



Board Of Inquiry

Renewable Electricity Generation

14 July 2009

01

ADVANTAGES OF HYDRO GENERATION

Board Of Inquiry Visit to Clyde

1. Durability of Hydro Power Stations

Waipori 1907

Arapuni 1929

Roxburgh 1956

vs Meremere (1955- 1991), New Plymouth (1972 – 2007)

- Roxburgh has recently had a \$50 million refurbishment of its main machines. Transformer replacements are planned for the next few years.
- This should see Roxburgh through to another 50 years

02

ADVANTAGES OF HYDRO GENERATION

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2. Predictability

Catchment lakes act as a buffer

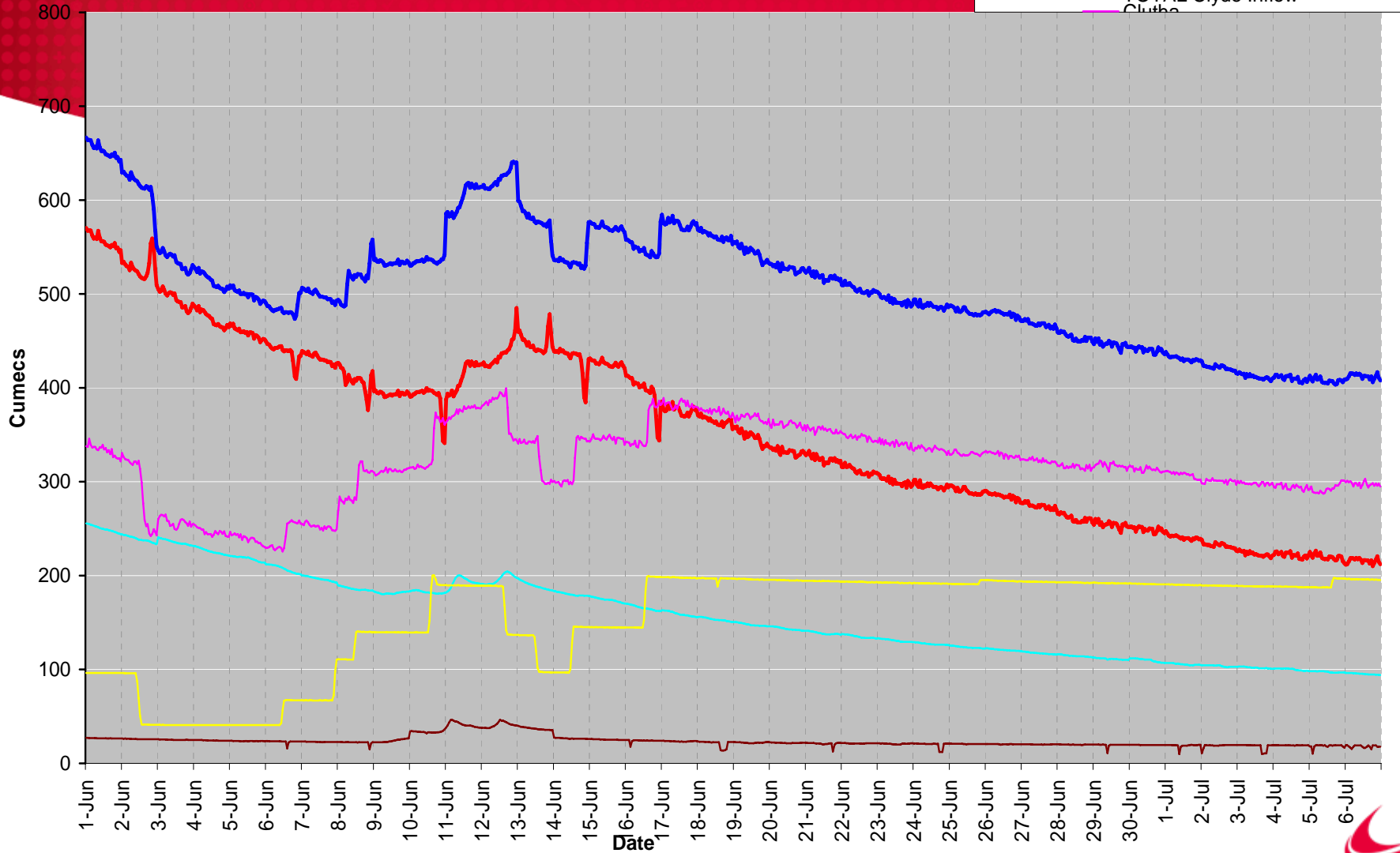
Flows generally recede steadily

Can also manage storage lake outflows

Rainfall can be forecast several days ahead

CLUTHA FLOWS from 1 June 2009

Clutha Flows



03

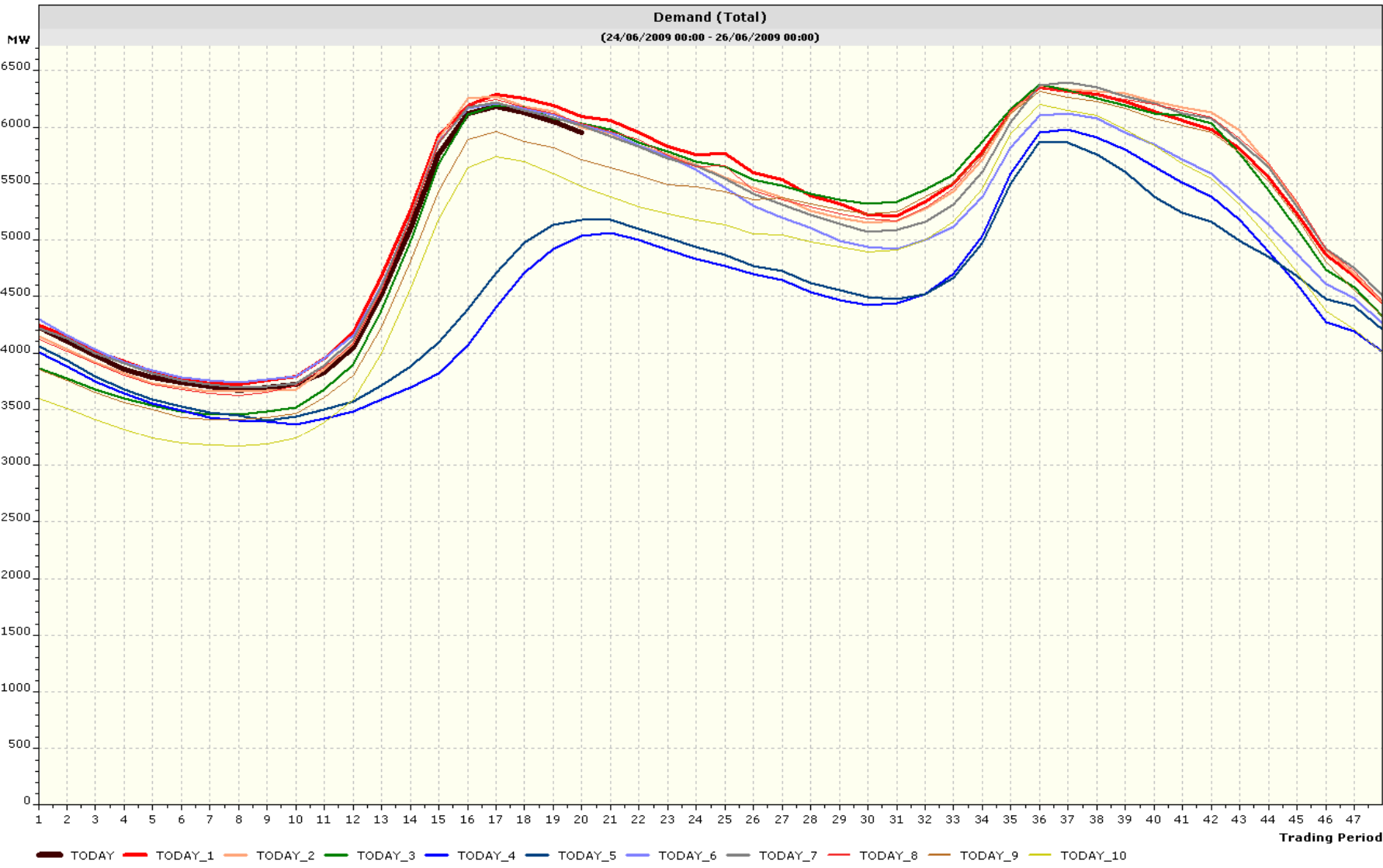
ADVANTAGES OF HYDRO GENERATION

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3. Flexibility

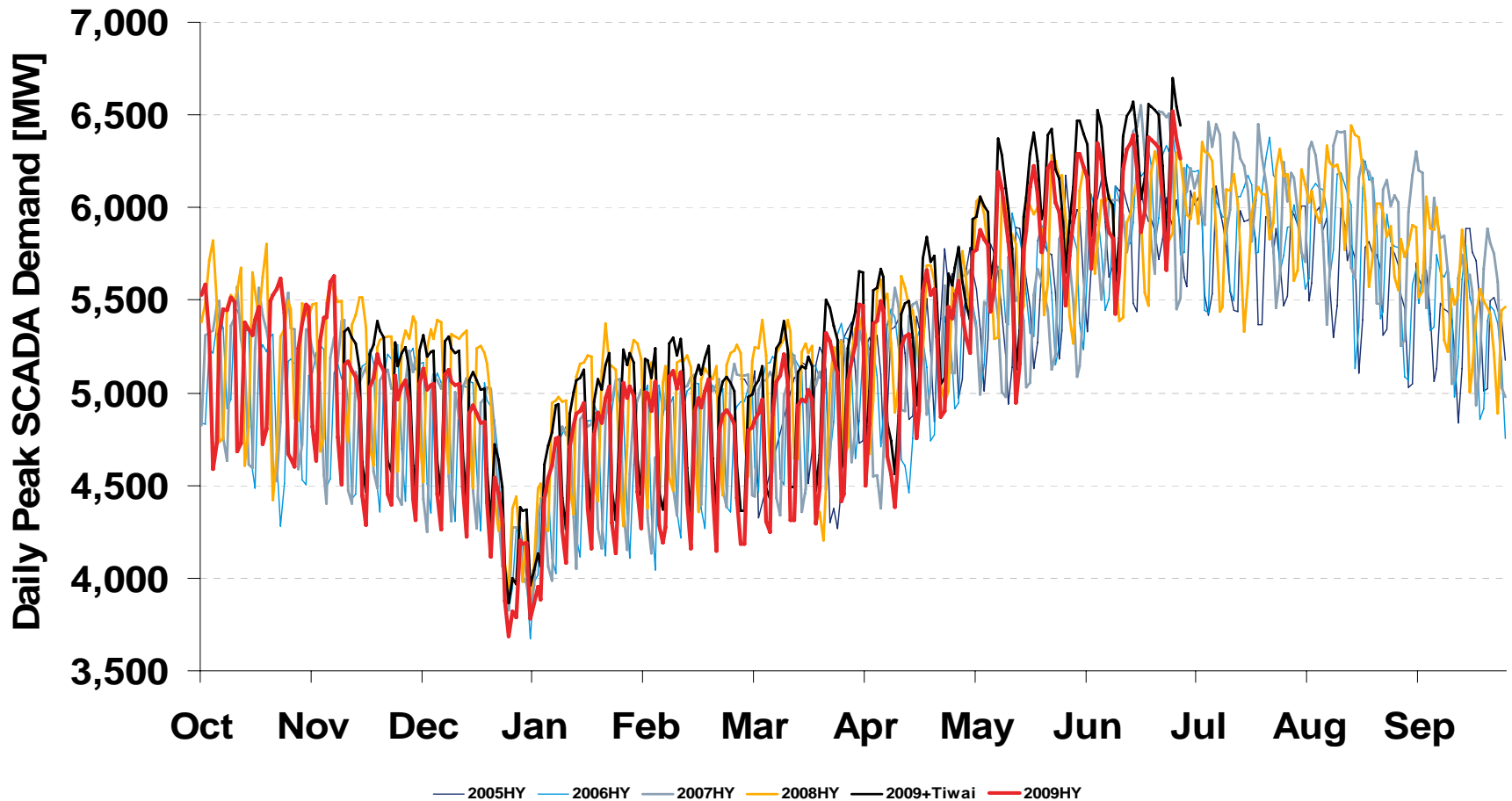
- Clutha Hydro is generally a mix of “baseload” (determined by minimum river flow requirements) with daily “load following” superimposed.
- Spring and early summer high catchment inflows can be stored for use the following winter
- Hydro machines can stop and start easily, reliably and quickly

National Demand by Trading Period – Last 10 days (MW)



Peak Demand

Daily Peak Demand - SCADA



04

ADVANTAGES OF HYDRO GENERATION

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4. Reliability

- Hydro machines are generally slow turning, (for example Clyde's generators run at 125 RPM vs Otahuhu's 3,000 RPM)
- There are no high pressures or high temperatures involved.
- Hydro's don't need chemical dosing.

05

ADVANTAGES OF HYDRO GENERATION

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5. Provision Of Ancillary Services

- Electricity can't be stored, it must be used the instant it's generated.
- The National Grid runs at various voltages but 50 cycles/second

In order to operate reliably the grid operator needs a range of ancillary services -

- * Frequency Keeping
- * Reserves (including Tailwater Depressed Operation)
- * Over Frequency Arming
- * Black Start
- Load shedding

Hydro Power Stations such as Clyde can provide most of these (*).



06

ADVANTAGES OF HYDRO GENERATION

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6. Amenity Value

- Hydro lakes often provide enhanced amenity values
- Boating/Sailing/Rowing very popular in Summer.
- Fishing also very popular.
- Picnic areas.
- Hydro developments are often accompanied by infrastructure upgrades (roading and bridges etc.)

