The 2010 Greenhouse Gas & Climate Change Workforce Needs Assessment Survey Report

ghg management institute
www.ghginstitute.org

Sequence
Executive Search and Temporary Staffing
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"I am convinced that this challenge, and what we do with it, will define us, our era and, ultimately, our global legacy."

Ban Ki-moon, on climate change, Secretary-General of the United Nations

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The Greenhouse Gas Management Institute was founded as a nonprofit organization in 2007 to build and support the social infrastructure necessary to enable the measurement, reporting and verification (MRV) in climate programs across the world. The Institute is deeply engaged in training and fostering a competent and ethical global community of qualified technical climate change professionals. Its vision is an ever-improving professional society composed of internationally recognized, highly competent and unquestionably ethical professionals who provide the foundation and leadership for greenhouse gas management globally.

The success of any effort to address climate change rests on the reliability of greenhouse gas (GHG) emissions-related data for markets and other mitigation policies. The reliability of this data depends on the availability of highly skilled and qualified professionals tasked with producing and assuring this information. Just as engineering and financial accounting rely on certified professionals, there is a need for high levels of competency and ethics in professionals charged with measuring, accounting, auditing and managing GHG emissions. We believe that the green jobs of the future include an army of skilled professionals tasked with ensuring that the numbers supporting emissions trading markets and other GHG policies are reliable and transparent.

The Institute offers rigorous training that meets the needs of both individuals and organizations working on all aspects of climate change. Our training courses are authored and taught by leading experts and delivered via e-learning and specialized onsite workshops, ensuring availability to both beginners and experienced professionals worldwide. The Institute's membership program connects the largest global community of greenhouse gas and climate change experts in the world and is developing courses in multiple languages. Our professional programs are creating a global personnel certification system that will foster confidence, enable policy implementation and create a clear pathway for career development. The Institute's research program provides policymakers and industry with unique, forward-looking inquiry into and analysis of GHG MRV and management challenges and solutions.

We have collaborated with a dynamic range of leading climate institutions to develop and expand the reach of GHG measurement and management training and education, including the UNEP Finance Initiative, the UNFCCC secretariat, the World Bank Institute, USAID, the Regional Greenhouse Gas Initiative, The Climate Registry, World Resources Institute, Point Carbon, the Carbon Disclosure Project, the ICAP Summer School, the Accenture Supply Chain Academy and ClimateCHECK, one of our founding sponsors.

In 2011, the Institute will launch Greenhouse Gas Measurement and Management, a first-of-its-kind, international peer-reviewed journal on measurement, reporting and verification of greenhouse gas emissions and removals as well as the management of emissions.

As a nonprofit U.S.-based 501(c)(3) organization, financial aid and full scholarships are available to qualified applicants, especially from developing countries and those working for nonprofit organizations.

Sequence is a premier professional services organization committed to providing executive search and staffing solutions to niche environmental, engineering and GHG/climate change industries.

Serving organizations throughout the world, we are not your average executive search firm. With more than 15 years of dedicated recruiting experience in the environmental and climate change marketplaces, we have assisted organizations, large and small, in hiring quality professionals and building dedicated practice groups that are committed to and responsible for building, maintaining and protecting the world's infrastructure, natural resources and environment.

Focusing much of our expertise on the greenhouse gas and climate change industry for public, private and municipal sectors, we are on the cutting edge of industry trends, technical knowledge and personnel needs within this emerging and growing field. Few other organizations are as steeped in this newly developing and quickly evolving profession.

Our clients are among the most successful and respected environmental, engineering and climate change companies worldwide. Ranging from private consultants and multinational corporations to governmental entities, our clients have come to count on our technical knowledge and understanding of these evolving markets to assist them in development of their internal organizations.

The Sequence team of highly skilled and experienced staffing professionals has successfully conceptualized, strategized and built from the ground up entire GHG/climate change technical practice groups, venture-funded GHG and sustainable software companies, and energy efficiency organizations and their support operations. Helping start-up to established organizations capitalize on new opportunities, achieve steady growth and attain greater prosperity, we are known as one of the industry's most trusted and capable firms.

We routinely recruit boards of directors and technical advisory boards as well as executive, management and staff-level personnel globally. We have established an environmental technical knowledge base to address the industry's growing demand for assistance in finding the skilled and qualified personnel needed to achieve success. Our dedication and commitment to the GHG/climate change industry means that we know where the top talent is; leaders with the experience and expertise always in high demand – impact players who make immediate, valuable contributions to their organizations.

Just as important, our word is our bond. Whether you are in the urbanized cities of North America, Europe or Australia, the savannahs of Africa or the newly industrialized frontiers of Southeast Asia that represent the future of world economies, you can count on us to proudly stand behind our motto: "Sequence: Where a handshake still means everything."

To learn more about Sequence, please visit: http://www.sequencestaffing.com.

Acknowledgements

The Greenhouse Gas Management Institute and Sequence Staffing thank the many individuals who contributed to the conceptualization, development, implementation, analysis and publication of the 2010 Greenhouse Gas & Climate Change Workforce Needs Assessment Survey Report.

We deeply appreciate all the help, thoughtful analyses and authorship provided by the assembled teams from each of our lead organizations, without whom this report could not have been developed. However, particular recognition goes to Tim Stumhofer at the GHG Management Institute, who led the development of the survey as well as the analysis and writing for this report, and Frank DeSafey at Sequence Staffing, who was also instrumental in the development of this survey and production of the report, managing the myriad technical elements associated with both. Many others also participated at various stages. Particular acknowledgement goes to Sequence Staffing's Craig Travis for his valuable input throughout the process and Yvonne McKinney for her exceptional editing of the report, as well as GHG Management Institute's Michael Gillenwater and Tom Baumann, whose leadership is greatly appreciated, and interns Rasheq Raman and Alexis Nikolakopulos. It was our great pleasure to work with such a talented and dedicated group.

A special thanks also goes to Jay Kaneshige from Kaneshige Design for his help in designing, crafting and implementing the technological aspects of this year's Internet survey.

Most important, we would like to thank the international community of greenhouse gas measurement and management practitioners for their participation and thoughtful answers – they were extremely forthcoming in their responses to us, and we are grateful for their insights. We hope that in return they will find this report a valuable contribution to the development of the field and worthy of their time and effort in completing the survey.

Michael Gillenwater
Greenhouse Gas Management Institute
Dean

Frank D. De Safey
Sequence Staffing
Vice President

Executive Summary

Addressing climate change is unquestionably a monumental challenge requiring correspondingly large solutions. For problems of this magnitude, discussion of potential solutions tends to focus on grand policy debates and the efficacy and impacts of high-level policy design questions. In this process, more practical matters are often seen as mundane issues easily managed after the policymaking is complete. Yet, early investments in the capacity to implement policy can be critical to the success of policy action. In the case of climate change, where policy is designed on a global scale and targets nearly every aspect of the economy, questions of policy implementation capacity require more advance investment and substantive treatment.

For the second year, this survey has been conducted to provide detailed findings on the state of the workforce that will continue to provide the foundation of society's response to climate change by shouldering the responsibility for the implementation of climate policy.

This report summarizes the findings of a 55-question survey developed by the Greenhouse Gas Management Institute and Sequence Staffing. Survey data were collected from the global community of climate change professionals focused on measuring and managing greenhouse gas (GHG) emissions. The survey was open by invitation to GHG practitioners between June and September 2010.

The survey attracted responses from over 1,000 professionals from around the world. This sample was both highly educated (69.8% holding graduate degrees) and compensated at a professional level (average salary of $80,459). The respondents were well distributed in terms of their GHG practice area and emissions sector of focus and reported working for a range of employer types.

Responses from this assembled global corps of climate change practitioners form the basis of nine key findings.

Climate Change Remains an Emerging Field Where Practitioners Rise Quickly Through the Ranks – Survey responses point to an industry characterized by top-heavy organizational charts and practitioners who quickly rise through the ranks. Responses show relatively senior climate change positions occupied by practitioners with few years of direct experience and intermediate GHG skills. In a corollary, when asked how many years of climate change experience practitioners should

accrue before being considered an expert, survey responses averaged 6.9 years. Yet, those respondents who self-identify as experts reported an average of 4.9 years of direct experience.

GHG Training Gets High Marks Overall, But Serious Reservations are Noted – Of respondents receiving training in GHG measurement and management, 81.1% indicated that they were generally satisfied with their experience. Yet when probed, majorities reported dissatisfaction with the topical breadth (53.2%), availability (63.8%) and rigor (59.1%) of training options. Analysis of responses also revealed a preference for different training providers in the following order: specialized training organizations, academic institutions, employer/internal training and consulting firms.

U.S. Facilities Ill-prepared for Regulatory Emissions Reporting, While American and International Companies Cite Confidence in Climate Risk Disclosure – Practitioners participating in our survey provided an assessment of preparedness of facilities and organizations facing reporting pressures and requirements. Of those respondents familiar with the U.S. Environmental Protection Agency's Mandatory Reporting Rule, 75.1% indicated that affected facilities were inadequately prepared. Respondents were more bullish on preparedness to meet climate risk disclosure pressures, with only 38.9% describing affected organizations across the globe as unprepared.

Climate Change Practitioners Support U.S. Carbon Pricing, Yet are Concerned About Level of Public Understanding on Climate Issues – Weighing in on an important ongoing policy debate – the question of which policy approach the U.S. should employ to mitigate GHG emissions – a large majority (81.2%) of survey respondents indicated their support for carbon pricing, with responses divided over the exact mechanism: comprehensive cap-and-trade (23.7%), carbon tax (20.1%) or a sectoral approach that employs a mix of pricing mechanisms (37.4%). In a separate noteworthy finding for policymaking at all levels, the overwhelming majority (87.2%) of climate change practitioners we polled expressed concern with the general public's degree of understanding of climate change.

Carbon Management Software Market is Still Embryonic – Responses on a question related to GHG management software added context on uptake and user impressions in this anticipated new market. Notably, fewer than half (44.2%) of the GHG practitioners we polled had ever used a commercial GHG software product. Of those respondents who reported using GHG software, the majority (57.2%) found it to be adequate for their needs, while just over a third (35.4%) found the new software insufficient and 7.4% said it exceeded their needs.

Practitioners Concerned with Peer Competency; Auditors Divided Over Quality of Work – Looking at the subset of respondents who had audited GHG work, responses were divided over the quality of work they had audited. Findings were more pointed, however, regarding the competency of those undertaking GHG work, with a slight majority (51.4%) of our full sample of practitioners describing their peers as incompetent.

Carbon Markets Not Up to Snuff; Auditing Needs Enhanced Governance – On the subject of GHG verification, a large majority (72.3%) of our surveyed practitioners indicated they believe auditing lacks sufficient oversight. Asked specifically about verification in the UN's GHG programs (CDM & JI), respondents were divided over the meaning of recent auditor suspensions, but showed cohesion (63.9%) in concluding that UN verifier accreditation doesn't adequately measure competence of individual auditors. Responding to a specific policy recommendation to deal with challenges of oversight and auditor competency in GHG verification, an overwhelming 86.5% of the practitioners polled indicated they support individual certification of verifiers as a prerequisite for performing audits of UN projects. In a broader finding, 87.4% of all respondents indicated that only some (42.7%), few (38.6%) or virtually none (6.1%) of the global carbon markets were functioning at a high professional level.

GHG Personnel Fail to Meet Current Market Requirements; Competency Concerns Loom with Expansion of Climate Programs – We compared responses regarding the GHG skills employers participating in our survey reported seeking to those skills that the specialized GHG training practitioners indicated they had received. The results of this comparison showed gaps between workforce supply and demand. Specifically, when asked about advances in policy that might exacerbate shortcomings in climate change human resources, a large majority (84.5%) of respondents agreed that all publicly traded companies will in the future require GHG management professionals, with a further 75.7% polled agreeing that an organization-focused GHG program similar to the United Kingdom's Carbon Reduction Commitment would be adopted in other countries. Most alarmingly, large majorities of respondents reported that there is an insufficient supply of qualified GHG practitioners to implement expanded international GHG measurement, reporting and verification requirements (80.1%) and scaled-up programs to combat deforestation (88.7%).

Executive Summary

Climate Employers and Job Seekers Cite Challenges in Demonstrating and Assessing Carbon Competency, See Professional Certification as a Fix – Responses were divided among survey respondents who had filled GHG-related roles. A slight majority of respondents (50.9%) who had sought jobs said they had a hard time demonstrating their qualifications for GHG-related positions due to a lack of well-accepted indicators. When asked whether a professional certification system would lessen these challenges, 85.9% of respondents who had recruited or hired said they would have found it easier (52.4%) or much easier (33.5%) to evaluate applicants if a professional credentialing system was available. And 81.7% of recruiting respondents reported they would prefer (58.4%) or strongly prefer (23.4%) a credentialed GHG applicant over a non-credentialed counterpart.

Survey Participant / Respondent Profiles

Participants responding to the 2010 Greenhouse Gas/Climate Change Workforce Needs Assessment Survey come from all corners of the globe, residing in countries large and small and working under a variety of political arrangements in states at all stages of economic development. In sum, the survey includes respondents representing a diverse class of practitioners working to mitigate the effects of climate change around the world through the measurement and management of greenhouse gas (GHG) emissions. (For more on GHG measurement and management as a professional discipline, see the associated "What do we mean by the GHG/climate change workforce?" box.)

Building on the success of our initial 2009 needs assessment, this year's survey saw participation grow to eclipse 1,000 respondents, with 789 of those completing the entire survey, up from 719 in 2009. These respondents represent a dynamic group of global professionals whose cumulative perspectives provide insight into this rapidly emerging professional discipline.

What do we mean by the GHG/climate change workforce?

Perceptions of what it means to work in climate change vary. Media often portray the work of climate change as exclusively the realm of research scientists, policy analysts and government officials. Consequently, at first blush, a greenhouse gas accountant may sound more like a specialist under the employ of your tax preparer than a frontline climate change practitioner.

The reality is a fast-growing technically skilled corps of climate change professionals is defining a new and often difficult to conceptualize practice: GHG measurement and management. The GHG practitioner melds a skill set grounded in science and engineering, supported by a diverse suite of competencies from corporate accounting to uncertainty analysis to GHG applications and complemented by an understanding of the ever-growing universe of topical policy developments and emissions estimation rules and mitigation technologies.

The elaboration of a precise definition of this emerging field is itself emerging and is one of the topics being addressed by a new scholarly peer-reviewed journal titled Greenhouse Gas Measurement and Management. This survey was designed both in outreach and content to poll the GHG measurement and management community.

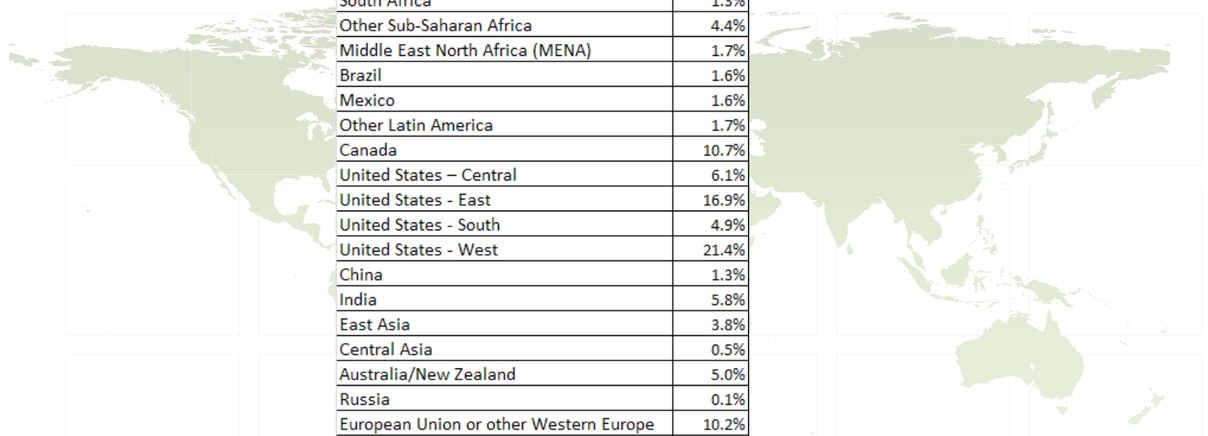
Geography

Looking at the makeup of our survey's sample with respect to geography, the majority of respondents hail from North America (61.6%), with 49.3% residing in the United States and 10.7% in Canada. Additional participants come from the European Union or other Western Europe (10.2%), Africa and the Middle East (7.4%), India (5.8%), China and other countries in East and Central Asia (5.6%), South and Central America (4.9%), Australia and New Zealand (5.0%) and Russia and Non-EU Eastern Europe (0.9%).

Educational background and professional development

Survey participants also represent a highly educated workforce. An impressive 96.0% report graduating from a university and a further 69.8% indicate completing graduate school. Nearly half (49.8%) of respondents indicate they have earned a terminal master's degree, and another 20.0% hold PhDs.

Geographic Location	Percent
South Africa	1.3%
Other Sub-Saharan Africa	4.4%
Middle East North Africa (MENA)	1.7%
Brazil	1.6%
Mexico	1.6%
Other Latin America	1.7%
Canada	10.7%
United States – Central	6.1%
United States - East	16.9%
United States - South	4.9%
United States - West	21.4%
China	1.3%
India	5.8%
East Asia	3.8%
Central Asia	0.5%
Australia/New Zealand	5.0%
Russia	0.1%
European Union or other Western Europe	10.2%
Non-European Union Eastern Europe	0.8%

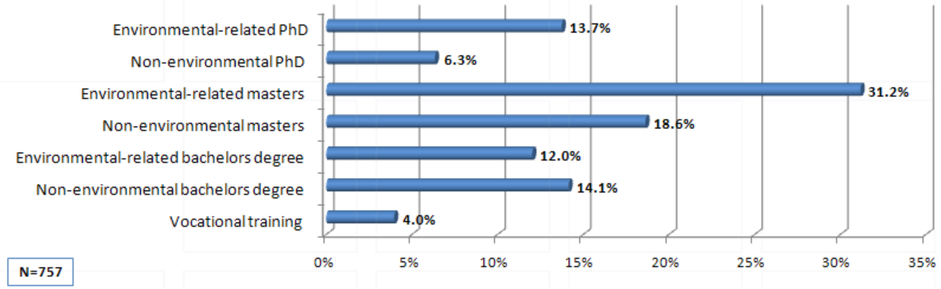


Considering the environmental nature of the field, we were not surprised to find that 56.9% of those polled earned an environmental-related degree. We found this leaning toward environmental education most pronounced among respondents who have earned graduate degrees (64.0%).

1 For a discussion of the degree to which this sample is representative of the climate change practitioner corps, please see the "Data Collection Methods and Sources of Bias" section of this report.

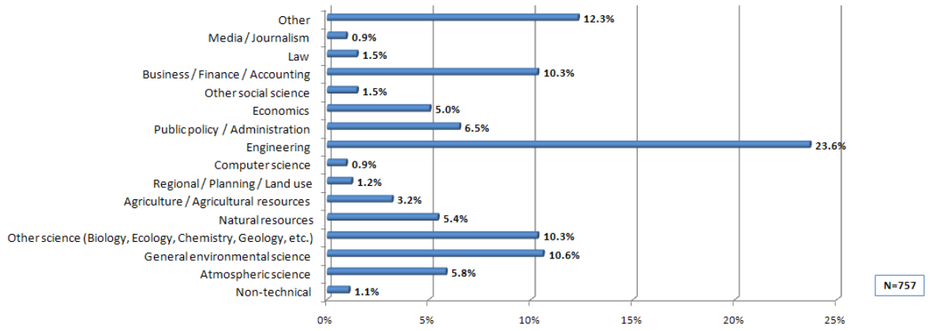
2 GHGMM is published by Earthscan. For more see: www.earthscan.co.uk/journals/GHGMM

What is the highest level you have achieved in education/training?



Respondents reflect diversity in the focus of their education. A slight majority of those polled (50.3%) characterized their educational background as engineering (23.6%) and hard and applied sciences (26.7% spread over a number of sub-categories). A complete overview of the educational backgrounds of our surveyed practitioners is provided in the table below.

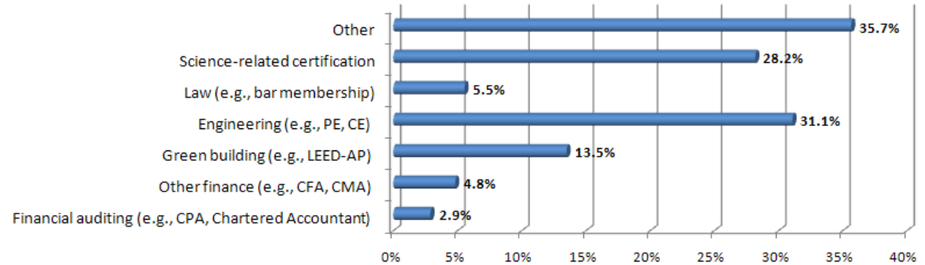
What has been the general focus of your education/training?



Looking at the professional background of our respondents further rounds out this picture. Again confirming the technical grounding evidenced in educational attainment, of surveyed practitioners indicating they hold a professional certification, nearly a third (31.1%) report that they are certified engineers. A further 28.2% hold science-related certifications. In contrast, only a combined 6.7% of the professionally certified respondents in our survey sample report holding a financially related

certification, with 2.9% holding an accountancy certification and 4.8% professionally certified in another financial discipline.

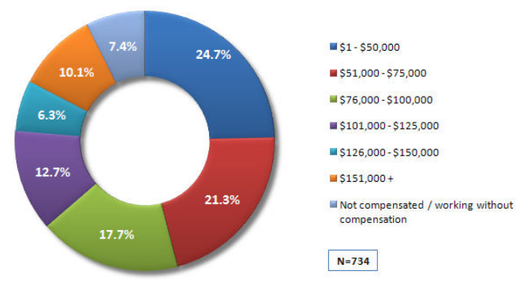
Do you have any environmental, accounting, auditing, or other professional certifications? (Check all that apply)



Professional standing

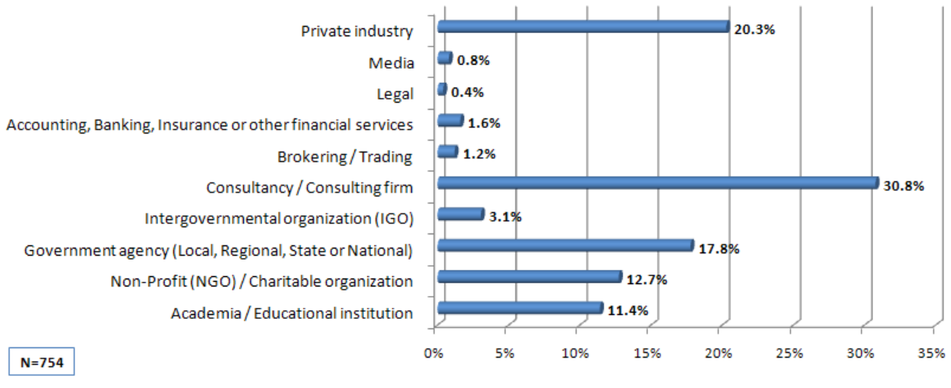
Those surveyed also revealed their annual earnings (listed in U.S. dollars per annum). Their responses showed a broad range from 7.4% working without compensation to 29.1% receiving over $100,000. Most respondents fell in-between, with nearly a quarter earning $50,000 or less (24.7%), 21.3% earning between $51,000 and $75,000 and 17.7% are said to earn between $76,000 and $100,000. Rounding out the higher earners, 12.7% reported earning between $101,000 and $125,000, 6.3% said they said they made between $126,000 and $150,000 and a further 10.1% earned in excess of $150,000. On average our GHG practitioner respondents earned $80,459 annually.

With regards to salary, how much are you currently compensated? (U.S. Dollars)



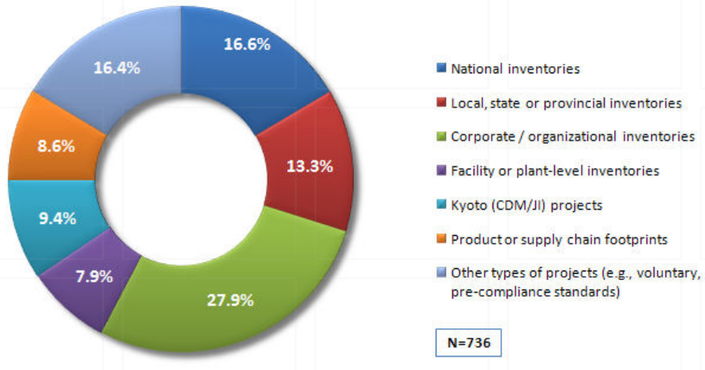
Survey respondents work for a broad array of organization types. For a second consecutive year, nearly a third (30.8 %) of surveyed practitioners identify as consultants, the most common organizational arrangement. Other well-represented employers from this year's responses include practitioners in the civil service (20.9%, with 17.8% in domestic institutions and 3.1% representing intergovernmental organizations), individuals representing private industry (20.3%), non-governmental (i.e., not-for-profit) staff (12.7%) and academics (11.4%).

How would you classify your current employer?



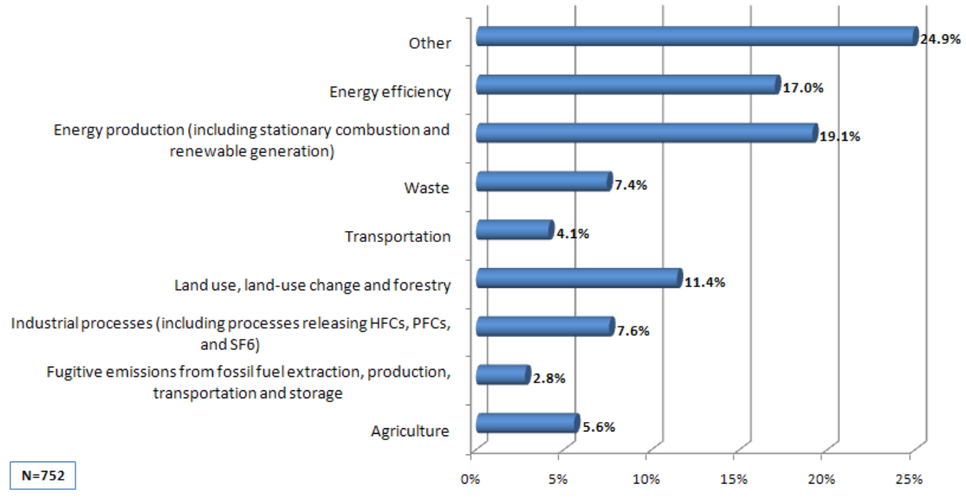
In terms of the focus of their work, organizational/corporate emissions inventory specialists topped our responses (27.9%), followed by national inventory experts (16.6%). Respondents also reported focusing on local (i.e., sub-national) inventories (13.3%), Kyoto (i.e., CDM/JI) projects (9.4%), supply chain work (8.6%) and facility inventories (7.9%). A further 16.4% of respondents said the primary focus of their work was best captured in a broadly defined "other" category.

What is your primary focus in relation to GHG inventories or projects?



Our respondents also indicated the primary area of practice by sector of the economy. Energy production (19.1%), energy efficiency (17.0%) and land use, land use change and forestry (11.4%) led specific responses. Our respondents also reported focusing on industrial processes (7.6%), waste (7.4%), agriculture (5.6%), transportation (4.1%) and fugitive emissions (2.8%). Rounding out these responses 24.9% reported specializing in an undefined "other" category.

Regarding GHG emissions and related climate change activities, please define your primary area of practice.



Climate Change Remains an Emerging Field Where Practitioners Rise Quickly Through the Ranks

The measurement and management of GHG emissions is an emerging professional discipline, and as such, personnel with skills and experience are in short supply. While this shortage challenges the industry, it also represents a significant opportunity for new entrants to the field. Unlike more established disciplines, the climate change practitioner corps is a shallow talent pool, particularly when considering those with a high degree of expertise. The field represents a dynamic opportunity for fresh-faced GHG practitioners, who can climb the professional ranks relatively quickly.

Findings

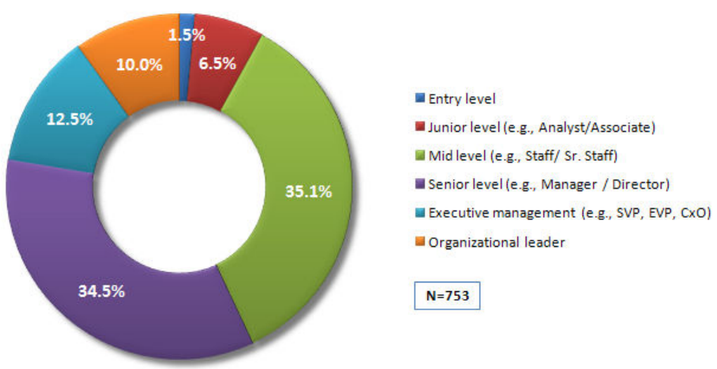
Staffing for climate change reveals top heavy organizational charts.

This year's survey responses continue to show evidence of top-heavy organizational charts. With respect to this apparent imbalance, we found that 57% of respondents identified their position as senior (34.5%), executive (12.5%) or organizational leader (10.0%). In contrast, a mere 8.0% of those surveyed identified themselves as entry-level (1.5%) to junior level (6.5%). Meanwhile, just over a third (35.1%) of respondents signaled that they were mid-level.

"The whole area of carbon management, from measuring your own carbon footprint to developing practical ways to reduce it, requires a new set of business skills."

Mike Barry
Head of Sustainable Business
Marks & Spencer Plc

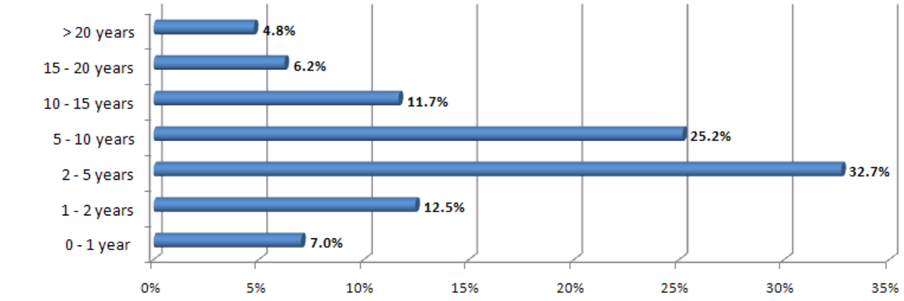
What level is your position within your organization?



What does it take to become a carbon expert? Not much time.

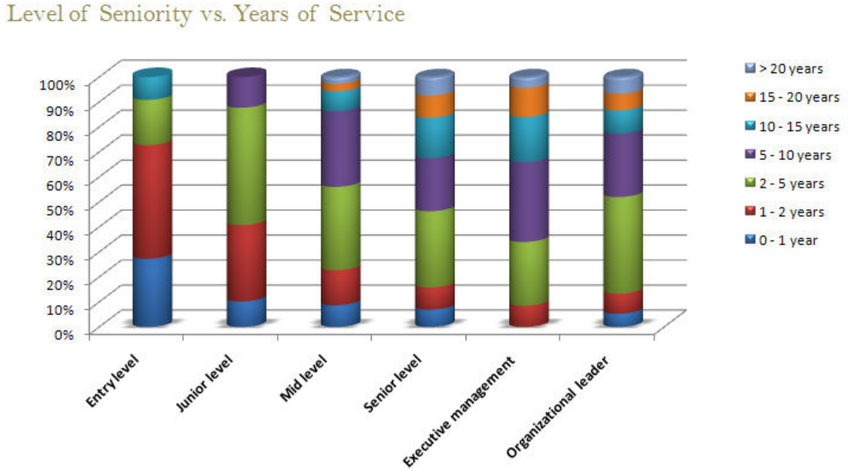
We drew further inferences about climate change practitioners and the general maturity of the industry by looking at the individuals holding these positions. Reflecting the relative newness of the field, more than half of our respondents (52.2%) stated they had worked on climate change/GHG issues for less than five years. Only 22.7% indicated they had been in the field for more than 10 years.

How many years have you worked on GHG or related climate change matters?

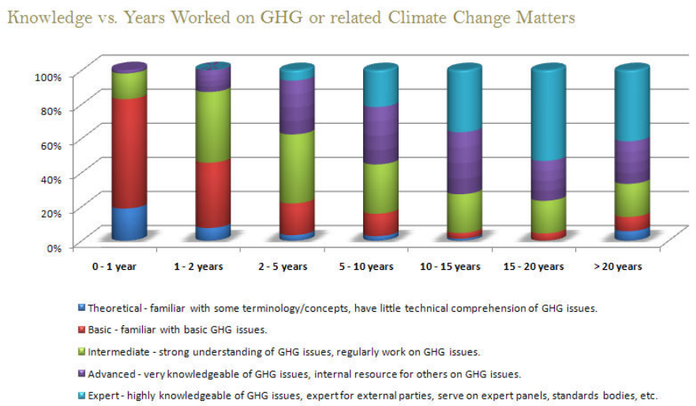


Comparing our respondents' work experience with the seniority of their roles adds further detail to this picture. The figure below charts the numbers of years of climate change experience respondents hold across organizational positions.

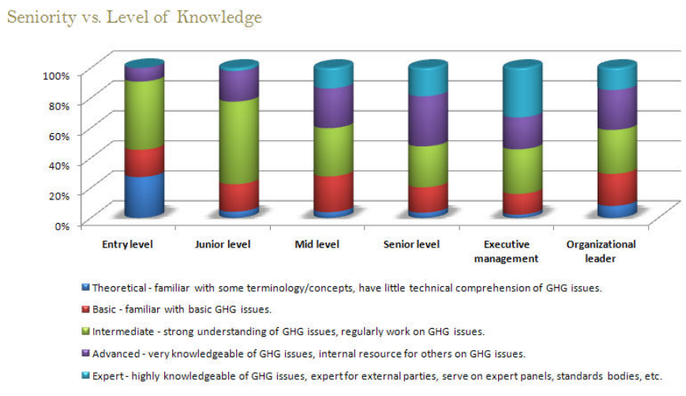
Level of Seniority vs. Years of Service



Further rounding out this picture, the respondents provided a self-assessment of their level of expertise. The data provide interesting perspective on the relationship between years of experience and expertise. Specifically, the data show that, on average, practitioners rated themselves at a slightly more advanced than intermediate level. The chart below links respondents' self-assessed skills with their years of experience working on climate change.



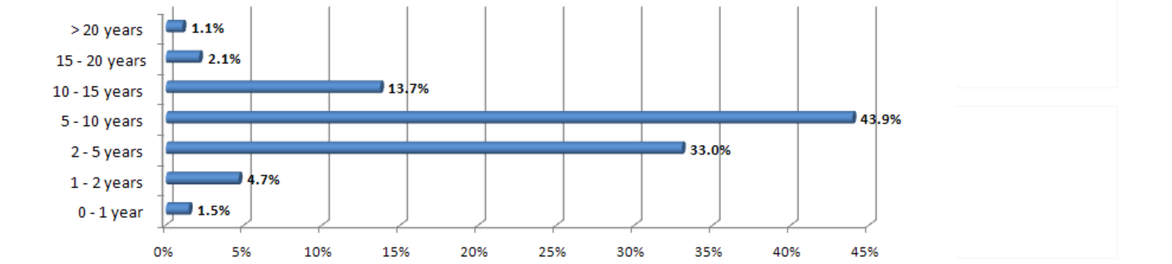
Providing perspective into how expertise is managed in organizational charts, the following figure compares self-assessed expertise against the position of individuals in a firm.



Our respondents also gave their opinions on how many years of experience a typical practitioner needs to be considered an "expert." The data allow us to examine observations on professional position relative to what practitioners see as a necessary amount of accrued experience. Statistical analysis pegs this at a mean of 6.9 years (SD 3.9). This finding comes in at nearly double our respondents' experience, 3.6 years (SD 1.4), and two years more than the subset of practitioners who self-identify as experts (4.9 years of experience; SD 1.2) though the variation among those polled is worth noting.

1 Averages for qualitative responses are, as in this paragraph, included throughout this report. These averages are derived from statistical analysis by converting qualitative rankings into ordinal numeric values. In other words, qualitative rankings are assigned numeric values, which are summed and from which a mean is calculated.

Climate Change Remains an Emerging Field Where Practitioners Rise Quickly Through the Ranks



2009 Findings: Shortage of GHG Professionals

Last year's survey asked several questions relating to the expansion of GHG programs and the capacity of support available to them. The survey concluded that there was a severe shortage of GHG professionals. That conclusion was supported by large majorities of survey respondents, with 83.9% indicating there was a shortfall of experts to implement current GHG programs and 86.8% concluding the shortage also would impact future GHG programs.

Conclusions

Building on the 2009 survey's documented observation that a shortage exists among the practitioner corps available to implement GHG programs, this year's report adds details to that picture of the industry. Putting context to the state of the employment market for GHG services, we use statistical analysis to further describe the state of the GHG workforce.

We also examined the level of seniority that individuals hold relative to observed and reported measures of expertise and experience. In addition, we juxtaposed this data with the respondents' assessment of the years of experience they consider necessary to be recognized as an expert in field. The comparison provides a unique perspective on the mindset and maturity of the human resources side of the market for GHG services.

GHG Training Gets High Marks Overall, But Serious Reservations are Noted

Human resources are key to implementing climate policies. Specifically, personnel capable of competently measuring, reporting and verifying GHG emissions are integral to the smooth functioning of climate programs. Yet these skills are not innate; mastery of them requires substantial training supported by practical experience.

In last year's survey of the industry, we found that GHG practitioners overwhelmingly believed higher education institutions (i.e., universities) were failing to train graduates adequately in GHG measurement and management. This year, we expanded the questions on training to include more specific assessments of the range, accessibility and rigor of offerings delivered by both formal academic institutions and through informal training programs.

"You basically have a global regulatory system staffed without the world's most talented human resource pool, and it's a big problem … what the CDM needs is 20,000 products of the U.S. education system."

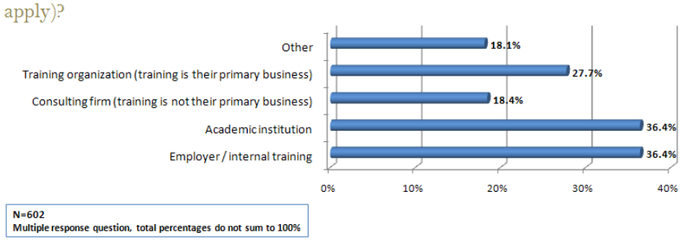
Assaad Razzouk
Chief Executive Officer
Sindicatum Carbon Capital Group

Findings

GHG training gets high marks but falls short in its breadth of offerings, availability and thoroughness.

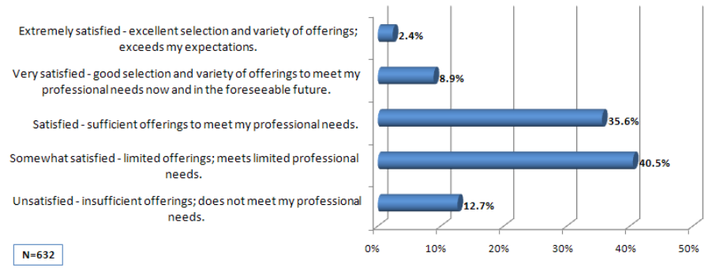
Roughly half (48.1%) of our respondents reported receiving specialized training in GHG measurement and management. They indicated the training came from a range of institutions and organizations. Asked about the types of providers delivering this training, responses were divided among academic institutions (36.4%), training organizations (27.7%), consulting firms (18.4%) and other training providers (18.1%) with several respondents indicating they had received instruction from more than one trainer. An additional 36.4% reported that they had received training internally from their employer.

What best classifies your primary training provider (check all that apply)?

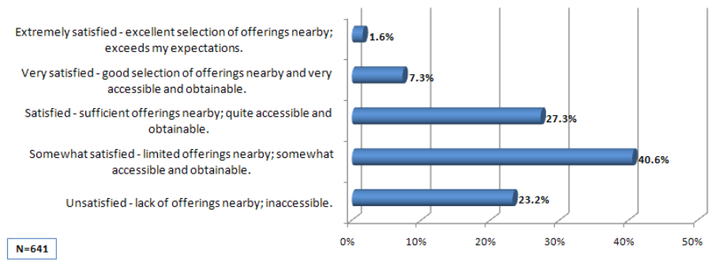


Of those receiving training, a large majority (81.1%) indicated that they were generally satisfied with their experience. Further questioning, however, uncovered a more conflicted outlook. Majorities reported dissatisfaction at a more granular level, with 53.2% citing dissatisfaction with the topical breadth of available training options. Similarly, 63.8% criticized the poor availability of training, and 59.1% complained that training was not sufficiently rigorous.

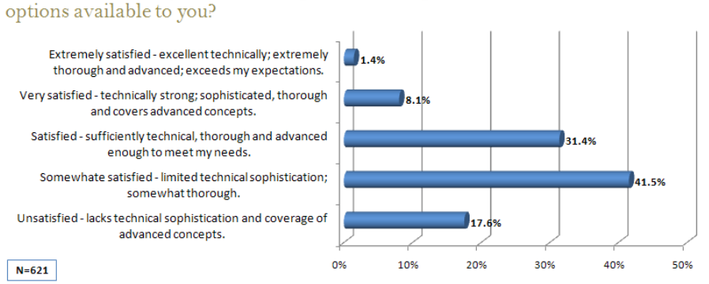
How satisfied are you with the breadth and depth of training and curriculum options available to you?



How satisfied are you with the availability of training and curriculum options available to you?



How satisfied are you with the rigor of training and curriculum options available to you?



Across this range of questions, survey respondents ranked training providers in the following order of preference: specialized training organizations, academic institutions, employer/internal training and consulting firms, with the positioning of an "other" category varying among questions.

2009 Findings: Universities failing

With respect to climate change education, 2009's survey sounded an alarm that universities are failing to deliver. In total, 81.9% of that year's respondents concluded that universities were not adequately training new graduates in GHG measurement and management skills. The margin grew to 84.1% when we looked only at the opinions of respondents from academia.

Conclusions

Beyond recognizing the general failure of universities to prepare technical GHG experts for the workplace, the 2009 survey findings also hinted at the extent to which informal educational organizations outside of academia were shouldering the GHG training burden. Building on those conclusions, this year's survey adds a detailed qualitative assessment of training providers. These findings pinpoint three broad areas of dissatisfaction, despite reports of overall positive training experiences. The responses also show that all types of organizations participating in training face similar challenges. With additional statistical analysis, a clear hierarchy of trainer preference was presented.

We found the results show three significant hurdles to successful training in the field. Shortcomings in availability, breadth and rigor of training underscore the need to improve GHG education. These highlight critical gaps in content, quality and delivery of training that must be overcome to build the human resources capacity needed to implement effective climate policies and programs.

U.S. Facilities Ill-prepared for Regulatory Emissions Reporting, While American and International Companies Cite Confidence in Climate Risk Disclosurey

Following the U.S. election of Barack Obama, whose presidential campaign platform included strong action on climate change, America's reengagement through both its domestic agenda and participation in international negotiations temporarily invigorated climate policy discussions around the world.

With the balance of the Obama administration's more ambitious climate policymaking still to be determined, America's climate efforts have primarily focused on developing the building blocks necessary to enable future programs. Central to this climate infrastructure agenda is the U.S. Environmental Protection Agency's (EPA) Mandatory Reporting Rule (MRR), an obligatory GHG reporting requirement for large U.S. facilities. (For details on this program, please see the associated policy box.)

Developing a new reporting regime in a country that has taken a piecemeal approach to climate policy raises questions about the capacity and ability of affected facilities and organizations to meet these regulatory obligations. We put these questions to our climate change practitioner respondents. Our findings reflect their assessment of the preparedness for mandatory GHG emissions reporting in the United States.

This year also saw climate risk disclosure addressed by U.S. regulators, with the Securities and Exchange Commission (SEC) issuing guidance on the inclusion of climate risk disclosure in financial filings. (For more on the SEC's interpretive guidance, please see the related policy box.) Whereas the EPA's MRR represented a necessary step to facilitate future domestic regulatory programs, the SEC's guidance on climate risk is a milestone in the global dialogue on climate risk disclosure in financial reporting. To date, the broader climate risk disclosure regime has, for the most part, existed outside government purview, operating as a voluntary initiative facilitated by the Carbon Disclosure Project, a nonprofit serving institutional investors and requesting climate risk disclosures from publicly traded companies.

"Carbon reporting is in its infancy relative to the financial reporting frameworks in existence, and there are additional complexities around measurement of carbon data. This heightens the risk of errors in published information."

Jenny Harrison
Director, Carbon Assurance & Energy Audit
Deloitte

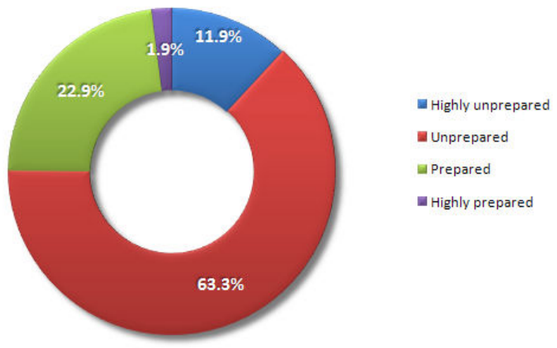
In a corollary to questioning relating to the GHG reporting capacity of affected U.S. facilities under the MRR, this survey also polled respondents on the global capacity to deliver climate risk disclosures. Probing questions of preparedness for both U.S. GHG reporting and global climate risk disclosure, our results provide a blueprint of some of the chokepoints that may hamper implementation of today's and tomorrow's climate regimes.

Findings

U.S. facilities are unprepared for regulatory emissions reporting.

The U.S. EPA's Mandatory Reporting Rule (MRR) has placed, for the first time, requirements for measuring and reporting GHG emissions on all large domestic facilities. The introduction of the MRR has spurred questions of preparedness: Do the affected facilities have the technical capacity needed to meet these reporting obligations? We posed this question to the GHG practitioners responding to our survey, and more than three-quarters (75.2%) of those familiar with MRR compliance issues responded that the affected facilities are inadequately prepared. Of those concerned respondents, 63.3% said the facility managers were unprepared and 11.9% elevated their assessment to "highly unprepared." Conversely, 22.9% believed that U.S. facilities were prepared, and 1.9% characterized U.S. facilities as "highly prepared" for mandatory GHG reporting.

How would you rate the preparedness of affected U.S. facilities to meet reporting requirements of the U.S. EPA's Mandatory Reporting Rule?

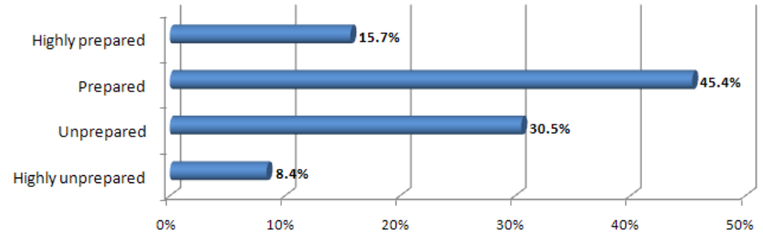


Companies state relative preparedness for climate risk disclosure.

Relating to the broader realm of climate risk disclosure, international survey respondents were polled on the question of organizational preparedness to make such disclosures. In this case, respondents cited a relatively high degree of preparedness. Specifically, 45.4% of respondents indicated their employers were prepared to make such disclosures. Another 15.7% concluded their employers were highly prepared,

while 30.5% judged them to be unprepared and an additional 8.4% called their employers highly unprepared.

If your organization is impacted by climate risk disclosure requirements (e.g., the U.S. SEC's interpretative guidance on climate risk), which of the following statements describes your employers readiness?



The apparent gap between perceived corporate preparedness for climate risk disclosure and perceptions of relative unpreparedness for mandatory GHG reporting presents an interesting question regarding the state of climate risk disclosure. Because climate risk is, in part, built upon GHG emissions data, it would seem that unpreparedness for GHG reporting would translate to ill-preparedness for climate risk disclosure. Yet, our survey responses present the opposite case. When the subsection of climate risk responses from the United States are compared with U.S. MRR findings, respondents rate climate risk preparedness higher than GHG reporting capacity in the same jurisdiction. Further polling is necessary to draw any conclusions from this disparity, but this preliminary result hints toward differing perceptions of the rigor and quality of reporting necessary to meet the requirements of these two types of reporting schemes.

Policy Box: U.S. EPA Mandatory Reporting Rule

In late 2009, responding to a congressional request and associated appropriations, the U.S. EPA published a rule ("40 CFR part 98," also known as the Mandatory Reporting Rule, or MRR) requiring large industrial emitters to measure and report their GHG emissions. Under the MRR, obligatory GHG reporting is required of sources and suppliers exceeding 25,000 tonnes of carbon dioxide equivalent per annum, a threshold value that covers approximately 10,000 facilities, which account for roughly 90% of U.S. GHGs. The mandatory reporting period for most emitters began in early 2010 with other source categories being phased in over time on a staggered schedule.

Policy Box: SEC Interpretive Guidance on Climate Risk Disclosure

The development and advancement of reporting frameworks for climate risk disclosure have – from inception to present day – primarily existed in the voluntary realm, notably fostered by the work of the nongovernmental Carbon Disclosure Project. Regulatory developments in 2010 marked a significant turning point in how financial regulators address climate risk. Central to this development is the U.S. SEC's decision to release interpretive guidance on climate risk disclosure.

As concerns the generic practice of disclosing risks in financial statements, there are two key concepts worth noting: i) the fundamental purpose of financial disclosures and ii) the methods of recourse that push companies to make these disclosures. That is, disclosures are required as a means by which to provide investors with foresight on potential risks and opportunities, a concept that is buttressed by the potential for litigation against companies failing to make reasonable disclosures.

The SEC's decision to issue specific guidance related to risk disclosures is a fairly uncommon activity. (At the date of announcement, only 22 guiding releases had been issued since 2000.) Guidance releases are subject to majority approval by the commission's five appointed commissioners: This release passed by a party-line (3-2) majority. The SEC's interpretive guidance on climate risk disclosure effectively amounts to the commission's formal acknowledgement of climate as a risk factor and that high-level guidance on how to incorporate these risks into financial disclosures was needed.

Given the flexibility in legal interpretations of "material risk," the central concept driving risk disclosures of any nature, both the application of climate risk disclosures and the required precision of such reporting is, at this juncture, unclear, pending clarifying litigation. However, from the onset of the formal recognition of climate risk by financial regulators, it is worth noting the specific risk areas highlighted in their guidance.

A. Impact of Legislation and Regulation.
B. International Accords.
C. Indirect Consequences of Regulation or Business Trends.
D. Physical Impacts of Climate Change.

Notably, the role of GHG emissions reporting garners specific attention in this guidance. In reference to the above broad categories, GHG reporting serves as the basis for assessments of regulatory risk (A), compliance with international accords (B) and as a means by which to track other market and reputational impacts (C).

U.S. Facilities Ill-prepared for Regulatory Emissions Reporting

2009 Findings: GHG accounting is critical

In 2009's survey, respondents overwhelmingly stated that GHG accounting was crucial to the successful management of climate change, with 98.4% of respondents calling it "critical" to "very critical." Along the same line of questioning, practitioners were also asked which climate programs they thought were most important. Leading this poll was the Kyoto Protocol, including CDM/JI, closely followed by the GHG Protocol and "future U.S. cap-and-trade." Whereas last year's findings outlined the significance of GHG accounting to climate policy and identified the foundational programs, looking at the implementation challenges for climate risk disclosure and GHG reporting requirements, this year's survey responses highlight that GHG accounting capabilities are more nascent under GHG programs.

Conclusion

The U.S. EPA's Mandatory Reporting Rule establishes an important and foundational program underpinning the data requirements of future U.S. climate programs. Given the importance of the MRR, the responses from our survey are disconcerting. The GHG practitioners we polled indicated a firm belief that affected facilities are unprepared to meet their reporting obligations.

In contrast to findings regarding GHG measurement and reporting capacity in the United States, when polled on the broader question of organizational capacity to make climate risk disclosures our global sample found a comparatively high degree of preparedness. The finding held true across the international sample and in the United States. But it is a finding that introduces a number of questions regarding data quality, rigor and reporting expectations of GHG data under varying types of reporting regimes.

Climate Change Practitioners Support U.S. Carbon Pricing, Yet are Concerned About Level of Public Understanding on Climate Issues

Mitigating climate change is one of the most challenging issues humanity has ever attempted to solve through public policy. The challenges endemic to forging collective action on this global problem include the unequal distribution of emissions and climate change impacts as well as the large temporal lag between cause and effect. In sum, the politics of climate change are uniquely thorny.

As transformative climate policies are necessary to achieve the monumental task of decarbonizing the global economy, a supportive public is key. Yet, engaging and informing the body politic on an issue as complex as climate science has proven problematic. Addressing this point, we asked our respondents for their impressions on the public's understanding of climate change. We also asked them to weigh in on their preferred approach to one of the most closely watched and hotly contested climate policy debates: Which policies should the United States use to mitigate GHG emissions?

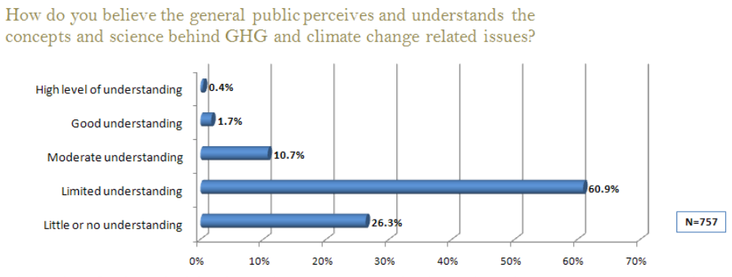
"Cap-and-trade was just one way of skinning the cat; it was not the only way. It was a means, not an end. And I'm going to be looking for other means to address this problem."

Barack Obama
President
United States of America

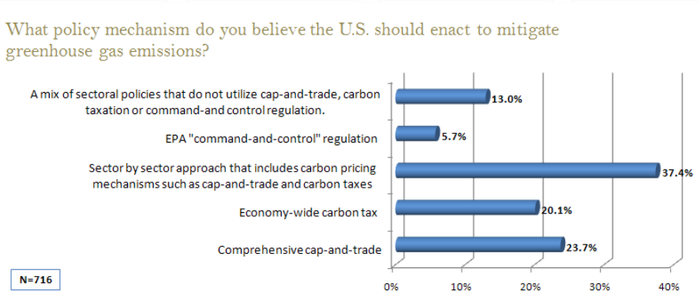
Findings

Experts are unimpressed with the public's understanding of climate change.

Underscoring one of the most significant barriers to political action on climate change, the overwhelming majority (87.2%) of climate change practitioners we polled expressed concern with the general public's degree of understanding of climate change. This number includes 26.3% who said the public had "little or no understanding" and 60.9% who indicated the public had a "limited understanding" of GHG/climate change issues. Only 2.1% believed that the public had a good or a high level of understanding of climate change issues.

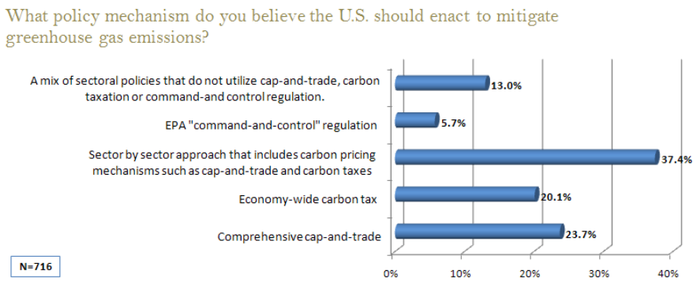


While this finding held relatively true across the board with respect to geography, respondents in Western Europe gave the public noticeably higher marks.

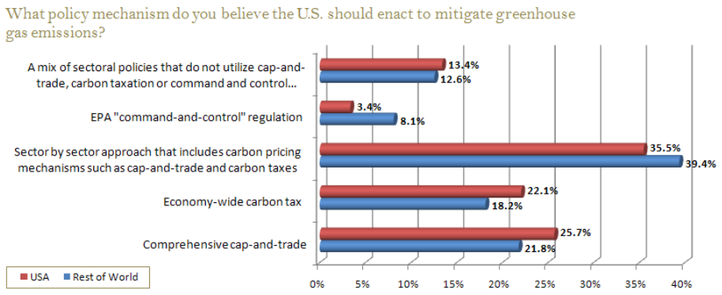


GHG experts are unambiguous in their call for U.S. carbon pricing and regulation.

Commenting on an active area of policymaking – the debate over regulatory approaches to mitigate GHG emissions in the United States – 81.2% of respondents said they believed the country should enact a carbon pricing measure in the form of a comprehensive cap-and-trade (23.7%), carbon tax (20.1%) or a sectoral approach that employs a mix of pricing mechanisms (37.4%). In contrast, 5.7% of respondents felt command-and-control regulation was a more appropriate method. (For more on these policy approaches, please see the associated policy box.) Of note, only 13% of those polled indicated they believed an approach that sidestepped both carbon pricing and command-and-control regulation was appropriate for the United States.



Complementing the aggregated global perspective on U.S. climate policy options, the below chart compares the opinions of American respondents with those residing outside of the United States.



Policy Box: Policy Approaches

This report discusses a number of possible policy approaches available to mitigate GHG emissions. To provide some clarity on these approaches, a short summary of the policy options referred to in this section is provided below.

Carbon pricing is rooted in the idea of forcing polluters to pay for their GHG emissions through some form of policy. The resulting cost of polluting creates an economic incentive to minimize emissions. Carbon pricing can be implemented directly, through a carbon tax, or indirectly, as through a cap-and-trade system where market forces of supply and demand determine the carbon price.

The Natural Resources Defense Council defines a carbon tax as a fee levied on carbon-based fuel stocks, based on their carbon content. However, it can be thought of more broadly as a tax levied on any and all sources of GHG emissions (e.g., methane from coal mines as well as carbon dioxide from fuel combustion) or on activities that are precursors to emissions (e.g., petrol refining).

The Stockholm Environment Institute describes cap-and-trade as a system that involves trading of emission allowances (i.e., permits), where the total number of allowances is strictly limited or "capped." Trading occurs when an entity has excess allowances (e.g., through reductions in its own emissions) and then sells them to an entity requiring allowances because of growth in its emissions or an inability to make cost-effective reductions.

The Encyclopedia of Earth characterizes command and control regulations as focused on preventing environmental problems by specifying how a company will manage a pollution-generating process. A typical example of a command and control regulation is a performance standard that specifies the pollution rate all factories of a certain type must stay below.

An economy-wide approach indicates that all economic sectors are covered by a policy whereas a sectoral approach implies that different policy mechanisms are applied to one or more specific sectors of the economy.

Climate Change Practitioners Support U.S. Carbon Pricing,
Yet are Concerned About Level of Public Understanding on Climate Issues

Conclusion

The GHG practitioner community's grim perspective on the public's understanding of climate issues is disconcerting as an assessment of how the public perceives an issue whose management is integrally tied to electoral politics. We also note the moderately higher esteem in which the European practitioners we polled hold the public. Viewing this finding in parallel to Europe's climate leadership brings questions of causation to the fore, specifically the extent to which this impression is a result of policy or simply the bedrock for it.

Weighing in on one of the most intensely watched climate policy developments, the U.S. regulatory process, our survey respondents overwhelmingly approved regulatory design that prices carbon. Their opinions on how to implement such a pricing regime were divided among three broadly defined mechanisms: comprehensive cap-and-trade, economy-wide carbon taxation and sectoral carbon pricing. The climate change experts also assessed command-and-control regulation and a broadly defined "other" category of regulatory tools (e.g., incentives), both approaches garnered limited support. Preference for carbon pricing, while lopsided, is not unexpected. The findings reflect the experts' general support for market-based approaches to GHG mitigation, approaches that balance flexibility with environmental integrity.

Carbon Management Software Market is Still Embryonic

Developing specialized software products to streamline the collection, reporting and analysis of GHG emissions data, as well as using that data to make management decisions, has quickly advanced from an esoteric concept to a keenly watched area of clean tech innovation. The rapid growth of this emerging sector, fueled by high-profile venture capital investments, is considered by many as a validation of the importance of sophisticated GHG management strategies in a resource- and carbon-constrained world.

Yet the GHG software market – said to have more than 50 competing offerings – has developed at a rapid pace, leaving unanswered many questions relating to the market's contours, such as market size, corporate interest and willingness to pay and to the market's product offerings, such as ease of use and product capabilities. A few private reports have examined the market in terms of opportunity and current offerings, but none of the studies incorporate systematic polling of a large sample of the technical practitioners that are or expect to be operating these software products. In our survey, we asked respondents about their experience with GHG software, looking specifically at levels of uptake and qualitative assessment of new software products.

"We can pass all the (climate change) laws we want, but if we don't track, manage, verify, and achieve the goals, we're going to be lost, and we're only going to be doing that with information technology."

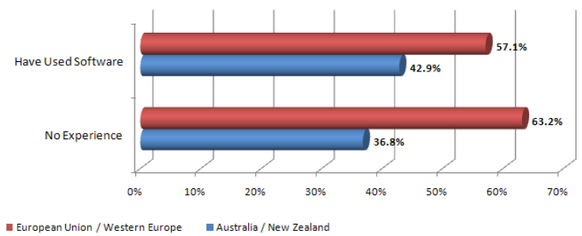
John Doerr
Partner
Kleiner Perkins Caufield & Byers

Findings

GHG software is used by a minority of practitioners.

Responses from polled practitioners give unique insight into the much-heralded field of GHG software. Perhaps the most surprising finding was the slow uptake of GHG software products among climate change professionals. Fewer than half (44.2%) of the GHG practitioners we polled had ever used a GHG software product. However, usage was notably high in Europe (54.8%) and the Australia/ New Zealand region (62.2%).

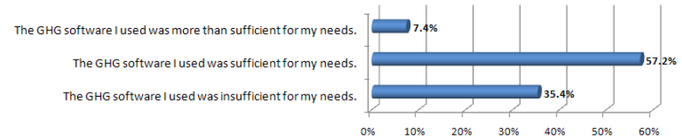
GHG / Climate Software Usage in Australia / New Zealand & European Union / Western Europe



1 Estimates vary. For additional details see reports published by Groom Energy Solutions, Pike Research and Verdantix.

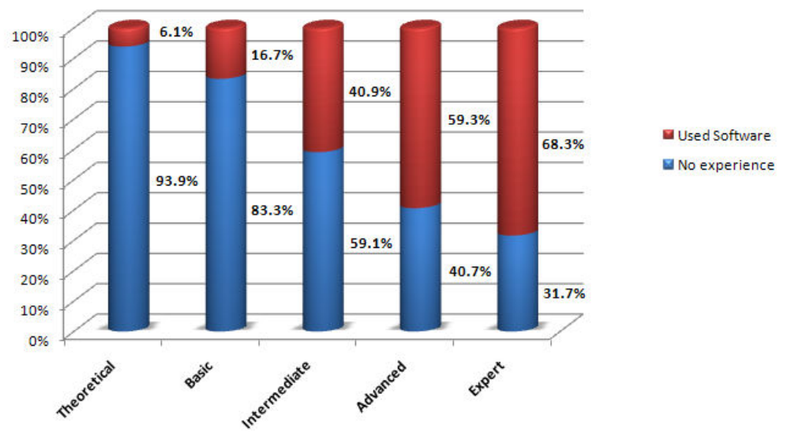
Of those respondents who reported using GHG software, the majority (57.2%) found it to be adequate for their needs. Just over a third (35.4%) found the new software insufficient and 7.4% said it exceeded their needs.

Which of the following describes your experience with the GHG Accounting / Management Software?



Another interesting finding to emerge from our data was how the respondents' software usage related to their self-assessment. Not only does usage appear to increase relative to the expertise of practitioners, but, similarly, their assessment of the software appears to correlate with their (self-rated) expertise. In other words, the higher practitioners assess their expertise, the more likely they are to have used GHG software.

GHG Software Use by Self-rated Knowledge of Technical GHG Issues



Policy box: GHG Accounting Software

The rapid growth in both the number and sophistication of software products designed to support corporations in the measurement, reporting and management of GHG emissions has been harkened as an advancement for carbon management. With potential likened to past software bonanzas in enterprise and financial data management, many software developers, large and small, have made an aggressive push into the GHG marketplace.

Vendor marketing materials and specialized research firm reports alike cite a common litany of converging factors driving demand for GHG software. Corporate compliance and competition in the context of GHG markets and regulations often top this list and generally refer to both newly implemented schemes and those still on the drawing board. Similarly, a broad range of voluntary programs are also touted as important levers encouraging uptake. These schemes range from informational requirements levied across supply chains (e.g., the WalMart Supplier Sustainability Assessment) to GHG reporting in the context of voluntary climate risk disclosures (e.g., the Carbon Disclosure Project), GHG registries (e.g., The Climate Registry) and corporate social responsibility (e.g., Global Reporting Initiative). Finally, underscoring the analytical horsepower of modern software solutions, the case for streamlined reporting gives way to a broader dialogue supporting resource efficiency across environmental metrics.

Definitions of GHG accounting software vary but share in principle a few key elements. These products are often said to push "beyond the spreadsheet." As such, they centralize and consolidate GHG data collection and facilitate and empower GHG-specific planning, projections and other management decisions (e.g., mitigation analysis and investment decisions). Also prominent in GHG accounting software are features that permit synergized reporting to voluntary and regulatory schemes, as well as more generic capabilities, such as audit support.

Conclusion

With so much noise made about the transformational potential of GHG software products, the findings here unambiguously point to a nascent market that has some distance yet to travel.

Our findings indicate that adoption of carbon management software tools is still not widespread. Less than half of the GHG practitioners surveyed have used them. Higher usage was reported in Europe and Australia/New Zealand, but this was counterbalanced by even lower uptake in other countries, including the developing world. Notably, fewer than half of the respondents from the United States and Canada had used the software. Moreover, those using software tools are generally experts in the field, with the rate of usage increasing in concert with self-reported expertise assessments.

Basic qualitative assessments of the software were generally positive, with more than 60% of the respondents who had used the products indicating that a software product was adequate for their needs. Yet, we found very few respondents who gave the software high marks, and nearly 40% described the products they had used as inadequate. Notably, our findings on software usage and divergent views on the capabilities of these products better outline the "state of play" for the embryonic but emerging GHG software sector.

Practitioners Concerned with Peer Competency; Auditors Divided Over Quality of Work

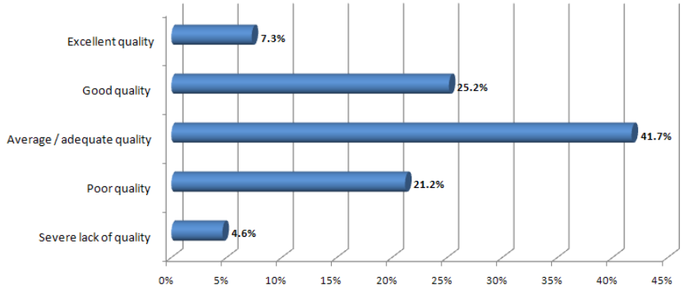
We examined GHG practitioners' assessment of quality in the marketplace for GHG services, and the results provide broad impressions from professionals concerning peer competency and the quality of GHG-related work products. We also looked at respondents' opinions on the suitability of contractual arrangements, as judged by clients' expectations and degree of satisfaction. The responses indicate that the industry is broadly divided on these issues, though additional statistical analysis reveals a more nuanced picture.

Findings

Auditors are sharply divided on quality of GHG work.

With 18.3% of our respondents having offered auditing services, we had a small but valuable subset reporting on their experiences in formally reviewing GHG emissions quantification work. These auditors were divided on their assessment of the quality of GHG work they had audited. Just over a quarter (25.8%) of the auditors described quantification work in general as poor (21.2%) to severely poor (4.6%), whereas about a third (32.5%) of the auditors rated the work as good (25.2%) to excellent (7.3%). The plurality of respondents (41.7%) rated the work they had audited as average or adequate. The mean response was just above "average." Additional analysis pegs the auditors' qualitative assessment evenly across sectors and types of GHG work.

How would you classify the quality of GHG measurement and reporting work that you have audited (e.g., in project design documents)?



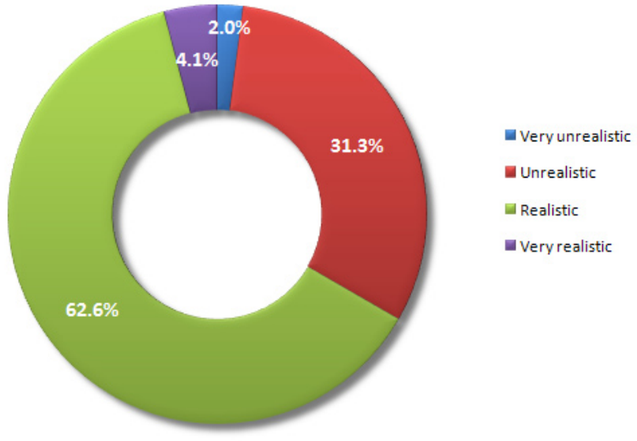
"Every single PDD (CDM Project Design Document) has a problem. They all have mistakes, big or small, several or dozens."

Gao Guangsheng
Director General
Office of National Leading Group on Climate Change (China)

Auditing relationships strained by expectation gaps?

This year's survey also probed the nature of client-auditor relationships and found the auditors' opinions were again divided. One-third of auditors (33.3%) found GHG clients' expectations to be unrealistic (31.3%) to very unrealistic (2%), but a majority (62.6%) found them to be realistic, with an additional 4.1% describing them as very realistic. These findings were consistent across sectors, type of work and a range of other factors.

How would you classify the expectations of clients for whom you have performed an audit?

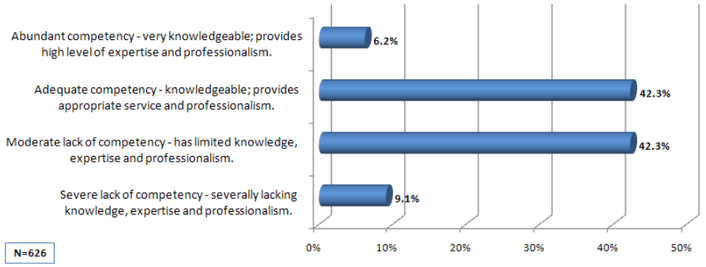


GHG practitioners give peers low marks on competency.

GHG practitioners indicated some concerns in their assessment of the competency of other practitioners working in their area of specialization or expertise.

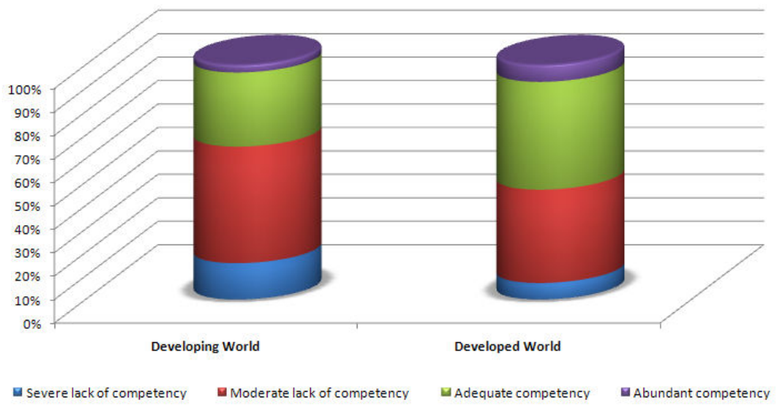
A narrow majority (51.4%) of practitioners found their peers to exhibit a moderate (42.3%) to severe (9.1%) lack of competency.

How would you assess the competency of other professionals working in your area of GHG specialization or expertise?



Like many of these assessments, there is little diversity in responses across sectors, years of experience and a range of other characteristics. However, we found a subtle variation in responses at the national level, with respondents from developed countries generally reporting a higher degree of peer competency than those answering the survey in the developing world.

Compentency Assessment Developed vs. Developing World



Conclusion

Our survey offered an anonymous forum for GHG practitioners to give their frank opinions. Learning how climate change professionals rate the work products and competency of their peers provides valuable insight into the state of the field. Industry impressions reveal a challenging landscape. They show that practitioners' opinions are divided on work quality and client expectations. In addition, the majority of responding climate change professionals question the competency of their peers.

These are foundational findings insofar as they reveal qualitative data describing the industry's level of maturity. By uncovering disagreement among practitioners on the quality of audited work, the expectations of clients and the competency of peers, our results point to the field's most pressing challenges and show how the industry weighs in on a broader scale of maturity.

Carbon Markets Not Up to Snuff; Auditing Needs Enhanced Governance

Greenhouse gas auditing – commonly referred to as "verification" – is a key quality assurance element for climate policies and programs. Third-party verification, already pervasive in regulatory emissions trading schemes, has grown increasingly common in voluntary carbon markets, emission registries and corporate social responsibility initiatives. A Greenhouse Gas Management Institute verification briefing released earlier this year offered the following summary of the practice: "Verification demonstrates confidence to stakeholders that the quality of assets, as well as associated investment risks, are well understood by buyers, sellers, regulators and other stakeholders."

Many GHG policies and programs are reliant on third-party verification for quality assurance. As GHG programs have proliferated and matured, the demands on those conducting verification have similarly expanded. A recent series of rulings delivered by the Clean Development Mechanism (CDM) Executive Board, the arbiter for the world's largest GHG offset program, focused interest on both the competency of the individuals undertaking verification activities and the oversight arrangements that govern verification firms (i.e., "accreditation" of verification firms). (For details on the role of verification in the UN's offset programs – the Clean Development Mechanism and Joint Implementation – see the associated policy box.)

To provide the practitioner's view on these matters, we posed a number of questions relating to GHG verification to the experts in our sample.

"Think of the people who audit Microsoft's balance sheet. You have shareholders who will complain if the audit is bad. But with the CDM, there is no figure like the shareholder to complain if the audit is bad. There is no outside, independent force to moderate them and hold them accountable."

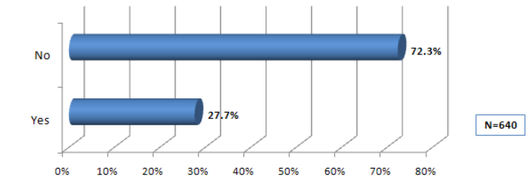
José Miguez
General Coordinator on Global Climate Change, Brazilian Ministry of Science and Technology and alternate member, Clean Development Mechanism Executive Board

Findings

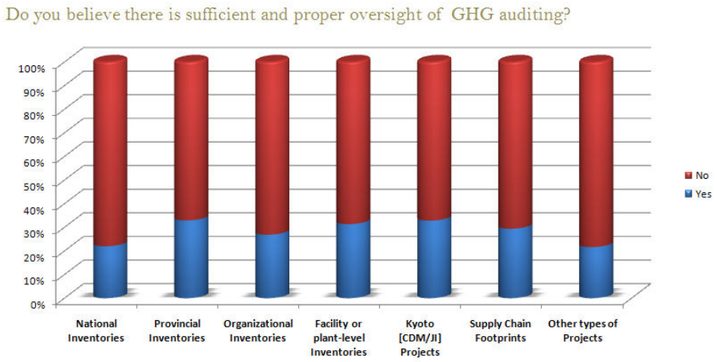
Climate practitioners believe GHG auditing lacks sufficient oversight.

We found that a large majority (72.3%) of our respondents believe that GHG auditing lacks sufficient oversight. This is a troubling finding, given the crucial role auditors play in climate programs.

Do you believe there is sufficient and proper oversight of GHG auditing?

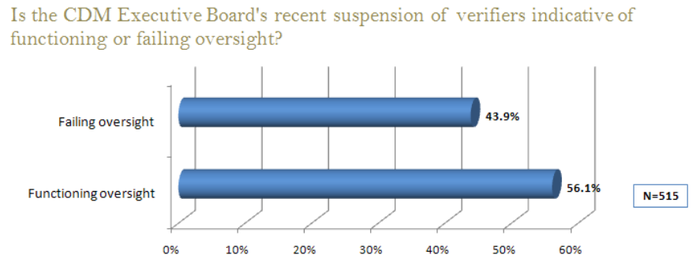


The finding was confirmed by consistently large margins across all areas of GHG work.

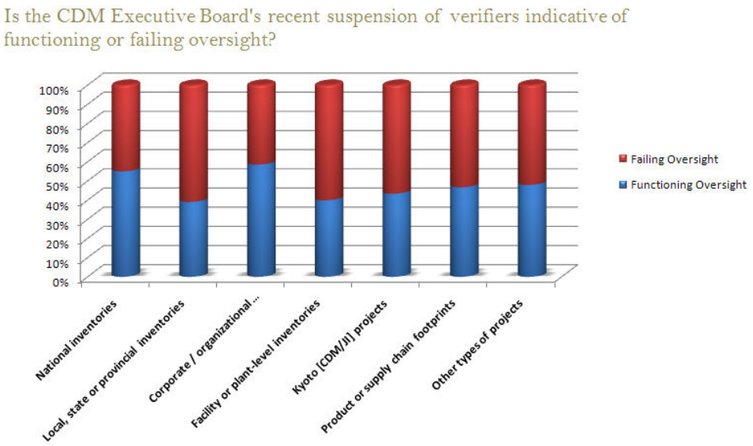


Climate change community divided on meaning of Executive Board auditor suspensions.

Commenting on a topical auditor oversight issue, a slight majority of respondents (56.1%) thought the CDM Executive Board's suspensions of verification firms were indicative of functioning oversight, while the remaining 43.9% disagreed, concluding the suspensions pointed to failures in oversight.



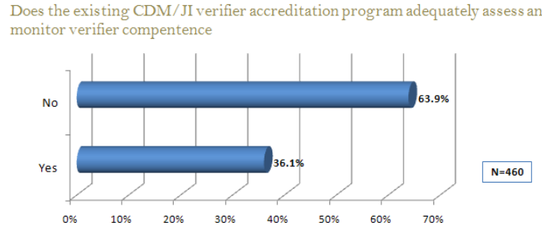
Looking across the carbon landscape, these answers varied with the focus of the respondents' work. CDM/JI practitioners were almost evenly divided on the issue, with 50.8% of the respondents saying the suspensions represented a failure in oversight, while 49.2% indicated they believed the suspensions were representative of functional oversight.



1 GHGMI "Taking Quality Assurance Seriously n Carbon Markets" available online at: http://ghginstitute.org/wp-content/uploads/2010/07/GHGMI_IssueBrief_QualAssur_2010Jul.pdf

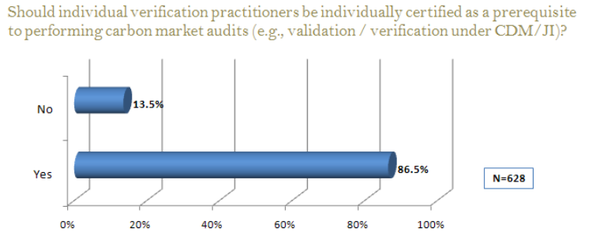
Majority of GHG practitioners believe CDM/JI auditor accreditation falls short on measuring competence.

A majority of respondents (63.9%) indicated there are shortcomings in CDM/JI verifier accreditation, stating that the UN-administered programs do not adequately assess and monitor the competence of individual verifiers performing the work within accredited verification firms. (For more on verification under CDM/JI, please see the associated policy box.)



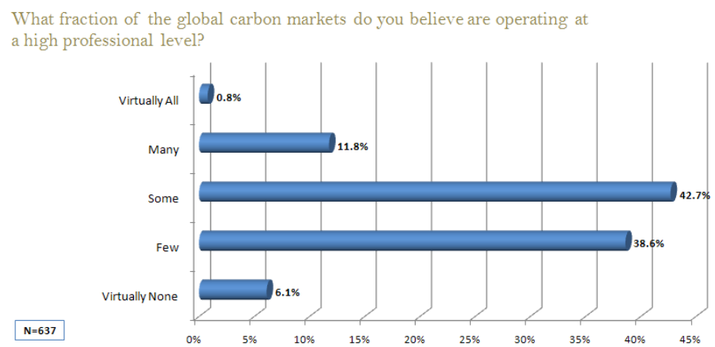
Climate practitioners come out strongly for individual certification of auditors.

Responding to a specific policy recommendation to deal with challenges of oversight and auditor competency in GHG verification, an overwhelming 86.5% of the practitioners polled indicated they support individual certification of auditors as a prerequisite for performing CDM/JI audits.



Relatively few carbon markets are functioning at a high level of professionalism.

When asked about the level of professionalism within operating GHG programs, only 12.6% of our respondents indicated they believed that many or virtually all global carbon markets were operating at a high professional level. Inversely, 87.4% of all respondents indicated that only some, few or virtually none were functioning at a high level. Notably, 44.7% responded that few (38.6%) to virtually no (6.1%) carbon markets are operating with high professionalism.



Policy Box: CDM/JI verification

Under the CDM, verification bodies – the auditing firms relied upon to impartially confirm the veracity of GHG project assessments – must first be accredited to ensure that their systems and personnel are sufficient to undertake GHG auditing work. The accreditation process, administered by the United Nations, combines a desk review and onsite assessment of the verification bodies to determine the adequacy of their systems, their competency and their independence. Once accredited under the CDM, the verification bodies are referred to as Designated Operational Entities (DOEs).

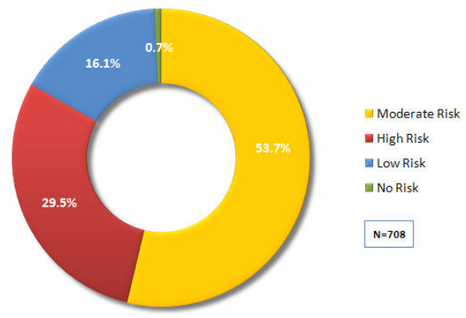
As part of their accreditation, these verification bodies are required to keep all their systems up-to-date. As a measure of oversight, the CDM Executive Board may, at any time, check whether a DOE still meets its accreditation requirements. Over the past two years, these spot checks have resulted in the suspension of several verification bodies.

Given the role that these verification firms play, commentators inside and outside the marketplace have been quick to give their opinions on the implications of these suspensions for carbon markets and more broadly for climate policy.

2009 Findings: Enron

Perhaps the most jarring result from 2009's survey was the headline-grabbing finding that the GHG practitioner community believed carbon markets were at risk of suffering problems in emissions measurement and reporting along the lines of the financial accounting problems made infamous by the likes of Enron, WorldCom and Tyco. This finding effectively connected these major accounting scandals with the relatively anemic quality assurance safeguards in the GHG emissions trading markets.

What do you think is the risk that carbon markets will suffer from problems similar to those symbolized by the Enron, WorldCom and Tyco accounting scandals? (2009 Survey Results)



Carbon Markets Not Up to Snuff; Auditing Needs Enhanced Governance

Conclusion

The results were pointed when we put policy questions on a number of simmering market-wide quality assurance debates directly to GHG practitioners. GHG professionals overwhelmingly found verifier oversight to be insufficient. They believe that CDM/JI accreditation does not adequately judge verifiers' competency. And the respondents hold that individual certification should be required for CDM/JI auditors. These results could be read as the basis for policy recommendations, but, at a minimum, they suggest that GHG verification faces severe and systemic problems that demand substantial consideration and rethinking by policymakers and program administrators.

But not all the findings in this section were so bold in calling for reform. Practitioners were split over the meaning of the CDM Executive Board's auditor suspensions and, by extension, the efficacy of the CDM's oversight of verification activities. In addition, the respondents were divided in their opinions of the degree of professionalism exhibited in carbon markets: Practitioners held out hope for a few carbon markets but were skeptical of most. This topic is worthy of tracking over time to see if and how opinion changes as programs consolidate and mature.

GHG Personnel Fail to Meet Current Market Requirements; Competency Concerns Loom with Expansion of Climate Programs

With respect to climate policy, the importance of developing a skilled workforce cannot be overstated. Yet, while policy wrangling tends to spotlight GHG program elements, issues related to developing a workforce capable of implementing these programs are typically overlooked.

"It's not a malfeasance of any sort, but in many cases it's under-trained (GHG verifier) staff that have to hit the ground running."

Karan Capoor
Senior Financial Specialist, Climate Mitigation and Carbon Finance
The World Bank

Our survey results take a closer look at implementation in the context of the current market and future policy scenarios. Findings from both direct questions and deductive analysis of survey responses give perspective on the state of the human resources available to implement both present and future climate change policies.

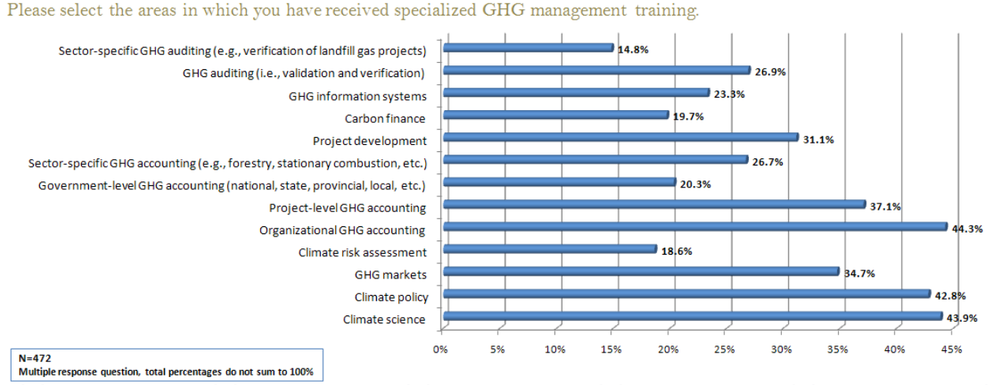
Findings

Gaps exist between the climate change workforce supply and demand.

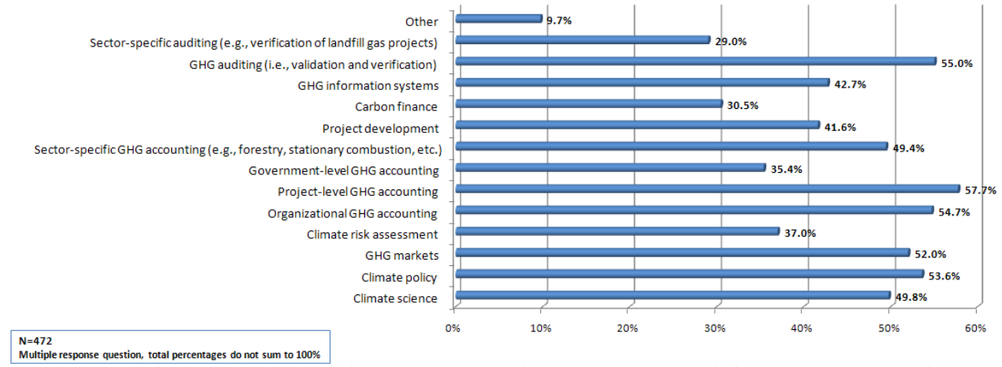
Our respondents provided confirmation that the climate change workforce is not appropriately prepared to handle today's workload, let alone tomorrow's.

The data collected allowed us to compare the training that practitioners received relative to the skills and competencies that employers reported seeking in recruiting efforts. Comparing these data reveals mismatches between the developed workforce's skills and those in demand.

Please select the areas in which you have received specialized GHG management training.



What type of skills do you look for in a qualified GHG related candidate? (Check all that apply).

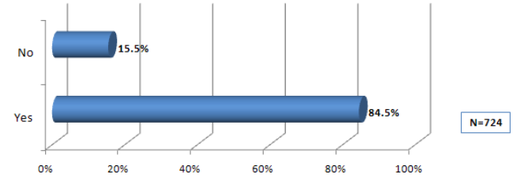


Most climate practitioners envision a day when corporate carbon managers will span the industry.

Looking past current skill gaps to future policy requirements, our responding practitioners firmly agreed that climate policy would see a significant expansion.

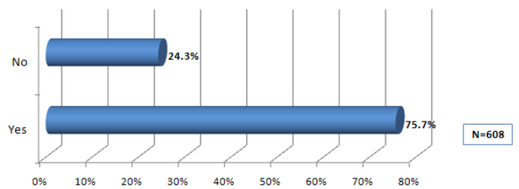
A large majority (84.5%) of respondents in this year's survey agreed that someday all publicly traded companies will require a full- or part-time GHG employee or consultant.

Do you foresee a day in which all publicaly traded companies will require a full- or part-time employee or consultant to oversee the management of GHG and carbon related issues?



Our respondents also envisioned specific policy developments that could spur corporations to rethink their approach to climate change. For example, three-quarters (75.7%) of those polled agreed that organization-focused GHG programs similar to the United Kingdom's Carbon Reduction Commitment would be adopted in other countries. (For more on the U.K.'s Carbon Reduction Commitment, see the related policy box.)

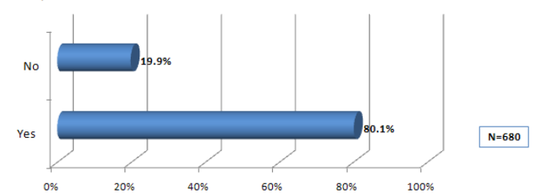
Do you believe we will see "downstream" GHG regulatory programs focused on non-energy-intensive organizations like the United Kingdom's Carbon Reduction Commitment and Energy Efficiency Scheme (CRCEES)?



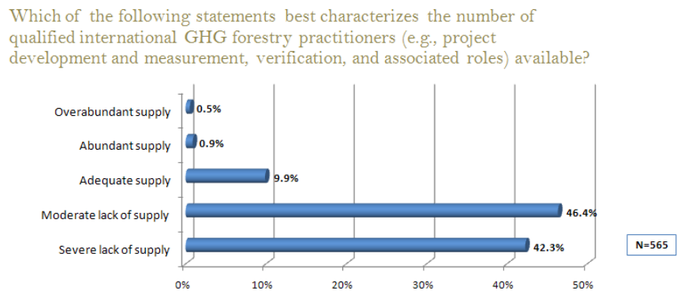
GHG workforce capacity will challenge future climate agreements and mechanisms.

At an international level, the practitioner community voiced concern over the implementation of expanded climate schemes. When polled on extending an international climate change framework that would more substantively engage rapidly developing countries (e.g., Brazil, South Africa, China, and India), the large majority of respondents (80.1%) questioned whether the GHG measurement, reporting and verification (MRV) requirements of such a regime would overextend the professional capacity available to perform the work.

Should an international framework along the lines of the Copenhagen Accord emerge that includes measurement, reporting and verification (MRV) for rapidly developing countries (e.g., Brazil, China, India, South Africa)?



The practitioners were also concerned about the number of qualified forestry experts available to implement scaled-up carbon finance mechanisms designed to stem deforestation (e.g., Reduced Emissions through Deforestation and Degradation, or REDD), with 88.7% of respondents concluding there was a moderate (46.4%) to severe (42.3%) shortage of skilled experts.



Policy Box: The Carbon Reduction Commitment

The Carbon Reduction Commitment (full title: "Carbon Reduction Commitment and Energy Efficiency Scheme," but commonly referred to as the CRC) is a domestic British climate change program. The scheme was developed by the UK's Department of Energy & Climate Change, is administered by the Environment Agency and was enabled under the 2008 Climate Change Act.

The CRC, which went into effect in early 2010, has undergone a number of substantial changes throughout its development and in the early stages of its implementation. Whereas previous iterations of the scheme incorporated a complex rebate ("recycling payment") program determined by participant performance relative to its corporate peers, in its latest permutation the program is effectively a carbon tax. (The recycling payment was scrapped in late 2010 amidst larger government reform and consolidation.)

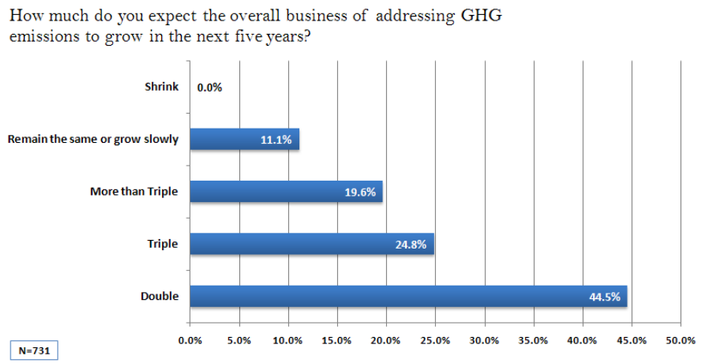
As a result of ongoing design changes, the CRC has been difficult to define precisely. The program has been referred to as a mandatory carbon emissions reporting and pricing scheme, a mandatory cap-and-trade scheme, and a mandatory climate change and energy-saving scheme. Divergence in nomenclature is, in part, a product of the program's unique hybridized approach. Specifically, the scheme draws from design elements of cap-and-trade, but applies a different point of regulation.

Rather than focus on high-emitting facilities (installations), which in the UK are covered under the EU Emission Trading Scheme, the CRC is designed to be compatible and complementary to other climate programs while narrowly focusing on the measurement and reduction of emissions from non-energy intensive sectors. The CRC's coverage is organizational in scope, and eligibility is determined by energy usage, with annual electric consumption thresholds determining both organizational reporting requirements and participation obligations. The CRC obliges roughly 4,000 businesses and public organizations to purchase permits. While it was originally envisioned that these permits would be part of an active trading program, subsequent scheme revisions have fixed these allowances' prices at £13/tonne in its introductory period. The CRC is expected to raise £1bn/year.

GHG Personnel Fail to Meet Current Market Requirements; Compency Concerns Loom

2009 Findings: GHG industry to see significant business growth

In 2009's survey, climate change practitioners expressed confidence that the market for GHG services would expand rapidly in the coming year. (See table for a breakdown of the forecast.) That survey, however, did not examine capacity constraints for specific policy and program projections. This year's respondents begin to fill in the picture, first assessing the capacity available to implement today's programs and then looking at capacity challenges projected over policy scenarios.



Conclusion

Our results provide perspective on the state of GHG training, matching supply to demand to assess how well skills development meets the needs of the market. Superseding the challenge of developing human resource capacity for today is meeting the projected GHG workforce needs of tomorrow. Respondents offered a bullish outlook with respect to corporate carbon management. They predicted a massive expansion, citing GHG management requirements continuing at the organizational level generically and also with specificity referencing the policy details of Britain's Carbon Reduction Commitment.

Yet, on the subject of climate program growth, respondents voiced strong collective concern about the technical MRV capacity available for implementation.

In sum, our results make a strong three-pronged case that climate policy may be facing a looming capacity crunch. More data with respect to GHG capacity in specific programs, sectors and regions would greatly aid in completing this sketch, but our survey results clearly show that: (1) GHG skills do not match current needs; (2) GHG measurement and management is expanding at all levels and (3) severe capacity concerns loom for future policy scenarios.

Climate Employers and Job Seekers Cite Challenges in Demonstrating and Assessing Carbon Competency, See Professional Certification as a Fix

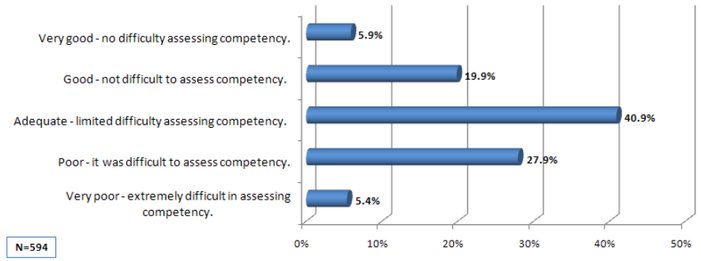
Discussing the practical side of employment in the climate change market, our respondents highlighted a number of challenges. Drawing on their experience as job applicants and as recruiters or employers, the practitioners cited challenges in showing or judging professional competence during the hiring process. Respondents also gave their perspective on the value that professional certification might provide in lowering these barriers.

Findings

Employers cite challenges assessing GHG job applicants.

With respect to hiring in the GHG/climate change sector, those in our survey who had recently recruited for new positions cited varied experiences in assessing the competency of applicants. A third of practitioners (33.3%) trying to hire said they had a poor to very poor time assessing applicants for GHG-related roles. The plurality of respondents (40.9%) found the experience adequate, citing limited difficulty in assessing GHG competency, while the remaining quarter (25.8%) said they had an easier time. Overall, the practitioners judged that their attempts to assess applicants fell short of adequate, a trend that held consistently across country, sector of employer and type of GHG work.

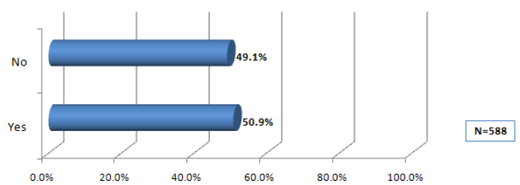
How would you describe your experience assessing the competency of qualified GHG job applicants?



With carbon credentials so challenging to prove, the hiring process would benefit from professional certification.

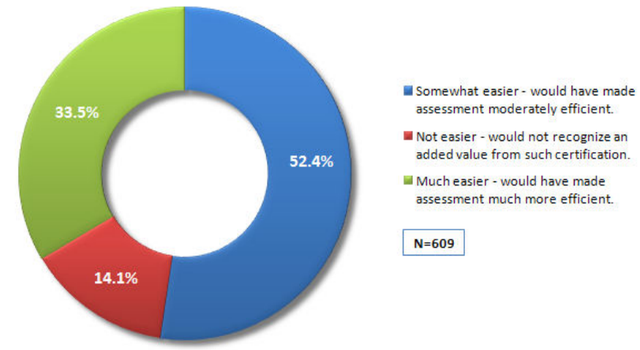
Roughly half of the practitioners surveyed said they found it challenging to demonstrate their GHG competency and job qualifications in the absence of well-accepted indicators, such as professional certification.

Have you found it challenging to demonstrate your qualifications for GHG-related positions due to a lack of well-accepted indicators (e.g., degrees or other certifications)?



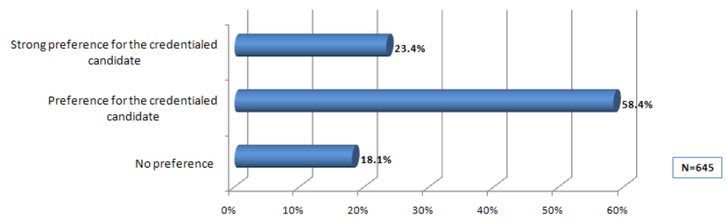
We also asked practitioners whether a well-accepted professional certification system would lessen the challenges cited in assessing competency. Of those respondents who had recruited or hired, 85.9% said they would have found it easier (52.4%) to much easier (33.5%) to evaluate applicants if a professional credentialing system was available.

If there was an internationally recognized GHG personnel certification relevant to the position you were filing, how would assessment have been affected?



If faced with two otherwise identical applicants, 81.8% of the responding practitioners reported they would prefer (58.4%) or strongly prefer (23.4%) a credentialed GHG applicant over a non-credentialed counterpart.

If there was an internationally recognized GHG personnel certification relevant to the position you were filing, how would assessment have been affected?



2009 Findings: Professionalism

Drawing reference to the rapid professional evolution of the information technology industry in the 1980s, 2009's survey asked practitioners whether they expected climate change-related occupations to professionalize through personnel certification schemes and related institutions. Over two-thirds (77.2%) of the respondents agreed, saying they anticipated that the forces of professionalization would make their mark on the field.

To provide context to this finding, the 2009 report also included a broad outline of what professionalization would look like in the context of GHG measurement and management. Specifically, the report pointed to four distinct events: (1) the recognition of greenhouse gas accounting and management as a distinct professional occupation; (2) the establishment of training and the formalization of an academic study that reflects the requisite knowledge and learning of greenhouse gas management and that confirms technical proficiency; (3) the formation of professional associations and groups to support continuous learning, occupational and project activities and (4) the formation of a formal code of ethics and creation of official certifications or licensure for competency.

Climate Employers and Job Seekers Cite Challenges in Demonstrating and Assessing Carbon Competency

Conclusion

Our survey results document GHG practitioners' impressions on staffing challenges in the climate change employment market and the potential value of professional certification as a specific policy remedy. The findings read clearly. Lacking well-defined parameters, GHG employers said it was difficult to assess the competency of applicants. Likewise GHG applicants found it challenging to present their skills to prospective employers. When professional certification was presented as a potential solution, practitioners who had experience in hiring were definite in their support both in the abstract and when presented with a scenario involving otherwise equally matched job candidates.

These findings give further voice to calls for professional certification of GHG practitioners. Together with other findings – such as the anticipated growth in the GHG industry, the call for closer scrutiny of GHG auditing, and practitioners' concerns about peer competency – this year's report documents a need for professionalization across GHG roles and activities.

Looking to future research and analysis in this area, we will continue to monitor and measure the industry's march toward professionalization, which we recognize as an important turning point as the field grows and matures into a workforce capable of effectively implementing tomorrow's climate change policies and programs.

Data Collection Methods and Sources of Bias

Methods

The Greenhouse Gas & Climate Change Workforce Needs Assessment Survey was designed to obtain qualitative and quantitative responses with regards to industry perception, market growth, the emerging profession, workforce characteristics and needs, perceptions of policies and protocols, human capital resources and training needs and evaluations.

Survey invitations were sent to members of the international greenhouse gas and climate change community. These included organizational leaders, as well as senior, mid-level, staff and entry-level professionals in varied governmental, private and nongovernmental groups. The survey was promoted widely on industry listservs (e.g., Climate-l, the GHG Management Institute's proprietary mailing list, Sequence Staffing lists, etc.), and participation was open by request to qualified individuals. Data was collected via the Internet, with each participant having an individual survey code and responses kept anonymous and confidential.

The survey was divided into six sections, each with approximately 10 questions. On average, we estimated that it would take between 15 to 20 minutes to complete, but in some cases it was longer for thoughtful responses and some individuals returned to finish their survey on separate occasions. Overall, 1,163 individuals participated in the survey, but results were only tabulated from the 789 who completely finished the survey and confirmed completion via the final submit survey button (i.e., finalized drop-off response rate was roughly 30%).

The data was deposited into an SQL database through a survey software interface and reviewed as necessary to confirm validity. Responses were considered in aggregate and, in some cases, divided into groups based on a number of factors (e.g., region, sector, etc.) to allow for more insightful cross-tabulations. These cross-tabulations are particularly relevant in reference to the expansion of the survey's scope to cover a range of policies and practice areas not necessarily relevant to all respondents. In cases where such issues of familiarity arose, all efforts were made to show variations between subsets of respondents and the full sample.

This report includes summary results of the survey, analysis of the responses and our insights and recommendations. In addition, we have provided background on areas of policy and findings from the 2009 survey report, as well as several brief quotes from community members and leaders to help reflect or illustrate key points.

Discussion of Bias

While we have made efforts to source representative responses from a cross sampling of the international community, the survey is biased by the fact that it was offered only in English. While English is widely used within the international community, we had no way to fully ensure that a representative sample across all geographic sectors was captured. Additionally, taking the survey required Internet access. While many of the world's experts and those involved with greenhouse gas emissions and climate change are connected to one another via the Internet, Internet access does represent a potential barrier, especially to individuals in less developed countries or those where access is limited due to organizational or governmental constraints. The challenges of Internet access were exacerbated by the length of the survey, which we estimate to have doubled from last year in terms of time required for completion. We believe the increased drop-off rate is at least in part attributable to the increased length of the survey.

We also recognize that the primary reliance on the Climate-l listserv, the GHG Management Institute's proprietary e-mail list and Sequence Staffing lists to advertise this survey represents a significant source of bias. While these resources are impressively international and far-reaching, we have to assume that there are practitioners these resources do not contact. A comparison to a peer survey, the 2009 Carbon Salary Survey, provides a good point of reference to normalize the success of this survey's outreach to a broadly similar community. With 1,157 respondents in 2009, the Carbon Salary Survey's reach was near parity to this effort. A comparison of the respondent profiles for the two surveys, however, gives perspective on possible areas of improvement, most saliently geography. The Carbon Salary Survey, a collaboration of three European partners, demonstrates that there is the potential to reach more individuals in Europe, in particular, but also other regions around the world.

Future surveys will aim to bridge these gaps and reduce potential sources of bias. Offering respondents the opportunity to participate in multiple languages and attempting to better capture non-English speaking individuals are clear priorities. Similarly, crafting surveys that give greater attention to the challenges of limited or even no Internet access will be closely considered when drafting future surveys. And more focused outreach, particularly through national, regional and sectoral networks, will be incorporated into future survey
planning in the interest of reaching as many practitioners as possible.

This survey's results represent our best attempt to poll the global community of climate change professionals. While it is challenging to reach such a disparate practitioner community, we believe that the sample that participated in this survey is a valid representation of the professional GHG community. As such, we are confident that the data contained in this report is highly reflective of the opinions, developments and trends of those engaged in this industry.

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The 2010 Greenhouse Gas & Climate Change
Workforce Needs
Assessment Survey Report