

# Brown coal exit: A market mechanism for regulated closure of highly emissions intensive power stations

Crawford School, 29 Feb 2016

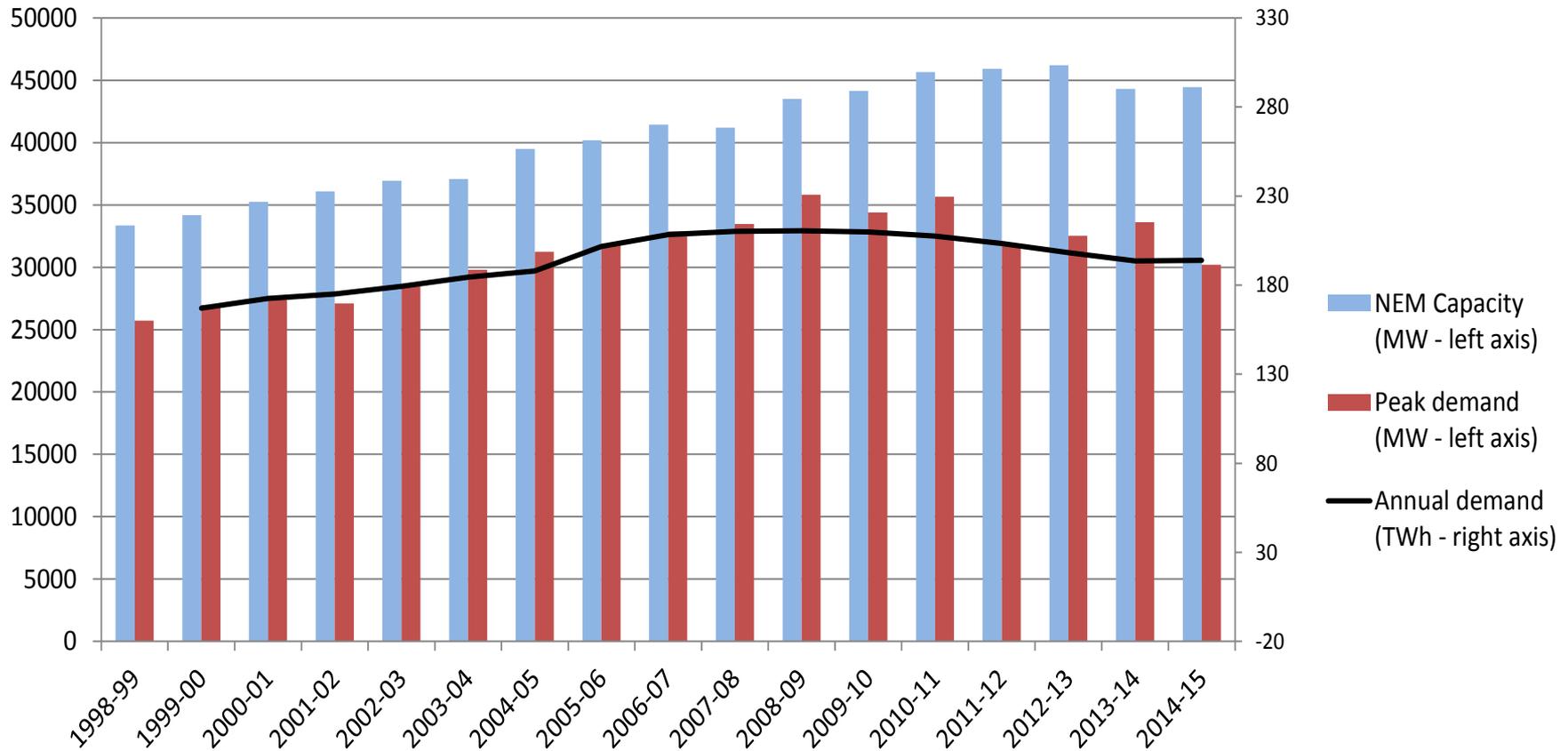
Frank Jotzo

Centre for Climate Economics and Policy, Crawford School of Public Policy, ANU

Salim Mazouz

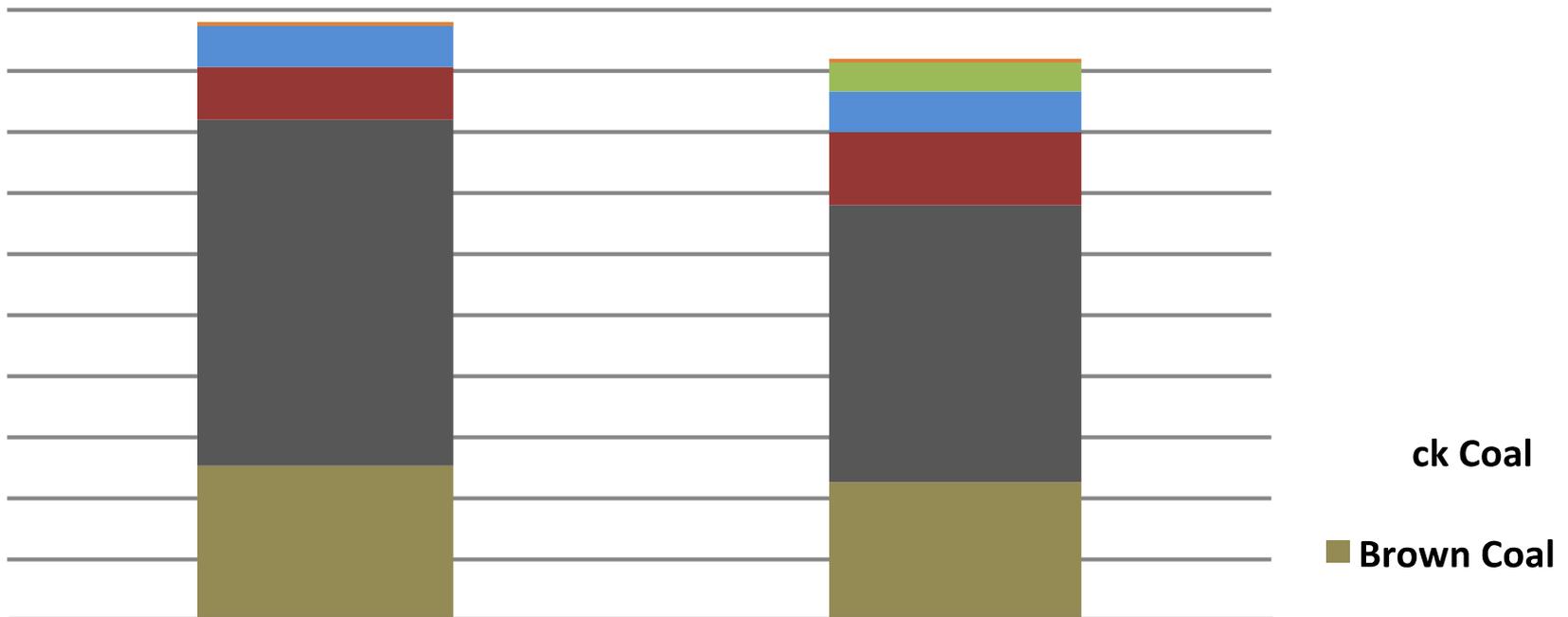
Principal, Centre for International Economics (CIE)

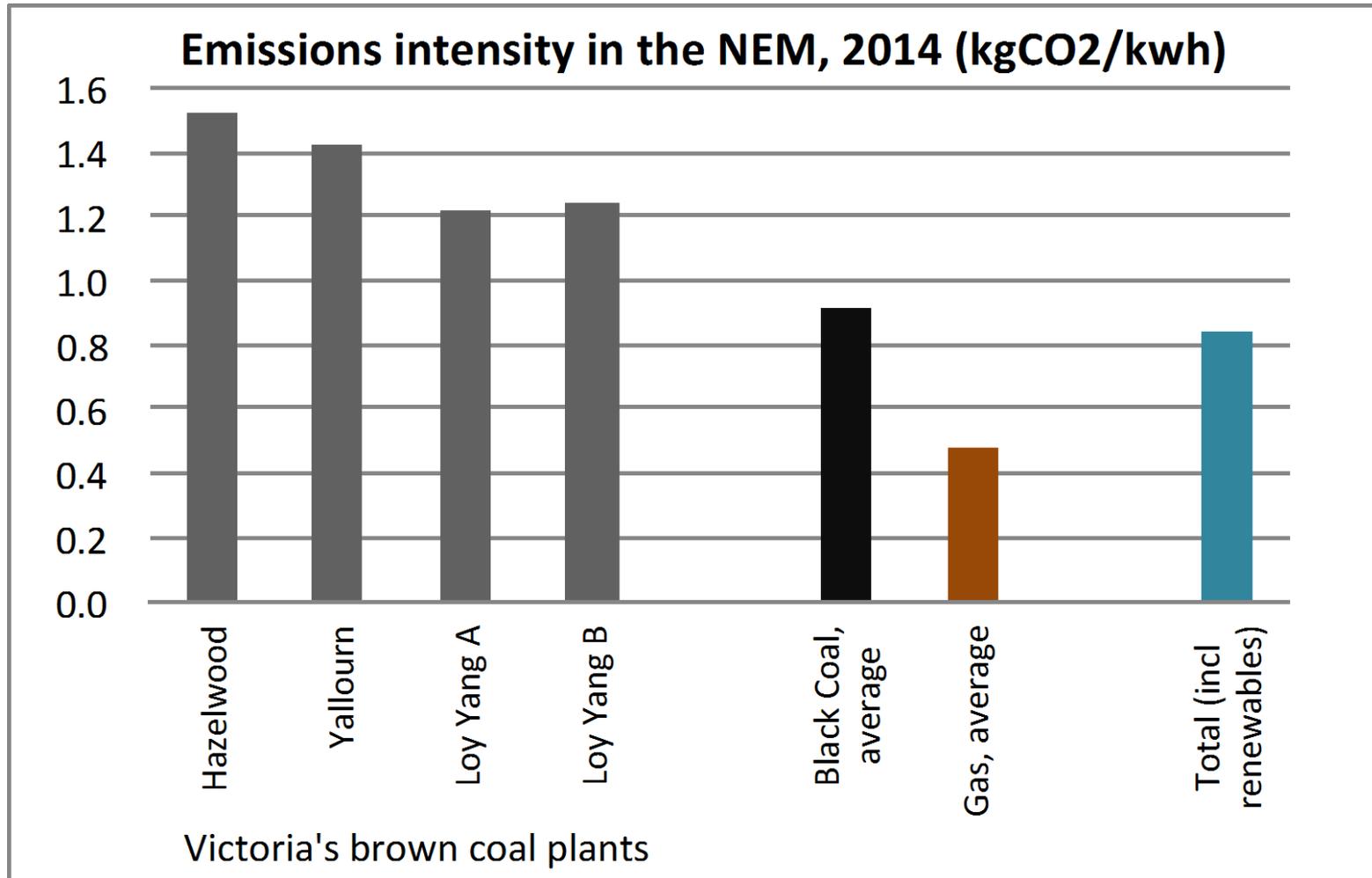
# Capacity and demand in the NEM



Over Capacity

## Problem in absence of carbon price: One or more black coal power stations could exit, rather than lignite stations







# *A proposal for a specific policy intervention while there is no carbon price:*

*Avoiding the wrong exit pathway*

Context:

- **Policy uncertainty**
- **Investment climate**
- **Electricity market design for high renewables penetration**



# Farewell to brown coal without tears: how to shut high-emitting power stations

November 19, 2015 6.11am AEDT

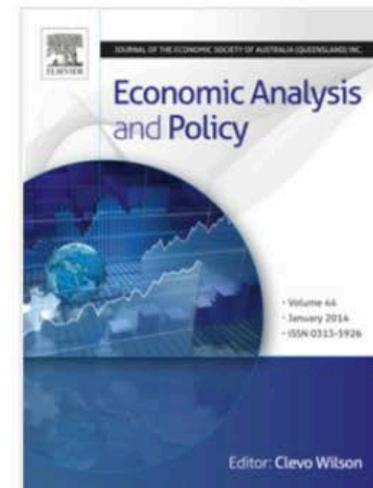
Loy Yang power station in Victoria's Latrobe Valley. Takver/Flickr, CC BY-SA

## Accepted Manuscript

Brown coal exit: A market mechanism for regulated closure of highly emissions intensive power stations

Frank Jotzo, Salim Mazouz

PII: S0313-5926(15)30135-1



## *Traditional approaches to plant closure – with problems:*

### Negotiated payments to operators

Information asymmetry – extracting rents from government?

Politically difficult esp if on-budget payments

Australia's failed 'contract for closure' scheme

### Direct regulation to force exit (eg CO<sub>2</sub> standard)

Information asymmetry – which is the best plant to close?

Could be politically difficult



*The proposal:*

## **Competitive bidding process for power station closure**

### **1. Plants bid over the payment they require for closure**

Including site remediation

Plus structural assistance to communities; renewable energy at site?

### **2. Regulator chooses the best (most cost effective) bid**

Indicator: \$/tCO<sub>2</sub> expected to be saved

Regulator may choose not to accept any bids

### **3. Remaining generators pay for exit**

In line with their future CO<sub>2</sub> emissions, over some period of time

Other models possible – consider incentive effects and price uplift



# Who pays?

*Incentives to bid low are strongest, future profitability of high-emitting plants lowered, limited (no?) scope for collusion*

*Incentives to bid low exist but less pronounced, price uplift higher (gas), some scope for collusion?*



Payments made by remaining brown coal power stations

**Payments by all remaining generators in proportion to CO<sub>2</sub> emissions**

Payments by all remaining generators in proportion to electricity sent out

## CO<sub>2</sub> savings per year

Depends on what replaces the exiting plant, scenarios:

100% black; 70% black and 30% brown (this is on the high side)

**Hazelwood exit: 5-6 MtCO<sub>2</sub>/year**

**Yallourn exit: 4-5 MtCO<sub>2</sub>/year**

Conservative estimates, eg no substitution into gas

Consider likely time frame of future operation of plant if it does not exit

## Magnitude of payments

Illustration: A total exit payment of \$0.4b to \$1b recovered in the NEM:

Wholesale levy \$3-7/tCO<sub>2</sub> if spread over just one year

Retail price increase 1-2% over one year

## Open questions

Magnitude of price uplift

Who gains, who loses

## Remember

- payment  $\neq$  economic cost
- black coal exit would also result in price uplift
- site remediation costs will be incurred in future anyway

## Modelling for this proposal

Empirical modelling:

price uplift, output by plant, state-by-state analysis

Bidding strategies under exit scheme

## Mechanism design

Design for effectiveness and political acceptability

## The longer term

What comes after the paid exit mechanism?

A carbon price of some form? “One in one out” approaches

Energy market design?