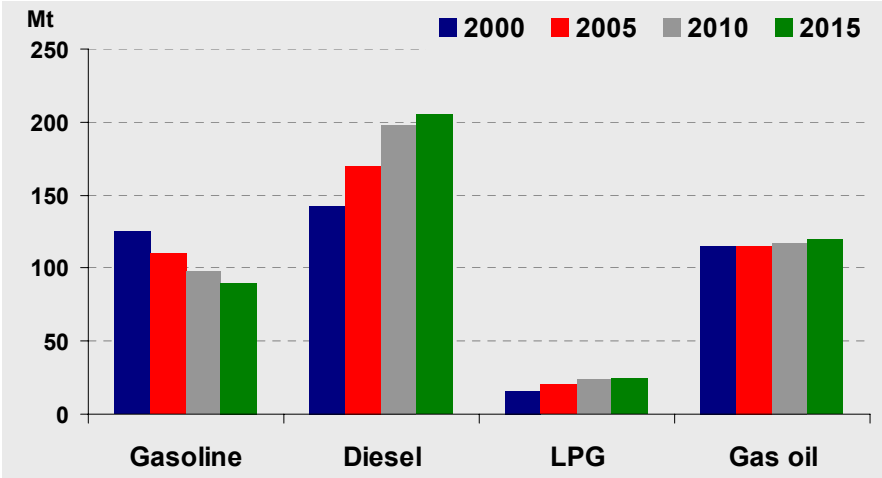
Changes in European fuel demand structure

Product imbalance – challenge for the refining tndustry

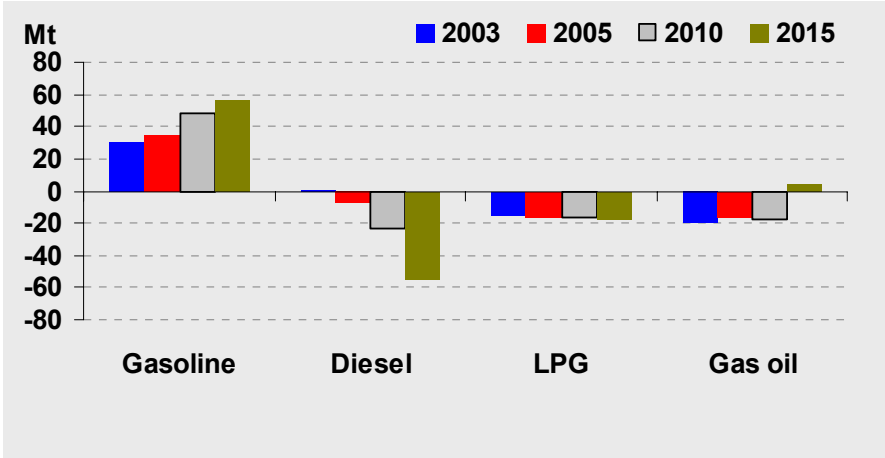
Market trends

- Growing demand for oil products in EU25 – from ca. 720 Mt in 2005 to ca. 760 in 2015 – an increase of 40 Mt or 6% during the period. Faster in early years, slowing afterwards
- Currently, total European oil product supply vs. demand is fairly balanced overall (only ca. 10 Mt surplus)
- However there is a mismatch between supply and demand for individual products
  - Declining demand for gasoline and heavy fuels (forecast surplus of 56Mt in 2015)
  - Demand shift towards diesel, for which shortfall is expected to grow (forecast deficit of 54 Mt in 2015)

Oil product demand



European Union fuel balance



** Source: Wood Mackenzie*

European development potential

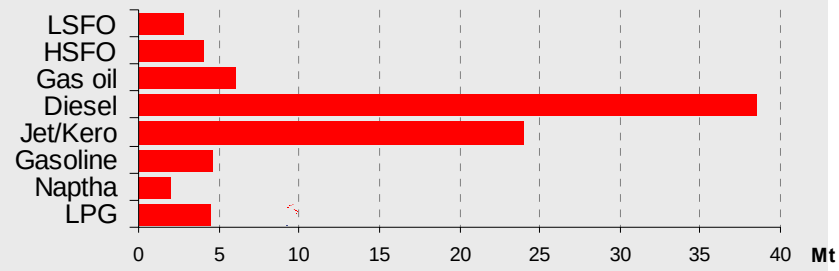
Triggering new investments in refining

Market trends

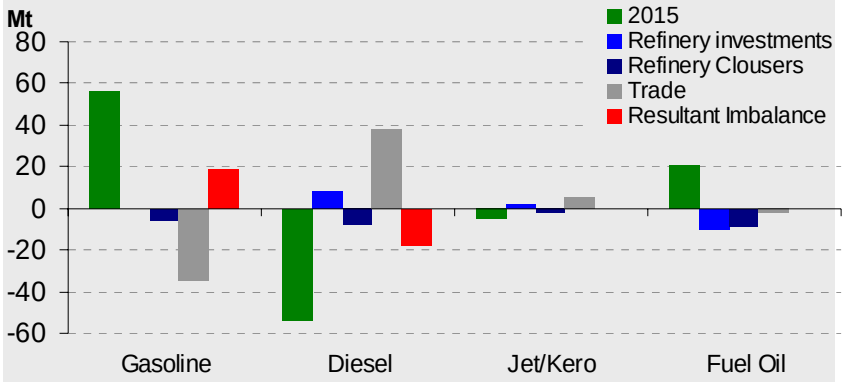
Europe – domination of individual product imbalances

1. Overall, total oil products balanced but growing surplus in gasoline and increasing deficit of middle distillates
2. Tightening environmental protection requirements in Europe (CO_2 emissions)
3. Common approaches:
   - Upgrade of processing capacity for middle distillates
   - Modernization of existing plants
   - In Eastern Europe – expansion of processing capacity
4. Planned projects: new refineries in Spain, Portugal and Turkey. Expansion: Huelva, Cartagena - Spain, PKN ORLEN, LOTOS - Poland, Mazeikiu Nafta – Lithuania, Gonfreville – France, Preemraf – Sweden, Porvoo - Finland

Incremental European refinery production to 2015*



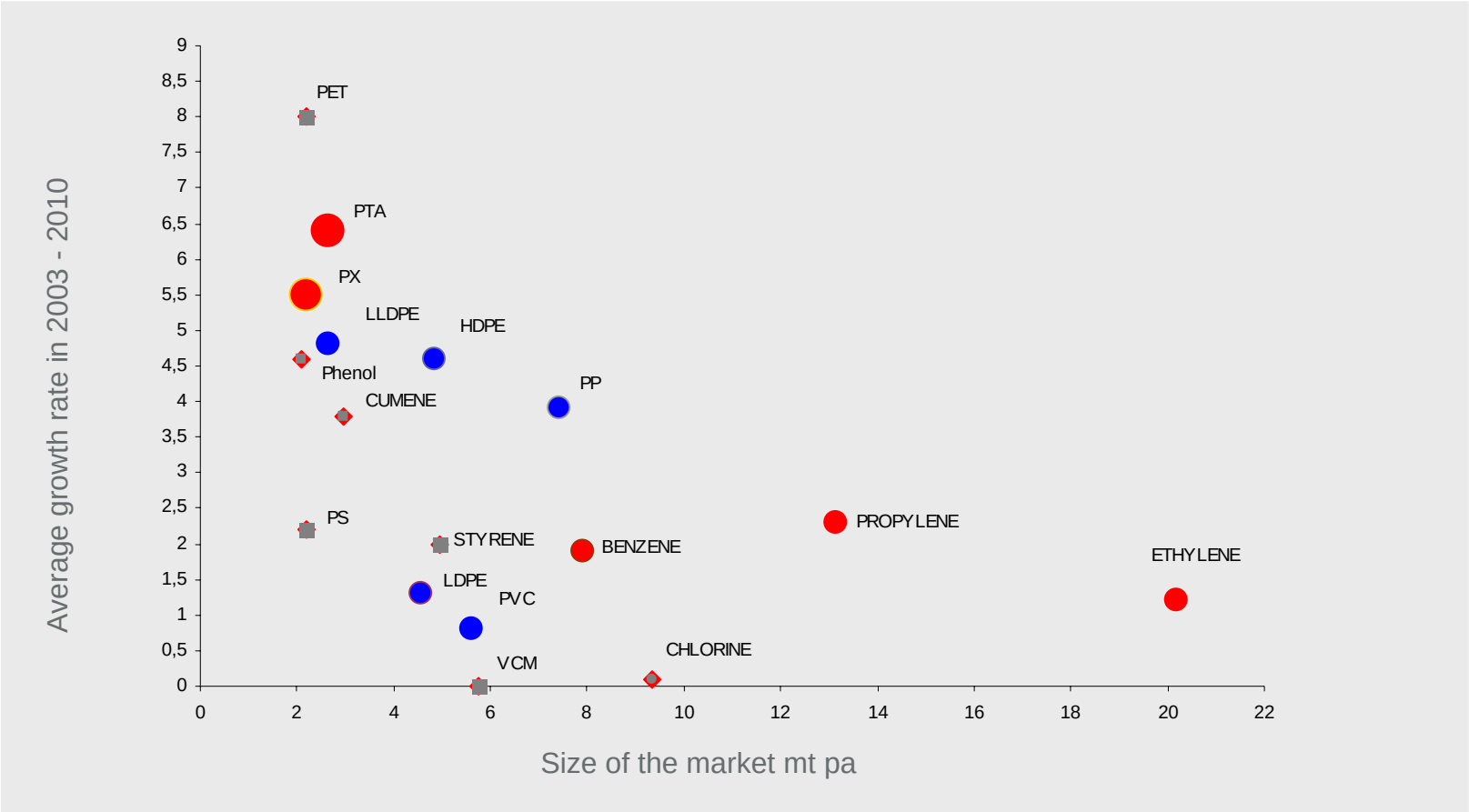
Resolution of imbalances and implications for the industry



** Source: Wood Mackenzie*

Petrochemical market perspectives in Europe

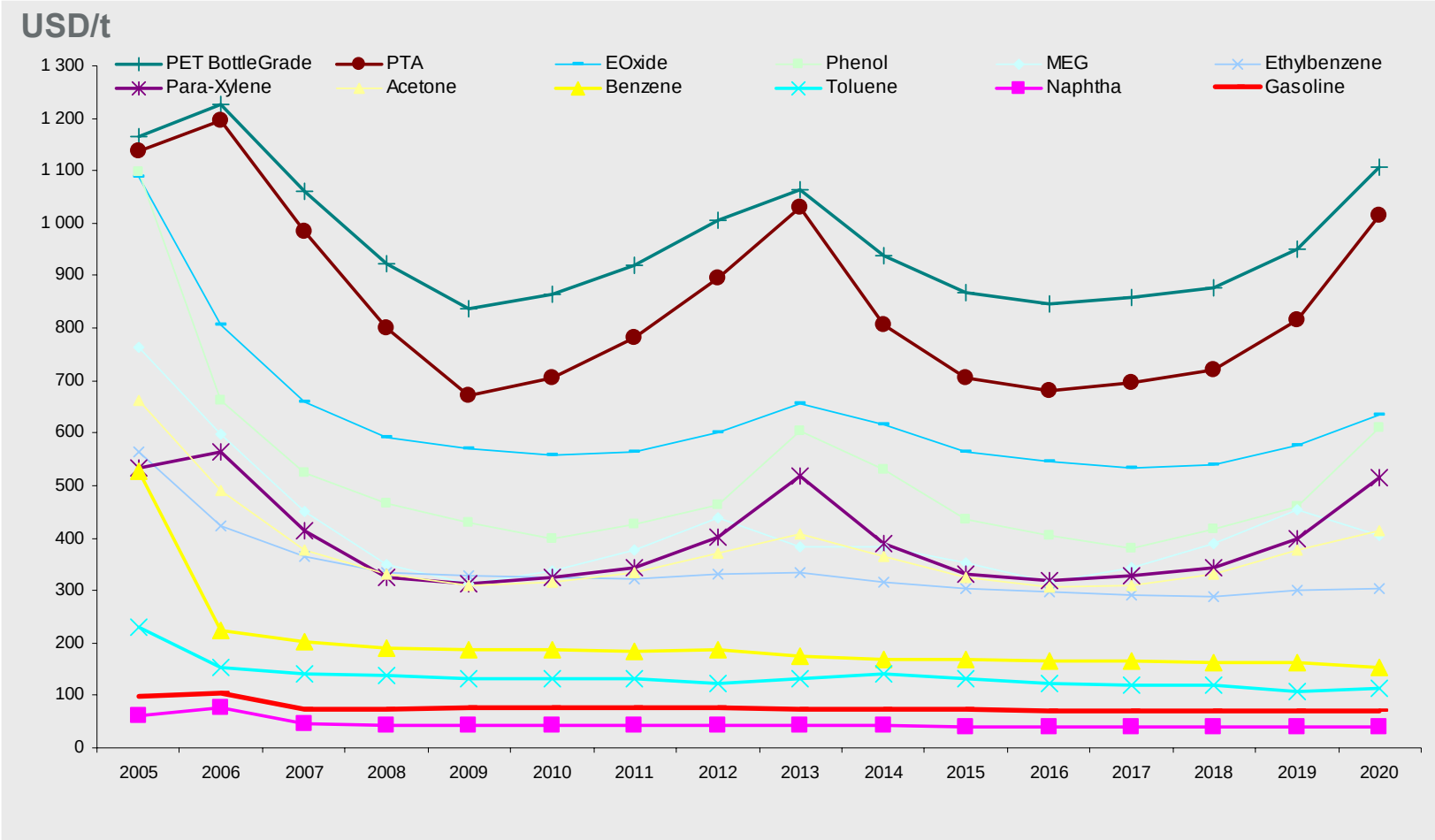
Selected petrochemical products offer upside potential in growing market



Source: CMAI, 2003

Long term perspective for petrochemical margins

Start up the PX/PTA installation PKN ORLEN ahead of pick-up in the cycle



Source: Nexant 2005

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PKN ORLEN Plock Refinery investment plans

Answer to market trends

Declining/Steady trend of gasoline demand vs. investment plans of PKN ORLEN

- Optimisation of aromatic and light cut management by commissioning new plants for:
  - Paraxylene/PTA
  - Ethyl benzene
  - Butadiene extraction expansion
  - Ethoxylates
  - Steam cracking
  - PVC expansion

Increasing trend of Diesel/Gas oil demand vs. investment plans of PKN ORLEN

- Increasing middle distillates streams and overall crude processing capacity by commissioning new plants for:
  - Residue solvent deasphalting
  - Hydrodesulphurisation

Increase in crude oil throughput capacity of 400 – 500 th. tpa
Debottlenecking by 2 mln tpa of crude

Most important refining projects

Unit	Investment characteristic
HON VII	increase in diesel fuel production capacity by 2 mln t/y while entire diesel output < 10 ppm S
FCC Gasoline Desulphurisation	entire gasoline output < 10 ppm S
ROSE	solving the problem of the bottom of the barrel, better feedstock for resid hydrocracker
Hydrocracker expansion	new steam boiler
Pipeline Ostrów Wlkp. Wrocław	to increase profitability in fuel transportation
Intensification butadiene unit	to extract whole amount from expanded steam cracker effluent
Ethylenoxide & EG	to produce more MEG as demanded by market and have a complex offer for polyester manufacturers (with PTA)
Ethylbenzene unit	to enter new, profitable, market
Unipetrol	hydrocracker revamp, FCC heart cut gasoline desulphurisation

These will allow an increase in effective crude processing capacity to 16 m t/y, match the Company to EU 2009 requirements, and decrease the cost per bbl processed

Most important petrochemical projects

Project size

- Proposed capacity of complex units:
  1. PX installation - 400 th. tpa
  2. PTA installation - 600 th. tpa
  3. By-products:
     - benzene - 80 th. tpa
     - orthoxylene - 40 th. Tpa
- Size is optimal in terms of capital and operating expenditure
- Planned increase in crude oil throughput of 400-500 th. tpa

Project benefits

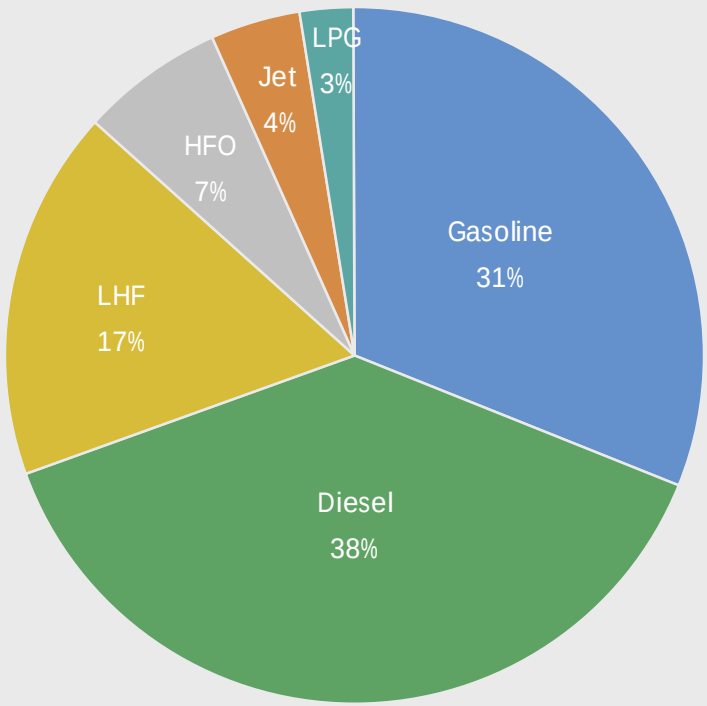
- Value creation by entering the rapidly developing polyester (PET) market. Feedstocks include paraxylene (PX), purified terephthalic acid (PTA) and monoethylene glycol (MEG)
- Decrease of the unit cost of crude processing at the DRW installation due to higher crude throughput
- Operation of the PET granulate plant with an annual capacity of 120 th. tpa

Off take agreements for PTA already signed

- 1) Mitsubishi Chemical Corporation, based in Tokyo, Japan
  150 th tons
- 2) SK EUROCHEM, based in Wloclawek, Poland ,
  25-50 th tons during the first year
  100-120 th tons in the next years

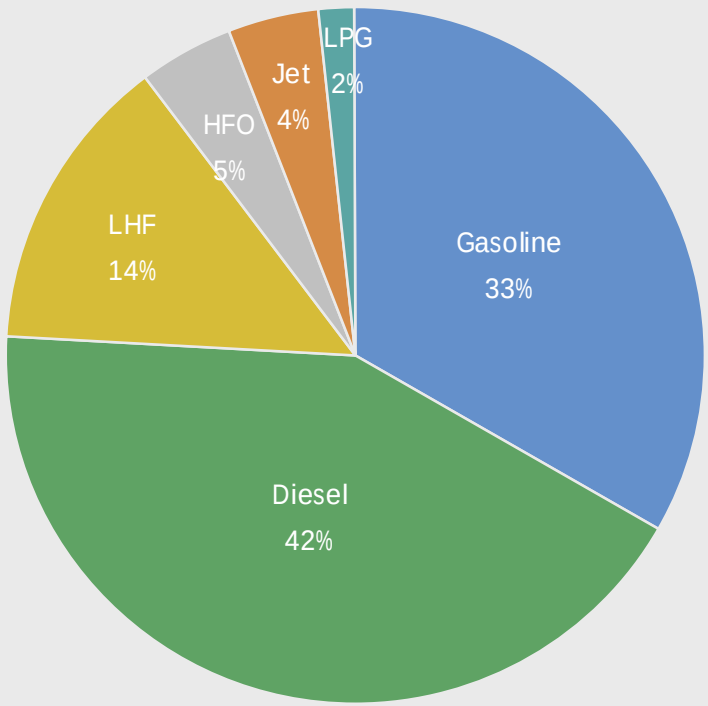
Refining product slate development: Płock plant

2005 Product slate



2005 : Total 9.2 mt

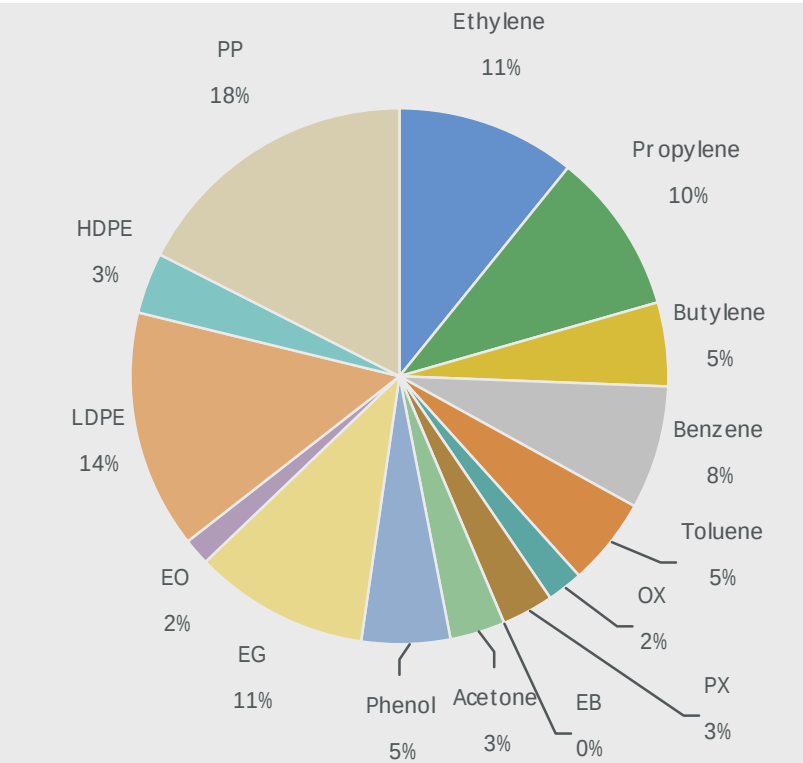
2009 Product slate



2009: Total 9.9 mt

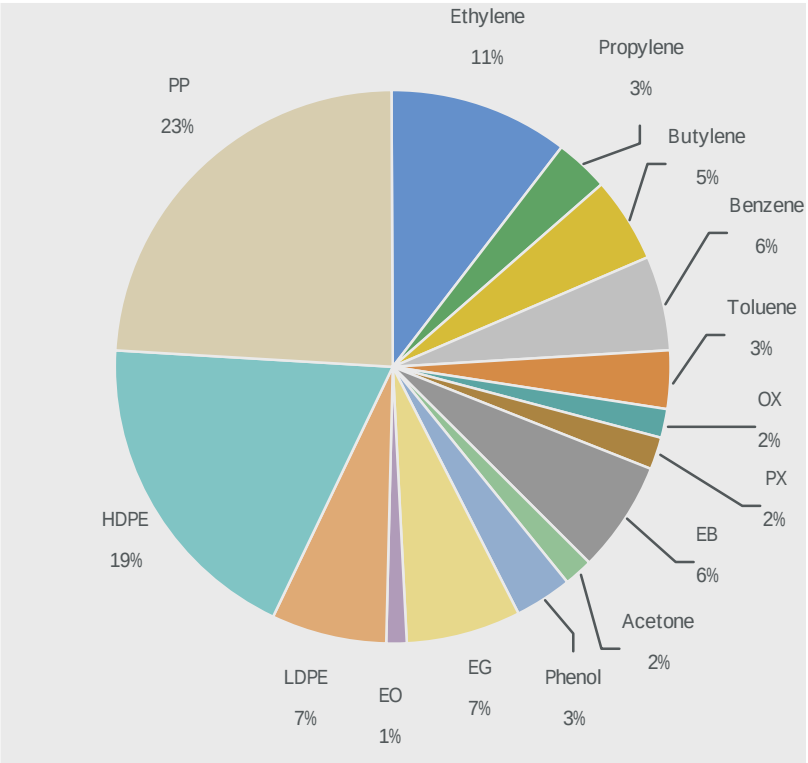
Petrochemical product slate development in Płock plant

2005 Product slate



2005: Total 0.83 mt

2009 Product slate



2009: Total 1.65 mt

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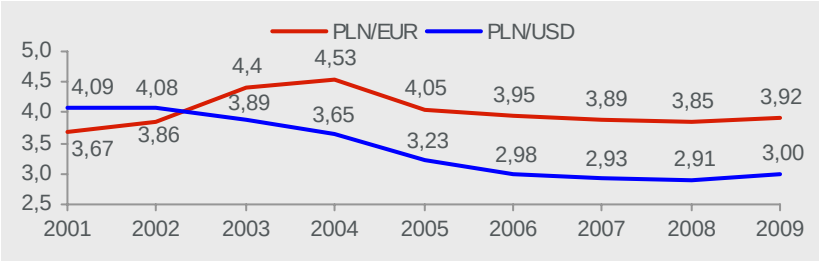
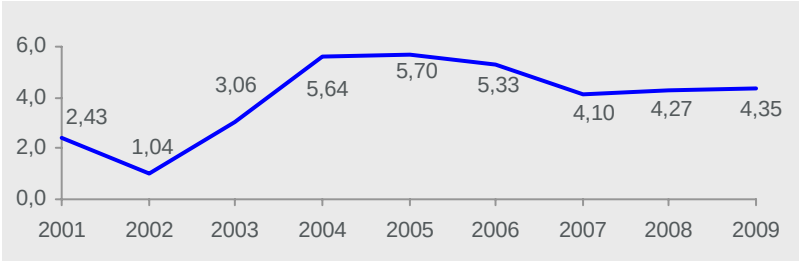
Macroeconomic background[1]: refining

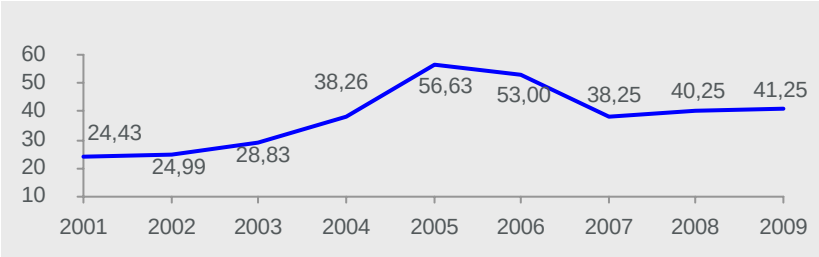
Exchange rates January 2006 forecasts[2]



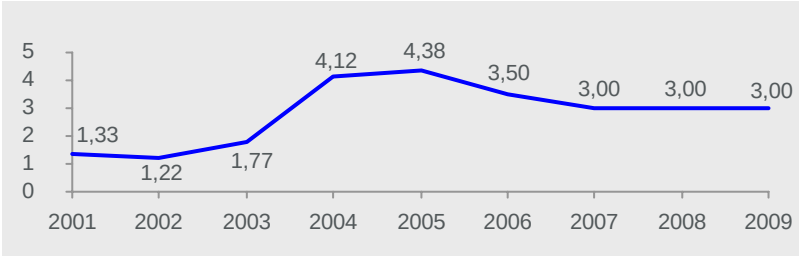
Refining margin (USD/bbl)



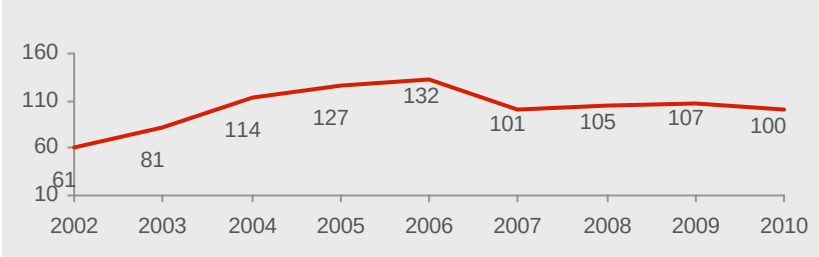
Brent (USD/bbl)



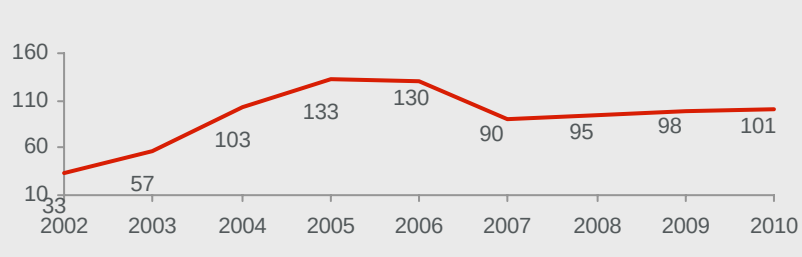
Brent/Ural differential (USD/bbl)



Gasoline (USD/tone)



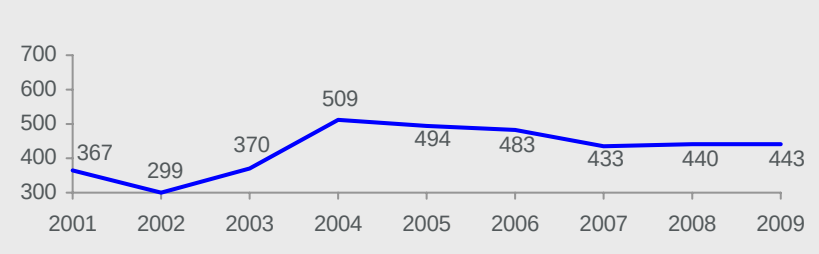
Diesel (USD/tone)



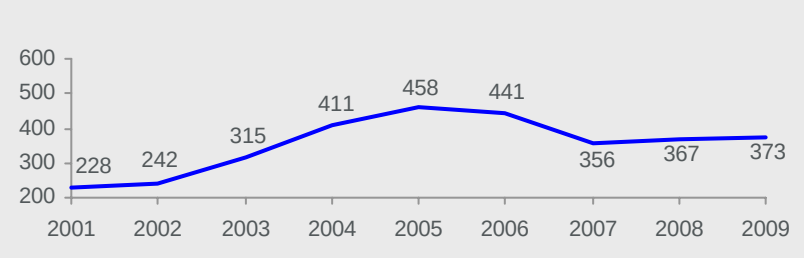
1) January 2006 forecasts
2) Exchange rates assumed in February 2005 for PLN/EUR: 4.40 (2005), 4.12 (2006), 4.08 (2007), 4.03 (2008), 4.10 (2009) and for PLN/USD: 3.20 (2005), 3.16 (2006), 3.17 (2007), 3.13 (2008), 3.38 (2009)
Source: Datastream, PKN ORLEN assumptions based on CERA i banks.

Macroeconomic background[1]: petrochemicals

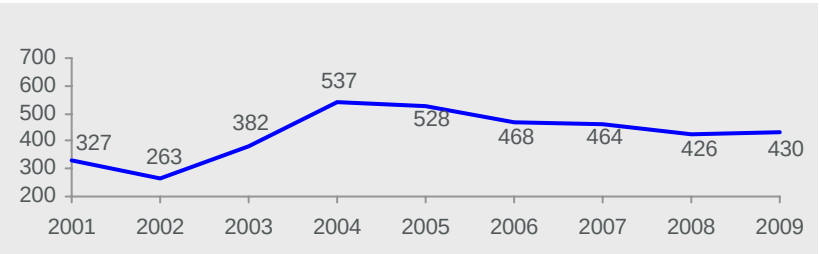
Ethylene crack margin (USD/t)



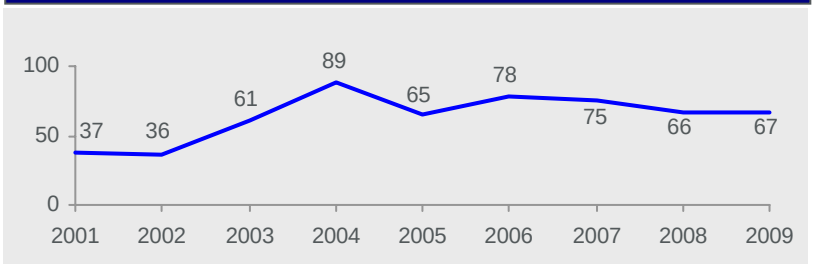
Propylene crack margin (USD/t)



Paraxylene crack margin (USD/t)



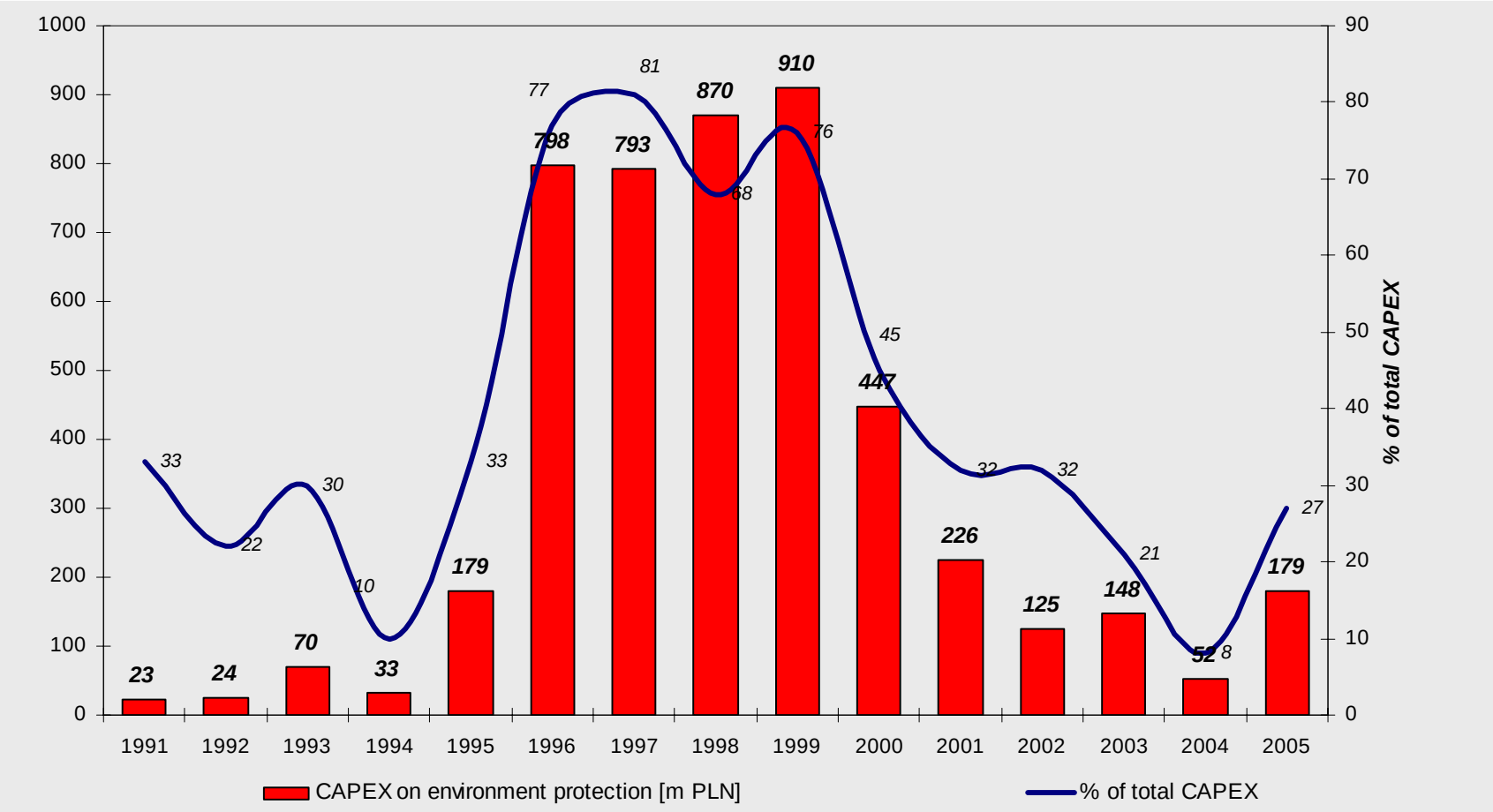
Naphta (USD/t)



1) January 2006 forecasts
Source: Datastream, PKN ORLEN assumptions based on CERA i banks.

Environment friendly investment PKN ORLEN

CAPEX on the projects connected with environment protection 1991 – 2005 (without fuel sites)

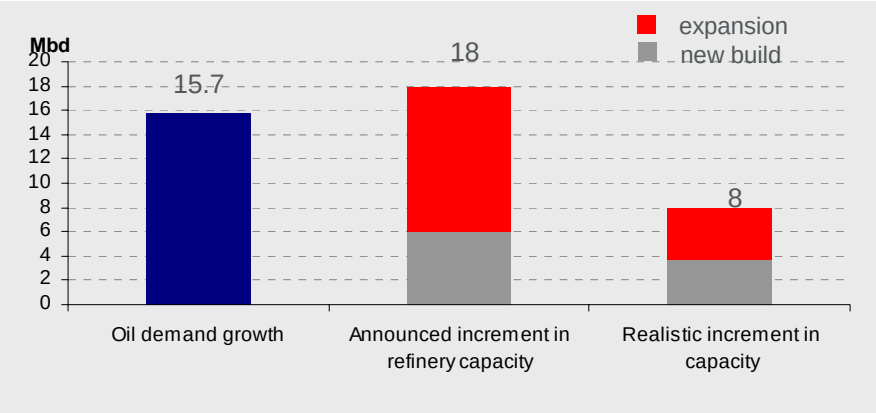


Shortage of refining capacity

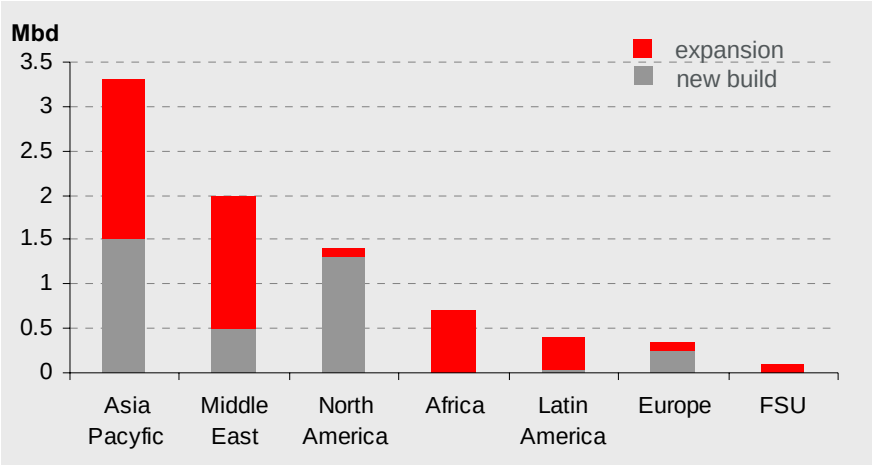
Market trends

- Potential overcapacity of ca. 2.3mb/d - if all announced new projects and expansions are implemented. It would lead to an increase in crude distillation capacity of 18mb/d which is substantially more than forecast oil demand growth of 15.7 mb/d
- Realistic deficit in capacity of 7.7mb/d, as experts believe that only part of the announced projects will take place (forecast increment of 8 mb/d)*
- The largest amount of capacity additions will be in the Asia/Pacific region (where the greatest demand growth is expected) and the Middle East (both for domestic consumption and for export). Expansion plans for Europe and FSU are insignificant in reality.

Oil Demand growth vs. additional oil refining capacity (2005 – 2015)



Realistic regional capacity additions



** Source: Wood Mackenzie*

THANK YOU FOR YOUR ATTENTION

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