



# Overview of Australian environmental markets

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# About Karel Nolles

- Senior Research Fellow, UNSW, since 1<sup>st</sup> January 2004
- Manager Environmental & Electricity Markets, Australian Financial Markets Association since 2001
  - Founded in 1986, and is the peak industry body representing the OTC markets
    - Dealer accreditation and trading
    - Standardised documentation
      - » Eg: REC Shortforms, ISDA for electricity
  - Now 30% of membership are electricity companies
  - Many of AFMA's members now involved in various environmental markets
  - Weather Derivatives Working Group
  - Environmental Products Working Group



# Presentation outline

- *Implications in terms of market design for regulatory markets.*
- *Importance of forward markets*
- *Market surveillance, market monitoring, market design*

# Big policy stuff

- Using markets to drive least cost implementation of given goal. (Fix  $q$ , let  $p$  be determined).
- Seeking Allocative and Dynamic efficiency
  - Spot prices for managing efficient operation of today's plant
  - Forward prices for driving efficient investment
- Relationship between forward and spot prices depends on a number of things.
- Stated policy goals are dependent on price being “correct” (meaning efficient).

# Some Forward/Spot interactions

- Stackelberg leader problem in spot only markets
  - Nash equilibrium
- Where good is storable forward price set by arbitrage argument.
  - Price rises as cost of borrowing
- Long term instruments impacts
- Nature of the instrument matters
- Wrong spot instrument can lead to poor forward markets, hence to poor investments



# Experimental Research Work being conducted

- Effect of value on the demand side being induced by a known tax
- Effect of more/less information on the amount of production.
  - MRET market problem

# Experiments being developed

- Examination of performance of markets with grandfathering and a annual revenue neutral auction.
- Forward/Spot interactions
- Markets for electricity reliability
  - Proposed – GMU/Cornell/FERC
- Policy outreach work
  - CSIRO/AFMA (ASX/SFE ?)

# Example: Impact of form of demand side value induction

- Experiment has 10 participants, 5 retailers, 5 suppliers, all participants on each side of market of equal sizes.
- No banking/Borrowing
- “Hyper-competitive” environment. (1.5 suppliers at/above equilibrium price).



# Generator G4

Today's Date and Days to next Acquital

Today is: 16 January 2005

There are 345 Days to Acquittal date

Login Panel

CONNECTED TO 192.168.0.3

Vernon Smith Logged In as participant G4

LOGIN

My Cash Balance

\$1,192.34

My Generator

My Energy Generation and REC Creation

Cost of generation was \$28.00 per MWh

Last Market Traded Price

\$31.24

Send Offer or Bid

Offer to Sell RECs

Offer Price

Offer Qty

Enter Price

Enter Quantit

Send Offer to Sell

Bid to Buy RECs

Bid Price

Bid Qty

Enter Price

Enter Quantit

Send Bid to Buy

REC Registry

RECs in MY account

3,000

Received

Trades

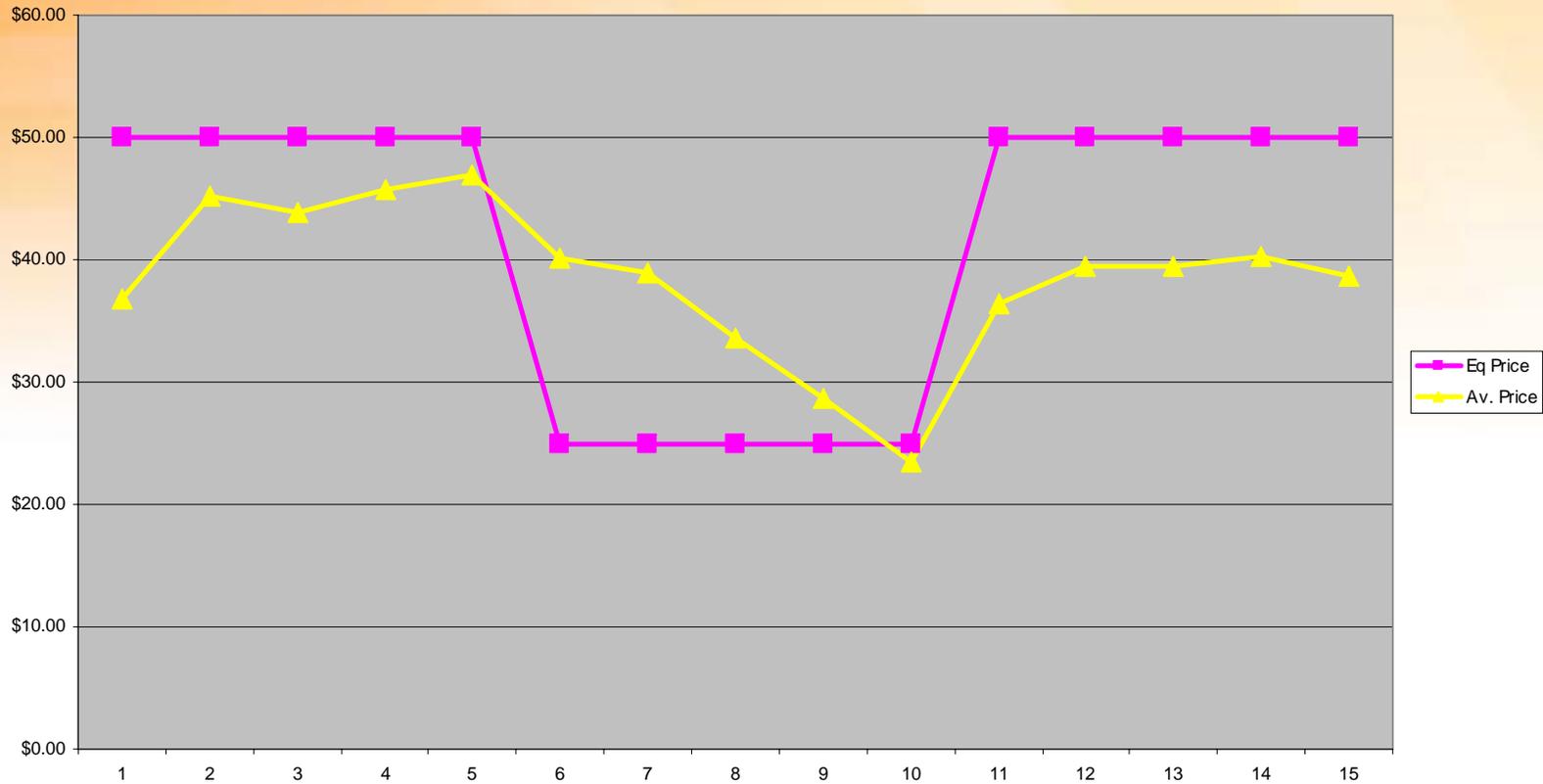
Offers to Sell Currently in Market

02/Jan/05 G2 Offers 47 @ \$29.30 each = (\$1,379.92)  
 08/Jan/05 G1 Offers 208 @ \$24.97 each = (\$5,193.76)  
 12/Jan/05 G2 Offers 27 @ \$23.62 each = (\$637.74)  
 08/Jan/05 G2 Offers 287 @ \$19.27 each = (\$5,530.49)  
 13/Jan/05 G1 Offers 140 @ \$13.16 each = (\$1,842.40)  
 03/Jan/05 G1 Offers 215 @ \$8.36 each = (\$1,797.40)  
 09/Jan/05 G3 Offers 164 @ \$7.60 each = (\$1,246.40)  
 08/Jan/05 G1 Offers 298 @ \$5.59 each = (\$1,665.82)  
 06/Jan/05 G1 Offers 178 @ \$2.58 each = (\$459.24)  
 01/Jan/05 G3 Offers 135 @ \$1.56 each = (\$210.60)  
 13/Jan/05 G3 Offers 218 @ \$0.23 each = (\$50.14)  
 11/Jan/05 G1 Offers 235 @ \$0.10 each = (\$23.50)

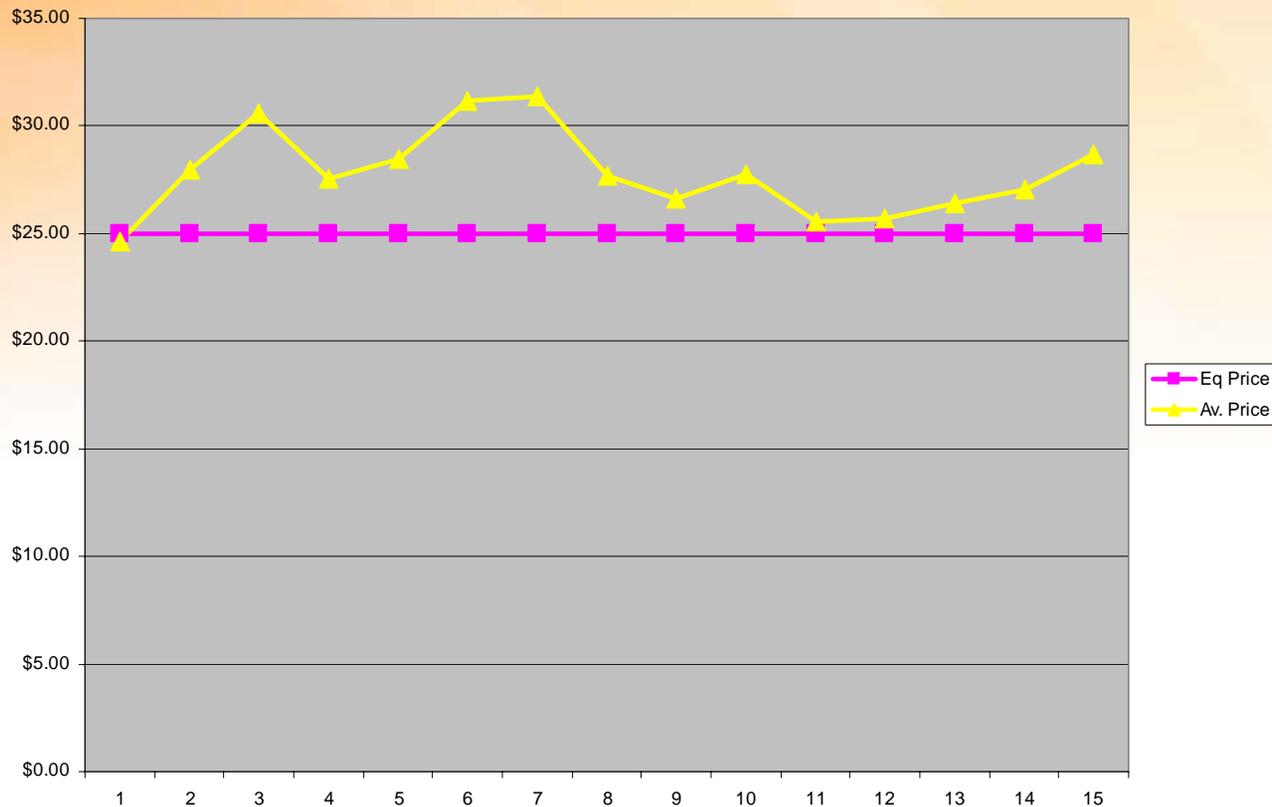
Bids To Buy Currently In Market

11/Jan/05 R7 Bids for 194 @ \$53.57 each = \$10,392....  
 14/Jan/05 R8 Bids for 95 @ \$52.97 each = \$5,032.15  
 06/Jan/05 R6 Bids for 58 @ \$51.82 each = \$3,005.56  
 04/Jan/05 R6 Bids for 102 @ \$51.53 each = \$5,256.06  
 12/Jan/05 R6 Bids for 106 @ \$49.03 each = \$5,197.18  
 06/Jan/05 R5 Bids for 53 @ \$48.83 each = \$2,587.99  
 14/Jan/05 R8 Bids for 43 @ \$47.05 each = \$2,023.15  
 07/Jan/05 R7 Bids for 122 @ \$44.29 each = \$5,403.38  
 13/Jan/05 R6 Bids for 16 @ \$40.02 each = \$640.32  
 15/Jan/05 R7 Bids for 109 @ \$39.42 each = \$4,296.78  
 12/Jan/05 R5 Bids for 73 @ \$37.87 each = \$2,764.51

# Case 1: Demand side induced value is private



## Case 2: Demand side value is from known tax



# Policy Thoughts

- Forward / Spot interactions & performance need to be considered
- Specifics of market microstructure & price formation need to be considered for given market architecture.
- Market monitoring & Surveillance.
  - Just because there is a market does not mean the price can be assumed to be efficient. (Otherwise we could disband the ACCC)



Centre for Energy and  
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Thankyou... and *questions*

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