Lessons for environmental markets from the financial markets – some Australian perspectives and experiences

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Introducing AFMA

- Australian Financial Markets Association
- 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 our members now involved in various environmental markets
- Weather Derivatives Working Group
- Environmental Products Working Group
  - Developing “Enviro Markets” dealer training course

Some size perspective

- Government Debt Securities (ie: Government Bonds)
- Non-Govt Debt Securities (ie: Corporate Bonds)
- Reciprocal Purchase Agreements (Repos)
- Overnight Index Swaps (and other swaps)
- Forward Rate Agreements
- Interest Rate Options
- Foreign Exchange
- Currency Options
- Credit Derivatives
- Equity Derivatives
- OTC Electricity

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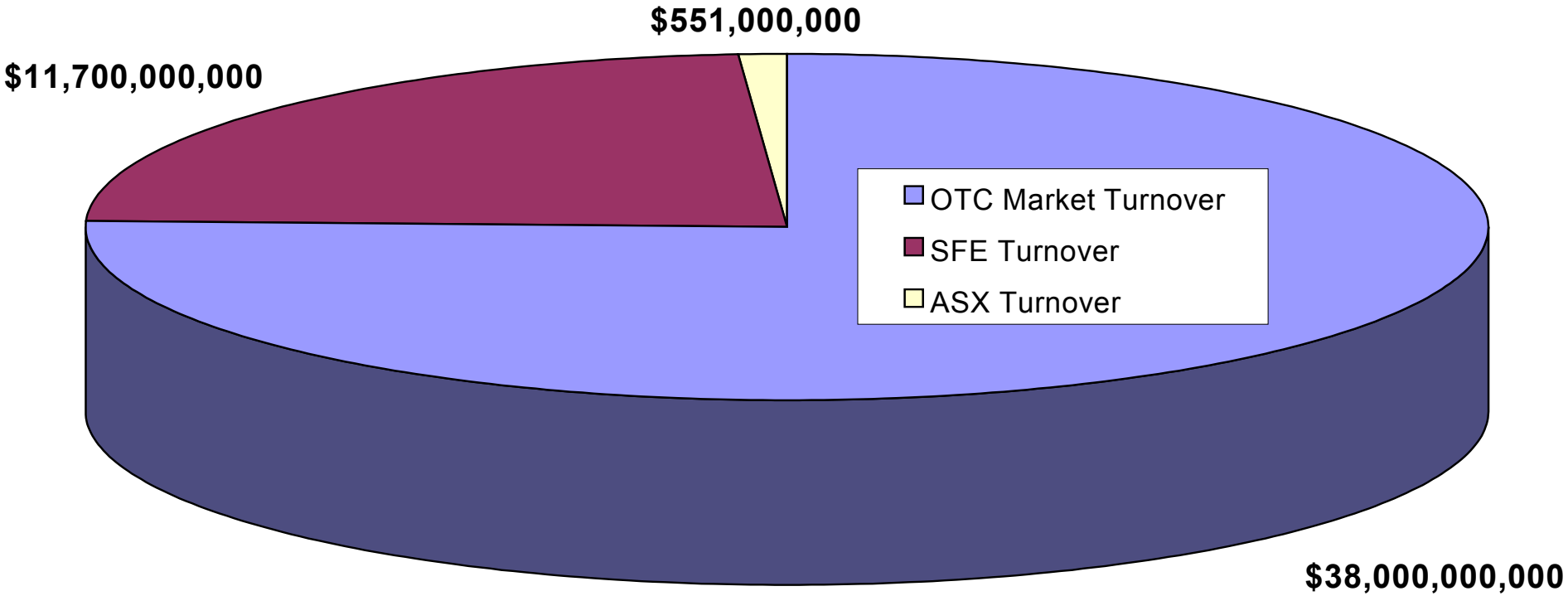
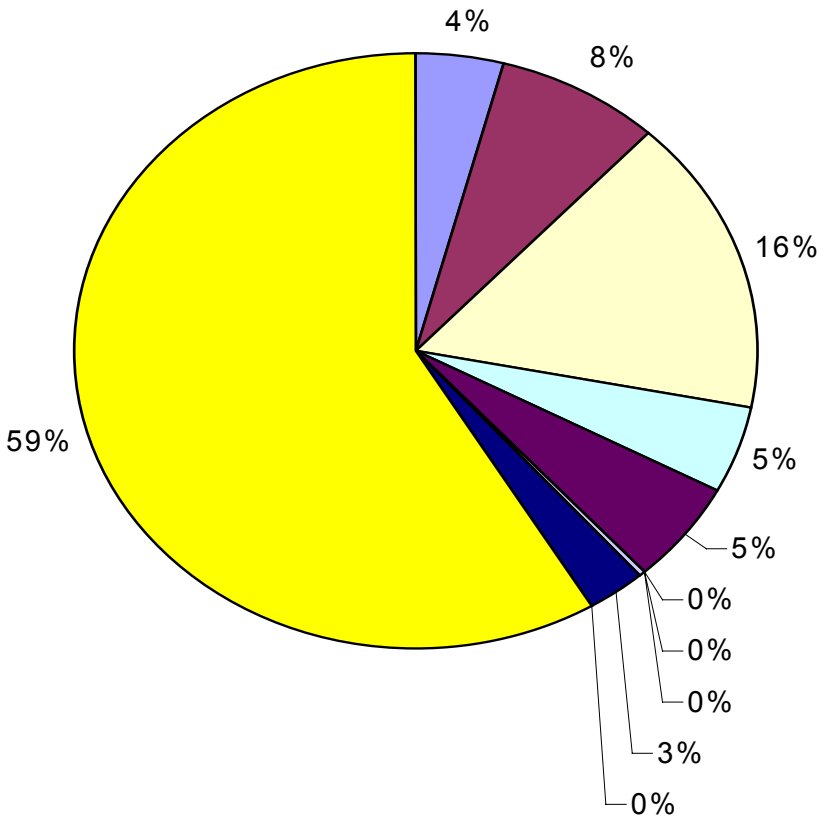
Turnover by market - 2001/02



OTC Turnover by Instrument
AUD 2000-01



- Debt Securities
- Negotiable and Tranferable Instruments
- Repos
- Swaps (non-elec)
- FRAs
- Interest Rate Options
- OTC Equity Derivatives
- Credit Derivatives
- Currency Options
- Electricity Forwards
- Forex (all kinds)

Small of scale but interesting of nature

- The largest environmental market in Australia is the Mandatory Renewable Energy Target market (MRET).
- Turnover is around 3% of the physical electricity market
- 3% of 0.35% is around 0.01%
  - Never see large numbers of traders wearing loud braces
  - “We don’t want that!!!” says the government department
    - Profoundly confused attitudes

About Forward Trading (1)

- Forward trading often starts well before the underlying physical market even exists
  - AFMA has published weekly revaluation prices for NSW Greenhouse Certificates since November 2002, but the government registry for NGAC's only went live in September 2003.
- Forward trading is what drives investment decision making
- Forward trading volumes are generally multiples of the underlying spot markets
  - About 2x in the case of RECs
  - About 8x in the case of Commonwealth Govt Securities

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About forward trading (2)

- Hedging is the main risk management tool
- Hedging levels are frequently around 90+% in electricity, and similar levels probably apply in MRET
- At high hedging levels, some very counterintuitive results can occur in the spot markets.
  - High demand, low prices
  - Generators bidding down…

AFMA Environmental Product Curve

Curve Date: 17-Sep-03

National curve (all regions)

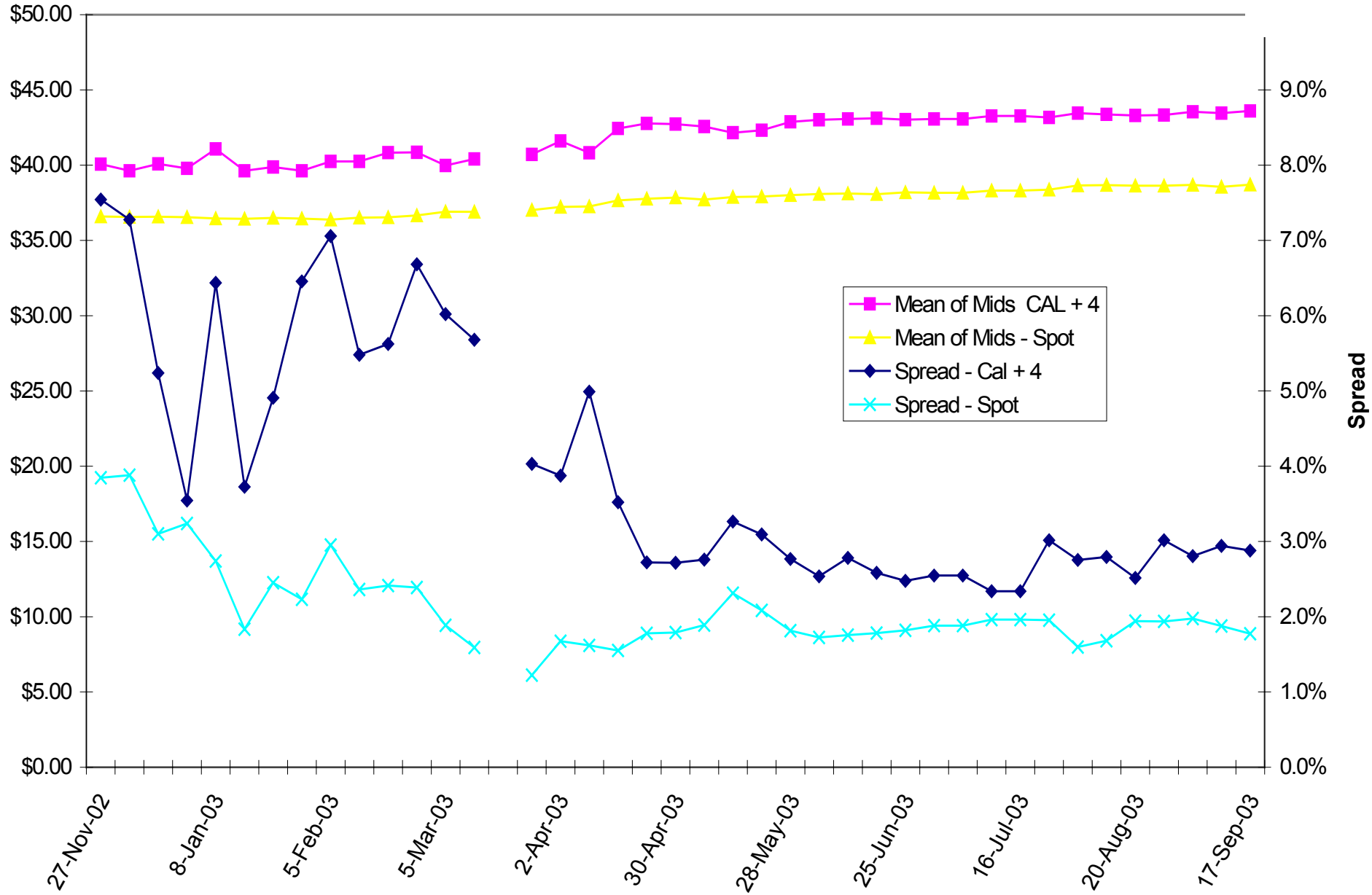
ALL PRICES ARE ON AN EX-GST BASIS.

	REC- Non-Woodwaste									
Term	Mean all Bids	Mean All Offers	Spread (Percentage)	Median of Mids (Excl Outliers)	Median of Mids (All)	Mean of Mids (Excl Outliers)	Mean of Mids (all)	Std Dev of Mids (All)	Number of Contributions Received	Number of Contributions <> 1 sd
Spot	$38.35	$39.04	1.8%	$38.75	$38.75	$38.71	$38.70	0.29	11	3
Cal 03	$39.23	$40.14	2.3%	$39.73	$39.75	$39.68	$39.69	0.25	11	3
Cal 04	$40.09	$41.39	3.2%	$40.79	$40.75	$40.79	$40.74	0.31	11	3
Cal 05	$41.50	$42.48	2.3%	$42.00	$42.00	$42.00	$41.99	0.49	11	5
Cal 06	$42.30	$43.38	2.5%	$42.75	$42.75	$42.86	$42.84	0.43	11	2
Cal 07	$43.11	$44.37	2.9%	$43.50	$43.75	$43.60	$43.74	0.50	11	4

Extracts from the curve, and other materials, are available for free on the AFMA website:

www.afma.com.au

Non-Woodwaste RECs - Spot and Cal + 4 (Cal 07)



Primary, Secondary, Spot & Forward, a witch's brew of interactions

- One of the attractions of markets is that initial allocation supposedly doesn't matter.
- In real markets, it does.
  - Secondary trading may not be liquid enough to sort out the allocation
  - Forward trading prior to initial allocation may render the results very different to the auction outcomes.
  - Don't do a primary issuance until you understand the WHOLE market.

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Some risks that get ignored

- Credit Risk
  - Market theory assumes all profitable trades occur. (Less transaction costs).
  - Some participants are just too risky to deal with.
    - Difficult if the point is to get new entrants.
- Settlement Risk
  - Use of third party clearing houses – eg: Austraclear
  - Doing some experimental work on this at the moment
- Regulatory Risk
  - Volume in the MRET market dried up during the government review of the scheme.

Markets – let them run free?

- Sometimes said “let the market run”
- Other markets don’t in reality work like that
  - Stock exchanges have complex rules of behaviour
  - Reserve Banks intervene in Forex markets
  - National governments run strategic oil reserves
  - Using of single desks in Wheat & Wool markets
  - Other examples rapidly come to mind

What do environmental markets need?

- Good market structures
  - Monitoring and Surveillance
    - Currently the “wild west”
  - Management of credit and settlement risks
  - Quality assurance
  - Depth and Liquidity
- Who will monitor the environmental markets?
  - The reserve bank?
  - The Treasury?
  - The EPA ?

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Key Point – Must be efficient

- The theoretical benefits of using markets to implement environmental policy rest on the assumption that the market is efficient. This is also the bedrock upon which public and participant acceptance of the market based scheme rests.
- If an environmental market becomes characterised by abuse of market power, illiquidity, or predatory behaviour, then the environmental benefits may be lost, and even if they are maintained, the "good-will" of the public and of market participants will certainly be damaged. This may lead to public calls for the use of a market to be abandoned, in favour of returning to some other more "traditional" approach.
- The "Dead Koala RECs" problem

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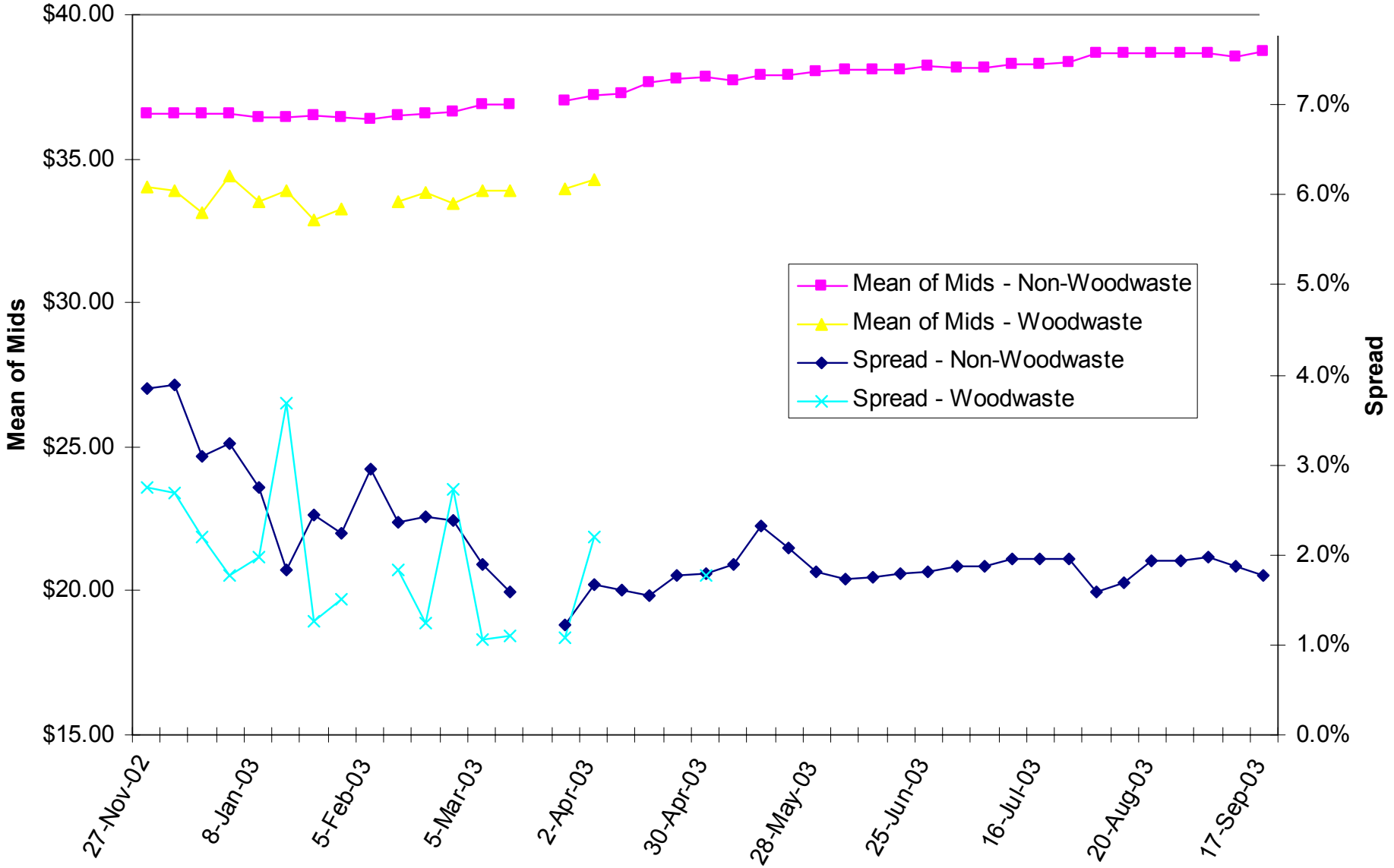
Non-Woodwaste & Woodwaste RECs - Spot

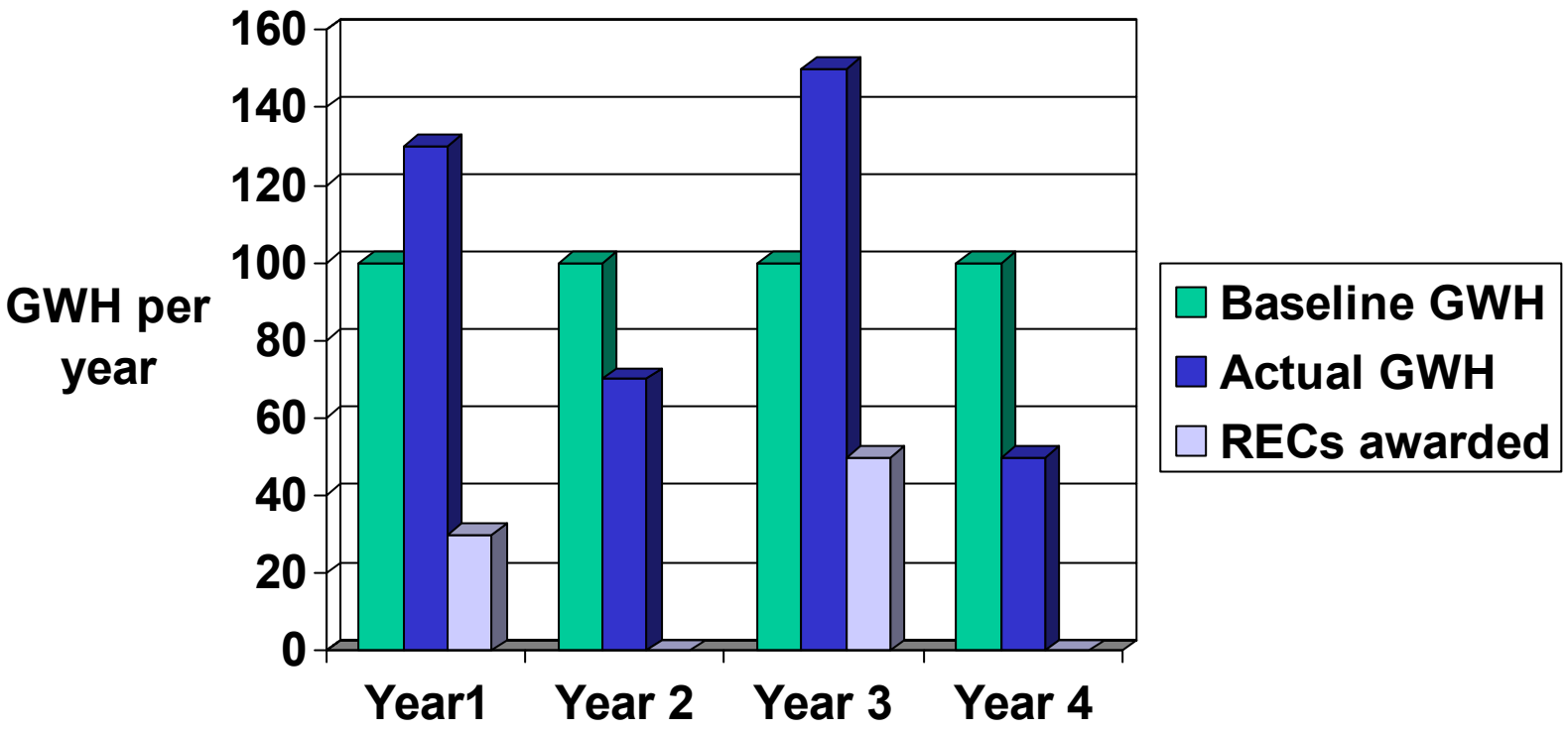


Some examples of market pathologies

- Baselines
  - MRET scheme involves setting baselines
- Fungibility
  - NGAC Scheme treats Energy Efficiency, Sequestration, low emission generation as all equivalent
- Complexity and disconnection of instrument from policy problem
  - NGAC scheme again

MRET baseline: default is 1994-96 Average output or LTA

RECs awarded above baseline but not "clawed back" below it



Rewards those generators with non-zero baseline & high annual variability (here 80,000 RECs over 4 years although ave. output = baseline)

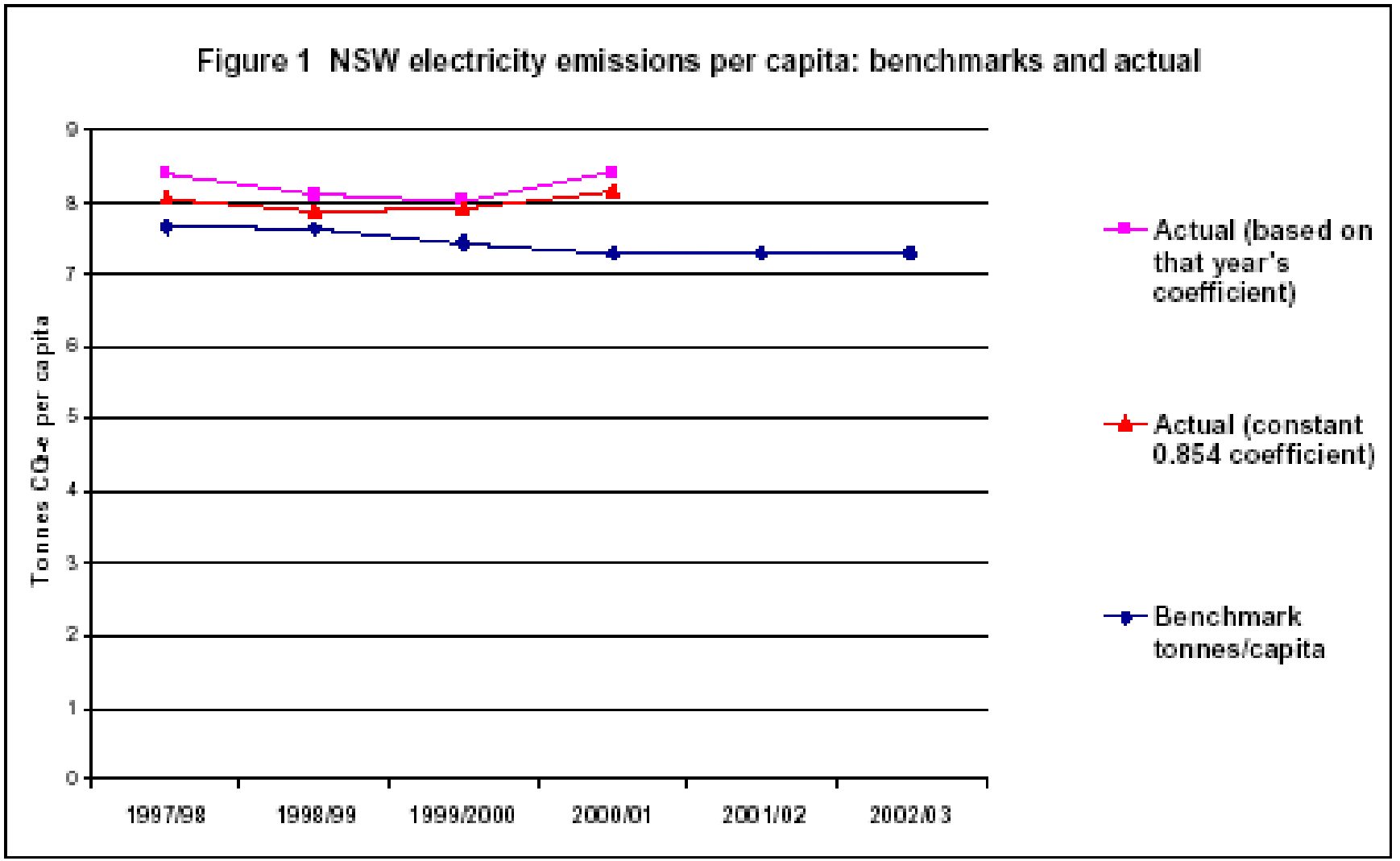
Graphic courtesy of Assoc. Prof. Hugh Outhred, UNSW

Retailer emission reduction target - allowed strategies – Previous Scheme

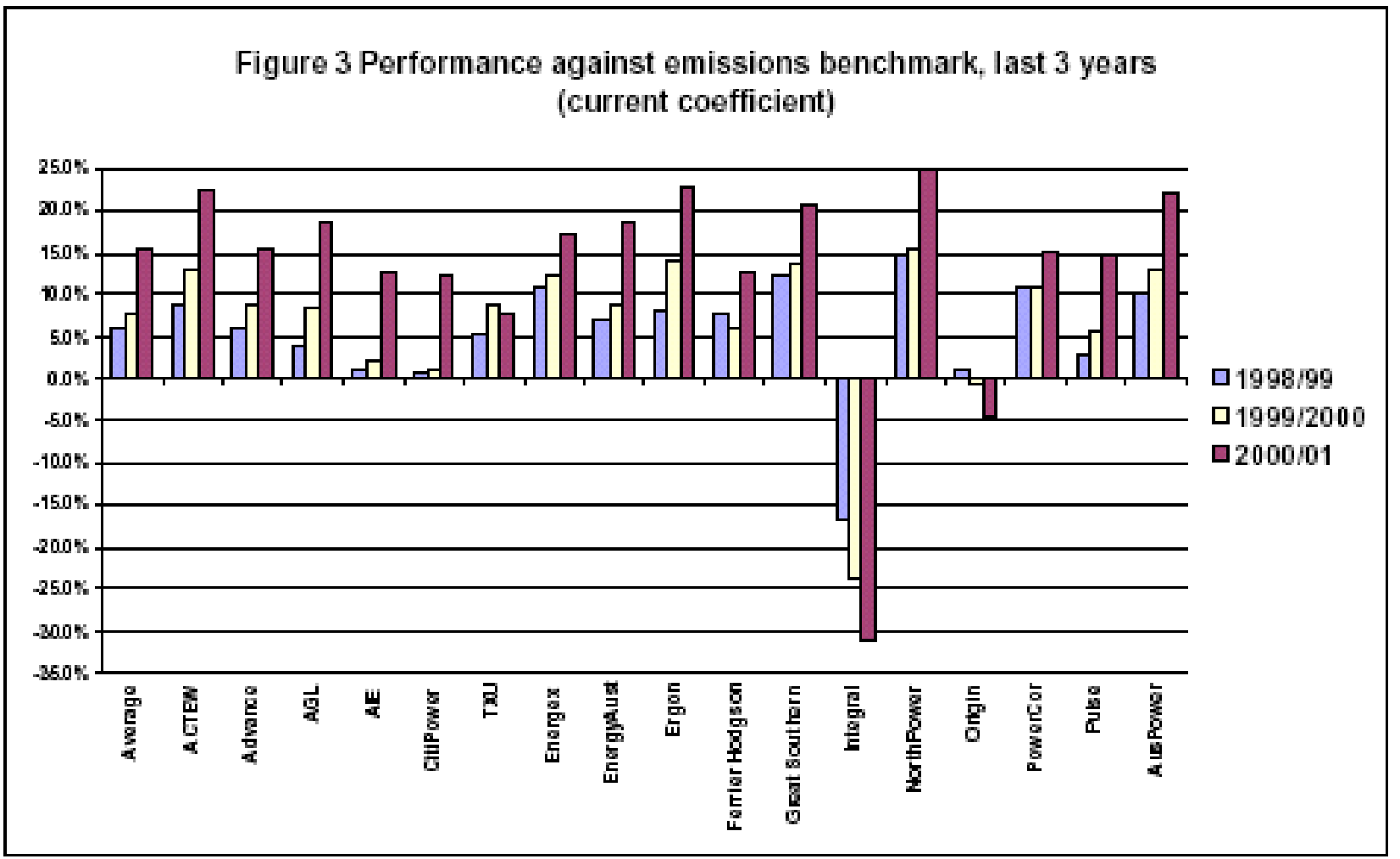
- Assigned generation declaration (AGD):
  - Contract with a “low emission” generator to buy rights to the “emission reduction” per MWH:
    - (“NSW pool” emission coefficient) minus (generator emission coefficient) per MWH
- Energy sales foregone:
  - Electricity “saved” by encouraging an end-user to improve end-use efficiency or switch fuel
- Carbon sequestration:
  - Offset fossil fuel use by biosphere carbon

NSW Electricity Industry GH emissions

(IPART Licence Compliance Report, 2001)



Compliance by retailer
(IPART Licence Compliance Report, 2001)



Issues with previous GH licence condition on retailers

- Most retailers failed to comply with emission reduction targets:
  - Partly due to the complexity of the scheme
  - Definition of “compliance”
- Problems with “free-riding”:
  - A renewable energy generator could sell federal RECs & NSW AGDs for the same energy
  - Gas-fired generators installed for other reasons
  - “Energy sales forgone” difficult to audit
  - Getting credit for doing things that were happening anyway

New "REFORMED" NSW Govt Scheme

- Introduce penalties for non-compliance
- Allow trading of AGDs (renamed as AGCs)
- Allow pre-1997 zero-emission AGCs above baseline (similar to MRET)
- Re-set targets to deliver a substantial GH gas reduction
- All the problems fixed???
  - Don't you believe it. (Nolles, Outhred et al. 2002) (Macgill 2003)
    - Fungibility
    - Auditing
    - Baselines

What are markets good at?

- Finding the real incentive structures and using them!!!
  - If loopholes exist, they will be used.
- Quickly becomes apparent when the “emperor has no clothes”.

Lessons to learn

- **Policy makers implementing environmental markets must consider who will monitor the market they create, how it will be monitored, what data should be collected, and how they will act if market manipulation or other market pathologies such as insider trading, front-running or other practices are identified.**
- **It is profoundly concerning when government agencies charged with running environmental markets claim no interest in monitoring the prevailing prices or market behaviours.**
- **It is NOT just the spot market that matters. Forward trading and derivative instrument trading are also critical – in fact more so if new investment is the aim.**
- **Markets – particularly markets specifically created as instruments of public policy – are like pets bought at Christmas – they need to be cared for after being brought home, and are not "set and forget" exercises.**

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Experimental Work examining these lessons

- Undertaking a PhD looking at electricity and environmental market design
- Experimental economics work with SIRCA and the UNSW, with support from Reuters.
- Currently working with Vernon Smith's team at George Mason Uni (ICES)

http://www.sirca.org.au/

http://www.ergo.ee.unsw.edu.au/

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