

# WHAT IS THE COST OF “CLEAN ENERGY”?

A Retainer Service Providing Comprehensive Analysis of North American NO<sub>x</sub>, SO<sub>2</sub>, Mercury, CO<sub>2</sub> and Renewables, Assessing the Impact on Current and Prospective Allowance/Credit Prices, Energy Markets and Assets

## OVERVIEW

Environmental standards and requirements affect the bottom line of virtually every energy player in North America. Increasingly, regulators are using market-based mechanisms such as emissions “budgets” and renewable energy credit trading to achieve their objectives, thereby putting explicit values on “clean energy.” The availability and pricing of allowances, offsets, credits and RECs directly influence prices of electricity, coal, natural gas, fuel oil, and energy transportation services. The growing intensity of policy concerns regarding climate change is prompting consideration of measures that will reach far beyond the scope of current emissions markets with several regional efforts (involving a number of U.S. states and Canadian provinces) already taking the lead in this direction. With a new, more activist U.S. administration and Congress, policy measures are coming sooner rather than later. The current and emerging environmental market policies are impacting investments in power plants, energy production, transportation and marketing initiatives. They directly affect the operating costs of major energy consumers, producers, service providers and, increasingly, consumer transportation options and choices.

The potential for huge shifts in energy costs and asset valuations has never been greater, given the vast array of technology options under consideration and regional, national, and international environmental regulations and compliance alternatives under consideration or in litigation. As such, those firms that have in-depth understanding of these markets will have a distinct advantage over their competitors.

**PIRA’s NORTH AMERICAN ENVIRONMENTAL MARKETS SERVICE (N.A. EMS) gives clients both the big picture — for perspective on significant long-term emissions market developments — as well as up-to-date, detailed data and analysis needed to make informed near-term decisions.** PIRA examines the forces that affect the U.S. acid rain, fine particulate and ozone-related markets (i.e. NO<sub>x</sub> and SO<sub>2</sub>) as well as emerging controls and markets for mercury and greenhouse gases. The development of U.S. and Canadian greenhouse gas regulations and markets are covered in detail in order to provide a sense of the environmental pressures on existing and future emitters. Although not currently subject to cap-and-trade programs, greenhouse policy developments regarding the transportation sector are also assessed in view of their potentially strong impact on oil industry operations and strategies. Policies and markets promoting renewables have joined the suite of market-based approaches encouraging “clean energy,” and these are also addressed in this context.

### Clients of N.A. EMS benefit from:

1. **Near- and long-term emissions price forecasts.** These assessments draw upon the experience of PIRA’s consultants and on research and insight into market fundamentals.
2. **Assessment of renewable power development.** New renewable capacity is facing numerous incentives, but also significant hurdles. PIRA’s assesses the costs of different technology — both for developers and for the power sector — and analyzes the likely penetration renewable generation.

3. **Comprehensive analysis of current and prospective legislative and regulatory developments** on the national, regional and local level.
4. **Examination of NO<sub>x</sub>/SO<sub>2</sub> compliance issues**, including the Acid Rain Program, SIP Call/Ozone, CAIR, Regional Haze, NSR, PSD and others.
5. **Monitoring and analysis of trends in emissions performance at the plant level**, including the installation of controls technology and performance, and the implications for meeting current and proposed regulations. Clients have access upon request to special databases, including detailed compilations of installed and planned scrubber and SCR units developed for this purpose.
6. **Economic analysis of compliance choices**, including fuel switching, long-term technology options, credit purchases, etc.
7. **Skilled assessments of the impact of potential policy scenarios.**
8. **Special reports highlighting issues related to current and prospective business strategies, risks and opportunities.**
9. **Non-partisan coverage of the evolving political, social and business reactions** to the issues.

## COMPONENTS OF N.A. EMS

Clients of PIRA's N.A. EMS benefit from the following "deliverables":

### 1. *North American GHG Quarterly Update*

While the U.S. has not ratified Kyoto there are continued domestic and regional developments in regulating GHG. Northeastern U.S. states have implemented a cap on power sector CO<sub>2</sub> emissions through the RGGI program/market, while California has committed to significantly reduce GHG and is actively developing policies impacting both power generation and transport to achieve its goals. On a federal level, options for national programs are being discussed, and the choices made can have serious implications for market players. Canada has ratified Kyoto but given strong trends favoring rising emissions, faces particular challenges in designing and implementing policies to achieve reduction goals. Understanding evolving policies at a national and provincial level and timely assessment of these developments can help inform, prepare and shape industry responses to potential new markets and regulations.

### 2. *North American SO<sub>2</sub>/NO<sub>x</sub> Quarterly Update*

Quarterly assessments of the SO<sub>2</sub> and NO<sub>x</sub> markets, generally following the release of the EPA CEMs data, analyzing the most recent trends in generation, emissions, weather, fuel use, control equipment and related fundamental factors driving the markets.

### 3. *U.S. SO<sub>2</sub> Scorecard*

Released in the intervening two months between the *North American SO<sub>2</sub>/NO<sub>x</sub> Quarterly Updates*, this report summarizes and assesses market influences affecting the SO<sub>2</sub> market in an easy-to-read grid. The *Scorecard* also features updated charts depicting key market fundamentals, including fuel prices, the implied sulfur premium, and allowance holdings by non-compliance players.



### 4. North American EMS Special Reports

In-depth reports that provide analysis on significant current and anticipated environmental issues, market conditions, control technology advances and regulatory developments for renewables as well as SO<sub>2</sub>, NO<sub>x</sub>, mercury and CO<sub>2</sub> regulations — and how they could impact your business.

### 5. North American EMS Bulletins

These one-off reports provide analytic briefs on timely issues confronting North American environmental markets. Unexpected shifts in supply-and-demand fundamentals require timely review to ensure an accurate assessment of emissions markets going forward. Such shifts can be policy-related or they could involve factors such as extreme weather or sudden movements in the fuel markets, which may lead PIRA to update our views.

### 6. The Energy Price Portal

All of PIRA's price forecasts and histories are available through this single, dynamic interface. Via PIRA Online, N.A. EMS clients get easy access to prices for:

- CAIR NO<sub>x</sub> Annual and Successor
- RGGI CO<sub>2</sub>
- SIP Call NO<sub>x</sub> Seasonal
- WCI CO<sub>2</sub>
- Title IV SO<sub>2</sub> and Successor
- U.S. Federal CO<sub>2</sub>

### 7. North American EMS Statistics

Clients have access to up-to-date emissions-related data by request, including:

- Current and historically reported annual and quarterly CEMS data.
- Scrubber (SO<sub>2</sub>) and SCR (NO<sub>x</sub>) retrofit databases — compiling announcements of these installations at the unit level, including expected online dates and resultant emissions reductions.
- Scrubber and SCR control cost calculators.
- Other statistics related to the implementation of environmental policy, such as trading budgets, individual-state SIPs, etc.

### 8. Access to PIRA Staff

Phone and email access to PIRA's staff allows clients to obtain quality analytical support on the latest developments in short-term supply and demand or request research on special topics with a quick turnaround. Clients can also arrange for conference calls with our market analysts.

## FEES

The annual fee for PIRA's N.A. Environmental Markets Service is \$14,000 for up to 10 users located at one client site; **discounts are available for existing clients to certain PIRA services.**

**For more information, please refer to the attached Acceptance Form or page 6.**



## WHO CAN BENEFIT FROM N.A. EMS

### Electric Generating Companies and Industrial End-Users

Both groups are the current and obvious future targets of all major acid rain, ozone, particulates, mercury, and global warming initiatives. They face the most pressing decisions regarding compliance strategies and credit portfolio management. To safeguard their competitive positions, they must understand the implications of evolving policies on fuel, operating and investment costs, and the operations and prices of emissions credit markets. The close association between PIRA's Environmental and Electric Power groups ensures that the products meet these users' business needs.

### Energy Transmission and Storage Companies

Pipelines, railroads, truck and barge companies, ocean freight companies, and electric transmission companies that anticipate short- and medium-term shifts in environmental requirements and compliance costs will have a strategic advantage when setting pricing strategies, valuating existing assets, targeting potential acquisitions and planning expansions.

### Coal, Oil and Gas Producers and Refiners

Current and prospective regulations and credit prices significantly impact prospective national — and especially regional — markets for these fuels. In certain cases, producers will also see direct effects of regulations — and potential opportunities arising from them. These considerations will be important elements in targeting exploration and production regions and in increasing profitability. As large stationary source emitters, refineries are impacted by the expanding scope of emissions regulations. Moreover, refinery economics will be impacted by emerging greenhouse policies targeting the transportation sector, the refining industry's most critical market.

### Marketers and Traders

Electricity, coal, and gas marketers need to be fully informed about the compliance implications for fuel choice, as well as for credit pricing and management facing their customers, in order to formulate their own near- and long-term strategies.

### Environmental Agencies

Such agencies will find an independent analysis of private-sector compliance strategies, progress and costs — as well as the workings of national and local emissions credit markets — invaluable in assessing the impacts of current and prospective regulatory actions.

### Financial Institutions

As banks are called upon to provide debt for new energy projects, it will be imperative to analyze accurately both the market and regulatory environment for these new projects. Environmental regulation is becoming more complex and imposing its own set of constraints, costs, and opportunities for investors in electric generation and related facilities. Understanding regional markets, growth potential, infrastructure constraints, and implications of environmental regulations will be essential for due diligence.

### Equipment Manufacturers and Contractors

Turbine manufacturers, EPC (engineering, procurement, and construction) contractors, environmental equipment makers, and catalyst suppliers can all benefit from a better understanding of current and prospective compliance choices facing their customers. In addition, vehicle manufacturers are on the front lines of emerging greenhouse policies.



## THE NORTH AMERICAN ENVIRONMENTAL GROUP

**Roman Kramarchuk (Managing Director, Emissions and Clean Energy)** heads up N.A. EMS and PIRA's Greenhouse Gas Emissions Service, which includes coverage of the Kyoto credit markets and the European Emissions Trading System. Prior to joining PIRA, he was extensively involved in the development of the CAIR and CAMR (mercury) Rules and the BART Guidelines with the U.S. EPA's Clean Air Markets Division. Working at PG&E NEG and with PA Consulting / PHB Hagler Bailly, he evaluated strategies regarding power sector fuel choice, allowance purchases and capital investments in pollution control equipment and advised on plant development/acquisition and asset valuation. Mr. Kramarchuk also spent several years working on USAID- and World Bank-funded projects to develop power markets, market rules and regulatory capacity overseas. He has a MPP from the Kennedy School of Government at Harvard and a BA in economics and BSE in systems engineering from the University of Pennsylvania.

**Ronald B. Gold (Senior Director, North American Emissions)** is an International Energy Economist with broad experience in analyzing energy, economic, and environmental trends. In addition to his work for PIRA, through 2006, Dr. Gold served as Vice President of the Petroleum Industry Research Foundation, writing extensively on U.S. energy policy issues. Dr. Gold retired from Exxon at the end of 1997, where he was Company Economist and Manager of the Energy Outlook Division for Exxon Company International. Earlier in his career, he worked for the U.S. Treasury Department, Office of Tax Analysis, and was also an assistant professor of economics at Ohio State University. Dr. Gold received his undergraduate degree from Brooklyn College, City University of New York, and his M.A. and Ph.D. in economics from Princeton University.

**Allan M. Stewart (Executive Director, Electric)** is responsible for the preparation of a comprehensive series of commercially oriented assessments of North American electric markets as well as data and analysis of the primary drivers of emissions credit prices. Prior to joining PIRA, Mr. Stewart worked with the Consolidated Edison Co. of New York in a variety of senior positions. He received his undergraduate degree in Civil Engineering from the State University of New York at Buffalo and an MBA from Adelphi University.

**Jennifer McIsaac (Associate Director, Emissions and Clean Energy)** joined PIRA after a stint with NUI Corp. There she analyzed gas supply needs and recommended baseload/swing purchases and storage injections/withdrawals. Prior to that, while pursuing her undergraduate and graduate degrees, she was an economics research intern in Exxon Company International's Corporate Planning Department, where among many tasks she analyzed emissions in the transportation and power generation sectors. She holds a BA from Drew University and is a doctoral candidate in economics at Cornell University.



## ACCEPTANCE FORM

We wish to become a client to PIRA Energy Group’s NORTH AMERICAN ENVIRONMENTAL MARKETS SERVICE, and we understand and agree that the fee for the service is (circle as appropriate). NOTE:

**Discounts are available to clients of the Retainer Services listed below:**

	Annual Fee Options		
Company Status	N.A. EMS	<i>OR, combine your N.A. EMS Service with PIRA’s Greenhouse Gas Emissions Service (GHG) at these rates:</i>	N.A. EMS w/GHG
Non-Retainer Client	\$14,000		\$25,000
Client of One Service*	\$12,000		\$21,000
Client of Two Services*	\$9,500		\$17,000

\* Services include: Global Oil, No. American Natural Gas, No. American Electricity, and International Coal

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First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_

Position Title: \_\_\_\_\_

Address: \_\_\_\_\_

City/Code/Country: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Total Fee: \_\_\_\_\_ Signature: \_\_\_\_\_

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