

LEADING BY EXAMPLE:  
PROFITABLE CORPORATE STRATEGIES AND  
SUCCESSFUL PUBLIC POLICIES FOR REDUCING  
GREENHOUSE GAS EMISSIONS

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OVERVIEW

Ever since Michael Porter published his short but influential article in *Scientific American* in 1991,<sup>1</sup> academics, regulators, business people and environmentalists have been experimenting with and debating a hopeful question: *Can a reduced environmental footprint go hand-in-hand with economic growth and profitability?* At least in regard to greenhouse gas (GHG) emissions, we may have reached a tipping point toward an affirmative answer in the debate. There is growing and widespread recognition that the astronomical public cost of potential climate change alters the nature of economic calculations and strategic business decision-making. Business leaders have set aside arguing about the science of climate change and its attendant uncertainties. Instead, they have decided to take action.<sup>2</sup> At the same time,

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<sup>1</sup> Michael E. Porter, *America's Green Strategy*, SCI. AM., Apr. 1991, at 168.

<sup>2</sup> As early as 1997, BP Amoco chief executive Sir John Browne took a maverick position in a speech, acknowledging the need to confront climate change, and committing his company to taking responsible action. See Martha M. Hamilton, *Oil Firm Plans to Go Beyond Emissions Pact; British Petroleum's Target: 10% Cut in 'Greenhouse' Gases*, WASH. POST, Sept. 13, 1998, at F01 (stating that BP became the first oil company to acknowledge the role of fossil fuels). More recently, Randy Overbey, president of Alcoa's energy business, said before a Senate subcommittee, "Rather than further debate the science, we have decided that the risk of significant climate change is an issue of vital importance requiring action." Elizabeth Shogren, *Warming up to Reducing Greenhouse Gases: Some Big Businesses, States and Cities are Taking Market Based Steps to Curb the Emissions Thought to Cause Climate Change*, L.A.

leading governments at every level around the globe have set standards and made investments in promoting GHG reductions in economic jurisdictions large and small.<sup>3</sup> A long-held belief has prevailed for decades that environmental management necessarily entails increased cost, a dampening of competitiveness, and restrictions on growth.<sup>4</sup> Accumulating evidence is turning this thinking—which has been a major stumbling block to change—on its head.<sup>5</sup>

In this paper, we will look at what some of these most forward-thinking multinationals and governments have done, and will extract from their experience the evidence that points to the business upside of managing GHG emissions. We will also look at successful public policies that have supported the competitive posture of business at national, regional, and local levels while helping to reduce emissions levels. In every instance we examine, the reduction of GHG emissions have resulted in substantial cost-savings and directly benefited the bottom-line of businesses. In other instances, the evidence will show how costs can be wisely managed and systems put in place to preserve the competitiveness of industries in a carbon constrained future. Sometimes it is a visionary leader that sees the opportunity and guides the enterprise to seize it; sometimes it is an innovative public policy that creates the opportunity more broadly for all constituents. In every case, the evidence provokes us to think in new ways about what is possible to accomplish and how.

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TIMES, July 30, 2003, at A15. Also, Christopher Walker, managing director of Swiss Re's GHG Risk Solutions unit, said before another Senate subcommittee, "The question is no longer whether the climate is changing, but how the occurring climate change will affect our existence, what conclusions can be drawn from it and what can be done to mitigate the impact." Christopher T. Walker, Managing Director of Greenhouse Gas Risk Solutions, Swiss Re, Testimony at the Hearing on the Case for Climate Change Action (Oct. 1, 2003), available at [http://commerce.senate.gov/hearings/testimony.cmf?id=949&wit\\_id=2674](http://commerce.senate.gov/hearings/testimony.cmf?id=949&wit_id=2674).

<sup>3</sup> See, e.g., charts *infra* pp. 66-80.

<sup>4</sup> Genevieve Mullett, *Iso 14000: Harmonizing Environmental Standards and Certification Procedures Worldwide*, MINN. J. GLOBAL TRADE, Winter 1997, at 379.

<sup>5</sup> See, e.g., Michael Meacher, *Let Us All Make It Our Business to Clean up*, TIMES (London), Feb. 24, 1998.

Regional changes in climate have already had an impact on biological systems around the world,<sup>6</sup> and global economic losses from catastrophic weather events have increased more than ten-fold over the last 50 years.<sup>7</sup> In the most elite business circles, climate change has taken its place as the leading global environmental threat to economic well-being.<sup>8</sup> It is now the largest global industrial enterprises that are voluntarily and meaningfully leading the way on reducing GHG emissions. In many cases, these companies operate in the sectors that produce the most GHG emissions. The marketplace, the academic literature, and the popular press are starting to agree that including environmental planning and emission-reduction goals in strategic planning and execution enhances competitiveness and can directly impact bottom-line profitability.<sup>9</sup> Data emerging from the most innovative companies is showing direct cost savings of billions of dollars together with significant accompanying environmental benefits. Yet these "free lunches" are only a part of the broader story of how the application of business principles to environmental management can yield advantages to both shareholders and the Earth's climate.<sup>10</sup> Companies can deploy GHG reduction strategies to secure additional competitive advantages in a variety of ways, such as: enhancing brand equity and product differentiation, improving risk management calculations, redefining markets, and being able to lead and influence the drafting of impending regulatory standards.

According to one study, already a few years old, "35% of the world's 250 largest corporations issue environmental reports,"<sup>11</sup>

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<sup>6</sup> See Daniel Glick, *The Big Thaw*, NAT'L GEOGRAPHIC, Sept. 2004, at 13 (containing a recent catalogue of the global impact of climate change).

<sup>7</sup> INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2001: IMPACTS, ADAPTATION, AND VULNERABILITY 13 (2001).

<sup>8</sup> For example, business leaders at the World Economic Forum in Davos, Switzerland in 2000 voted global climate change as the most pressing issue confronting the global business community. See Matthew Bramley & Robert Homung, *Martin Failed Us on Climate Change*, TORONTO STAR, Mar. 3, 2000, at OP01.

<sup>9</sup> See, e.g., FOREST L. REINHARDT, DOWN TO EARTH: APPLYING BUSINESS PRINCIPLES TO ENVIRONMENTAL MANAGEMENT (2000).

<sup>10</sup> *Id.* at 80-82, 101-03.

<sup>11</sup> Ans Kolk, *Green Reporting*, HARV. BUS. REV., Jan.-Feb. 2000, at 15.

and that number has certainly already grown substantially since. It is easy to find these reports on company web sites, posted under prominent homepage tabs marked "Sustainability," "Environment" or "Climate Change." Often, these reports take the form of well-produced printed publications, on par with the company's annual report. This investment in public exposure is to some degree public relations, to some degree an acceptance of environmental science, and to some degree routine corporate public disclosure. What is striking, however, is that it represents the surfacing of a larger, unseen and widespread effort many years in the making. Over the last decade in particular, companies have invested in research, pilot programs, new management and reporting structures, and new standards and methods of internal information-gathering—in short, in new company wide infrastructures dedicated to environmental management.<sup>12</sup> These companies are now in a position to report quantified results and carefully considered opinions and to make public commitments to reduce GHG emissions as part of a larger business strategy.

These companies could not behave this way if it was not in the interest of their shareholders. Their collective business wisdom has come to recognize that a profitable future depends upon decarbonized economic growth, and there has emerged a whole new field of expertise—called carbon management—increasingly crucial to the long-term well-being of the global economy. As a result, environmental science is finding expression in cutting-edge business practices.

It is a surprising development that has emerged quietly and incrementally, but now appears to be gathering steam. A recent tally pointed to nearly sixty large companies with combined net annual sales of \$1.5 trillion that are pursuing GHG emissions-reduction targets<sup>13</sup>—even in the absence of a ratified Kyoto

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<sup>12</sup> See, e.g., chart *infra* pp. 59-65.

<sup>13</sup> Andrew Hoffman, *Winning the Greenhouse Gas Game*, HARV. BUS. REV., Apr. 2004, at 20; see also ANDREW HOFFMAN, BOSTON UNIV. SCH. OF MGMT., CLIMATE CHANGE STRATEGY: THE BUSINESS LOGIC BEHIND VOLUNTARY GREENHOUSE GAS REDUCTIONS (2003), available at [http://www.pca-online.org/our\\_work/docs/climate\\_change\\_report.pdf](http://www.pca-online.org/our_work/docs/climate_change_report.pdf) (last visited Nov. 21, 2004) (an earlier and more in depth version of the article found in the Harvard Business Review).

Protocol. These global industrial leaders have paved the way and are securing for themselves a number of purely economic advantages: substantial cost-saving, influence over the crafting of new regulatory standards, experience with emerging emission trading mechanisms, as well as favorable consumer perceptions.

To some degree, the natural laws of business competition are forcing imitation by archrivals and lesser players, and at the most forward-thinking companies, environmental planning has taken its place in the boardroom as a strategic business weapon.<sup>14</sup> At the same time, governments across the globe—national, regional, and local—are promoting green practices with public funds and securing competitive advantages for their constituents.<sup>15</sup> Before reviewing the specifics of this activity, it is important to take note of some of the contours of this growing shift in thinking and business practice and consider the reasons why this activity needs the support of sound national and international public policy frameworks.

The auto industry provides a good example of how the most forward-thinking companies are creating a competitive advantage by anticipating climate change regulations, and how the most forward thinking national governments are using regulatory frameworks to support the long-term competitiveness of their national auto industries.

The most progressive auto companies are expecting that a global regulatory framework will soon mandate significant reductions in permissible CO<sub>2</sub> emissions, and have already taken steps to comply with a carbon-constrained future.<sup>16</sup> Other competing auto manufacturers have not done so and are only now beginning to confront how climate change might impact their businesses.<sup>17</sup> It turns out that this difference has a significant and quantifiable economic meaning. A recent report found that the

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<sup>14</sup> Meacher, *supra* note 5.

<sup>15</sup> See, e.g., FED'N OF CANADIAN MUNICIPALITIES, GREEN MUNICIPAL FUNDS (2004) (on file with Widener Law Journal).

<sup>16</sup> See, e.g., Ralph Manning, *Electronic Car Solution?*, ORLANDO SENTINEL TRIB., Feb. 21, 1994, at A12.

<sup>17</sup> See, e.g., DUNCAN AUSTIN ET AL., WORLD RES. INST., CHANGING DRIVERS: THE IMPACT OF CLIMATE CHANGE ON COMPETITIVENESS AND VALUE CREATION IN THE AUTOMOTIVE INDUSTRY iii (2003).

costs companies will incur in meeting new carbon constraints "will vary across the industry," estimating "that costs per vehicle will range from \$650 for BMW to less than \$25 per vehicle for Honda."<sup>18</sup> American automakers, currently dependant on fleets of light trucks and sport utility vehicles (SUVs) for profits, are among the most exposed to downside risk. The report projects that the two biggest independent American automakers will face costs near the top end of the scale: \$403 additional cost per vehicle for Ford Motor Company (Ford), \$377 additional cost per vehicle for General Motors (GM), and that because of this, profits between now and 2015 will be negatively affected: 10% lower for Ford, and 7% lower for GM.<sup>19</sup> A new breed of financial analysts are starting to add up the costs, bringing a new kind of intelligence to the stock market, and investors are starting to recognize this as a material issue.<sup>20</sup>

In contrast to Europe and Japan, the regulatory structure in the United States is not enhancing the long-term competitiveness of its automakers. On the national level, Washington has backed away from Kyoto.<sup>21</sup> It is true that on the state level a number of legislatures have enacted measures to cap emissions linked to global warming.<sup>22</sup> Most notable is a California law that caps permissible greenhouse gas emissions from automobiles starting in 2009.<sup>23</sup> It's the toughest and first law of its kind, but it is being contested by automakers with support from Washington.<sup>24</sup> They have argued in court that the California law is an attempt at the state level to impose better fuel economy standards, a prerogative that under federal law is reserved for Washington lawmakers.<sup>25</sup>

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<sup>18</sup> *Id.* at 33.

<sup>19</sup> *Id.* at 41.

<sup>20</sup> Danny Hakim, *Catching Up to the Cost of Global Warming*, N.Y. TIMES, July 25, 2004, § 3, at 5.

<sup>21</sup> Jeffrey Ball, *States Feel Heat on Global Warming Steps: Political, Industry Pressures Undermine Efforts to Trump Washington on Emissions in Absence of Federal Action Curbs*, WALL ST. J., Nov. 12, 2003, at 4.

<sup>22</sup> *Id.* (summarizing the different approaches certain states have taken to reduce carbon dioxide emissions).

<sup>23</sup> *Id.*

<sup>24</sup> Danny Hakim, *California Softens Plan to Control Auto Emissions*, N.Y. TIMES, Aug. 7, 2004, at C1; *see also* Ball, *supra* note 21.

<sup>25</sup> Ball, *supra* note 21.

Despite local efforts at reform in the United States, the federal stance has remained fixed. "The fuel economy standard for cars remains at the 27.5 mpg . . . level first set in 1990."<sup>26</sup> "In Japan, new legislation requires fuel economy improvements in cars of 23[%] beyond 1995 levels by 2010."<sup>27</sup> Some cars will be required to average 44 mpg.<sup>28</sup> In the European Union, automakers have sat down with regulators and made voluntary commitments to reduce "CO<sub>2</sub> emissions from passenger cars by 25[%] relative to 1995 levels by 2008."<sup>29</sup> This translates into vehicles that average 39 mpg.<sup>30</sup> Early progress will extend the target to 46 mpg by 2012.<sup>31</sup>

Public policies like those in Japan and the European Union that support emissions reductions have a number of powerful drivers working to their advantage and are proving to be a boon to business. First, since they set targets and benchmarks, the policies effectively focus planning, execution, and measurement. They also create a favorable environment in which companies can allocate funds or secure financing to pay for measures that might otherwise be more difficult to justify. Most observers believe some form of global regulation is inevitable, and the stock market is beginning to look at preparedness for a carbon constrained future as a tangible asset that will be intimately linked to company performance. Action to impose regulatory standards on the U.S. auto industry in this context might be seen as a supportive mechanism. Evidence indicates that the measures will protect the global competitiveness of American industry in the long term by correcting an overemphasis on short-term gains that might prove crippling.<sup>32</sup>

It will be instructive to witness this global interplay between companies pursuing a forward-thinking environmental business strategy, disadvantaged competitors delaying the advent of an

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<sup>26</sup> See AUSTIN ET AL., *supra* note 17, at 6.

<sup>27</sup> *Id.* at 5.

<sup>28</sup> *Id.*

<sup>29</sup> *Id.*

<sup>30</sup> *Id.* at 12.

<sup>31</sup> *Id.* at 5.

<sup>32</sup> See generally RICHARD BYRNE, UNION OF CONCERNED SCIENTISTS, LIFE IN THE SLOW LANE: TRACKING DECADES OF AUTOMAKER ROADBLOCKS TO FUEL ECONOMY 9-10 (2003) (discussing the automobile industry fear that CAFÉ emissions reductions will harm business and noting that Japan has already adopted competitive technologies).

inevitable future, and evolving public policy, not only in the auto industry, but in every major industrial sector, including those that do not even produce significant GHG emissions of their own.<sup>33</sup>

There may now be a few hundred companies around the world actively working to reduce emissions. It is not yet possible to easily evaluate or directly compare their efforts because standards of measurement, reporting, and verification have not yet achieved a uniform reliability, and, for the present, we must rely largely on what these companies have chosen to publicly disclose. The chart on pages 59-63 is the best we can compile of this vanguard of forward-thinking companies actively and publicly engaged in confronting the issue of climate change. We have every indication that their numbers are growing. Still, we must keep in mind that by one estimate there are 65,000 transnational corporations in the world,<sup>34</sup> and it is unlikely that most of these will follow the lead of the few hundred leading reducers unless compelled by public policy to do so. Other charts below provide a broad glimpse of policy frameworks that are supporting emissions reductions. They reveal an impressive array of activities at municipal, regional and national levels in the United States, Canada, Europe and Australia.<sup>35</sup>

Let us now examine in some greater detail the case of three global industrial giants in particular that have profitably integrated GHG management into strategic planning and standard operating procedure, and mention a few other notable efforts. Then, let us look at some of the most advanced public sector policy frameworks that are reducing emissions today. It is in the intersections of these policy frameworks and the innovations of the leading corporate reducers around the world that the path to a carbon-managed future will eventually be found.

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<sup>33</sup> This theme recently found prominence on the cover of a leading, popular business magazine. See John Carey, *Global Warming: Why Business Is Taking It So Seriously*, BUS. WK., Aug. 16, 2004, at 60.

<sup>34</sup> WORLD RES. INST., 6 ENVIRONMENTAL STORIES TO WATCH IN 2004: REMARKS BY JONATHAN LASH ON DECEMBER 22, 2003 9 (2003).

<sup>35</sup> There is activity and responsiveness in other parts of the globe, but this paper does not include consideration of them.

## LEADING CORPORATE INNOVATORS

The three companies we will examine in detail in this section have been chosen because they differ so fundamentally in their relationship to climate change in both strategic motivation and tactical execution. BP's story is the tale of bold, visionary leadership. Swiss Re's story is about necessary action in the face of tremendous risk. IBM's case demonstrates how to remain agnostic in the face of debate yet extract tremendous advantage from operational opportunities. Most businesses can locate themselves within this wide spectrum of strategy and experience exemplified by these three global giants. At the end of this section, we specifically mention a few other companies that appear on the chart on pages 59-63, whose stories deserve a closer look.

*BP*

The environmental story of oil giant BP is well documented in both academic and popular literature.<sup>36</sup> Sir John Browne, the company's chief executive, made an unprecedented speech in 1997 in which he publicly asserted that it would be unwise to ignore the legitimate scientific concern over climate change.<sup>37</sup> He committed the company to GHG reductions and the pursuit of international solutions to address the issue—six months before diplomats were to meet in Kyoto to craft the well-known protocol. It was a bold act of leadership and a calculated grab for the competitive advantage that comes with defining a unique industry position. Yet at the time, neither Browne nor BP managers knew precisely how they would live up to their new commitments even though their public adoption of a responsible posture on climate issues had been years in the making.<sup>38</sup>

One of the company's first moves was to design and implement an internal system that would allow BP business units

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<sup>36</sup> See, e.g., FOREST L. REINHARDT & EMILY RICHMAN, GLOBAL CLIMATE CHANGE AND BP AMOCO, HARVARD BUSINESS SCHOOL CASE STUDY, N9-700-106 (2000).

<sup>37</sup> BP P.L.C., BP SUSTAINABILITY REPORT 2003 23 (2004) [hereinafter BP SUSTAINABILITY REPORT 2003].

<sup>38</sup> See REINHARDT & RICHMAN, *supra* note 36, at 7-9.

to trade GHG emissions.<sup>39</sup> The carbon trades were treated like actual cash flows and used to evaluate the financial performance of the twelve business units participating in the pilot program.<sup>40</sup> By 2000, the system was expanded to encompass all of the company's 130 business units.<sup>41</sup>

At the same time, in the fall of 1998, BP announced that it would reduce its own emissions of greenhouse gases by 10% from 1990 levels by the year 2010.<sup>42</sup> Given anticipated growth, this meant an actual reduction of 50%,<sup>43</sup> and when the announcement was made, the company was certain that only two-thirds of the emissions savings could be accomplished without incurring net present costs.<sup>44</sup> It remained unclear how the final one-third of reductions would be accomplished and what they would cost the company, but it put the company on a path to "acquire the managerial skills it would need in a world where Kyoto had the force of law."<sup>45</sup> The inspirational target-setting transformed thinking and unleashed new solutions. One example: the company arbitrarily disallowed the flaring of short-chain waste gases (butane and propane) to curtail GHG emissions, and managers discovered profitable markets for the gases in the neighborhood of the refineries.<sup>46</sup>

In its own sustainability report, BP summarizes this story rather cryptically, but with an emphasis on the numbers. The company reports that it spent approximately \$20 million to carry out its internal emissions reductions strategy<sup>47</sup> and has reaped almost \$650 million in savings within the first three years of its implementation.<sup>48</sup> It reports that senior BP management was so

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<sup>39</sup> BP CANADA ENERGY CO., BP, CLIMATE CHANGE ACTION PLAN UPDATE 10-11 (2001), at <http://www.vcr-mvr.ca/registry/out/C0621-BPCEN-02-PDF.PDF> (on file with Widener Law Journal).

<sup>40</sup> See BP AMOCO, GREENHOUSE GAS EMISSIONS TRADING IN BP AMOCO 6 (1999).

<sup>41</sup> *Id.* at 5, 12.

<sup>42</sup> See BP SUSTAINABILITY REPORT 2003, *supra* note 37, at 23.

<sup>43</sup> *Id.* at 4.

<sup>44</sup> REINHARDT & RICHMAN, *supra* note 36, at 10.

<sup>45</sup> *Id.*

<sup>46</sup> *Id.* at 14.

<sup>47</sup> See BP SUSTAINABILITY REPORT 2003, *supra* note 37, at 23.

<sup>48</sup> *Id.*

surprised by the results that they transferred responsibility for this work from the environmental affairs division to line business units and predicts that there is at least another \$650 million in value to be realized from the next step in reduction efforts.<sup>49</sup> The internal carbon trading system has yielded a real reduction of just under 20% against business as usual and earned the company an advisory role in developing the European Union's Emissions Trading System.<sup>50</sup> Compared to industry giants that have been slow to respond to climate, BP has developed a number of desirable competitive advantages through its visionary pursuits: substantial internal cost reductions, brand differentiation, managerial expertise, influence in regulatory arenas, and a number of intangible benefits such as improved employee morale and pride.

#### *Swiss Re*

Swiss Re, the global financial services company, announced its intention to become GHG neutral by 2013.<sup>51</sup> Swiss Re is North America's leading reinsurer and the world's largest life and health reinsurer.<sup>52</sup> Still, the company was only responsible for the release of about 43,700 tons of CO<sub>2</sub> in 2003,<sup>53</sup> a relatively insignificant amount hardly worth even mentioning. So why did the company bother to draw attention to its effort?

It was a largely symbolic step made at the request of the company CEO to align Swiss Re's internal policies with its industry-leading positions on climate change. The company has come to regard climate change as the single greatest threat to its viability as a business and has been at the forefront of efforts in the financial services industry to address the problem through its business and investment expertise. The stakes are high not only for

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<sup>49</sup> Email from Chris Mottershead, Distinguished Advisor, BP Energy and the Environment, to Michael Northrop, Rockefeller Brothers Fund (Sept. 29, 2003) (on file with author).

<sup>50</sup> See Hoffman, *Winning the Greenhouse Gas Game*, *supra* note 13, at 19.

<sup>51</sup> See SWISS RE, SUSTAINABILITY REPORT 3 (2003) [hereinafter SWISS RE SUSTAINABILITY].

<sup>52</sup> News Release, Swiss Re, Swiss Re to Acquire CNA Financial's Book of Life Insurance Policies in Admin Re Transaction (Feb. 5, 2004) (on file with Widener Law Journal).

<sup>53</sup> See SWISS RE SUSTAINABILITY, *supra* note 51, at 3.

the company and the industry, but for the global financial system as a whole, and Swiss Re's commitment to eliminate its own emissions footprint was a loud statement of what it believes the rest of the world should do as well.

Insurance and reinsurance act as powerful enablers of business. By decreasing and spreading risk, insurance enables a business enterprise—for example, the construction of a high-rise office building—to attract capital at sufficiently reasonable terms to proceed. Insurance rates are calculated on the basis of historical data, but climate change threatens to confound the actuarial assessment of risk.<sup>54</sup> Catastrophic, weather-related disasters have already become increasingly frequent, unpredictable, and expensive.<sup>55</sup> As one executive put it, "If historical data is not reliable, then there will be no difference between insurance and gambling."<sup>56</sup>

The company has three climatologists on staff and in 2000 created a special unit—called Greenhouse Gas Risk Solutions (GHGRS)—as part of the Financial Services Business Group to mitigate and manage risk associated with climate change issues.<sup>57</sup> One primary means of affecting change is through raising awareness. Swiss Re has initiated a series of conferences at its own Centre for Global Dialogue and elsewhere, has issued a number of publications, and is an active member of a number of international

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<sup>54</sup> See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 7, at 13.

Such developments would place upward pressure on insurance premiums and/or could lead to certain risks being reclassified as uninsurable with subsequent withdrawal of coverage. Such changes would trigger increased insurance costs, slow the expansion of financial services into developing countries, reduce the availability of insurance for spreading risk, and increase the demand for government-funded compensation following natural disasters.

*Id.*

<sup>55</sup> See generally SWISS RE, NATURAL CATASTROPHES, at [www.swissre.com/INTERNET/PWSWSPR.nsf/wwallbyidkey/v/WJAN55klbv](http://www.swissre.com/INTERNET/PWSWSPR.nsf/wwallbyidkey/v/WJAN55klbv) (on file with Widener Law Journal).

<sup>56</sup> Interview with Christopher Walker, Managing Director, Greenhouse Gas Risk Solutions, Swiss Re Financial Services Corporation (July 26, 2004) (on file with author).

<sup>57</sup> See generally SWISS RE'S GREEN HOUSE GAS RISK SOLUTIONS, SWISS RE, at <http://www.swissre.com> (search keyword GHGRS).

groups involved in emissions trading and carbon sequestration.<sup>58</sup> It is also making its influence felt directly in business with its clients.

For example, Swiss Re concluded that climate change issues expose directors and officers of corporations to significant risk of personal liability if they fail to comply with climate change related regulations.<sup>59</sup> As a result, Swiss Re is educating companies with Directors and Officers (D&O) policies and requiring them to address the issue to prevent losses, for example, from GHG-related shareholder lawsuits.<sup>60</sup> D&O policy renewals for corporate clients are now contingent upon the completion of a questionnaire that requires answers on emissions levels, emission reduction plans, and the company's climate change strategy, forcing attention to be paid to these issues at the highest levels of client companies.<sup>61</sup> The responses are factored into risk and underwriting assessments.<sup>62</sup>

Swiss Re has also developed innovative products to further emission reductions in a number of ways. One product removes some risks that have hampered the functioning of early emissions trading mechanisms.<sup>63</sup> Another product spreads risk across a portfolio of renewable energy projects, so that, for example, a single failed geothermal drilling attempt does not ruin an otherwise viable project.<sup>64</sup> Other products succeed in decreasing the cost of capital for GHG reduction projects.<sup>65</sup> Swiss Re became the first

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<sup>58</sup> See generally Swiss Re Centre for Global Dialogue at <http://www.ruschlikon.net/INTERNET/rschwebp.nsf?Open> (a search for greenhouse gas illustrates numerous conferences on the topic).

<sup>59</sup> Christopher Walker, Managing Director of Greenhouse Gas Risk Solutions, Swiss Re, Testimony at the Hearing on the Case for Climate Change Action (Oct. 1, 2003), available at [http://commerce.senate.gov/hearings/testimony.cmf?id=949&wit\\_id=2674](http://commerce.senate.gov/hearings/testimony.cmf?id=949&wit_id=2674) [hereinafter Walker Testimony].

<sup>60</sup> See generally Chris Walker, Fingerprints and Footprints: The Commercialization of Sustainability—A Reinsurer's Prospective, Presentation, (May 12, 2004) (noting that shareholders introduced more than twenty-five climate-change related resolutions in 2003 and in a number of cases—at Chevron, Exxon and AEP, for example—garnered about one third of votes in support), available at [www.theclimategroup.org/tcg\\_conf\\_walker.ppt](http://www.theclimategroup.org/tcg_conf_walker.ppt) [hereinafter Walker Presentation].

<sup>61</sup> See Walker Testimony, *supra* note 59.

<sup>62</sup> *Id.*

<sup>63</sup> See Walker Presentation, *supra* note 60.

<sup>64</sup> *Id.*

<sup>65</sup> *Id.*

company to insure an offshore wind farm by combining isolated underwriting expertise for marine and energy projects into a single product.<sup>66</sup> With \$9 trillion in assets under management, Swiss Re is also innovating to develop project financing mechanisms and special investment funds to attract capital for energy efficiency projects that might otherwise remain uncanceled.<sup>67</sup>

The business advantage of this activity lies neither in cost reductions nor securing advantages over competitors in a regulated future, but in the managing of risk and uncertainty. A future marked by severe climate change could effectively undermine much of the insurance industry, so the measures that the world's second largest reinsurer is taking are designed to secure the company's long term future and protect its value proposition for shareholders.

### *IBM*

IBM has reported astonishing cost-savings figures directly related to emission reduction efforts. Since 1990, the company has reduced GHG emissions by 65% and in the process realized a savings of \$791 million.<sup>68</sup> IBM has turned energy efficiency into a hidden profit center. It has mandated an annual internal energy conservation target of 4%, and has exceeded the target three years in a row.<sup>69</sup> In 2003, "conservation measures reduced electricity use by 331 million KW hours, and fuel use by an equivalent of 2.38 million gallons of oil, representing 7.2% of total energy use for the year."<sup>70</sup> The company also derived 2.5% of its energy needs from renewable energy sources.<sup>71</sup> Through these measures, it "avoided the release of more than 180,000 tons of CO<sub>2</sub> emissions."<sup>72</sup> In "1998, IBM became the first semiconductor manufacturer to set a

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<sup>66</sup> *Id.*

<sup>67</sup> *Id.*

<sup>68</sup> Ravi Kuchibhotla, Energy and GHG Emissions Management at IBM Corporation, Presentation at the Toronto Conference of the Reducers (May 10, 2004), available at [http://www.theclimategroup.org/tcg\\_conf\\_kuchibhotla.ppt](http://www.theclimategroup.org/tcg_conf_kuchibhotla.ppt).

<sup>69</sup> *Id.*

<sup>70</sup> *Id.*

<sup>71</sup> *Id.*

<sup>72</sup> *Id.*

numeric emissions reduction target for perfluorocompounds,"<sup>73</sup> and since 2000 has reduced emissions of them by more than 55%.<sup>74</sup>

While these numbers by themselves make a strong business case for the potential benefits of emission reductions based on energy conservation strategies, what is also worthy of note is the company's well-developed environmental management system that supports these efforts.<sup>75</sup> IBM operations do not directly release significant quantities of greenhouse gases, yet the environmental management system has been able to identify indirect sources of emissions, reduce them, and extract a handsome return.<sup>76</sup>

IBM's environmental management system has developed over decades and originated in response to concerns that predate climate change.<sup>77</sup> The system, however, has come to include a set of specific instructions for energy management that has created an internal infrastructure.<sup>78</sup> Senior executives at IBM locations are required to designate individual energy managers, submit annual master plans for energy consumption, and provide periodic reports on energy consumption, conservation and cost avoidance.<sup>79</sup> Global energy managers also meet periodically to share knowledge and best practices and are charged with conducting annual self-assessments.<sup>80</sup> The company also conducts independent internal audits.<sup>81</sup> In addition, through participation in a number of external voluntary programs and the establishment of internal recognition and award programs, IBM is including energy conservation as a plank of its corporate culture.<sup>82</sup>

Unlike Swiss Re, IBM remains guarded in its public posture on climate change. In its first corporate responsibility report issued

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<sup>73</sup> *Id.*

<sup>74</sup> Kuchibhotla, *supra* note 68; *see also* IBM, CORPORATE RESPONSIBILITY REPORT 62 (2002) [hereinafter IBM, CORPORATE RESPONSIBILITY].

<sup>75</sup> IBM, ENVIRONMENT AND WELLBEING PROGRESS REPORT 13 (2000) [hereinafter WELLBEING REPORT].

<sup>76</sup> *See* IBM, CORPORATE RESPONSIBILITY, *supra* note 74, at 62.

<sup>77</sup> WELLBEING REPORT, *supra* note 75, at 15.

<sup>78</sup> *Id.*

<sup>79</sup> *Id.*

<sup>80</sup> *Id.*

<sup>81</sup> *Id.* at 17.

<sup>82</sup> IBM, CORPORATE RESPONSIBILITY, *supra* note 74, at 62.

in 2002, the company used the qualifier "so-called" in reference to greenhouse gases and remained agnostic in its stance on climate change science.<sup>83</sup> This cautionary public stance may reflect sensitivity to the prevailing political winds in Washington, yet IBM's example still provides a powerful business argument for action on emissions. It is not necessary for companies to take a stand on climate change science, nor even to be a major producer of GHG emissions in order to extract profit through energy efficiency and reduce its environmental footprint.

#### *Some Other Efforts of Note*

A number of other companies bear some passing mention here because they are significant players in major industries, and help us to round out a picture of how awareness of climate change issues and their consequences is permeating global economic thinking.

In the chemical industry, multinational giant Dupont has achieved "almost a 70% reduction in all GHG emissions since 1990" across all regions of global operation, realized "a cumulative energy savings of more than \$2 billion," and is now looking to influence the practices of companies in its own hefty supply chain.<sup>84</sup> Between 1990 and 2000 the company had cut its GHG emissions by 40% while holding energy use flat and increasing output by 40%.<sup>85</sup> In 2000, the company committed to reducing emissions an additional 25% by 2010.<sup>86</sup> By 2010, the company aims to obtain 10% of its energy from renewable sources<sup>87</sup> and hopes to steadily increase this percentage over time.

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<sup>83</sup> *Id.* at 64.

<sup>84</sup> Dave Findlay, Presentation at Toronto Conference of the Reducers (May 10-12, 2004); see also Dupont, *Global Greenhouse Gas & Energy Consumption Graph*, in GLOBAL PROGRESS REPORT: PROGRESS REPORT DATA SUMMARY (2003), available at <http://www1.dupont.com/NASApp/dupontglobal/corp/5>.

<sup>85</sup> See generally DUPONT, GLOBAL PROGRESS REPORT: PROGRESS REPORT DATA SUMMARY (2003), available at <http://www1.dupont.com/NASApp/dupontglobal/corp/5>.

<sup>86</sup> Gary M. Pfeiffer, Creating Sustainable Business Assets for Today and Tomorrow, Address to the Year 2000 Conference on Environmental Innovation (Mar. 8, 2000), available at [www1.dupont.com/NASApp/dupontglobal/corp/index.jsp?page=/content/US/enUS/news/speeches/pfeiffer\\_03\\_08\\_00.html](http://www1.dupont.com/NASApp/dupontglobal/corp/index.jsp?page=/content/US/enUS/news/speeches/pfeiffer_03_08_00.html).

<sup>87</sup> *Id.*

Cement production is one of the world's largest sources of greenhouse gases, releasing about 5% of global emissions.<sup>88</sup> LaFarge, the world's largest cement manufacturer, produced eighty metric tons of carbon dioxide (CO<sub>2</sub>) in 2002, almost the equivalent of two Switzerlands.<sup>89</sup> By changing its manufacturing processes, however, LaFarge has reduced its GHG emissions by nearly 11% below 1990 levels;<sup>90</sup> by 2010, the company wants to reduce emissions by a total of 20% per ton of cement.<sup>91</sup> LaFarge is keen to continue this work since it is realizing significant cost savings and strengthening its future competitiveness in the industry. Other manufacturers are following its lead.<sup>92</sup>

Alcoa, the world's leading aluminum manufacturer, is forecasting a cost savings of \$62 million in 2004-2005 from emission reduction measures, a more than threefold increase over actual savings of \$19 million in 2002.<sup>93</sup> The company seeks to achieve a 25% reduction of GHG from base year 1990 by 2010, and if a new low-temperature manufacturing process proves feasible (inert anode technology), the reduction could grow by 50% compared to 1990 levels.<sup>94</sup> By eliminating wastes and applying design for sustainability, Alcoa expects to save \$100 million in environmental and energy costs by 2006.<sup>95</sup>

Tembec, a leading Canadian forest products company, has committed itself to entirely eliminating the use of fossil fuels in its

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<sup>88</sup> SUSTAINABILITY NOW, FOSSIL FUELS AND CEMENT CO<sub>2</sub> EMISSIONS, *at* <http://www.sustainability.ca/index.cfm?body=Chunkout.cfm&k1=318&CFID=5996151&CFTOKEN=61908224>.

<sup>89</sup> LAFARGE, OUR SECOND SUSTAINABILITY REPORT 3 (2003) [hereinafter LAFARGE REPORT]. A LaFarge representative put Switzerland's 2002 CO<sub>2</sub> emissions at forty-six metric tons. E-mail from Chris Boyd, LaFarge Representative, to Michael Northrop (Sept. 22, 2003) (on file with author).

<sup>90</sup> LAFARGE REPORT, *supra* note 89, at 2.

<sup>91</sup> *Id.*

<sup>92</sup> *See, e.g.*, ST. LAWRENCE CEMENT INC., SUSTAINABLE DEVELOPMENT: ENVIRONMENTAL RESPONSIBILITY, *at* [http://www.holcim.com/CA/ENC/b/IEW/oid/48661/channel\\_id/8801/module/gnm50/jsp/templates/editorial/editorial.html](http://www.holcim.com/CA/ENC/b/IEW/oid/48661/channel_id/8801/module/gnm50/jsp/templates/editorial/editorial.html) (last visited Oct. 17, 2004).

<sup>93</sup> Alcoa, Alcoa's Strategic Direction: A Vision for Tomorrow, Company Presentation (Apr. 2, 2004).

<sup>94</sup> ALCOA, NEIGHBORS BUILDING COMMUNITY: ALCOA MILL PRODUCTS 2002 COMMUNITY REPORT (2002).

<sup>95</sup> *Id.*

manufacturing operations by 2008.<sup>96</sup> Between 1990 and 2001, the company achieved an emission reduction of 27% as a result of energy efficiency programs and fuel conversion measures.<sup>97</sup> By 2008, the company intends to further reduce energy consumption by 10% and energy costs by 20% relative to 2002 levels.<sup>98</sup> Through energy efficiency, conservation and switching to greenhouse neutral fuels, the company has made significant strides. In the manufacturing process, one ton of product now generates 48% less CO<sub>2</sub> than in 1990. The company reduced total GHG emissions by 31% since 1990, and as compared to 1996, one ton of product requires 13% less energy to produce.

Austin Energy, the tenth largest community owned electric utility company in the U.S., has returned more than \$1.3 billion in profits to its customer-owners since 1976 and has not raised base electric rates since 1994.<sup>99</sup> Through energy efficiency programs that provide financing for cleaner appliances and encourage the installation of insulation, the utility has decreased electricity demand by 500MW since 1982.<sup>100</sup> Well-known locally for its investment in green buildings, Austin Energy is a leader in developing renewable energy sources. It currently generates 89MW of power from wind, 11MW from landfill gas, 1MW from hydro, and 250KW from the sun.<sup>101</sup> Customers can chose to buy energy generated only from renewable sources.<sup>102</sup> The company is

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<sup>96</sup> TEMBEC, TAKING OUR ENVIRONMENTAL RESPONSIBILITIES BEYOND THE BOARDROOM 3 (2003).

<sup>97</sup> See, e.g., TEMBEC, GREENHOUSE GAS EMISSIONS AND ENERGY CONSUMPTION TEMBEC PULP AND PAPER MILLS, at [http://www.tembec.ca/DynamicPortal?key=web&lng=enUS&crit=environment\\_emissions\\_gaz&page=tpl\\_env](http://www.tembec.ca/DynamicPortal?key=web&lng=enUS&crit=environment_emissions_gaz&page=tpl_env).

<sup>98</sup> TEMBEC, IMPACT ZERO (2004) at [http://www.tembec.ca/DynamicPortal?key=web&lng=enUS&crit=environment\\_programs\\_impact&page=tpl\\_env](http://www.tembec.ca/DynamicPortal?key=web&lng=enUS&crit=environment_programs_impact&page=tpl_env).

<sup>99</sup> AUSTIN ENERGY, COMPANY PROFILE, at <http://www.austinenergy.com/About%20Us/Company%20Profile/index.htm> (last visited Oct. 9, 2004).

<sup>100</sup> AUSTIN ENERGY, ANNUAL REPORT 15 (2003).

<sup>101</sup> *Id.* at 17.

<sup>102</sup> *Id.*; see also AUSTIN ENERGY, GREENCHOICE: THE #1 GREEN POWER PROGRAM IN AMERICA, at <http://www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Choice/index.htm> (last visited Oct. 10, 2004).

aiming to supply 20% of electricity demand from renewable sources by 2020,<sup>103</sup> including 100MW of solar power.<sup>104</sup>

"ST[Microelectronics,] one of the world's top five microchip manufacturers," has developed a "Decalogue" of commandments for environmental performance that yielded \$60 million in profit from energy efficiency from 1994-2001.<sup>105</sup> In 1999, the company committed itself to "zero net CO<sub>2</sub> emissions by 2010—when [the company] expects to be [manufacturing] forty times as many chips as it did in 1990."<sup>106</sup> By 2010, the company also expects 65% of its electricity to come from alternative sources, and forecasts that between 1994 and 2010, it will be saving \$900 million of energy and reducing CO<sub>2</sub> emissions by 10 million tons.<sup>107</sup>

#### ADVANCING POLICY FRAMEWORKS

Parallel to the efforts of industry have been the efforts of governments at all levels around the world—national, regional, and local. Despite the absence of an overarching global agreement, many governments have taken measures that are bearing fruit; below we examine a number of them. We will see that goal setting at the national level aligns the efforts of the entire national economy and positions it for future competitiveness—something we saw in the auto industry earlier in this paper.<sup>108</sup> What is also encouraging—and again parallel to experience we have from industry—is that these national efforts are expected to be economically beneficial.

The array of innovative approaches to fostering carbon reduction is quite impressive. They range from mandated emission reductions and progressive tax policies to novel financing mechanisms and innovative trading schemes. All these measures are creating a territory of opportunity into which industry is

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<sup>103</sup> AUSTIN ENERGY, STRATEGIC PLAN 21 (2003).

<sup>104</sup> *Id.* at 27.

<sup>105</sup> Chris Lotspeich, *Ecology Is Free: RMI's Work With STMicroelectronics*, RMI SOLUTIONS NEWSLETTER VOL. XIX #3 (Rock Mtn. Inst., Snowmass, Colo.), Fall-Winter 2003, at 7, 9.

<sup>106</sup> *Id.* at 9.

<sup>107</sup> *Id.*

<sup>108</sup> *See supra* pp. 25-28.

venturing and is finding, through this growing interplay of corporate strategy and emerging public policy, new possibilities for long-term growth, competitiveness, and profitability.

### *National Governments*

Germany has the third largest economy in the world<sup>109</sup> and has unilaterally made the most progress in reducing emissions. It is showing the most developed nations what is possible to accomplish. Even in the absence of a ratified Kyoto Protocol, it has already met its target—having already reduced emissions by 19% below 1990 levels.<sup>110</sup> It expects to achieve a 21% reduction target easily by 2010.<sup>111</sup> Furthermore, German officials think they can lower emissions by 40% by 2020.<sup>112</sup> Germany is also moving aggressively to develop renewable power. It installed 1200MW of new wind turbines in the past year, and its installed wind capacity now surpasses that of the United States.

Overall, Germany's approach includes scores of programs to make it easy for industry and private individuals to reduce emissions. A national initiative, the CO<sub>2</sub> Building Rehabilitation Program, provides low-cost loans to homeowners and small businesses for building retrofits, energy efficiency improvements, incentives for increased renewable energy generation, and innovative finance schemes.<sup>113</sup> These loans have been made possible by changes to national tax law.<sup>114</sup> Recent studies by the German government indicate that these actions will have no negative effects on the German economy, but rather will stimulate

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<sup>109</sup> *Cal Facts 2002: Economy*, at [http://www.lao.ca.gov/2002/cal\\_facts/econ.html](http://www.lao.ca.gov/2002/cal_facts/econ.html) (last visited Oct. 9, 2004).

<sup>110</sup> Press Release, European Commission, Greenhouse Gas Emissions in EU15 Declining (July 15, 2004) (on file with the Widener Law Journal).

<sup>111</sup> *Id.*

<sup>112</sup> *Id.*

<sup>113</sup> KREDITANSTALT FUR WIEDERAUFBAU, CO<sub>2</sub> BUILDING REHABILITATION PROGRAM, at [www.kfwfoerderbank.de/EN/Bauen%20Wohnen%20Energiesparen/KfWCO2Buil.jsp](http://www.kfwfoerderbank.de/EN/Bauen%20Wohnen%20Energiesparen/KfWCO2Buil.jsp) (last visited Oct. 9, 2004).

<sup>114</sup> *Id.*

economic growth, exports, and employment, and make Germany more competitive.<sup>115</sup>

In 1997, the United Kingdom committed to achieve a 12.5% reduction in GHG emissions by 2010, in accordance with the target set by the Kyoto Climate Treaty.<sup>116</sup> Based on positive experience in the subsequent six years, Prime Minister Blair's government announced intentions in early 2003 to cut emissions by a total of 20% by 2010.<sup>117</sup> The government also announced its intention to put the U.K. on track to reduce its emissions of CO<sub>2</sub> by 60% by 2050,<sup>118</sup> and to obtain 10% of the nation's electricity from offshore wind by 2010.<sup>119</sup>

A detailed study by the Department of Trade and Industry concluded that the economic costs to the country of these actions would be small, reducing GDP growth rate between 2000 and 2050 by around 0.005 percentage points.<sup>120</sup> These calculations make no effort to tabulate the benefits of climate action, which are believed to be substantial.

European Union policymakers have initiated an ambitious legislative agenda. As a start, a European-wide emissions trading scheme, seeking least-cost, continent-wide reductions, was approved in June 2003.<sup>121</sup> Between now and 2008, the European Union plans additional climate-related legislation on equipment standards, demand-side management, combined heat and power, procurement, transportation, infrastructure, bio-fuels, and

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<sup>115</sup> See, e.g., FED. MINISTRY FOR THE ENV'T, NATURE CONSERVATION & NUCLEAR SAFETY, FEDERAL MINISTRY OF FINANCE, ECONOMY AND FINANCIAL REPORTS: PROMOTION OF ENVIRONMENTAL PROTECTION IN GERMAN LAWS ON TAXES AND ON OTHER TYPES OF LEVIES (2000).

<sup>116</sup> DEP'T OF AGRIC. & RURAL DEV., U.K., CLIMATE CHANGE, BIOMASS AND AGRICULTURE, at [www.dardni.gov.uk/pa2002/pa020167.htm](http://www.dardni.gov.uk/pa2002/pa020167.htm) (Sept. 16, 2002) [hereinafter DEP'T OF AGRIC.].

<sup>117</sup> Tony Blair, 'New Coalition for the Environment', GUARDIAN UNLIMITED (Web Edition), Oct. 24, 2000 (on file with the Widener Law Journal).

<sup>118</sup> DEP'T OF AGRIC., *supra* note 116.

<sup>119</sup> *Massive Wind Farm Plans Hailed*, BBC ONLINE NEWS, July 14, 2003, at <http://news.bbc.co.uk/1/hi/uk/3065143.stm>.

<sup>120</sup> INTER-DEPARTMENTAL ANALYSTS GROUP, LONG-TERM REDUCTIONS IN GREENHOUSE GAS EMISSIONS IN THE UK 67 (2002).

<sup>121</sup> See EUROPEAN CLIMATE CHANGE PROGRAMME, THE EUROPEAN COMMISSION, SECOND ECCP PROGRESS REPORT (2003).

fluorinated gases.<sup>122</sup> All twenty-five E.U. nations, including the ten recently admitted accession countries, will be subject to these resulting laws and regulations.<sup>123</sup>

Other European nations—such as Sweden, France, Denmark, and the Netherlands—have also made significant reductions commitments. Sweden has recently committed to a 50% reduction by 2050<sup>124</sup> and has called for a European-wide target of 60% by that date.<sup>125</sup> France has also taken a very aggressive position regarding its longer-term commitment, promising to reduce emissions by 75% by 2050.<sup>126</sup> Denmark has renewed its commitment to a 21% reduction target by 2010.<sup>127</sup> Wind now generates 20% of Denmark's electricity needs.<sup>128</sup> In the Netherlands, policymakers are developing a detailed fifty year plan for GHG reductions.<sup>129</sup>

On the other side of the Atlantic, Canada ratified its 6% Kyoto reductions target at the end of 2002.<sup>130</sup> The newly elected Martin government is currently reworking Canada's national implementation plan.

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<sup>122</sup> *Id.*

<sup>123</sup> *Id.*

<sup>124</sup> *Emissions Should Be Halved by 2050*, ENVIROREPORT, Oct. 2000, at [http://www.environ.se/enviroreport/envirorep5/pdf/er5\\_4\\_w.pdf](http://www.environ.se/enviroreport/envirorep5/pdf/er5_4_w.pdf).

<sup>125</sup> CTR. FOR ENV'T & SUSTAINABILITY, GÖTEBORG UNIVERSITY, UK-SWEDEN ENVIRONMENTAL TECHNOLOGIES ROUND TABLE DISCUSSION 9 (2003).

<sup>126</sup> Press Release, International Energy Agency, IEA Commends the Framework for Competition in French Gas and Electricity Markets but Cautions That Challenges Remain (July 12, 2004) (on file with the Widener Law Journal).

<sup>127</sup> MARTIN MEJLHEDE, SHECCO TECHNOLOGY, DANISH FOCUS ON CO<sub>2</sub> (2003) at [www.shecco.com/artikler/danishdays.htm](http://www.shecco.com/artikler/danishdays.htm).

<sup>128</sup> Birger T. Madsen, *The Wind Power Market—Status; Drivers, and Future Challenges: Cases from Germany, Denmark, UK and India*, Presentation at Renewable Energy on the Market Conference Sept. 17-19, 2003, available at <http://www2.mim.dk/reconference/presentations.asp>.

<sup>129</sup> A. Faaij, et al., *Sustainable Energy Systems on the Long Term: Two Visions on the Dutch Energy System*, at [http://www.portalenergy.com/balpyo/ghgt5/Papers/E2\\_3.pdf](http://www.portalenergy.com/balpyo/ghgt5/Papers/E2_3.pdf) (last visited Oct. 9, 2003).

<sup>130</sup> Lara Jill Rosenblith, *A Premier on the Kyoto Protocol—The Climate's Changing, Now What?*, at <http://environment.about.com/od/kyotoprotocol/a/aa090402a.html> (last visited Oct. 9, 2004).

While the United States has rejected Kyoto and has adopted no other national framework, there is significant activity at regional, state and local levels.<sup>131</sup>

### *State and Regional Governments*

California by itself is the world's fifth largest economy.<sup>132</sup> It has adopted a string of policies that when joined together constitute the most comprehensive U.S. governmental response to climate change to date. Among its many actions, California has decided to regulate carbon emissions from vehicles,<sup>133</sup> mandated that the amount of energy generated from renewable sources equal 20% of total state electricity sales by 2010,<sup>134</sup> improved building codes,<sup>135</sup> adopted energy-efficiency standards for appliances,<sup>136</sup> increased state funding for energy efficiency,<sup>137</sup> and established a tax credit for solar and wind power systems.<sup>138</sup> California also recently set up the country's first registry for GHG emissions, developed reporting protocols for participating companies, and contracted with independent firms to certify emissions data.<sup>139</sup> California also administers the largest state-funded energy research program<sup>140</sup>

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<sup>131</sup> See chart *infra* pp. 66-67.

<sup>132</sup> See *Cal Facts*, *supra* note 109.

<sup>133</sup> Press Release, Union of Concerned Scientists, California Governor Signs Landmark Global Warming Bill, (July 22, 2002) (on file with the Widener Law Journal).

<sup>134</sup> Press Release, Hydrogen Now, Report Says State Has Potential to Increase Renewable Energy Production Ten-Fold, (Nov. 24, 2003) (on file with the Widener Law Journal).

<sup>135</sup> See, e.g., CAL., RECENTLY APPROVED CHANGES IN CODE STANDARD, at [http://www.bsc.ca.gov/apprvd\\_chngs.html](http://www.bsc.ca.gov/apprvd_chngs.html) (last visited Oct. 23, 2004) (providing links to the newly promulgated building standards).

<sup>136</sup> See, e.g., CAL. ENERGY COMM'N, APPLIANCE INFORMATION (2004), at <http://www.energy.ca.gov/efficiency/appliances/>.

<sup>137</sup> See, e.g., HOWARD GELLER & SHERYL CARTER, THE ENERGY FOUND., ENERGY EFFICIENCY: PUBLIC POLICY ISSUES AND RECOMMENDATIONS 3 (2004).

<sup>138</sup> See, e.g., CONSUMER ENERGY CTR., CAL. ENERGY COMM'N, SOLAR AND WIND TAX CREDIT SYSTEM (2004), at [www.consumerenergycenter.org/renewable/tax\\_credit.html](http://www.consumerenergycenter.org/renewable/tax_credit.html).

<sup>139</sup> See generally *California Climate Registry Makes Headway*, at <http://www.greenbiz.com/news/printer.cfm?NewsID=25397> (Aug. 6, 2003).

<sup>140</sup> See CAL. ENERGY COMM'N, PIER (PUBLIC INTEREST ENERGY RESEARCH) (2004), at <http://www.energy.ca.gov/pier/>.

and has an active program to export clean energy technologies to foreign markets.<sup>141</sup> California estimates its commitment to renewable energy will bring in \$11 billion in benefits over a five-year period from job creation and in-state investment.<sup>142</sup>

California's efforts are being matched on the other side of the country by an alliance of six New England governors. They committed in 2001 to reduce greenhouse gas emissions by between 75% and 85% over the long term.<sup>143</sup> In the near term they agreed to return emissions to 1990 levels by 2010 and seek a 10% reduction below that level by 2002.<sup>144</sup> The governors are now working together and individually to enact more detailed plans.

In 2004, Connecticut adopted legislation that has transformed regional commitments—made in August 2001 at a meeting of New England Governors and Eastern Canadian Premiers—into law.<sup>145</sup> To meet the required short and long-term targets, the legislation mandates biannual reporting and a GHG inventory every three years as well as the keeping of a GHG registry.<sup>146</sup> The state also passed other pieces of progressive legislation in 2004. One of them abolishes sales tax on the purchase of vehicles that average forty miles per gallon or more.<sup>147</sup> Another mirrors California's law on capping auto emissions.<sup>148</sup> A third mandates energy efficiency requirements for a number of appliances, a measure similar to ones adopted in other states.<sup>149</sup> In 2005, one measure under

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<sup>141</sup> See CAL. ENERGY COMM'N, GLOBAL ENERGY CONNECTION, at <http://www.globalenergyconnection.ca.gov/tep/jsp/index.jsp> (last visited Oct. 23, 2004).

<sup>142</sup> *Californian Governor Seeks to Boost Renewable Energy*, REUTERS NEWS SERV., Mar. 20, 2002, available at <http://www.planetark.com/dailynewsstory.cfm?newsid=15087&newsdate=20-Mar-2002>.

<sup>143</sup> CAL. ENERGY COMM'N, SUMMARY OF NATIONAL CLIMATE CHANGE PROGRAMS (2002), at [www.energy.ca.gov/global\\_climate\\_change/summary.html](http://www.energy.ca.gov/global_climate_change/summary.html).

<sup>144</sup> *Id.*

<sup>145</sup> PEW CTR. ON GLOBAL CLIMATE CHANGE, STATES NEWS: CONNECTICUT LEGISLATURE REQUIRES CLIMATE PLAN AND GREENHOUSE GAS REPORT, at [http://www.pewclimate.org/what\\_s\\_being\\_done/in\\_the\\_states/news.cfm](http://www.pewclimate.org/what_s_being_done/in_the_states/news.cfm) (last visited Oct. 23, 2004).

<sup>146</sup> See generally PEW CTR. ON GLOBAL CLIMATE CHANGE, CLIMATE CHANGE ACTIVITIES IN THE UNITED STATES: 2004 UPDATE (2004).

<sup>147</sup> 2004 Conn. Pub. Acts 04-231.

<sup>148</sup> 2004 Conn. Pub. Acts 04-84.

<sup>149</sup> 2004 Conn. Pub. Acts 04-85.

consideration includes a "feebate" program: it will levy fees for SUVs and provide rebates to purchasers of hybrid vehicles.<sup>150</sup>

An executive order was issued from the Connecticut governor's office on Earth Day 2004 that requires the state and its universities to work to save energy while purchasing increasing amounts of clean energy for its facilities.<sup>151</sup> This order committed the state to purchasing 50% of the energy government buildings consume from renewable sources by 2020.<sup>152</sup> It also mandated that all energy the state government purchases in 2050 be from renewable sources.<sup>153</sup> The state has meanwhile maintained and expanded its national reputation as the leader in research, development and manufacture of fuel cell technology. It employs more people in the sector than any other part of North America, and the recently appointed head of the Connecticut Development Authority hails from a background in fuel cell development and marketing.<sup>154</sup> It is expected that this technology will play a critical role in reducing GHG emissions in both the transportation and electricity sectors, becoming, in the process, an engine for the state's economy.<sup>155</sup> More and more, the state's environmental policy, energy policy and economic development plans are coming into alignment.

Massachusetts has adopted the nation's first law regulating carbon emissions from power plants.<sup>156</sup> It has also committed to

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<sup>150</sup> CONNECTICUT CLIMATE CHANGE, CONNECTICUT CLIMATE STAKEHOLDERS DIALOG: RECOMMENDATIONS TO THE GOVERNOR'S STEERING COMMITTEE 3.1-12 (2004).

<sup>151</sup> See Press Release, The Executive Office of Governor John G. Rowland, Governor Rowland Announces Largest Clean Energy Purchase in New England (Apr. 22, 2004) (on file with the Widener Law Journal).

<sup>152</sup> *Id.*

<sup>153</sup> *Id.*

<sup>154</sup> NAT'L ASS'N OF SEED & VENTURE FUNDS, CONNECTICUT GOVERNOR RELL NAMES DEVELOPMENT AGENCY CHIEF (Aug. 24, 2004), at <http://www.nasvf.org/web/allpress.nsf/pages/9453>.

<sup>155</sup> See generally CONNECTICUT GLOBAL FUEL CELL CENTER, UNIVERSITY OF CONNECTICUT, WHAT IS FUEL CELL TECHNOLOGY, at [http://www.ctfuelcell.uconn.edu/cgfcc\\_faq\\_fc.htm](http://www.ctfuelcell.uconn.edu/cgfcc_faq_fc.htm) (last visited Oct. 9, 2004).

<sup>156</sup> MASS. EXECUTIVE DEP'T, CLEAN AIR & MASSACHUSETTS UTILITIES: EIGHT YEARS OF CLEANING POWER PLANT EMISSIONS IN THE COMMONWEALTH OF MASSACHUSETTS 2 (1998); see also MASS. REGS. CODE tit. 310, § 7.29 (2004).

buying 15% of its energy from renewable sources by 2020,<sup>157</sup> created a Renewable Energy Trust Fund to encourage energy efficiency and renewable-energy project development,<sup>158</sup> and instituted a CO<sub>2</sub> offset program for new utilities.<sup>159</sup> Under Massachusetts Governor Mitt Romney, the state completed an ambitious GHG plan in 2004 that includes a substantial renewables purchase commitment for state facilities, a smart growth program, a plan for greening state vehicle fleets, improvements in building codes, and a requirement that all new building projects disclose the CO<sub>2</sub> emissions they will generate.<sup>160</sup>

Elsewhere in the region, Maine became the first U.S. state to legislate state-wide emissions reductions targets that call for reducing "emissions to 1990 levels by 2010 [and] to 10% below 1990 levels by 2020";<sup>161</sup> New Hampshire has mandated reductions in carbon emissions from power plants;<sup>162</sup> Rhode Island has developed a state action plan;<sup>163</sup> and Vermont has issued an executive order to reduce GHG emissions.<sup>164</sup>

To the south, New Jersey became the first U.S. state to develop a GHG reduction plan. In 1998, it committed to reduce emissions by 3.5% by 2005.<sup>165</sup> To achieve this goal, state power

<sup>157</sup> Abbey Tennis, Recent Climate Change Initiatives in Mass. & the Northeastern U.S., Presentation to the Massachusetts Office of Commonwealth Development (Jan. 14, 2004), at [www.mass.gov/dep/recycle/files/statplan.pdf](http://www.mass.gov/dep/recycle/files/statplan.pdf).

<sup>158</sup> NATIONAL FUEL CELL RESEARCH CENTER, STATE INITIATIVES: MASSACHUSETTS RENEWABLE ENERGY TRUST FUND, at [www.nfrcr.uci.edu/fceresources/REGULATIONSINITIATIVES/INITIATIVES/state/MARenewableEnergyTrustFund.htm](http://www.nfrcr.uci.edu/fceresources/REGULATIONSINITIATIVES/INITIATIVES/state/MARenewableEnergyTrustFund.htm) (last visited Oct. 9, 2004).

<sup>159</sup> Michael Grubb, Associated Director of Policy for The Carbon Trust, Strategic Development of the Kyoto-Marrakech System, Presentation to Workshop on Implementing Kyoto in Russia and the CIS (Apr. 9-10, 2003) (on file with the Widener Law Journal).

<sup>160</sup> See generally MASS., MASSACHUSETTS CLIMATE PROTECTION PLAN (Spring 2004).

<sup>161</sup> CLIMATE INST., STATE AND LOCAL ACTION: MAINE, at <http://www.climate.org/topics/localaction/grmhs.shtml>.

<sup>162</sup> CAL. ENERGY COMM'N, *supra* note 143.

<sup>163</sup> See TELLUS INST., RHODE ISLAND GREENHOUSE GAS ACTION PLAN, at <http://righg.raabassociates.org/Articles/GHGPlanBody7-19-02FINAL.doc>.

<sup>164</sup> Vermont, Exec. Order No. 11-02 (2002-2020).

<sup>165</sup> N.J. DEP'T OF ENVTL. PROT., SUSTAINABILITY GREENHOUSE ACTION PLAN E3 (1999).

companies committed themselves to reducing CO<sub>2</sub> emissions by 15% per kilowatt hour and increasing green energy generation to 3% by 2008 (increasing to 6.5% by 2012).<sup>166</sup> In June, New Jersey Governor James McGreevey agreed to purchase 20% of the state's electricity from green energy producers by 2020.<sup>167</sup> In addition, the state established a smart growth policy to reduce sprawl,<sup>168</sup> set up a fund that could generate over \$90 million a year for energy efficiency programs,<sup>169</sup> and signed covenants with municipalities, universities, and religious institutions committing participants to the state's reductions goal.<sup>170</sup> Signaling that the state's intellectual resources are also becoming engaged, all fifty-six of its universities and colleges signed the covenant.<sup>171</sup> While currently on track to meet its commitment, New Jersey is now looking to reduce emissions further with a special emphasis on the transportation infrastructure and green buildings.<sup>172</sup>

In New York, Governor George Pataki has announced a state emissions-reductions target of 5% below 1990 levels by the year 2010 and 10% below 1990 levels by the year 2020.<sup>173</sup> The Governor also announced his intention to have 25% of the state's

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<sup>166</sup> *Id.* at 12.

<sup>167</sup> Tracey L. Regan, *McGreevey Pledges to Push Wind, Solar Power*, THE TIMES (N.J.), June 4, 2003, at A3.

<sup>168</sup> N.J. DEP'T OF CMTY. AFFAIRS, OFFICE OF SMART GROWTH, WHAT IS SMART GROWTH?, at [www.nj.gov/dca/osg/smart/index.shtml](http://www.nj.gov/dca/osg/smart/index.shtml) (last visited Oct. 2, 2004).

<sup>169</sup> OZONE TRANSP. COMM'N, TECH. & INNOVATIONS COMM., ENERGY EFFICIENCY AND ENERGY CONSERVATION 4 (2000), at <http://www.otcair.org/document.asp?Fview=Report>.

<sup>170</sup> PEW CTR. ON GLOBAL CLIMATE CHANGE, STATE AND LOCAL NET GREENHOUSE GAS EMISSIONS REDUCTION PROGRAMS: GREENHOUSE GAS REDUCTION TARGET, at [www.pewclimate.org/docUploads/states%5Fgreenhouse%2Epdf](http://www.pewclimate.org/docUploads/states%5Fgreenhouse%2Epdf).

<sup>171</sup> *Id.*

<sup>172</sup> See N.J. DEP'T OF ENVTL. PROT., CLEAN AIR COUNCIL, 2002 PUBLIC HEARING REPORT: INNOVATIVE SOLUTIONS FOR CLEAN AIR (2002), at <http://www.nj.gov/dep/cleanair/hearings/phr02.htm>.

<sup>173</sup> JIA LI, CTR. FOR CLEAN AIR POLICY, MODELING POWER SECTOR GHG REDUCTION POLICY IN NEW YORK STATE 9 (2002), at [www.pnl.gov/aisu/pubs/lic8.pdf](http://www.pnl.gov/aisu/pubs/lic8.pdf).

electricity generated from renewables by 2012<sup>174</sup> and to adopt California's tailpipe CO<sub>2</sub> standard.<sup>175</sup> A series of tax credits and incentive programs are also part of the package.<sup>176</sup> In a sign of Governor Pataki's willingness to lead on climate protection, he invited all ten governors from Maine to Maryland to join him in a discussion on establishing a regional cap and trade program for greenhouse gas emissions from the power sector.<sup>177</sup>

Pennsylvania has also taken several notable actions, including making a commitment to purchase 5% of the state government's energy from renewable sources,<sup>178</sup> developing an electrical choice program allowing Pennsylvanians to purchase green energy from power companies (120,000 households have already made the switch),<sup>179</sup> creating a cooperative program among thirty-two Pennsylvania colleges to substitute wind power for a portion of their electrical needs,<sup>180</sup> committing to build green state office

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<sup>174</sup> Press Release, Worldwatch Institute, Renewable Energy Enters Boom Period: Renewable Energy Continues Rapid Growth Worldwide (July 10, 2003) (on file with the Widener Law Journal).

<sup>175</sup> Press Release, Governor's Office of Regulatory Reform, Governor: Regulation to Reduce Harmful Vehicle Emissions—Alternative to Promote Clean Vehicle Technology, Improve Air Quality (Jan. 4, 2002) (on file with the Widener Law Journal).

<sup>176</sup> See Akenna Solar, *New York Solar Energy Incentive Programs*, at [http://www.akeena.net/solar\\_energy\\_benefits/incentive\\_programsny.html](http://www.akeena.net/solar_energy_benefits/incentive_programsny.html).

<sup>177</sup> Press Release, Office of the Governor, Governor Announces Cooperation on Clean Air Initiative—Leaders of Northeast States Will Participate in Regional Strategy to Curb Emissions (July 24, 2003) (on file with the Widener Law Journal).

<sup>178</sup> Press Release, Pennsylvania Public Utility Commission, Gov. Schweiker Announces Historic Purchase of Green Power: Action Marks Fifth Anniversary of PA's Landmark Electric Competition Program (Dec. 5, 2001) (on file with the Widener Law Journal).

<sup>179</sup> *Id.*

<sup>180</sup> Bill Campbell, *University a Leader in Consumption of Wind Energy*, PENN STATE INTERCOM, Apr. 3, 2003, at [www.psu.edu/ur/archives/intercom\\_2003/April3/wind.html](http://www.psu.edu/ur/archives/intercom_2003/April3/wind.html). This collaborative purchase decision by these universities was the largest single order for wind power to date in the United States.

buildings,<sup>181</sup> and giving grants to individuals who buy low-emission vehicles.<sup>182</sup>

Another cross-cutting development in the U.S. concerns the creation of fourteen state-based clean energy funds that expect to have more than \$3 billion in assets to underwrite the transition to a clean energy future.<sup>183</sup> Twelve of these states, including New York, California, Connecticut, and Massachusetts, have created the Clean Energy States Alliance, or CESA, which aims to build a more robust domestic clean-energy market.<sup>184</sup> These states are developing joint strategies to accelerate commercialization of clean energy technologies like solar, wind, and fuel cells, and they are actively soliciting private U.S. investment funds as partners.<sup>185</sup> Through this new alliance, incorporated as a separate nonprofit organization, the state funds are also reaching out to private and public funds in Canada and Europe to facilitate transatlantic opportunities to develop the renewable energy market.<sup>186</sup>

Finally, more than forty U.S. states have decided to implement net metering rules, which allow excess energy generated at home by solar, wind, fuel cell or other means to be returned to the energy grid for use elsewhere.<sup>187</sup> The economic returns to household energy generators from running their electric meter backwards during off-peak hours helps pay down the cost of investments in

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<sup>181</sup> See GOVERNOR'S GREEN GOVERNMENT COUNCIL, FACT SHEET: GREEN BUILDING IN PENNSYLVANIA FOR COMMONWEALTH REAL ESTATE STAFF, at [www.gggc.state.pa.us/building/realefs.html](http://www.gggc.state.pa.us/building/realefs.html).

<sup>182</sup> See generally PA. DEP'T OF ENVTL. PROT., ALTERNATIVE FUELS INCENTIVE GRANT PROGRAM: GUIDELINES AND GENERAL INFORMATION, at <http://www.dep.state.pa.us/dep/deputate/pollprev/pdf/afig/general%20info.pdf> (last visited Oct. 11, 2004).

<sup>183</sup> MARK BOLINGER & RYAN WISER, ENVTL. ENERGY TECHNOLOGIES DIV., LAWRENCE BERKLEY NAT'L LAB., CLEAN ENERGY FUNDS: AN OVERVIEW OF STATE SUPPORT FOR RENEWABLE ENERGY vii (2001).

<sup>184</sup> CLEAN ENERGY STATES ALLIANCE, ABOUT CESA, at <http://www.cleanenergyfunds.org/about%20.htm> (last visited Oct. 3, 2004).

<sup>185</sup> *Id.*

<sup>186</sup> CLEAN ENERGY STATES ALLIANCE, INTERNATIONAL—CLEAN TECHNOLOGY IMPLEMENTATION NETWORK (CTIN), at [www.cleanenergyfunds.org/international/index.html](http://www.cleanenergyfunds.org/international/index.html) (last visited Oct. 3, 2004).

<sup>187</sup> Interstate Renewable Energy Council, PV Consumer Project, Net Metering Revisions Pass CA Legislature; Go to Governor for Signature (Sept. 2, 2002), at [www.spratley.com/ncp/board2/?i=963](http://www.spratley.com/ncp/board2/?i=963) (last visited Nov. 21, 2004).

household renewables systems, making installation more affordable.<sup>188</sup>

In Canada, Manitoba is at the forefront of efforts on the provincial level. The province has made reducing GHG emissions the centerpiece of a comprehensive economic development plan.<sup>189</sup> Starting with its commitment to meet or exceed Kyoto goals by 2010, Manitoba has instituted an array of measures to reduce emissions in the short and medium term.<sup>190</sup> These measures include eliminating coal from its energy mix, increasing funding for energy efficiency, encouraging substitution of ethanol into gasoline blends, developing wind and geo-thermal power, introducing low-impact hydro, and undertaking research on hydrogen fuel use in buses and automobiles.<sup>191</sup> As the bus manufacturing capital of North America, Manitoba sees fuel-cell buses as a key part of its economic future.<sup>192</sup>

Equally important is Manitoba's decision—in collaboration with the provinces of Ontario and Saskatchewan—to begin assessing the development of a national clean energy grid in Canada that would distribute wind and low-impact hydro energy, displacing dirty coal elsewhere in the country.<sup>193</sup> The three provinces plan to begin assessing how best to construct the necessary transmission lines to carry this renewable energy across the country.<sup>194</sup> Through these actions, Manitoba believes it can generate thousands of new jobs and also be a zero-net-emissions economy in twelve to fifteen years.<sup>195</sup>

In Australia, the Victoria, New South Wales, and South Australia state governments have all called on the federal government to ratify Kyoto, and have each developed provincial

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<sup>188</sup> *Id.*

<sup>189</sup> MANITOBA CONSERVATION CLIMATE CHANGE BRANCH, KYOTO AND BEYOND: A PLAN OF ACTION TO MEET AND EXCEED MANITOBA'S KYOTO TARGETS 2 (2002).

<sup>190</sup> *Id.* at 10-11.

<sup>191</sup> *Id.* at 10-14.

<sup>192</sup> *Id.* at 22.

<sup>193</sup> Jeff Turner, Climate Change: Kyoto and Beyond—Seizing Opportunities, Presentation to the Canadian Water Resources Association Climate Change Symposium (June 17, 2003), available at <http://www.cwra.org>.

<sup>194</sup> *Id.*

<sup>195</sup> *Id.*

GHG reduction strategies.<sup>196</sup> Victoria's strategy includes more than fifty measures that are expected to deliver savings totaling 7.5% by 2010.<sup>197</sup> Together, these states recently published a report showing that Australia would benefit financially by reducing emissions:

*Municipal Governments*

In Canada, a total of 103 cities and counties, representing half of the country's population, have announced their determination to reduce GHG emissions<sup>198</sup> and are working through the Cities for Climate Change Protection program. Developed by the International Council for Local Environmental Initiatives (ICLEI), a nongovernmental organization, the program helps municipalities reduce emissions through a five-step process.<sup>199</sup> To support this work, the Canadian federal government created a two-tiered financing fund totaling US\$250 million that is administered by the Federation of Canadian Municipalities (FCM).<sup>200</sup> FCM has set aside \$50 million for grants to help municipalities develop feasibility studies for reducing GHG emissions.<sup>201</sup> Cities typically match these contributions one-for-one.<sup>202</sup> The remaining \$200 million is in a revolving loan fund that cities can tap for energy-efficiency projects identified in their feasibility studies.<sup>203</sup> Well over 250 loans and grants have been made so far, with payback

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<sup>196</sup> See *Kyoto Protocol Report Data Manipulated: Kemp*, ABC NEWS ONLINE (Australia), Sept. 17, 2002 (on file with the Widener Law Journal).

<sup>197</sup> See VICT., DEP'T OF NATURAL RES. & THE ENV'T, VICTORIAN GREENHOUSE STRATEGY 44 (2002).

<sup>198</sup> INT'L COUNCIL FOR LOCAL ENVTL. INITIATIVES, PARTICIPANTS OF THE CITIES FOR CLIMATE PROTECTION CAMPAIGN: NORTH AMERICA, at <http://www.iclei.org/co2/ccpmems2.htm?REG=NA> (last visited Oct. 9, 2004).

<sup>199</sup> INT'L COUNCIL FOR LOCAL ENVTL. INITIATIVES, CITIES FOR CLIMATE PROTECTION (CCP) HOMEPAGE, at [www.iclei.org/co2/](http://www.iclei.org/co2/) (last visited Oct. 9, 2004).

<sup>200</sup> Press Release, Federation of Canadian Municipalities, Green Municipal Funds Investments of \$1.2 Million to Improve Municipal Infrastructure and the Environment, (Apr. 22, 2002) (on file with the Widener Law Journal).

<sup>201</sup> FED'N OF CANADIAN MUNICIPALITIES, *supra* note 15.

<sup>202</sup> See Press Release, Backgrounder: Federation of Canadian Municipalities, Federation of Canadian Municipalities Green Municipal Funds Studies and Projects (May 25, 2001) (on file with the Widener Law Journal).

<sup>203</sup> *Id.*

terms varying from three to ten years.<sup>204</sup> Loans are repaid with savings from energy efficiency measures. Over time, cities can then use accumulated savings for other purposes.<sup>205</sup>

Some of Canada's largest and best known cities, including Ottawa, Calgary, and Edmonton, are successfully using the financing mechanisms made available by the Federation of Canadian Municipalities to reduce their energy use, lower GHG emissions, and save money on their electricity bills.<sup>206</sup> Toronto was the first city in the world to take on a GHG reductions commitment—20% below 1998 levels<sup>207</sup>—and it has saved \$17.5 million through energy efficiency improvement financed through its Toronto Atmospheric Fund, created by the city for its own use.<sup>208</sup> Toronto has also generated more than \$20 million in revenue from the sale of electricity generated from methane gas captured at city landfills.<sup>209</sup>

In the United States, 147 municipalities have joined ICLEI's fast-growing Cities for Climate Protection program.<sup>210</sup> These cities can already count 10 million tons of CO<sub>2</sub> emissions reduced, with many times that in additional commitments.<sup>211</sup> Municipalities doing this work are also able to count more than \$90 million in

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<sup>204</sup> Interview with Louise Comeau, Director, Sustainable Communities and Environmental Policy, Federation of Canadian Municipalities (Oct. 2003) (on file with author).

<sup>205</sup> NAT'L HOUS. RESEARCH COMM., NEW FUNDING GIVES ENVIRONMENTAL INNOVATION A BOOST 11 (2002).

<sup>206</sup> LOUISE COMEAU, SIERRA CLUB OF CANADA, RATIONAL ENERGY PROGRAM: UPDATE AND SUMMARY OF KEY MEASURES TO THE YEAR 2010 (1998) at <http://www.sierraclub.ca/national/programs/atmosphereenergy/climatechange/rep98.html>.

<sup>207</sup> Abby Young, *State-Local Government Perspective*, at [www.gcrio.org/USGCRP/sustain/young.html](http://www.gcrio.org/USGCRP/sustain/young.html).

<sup>208</sup> TORONTO, TORONTO ATMOSPHERIC FUND, at [www.city.toronto.on.ca/taf](http://www.city.toronto.on.ca/taf) (last visited Oct. 10, 2004).

<sup>209</sup> *Id.*

<sup>210</sup> INT'L COUNCIL FOR LOCAL ENVTL. INITIATIVES, CITIES FOR CLIMATE PROTECTION CAMPAIGN: U.S. PARTICIPANTS, at [www3.iclei.org/us/participants.cfm](http://www3.iclei.org/us/participants.cfm) (last visited Oct. 10, 2004).

<sup>211</sup> See Konrad Otto-Zimmermann & Karen Alebon, *ICLEI: Working With Cities to Promote Sustainable Development*, HABITAT DEBATE (United Nations Human Settlements Programme, Nairobi, Kenya), Sept. 2002.

savings from efficiency measures.<sup>212</sup> Portland, Oregon, was the first U.S. city to adopt a plan and a strategy for reducing greenhouse gas emissions.<sup>213</sup> The plan calls for lowering GHG releases by 10% by 2010.<sup>214</sup> Portland's efforts have led to a 65% increase in public transit use since 1990,<sup>215</sup> a recycling rate of 57%, and a strong public-private partnership to improve energy efficiency in apartments and commercial buildings. Central to Portland's success is its forward thinking approach to urban planning, which discourages sprawl.<sup>216</sup> Officials in Portland estimate that energy efficiency programs have saved city businesses and residents more than \$300 million since 1990,<sup>217</sup> while city government itself is saving about \$2 million per year from energy efficiency measures.<sup>218</sup>

In Australia, 184 municipalities with two-thirds of the country's population are participating in an ICLEI's Cities for Climate Protection program of their own.<sup>219</sup> Thirty-three of the participating municipalities are already at the most advanced stage of the five-step process.<sup>220</sup> This is the fastest pace of any group of cities in the world.<sup>221</sup> The 2002 progress report cited 780 actions

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<sup>212</sup> *Id.*

<sup>213</sup> EPA, INSIDE THE GREENHOUSE: CITIES IN THE VANGUARD, at <http://www.epa.gov/globalwarming/greenhouse/greenhouse16/vanguard.html>.

<sup>214</sup> *US Cities Could Help Meet 10% of Kyoto Targets*, EDIE NEWS CENTRE, May 26, 2000, at [www.edie.net/news/news\\_story.asp?id=2773&channel=0](http://www.edie.net/news/news_story.asp?id=2773&channel=0); see also MARK KENDALL, CLIMATE SOLUTIONS, OREGON—PIONEERING STATE CLIMATE ACTION (2003), at [www.climatesolutions.org/pages/eNewsbulletins/June\\_2003/Oregon.htm](http://www.climatesolutions.org/pages/eNewsbulletins/June_2003/Oregon.htm).

<sup>215</sup> PORTLAND, OFFICE OF SUSTAINABLE DEV., ENERGY DIVISION, PORTLAND CLIMATE CHANGE EFFORTS 2 (2003).

<sup>216</sup> *Id.* at 1.

<sup>217</sup> *Id.*

<sup>218</sup> Interview with Michael Armstrong, Policy Analyst, Portland, OR Office of Sustainable Development, (Dec. 1, 2003).

<sup>219</sup> INT'L COUNCIL FOR LOCAL ENVTL. INITIATIVES, PARTICIPANTS OF THE CITIES FOR CLIMATE PROTECTION CAMPAIGN: AUSTRALIA, at <http://www3.iclei.org/co2/ccpmems2.htm?REG=AP> (last visited Oct. 10, 2004).

<sup>220</sup> AUSTRALIAN GREENHOUSE OFFICE, KEY ACHIEVEMENTS FOR CCP AUSTRALIA AS AT 1 JANUARY 2003, at <http://www.greenhouse.gov.au/lgmodules/achievements.html> (last visited Oct. 10, 2004).

<sup>221</sup> AUSTRALIA GREENHOUSE OFFICE & INT'L COUNCIL FOR LOCAL ENVTL. INITIATIVES, CITIES FOR CLIMATE PROTECTION AUSTRALIA PROGRESS 2002 PROGRAM REPORT 25 (2002).

by local councils.<sup>222</sup> A key driver for this progress is the Australian government's Greenhouse Office which supports a national ICLEI office and contributes funds for projects. Local governments have more than matched national contributions at better than a three-to-one rate. Summaries of projects undertaken to date indicate that Australian cities are not only increasing their emissions abatement but are also using these programs to generate jobs and local investment.<sup>223</sup>

In Europe, the first ICLEI cities network now includes 118 municipalities.<sup>224</sup> Given their earlier start date, it isn't surprising that more European cities have achieved their initial reductions targets. Each city reports it is benefiting from cost savings associated with energy efficiency measures implemented to reduce GHG emissions. For example, city planners in Heidelberg, Germany, have methodically reduced energy use in city facilities since 1993.<sup>225</sup> Today, the city's energy use for heating is down 28% and its GHG emissions have been reduced by 36%. From these efforts, the city saves \$1.5 million annually on its fuel bill.<sup>226</sup>

#### CONCLUSION

Throughout the foregoing survey, an attempt has been made to follow a particular thread of evidence. We have been looking for the upside—the financial justifications for emission reductions efforts on the part of corporations and government jurisdictions—be they global, international, national, regional or municipal. One of the largest obstacles to sensibly confronting climate change is a set of unquestioned assumptions that environmental management efforts are by definition costly, anti-competitive, and disruptive of

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<sup>222</sup> *Id.*

<sup>223</sup> AUSTRALIA GREENHOUSE OFFICE, GREENHOUSE GAS ABATEMENT PROGRAM PROJECTS, *at* [www.greenhouse.gov.au/ggap/successfulprojects/index.html](http://www.greenhouse.gov.au/ggap/successfulprojects/index.html) (last visited Oct. 10, 2004).

<sup>224</sup> INT'L COUNCIL FOR LOCAL ENVTL. INITIATIVES, PARTICIPANTS OF THE CITIES FOR CLIMATE PROTECTION CAMPAIGN: EUROPE, *at* <http://www2.iclei.org/co2/ccpmems2.htm?REG=EU> (last visited Oct. 10, 2004).

<sup>225</sup> ENERGIE-CITIES, CLIMATE CHANGE: HEIDELBERG GERMANY (2001), *at* <http://www.energie-cites.org/BD/PDF/hei-cha-en.pdf>.

<sup>226</sup> Interview with Sabine Lachenicht, Project Manager, Climate Protection, City of Heidelberg (Apr. 10, 2003).

growth. We have amassed substantial contrarian evidence here that points the way to a carbon-constrained future without severe economic disruption, but rather, with improved efficiency, profitability, and growth.

Let's look again at some of the raw numbers. BP reports a savings of \$650 million from emissions reductions efforts.<sup>227</sup> IBM reports a savings of \$791 million.<sup>228</sup> DuPont claims \$2 billion in efficiencies.<sup>229</sup> Alcoa is looking at saving \$100 million by 2006.<sup>230</sup> STMicroelectronics expects \$900 million in savings by 2010.<sup>231</sup> Germany reports its efforts will lead to the creation of 450,000 jobs,<sup>232</sup> many of them within the renewable energy sector that sees €10 billion of annual turnover.<sup>233</sup> In the United Kingdom, emissions dropped by 15% between 1990 and 2002, and during the same period, the economy grew by 30%.<sup>234</sup> Report after report concludes that the cost of implementing these efforts will be more than offset by the direct benefits. We can only conclude that on a fundamental level it is quite practical and profitable to reduce greenhouse gas emissions in a wide array of contexts using a number of simple strategies.

Further, it appears that the long-term benefits in many instances are substantial. Both corporations and cities are not only able to document savings but also to generate revenues from energy-efficiency programs. This almost always motivates corporate thinking, but Portland, Toronto, and Heidelberg, for instance, have realized millions of dollars in energy savings,

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<sup>227</sup> See *supra* p. 30 and note 49.

<sup>228</sup> See *supra* p. 34 and note 69.

<sup>229</sup> See *supra* p. 36 and note 85.

<sup>230</sup> See *supra* p. 37 and notes 95-96.

<sup>231</sup> See *supra* p. 39 and notes 108-10.

<sup>232</sup> DEP'T FOR PRESS, GERMAN EMBASSY, THE WEEK IN GERMANY: BUSINESS AND TECHNOLOGY, KYOTO GOOD FOR BUSINESS, SAYS TRITTIN, (2004), at <http://www.germany-info.org/relaunch/info/publications/week/2004/040102/economy2.html>.

<sup>233</sup> KOMPETENZNETZE.DE, RENEWABLE ENERGIES: THE FUTURE IS NOW (2004) (on file with the Widener Law Journal).

<sup>234</sup> Paul Brown, *New Front Opened in Fight Against Climate Change: This Issue Will Dominate World Agenda, Says Blair*, GUARDIAN UNLIMITED (Web Edition), Apr. 28, 2004, at <http://www.guardian.co.uk/guardianpolitics/story/0,3605,1204760,00.html>.

freeing-up funds for use elsewhere. At the national level, Germany anticipates becoming more competitive economically as a result of its ambitious GHG reductions programs.<sup>235</sup> The U.K. and Australia can show that the costs of long-term strategies are not only negligible, but also likely to improve economic prospects significantly compared to business as usual.

Unfortunately, except for ICLEI's programs and the work of regional coalitions, most GHG reduction efforts are carried on under the radar of the media and public. Yet given the seriousness of the problem, no ton of CO<sub>2</sub> removed from the atmosphere should fall on deaf ears. All levels of industry and government can and should learn from one another. Thus, the exchange of information is critical. As more good examples become widely known, it should give policymakers the confidence to consider more aggressive approaches to GHG mitigation or provide national leaders with the resolve to pursue the international climate treaty with greater purpose.

Finally, it is becoming ever clearer that emissions reductions occur faster and go more deeply when policy is linked to financing. All levels of government could do much more to facilitate reductions through creative financing mechanisms that create additional opportunities for industry.

Results of negotiations on the international climate treaty have, so far, been undeniably disappointing. But national, regional, and local governments—along with a growing number of national and multinational corporations—have not waited for instructions. Instead they are moving ahead pragmatically and unilaterally with GHG reduction plans. Regardless of what the diplomats decide, these early reducers are setting a new course for tackling climate change. Their successes should give governments and companies around the world a greater sense of confidence about the feasibility of achieving significant greenhouse gas reductions cost effectively.

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<sup>235</sup> See URBAN RENAISSANCE INSTITUTE, LESS GOVERNMENT, LESS GREENHOUSE GAS, at <http://www.urban-renaissance.org/vrbanren/index.cfm?DSP=content&contented ID=5791> (last visited Oct. 10, 2004).

THE CLIMATE GROUP<sup>236</sup>

The charts of leading reducers and policy frameworks that accompany this paper have been compiled by The Climate Group, a newly-founded, solutions-oriented leadership coalition based in the United Kingdom. Its membership is comprised of representatives of cities, states, governments, and corporations committed to collaboration on cutting GHG emissions. The organization is assembling, from diverse and previously isolated centers of expertise, a growing global group of reducers and supporters. Together, they are developing new tools to understand best practices in reduction efforts, establishing fresh international, cross-sector dialogues, and creating mechanisms that will help link winning solutions with sources of capital.

The Climate Group was officially launched in April 2004 by British Prime Minister Tony Blair, and subsequently held its first *Conference of the Reducers* in Toronto, Canada in May, with other conferences planned for Europe, the United States, and Australia in the coming year. The aim of these meetings is to share information on successful GHG reduction strategies—like those discussed in this paper—and to accelerate implementation of similar and even more ambitious strategies as a result of the conference interaction. These charts, and continually updated versions of it, will be housed on The Climate Group web site along with other information of utility for businesses, government, and the media. To remain apprised of developments, bookmark the organization's web site, [www.theclimategroup.org](http://www.theclimategroup.org).

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<sup>236</sup> The following is taken from [www.theclimategroup.org/index.php](http://www.theclimategroup.org/index.php).

# The Climate Group