



# Auctioning greenhouse gas emissions permits: How should the auction be designed?

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## Overview

Presentation based on Report for National Emissions Trading Task Force (NETT)

- Auction objectives + Comments
- Key Design Elements
- Auctioning several vintages
- Additional Features
- Timing and Frequency

## Auction Objectives according to NETT

- Key objective:
  - Achieve an efficient allocation of permits  
= allocate permits to those who value them most highly
- Facilitate efficiency of ETS system:
  - Reveal market prices of permits to auction participants and non-participants, particularly at early stages
- Revenue maximization:
  - Not a primary goal

## Comments on Key Objectives

- Most permits are *not* allocated by auction
  - ➔ Auction *cannot* ensure efficient allocation of permits
- Significant share of permits is allocated to Trade Exposed Energy Intensive Industry sector (which has a private valuation of zero!)
  - ➔ Initial allocation is highly *inefficient* by construction!
  - ➔ Well functioning secondary markets are crucial!
- Efficiency of ETS requires not only efficient allocation of permits, but efficient investments regarding abatement measures
  - ➔ Early price signals are crucial (time lag!)

# Key Design Elements

## Ascending Clock Auction:

- Auctioneer publishes total available quantity, initial reserve price and further schedule of price offers
- Participants hand in demand bids for the reserve price
- Auctioneer reveals total demand
- As long as total demand > total available quantity auction goes on
- Demand bids cannot increase
- Auction ends when total demand  $\leq$  total supply
- Final price: **uniform pricing:**  $p_t$  if total demand = total supply or  $p_{t-1}$  if total demand < total supply (normal case)
- All bidders receive their quantity of last round (normal case)
- The remaining supply is allocated proportional according to residual bids at  $p_{t-1}$

# Auctioning several vintages

- In some auction events, several vintages of permits will be available
- Different vintages are almost (but not perfect) substitutes
- All vintages are auctioned simultaneously
- For each vintage a separate clock is implemented
- Bidders may shift demand from one clock to another
- At the end of each round, a clock ticks forward if total demand for the respective vintage exceeds supply
- Auction continues as long as at least one clock ticks forward



# Additional Features

## Double auction extension

- Facilitates efficient allocation of permits assigned to TEEI
- Sellers specify supply schedules prior to start

## Proxy bids

- to reduce transaction costs for small participants

## Alternative implementation: Intra-round bids

- Bidders submit demand schedules for all given prices
- May increase efficiency
- Smooths closing of auction
- Allows for larger increments

**Advantages:**

Upward sloping demand curve reduces vulnerability to strategic demand reduction and collusion

Suppliers (TEEI companies) profit from lower transaction costs in the auction compared to the secondary market

Price signals are more reliable as both net buyers and net sellers participate in the auction

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# Timing & Frequency

## ■ Timing:

- **First auction** before start of the scheme after first period of monitoring to ensure that necessary information is available
- **Last auction** of one vintage within reconciliation period to give companies with unforeseeable shortage possibility to buy
- **Advance auctions:** Future allowances should be made available **three years** in advance of their vintage:
  - to help establishing a future market
  - assist future investments (3 years is lead time for investments)

## ■ Frequency

The auctions should be held **quarterly** :

- To minimise transaction costs
- enables both price and quantity risk management

Figure 5.3: Timing, frequency and distribution of permits across auctions

Auction date Year Qtr	Financial Year of Emission Permit Vintage							
	10/11	11/12	12/13	13/14	15/16	16/17	17/18	18/19
2009 Aug								
Nov	20%							
2010 Feb								
May	20%	20%		20%				
Aug	15%							
Nov	15%							
2011 Feb	15%							
May	15%	20%	20%		20%	4 products available at auction		
Aug	s <sub>i</sub>	15%						
Nov		15%						
2012 Feb		15%						
May		15%	20%	20%		20%		
Aug		s <sub>i</sub>	15%					
Nov			15%					
2013 Feb			15%					
after review May			15%		20%		20%	
Aug			s <sub>i</sub>	15%				
Nov				15%				
2014 Feb				15%				
after review May				15%		20%		20%
Aug				s <sub>i</sub>	15%			
					etc			

Distribution:  
Slightly front-loaded (20% in advance vs. 15% in spot)





# Outlook

- Test auction format experimentally

Final Report available:

[http://www.emissionstrading.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0015/8421/Auction\\_Design\\_Report.pdf](http://www.emissionstrading.nsw.gov.au/__data/assets/pdf_file/0015/8421/Auction_Design_Report.pdf)



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