



The New Zealand  
REFINING COMPANY LTD

# PRODUCT QUALITY AND GREENHOUSE GASES

Author: GM  
File Ref: K:\..\slides\GHG&PQ  
Custodian: CA  
File Ref: GM  
Date: June 2001  
Revision: 0:A

## A CROSS ROAD FOR NZRC

- **Capital Expenditure Required**
- **Operating Costs Increase**
- **No Margin Increase Expected**
- **International Competitiveness May Reduce**



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## EXAMPLE BENEFITS OF PRODUCT QUALITY IMPROVEMENTS

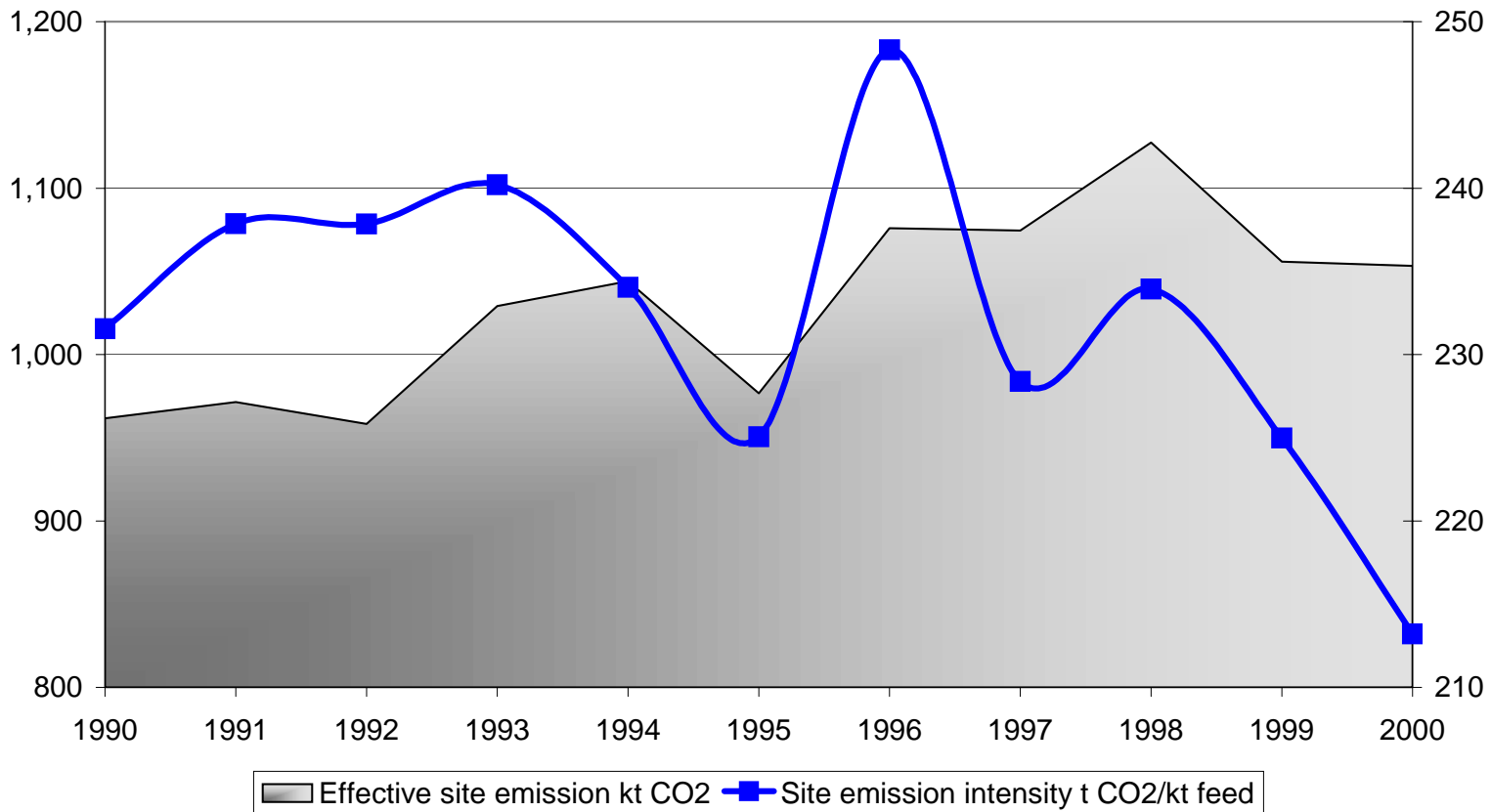
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BENEFIT	DIRECT	ENABLING
Local Air Quality	SO <sub>x</sub> , NO <sub>x</sub> , Benzene (Particulates)	NO <sub>x</sub> Removal Particulate Filters
Greenhouse Gases	Higher Refinery Emissions  Higher Transport Emissions?	New Engine Technologies e.g. GDI

# NZRC's CO<sub>2</sub> EMISSIONS

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NZRC CO<sub>2</sub> Emissions 1990-2000



# CLEANER FUELS - MORE ENERGY

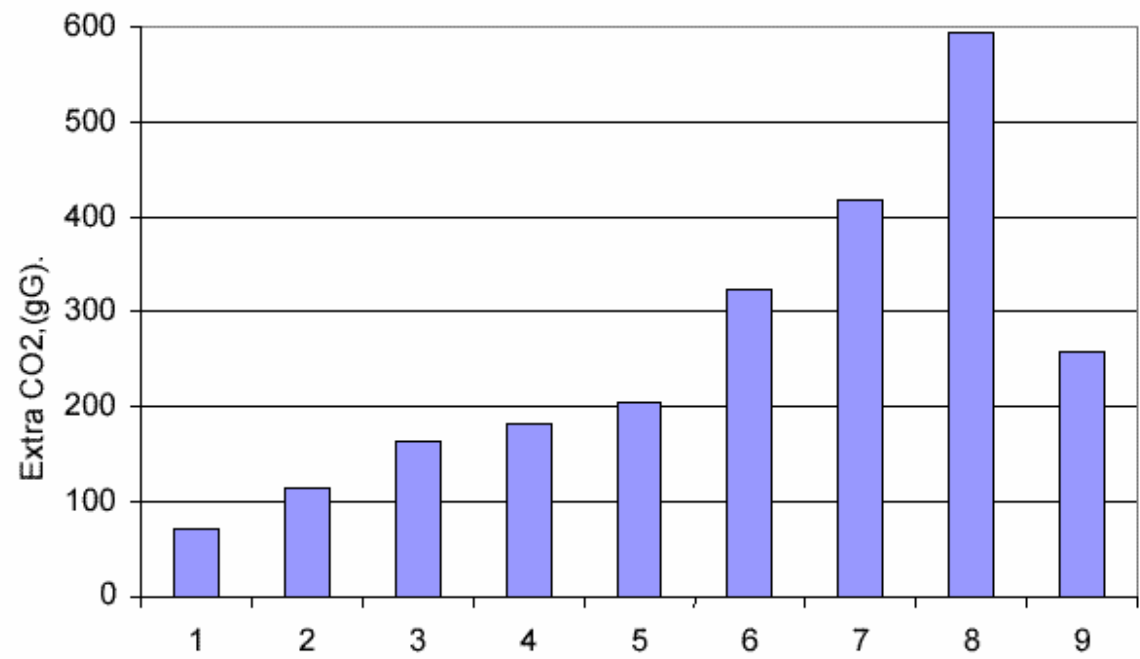
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- **MORE H<sub>2</sub> PRODUCTION**
- **MORE DESULPHURISATION**
- **BETTER FRACTIONATION**
- **LESS HEAVY ENDS (MORE CRACKING)**
- **AROMATICS REDUCTION**

# AUSTRALIAN REFINERIES GHG FOR PQ

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Estimated Additional Greenhouse Gas Emissions for the Production of Euro 4 Fuels (Relative to Euro 2 Fuels)



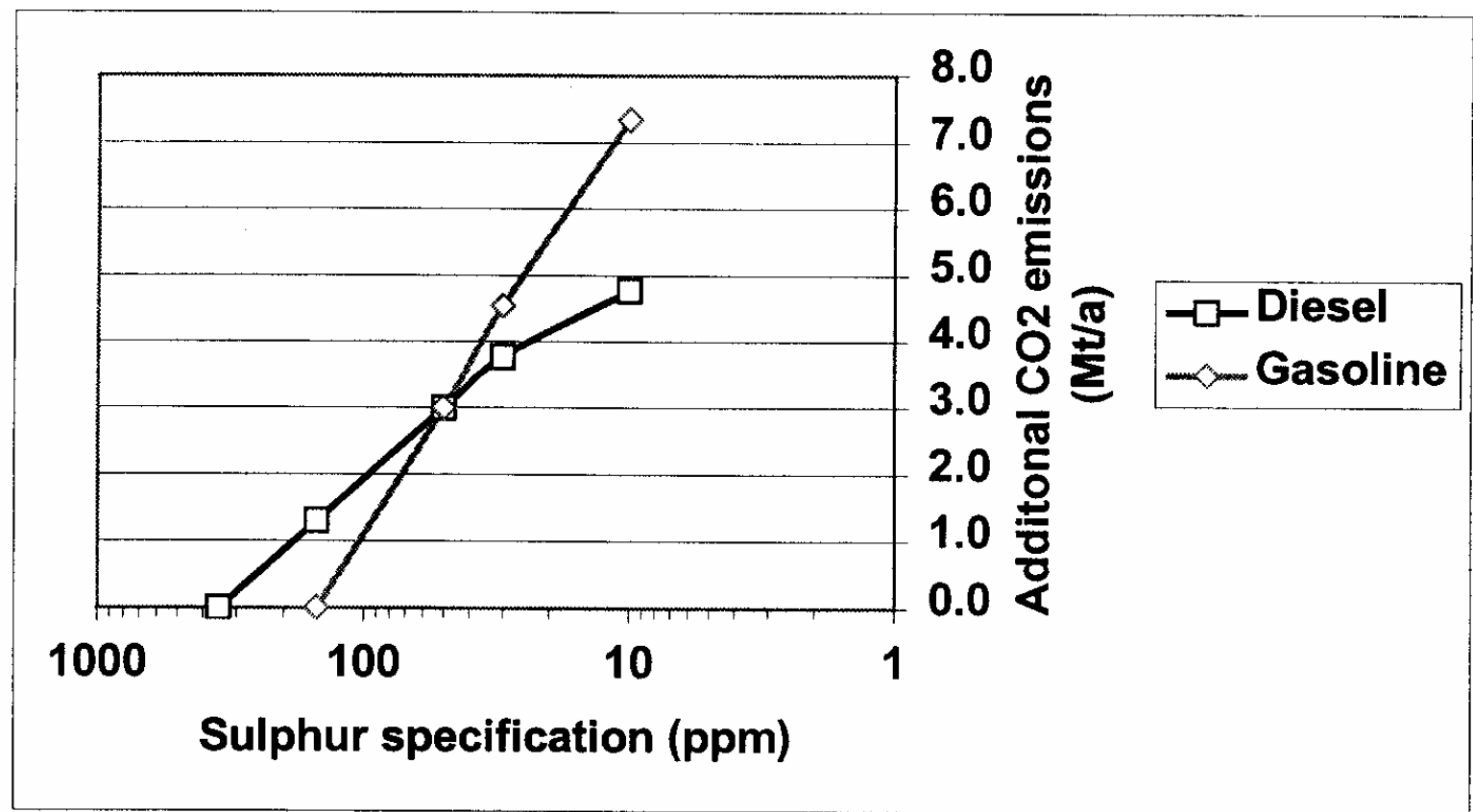
1 to 8 = Australian Refineries, 9 = Average

total = 2.1 mtpa CO<sub>2</sub>

Source : Review of Fuel Quality Requirement for Australian Transport

# EXTRA CO<sub>2</sub> FROM EU REFINERIES

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Diesel 350ppm - Base Case

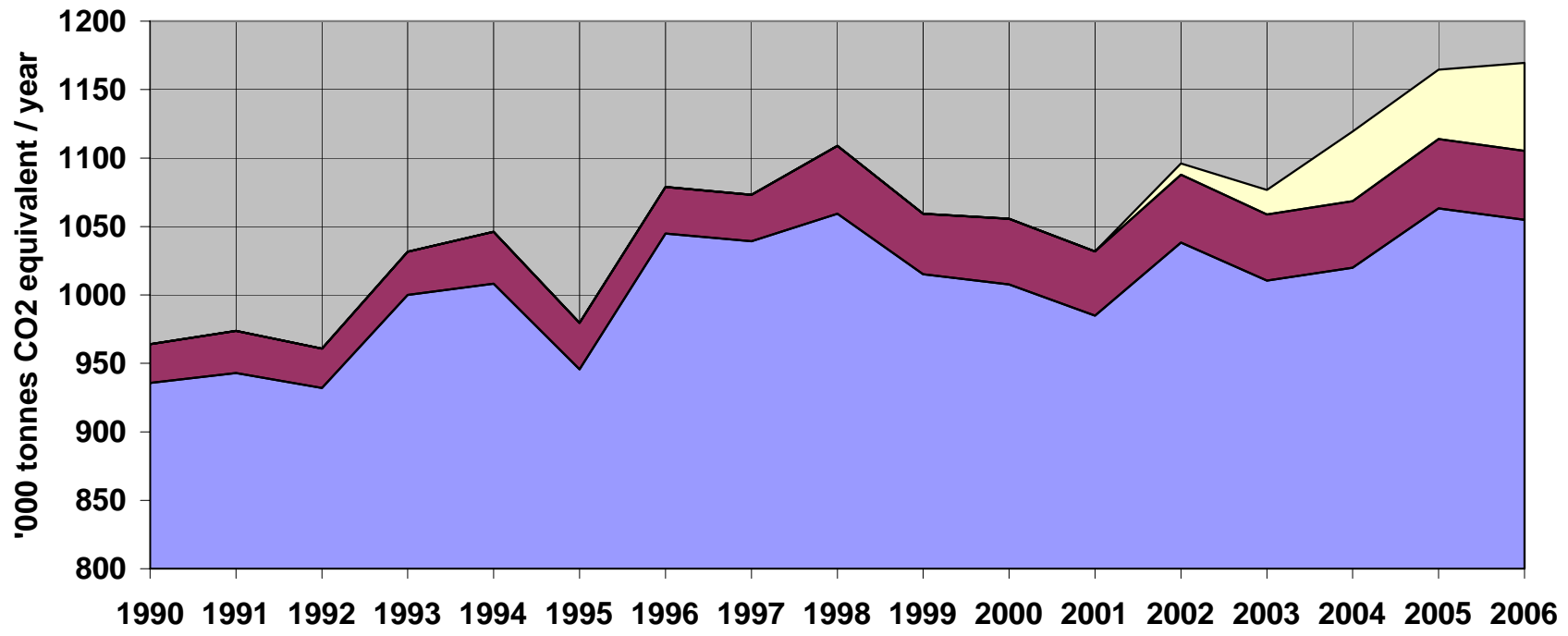
Gasoline 150ppm - Base Case

Source : Clean Fuels 2001, Concawe

# CURRENT & FUTURE GHG EMISSIONS

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Current & Future GHG Emissions



- CO2 produced due to product quality compliance (on site emission and imported electricity)
- CO2 due to imported electricity (excluding PQ projects)
- Actual on-site emission (on site equiv less CO2 sold)

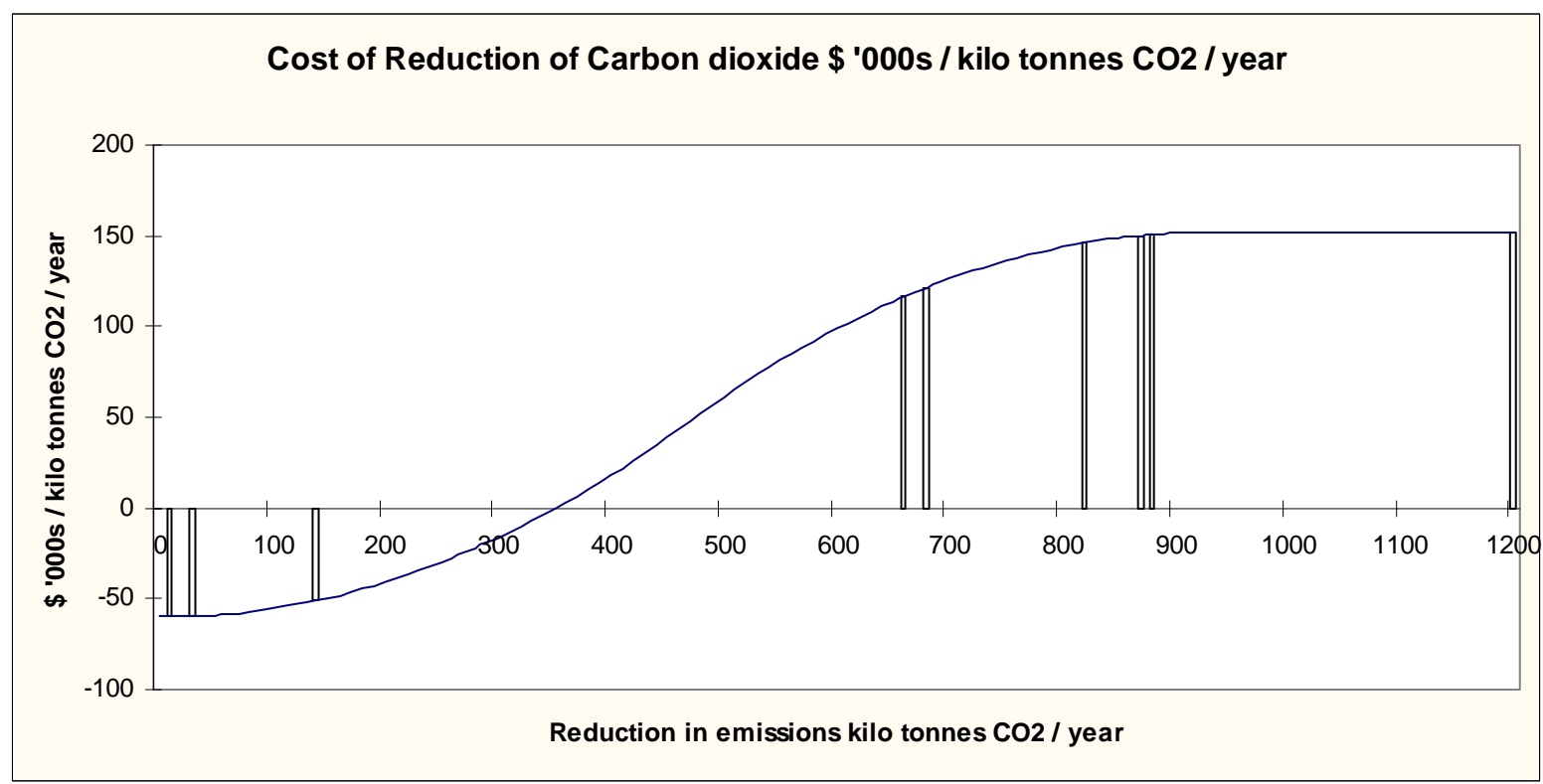
# POSSIBLE GHG REDUCTIONS

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- **TRADITIONAL MEANS**
  - Audits
  - Maintenance
  - Operation
  
- **CATALYST SELECTION**
  
- **GREEN/BROWN FIELD PRODUCT QUALITY PROJECTS**
  
- **OTHER PROJECTS E.G. COGENERATION**
  - (Note Chicken and Egg with PQ!)

# COST OF GHG REDUCTIONS - INDICATIVE

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## KEY ISSUES FOR NZRC

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- **Recognition of increased Greenhouse Gases for Product Quality**
- **Point of obligation for transport fuels downstream refinery (I.e. user not producer)**
- **Incentives for early action (Product Quality and Greenhouse Gases)**
- **Preserve competitiveness, avoid C leakage**