



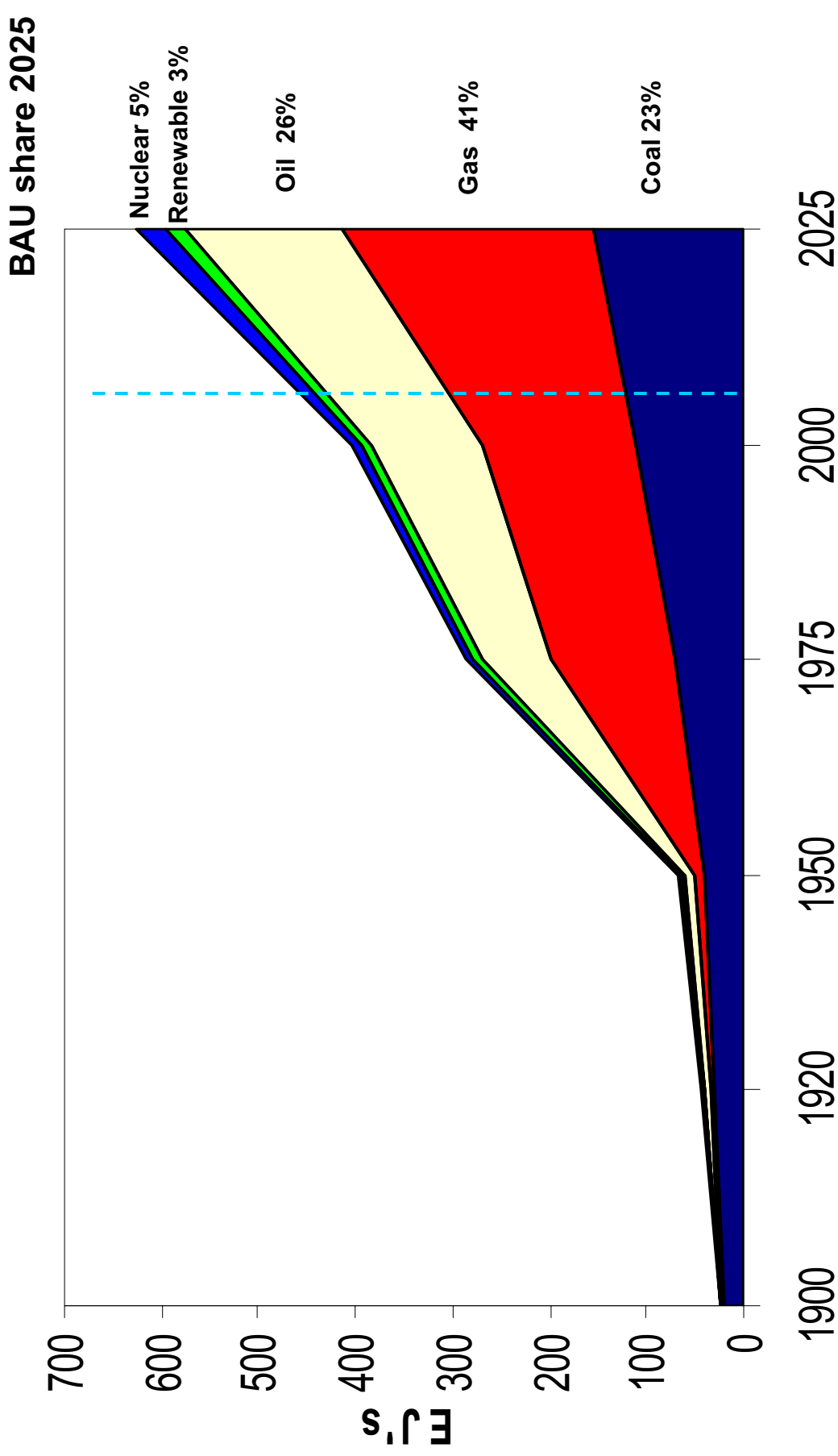
# **The Future for Coal in NZ: SE's perspective**

***Don Elder***  
*CEO Solid Energy*

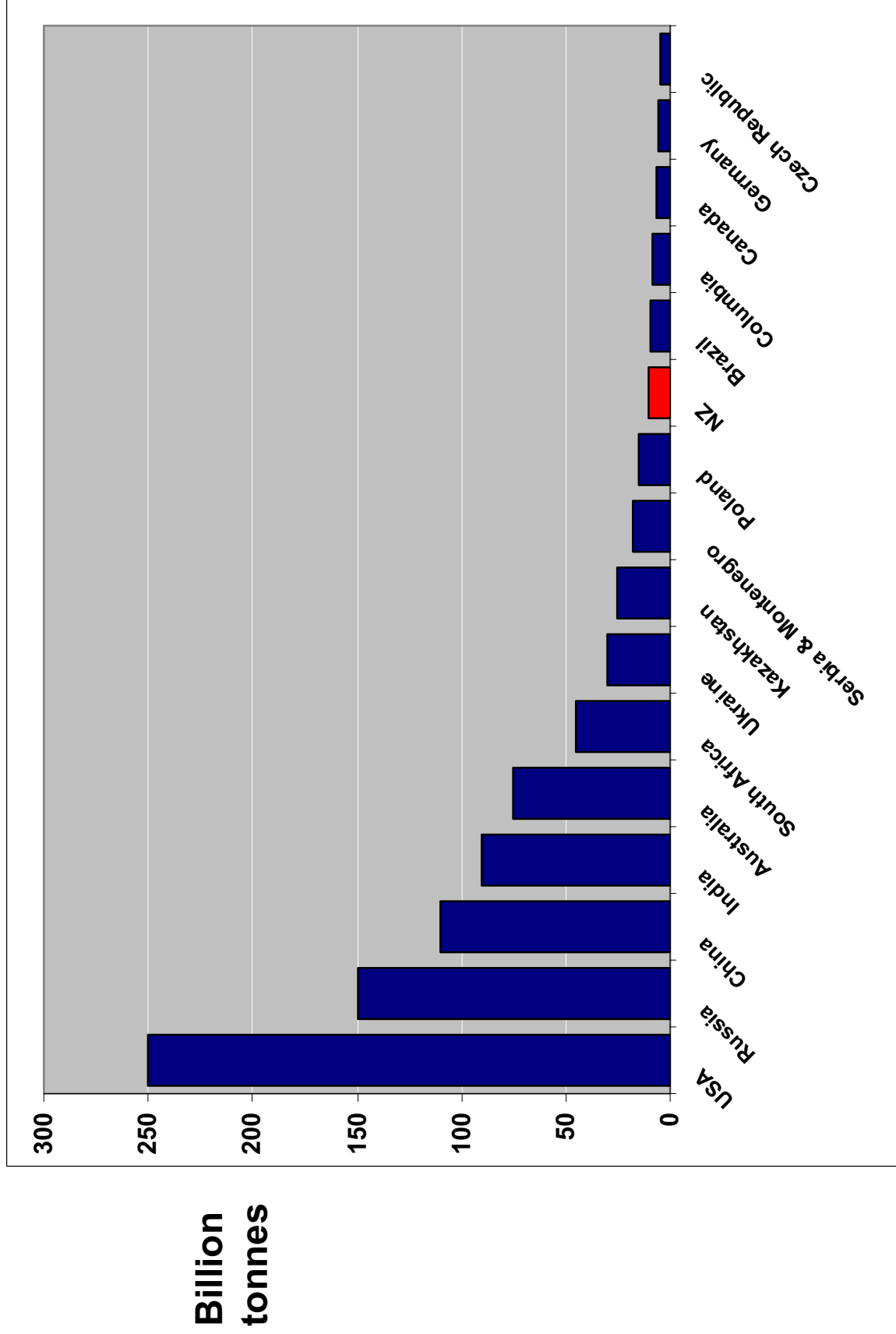
*AUSIMM, Auckland, November 15 2005*

# Fossil fuels will remain key to the global energy mix ... and coal use will grow in proportion

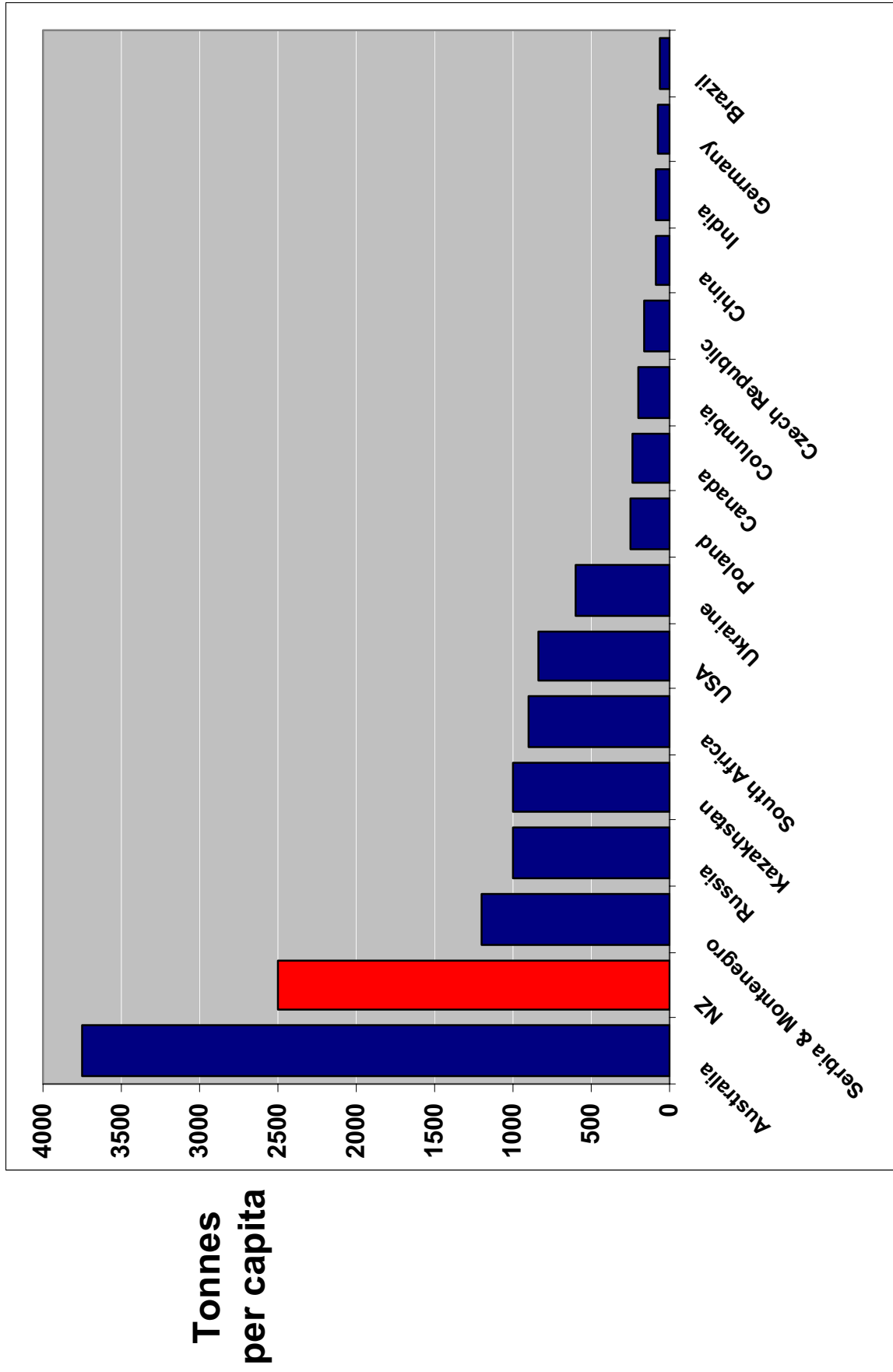
## World Primary Energy Consumption - by Fuel



# NZ's coal resources are significant on a global scale



**... and per capita our coal resources are immense**



## **Our resource is well defined ...**

|                          |                          |                           |
|--------------------------|--------------------------|---------------------------|
| <b>N.I. coal</b>         | <b>30,000 PJ</b>         | <b>\$3 – 10 /GJ</b>       |
| <b>S.I. coal</b>         | <b>10,000 PJ</b>         | <b>\$1 - 5 /GJ</b>        |
| <b>Southland lignite</b> | <b><u>130,000 PJ</u></b> | <b><u>\$1 - 3 /GJ</u></b> |
|                          | <b>150,000 PJ</b>        | <b>\$1 - 10 /GJ</b>       |

**... and is “almost unlimited”**

|                          |                          |                           |
|--------------------------|--------------------------|---------------------------|
| <b>N.I. coal</b>         | <b>30,000 PJ</b>         | <b>\$3 – 10 /GJ</b>       |
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**Current domestic use: ~ 75 PJ/year (exc coking coal exports)**

**Resource life: ~ 2,000 years**

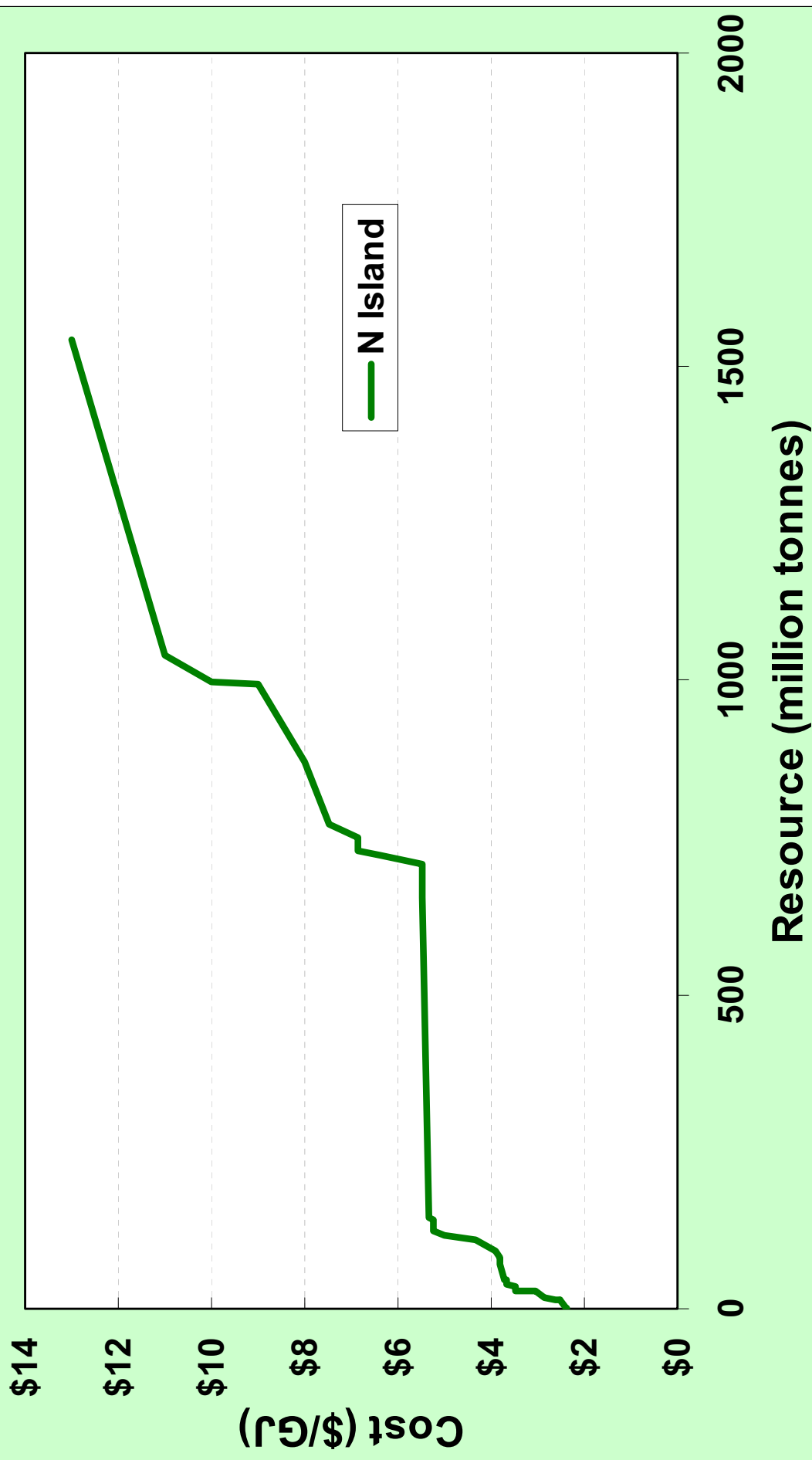
**(Gas reserves ~ 3,000 PJ \$5 - 10 /GJ)**

## But “what happened to all that coal”?

- “Economic coal” has little meaning at a national level
- Coal is a low-value commodity
- Its economic availability depends on many factors:
  - Resource size and location
  - Market size, location and security
  - Market energy prices (with location and time)
  - Distribution infrastructure and cost

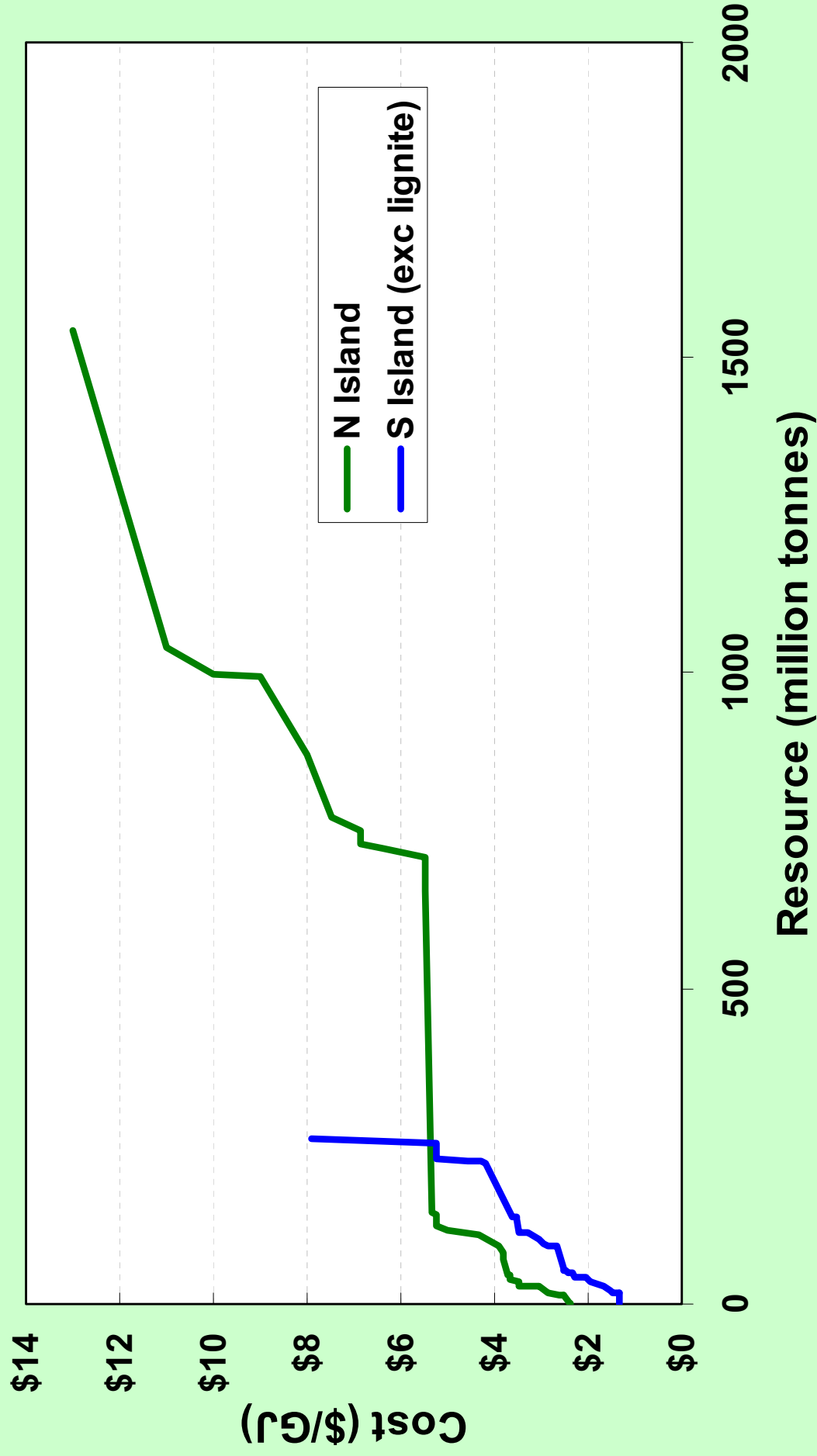
# SENZ resources include 1.5bt in the N Island

## SENZ Coal Resources & Cost



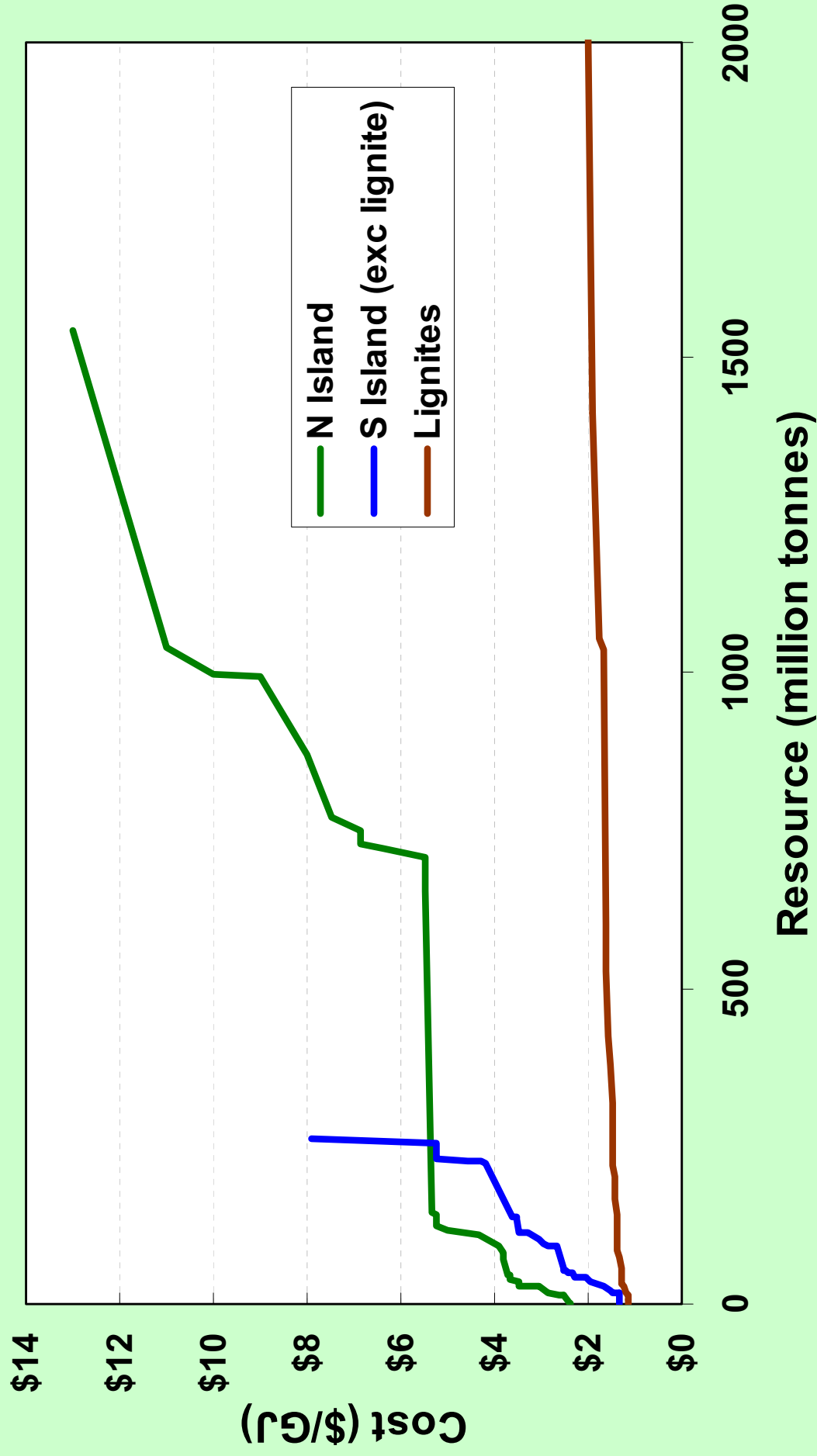
# .. 500mt+ in the S. Island

## SENZ Coal Resources & Cost



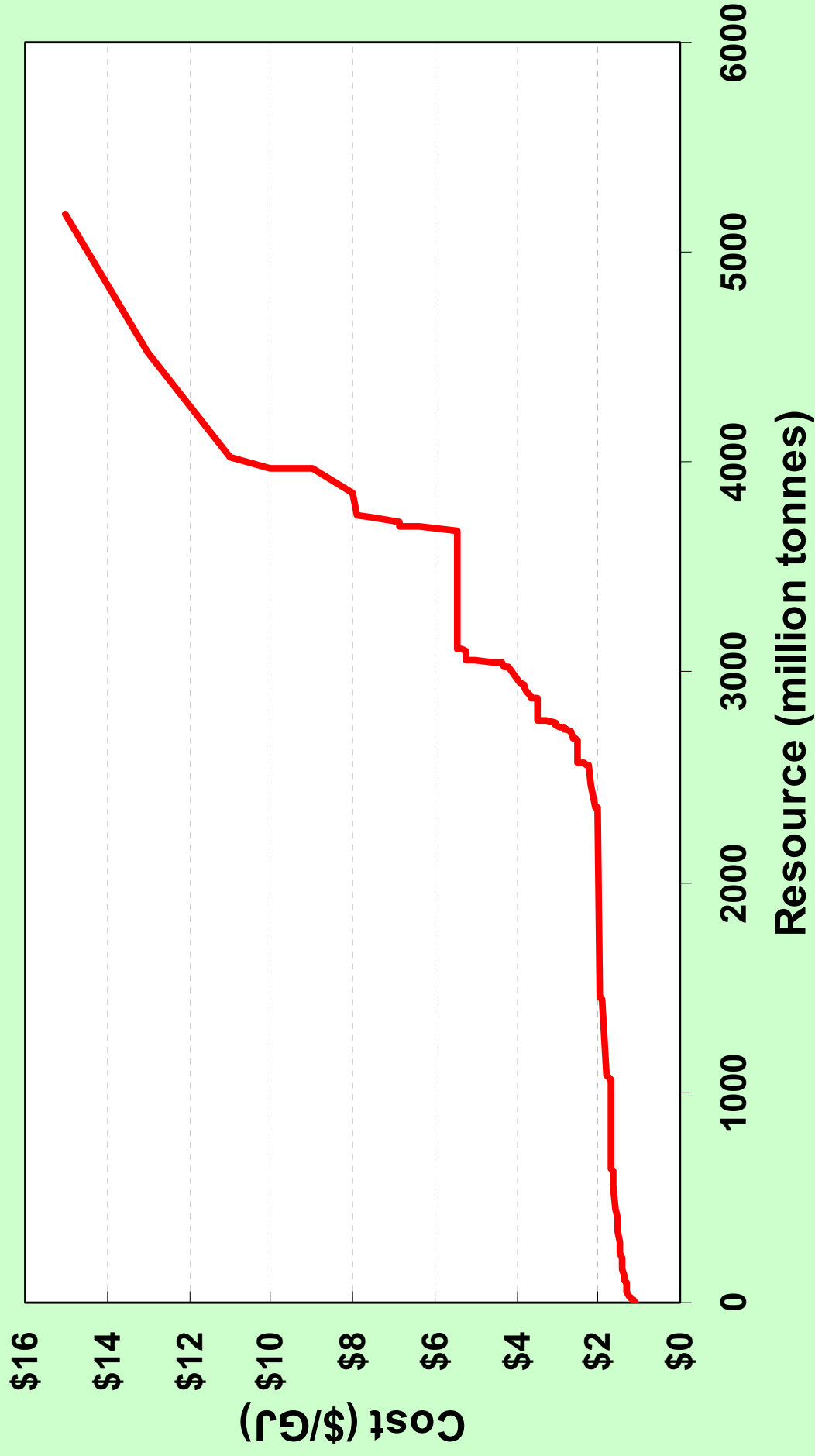
# ... and 2.5bt of lignite

## SENZ Coal Resources & Cost



... total 5.5bt of which 4bt is under \$6/GJ

## SENZ Coal Resources & Cost

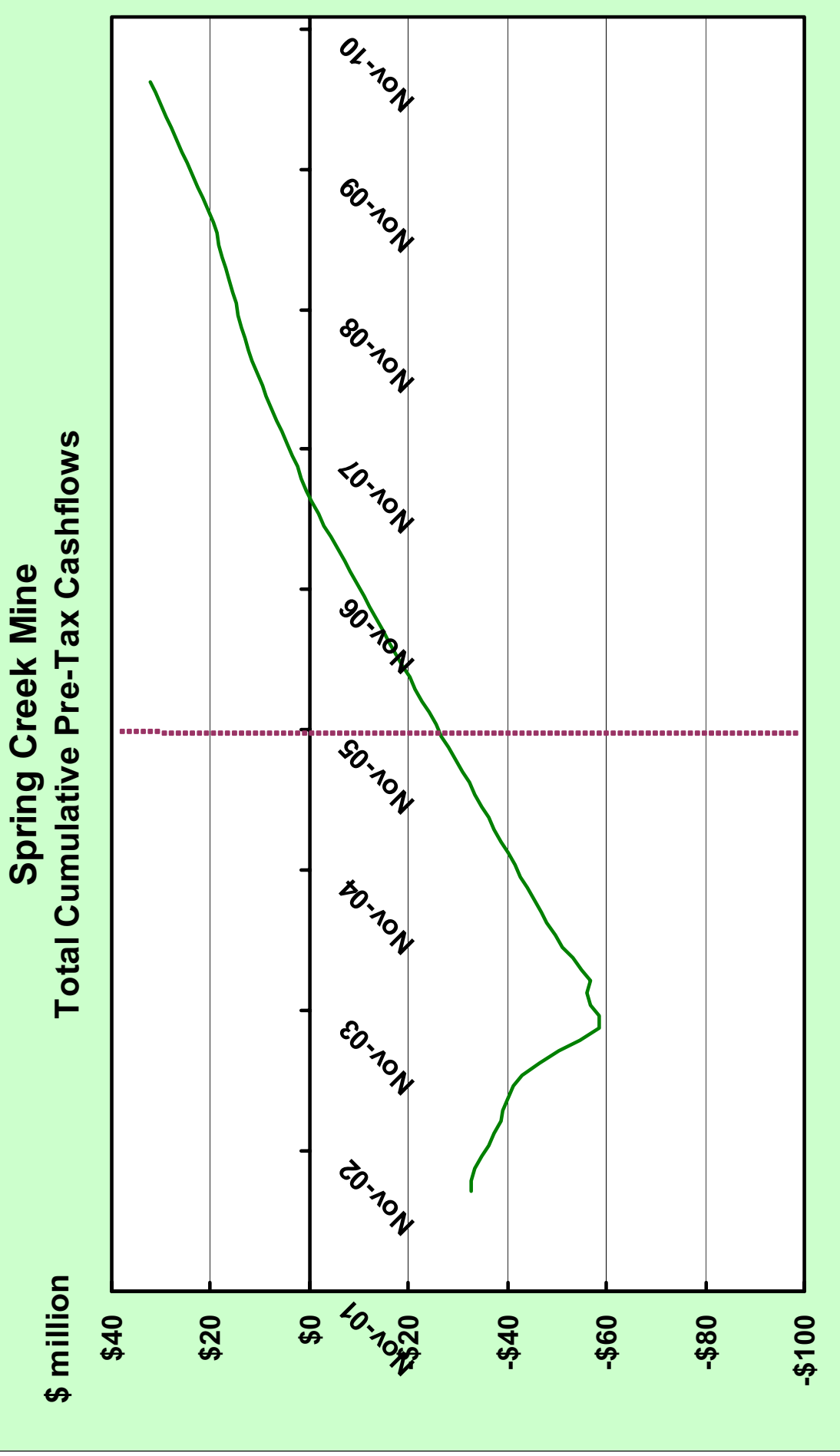


# But “what happened to all that coal”?

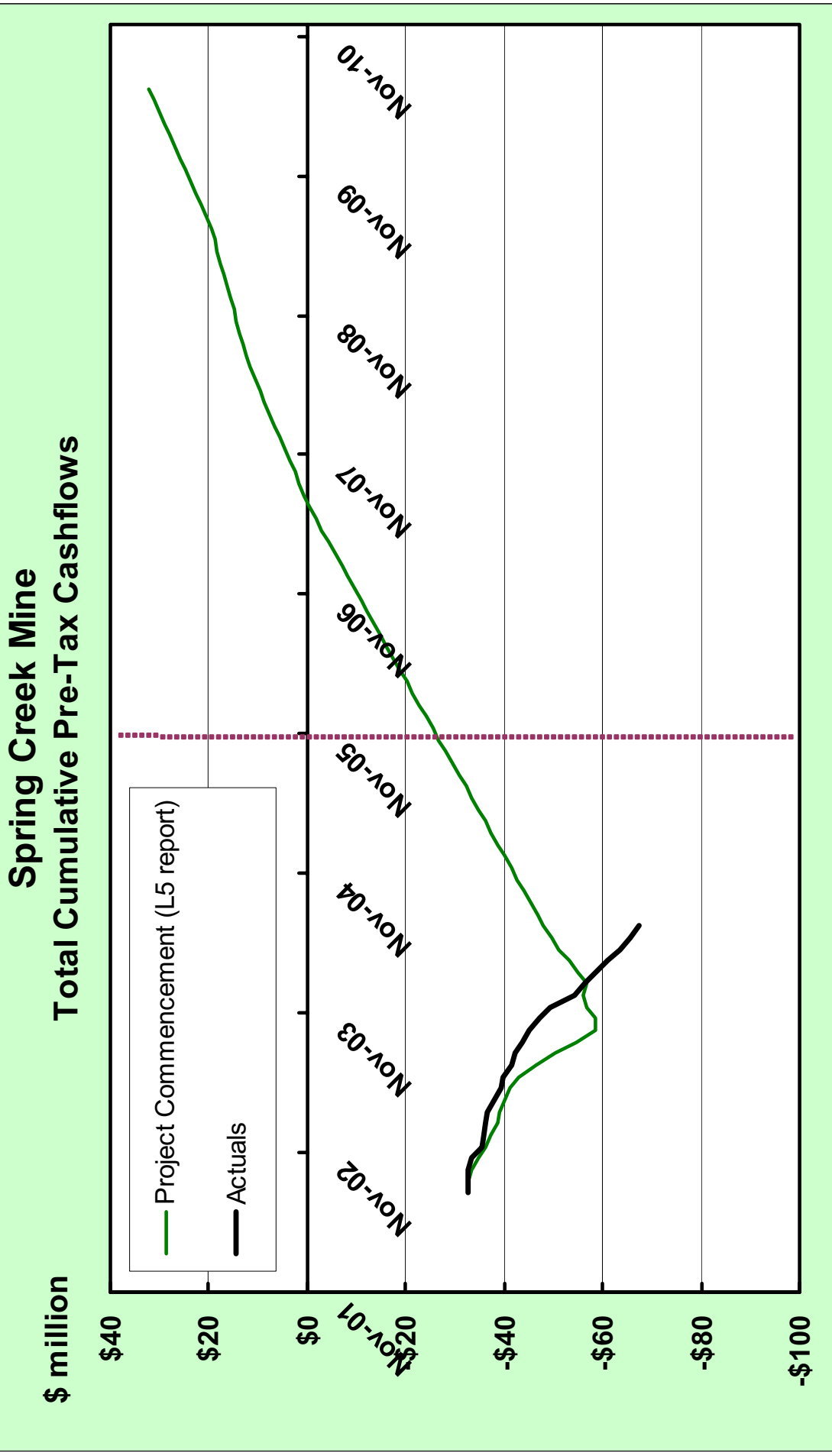
**Its economic availability depends on many factors:**

- Resource size and location
- Market size, location and security
- Market energy prices (with location and time)
- Distribution infrastructure and cost
- Quality of geological information
- Quality of mine planning

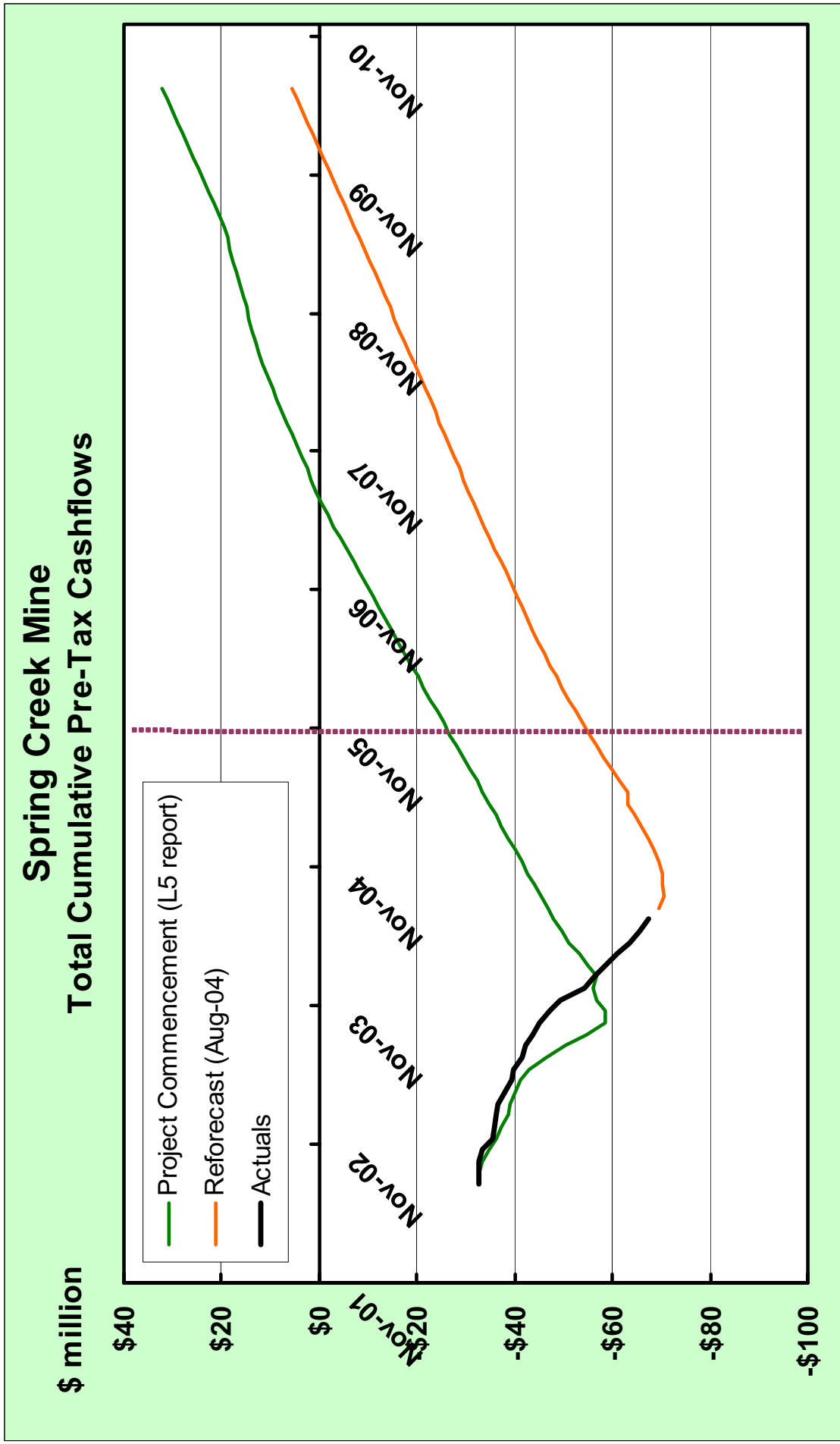
# Spring Creek Underground Mine (near Greymouth) was the great new hope for the industry .. and for SE



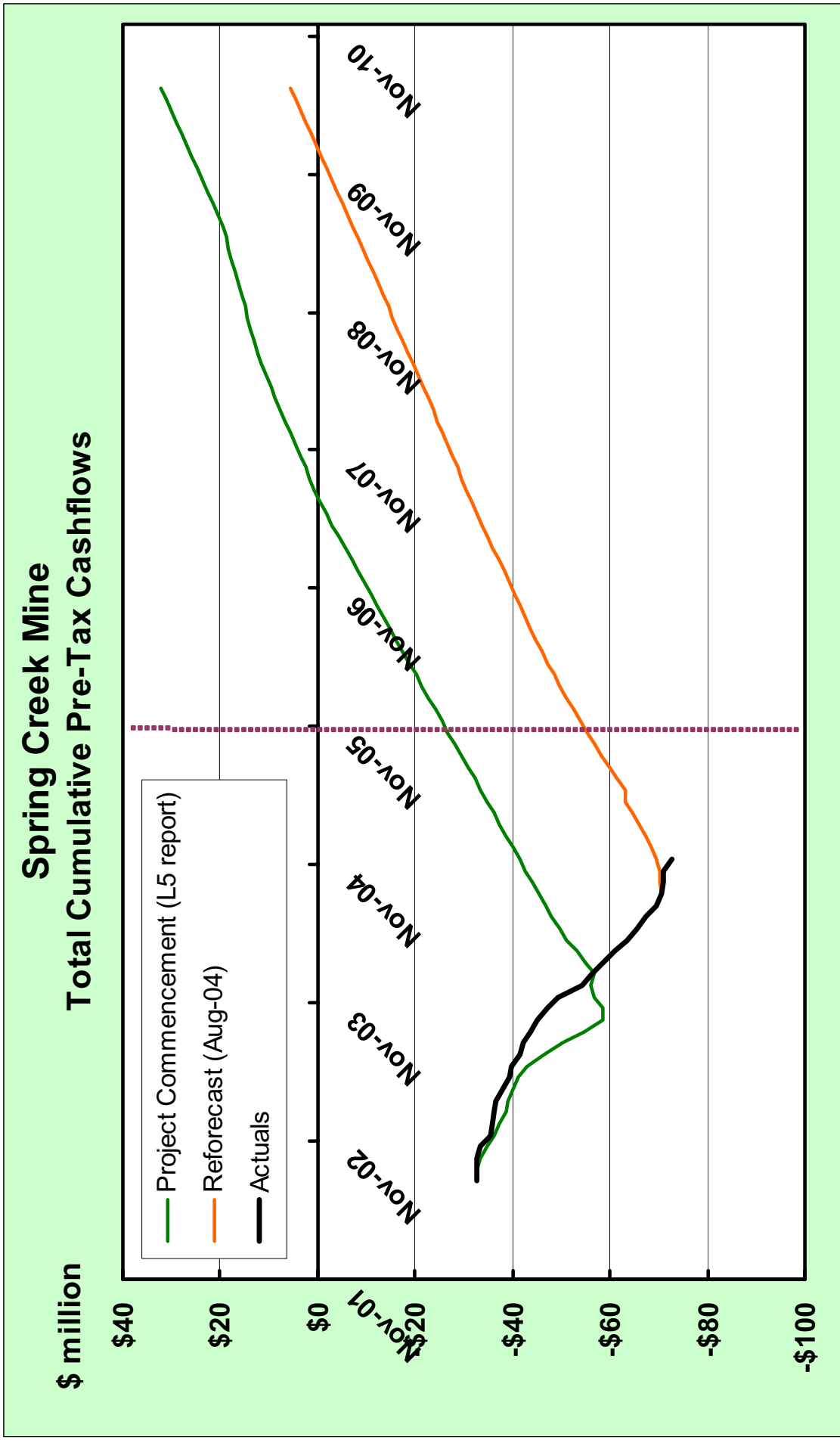
# Initial development underperformance delayed revenue and increased costs (\$2-3M per month) ...



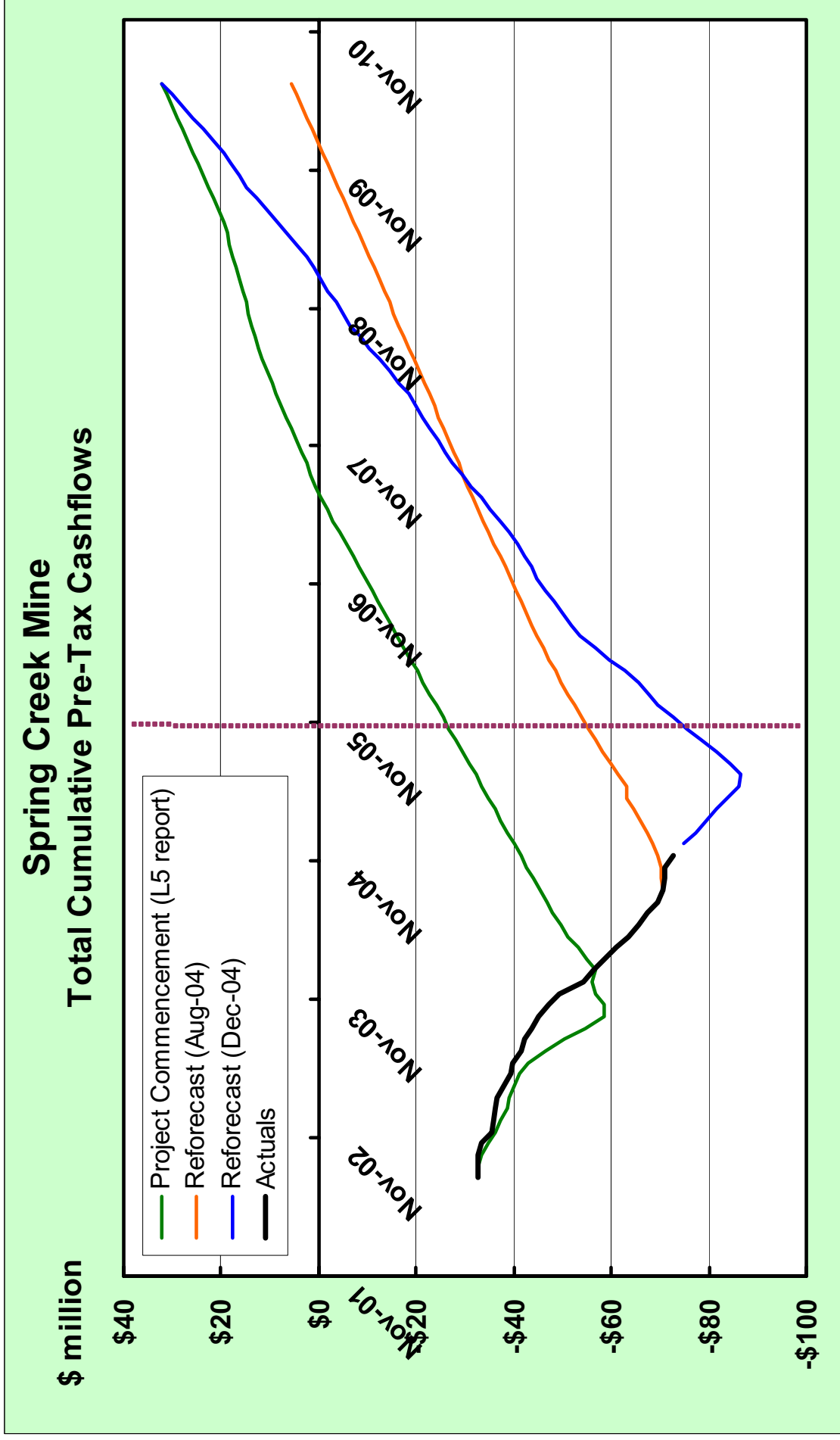
... but a +ve go forward decision was still justified based on re-running the plan



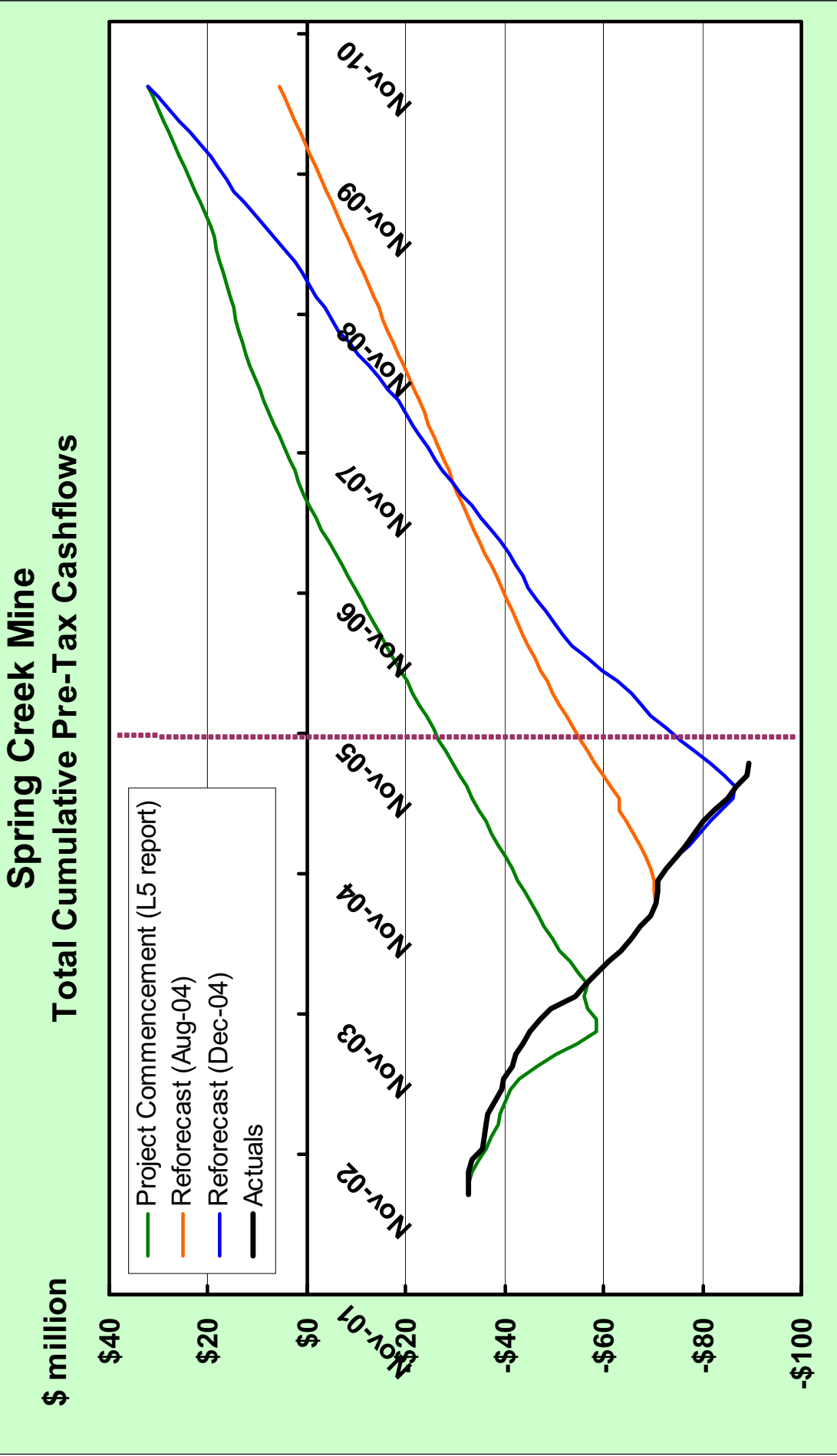
... until extraction also had problems



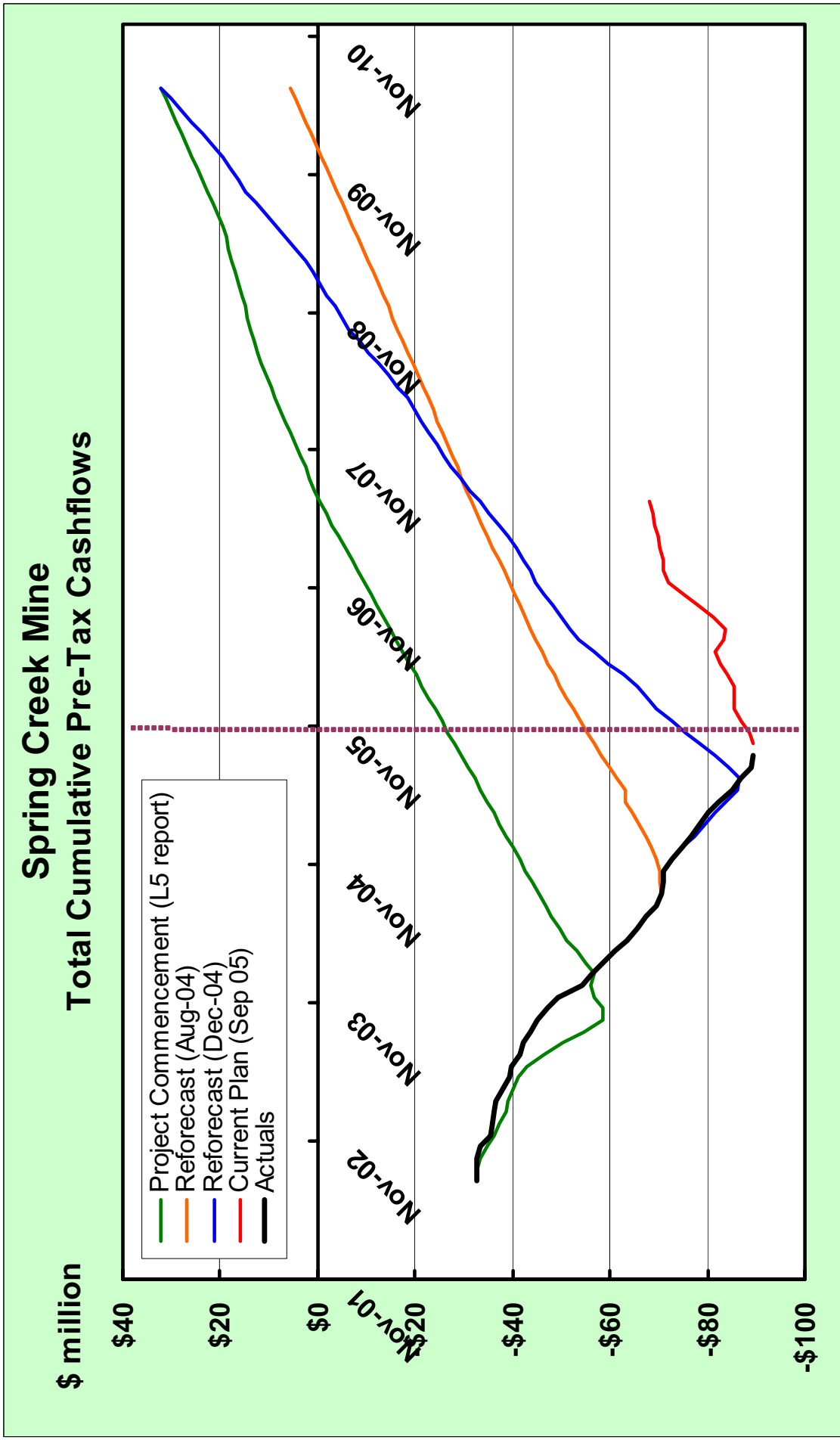
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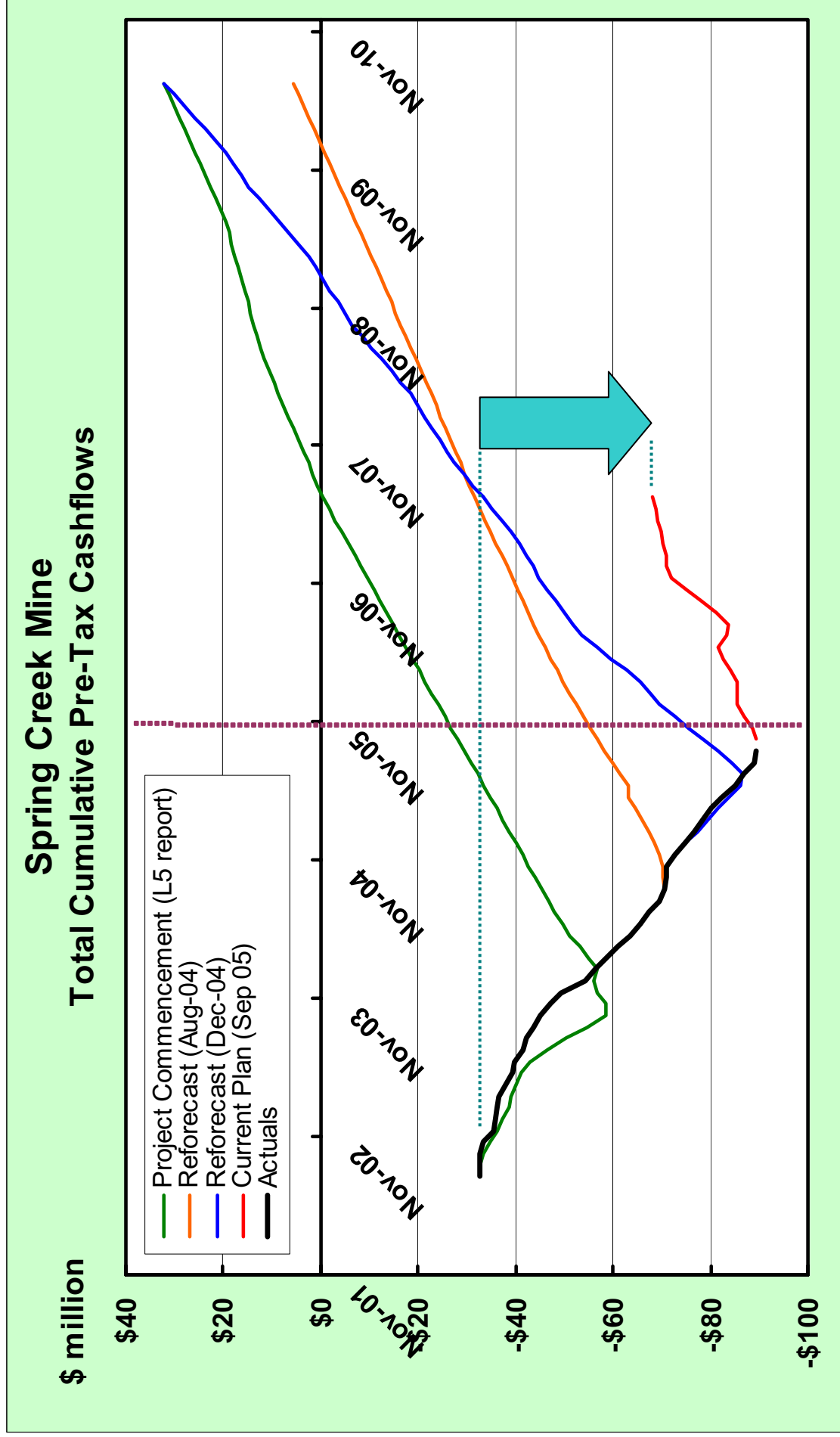
... once underground it is hard to stop!



... but a +ve go forward decision is still justified based on re-running the plan!



# However sunk underground mine development has no other resale value ... write-off becomes inevitable



# But “what happened to all that coal”?

**Its economic availability depends on many factors:**

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- Market energy prices (with location and time)
- Distribution infrastructure and cost
- Quality of geological information
- Quality of mine planning
- **Environmental performance and stakeholder credibility**

# **Environmental credibility**

**The cumulative result of all the activities we undertake will be a positive net effect on the New Zealand environment**

**Balance sheet provision for ~\$100M of future environmental rehabilitation expenditure ... separate from ongoing operational expenditure (≈ another \$100M over 20 years)**

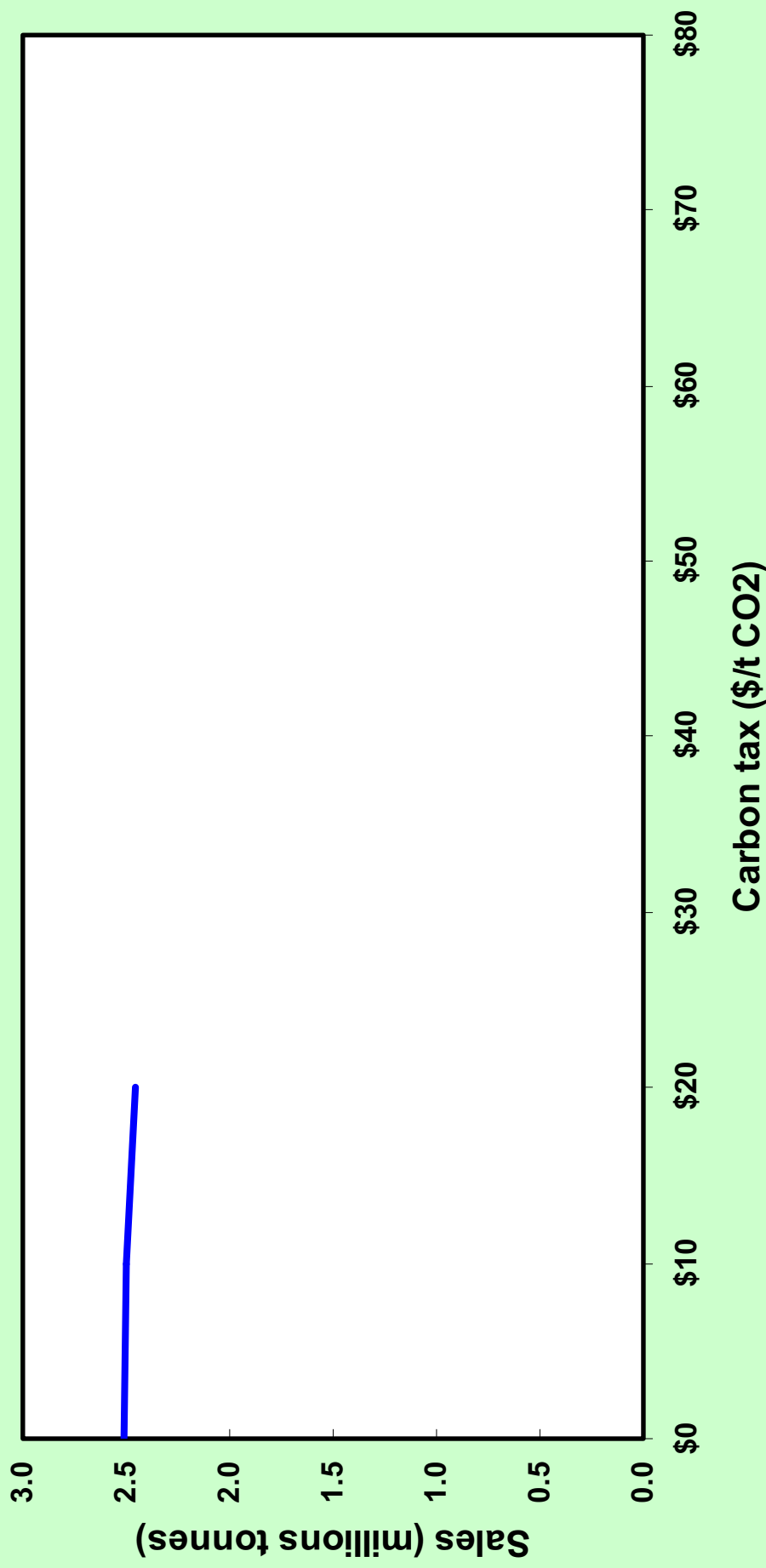
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- Environmental performance and stakeholder credibility
- **And ... climate change policies**

# Any price-based CO2 measure will constrain the economy long before it reduces coal use significantly

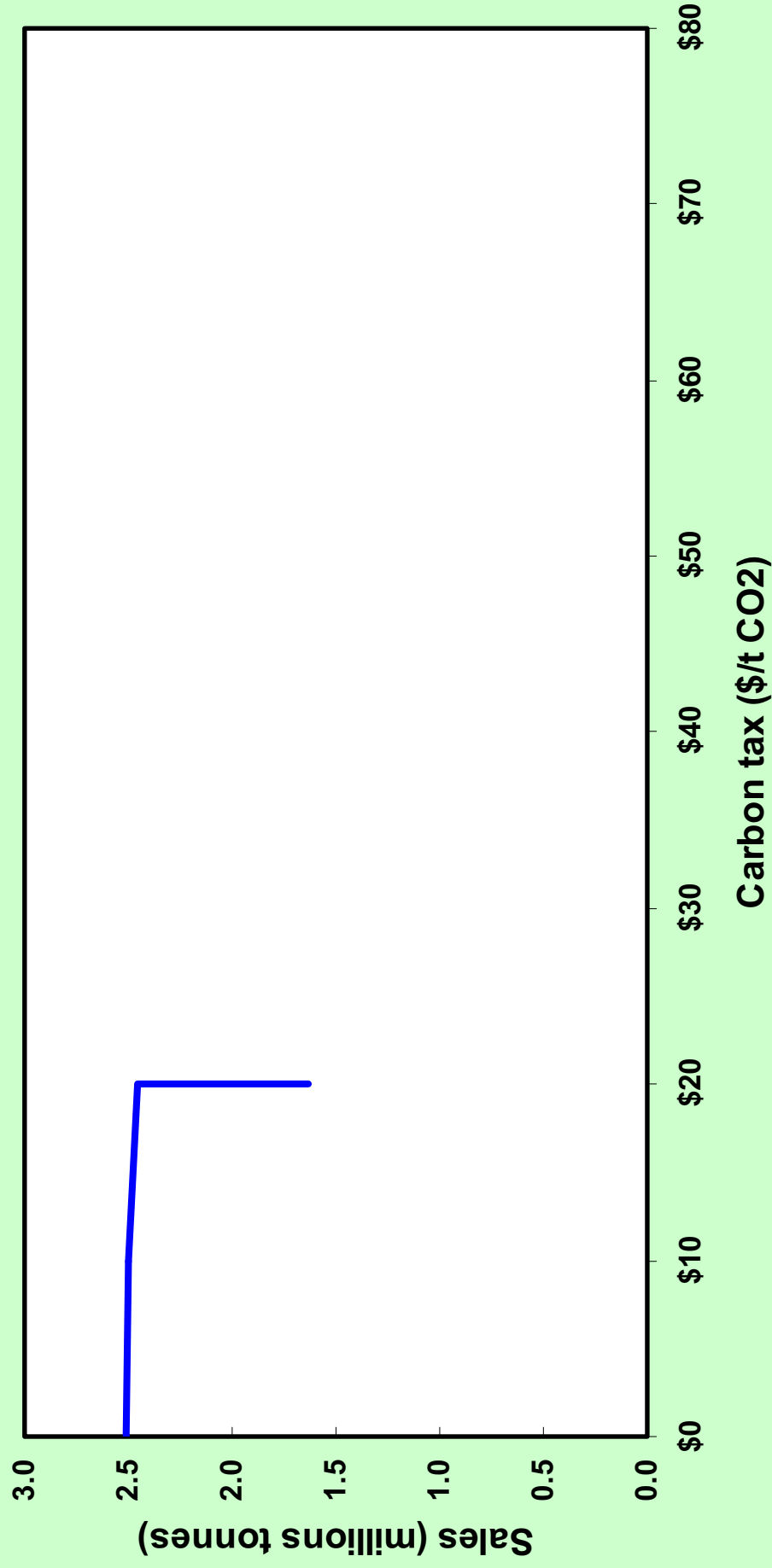
**SENZ NZ Coal Sales in CP1**  
(No NGAs, no CH4 tax)





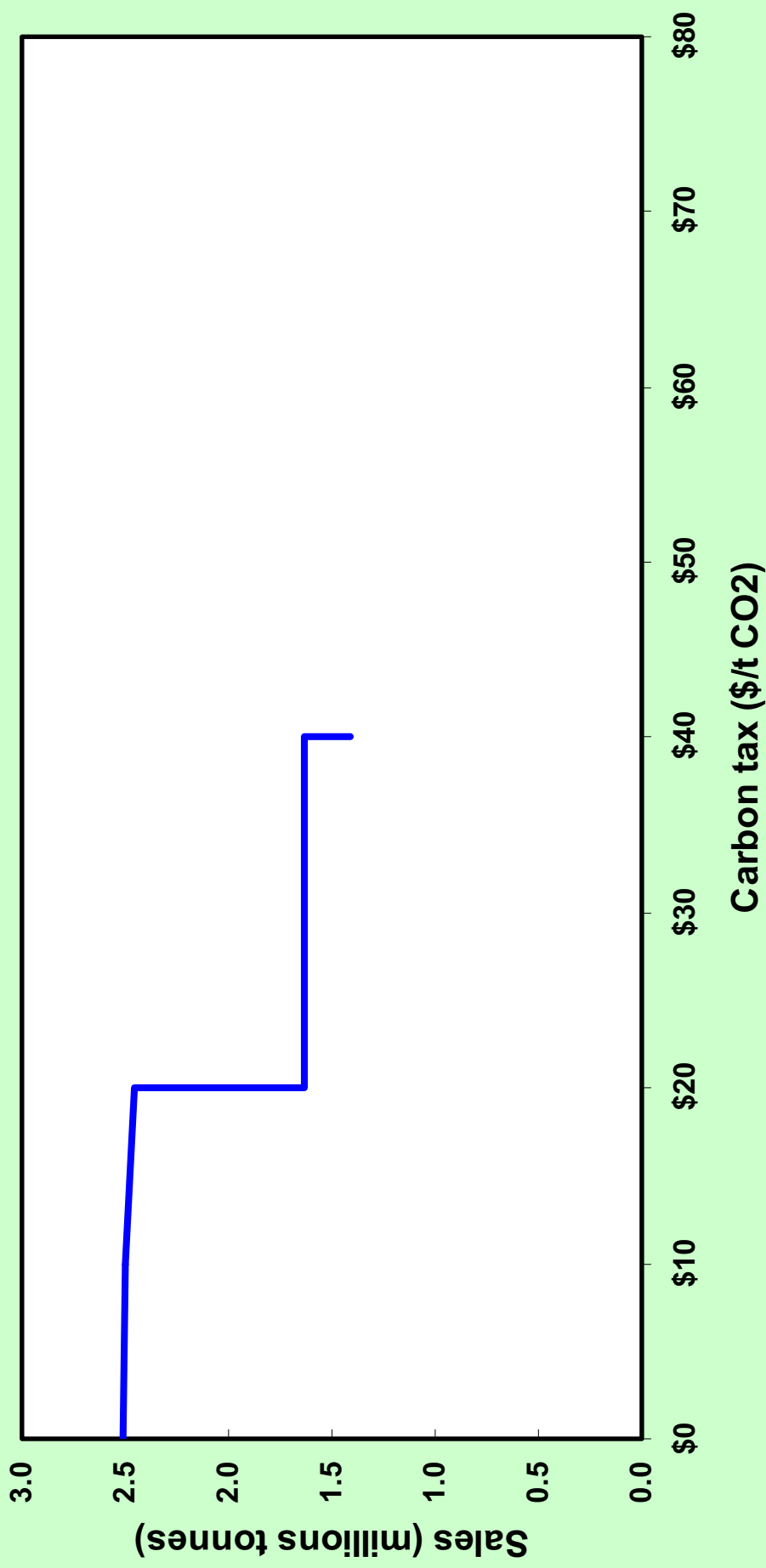
# At ~\$20/t-CO<sub>2</sub> steel production stops

SENZ NZ Coal Sales in CP1  
(No NGAs, no CH4 tax)



# At ~\$40/t-CO<sub>2</sub> dairy becomes uneconomic

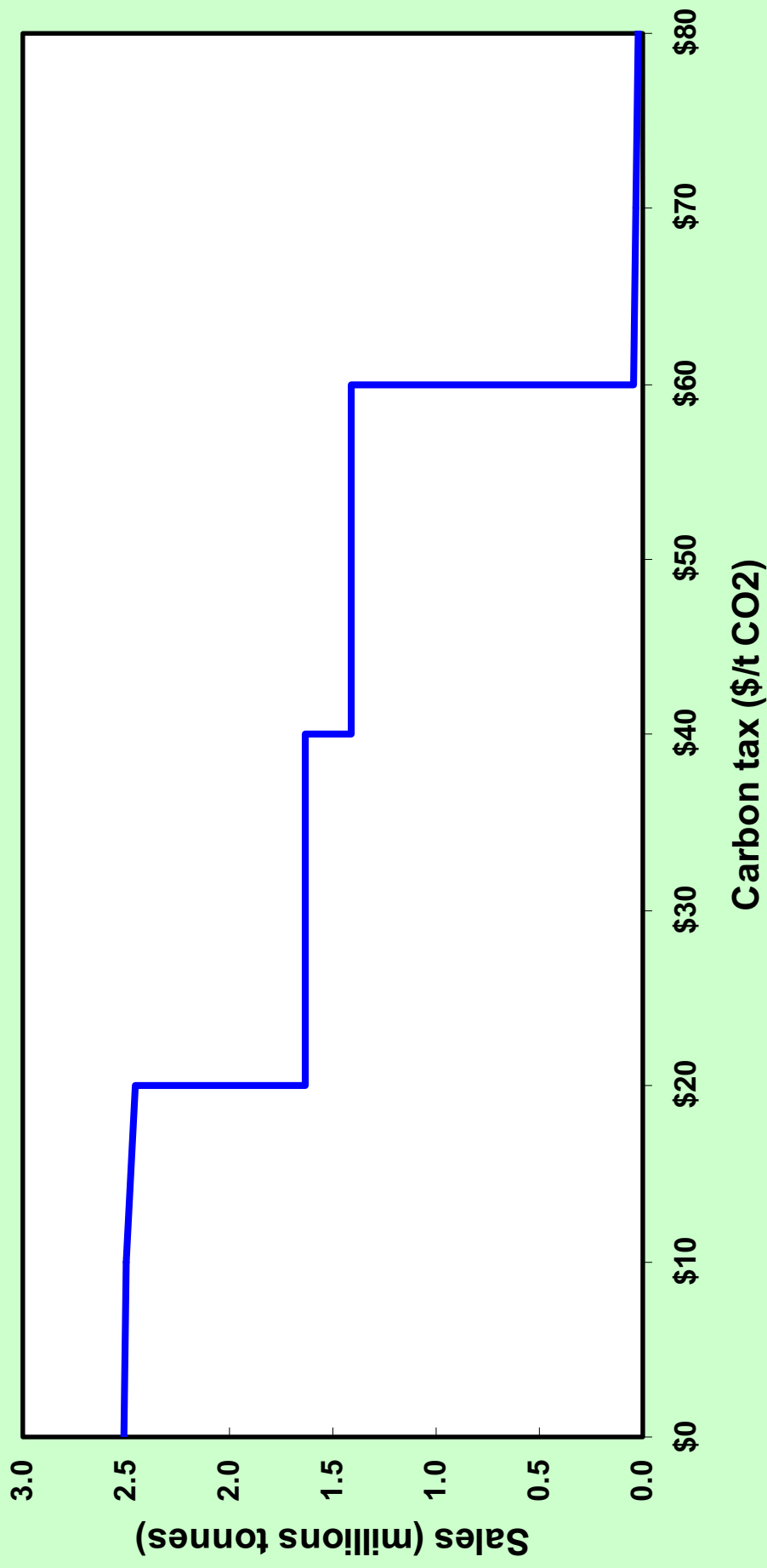
SENZ NZ Coal Sales in CP1  
(No NGAs, no CH4 tax)





**And at ~\$60/t-CO<sub>2</sub> Huntly stops using coal ...  
but electricity prices have already risen 75%!**

**SENZ NZ Coal Sales in CP1**  
(No NGAs, no CH<sub>4</sub> tax)



# **The future for coal in NZ is very bright**

**... but only if**

- **the industry avoids more “own goals”**
  - **avoids headlong mine development with poor planning**
  - **takes environmental responsibility seriously**
  - **offers solutions to CO2 emissions**
- **and we recognise that our coal resources are a strategic asset, not an embarrassing liability**

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***NZ energy's issue is not security of supply  
... it is security of demand!***

# Carbon Capture & Storage (CCS) costs

(NZ\$ / tonne CO2)

|                       | <u>2000</u>        | <u>Today</u>    | <u>Future</u>   |
|-----------------------|--------------------|-----------------|-----------------|
| Capture               | \$50 - 1000        | 20 - 200        | 5 - 30          |
| Transport             | 8 - 80             | 8 - 80          | 8 - 80          |
| Injection             | 20 - 500           | 8 - 200         | 8 - 200         |
| <hr/>                 |                    |                 |                 |
| <b>Total CCS cost</b> | <b>\$80 - 1600</b> | <b>36 - 500</b> | <b>20 - 300</b> |

**NZ's future could see lignite-based IGCC generation, with H<sub>2</sub> production and CCS, at total costs under NZ 7-8c/kWh**

