



# Greenhouse Gas

## GHG Market Overview:

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Natsource**

# Kyoto's GHG Market Is Evolving

## Canada:

Ratified Kyoto Protocol;  
Trading system under development; Provincial GHG requirements implemented

## Japan:

Ratified Kyoto Protocol;  
GHG trading simulations in 2002;  
Implementation of domestic measures

## Denmark:

GHG cap in power sector, 2001-2003;  
Purchased ERUs from Romania in March 2003

## Other EU Countries:

Planning to implement domestic trading programs in 2005 to conform to EU plan

## Sweden and Norway :

Issued tenders for CDM and JI projects

## Austria:

Plans to issue tender worth 36 million EUR for CDM and JI projects

## Finland:

Tender for small-scale CDM project issued;  
Expected to yield 500,000 tons CO<sub>2</sub>e

## Netherlands:

Purchased 25.2 million GHG reductions for \$138 million from ERUPT and CERUPT; 1 more ERUPT issued;  
Transactions outside tender process executed

## European Union:

Ratified Kyoto Protocol;  
GHG trading system operational in 2005

## United Kingdom:

500 trades under UK Emissions Trading Scheme involving 1.7 to 1.8 million allowances

## New Zealand:

2 Wind projects approved for credit.  
Tender for projects to be issued, for up to 4million tons



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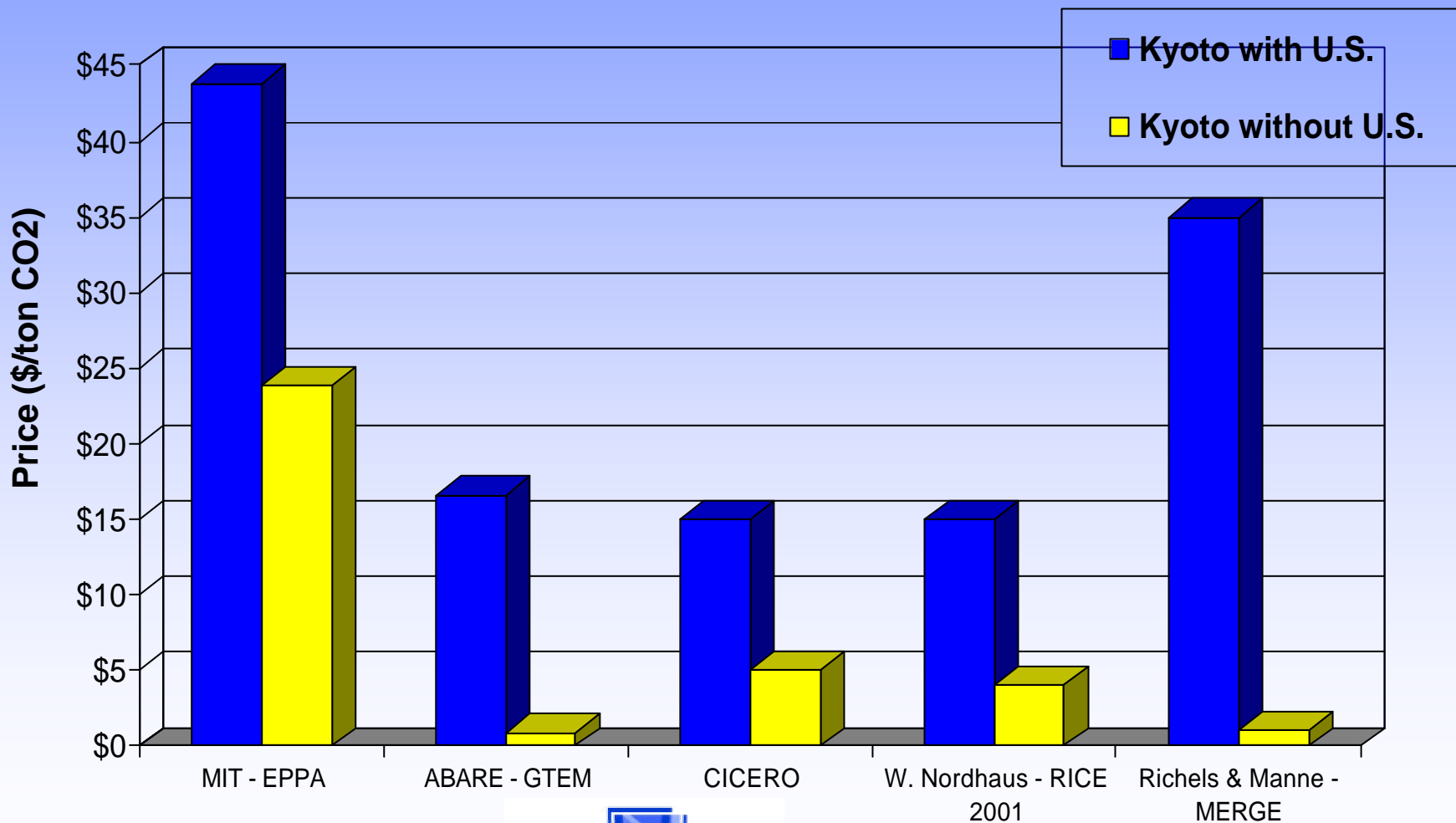
# Kyoto vs. Non-Kyoto Markets

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## Supply & Demand of Kyoto: CO2 Price Projections with & without the U.S.



# USA is moving forward via a Patchwork of State & Local GHG Programs

## Other US federal environmental laws started this way

● OR: CO<sub>2</sub> standard for new power plants - 17% below most efficient natural gas plant; reductions can be purchased from Oregon Climate Trust or generated from approved projects

● Portland, OR: 20% below 1988 CO<sub>2</sub> emissions by 2010

● CA: GHG Climate Action Registry being developed

● San Francisco – accepts Kyoto Target level

● OK: Oklahoma Carbon Sequestration Enhancement Act - program allows state to certify carbon sequestration from changes in farming practices

● Seattle, WA: Long-term goal of zero net GHG emissions from Seattle City Light, which has purchased reductions from OR Climate Trust

● WI: GHG registry being developed

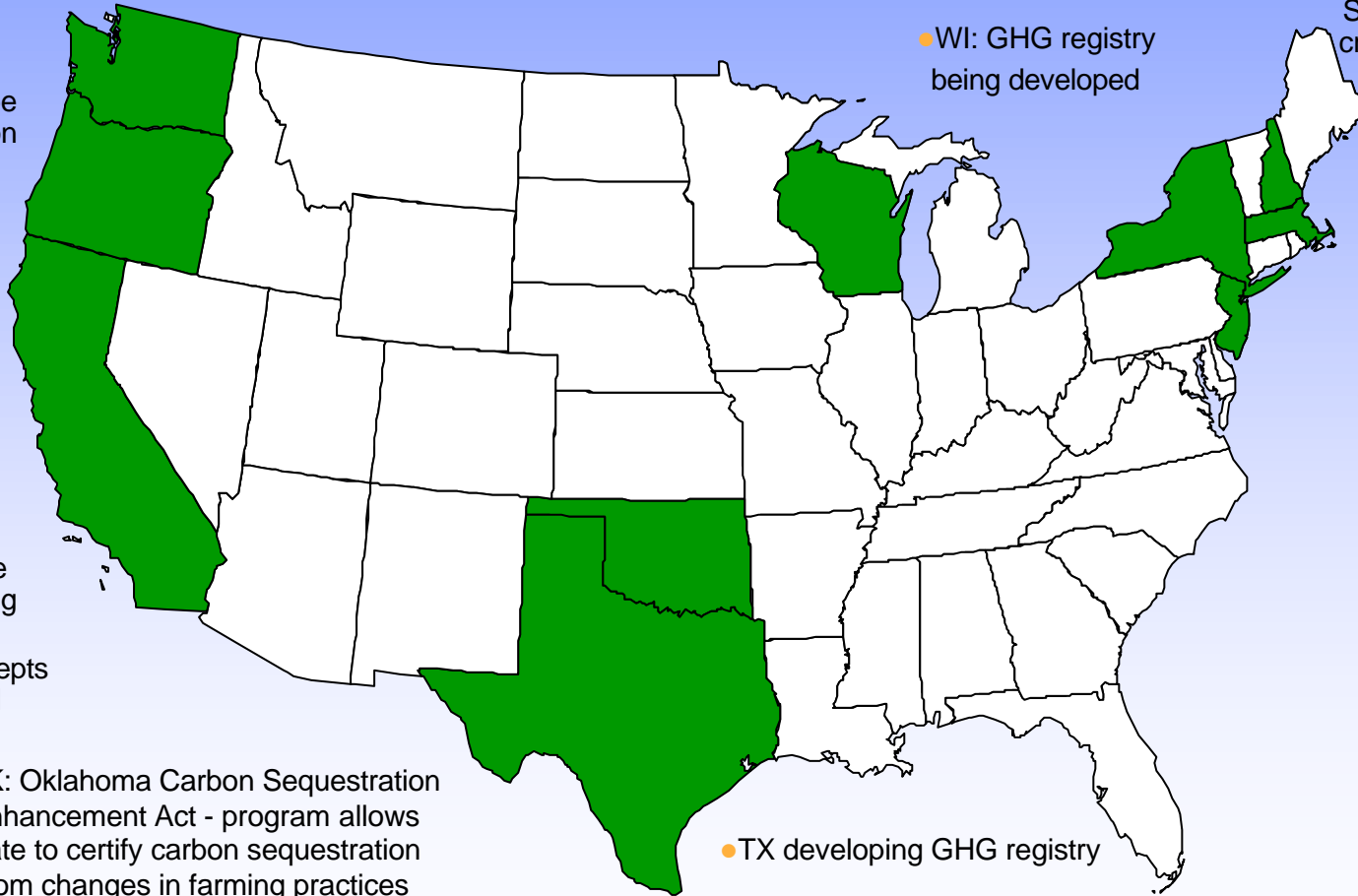
● TX developing GHG registry

● NH: 4P legislation requiring 3 power plants to reduce CO<sub>2</sub> emissions to 1990 levels passed House of Representatives and is being considered by State Senate; sources may purchase credits from 11 NE states; GHG registry being developed

● MA: Law requiring 10% tonnage and rates cuts in CO<sub>2</sub> emissions from 6 existing power plants; sources may purchase external CO<sub>2</sub> offsets; GHG registry being developed

● NY: GHG Task Force established; recommendations for federal 4P reductions

● NJ: Statewide GHG emissions reduction target of 3.5% below 1990 levels by 2005; voluntary generation of GHG credits and banking in NJ credit registry



# CDM as the Universal Kyoto & Non-Kyoto GHG Instrument?

- US Buyers prefer GHG that has a proxy value in Kyoto markets
- USA initiated Kyoto trading flexibility
  - Any potential US program likely to include Developing Country Project (DCP) similar to CDM
- All 3 US Bilateral GHG Agreements (Canada, Japan & Australia) stress aiding clean developing country investment
- CDM, or it's non-Kyoto equivalent, could act as a common “swing” instrument which could provide compliance value in Kyoto and non-Kyoto markets.

## CDM is the Current Focus

- CDM is the first Kyoto compliance and may have value in many GHG markets
- Latin America has created the infrastructure to gain the advantage as the key source of CDM supply
- Many landfill gas projects (LFG) projects as they have been the easiest to develop at current price levels
- Multi-lateral buying programs (PCF, IFC, CAF) have disproportionate quantities of both LFG and Latin projects and are looking to diversify (SARs further affecting Asian Supply)
- Prices of CER candidate emission reductions are ranging from \$2 to \$6 per CER (1 metric ton of CO<sub>2</sub> equivalent)
  - Value affected by credit, guarantees, location, technology etc.
- Recent Executive Board reviews a cause for concern
  - Of initial 14 projects, 8 rejected and 6 sent for revisions
- Supply is Key! Many “offers” but few good sellers



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# Regional Markets

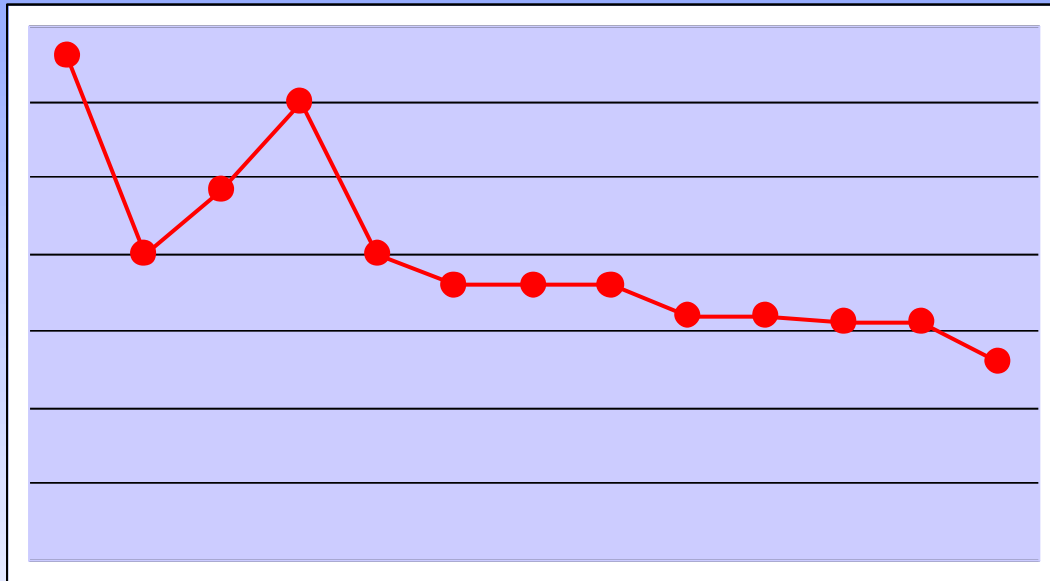
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# Pricing Context: Denmark

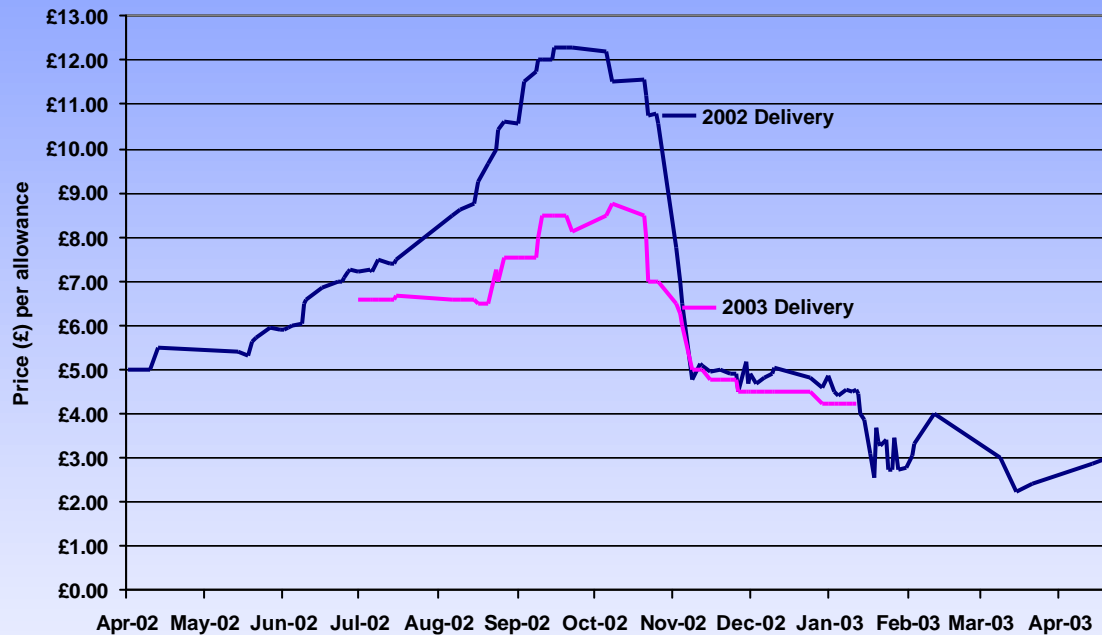


DK GHG Market Pricing 2002-3

- NO CDM in Danish Market
- Original 8 participants: now 4
- Operation: 2001 to 2003
- Prices confidential
- Cap at €4, so low prices
- Folding into EU program

# Pricing Context: UK

UK Allowance Spot Market Price Curve (Current Vintage)



- NO CDM in UK Market
- 1.8 million tonnes traded\*
- Peak at £12.40
- Bi-annual true-up
- Currently at £2 – 3 range

\* Excludes firms' internal transfers

UK Market: GHG Allowance Pricing 2002-3



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Source: Natsource Transaction Database, April 2003

# EU-Wide Emissions Trading

- **Key features:** Mandatory, Absolute target, % not finalized
  - CO2 only 2005-2007. All 6 KP gasses 2008-2012.
    - Trading system likely to cover about ½ of EU emissions.
  - Trading to cover Industrial & energy sectors; not chemical /aluminium
  - Allocation by grandfathering 2005; up to 5% auctioned 1st period / 10% 2nd
  - Priority will be given to domestic actions.
    - Trading & projects limited to a percentage of target (6%?..)
    - CDM/JI project not eligible for first compliance period
  - Still to be decided
    - Linkages Directive - CDM/JI for 2<sup>nd</sup> period
    - Rules on banking from 1<sup>st</sup> to 2<sup>nd</sup> commitment period
  - National allocation plans must be presented in March 2004; trading to begin in 2005
  - Other **EU countries** waiting for finalized EU system rules before implementing domestic trading systems
- EU obligations start in 2005 but they have already traded
  - Shell (UK) contracted for EU Allowances from Nuon (NL)
- Uncertainty remains - Who's long, who's short? No allocations...



# Japanese Market

- Cap and Trade is viewed as potentially damaging to Japan's competitiveness
- Japan has established guidelines for CDM and JI investment
- Japan is currently developing a registry and running trade simulations
- METI has announced there will be no "Dutch Style" buying program.
- Investment in CDM is looked upon favorably by Industry Keidanren and is considered a "defensible" strategy.



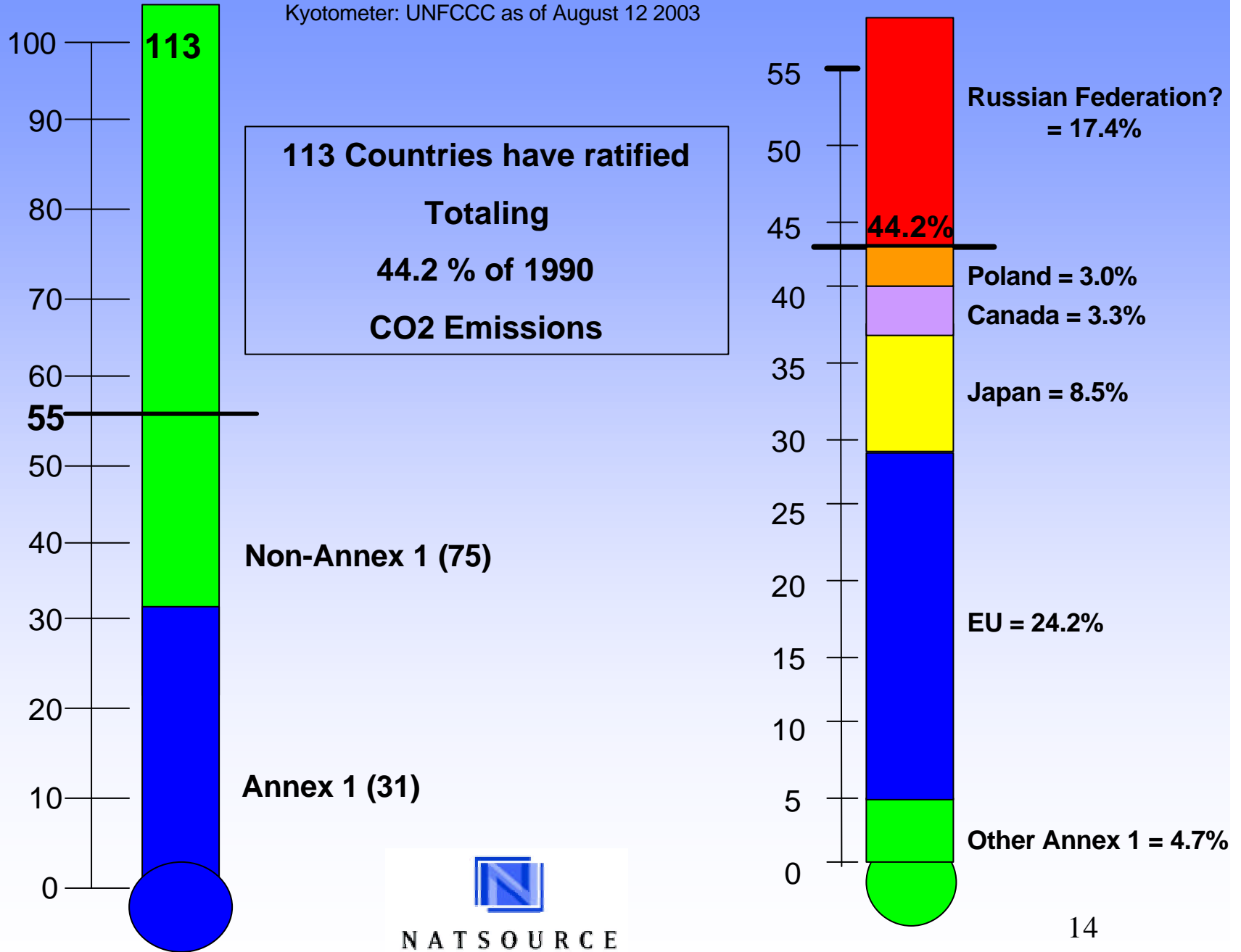
# Canadian Market

- Industry Covenant process in progress
  - 9 Sectors covering 670 companies
  - 55 million tons to be reduced per year by 2010
  - To be finalized by 1<sup>st</sup> quarter 2004 and implemented by 2005
  - Shall decide Allocation (intensity targets), Penalties, Domestic offset & early action crediting, Monitoring & verification
- “Carbon intensity” based system (lbs co2/MWh)
- Define mechanism for Canada’s C\$15 cap
- Most active market has gone silent while finalizing allocation & other program details

# Russia Must Ratify for Entry into Force

55 Parties Need to Ratify Representing 55% of Annex I Parties' 1990 CO<sub>2</sub> Emissions

Kyotometer: UNFCCC as of August 12 2003



## Waiting on Russia

### The swing vote from the biggest long

- Political will is questionable
  - No National authority, registry or bilateral MOUs
- Outside pressure from Japan, NATO and the US will be factors
- If Russia drops KP, market could 1) stutter 2) carry on, or 3) fall apart
- Internal pressure from oil & gas industry to ratify and benefit from surplus
  - Financial benefits are too great to ignore

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# Market Size, Timing & Prices

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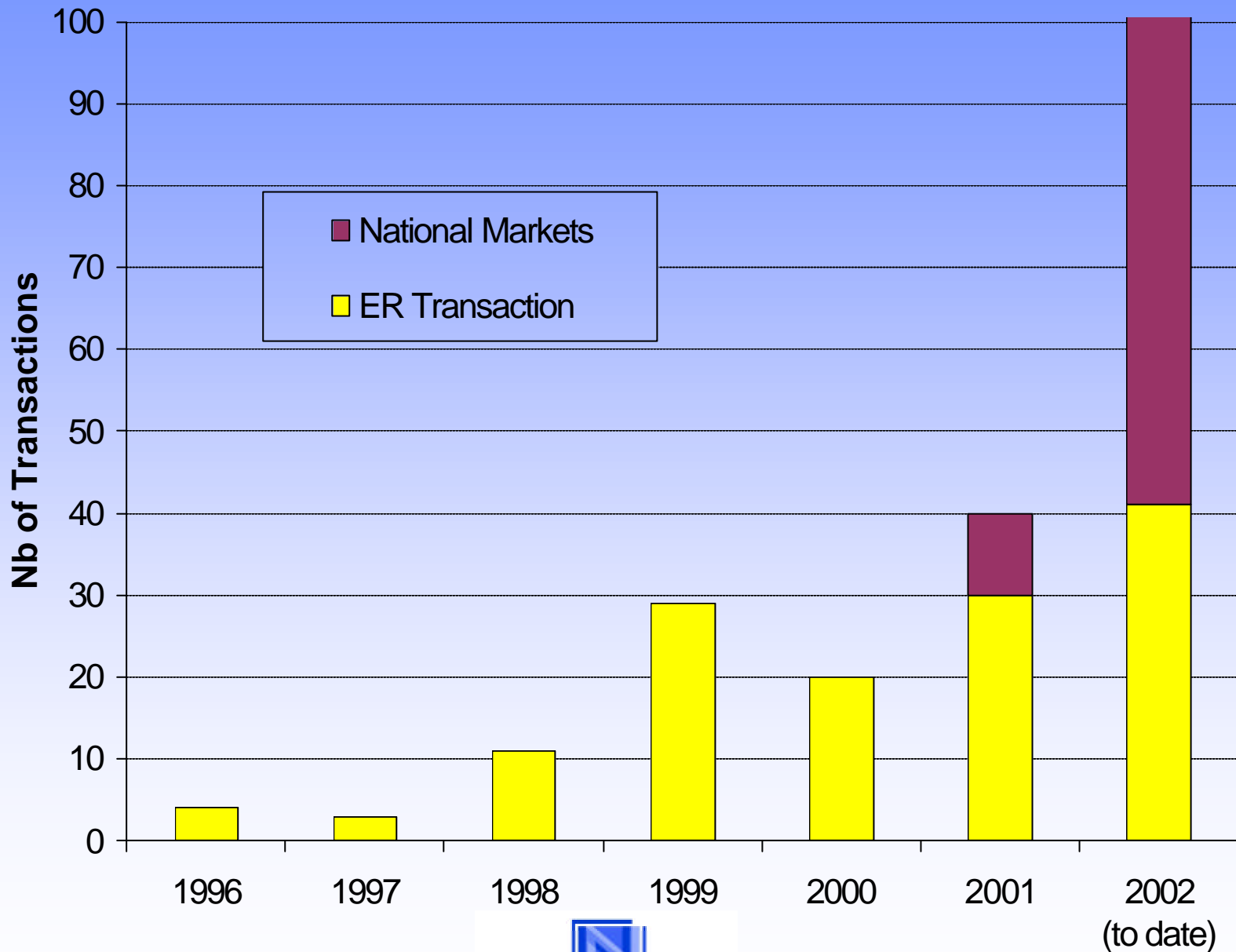
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## Number of trades 1996-2002



Source: based on World Bank Report

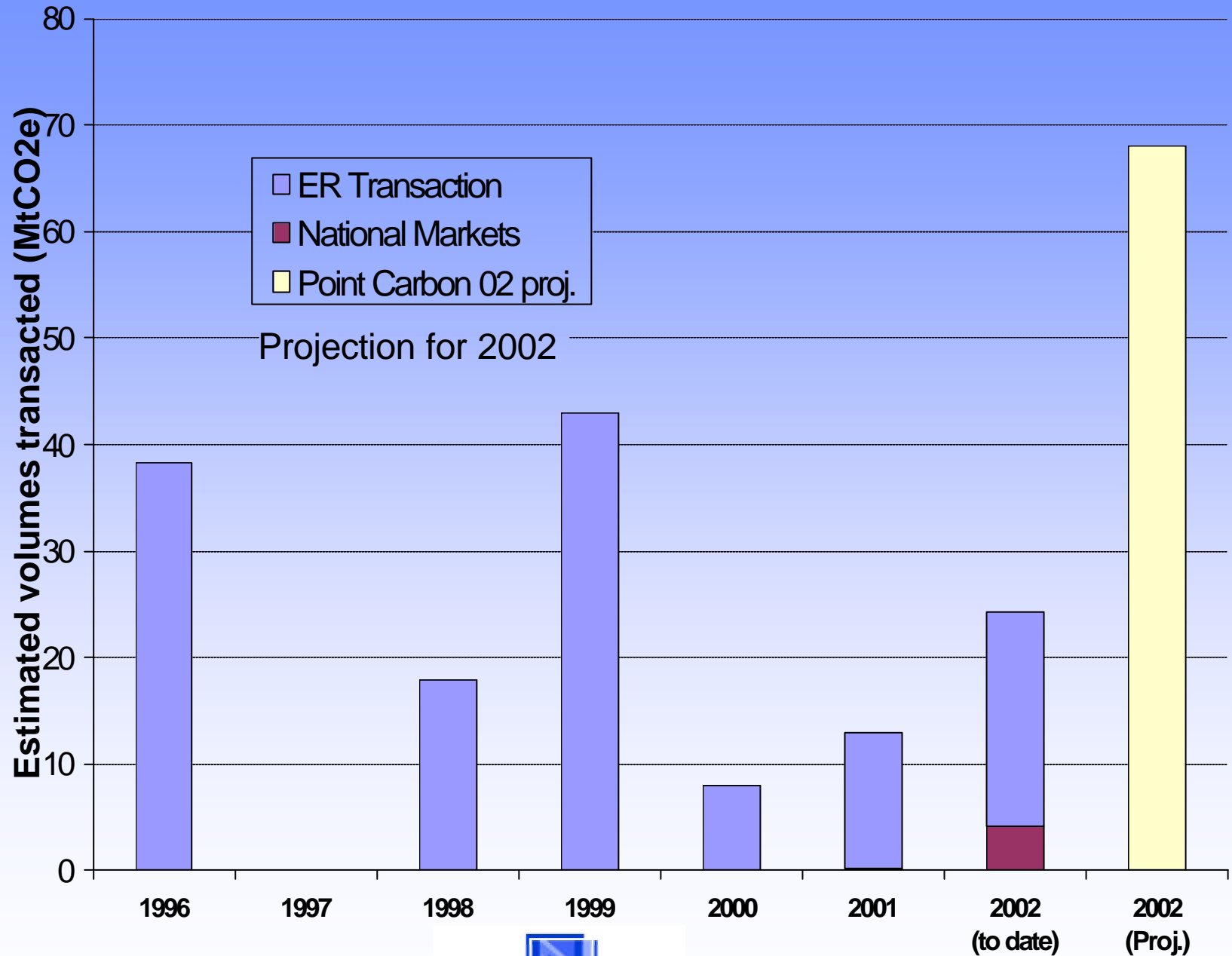


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# Volumes transacted 1996-2002

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Source: based on World Bank Report



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# How Big is it Now? Future?

- A recent World Bank Report estimates the total value of known transactions, including vintages up to 2012, to be about \$350m - \$500m
- Project-based ER purchases bulk of carbon market
  - 2/3 of transactions, but 97% of volume since 1996
  - Still 85% of volume in 2002
- Volumes transacted in 2002 are likely to be at least 4 times higher than volumes transacted in 2001. 2003 appears be more active yet.
- The UK spot market may overtake the North American market in terms of number of trades executed. However, volumes remain small.
- Ratification of the KP could increase volume dramatically. Prices may not change.



# Market Trends & Issues

- Landmark events are important but results are unpredictable
  - Canada Ratification – A bit of a bust Wait for covenants to be negotiated
  - Russia Ratification – KP into force but at what cost? Liquidity will increase but will prices?
  - EU Directive finalization- Still issues to be resolved regarding CER/ERU linkage, allocation and banking
- COP9 will give more clarity on Sequestration
- Market fragmentation with price distortions likely for foreseeable future. Transitions can be messy.
- Ratification will force Kyoto market convergence
- Responsibility is moving from Environmental departments to Energy Traders
  - Traders view GHG as an opportunity not cost



# Current Market Pricing

GHG Prices by Commodity and Vintage (U.S.\$ per ton CO<sub>2</sub>E)

Commodity Type	Vintage Year	Bid @ Ask Spread
<b>Verified Emission Reductions ("VERs")</b>		
USA VERs	2000-2018	\$0.50 @ \$1.00
CCX	2003-2006	\$0.30 @ \$2.25
Ratifying Annex B VERs	2000-2007	\$1.00 @ \$3.00
Ratifying Annex B VERs	2008-2012	\$1.50 @ \$3.00
CDM VERs	2000-2012	\$3.00 to \$6.00
Dutch ERUs	2008-2012	€4.5
World Bank PCF	2000 - 2012	\$3.00 to \$4.00
PCF Secondary Market	2000-2012	\$3.50 @ \$7.00
<b>Compliance Tools</b>		
UK allowances (not trading)	2002	£3.00 @ £4.50
UK allowances	2003	£2.25 @ £2.75
EU Allowances	2005 - 2007	€6.00 @ €8.00
AAUs	2008 - 2012	@ \$7.50

**Current prices could be best indication of future prices...**



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