Consult

ICF CONSULTING

Fall 2000

SPECIAL ENERGY AND ENVIRONMENTAL ISSUE

Liberalization and Regulation

Benchmarking and Efficiency Analysis

EmissionStrategies.Com

Using E-Business Solutions to Create Value from Emission Assets

Clever Carbon

An Asset Class Unique to Its Time

Liberalization and Regulation in the Netherlands

Benchmarking and Efficiency Analysis

One of the most important changes across the European energy industry has been the liberalization and deregulation following European legislation. In 1997, the European Electricity Directive came into force and set a binding timetable for the liberalization of electricity generation, distribution, and supply across Europe. In the Netherlands, the Directive was soon adopted and an independent regulator, the DTe, was established. In comparison to the approach adopted by its European counterparts, the Dutch program of liberalization is one of the most ambitious and far reaching.

The tariffs that the transmission and distribution network companies charge are subject to a price cap. The tariffs for 2000 were based on tariffs set in 1996 and are allowed to rise in line with inflation, but are simultaneously required to decrease by a factor X. This X factor varies between companies and reflects the level of economic inefficiency in that company. This form of tariff regulation is known as CPI-X (where CPI is the consumer price index) and is applied to a tariff basket to cover the efficient operating expenditure, rate of return, depreciation, and tax.

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Using E-Business Solutions to Create Value from Emission Assets

Three of the most pressing environmental challenges faced by companies today include greenhouse gas (GHG), nitrogen oxide (NO_x), and sulfur dioxide (SO_2) emissions. These emissions have a measurable impact on corporate performance and shareholder value. A clear need is being articulated by companies around the world (both energy producers and consumers) for accurate and objective information on emissions, emission trading, and emission management strategies.

Linking emissions and reductions to impacts on financial value is essential now that nascent markets for reduction credits have emerged. For GHG emissions, most companies now anticipate a need to operate within carbon-constrained scenarios, regardless of the fate of the Kyoto Protocol. A global market has emerged, though

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Liberalization and Regulation in the Netherlands (cont.)

The goal is to set a target price reduction (the X factor) for companies that will force them to eliminate existing inefficiencies and pass the benefits on to consumers in the form of lower retail prices. If a company manages to reduce its costs by more than the X factor, it is allowed to keep the excess. The incentive structure, therefore, remains balanced and the gains from efficiency improvements are shared between customers and shareholders.

Target price reductions for companies will force them to eliminate inefficiencies and pass the benefits on to consumers.

To determine the possible cost savings, the independent Dutch regulator has benchmarked companies on the basis of operating expenditure and total cost, and established the relative economic efficiency of the companies in delivering a specified set of outputs for a unit of input. Regulatory benchmarking and efficiency analyses, using the techniques described below, are applied at a general level examining the production functions of firms. These techniques have been applied in the telecommunications, banking, environmental, and retail industries. Analysis allows a firm to determine its relative position against its competitors and, potentially, use this information to optimize its production process to extract the most profit from its operations. The studies also indicate which efficient companies the firms should be using for comparison. For example, for a major Dutch client, ICF Consulting determined that the comparison firms were Southern California Edison (USA) and Power NZ (New Zealand). The next phase would be to examine our client's operations in more detail and compare them to those of Southern California Edison and Power NZ to identify possible efficiency savings.

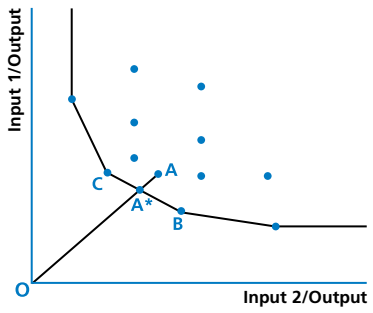
These benchmarking and efficiency analyses are potentially invaluable tools in identifying target companies for takeover or mergers within a converging market and have been relatively under-utilized thus far. The efficiency scores can be used to calculate possible efficiency gains and translated into company valuations. Further, combining data and re-running the analyses can help assess the relative position of a hypothetically merged or acquired entity, allowing the purchaser to assess the potential cost savings.

Two techniques are commonly used when benchmarking companies: statistical and data envelopment analysis (DEA).

Statistical techniques attempt to find a best-fit relationship between the inputs a company uses and the outputs it produces. This statistical relationship can then be used to determine the relative positions of the companies in the sample group.

DEA—a multi-input multi-output analysis—divides the inputs by the outputs. DEA traces out a locus of most efficient companies, producing a best-practice frontier. Any company lying above this frontier is considered inefficient.

Data Envelopment Analysis (DEA)



Exhibited here is a locus of firms that make up the frontier of best practice. All firms lying above this frontier are considered inefficient. The relative inefficiency of firm A is measured by dividing distance OA* by distance OA. Firms B and C, which form the relative frontier for firm A, are considered firm A's peers.

The Dutch regulator will use DEA to generate relative efficiency scores. These scores factor into the price control review by informing the DTe of the potential efficiency gains in costs. Recently, the DTe announced the final X factors for the Dutch electricity sector and the weighted average was 5.9 percent. On average, Dutch companies will have to reduce their tariffs by 5.9 percent per annum in real terms over the three-year regulatory period, resulting in an overall savings in excess of 1.3 billion Dutch Guilders (US $550 million).

The broader strategic implications of CPI-X regulation are wide ranging. By basing variable X factors on the relative economic efficiency of firms, the regulator implicitly encourages price homogeneity within the market. As a result, many companies have found the need to merge or acquire in order to gain and exploit both economies of scale and scope and to satisfy return requirements. In the Netherlands, this trend is likely to accelerate during the next few years and many expect that only three to four electricity distributors will exist after the first, three-year regulatory period. The opportunities for merger and acquisition (M&A) activity are enormous for both Dutch and foreign entities. Recent examples of such M&A activ-

ity in the Netherlands have included the acquisition of Nutsbedrijf Haarlemmermeer by RWE and, similarly, Endesa's acquisition of Nutsbedrijf Regio Eindhoven.

The implications of M&A activity are much more significant on a European scale. The consolidation of the number of players as a result of liberalization will lead to substantial benefits for consumers but will also require tough regulation to ensure that the market remains a level playing field for incumbents and new entrants alike.

ICF Consulting has assisted the major players in the Dutch market in understanding and assessing the strategic implications of price cap regulation and benchmarking. Together with our associate, Dr. Michael Pollitt of Cambridge University, we have assisted our clients in understanding the techniques and implications of benchmarking analyses. We also have provided appraisals and counter-analyses of the DTe's own studies and reports. Our clients have included Eneco NetBeheer, TenneT, REMU, NUON Group, and EnergieNed.

Using E-Business Solutions (cont.)

one with limited liquidity, for carbon dioxide (CO_2) equivalents.

In Europe, countries such as the United Kingdom and Denmark have proposed piloting domestic GHG emission trading markets. Several other countries with reduction commitments under the Kyoto Protocol also are exploring setting up domestic GHG emission trading programs to help companies reduce the cost of meeting reduction targets. In many jurisdictions, a market already exists for emission reduction credits of the air pollutants NO_x and SO_2.

In the United States, for example, the acid rain provisions of the U.S. Clean Air Act permitted emission trading and helped to clarify the rules of the market. Other countries also are looking at emission trading as an opportunity to reduce the overall costs of meeting local and regional air pollution goals. In its fight against smog, Canada's largest province, Ontario, has recently proposed a two-phased approach to creating a market for NO_x and SO_2. The first phase will include entities operating in the energy sector. In the second phase, all entities emitting NO_x and SO_2 will be required to meet emission reduction targets and have the option of using emission reduction trading as a compliance strategy.

It is clear that air emissions have financial value and that companies need to approach the management of their emissions as they would any other asset or liability on their corporate balance sheet.

E-business platforms provide an ideal tool for handling the complexity of global emissions management at multiple sites. ICF Consulting has developed an e-business solution to provide companies with the information, tools, and services needed for designing and executing a management strategy—EmissionStrategies.com.

EmissionStrategies.com provides a framework for ensuring that companies derive maximum value from their emission assets, or conversely, appropriately manage their emission liabilities at least cost. This is true whether the goal is developing credible emissions estimates or structuring emission reduction projects using sophisticated financial engineering techniques.

Companies may enhance their understanding of a particular air emission problem with news about regional regulatory developments, price forecasts, emission market outlooks, and best practices in emission risk management. They also have the opportunity to evaluate risks and opportunities arising from their emissions, and are provided with a detailed, step-by-step approach to developing an integrated strategy for managing emissions.

This solution provides companies with a global e-business platform with which they can quantify emissions risks, benchmark emissions performance, evaluate opportunities for buying and selling emissions, and assess financial impacts of emissions management on shareholder value.

To learn more about e-business solutions to create value from emission assets, visit EmissionStrategies.com.

Calendar of Events

November

November 13-24, 2000

The Hague, Netherlands. At the **Conference of the Parties (COP) 6,** senior members of ICF Consulting will participate as accredited delegates. The conference is the most important session since the Kyoto Protocol was adopted in 1997 and is intended to clarify many of the governing rules. *For more information, please contact Craig Ebert at 1.202.862.1130.*

November 15-17, 2000

Washington, DC. ICF Consulting's Kojo Ofori-Atta will speak at the **Congestion and Parallel Path Issues between RTO's** conference. *For more information, contact Elizabeth Kaiga at 1.703.934.3497.*

November 20-22, 2000

Amsterdam, Netherlands.
ICF Consulting sponsors **EMART 2000,** an event for energy traders and marketers. ICF Consulting's John Marlow will speak on "Weather and Emission Derivatives and Renewable Certificates." Additionally, ICF Consulting will have an exhibit booth, host a luncheon, and launch new products and services. *For more information, contact Simon Green in London at 44.207.958.9020 or Faith Welling in Fairfax at 1.703.934.3659.*

November 28-December 1, 2000

Houston, Texas. ICF Consulting's Judah Rose will speak at the **Pricing Wholesale Energy Products and Services** conference. *For more information, contact Elizabeth Kaiga at 1.703.934.3497.*

December

December 3-6, 2000

Arlington, Virginia. At the **Annual Meeting of the Society for Risk Analysis,** ICF Consulting's James Laurenson will present a paper titled, "Risk of Waterborne Infectious Disease in Children with Normally Developing Immune Systems." *For more information, contact Jim Laurenson at 1.703.934.3648.*

December 4-6, 2000

New Orleans, Louisiana. At the **11th National Energy Services Conference and Exposition,** ICF Consulting's Philip Mihlmester, Steven Fine, and Todd Davis will present a paper titled, "Marketing Green and Banking Carbon." ICF Consulting also will have an exhibit booth at this conference, which is hosted by the Association of Energy Services Professionals (AESP) International. *For more information, contact Pat Alexander at 1.703.934.3157.*

December 5-6, 2000

Houston, Texas. ICF Consulting is sponsoring Infocast's **"Managing the Risk of Retail Operations"** conference. The conference is an in-depth, comprehensive risk management course for companies providing retail power. Learn how to avoid getting burned by price spikes, regulatory changes, standard offer service, customer switching, counter-party defaults, and billing problems. ICF Consulting's Todd Davis, S. Balakrishnan, and Rob Gunnin will be presenting courses on risk factors. *For more information, contact Sheila Hudson at 1.703.934.3181.*

December 6-8, 2000

New Orleans, Louisiana.
ICF Consulting's Mark Inglis will participate in panel presentations on the requirements for load profiling and a retail market settlement at Infocast's **"Conference on Implementing Retail Access."** He will also lead a workshop on "Advanced Load Profiling & Market Settlement." *For more information, contact Mary Rekenthaler at 1.703.934.3086.*

December 11-12, 2000

Miami, Florida. At the **Business Case for FUEL CELLS—Applications, Investment Opportunities, Life Cycle Costs and Interconnection** conference, ICF Consulting's S. Balakrishnan will co-chair a workshop on "Developing an Effective Business Plan for Fuel Cells: Markets, Revenue Potential, Resource Plan, and Risks." The conference is sponsored by The Center for Business Intelligence. *For more information, contact Sheila Hudson at 1.703.934.3181.*

January

January 18-19, 2001

Orlando, Florida. ICF Consulting is sponsoring Infocast's **"Managing the Risk of Retail Operations"** conference. Please see conference description for December 5-6, 2000. *For more information, contact Sheila Hudson at 1.703.934.3181.*

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Clever Carbon: An Asset Class Unique To Its Time

Unlike the better known classes of air emissions, greenhouse gas (GHG) emissions display unique characteristics. GHG emissions are unique as an asset class because they are not underpinned by any formal regulatory framework. It is the increasing expectation that these emissions will be regulated that makes their management important. Despite their current informality, GHG emissions should be considered intangible assets because they possess real economic value. This combination of informality and value makes for exciting financing.

The absence of GAAPs creates an environment where the structure of the asset can be optimized to comply with the corporate and capital structure of the investor. Many of these opportunities will only remain in the absence of GAAPs for GHG assets.

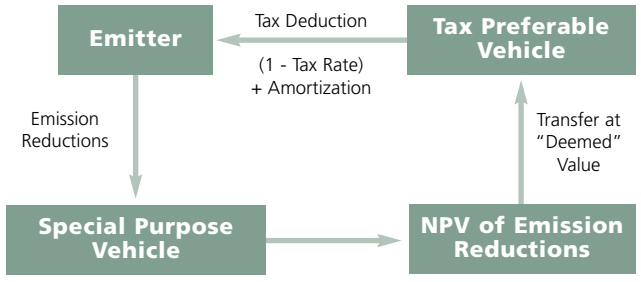
Should the Kyoto Protocol be ratified, a diverse range of carbon assets will emerge. Countries will be assigned units consistent with their respective emission reduction targets. Other forms of carbon assets will also emerge as a result of project-based emission reductions generated through Joint Implementation and the Clean Development Mechanism Articles of the Protocol.

While it is expected that all classes of GHG assets within the meaning of the Protocol will be fungible, the same cannot be said for the relative financial risks that naturally accrue to these classes of emissions. It is these heterogeneous risk profiles that will, to a large extent, dictate the direction of capital flows that occur under the aegis of the Protocol. Capital is naturally risk averse and will not unwittingly accrue risk without a concomitant and offsetting dividend. Providers of project finance will doubtless discount the extent of these diverse financial risks into their pre-financing considerations. Indeed, the emerging market for GHG emission reductions is beginning to reveal a tendency toward this behavior.

These risk assessment considerations are doubly confusing within the current pre-ratification commercial environment. Conventional wisdom suggests that without some certainty as to the final "definition" of these asset classes, actors within the broad carbon market are constrained in their ability to realize the value of any notional income stream of emission reductions while minimizing their commercial exposure to a volatile international policy environment. In short, the value cannot be discounted into the pre-financing of projects, and, therefore, cannot reduce the effective weighted average cost of capital of any project.

ICF Consulting believes that commercial opportunities to extract value from emission reduction income streams are greatest where there remains some significant lack of recognition of carbon as a discrete asset class. While this may initially appear counter-intuitive, this lack of formal recognition provides for an environment where project proponents and/or financiers are able to ascribe a "structural definition" to the emission reduction asset that best suits their unique commercial purposes. The current absence of generally accepted accounting principles (GAAPs) over precompliance assets implies absolute "definitional latitude," where the structural malleability of the asset can be optimized to comply with the specific corporate and capital structures employed by an investor. Differing asset "definitions" can, for example, be applied to produce a variety of differing tax events that, in turn, can be matched against specific tax positions held by these investors. Many of these opportunities will only remain in the absence of GAAPs for GHG assets.

Non-Vanilla Tax Structure: An Example



The chart above demonstrates how a non-vanilla tax structure can be applied to a notional income stream of emission reductions, such that the capitalized value of that income stream (net present value or NPV) can be extracted ex ante.

Clearly, as a prerequisite, any emitter applying such a structure must have a balance sheet with an assessable tax

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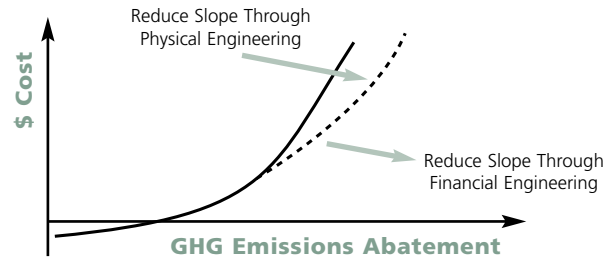
position against which a deduction can be made. Moreover, it should be realized that such a structure only provides for the emission reductions NPV at "1-tax rate" and, as such, not all the capitalized value can be unlocked. The extent of latent value is a function of the applicable tax rate. In balance, however, many Annex B jurisdictions (OECD plus economies in transition) provide for amortization of deductions across more than one tax year, thus providing the beneficiary with some latitude as to temporal tax positioning within the special purchase vehicle.

While such structures may initially appear esoteric, this particular example demonstrates that the application of structured financing techniques to emission reduction events can enhance the balance-sheet. Indeed, a diversity of structures can be applied to achieve similar results in terms of providing mechanisms through which the cost of emission reductions can be reduced (or, conversely, the benefit of emission reduction events can be enhanced).

The application of structured and/or project financing techniques to emission reduction events is also important in the more general policy context. Policy analysis of emission reduction cost-structures is now evolving to the point where it is increasingly important to articulate the differences between marginal abatement cost curves and GHG supply curves. While theorists have traditionally contended that the two are interchangeable, the accuracy of this argument relies on the assumption that all actors wishing to access emission reductions along the supply curve have uniform costs of capital. This assumption is being tested. ICF Consulting holds the view that the difference between a supply curve (in pure "engineering solution" terms) and an abatement cost curve is the degree to which the supply cost event can be re-engineered to materially reduce those costs. It is in this context that the application of structured and project financing techniques becomes critical. The following chart demonstrates how a marginal abatement cost curve (dotted line) might be manipulated such that it departs from the carbon supply curve.

Companies are increasingly seeking to manage their emission positions more competently through the application of often esoteric financing techniques to execute transactions that minimize or negate residual risk classes such as

GHG Supply Curve: Positive Manipulation



those arising from the uncertainty over the structure of the Kyoto Protocol. Indeed, tax-based structures (i.e., structured financing) are increasingly being applied to project financing to reduce the effective cost of capital and reduce the effective nominal investment hurdle-rate. When matched with some of the emergent credit enhancement products that are capable of negating classes of risk within structured financing transactions, the potential enhanced value of unilateral early action by corporations to reduce GHG emissions can be fully realized.

About ICF Consulting

ICF Consulting is one of the world's leading consulting firms advising clients on managing the world's natural, physical, economic, and community resources in a sustainable way. The firm's more than 750 employees help clients optimize energy resources, meet environmental challenges, foster economic and community development, enhance transportation policy and projects, and manage information technology resources. ICF Consulting's clients include firms in the energy and utility industries, all levels of government, and national and multilateral organizations throughout the world. ICF Consulting has 16 offices around the globe, including offices in Bangkok, Chicago, Fairfax, London, Los Angeles, Melbourne, Moscow, New York, San Francisco, Toronto, and Washington, D.C.

For more information on ICF Consulting's services, please visit our Web site at **www.icfconsulting.com.**

We welcome your comments and suggestions. Please contact us at 1.703.934.3659 or by e-mail at **consult@icfconsulting.com.**