

Midwest Regional Greenhouse Gas Registry

Options Paper (Final) (February 17, 2006)

1. Introduction

In order for the Midwest Registry Working Group (RWG)¹ to establish goals and objectives for its proposed Midwest Regional GHG Registry (Midwest Registry)—and to undertake the registry’s design and implementation—this options paper provides the RWG with a comprehensive assessment of registry design options. The following options assessment is informed by WRI’s research and analyses of technical accounting issues based on the WRI/WBCSD GHG Protocol Standards and other relevant accounting protocols and tools. Key questions addressed in this options paper include:

- What are the key GHG registry design questions before the RWG?
- What are the relevant criteria that need to be considered in evaluating various options for GHG registry design?
- How have other GHG programs, in particular the California Climate Action Registry (CCAR) and the Northeast Regional Greenhouse Registry (RGGR), approached the same design issues?

An important aspect of the design assessment is to identify the contributions that various options, if implemented, could make to the strategic goals and principles of the program. This assessment is largely based on WRI’s experience working on the design and implementation of registries that may share similar goals and objectives as those that will be identified for the Midwest Registry.

The following sections review and synthesize the results of WRI’s analysis of various technical and non-technical GHG registry design options. The intent is to provide information and insights on the types of challenges associated with these options and to evaluate the options based on a set of criteria related to the RWG’s strategic goals, objectives, and guiding principles. The assessment should guide the RWG to undertake informed decisions and develop an effective GHG registry design and implementation strategy.

1.1. Strategic Goals and Objectives

The first step in designing the Midwest Registry is for the RWG to define the overall goals and objectives of the Midwest Registry. The remaining design and administrative elements can then

¹ The RWG, comprised of the Lake Michigan Air Directors Consortium (LADCO) and representatives from the five LADCO States (Illinois, Indiana, Michigan, Ohio, and Wisconsin) and Minnesota, is the main decision-making body in the development of the Midwest Regional GHG Registry.

be developed, largely based on the over-arching vision and criteria derived from these goals and objectives. The principle goal of the Midwest Registry, as identified by the RWG, is to ensure a credible GHG measurement and reporting platform to participating entities.

In achieving this principle goal, an array of objectives could also be pursued, providing multiple benefits to regional businesses, governments, citizens, and other stakeholders, which may include:

- 1) *Facilitating corporate GHG management and strategy development*: managing GHG risks, identifying reduction opportunities, demonstrating business leadership, public reporting, improving stakeholder relations, generating energy/process cost savings through increased efficiencies, and preparing Midwest industries and businesses for an increasingly carbon-constrained economy;
- 2) *Promoting linkages with other registries*: enhancing credibility, conservation of limited resources, reduced burden on participating businesses, and possible long term convergence towards a more unified program;
- 3) *Improving air quality and protecting the climate*: increasing energy efficiency and conservation and encouraging GHG reductions;
- 4) *Promoting regional economic development*: promoting the identification of new business opportunities and technological innovation for low carbon technologies.

In considering these possible objectives, the RWG has a number of options:

- To narrow the focus of the Midwest Registry to only implementing the program specifications required to meet the most basic objectives, namely facilitating corporate GHG management and strategy development and promoting linkages with other registries. With this relatively narrow objective fewer intricate program decisions, funding, and time resources will be required at the outset of the program.
- To focus on the first and second objectives during the initial implementation of the registry, but include the other objectives as secondary objectives to help guide the development and deployment of new features and functions linked to the registry into the future.
- To meet more than the first two objectives in the initial program specification. For example, the program specifications could be developed to meet the third objective by requiring participants to set voluntary GHG reduction targets such as in the US EPA Climate Leaders program.

In the short-term, the Midwest Registry may find it easier, more timely, and less resource intensive, to focus on the first two objectives—facilitating corporate GHG management strategies and promoting linkages—and build a foundation towards meeting the other objectives in the future.

In an increasingly carbon constrained economy, implementing the registry and basic entity/corporate-level accounting guidelines will provide businesses with a credible GHG measurement and reporting platform to prepare and report an entity-wide GHG emissions inventory to:

- Identify and manage GHG risks and opportunities;
- Identify ways to reduce GHG emissions;
- Identify options for hedging GHG risk and realizing financial benefits from reductions;

- Develop new investment strategies and gain investors buy-in;
- Obtain public recognition as an environmentally conscious company; and
- Define carbon liabilities and reduction opportunities across the value chain

The successful implementation of the inventory component in turn may facilitate the development and acceptance of additional GHG program components such as setting reduction targets and implementing GHG mitigation projects that will help further the objectives of improving air quality and promoting climate-friendly economic development. Striving to meet these objectives may bring about innovative opportunities for Midwest states to apply the registry in a way that distinguishes itself from other registry programs while addressing the region's unique economic and environmental priorities (See Section 1.3).

Overall, practical reasons to guide the identification and prioritization of goals and objectives include:

- *Time constraints:* Considering the short timeline presented in the registry work plan, it is important that the registry is developed and operationalized quickly. A more narrow focus in the short-term may ensure that the registry can be launched quickly, businesses can start participating and developing high quality inventories, and the registry can establish a track record as early as possible.
- *Resource requirements:* Larger resource and funding requirements may be necessary for a registry designed to serve a broader focus from the outset.
- *Midwest specific considerations:* With limited resources and time to implement this GHG Registry, a focus on any elements that will make this Registry relevant to participants in the Midwest should be considered when prioritizing resources.

1.2. Program Design Principles

Program design principles are concepts and ideas that describe the essential characteristics of a registry, including its design criteria and the processes underlying its development. The design principles should be such that they help the RWG choose options and guide decisions around these options. The principles may also help guide and facilitate the stakeholders' process and implementation of the registry.

Registry design principles that may be considered include:

- The registry should try not to interfere with or pre-determine any existing or future state, regional, or federal climate policies;
- The registry should have the capacity to implement different program policies as different objectives are identified over time;
- The registry should be designed to promote transparency, consistency and accuracy;
- The registry should use broadly accepted and used accounting and reporting standards;
- The registry should incorporate Midwest-specific design aspects and/or program policies, but in doing so should consider the accounting and program specifications of other state, regional, national, and international registries and programs;
- The registry should be built on a flexible and adaptive platform that will meet both present and future program needs;

- The registry should be expandable to other Midwest States and inclusive to entities with a diverse scope and scale of operations and emission types;
- The registry should allow interaction and integration with other states and/or regional programs – e.g., CCAR and RGGR.

1.3. Registry Participation and a Regional Identity

In order to ensure that the registry developed will be relevant and unique to the Midwest region and attract the participants that are considered central to the successful implementation of the program, there are a number of key issues that will need to be addressed during the development and implementation phases of the program.

Sector Specific Calculation Protocols

Calculation Protocols are discussed in greater detail in Section 4.1, however, the existence of calculation protocols specifically designed for a specific sector can greatly facilitate the use of the Registry by participants from that sector by providing a comprehensive framework of all the sources and gases, detailing quantification methodologies and default state emission factors.

Registry “Hook”

In two different surveys, one done by CCAR and the other by the Mexico GHG Program, participants answered the question of ‘why’ they join registry programs in the following four ways:

- Identification of efficiency improvements (energy, industrial process, and operational)
- Early action protection
- Access to training sessions and/or software to facilitate the development of internal GHG management programs
- Public recognition and improved stakeholder relations

It is expected that the Midwest Registry participants will also find these as important reasons to join the registry. However, in order to ensure that the Midwest Registry is specifically relevant to the region’s unique economic, policy, and business context, there is an opportunity to think about innovative and unique ways that the registry could be used by registry participants and the states themselves through other Midwest-specific policies and programs that may be able to take advantage of the registry infrastructure. Creating a Midwest Registry “hook”—that is incorporating complementary state or regional programs that will make the registry more user-friendly and/or provide incentives specifically targeted at Midwest participants—is one way to ensure that the Midwest Registry will make sense for Midwest participants and have its own identity. For example, the agricultural and forestry sectors may be two less traditionally sought out sectors in other registry programs that may be of specific interest to the Midwest group, and whose participation could benefit from developing additional “hooks”.

Program options, registry services, and specific incentive programs that could be used to encourage Midwest participants could include:

- *Aggregation* – Although entity level accounting generally does not include aggregating smaller distinct entities, there may be benefits of aggregating a group of small similar entities

(e.g., small farm or forestry operations, smaller service sector companies) together and providing a program to help them collect the necessary information, providing training, and aggregating verification tasks for those entities.

- *Linking to other programs* –Other programs may already exist in the Midwest region that require data collection, verification of statements, or other similar types of activities. Examples of linkages might be with water quality programs, where activities like conservation tillage, riparian buffers, fertilizer management and manure storage, or forestry best management practices are activities that would be relevant for the GHG registry. Several of the states in the Midwest already work with stakeholders on such issues; implementing a linking mechanisms and incentives for reporting to the GHG registry could serve as an outreach opportunity and help conserve resources by linking to a program that has already reached these less traditional (from the GHG registry perspective) sectors.
- *Education about Midwest program co-benefits*—Companies or entities that are participating in other programs where GHG reductions may be a co-benefit of the program, i.e., meeting renewable portfolio targets or standards, may not realize the value that such actions have regarding their GHG emissions. Creating awareness and providing entities a platform for reporting the changes in their emissions profiles through such programs may be an additional value to businesses. Helping businesses make the link between such Midwest programs and their emissions will be important in attracting participants.
- *Public Outreach* – Many companies may value the ability to claim that they are reducing emissions or providing a public good; the Midwest Registry could develop a special branding or awareness program around the program for participating entities, even providing different awards or incentives to those companies who are successfully implementing certain levels of reductions over time.
- *Training* – Depending on the sectors that the Midwest States hope to reach with the registry, training on tools and reporting may be central to a successful program
- *Batch certification/ verification* – As mentioned above to reduce costs from smaller entities, it may make sense to aggregate the emissions information from similar entities to provide common services, such as batch verification (discussed in Section 2.4 below).
- *Developing incentives* – There may be a number of incentive programs that could be set up related to reporting, meeting reduction targets, or participating in an aggregation activity, which could be implemented at a local, state, or regional level. These incentives could be linked up to other programs such as tax incentives, energy efficiency programs, or agricultural programs in the states or region.

Although all of these ideas would require further exploration and consideration, the development of a few Midwest Registry “hooks” could add a unique flavor to the Midwest Registry, while allowing the program specifications themselves to be consistent, or even equivalent, to those of other state or regional registries. In addition, well thought out linkages and/or incentives developed with other Midwest programs—e.g., water quality, energy efficiency, or forestry best management practices programs—will ensure that a more holistic and regionally focused approach is being developed and allows for programs to pool together resources when trying to reach specific participants.

2. Non-Technical GHG Registry Design Options

The following are five broad, non-technical design decisions that will need to be considered when developing the Midwest Registry. Decisions on these program non-technical design options will have significant implications on the financial and staffing resources that will be required to implement and operate the registry, as well as the program technical design and calculation protocols/registry database decisions.

2.1. Potential Collaboration and Linkages with other GHG Registries

Within the guidance framework of registry goals and objectives, there are two main functions that the Midwest Registry will need to accomplish: (i) Registry design and development; and (ii) Registry implementation including business recruitment, administration and supervision. Both of these functions can be further categorized into five tasks or elements that comprise a registry:

- Program specifications for the entity/corporate-level accounting (Section 3 of the options paper), and its development;
- Protocols – Development of sector-specific protocols and tools;
- Database for the Registry (program platform), including technical maintenance of the software and hardware required for that database, and its ongoing development and maintenance;
- Administrative tasks, e.g., recruitment of participants, desktop reviews of incoming inventories, educational support for participating companies, administration of third party verification (if desired), etc., and its administration and development; and
- Development of new program applications and/or policies using the registry data, e.g., project accounting component, setting targets for companies, etc.

Through these basic design elements, the RWG can pursue the technical development and implementation of the Midwest Registry as a collaborative effort with other registries, as an independent effort, or both. The types of collaboration with other registries could include joint development, joint implementation including data sharing, and delegation to other registries. Each of these is covered under a broad term ‘linkage’. In considering whether or not to link with another registry, two broad questions need to be addressed:

- Why joining or collaborating with other similar registries may be important for the Midwest Registry—e.g., enhanced credibility, conservation of limited resources, ensure timely implementation, reduced burden on participating businesses, and possible long term convergence to a national program, etc?
- What are the key criteria to guide the decision on whether to link to another registry—e.g., shared objectives, goals, and principles; compatible accounting and reporting program specifications; and/or reporting platforms?

In thinking more specifically about these two questions, this section presents:

- A. The four likely registries the Midwest Registry could link to;
- B. How collaboration and linkages at various levels or functions might be established, including the key advantages and drivers for the Midwest registry under each scenario; as well as some disadvantages.

C. The elements or areas of work that may still need to be served independently by the Midwest registry.

A. Compatible Registries and Programs in the US

The most likely registries for possible linkages with the Midwest Registry include:

- The California Climate Action Registry (CCAR),
- The Regional Greenhouse Gas Registry (RGGR),
- The Chicago Climate Exchange (CCX), and
- The Wisconsin Voluntary Emission Reduction Registry (Wisconsin Registry).

The first three registries use the GHG Protocol Corporate Accounting and Reporting Standard as the backbone for their entity/corporate accounting, and have entity-level reporting requirements.

Like the Midwest Registry, CCAR and RGGR represent a state or a group of states whose goals are to develop a voluntary program that provides some level of baseline/base year protection to their members, gather credible data that may be used in the future to inform other GHG programs or initiatives, promote business action and education, and promote regional economic development.

As a privately operated exchange, CCX does not seek to support future GHG programs, voluntary or mandatory. CCX's main goal—to serve as a “road test” trading platform—does not address a number of the objectives and goals generally desired by state registries, such as developing a transparent registry where data can be stored for future uses, or implementing a registry that could easily link to other state registries for developing broader geographic GHG programs. However, CCX may provide some linkage opportunities for the Midwest Registry, should a project component be developed, or should the Midwest Registry wish to develop its own voluntary trading platform.

The primary objective of the Wisconsin Registry is to acknowledge voluntary emission reduction actions by companies. This Registry covers more than just GHG emissions and does not require entity-wide accounting from its participants. Like CCX, however, this registry does provide linkage opportunities for the Midwest Registry, should a project component be developed. There are also possible data exchange linkages that may be possible between the two registries.

B. Linkages with other registries: Scenarios, benefits, and concerns

How the Midwest Registry may link to these four registries will differ. The scenarios below attempt to outline different options for developing and implementing the five different elements identified above and describe how the Midwest Registry could interact with the different registries through these elements.

Scenario One: Stand Alone Registry, but Compatible

This scenario assumes that the Midwest States, as a regional body, develops all five elements for the registry without direct linkages to other registries. The Midwest Registry could still be compatible with other registries. For example, if the GHG Protocol Standards were used as the

basis for the Midwest Registry’s voluntary entity/corporate inventory reporting requirements, then the Midwest Registry would in principle be compatible with CCAR, RGGR, and CCX, as well as other GHG programs like US EPA Climate Leaders or international GHG programs based on the GHG Protocol (e.g. the Mexico Program and the World Economic Forum GHG Registry). There could also be opportunities to streamline data transfer between the registries, without any formal link between registries. Such mutually recognized protocols have been developed between CCAR and Climate Leaders to simplify business participation in both programs. Likewise the Midwest Registry program platform could use software compatible with CCAR or RGGR, to facilitate any future registry linkages or convergence.

The advantage of this scenario is the freedom to independently develop all elements of the registry – while still maintaining compatibility with other registries in some or all areas. There may also be some advantages perceived for those who see the registry design, rather than the program applications implemented through or in complement to the registry, as the main method to stamp the registry with a Midwest identity. Finally, if the Midwest states have existing capacity, e.g., software, established governing bodies, etc., that may facilitate the implementation of the registry, these may be more easily utilized through this scenario, depending on the capacity that is available.

Some disadvantages include the possible increased burden on businesses with operations in multiple states and regions that would like to report to applicable registries. Also, it could result in a potential increase in the development and long-term administrative burden for the Midwest Registry itself. RGGR, for example, received support from several foundations for its development. CCAR also had significant support from foundations during the development and implementation phases of their programs.

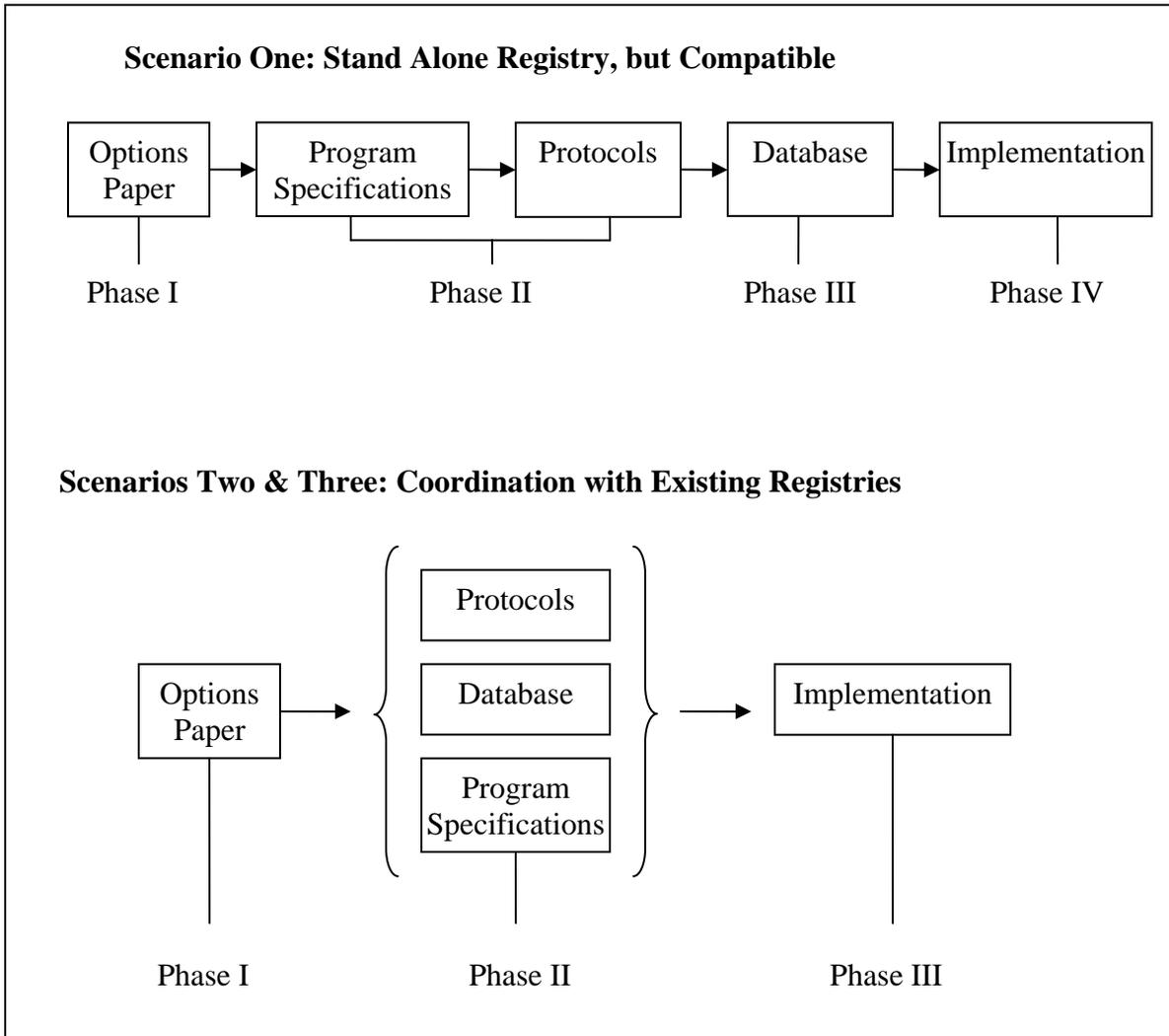
Figure 1 represents the steps that would need to be taken in this scenario and in the next two scenarios described below.

Scenario Two: The “Registry Alliance”—Shared Burden and Increased Credibility

The emergence of the Midwest Registry process has stimulated CCAR and RGGR to explore the possibility of establishing formal linkages between their programs and in the future other state registries as they develop. This initiative—the “Registry Alliance”—aims to create a common currency of GHG information (e.g., 1 ton = 1 ton), improve measurement compatibility and credibility, and increase business participation nationwide.

RGGR and CCAR, who mostly took the ‘stand alone’ approach during the development of their registries, now intend to collaborate on the technical specifications of their registries (elements such as those discussed in Sections 3 and 4 of this document), as well as explore how they might work together and with other registries on data collection and storage, and sharing some administrative tasks.

Figure 1: Registry Design, Development, Implementation – Phases and Scenarios



By linking elements one and two, i.e., the program specifications and protocols/tools for the entity/corporate-level accounting —the state and regional registries can:

- Increase the credibility of their corporate/entity-level GHG inventory reporting programs and protect their participants by moving towards a national model registry for voluntary corporate/entity-level accounting;
- Ensure the transparency, consistency, and rigor of the inventories being collected;
- Reduce the barriers for participation by removing the need for business to re-enter or re-calculate the data for their national inventories;
- Help create a common currency for GHG emissions information nationwide (e.g., a ton equals a ton under all registry programs) that can serve as the basis for future inter-regional policy linkages.

By linking element three, i.e., the development, management and maintenance of the software for their reporting systems—participating state and regional registries will:

- Reduce the costs associated with ongoing development, management and maintenance of their GHG reporting systems;
- Further streamline the reporting process for program participants.

By linking element four, i.e., the administration of GHG program(s) developed around the registry (specifically the administrative tasks for the voluntary entity/corporate inventory program)—participating state and regional registries will be able to:

- Reduce administrative costs and the costs to registry participants. Shared tasks may include GHG accounting training, development and updating calculation tools, identification of inventory verifiers, etc.

Resulting from this process (creating the Registry Alliance), opportunities exist for the Midwest Registry to help shape and solidify a national discussion on registry linkages. In addition, while CCAR and RGGR face some challenges with aligning themselves perfectly in all these technical elements, the Midwest Registry, by proactively being engaged in the Registry Alliance, can help shape and then build on the agreed design and administrative elements and therefore bypass the cost of having to link to CCAR and/or RGGR at a later date.

The inclusion of the Midwest Registry in the Registry Alliance would significantly increase the credibility of the Registry Alliance, the registries themselves, and the data being collected by the registries. Additionally, the inclusion of the Midwest would further reduce any confusion that companies with facilities in more than one state/region may experience by trying to join a state/regional registry. In addition, it would reduce the probability that companies with facilities nationwide will “shop around” for the registry with the least rigorous requirements, therefore avoiding the risk of a “race to the bottom.”

It is also important to note that even though USEPA Climate Leaders program is not a registry (and probably will not participate directly in the Registry Alliance), all efforts will be made to facilitate the transfer of data between the Registry Alliance and Climate Leaders, and to collaborate with this program for elements that the programs have in common, such as calculation protocols.

Scenario Three: Use Existing GHG Registries

There are two options for this scenario:

- Join an existing state registry initiative such as RGGR or CCAR
- Encourage companies to use CCX to store their inventories

Midwest States Joining RGGR

To participate in RGGR, the states involved in the Midwest Registry would sign the MOU currently being signed by the states involved in RGGR. Joining RGGR would involve:

- Adopting the program specifications developed by RGGR, and helping shape any outstanding issues/decisions still being explored or that need to be adjusted as a result of the Registry Alliance.

- Participating in the process to develop the administrative arm of the voluntary corporate inventory program in the Registry Alliance. This program would involve the 14 RGGR states, California, and any other state that joins the Registry Alliance.
- Participating in the administrative and technical management of the program platform and database.
- Possibly participating in discussions around possible further uses of the registry, though participation in any new programs would be voluntary.

The Midwest Registry could also consider maintaining a separate identity within RGGR to enable the implementation of GHG programs specific to the Midwest, or states within the Midwest Registry group. Joining RGGR would not preclude this.

Adopting CCAR Rules, Requirements, and Reporting Systems

The Midwest Registry could also adopt the CCAR General Protocol and sector specific protocols, as well as their reporting system CARROT. This may involve an internal MOU between the Midwest States and California. California and the Midwest states would still need to determine how the administration of the two regions would occur. As with joining RGGR, joining CCAR will also mean participating in the Registry Alliance.

Instructing Midwest Companies to Join the CCX

The Midwest Registry may also decide that rather than developing their own registry, they would encourage companies/entities in the Midwest to join the CCX. However, this option does not give the states access to the inventory data from the companies, or allow the development of other programs that may use the registry to store data. This option would also mean adopting CCX regulations with no real opportunity for input into their rule development.

While keeping the entity/corporate registry component separate from the CCX, there may still be opportunities to create linkages through inventory data sharing or participation in the offset projects component. CCX has a category of ‘Offset Providers’—e.g., project owners, project implementers, registered aggregators and entities selling offsets produced by qualifying CCX-registered ‘offset projects’. Although the Midwest Registry would need to approve the CCX methodologies for the accounting for project reductions, there may then be opportunities for companies in the Midwest Registry to sell “offsets” on the CCX.

Another Possible Linkage: The Wisconsin Voluntary Emission Reduction Registry

The Midwest Registry could not link with the Wisconsin Registry in the same manner as with some other state registries, as the objectives and form of this registry is different. However, as Wisconsin is a part of the Midwest group of states looking at the options paper, the following are two areas where the Wisconsin Registry and the Midwest Registry could consider collaboration.

Data Overlap

The Wisconsin Registry collects GHG emission reduction information from businesses and other entities. In the implementation of its voluntary entity/corporate reporting program, the Midwest Registry could collect the information in a format that would allow the transfer of this information directly to the Wisconsin Registry, thereby limiting data entry requirement for the Wisconsin entities. This could be further streamlined by the adoption of a common program

database platform such as the EATS software, which allows the reporting of many air pollutants. This would then allow a relatively straightforward transfer of all the air pollutant information to the Wisconsin Registry. This option would not require that companies reporting reductions only to the Wisconsin Registry would need to go through the Midwest Registry.

Objectives Overlap

The more difficult issue for any linkages between the Midwest and Wisconsin registries is how or if the GHG reductions calculated in the Wisconsin Registry could be reported on the Midwest GHG inventory report. This emissions balance sheet could be developed and reported to external stakeholders by companies as part of the Midwest Registries entity/corporate GHG inventory. An emissions balance sheet provides an account of entity inventory, entity reductions, and project reductions GHG data. However, the project reductions accounting methodologies used by the Wisconsin Registry are not consistent with other project accounting methodologies, such as the CCAR forestry protocol, CDM, the WRI/WBCSD Project Protocol for Project Accounting or CCX. The methodologies used by the Wisconsin Registry to establish the baseline are more flexible than may be accepted by other GHG programs.

In terms of linking any project aspects through the Wisconsin registry, there are two considerations:

- Whether the Wisconsin Registry aims to ensure external recognition of its project reductions.
- Whether the Midwest Registry aims or needs to recognize the project reductions reported in the Wisconsin Registry. This also relates to whether the Midwest registry decides to include a project accounting component or not.

If the former condition is considered the likely scenario for the Wisconsin Registry, then the Wisconsin Registry could possibly increase program participation by using the same reporting platform (database) and giving all businesses in Wisconsin the option to report reduction projects in conjunction with reporting their corporate/entity-wide inventories. If the project reduction information is only required for internal state use, there may be little incentive to require more rigorous baseline setting methodologies, verification of reductions, etc.

However, if the Midwest Registry develops a project accounting component, then the Wisconsin Registry may consider linking with the Midwest Registry. However, depending on the purpose of the project component in the Midwest Registry—e.g., develop credits that could be traded in a voluntary GHG program, or be recognized more broadly, the Wisconsin Registry may need to modify its program rules to reflect the level of rigor that is expected for larger markets.

C. Where should the Midwest Registry maintain its independence?

Despite the many gains that could be achieved by participating in the Registry Alliance or ‘joining’ an existing state registry initiative, there is a need to maintain a representative “Midwest Registry” group. This group could be responsible for a number of important tasks.

- *Developing Relevant Initiatives around the Use of the Registry:* As mentioned in Section 1.3 above, the creation of a “hook” to encourage Midwest specific business participation, would be a very regional-specific activity, especially if the Midwest states have particular sectors or

sources which they hope to target more intensely for participation in the registry, e.g., the agricultural sector.

- *Communicating with the various state air directors:* As it is expected that each state air directory will be responsible for approving funding for any new needs, programs, or changes in the administration of the Registry, however, having a central group to first analyze and then communicate such needs, with a specific Midwest focus, will be vital.
- *Communication to the Registry Alliance:* In the short and long term, the Registry Alliance will require a governing body that represents the individual needs of the states; a Midwest group would still need to be involved, if in a much more limited way in some regards, in the implementation and operationalization of the Registry Alliance.

2.2 Sectors, Sources, and Gases Covered

The issues of which sectors, sources, and greenhouse gases should be covered by the Midwest Registry are closely related to each other, and decisions on these issues should primarily depend on the strategic objectives and guiding principles that the registry will be based upon. In particular, the Midwest Registry may want to consider the following five determining factors, which are in part taken from the strategic objectives and guiding principles proposed above:

- *Inclusiveness/program participation:* If a key objective of the registry is to attract a broad range of participants (e.g., to encourage the identification of GHG emissions reduction opportunities in numerous areas), a wide range of sectors, sources, and gases should be included.
- *Midwest regions particular economy:* Some sectors, sources, and GHGs may have a particular importance to the economy of the Midwest region, such as the agricultural sector. Following the principle that the registry should reflect Midwest-specific design priorities, these sectors, sources, and gases should be given special consideration.
- *Consistency with other state/regional GHG registries:* The decisions made by other state/regional GHG registries, including CCAR and RGGR, may help inform decisions related to the Midwest Registry about which sectors, sources, and GHGs to include. Aside from practical considerations, remaining consistent with these other registries will assist the Midwest Registry in linking to them in the future.
- *Cost/technical feasibility:* There may be instances where cost, technical, and other constraints make it difficult for the registry to provide calculation protocols and tools for a particular sector, source, or gas at the time of the registry's launch. This does not mean that these sectors, sources, or gases should be explicitly excluded in the registry's program guidelines, but this prohibitive factor should be a consideration during the design of the registry. Similarly, there may be technical and/or resource constraints that make it difficult for participating businesses to account and report on a certain sector, source, or gas, or to do so using the most accurate methodology possible. In some cases, to alleviate this potential burden to participating companies, it may be justifiable for companies to either exclude particular gases or sources from their GHG inventory or to use a less rigorous (but potentially less accurate) accounting methodology to calculate these emissions. (This issue will be discussed in further detail in section 3.5 – Emissions Threshold.)

With these considerations in mind, different options for the coverage of sectors, sources, and gases under the Midwest Registry are evaluated below.

2.2.1. Sectors Covered

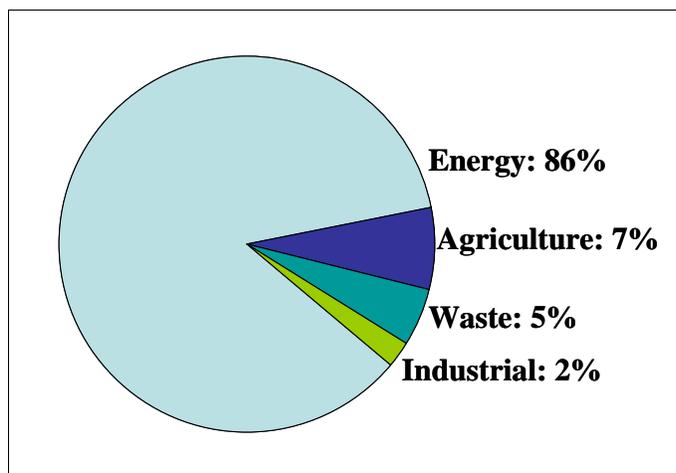
GHG emissions result, either directly or indirectly, from almost every economic activity. It often makes sense to categorize GHG emissions based on economic sectors, and an important design decision for the Midwest Registry is to determine sectors that are to be covered by the registry. Some salient sectors that the Midwest Registry may wish to cover include:

- *Energy*: The energy sector is the largest contributor to GHG emissions in the Midwest Registry region², accounting for approximately 86 percent of the region's emissions. The energy sector can be generally broken down into two broad activities, the generation of electricity and heat, and transportation. GHG emissions from the energy sector, mostly carbon dioxide (CO₂) – but also methane (CH₄) and nitrous oxide (N₂O) -- occur when fossil fuels (i.e., coal, oil, and natural gas) are combusted in either stationary (electricity and heat) or mobile (transport) combustion sources or when fugitive fuel emissions are released.
- *Industrial Processes*: In the industrial processes sector, GHGs occur as by-product or fugitive emissions from industrial processes not directly related to energy activities such as fossil fuel combustion. Examples of GHG intensive industries include the aluminum, chemical, cement, and iron and steel industries.
- *Agriculture*: The agriculture sector is the second largest contributor to GHG emissions in the Midwest Registry region, accounting for approximately 7 percent of the region's emissions. The primary GHGs from agricultural activities are N₂O and CH₄, which account for about 79 percent and 21 percent of the Midwest Registry region's agricultural emissions respectively. The largest contributors to GHG emissions are soil management activities, such as fertilizer application and other cropping practices, which emit N₂O emissions. Other GHG emission causing activities in the agricultural sector include methane CH₄ emissions from livestock and manure management, and CO₂ emissions from land clearing, and the burning of biomass.
- *Waste*: Activities from the waste sector that cause GHG emissions, mostly CH₄, include the landfilling of solid waste, the handling and treatment of wastewater, and the treatment of human sewage.
- *Land-use, land-use change, and forestry (LULUCF)*: This sector is different than other sectors in that some activities, such as deforestation, emit GHG emissions into the atmosphere, particularly CO₂ emissions, while other activities, such as afforestation and reforestation activities absorb CO₂ emissions. Worldwide, the LULUCF sector is one of the largest contributors to GHG emissions, accounting for 18 percent of global emissions. However, in many of the more industrialized countries and regions of the world, including the US and the Midwest region, the LULUCF sector absorbs more CO₂ than it emits. In 2001, the Midwest Registry region absorbed over 120 million tons of CO₂ from LULUCF, which amounts to over 10 percent of the region's total GHG emissions.³

² For purposes of this options paper, the "Midwest Registry region" includes the states of Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin.

³ Climate Analysis Indicators Tool (CAIT)–U.S. <http://cait.wri.org/>.

Figure 2.2.1. Midwest Registry Region GHG Emissions by Sector (2001)⁴



Source: WRI's Climate Analysis Indicators Tool (CAIT)–U.S. <http://cait.wri.org/>.

In the interest of promoting inclusiveness and program participation, it probably makes sense to not explicitly exclude any sectors from the registry program guidelines. Even if calculation protocols/tools for a particular sector are not made available by the registry at the time of the registry's launch, there is no down-side to leaving the door open for all sectors to have the opportunity to participate in developing an entity-level inventory.

Regarding the Midwest region's economy, it is clear that the energy sector, similar to all other regional economies in the US, is the key sector regarding GHG emissions and should be a major focus of the registry. After energy, the agriculture sector is the largest emitter of GHG emissions in the Midwest Registry region. Considering that agriculture is a key economic driver in the Midwest, and a sector that distinguishes the Midwest from some other regions of the US, this sector should be given consideration for inclusion in the registry.

Also, to promote consistency and facilitate linkages between the Midwest Registry and other state/regional GHG registries, all sectors covered by other registries, particularly energy and industrial processes – the sectors that CCAR and RGGR are most focused on – should be considered for inclusion in the Midwest Registry. In addition to energy and industrial processes, CCAR has developed a calculation protocol for the LULUCF sector, and it is possible that this tool could be adopted or customized for use in the Midwest.

Regarding considerations about development and administrative costs, it should be noted that specific entity-level accounting protocols are currently unavailable for the agriculture and waste sectors. While calculation methodologies exist for most GHG sources within these sectors (e.g., anaerobic treatment and digestion processes), the development of a comprehensive calculation protocol/tool for these sectors may require significant time, financial, and staffing resources, as well as a technically rigorous multi-stakeholder process. While it is unlikely that it would be feasible to complete such a process in time for the launch of the registry, this does not mean that these sectors should be excluded from participation in the registry. If the need arises once the

⁴ Data represents shares of total Midwest Registry Region emissions by sector, excluding the LULUCF sector.

registry is operational (e.g., agriculture or waste companies express interest in participating in the registry) it is possible that a process could be initiated, either by the registry or other stakeholders such as industry associations, companies, or NGOs, to develop a comprehensive calculation protocol for the agriculture or waste sector.

-CCAR: CCAR program guidelines do not exclude any sector from the registry, however calculation protocols/tools are currently only provided for the energy, industrial processes, and LULUCF sectors.

-RGGR: RGGR program guidelines do not exclude any sector from the registry.

2.2.2. Sources Covered

A GHG source is any physical unit or process that releases GHGs into the atmosphere.

Categories of GHG emission sources include:

- *Emissions from stationary combustion:* Sources of emissions from stationary combustion include boilers, heaters, furnaces, kilns, ovens, dryers, and any other equipment or machinery that uses fuel.
- *Emissions from mobile combustion:* Sources of emissions from mobile combustion include transportation devices such as cars, trucks, trains, airplanes, ships, etc.
- *Process emissions:* Sources include equipment that emits GHG emissions during the manufacturing process of various products, materials, or chemicals such as aluminum, ammonia, cement, iron and steel, lime, paper and other wood products, adipic acid, nitric acid, semiconductors, etc.
- *Fugitive emissions:* Fugitive emissions are emissions that are not physically controlled but result from the intentional or unintentional releases of GHGs. Fugitive emission sources include agricultural soils that release nitrous oxide (N₂O), livestock, landfills, coal mines, natural gas pipelines that release methane (CH₄), and refrigeration and air conditioning equipment that release hydrofluorocarbon (HFC) emissions.

In deciding which GHG emission source categories to include, the Midwest Registry may want to consider the four considerations noted above. Regarding inclusiveness, including all of the GHG emission source categories in the Midwest Registry would have positive implications for program participation, as the registry would be applicable to a wider range of companies from a wide range of economic sectors. Including all GHG emission source categories would also promote consistency and facilitate linkages with other GHG registries as other registries, including RGGR and CCAR, which both include all four of the GHG emission source categories listed above as options.

Regarding the Midwest regions particular economic situation, it may be particularly important to include sources from the fugitive emission source category, as most emissions from agricultural-related activities occur as fugitive emissions.

Regarding cost and resource requirements for the Midwest Registry program, one potential impact is that including all four of the GHG source categories means some specific sources may not be covered by the corporate tools currently available through CCAR, RGGR, WRI etc., and would need to be developed. This may increase program resource requirements, depending on

the decisions taken on calculation protocols (see section 2.1 and 4.1 below). For instance, if the Midwest Registry decided to accept the sector specific protocol already developed by other registries or the GHG Protocol Initiative, then a decision to include all four GHG source categories would have a minimal impact on resource requirements. If all new protocols and tools were developed this would be a very resource intensive undertaking.

-*CCAR*: All GHG source categories, including mobile combustion, stationary combustion, process emissions, and fugitive emissions, are covered. Over time, CCAR has slowly been developing their own sector-specific protocols, but are working with WRI and Climate Leaders in the development of new tools.

-*RGGR*: All GHG source categories, including mobile combustion, stationary combustion, process emissions, and fugitive emissions, are covered. RGGR has adopted both GHG Protocol Initiative and CCAR sector specific protocols to be used by participants.

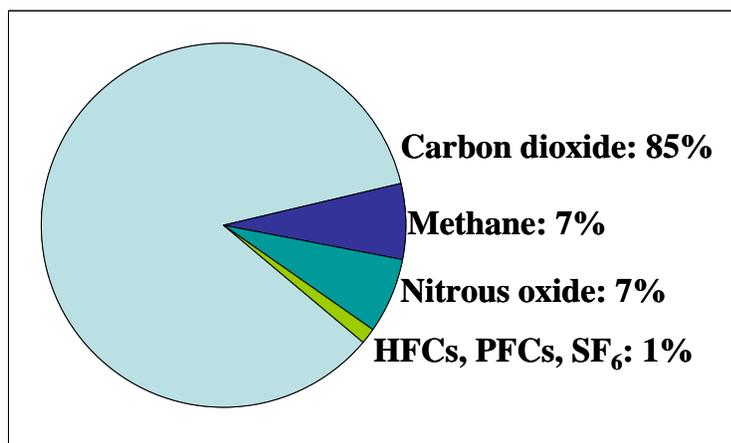
2.2.3. Gases Covered

Greenhouse gases (GHGs), which control energy flows in the atmosphere by absorbing infra-red radiation emitted by the earth, comprise less than 1 percent of the atmosphere. The most abundant GHG in the atmosphere is water vapor, although it is not directly influenced by human activity.⁵ The Kyoto Protocol and most other regulatory and voluntary climate change programs and GHG registries in the US and abroad focus on six major GHGs, which account for over 99 percent of global and the Midwest Registry region's GHG emissions each year. The Midwest Registry could include all or any combination of these six gases, which include:

- *Carbon dioxide (CO₂)*: CO₂ is the main human-influenced GHG globally, nationally, and regionally, and makes up approximately 85 percent of the Midwest Registry region's yearly GHG emissions. The majority of CO₂ emissions are from energy-related and land-use activities.
- *Methane (CH₄)*: CH₄ makes up approximately 7 percent of the Midwest Registry region's yearly GHG emissions. Sources or activities that contribute to CH₄ emissions include landfills, coal mining, natural gas and oil systems, livestock (enteric fermentation), livestock manure management, wastewater treatment, biomass combustion, and fossil fuel combustion.
- *Nitrous oxide (N₂O)*: N₂O makes up approximately 7 percent of the Midwest Registry region's yearly GHG emissions. Sources or activities that contribute to N₂O emissions include agricultural soils, adipic and nitric acid production, fossil fuel combustion, livestock manure management, and human sewage.
- *Hydrofluorocarbons (HFCs)*: Sources or activities that contribute to HFC emissions include substitutes for ozone-depleting substances and semiconductor manufacturing.
- *Perfluorocarbons (PFCs)*: Sources or activities that contribute to PFC emissions include substitutes for ozone-depleting substances, semiconductor manufacturing, and aluminum production.
- *Sulphur hexafluoride (SF₆)*: Activities that contribute to semiconductor manufacturing, electrical transmission and distribution, magnesium production.

⁵ UNEP and UNFCCC. 2002. "Climate Change Information Kit". Updated in July 2002 and based on the IPCC's "Climate Change:2001" assessment report. <http://unfccc.int>.

Figure 2.2.3. Midwest Registry Region GHG Emissions by Gas (2001)⁶



Source: WRI's Climate Analysis Indicators Tool (CAIT)—U.S. <http://cait.wri.org/>.

Considering that CO₂ constitutes the largest percentage of the region's GHG emissions, it is clearly important that at a minimum, the Midwest Registry covers CO₂ data. It will probably make sense for the Midwest Registry to include other GHGs as well. One key reason is to make the registry more inclusive and relevant to companies with non-CO₂ emissions, which will help to increase registry participation. Another reason is that most other registries, including CCAR and RGGR, cover all six of the major GHGs, and if the Midwest Registry chose to do the same, this would promote consistencies and facilitate linkages between the registries.

However, perhaps the most important reason for including all six major GHGs is that they may be particularly relevant to certain industries that are important to the Midwest's economy. For example, because the agriculture industry is an important economic driver in the Midwest, CH₄ and N₂O should be strongly considered for inclusion in the registry. CH₄ and N₂O are the two major GHGs that result from agriculture, and including these gases may enable large Midwest-based agriculture companies (e.g., ADM, Cargill, etc.) to participate in the registry.

In addition, SF₆, which results from magnesium production, is also particularly relevant to the Midwest region. Of the 18 magnesium producers taking part in the US EPA SF₆ Emission Reduction Partnership for the Magnesium Industry program, 11 of them are located in the Midwest Registry Region.⁷ These 11 Midwest-based magnesium producers may be good candidates to participate in the Midwest Registry if SF₆ emissions are included.

Regarding resource requirements for the Midwest Registry program, one potential impact on resource requirements is that including all six major GHGs as opposed to for example, including just CO₂, may require additional sector-specific calculation tools. This may increase program resource requirements, depending on the decisions taken on adopting available tools (see section 2.1 and 4.1). See section 2.2.2 for a similar discussion.

⁶ Data represents shares of total Midwest Registry Region emissions by gas, excluding the LULUCF sector.

⁷ US EPA SF₆ Emission Reduction Partnership for the Magnesium Industry website, <http://www.epa.gov/magnesium-sf6/partner.html>.

Other GHGs: In addition to the six main GHGs described in this section, there are other direct GHGs, such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and indirect GHGs, such as carbon monoxide (CO), nitrogen oxides (NO_x), and volatile organic compounds (VOCs), which the Midwest Registry could consider.⁸ The ozone-depleting GHGs such as CFCs and HCFCs are currently controlled by the Montreal Protocol, an internationally accepted agreement as well as by the US Federal law (Clean Air Act 1990). Measurements show that emissions of these ozone-depleting GHGs are in decline.⁹ The inclusion of the indirect GHGs could be considered based on the results of the ongoing IPCC work on the 2006 guidelines that will cover both direct and indirect GHGs.

Of these other GHGs, the one that might deserve the most consideration is NO_x, which may be relevant to the Midwest Registry regions potential large industrial participants due to air pollution issues, and because several Midwest Registry states (e.g., Illinois, Indiana, Michigan, and Ohio) are participants in the Federal NO_x SIP Call regulatory program.¹⁰ However, there may be significant barriers to including NO_x in the Midwest Registry due to a lack of understanding of its impact on climate change and because a global warming potential (GWP) figure (as of the 2001 IPCC report) for NO_x has not yet been published.

GHG Protocol standards require emissions data for the six major GHGs to be reported separately, while allowing (but not requiring) emissions data from the other GHGs to be reported separately under optional information.

-*CCAR*: The six main GHGs – CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ – are all required. Only CO₂ is required for the first three years of reporting, however participants are encouraged to report all six GHGs in years 1-3.

-*RGGR*: The six main GHGs – CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ – are all required.

⁸ Intergovernmental Panel on Climate Change (IPCC). 2001. "Climate Change 2001: The Scientific Basis". Chapter 4 – Atmospheric Chemistry and Greenhouse Gases. <http://www.ipcc.ch>.

⁹ Intergovernmental Panel on Climate Change (IPCC). 2001. "Climate Change 2001: The Scientific Basis". Chapter 4 – Atmospheric Chemistry and Greenhouse Gases. <http://www.ipcc.ch>.

¹⁰ Aulisi, A., A.E. Farrell, J. Pershing, and S. Vandever. 2005. *Greenhouse Gas Emissions Trading In U.S. States: Observations and Lessons from the OTC NO_x Budget Program*. World Resources Institute White Paper, January 2005.

Table 2.2. Sectors, Sources, and Gases Covered Options Checklist

Sectors, Sources, and Gases Covered Options	Inclusiveness/ program participation	Midwest's economy	Consistency with other state/regional registries	Resource and technical feasibility (short-term)
<i>Sectors</i>				
Energy	X	X	X	X
Industrial process	X	X	X	X
Agriculture	X	X	X	
Land-use change & forestry	X	X	X	X
Waste	X	X	X	
<i>Source categories</i>				
Stationary combustion	X	X	X	X
Mobile combustion	X	X	X	X
Process emissions	X	X	X	X
Fugitive emissions	X	X	X	
<i>Gases</i>				
Carbon dioxide (CO ₂)	X	X	X	X
Methane (CH ₄)	X	X	X	X
Nitrous oxide (N ₂ O)	X	X	X	X
Hydrofluorocarbons (HFCs)	X		X	X
Perfluorocarbons (PFCs)	X		X	X
Sulphur hexafluoride (SF ₆)	X	X	X	X
Nitrogen oxides (NO _x)	X	X		
Other GHGs (CFCs; HFCFCs; CO; VOCs)				

2.3. Geographical Boundaries

A geographical boundary is the physical location within which a registry participant must account for and report all emission sources. For determining geographical boundaries for the Midwest Registry, the main issue is to define a boundary that enables registry participants to include and report on the most applicable and relevant emissions sources. There are four main options that can be pursued separately or in combination:

- *State-level reporting*: Registry participants report emissions from all required sources located within a particular State.

- *Regional-level reporting:* Registry participants report emissions from all required sources located within a clearly defined Midwest region. For Midwest regional-level reporting purposes, the Midwest region could include all States participating in the Midwest Registry.
- *National-level reporting:* Registry participants report emissions from all required sources located in the US.
- *International-level reporting:* Registry participants report emissions from all required sources throughout its global operations.

As with every program non-technical design option, the most relevant criteria in making this assessment will primarily depend on the strategic objective(s) and guiding principles that the Midwest Registry decides on. For instance, if facilitating linkages with other registries is a key priority, then accepting national-level emissions data should be strongly considered. However, if the registry is more focused on stimulating regional environmental and economic development benefits, then accepting state or regional-level emissions data could be a more attractive option. A combination approach (e.g., requiring regional-level data while accepting national-level data) is another option that may be appropriate. Table 2.3 below summarizes the pros and cons of the four main options.

Table 2.3. Geographical Boundary Options Pros/Cons

Geographical Boundary Options	Pros	Cons
State-level reporting	-Some registry participants may only have operations within a single state; -May provide a good learning experience for companies that wish to participate in a GHG registry but are not yet in a position to account and report its regional or nationwide emissions; -May help companies prepare for and/or facilitate compliance with a future state-level climate change regulatory program	-Could defeat the purpose of a regional Midwest registry; -Limits potential linking opportunities with other GHG registries; -For companies with regional or national operations, reporting at a state level will not provide a complete picture of the company's GHG emissions -Administratively burdensome as some participants will submit several separate state-level inventories -Can create some additional accounting complications, for example when looking at electricity created by a participant outside the state and imported into the state.
Regional-level reporting	-Some registry participants may only have operations in the Midwest region, but not outside the Midwest; -May provide a good learning experience for companies that wish to participate in a GHG registry but is not yet in a position to account and report its nationwide emissions; -May help companies prepare for and/or facilitate compliance with a	-Limits potential linking opportunities with other GHG registries; -For companies that have national operations, reporting at a regional level will not provide a complete picture of the company's GHG emissions -May be too complex and burdensome for some companies, particularly those with highly decentralized management structures

	future regional climate change regulatory program	-Can create some additional accounting complications, for example when looking at electricity created by a participant outside the region and imported into the region.
National-level reporting	-Facilitates linkages with other US and international registries; -Provides a complete picture of a company's nationwide emissions; -Many company's have nationwide GHG reduction targets; -Increased GHG reduction opportunities for registry participants; -Many potential registry participants already maintain nationwide GHG inventories; -May help companies prepare for and/or facilitate compliance with a future US Federal climate change regulatory program	-Some registry participants may only have state or regional operations; -May be too complex and burdensome for some companies, particularly those with highly decentralized management structures
International-level reporting	-Facilitates linkages with other international registries; -Provides a complete picture of a company's worldwide emissions; -Some potential participants may already account for their international emissions	-Likely to be too complex and burdensome for many companies and may limit participation in the registry; -May limit linking opportunities with other US-based registries; -Many registry participants may not have any international operations

-CCAR: California emissions required; nationwide emissions optional but encouraged; international emissions currently not accepted, but may be considered in the future.

-RGGR: After much discussion, the RGGR group decided to require the geographic boundary to include at a minimum Northeast regional emissions; nationwide emissions optional but encouraged; state-level emissions not accepted; international emissions currently not accepted, but may be considered in the future.

2.4. Verification/certification

To help the RWG decide whether the Midwest Registry should require third-party verification of GHG inventories, this section describes both the potential advantages and disadvantages of requiring verification, as well as options for addressing some of the disadvantages that are currently being considered by other registries.

A third party verification is not required by all GHG programs—e.g., the US EPA Climate Leaders program does a desktop review of their members' inventories, but does not require third

party verification. In this case, the Climate Leaders program supplies all new companies with a consultant to answer any questions and help them collect the correct information the first year in which they join the program. This allows the Climate Leaders program to meet their objective of business education without third party-verification.

However, third party verification is required by both CCAR and RGGR, and CCAR has found that third party verification serves to educate participants on developing a high quality inventory as well as increasing inventory credibility.

The decision on whether or not to require third party verification relates directly to the goals and objectives of the registry, and the services that the registry aims to provide to participants. For example, a registry that plans to offer the following services may need to consider requiring third party verification:

- *Base year protection*: States may wish to require verification in order to have some level of comfort that numbers being reported are of a certain level of quality;
- *Possibility of future emissions trading nationally or internationally*: In order to trade with other systems, e.g., allocations from one system to another, third party verification will provide credibility and certify that the information is transparent and verifiable;
- *Credible database linkages with other registries*: If states wish to link together and recognize the data from each others inventories, third party verification can ensure that all of the data collected is on an equal quality;
- *Business education*: Verifiers will provide significant information to companies regarding their inventory, especially the first year where data management systems are being developed.

As can be seen above, the principle goal of ensuring a credible GHG measurement and reporting platform to participating entities requires that the data in the registry are credible. This can be established through a third party verification that shows that data is prepared in accordance with the program specifications including key accounting principles such as completeness, relevance, accuracy, transparency, and consistency. In addition, experience shows that third party verifiers provide valuable input to companies, especially in the first year, on managing data collection and inventory quality, and on clarifying the procedures for presenting complete and sufficient data to justify the quantification of the inventory. In addition, third-party verification allows companies to claim their aggregate yearly emission inventory, emission reductions, or other data publicly to relevant stakeholders, without having to reveal all of the inputs to the data, and still have stakeholders feel confident that the inventory has been compiled correctly.

On the other hand, there are some disadvantages to requiring third party verification, including the cost and disincentive to the company and the administrative burden to the GHG registry program.

CCAR's experience with verification shows that the cost of hiring a third party verifier can be quite high for the participating companies, especially during the first year when verifiers are not only reviewing the data, but are also reviewing the data collection and storage procedures, assessing the uncertainty risks around the company's inventory, and helping the company improve their methodologies for the next years. Although these costs come down significantly

after the first year for most companies – and costs for developing an inventory in general have gone down as more verifiers become available on the market – verification costs can vary greatly depending on the company, the sector, the inventory management system used by the company, etc. Additionally, third-party verification does place an additional burden on the administrators of the GHG registry program, as they need to:

- Develop an extremely specific verification document for verifiers to follow;
- Define which verification/ certification companies are allowed to provide their services to member companies; and
- If batch certification is offered, the GHG program is responsible for compiling all the data from the small companies, which can be very time consuming.

While some of these burdens—especially to the GHG program—may diminish over time, in order to reduce these burdens, some alternative approaches could be considered:

- Requiring third party verification the first year, followed by random audits in the following years;
- Applying a risk-based approach to identify groups of companies that may face a lower probability of having uncertain/faulty data and therefore would have a lower probability of getting audited;
- Consolidating administrative tasks, e.g., approving certification companies through the Registry Alliance group.

Such approaches and decisions will need to be considered by the RWG if third-party verification is adopted as a requirement by the Midwest Registry.

-*CCAR*: Requires third party verification for their participant's inventories, but offers batch certification for small entities that have joined the registry. In discussions with RGGR around the Registry Alliance -- and because RGGR is still discussing what their final requirements for third party verification will be -- CCAR has expressed interest in adjusting its verification requirements. CCAR's experience in last few years is leading them to consider some of the risk-based and random audit approaches that RGGR is exploring.

-*RGGR*: Requires third party verification, but the registry is still deciding on what their final requirements will be.

2.5. Potential for the Inclusion of a Project-based Accounting Component

The RWG may want to consider whether or not to incorporate a project-based accounting component into the Midwest Registry. Although generally not a first priority in a voluntary GHG program context where the current, primary function is to measure and report entity-level emissions inventories, there are a number of reasons to at least leave the door open to including a project-based component in the registry in the future:

- Should the demand for offset credits from GHG mitigation projects be created through other mechanisms—e.g., RGGI, CCX, or some future mechanism in California—then assuming the Midwest were linked to these registries in some way and the offset credits were

recognized between the different registries, this could provide an opportunity for participants to link to a broader system and GHG market;

- Should the Midwest Registry ever consider developing a voluntary (e.g., CCX) or mandatory (e.g., EU ETS) cap and trade program, then project offsets are a mechanism that can be used in addition to trading allowances to enable companies to meet their targets;
- In both of these first two cases, the learning involved in the design of an offsets program and development of GHG mitigation projects would be substantial and possibly useful depending on a future regulatory context;
- Businesses often look at the ability to generate offset credits as a driver for joining registries. This may be especially true in the Midwest where sectors such as agriculture are less likely to be capped in a cap and trade program and are more likely to be the providers of offset projects;
- Promoting specific activities through a project accounting mechanism may allow the Midwest Registry to encourage specific reduction practices or technologies in the region.

Although designing a project offset component of a GHG registry is complicated and time consuming, leaving open the option of including such a component is relatively straightforward. This involves ensuring that the accounting platform/software being used by the registry allows the inclusion of a project component into the registry, e.g., the EATS software. EATS, developed by the US EPA, is flexible enough to include both corporate/entity-level accounting inventories and project-level accounting information. EATS is being used for both of these types of data by various GHG programs. For example, RGGR and RGGI will be using EATS for both voluntary corporate-level reporting program and for an allowance-trading component with possibly a project offset application in the future. Also, the Clean Development Mechanism (CDM) is using the EATS software to track project offsets for countries participating the Kyoto Protocol.

Additionally, adopting a software platform that allows project reductions to be incorporated would in principle allow the Wisconsin Registry to use the same platform, hopefully simplifying the data entry for participants in both the registries.

-RGGR: Because of its relationship to RGGI, RGGR will not be offering reporters the option to report project-level data within the voluntary program. Rather, companies with GHG mitigation projects will need to follow the project-level methodologies that are being developed in conjunction with the RGGI cap and trade program.

-CCAR: On the other hand, CCAR, which unlike RGGR is currently not linked to a mandatory program, is planning to develop methodologies for a project-based component to their registry. As mentioned above, CCAR has already developed a calculation protocol for forestry projects. However, CCAR did not initially design CARROT with a project-based accounting component in mind, and is currently evaluating their options on the software front.

3. Program Technical Design Options – Entity Accounting and Reporting

This section analyzes six main program technical/accounting design decisions for entity/corporate-level accounting that will need to be considered by the Midwest Registry. The decisions made in this section will make up the bulk of the program specifications document and are needed regardless of which sources or sectors are included in the GHG program. They build up the generic accounting framework which any and all reporting entities would need to follow.

These technical/ accounting design decisions will be examined in detail based on the methodologies provided by the GHG Protocol Corporate Standard (revised edition) and the practices followed by key existing and emerging GHG registries in the U.S., particularly the California Climate Action Registry (CCAR) and the Northeast Regional Greenhouse Gas Registry (RGGR). The design decisions are:

1. What accounting principles to provide for reporting entities
2. How to define the reporting entity
3. How to define organizational boundaries for reporting entities
4. How to define operational boundaries for reporting entities
5. What rules to provide in establishing and adjusting a “base year” for GHG accounting
6. Whether and how to set an emissions accounting threshold
7. What requirements to specify for reporting to the registry and the public

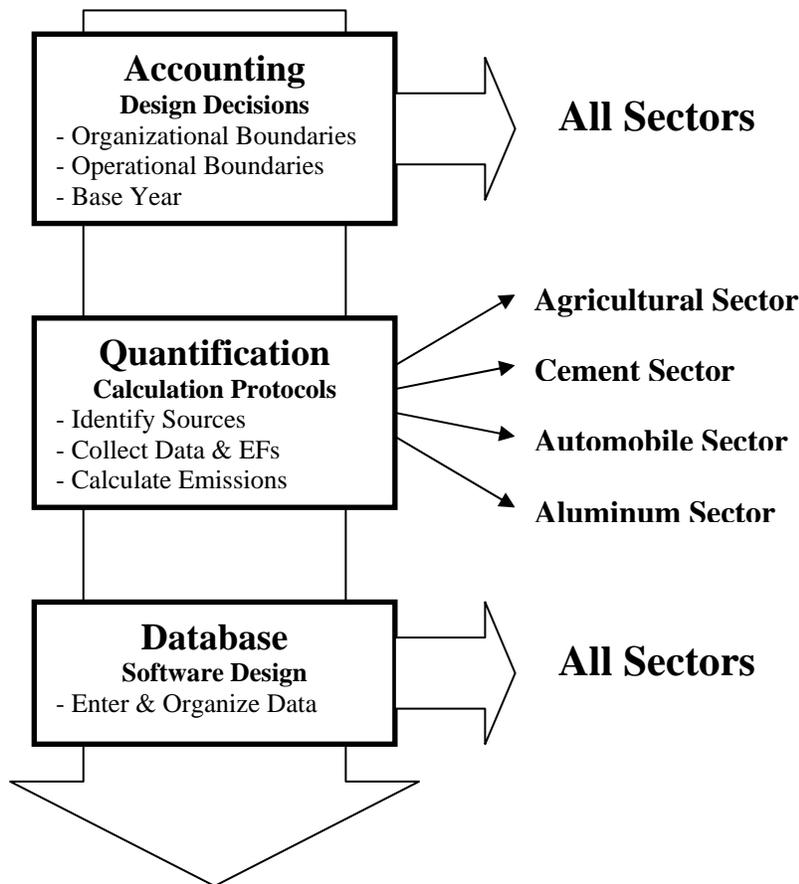
The analysis for these design decisions will address the following questions:

- What is the design decision and what are its related concepts?
- Why is this design decision important and necessary?
- How is the design decision addressed in the GHG Protocol?
- What are the options for the Midwest Registry in addressing these decisions?
- What are the key criteria that should be considered in thinking about these decisions?
- What decisions have been made by other existing/emerging GHG registries/programs?

Following the part 1 analysis on key registry goals including facilitation of corporate GHG management, the assessment in part 2 revolves around the potential core registry function of providing a credible measurement and reporting platform to businesses towards development of an entity-level GHG inventory. An entity level GHG inventory is essential to ensuring an effective, long-term corporate GHG management strategy and corresponding business decisions.

Building a GHG inventory involves a series of steps that can be broadly classified into three parts: (i) accounting; (ii) quantification; and (iii) reporting. Figure 1 below provides an overview of these steps and associated design decisions under each step. A striking feature of the ‘accounting’ step is that its concepts, methodologies, and decisions are generally uniform across different sectors including agriculture, industrial, and commercial sectors. In contrast, the quantification step involves data collection and calculation procedures that are mostly specific to source, GHG, and sector-types.

Figure 1. Key Steps and Technical Design Decisions in Developing a GHG Inventory



Entity-level GHG Inventory

3.1 Defining Accounting Principles for Registry Participants

Accounting principles are intended to help the participants of the Registry ensure that their reported information represents a faithful, true, and fair account of their GHG emissions by providing basic guidelines to underpin the accounting and reporting steps. For example, if given the option to report Scope 3 emissions, a reporting entity may consult the accounting principles in deciding whether or not to include certain Scope 3 emissions in their inventory. For a GHG program, it may be important to explicitly provide principles to help guide participants where the GHG program has left some flexibility in its requirements or when the application of its program specifications to specific issues is uncertain. A GHG program can also use the accounting principles to help guide third-party verifiers in reviewing accounting decisions.

In keeping with financial accounting principles, the GHG Protocol recommends the inclusion of the following five principles:

Relevance: Ensure that the GHG inventory appropriately reflects the GHG emissions of the entity and serves the decision-making needs of users—both the entity and the GHG program.

Completeness: Ensure that all GHG emission sources and sinks within the chosen boundaries are accounted for and reported. Disclose and justify any specific exclusions.

Consistency: Use consistent methodologies to allow for meaningful comparisons of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series.

Transparency: Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.

Accuracy: Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable assurance as to the integrity of the reported information.

Some balancing of different principles may be necessary in relation to specific accounting decisions, but all five principles are ultimately important and should be included.

Neither CCAR nor RGGR have explicitly listed out these principles in the Program Specification documents. However both have used these five principles to guide them in making program design decisions about accounting, reporting, and verification.

3.2 How to Define the Reporting Entity

There are two main options on how to define a reporting entity, i.e., the level of aggregation at which companies report:

1. Corporate-level reporting;
2. Facility-level reporting.

Defining the Reporting Entity

Corporate-level reporting requires the company to choose a consolidation approach for all its facilities, subsidiaries, etc., and provides a more complete representation of the overall emissions performance of the company. This reporting structure follows the definitions and rules provided by financial accounting, which are based on ownership or control, and are uniformly followed by companies across all sectors for financial information reporting. The advantages of corporate-level reporting include avoiding the concern that a company's overall emissions could be increasing while it reports emission reductions at one facility, allowing better management opportunities for the company, including liability and risk management. Also, corporate-level emissions are more easily represented and reported to a broader public audience. Finally,

corporate-level reporting is often less revealing of potentially sensitive information about company operations at specific facilities.

There are two main disadvantages to corporate-level reporting: a) the possible added complications of aggregating numerous business-units, which if ownership structures are complex can become an added burden; b) the cost of having to do a full corporate-level report, possibly needing to collect information from numerous business units, etc.

Facility-level reporting focuses on emissions and emission changes associated with a discrete business unit within a corporate boundary. Facility-level data is generally the level of aggregation required by mandatory regulatory programs (such as the Toxic Release Inventory or the Clean Air Act), making it an attractive option for any registry that envisions collecting data for a mandatory program in the future. Under these programs, the owner or operator of the facility is required to report the emissions for the whole facility. This approach would be most familiar to state agencies and to companies that already report facility-level emissions data. The GHG Protocol doesn't provide a definition of a facility, however, several US and international programs are based on facility-level reporting, and define a facility in terms of economic interest or operating permit.

A facility-level registry may have a limited role in achieving the most important of the Midwest Registry's goals, i.e., comprehensive corporate GHG management and strategy development, because facility-level data disregards whether total corporate emissions are increasing or decreasing.

Corporate Reporting – Key Benefits in the Midwest Registry Context: Given that entity-wide GHG management and strategy development is a key goal for Midwest registry, a corporate level consolidated inventory will have the following key benefits for registry participants:

- a) *Liability and risk management:* Companies GHG exposure are increasingly becoming a management issue in light of heightened scrutiny by the insurance industry and stakeholders and the emergence of environmental regulations/policies designed to reduce GHG emissions. Companies might incur liabilities for GHG emissions produced by joint operations in which they have an economic or operational interest. An entity-wide inventory can help participants fully understand and manage their potential liabilities.
- b) *Management information:* A consolidated inventory can help identify the most effective GHG emission reduction opportunities. This can drive a strategic and cost-effective corporate-wide approach to increasing materials and energy efficiency, as well as the development of new products and services that reduce direct and/or indirect GHG emissions.
- c) *Public reporting and performance tracking:* As concerns over climate change grow, NGOs, investors, and other stakeholders are increasingly calling for greater corporate disclosure of GHG information. They are interested in the actions companies are taking and how the companies are positioned relative to their competitors in the face of emerging regulations. In response, a growing number of companies are preparing corporate-wide stakeholder reports containing information on GHG emissions. These may be stand-alone reports on GHG emissions or broader environmental or sustainability reports. Conducting a

‘consolidated’ GHG inventory is also a prerequisite for setting an internal or public corporate-wide GHG target and for subsequently measuring and reporting progress.

- CCAR requires reporting at the corporate-level.
- RGGR requires corporate-level reporting. However, RGGR requires facility-level data collection (See Section 3.7) and disaggregation, which allows them to have data that could be used by a mandatory program, while still keeping the benefits of having companies report their corporate emissions.

3.3 How to Set Organizational Boundaries for Reporting Entities – Consolidation of GHG Emissions

If the GHG program requires corporate-level reporting, a method for consolidating those emissions from different facilities/ business units (called setting the organizational boundaries) is required. Consolidation is the process of combining emissions from the lower-level of corporate entities to the higher-level of the parent company. Consolidation results in total emissions of a parent company from all its group companies and other corporate entities within a specific geographic region (state, region, national, or global). Lower-level corporate entities may include wholly owned operations, joint ventures, subsidiaries, associated companies, facilities, etc.

GHG Protocol Approaches on ‘Consolidation’

The GHG Protocol Corporate Standard follows financial accounting rules to establish the structure of the reporting company and relationships among parties involved. Three distinct approaches are presented to consolidate GHG emissions: the “equity-share” and the two “control” approaches. However, if the reporting company wholly owns all its operations (e.g., small agriculture farm or office-based organization) its organizational boundary will be the same whichever approach is used.

Equity: Under the equity share approach, a company accounts for GHG emissions from operations according to its share of equity in the operation. The equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation. Typically, the share of economic risks and rewards in an operation is aligned with the company’s percentage ownership of that operation, and equity share will normally be the same as the ownership percentage.

Control: Under the control approach, a company accounts for 100 percent of the GHG emissions from operations over which it has control. It does not account for GHG emissions from operations in which it owns an interest but has no control. Control can be defined in either financial or operational terms. Therefore, when using the control approach to consolidate GHG emissions, companies can choose either the *operational control* or *financial control* criterion.

- *Operational Control:* A company has operational control over an operation if the company or one of its subsidiaries has the full authority to introduce and implement its operating policies over the operation. This criterion is consistent with the current accounting and reporting practice of many regulatory and emissions trading programs that require reporting

on emissions from facilities which companies operate (i.e., for which they hold the operating license).

- **Financial Control:** A company has financial control over the operation if the company has the ability to direct the financial and operating policies of the operation with a view to gaining economic benefits from its activities. Financial control usually exists if the company has the right to the majority of benefits of the operation, however these rights are conveyed.

In most cases, whether or not an operation is controlled by the company does not vary based on whether the financial control or operational criterion is used. Table 1 below summarizes the equity and control approaches and their definitions.

Table 1: Consolidation approaches and definitions

Consolidation Approach	Typical Definition	Accounting of Emissions
Equity	Equity Share	By equity share (0% to 100%)
Financial Control	> 50%	100% if > 50% 0% if < 50%
Operational Control	Operator	100% if an operator 0% if not an operator

Application of Consolidation Approaches – An Example

An example to illustrate how these approaches may be applied is provided in Annex A.

Application of Consolidation Approaches for Contractual Arrangements (e.g., leased assets, outsourcing, and franchises)

The selected consolidation approach (equity share or one of the control approaches) is also applied to account for and categorize direct and indirect GHG emissions from contractual arrangements such as leased assets, outsourcing, and franchises. If the selected equity or control approach does not apply, then the company may account for emissions from the leased assets, outsourcing, and franchises under Scope 3 (See section 3.4 on Operational Boundaries).

Specific rules on contracts or leased assets are provided below:

- **Under the equity share approach or the financial control criterion of the control approach:** The lessee only accounts for emissions from leased assets that are treated as wholly owned assets in financial accounting and are recorded as such on the balance sheet (i.e., finance leases).
- **Under the operational control criterion of the control approach:** The lessee only accounts for emissions from leased assets that it operates (i.e., if the leased asset is classified as an “operating lease”).

Guidance on which leased assets are operating and which are finance leases can be obtained from the company accountant. In general, in a finance (also known as capital) lease, an organization assumes all rewards and risks from the leased asset, and the asset is treated as

wholly owned and is recorded as such on the balance sheet. All leased assets that do not meet those criteria are operating leases.

Contractual arrangements that cover GHG emissions: To clarify ownership (rights) and responsibility (obligations) issues, companies involved in joint operations may draw up contracts that specify how the ownership of emissions or the responsibility for managing emissions is distributed between the parties. Where such arrangements exist, the GHG Protocol requires companies to follow the arrangements described in the contracts irrespective of whether they are using the equity share or control approach. These arrangements may be particularly important in the agriculture and forestry sectors. The ownership and/or control of carbon stocks may involve different types of contractual arrangements concerning land and wood ownership, harvesting rights, and control of land management and harvesting decisions.

The GHG Protocol Corporate Standard Requirements

The revised edition allows companies to select any of the three approaches in setting organizational boundaries while encouraging companies to separately account for their emissions applying both the equity and one of the control approaches. Similarly, GHG programs are encouraged to use this approach for voluntary emissions reporting. The rationale for this recommendation is that different inventory reporting goals may require different data sets. Thus companies may need to account for their GHG emissions using both the equity share and the control approaches. This will help companies to develop a GHG inventory that is capable of serving multiple goals. It makes sense for companies to report on the basis of both the approaches as they can generate and provide information for a variety of different users and uses – both current and future. Requiring both the approaches is more likely to enable the Midwest registry to serve as a comprehensive GHG accounting and reporting platform that provides information building blocks capable of serving most business goals.

Consolidation Approaches and Options for the Midwest Registry

The key rationale of the GHG Protocol approaches on consolidation is to ensure that the assets and liabilities a company creates by its joint operations are assessed based on the same consolidation rules that are used in financial accounting. Future financial accounting standards are expected to treat GHG emissions as liabilities and emissions allowances / credits as assets. Following the approaches provided by the GHG Protocol, there are three design options for the Midwest registry:

1. Provide flexibility to companies in choosing any of the three approaches
2. Specify a required approach and keep reporting based on other approaches optional
3. Require both the consolidation approaches i.e. participating companies are asked to report based on the equity and one of the control approaches.

A detailed assessment of the different consolidation approaches in terms of key design criteria is provided below:

Compatibility with US state and federal reporting programs (e.g., US Toxic Release Inventory Program, US state level mandatory programs): Government regulatory programs will always need to monitor and enforce compliance. Compliance responsibility generally falls to the entity or the parent company that has financial or operational control. The federal/state government

programs usually require reporting on the basis of control, either through a facility level-based system or involving the consolidation of data within certain physical/geographical boundaries (See Table 2 for US and international examples).

Table 2: Government Programs, Reporting Entity, and Consolidation Approach

Program	Reporting Entity	Who is liable to report?
European Pollutant Emission Registry	Facility	Owner (Financial Control) or Operator (Operational Control)
EU GHG Emissions Trading Scheme	Facility/Installation	Operator (Operational Control)
US Toxic Release Inventory Program	Facility/ Establishment	Owner (Financial Control) or Operator (Operational Control)
US State Mandatory Reporting Programs	Facility/Unit	Owner (Financial Control) or Operator (Operational Control)
US Acid Rain Program	Unit	Each unit has a designated representative chosen by the owners and operators of the unit
RGGI (Regional Greenhouse Gas Initiative) (Under Development)	Facility	Owner or Operator

Using the control approach will ensure compatibility with the standard regulatory approach as shown above.

Corporate GHG management: This is one of the main goals of the Midwest registry. For assessing risk and opportunities, GHG reporting on the basis of both the equity share and financial control approaches will provide the most complete picture. This is because liability to governments will most likely continue to be on the basis of control in joint operations, but it is possible that partners with a controlling share in such operations could demand other equity shareholders to cover their requisite share of GHG compliance costs.

Management information / performance tracking: For the purpose of performance tracking, the control approaches seem to be more appropriate since managers can only be held accountable for activities under their control.

Alignment with other GHG Programs: Utilizing the equity share and financial control approaches will allow the Midwest registry to be consistent with other existing and emerging GHG Programs in the country including CCAR, RGGR, DOE 1605b, EPA Climate Leaders etc. The table below summarizes the approach followed by CCAR and RGGR.

GHG Program	Reporting Entity	Consolidation Approaches
CCAR	Corporate	Equity or Management (or Operational) Control
RGGR	Corporate	Financial Control (Required)/ Equity (Optional)

Cost of administration: The equity share approach can result in higher administrative costs than the control approach for both the company and program administration, since it can be difficult and time consuming to collect and verify GHG emissions data from joint operations not under the control of the reporting company. Using the control approach can simplify the integration and roll-up of facility-data into corporate-data and vice-versa (See Table 2 above).

Key Decision Criteria and Matrix Analysis: The following matrix evaluates the three consolidation approaches in terms of the key decision parameters identified and analyzed above. In the matrix, ‘0’ implies low compatibility and ‘1’ implies high compatibility with the decision parameter under consideration. All five of the decision parameters are considered to be equally important. With any change in decision parameters or in their relative importance, the results could be different.

Decision Parameters	Equity	Financial Control	Operational Control
1. Compatibility with Current Federal/States Regulatory Reporting Program	0	1	1
2. Corporate GHG Risk Management	1	1	0
3. Alignment with Current and Emerging GHG Programs (CCAR, RGGR, Others)	1	1	0
4. Management Performance Tracking and Internal Reporting	0	1	1
5. Administrative Cost	0	1	1
TOTAL	2	5	3

The financial control approach holds the greatest level of compatibility with all five of the decision parameters. However, other approaches might be desirable if certain decision parameters were given a higher priority than others.

3.4. How to Set Operational Boundaries (Categorizing and Choosing Emissions)

After an entity defines its organizational boundaries, the next key step in the accounting process is to determine which activities and operations of the entity result in GHG emissions, and how the emissions from those activities will be categorized. Under the GHG Protocol, this process is known as setting operational boundaries. The GHG Protocol defines emissions by categorizing them in two ways, first as direct or indirect emissions, and then by choosing the “scope” of the emissions.

The GHG Protocol defines direct and indirect emissions as follows:

- **Direct GHG emissions** are emissions from sources that are owned or controlled by the reporting entity.
- **Indirect GHG emissions** are emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity.

Having companies distinguish their emissions based on the ownership of GHG sources ensures that companies will not double count each other's emissions (as long as they are all using the same approach to setting organizational boundaries). Under this approach, for any given GHG source only one entity will be able to claim that source's emissions as "direct" emissions.

In addition the GHG Protocol developed the concept of "scope" to further clarify the relative differences between direct and indirect emissions. The scopes are as follows:

- **Scope 1:** All direct GHG emissions.
- **Scope 2:** Indirect GHG emissions from consumption of purchased electricity, heat or steam.
- **Scope 3:** Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g., T&D losses) that are not covered in Scope 2, outsourced activities, waste disposal, etc.

Scope 2 is a special category of indirect emissions. It represents one of the largest sources of emissions for a company, and therefore a significant opportunity for reduction initiatives, either by the company or a GHG program. Reporting of Scope 2 allows transparent accounting and reporting of emissions and reductions associated with such opportunities. Also, in comparison to other indirect emissions, data for Scope 2 emissions can be gathered in a relatively consistent and verifiable manner.

The GHG Protocol Standard therefore requires entities to collect data on and report Scope 1 and 2 emissions. Collecting data on Scope 3 emissions is optional, however sector-specific calculation protocols enumerate important Scope 3 sources that should be collected (see Part 4).

Reporting Direct and Indirect Emissions - Options for the Midwest Registry

The Midwest Registry, therefore, must decide which categories of emissions will be included in registry. The four most reasonable and commonly seen options are:

- 1) Scope 1 emissions required
- 2) Scope 1 emissions required; Scope 2 (and Scope 3) optional
- 2) Scope 1 and Scope 2 emissions required.
- 3) Scope 1 and Scope 2 emissions required; Scope 3 optional.

In general, when thinking about which scopes to include and whether or not to make their reporting required, a GHG program needs to think about four main criteria:

- a) *What information is required for the types of current or new policy measures or initiatives that might rely on the registry information?* For example, the EU ETS registry is supporting a mandatory reporting and trading scheme only. Its key objective is to influence and reduce direct (Scope 1) emissions. Therefore the EU-ETS does not collect information on indirect emissions. If however, a GHG program hopes to develop demand-side initiatives using data from the registry, it may be useful to require that Scope 2 emissions are included in participants' inventories.

- b) *What services are being provided to the participants through the registry?* For instance, many US companies in recent years have established comprehensive GHG management strategies that go beyond Scope 1 emissions and also address both Scope 2 and significant Scope 3 emissions. For many companies, purchased electricity represents one of the largest sources of GHG emissions to which they contribute, and the most significant opportunity to reduce emissions. Accounting for these emissions enables companies to assess the risks and opportunities associated with rising energy costs and potential GHG-related liabilities. Furthermore, the inclusion of Scope 2 and 3 indirect sources could lead to other positive business outcomes, such as facilitating investments in upstream and downstream value-chain efficiencies, participating in emerging green power markets, and improved brand management. These are all important business drivers for many companies to get involved in GHG measurement and reduction activities. From GHG Program perspective, requiring Scope 2 emissions can also help promote investments in energy-efficient technologies and green power projects in the region.

In particular many service sector companies (e.g., retail, financial services, insurance, consulting, etc.) are primarily concerned with accounting for and reporting indirect emissions, as such companies do not generally emit a high level of direct emissions. To encourage the participation of service sector companies and to facilitate these companies' GHG management strategies, it would be important for the Midwest Registry to require Scope 2 emissions and encourage Scope 3 emissions reporting.

- c) *How best various options address registry's design and accounting principles as well as goals and objectives?* For instance, if the Midwest Registry decides to narrow its focus to the principle goal of ensuring a credible GHG measurement and reporting platform, without considering other strategic objectives, then it may be sufficient to only focus on direct (Scope 1) emissions. If, on the other hand, the Midwest Registry decides that in addition to ensuring a credible GHG measurement and reporting platform, that other key objectives will be to facilitate comprehensive corporate GHG management strategies, promote linkages with other GHG registries, and implement GHG programs to reduce GHG emissions, then it may make sense to establish rules that encourage participants to evaluate both direct and indirect emissions.

In promoting linkages and consistencies with other GHG registries, it is important to consider the decisions that other registries and GHG programs have taken on setting operational boundaries. On this design issue, there is a broad level of consistency among existing and emerging GHG registries throughout the U.S., as CCAR, RGGR, and the EPA's Climate Leaders Program - all follow GHG Protocol standards in requiring the accounting and reporting of Scope 1 and 2 emission sources. All of these registries and programs also accept Scope 3 emissions data, but the reporting of Scope 3 emissions is optional in all cases. (See Table 3 below).

- d) *What are the costs of the different options to the program and the participants?* Probably, for both the participants and the GHG program, including only Scope 1 emissions will be a less expensive option. However, the argument could be made that most companies already track electricity use, which is the basic information required to quantify Scope 2 emissions.

Clearly the addition of the Scope 2 information to the inventory should not bear a huge additional cost burden to participants, compared to the benefits of collecting this information. It is more apparent, however, that in most cases requiring Scope 3 emissions is likely to be much too burdensome for both the participants and the GHG program.

Table 3. Operational Boundary Requirements of Various U.S. GHG Programs

GHG Emission Scopes	GHG Protocol	CCAR	RGGR	EPA Climate Leaders
Scope 1 Emissions	Required	Required	Required	Required
Scope 2 Emissions	Required	Required	Required	Required
Scope 3 Emissions ¹¹	Optional	Optional	Optional	Optional

3.5. Establishing a Base Year for GHG Accounting

A “base year” is a historical datum – either a specific year or a series of multiple years – against which a company’s emissions are tracked over time. Tracking emissions over time enables participating companies to meet a variety of business goals, such as public reporting of GHG reductions, establishing GHG targets, managing risks and opportunities, and addressing the needs of investors and other stakeholders. In addition, setting a base year is required in order to have a starting point against which structural adjustments can be tracked as the entity expands or contracts over time.

Generally, an entity’s base year will be the first year that an entity accounted for its GHG emissions and developed a GHG inventory. It is important for entities to choose and report a base year for which verifiable emissions data are available.

For the Midwest Registry, the following questions will need to be answered concerning how to specify a base year:

- *Should the registry require a specific base year that must be used by all participating entities?*

Some registries allow participants to report base year information, along with annual emissions data thereafter, from either the most recent year or an earlier year as far back as 1990, as long as verifiable information is available. To be consistent with the Kyoto Protocol, a number of

¹¹ It should be noted that while accounting for and reporting Scope 3 emissions is optional in the general guidelines of all of these GHG programs, that certain sector-specific calculation protocols that these programs have developed or adopted may require certain Scope 3 emission sources that are particularly important to the specific sector. For example, the World Business Council for Sustainable Development (WBCSD) Cement Sustainability Initiative (CSI) CO₂ Protocol, which has been adopted by the GHG Protocol and customized into a new CCAR Cement Protocol, requires the accounting and reporting of indirect emissions associated with clinker purchases – a Scope 3 emissions source.

companies have established 1990 as a base year. However, most companies have been unable to find a consistent and verifiable data set from 1990, leading many to use more recent base years.

The GHG Protocol requires that companies establish a base year with verifiable emissions data, and specify why they have chosen this year. The GHG Protocol does not require entities to choose a specific base year.

-CCAR: Participating companies may select any year from 1990 forward as their base year.

-RGGR: Participating companies may select any year as their base year. RGGR does not set a limitation that a base year can not be established earlier than 1990.

- *Should the base year be a specific year or an average over multiple years?*

While most companies select a single year as their base year, it is also possible to choose an average of annual emissions over several consecutive years as a base year. Such a multi-year average base year may be attractive in situations where an entity's yearly emissions vary significantly from year to year, and therefore a single year's emissions data may be unrepresentative of the entity's typical emissions profile.

The Midwest Registry will need to decide whether or not the program specifications will allow entities to set multi-year average base years.

-CCAR: Participating companies may select a single year as their base year.

-RGGR: Participating companies will select a single year – not a multi-year average – for their base year. The program's rationale is that multi-year averages are not consistent with some regulatory schemes, and they also present difficulties in recalculating a base year should there be a need to update it.

- *In what situations should a participating entity be allowed or required to recalculate its base year?*

Often companies undergo significant structural changes that have a substantial impact on the company's GHG emission levels. Because these structural changes may occur years after an entity's base year emissions have been set, these resulting changes in emissions levels may distort the consistent tracking of emission levels over time. To ensure consistent tracking of emissions over time in these situations, it may be necessary for an entity to recalculate its base year emissions. The Midwest Registry will need to define conditions and provide rules articulating the basis and context for any recalculations of base year emissions.

According to the GHG Protocol, the following cases shall trigger the recalculation or adjustment of base year emissions:

- a) Structural changes to the reporting entity that have a significant impact on emission levels.
A structural change involves the transfer of ownership or control of emissions-generating

- activities or operations from one company to another. Structural changes include mergers, acquisitions, divestments, and the outsourcing or insourcing of GHG emitting activities.
- b) Changes in calculation methodology or improvements in the accuracy of emission factors or activity data that result in a significant change in emission levels.
 - c) Discovery of significant errors, or a number of cumulative errors, that are collectively significant.

In general, base year emissions shall be retroactively recalculated or adjusted to reflect changes in the entity that would otherwise compromise the consistency and relevance of future reported GHG emissions information.

Conversely, according to the GHG Protocol, base year emissions should *not* be recalculated or adjusted in situations where changes occur to facilities that did not exist in the base year or as a result of organic growth or decline. Organic growth or decline refers to increases or decreases in production output, changes in product mix, and closures and openings of operating units that are owned or controlled by the reporting entity.

-CCAR: Consistent with GHG Protocol standards, CCAR’s General Reporting Protocol (GRP) identifies six circumstances that would require participating companies to revise their base year emissions. These six circumstances include:

- Mergers and Acquisitions;
- Divestitures;
- Outsourcing – contracting activities to outside parties that were previously conducted internally;
- In-sourcing – conducting activities internally that were previously contracted to outside parties;
- A shift in the location of an emission sources (into or out of the U.S. or the State of California, depending on your geographic boundaries); and
- Fundamental changes in generally accepted GHG emissions accounting methodologies.

-RGGR: Draft guidelines on base year recalculations are the same as those presented in the GHG Protocol.

- *For base year recalculations, should a “significance threshold” be set to trigger when base year recalculations occur?*

According to the GHG Protocol, whether base year emissions are recalculated or adjusted depends on the significance of the changes. The determination of a significant change may require taking into account the cumulative effect of a number of small acquisitions, divestments or outsourced/in-sourced activities. The GHG Protocol does not specify as to what constitutes “significant.”

However, some GHG registries and programs do establish a specific “significance threshold.” A significance threshold is a qualitative and/or quantitative criterion used to define any significant change to the data, inventory boundary, methods, or any other relevant factors that would trigger

a base year recalculation. The Midwest Registry will need to consider whether or not a specific significance threshold should be established in its program specifications.

-CCAR: Registry guidelines establish a specific significance threshold for base year recalculations or adjustments at 10 percent of the base year emissions, determined on a cumulative basis. The following text is quoted from CCAR’s GRP:

“For many organizations, particularly large ones, mergers, acquisitions, and divestitures, as well as the other listed organizational changes, are common occurrences. Rather than requiring baseline adjustments whenever any changes occur in your organization, however insignificant, you need only adjust your baseline whenever you estimate that the *cumulative effect* of such changes affects your organization’s total reported emissions by plus or minus 10%.

In some situations, year-to-year changes to total emissions resulting from structural or other changes to your organization may fall below the 10% threshold for updating your baseline. You will need to update your baseline, however, if and when the cumulative effect is greater than 10%.”

-RGGR: Draft guidelines do not establish a significance threshold for base year recalculations.

3.6. Establishing an Emissions Accounting Threshold

Establishing an emission accounting threshold recognizes that companies may not be able to capture exact emission estimates from every source that exists within their organizational boundaries—either because the emissions from these sources are very small, and/or because the information is difficult to gather. An emissions accounting threshold allows companies to have some flexibility in how they collect and report the information from these sources. There are two basic approaches to setting emissions accounting thresholds: (1) defining a *de minimus* threshold for GHG emissions, below which they do not need to be accounted for; or (2) defining a materiality threshold, which is the allowable difference between total inventoried emissions and total estimated emissions taking into account omitted sources.

De minimus Emission Levels: Defining a *de minimus* threshold for emissions (either as a percentage of total inventory emissions, as an absolute quantity, or both) allows companies to omit from their verified inventory, sources that do not exceed a certain size—e.g., a company may have lawn mowers, which with a simple back-of-the-envelope estimate, could be shown to comprise below a certain percent, e.g., 5%, of the entity’s total emissions. If companies have more than one source type that they wish to exclude, e.g., lawn mowers and emissions from a certain chemical process, then the sum total of all the emissions from both source types would need to be below the *de minimus* threshold i.e. a permissible quantity of emissions that a company can leave out of its inventory.

This means that while a company would need to provide a calculated estimate to confirm (and show to a verifier) that the emissions from a source really are below the *de minimus* threshold, all that would need to be established for a verifier is that the estimate is reasonable. Data on the actual emissions from the source would not be required, (e.g., fuel bills for the lawn mowers).

Materiality Threshold: A materiality threshold is a related concept. However, a materiality threshold establishes an acceptable percentage (or absolute quantity) difference between the company's emissions inventory and the verifier's belief of what the company's emissions would be if all omitted sources were accounted for. For example, if a company does not include a certain set of sources that the verifier thinks should be included, and those sources are estimated to emit more than the materiality threshold, this would be material discrepancy and emissions from at least some of those sources would need to be inventoried.

Example: *De minimus* and Materiality Thresholds

Company X ignores Source B because the total emissions from this source are thought to be 3% of the total emissions, and this is below the *de minimus* level established by the GHG program to which they report.

During third-party verification Company X shows the verifier that Source B is in fact 3% or less of total emissions with some basic information. The verifier therefore does not consider this source during verification.

During the verification of the company's inventory however, the verifier finds that the company has omitted Source B and other sources whose estimated emissions when added together are equal to 8% of the total inventory. The GHG program allows a 5% materiality threshold, so the verifier finds that there is a material discrepancy and that the inventory needs to be adjusted. Had the omitted sources been found to be below 5% of total inventoried emissions, then the inventory would have stayed as presented to the verifier.

In deciding whether or not to include a *de minimus* or materiality threshold, and at what level to set either emissions accounting threshold if one is included, a GHG Registry needs to consider the balance between the principles of accuracy and completeness (see definitions in sections 3.1), as well as consider those of relevance and transparency. Requiring highly accurate data may mean that completeness will be sacrificed due to issues of cost, and data and/or methodological constraints. On the other hand, requiring a complete inventory, where every source is included and reported, may require accepting some emission estimates that are more uncertain. How this information will be used and presented is vital in making this decision and ensuring that the data is of the quality required for present and future policies or programs.

In the GHG Corporate Accounting and Reporting Standard, it is recommended to not make use of a *de minimus* threshold, but rather to estimate emissions for small sources, record how each estimate was calculated, and transparently record and justify estimates that may be of lower quality/ higher uncertainty. The GHG Protocol also recommends 5% as a rule of thumb materiality threshold; however it notes that a verifier should assess whether an error or omission of a smaller size may still be misleading given the purpose and context of the report. For example, if a 2% adjustment to inventoried emissions would prevent a company from achieving its corporate target, then this would most likely be considered material.

The Midwest Registry may choose to use either one or both types of accounting thresholds when developing program specifications. If third party verification is required under the program, then a materiality threshold should probably be required. However, depending on how the materiality threshold is defined, a *de minimus* threshold may not be required. For example, the program could require that all information be included in the inventory (i.e., no *de minimus* threshold), but that there be some emission calculations that do not require the same level of data quality as others, as long as they are transparently reported and the percent of emissions represented by those sources is below a certain percent of total emissions. (In the above example, Source B emissions would be included in the final inventory, but it would be recognized that less rigorous techniques have been used in estimating that data).

Regardless of which option is chosen, transparency is crucial for ensuring that the inventories being submitted can be compared, verified, and recognized as credible. Whether or not the registry stores data which has been calculated with a lower level of rigor depends on the use of the data by the program. For example, if the states plan on providing baseline/year protection to participating companies, it may be that the Midwest Registry would prefer to ensure that the data is relatively of higher quality (and employ a *de minimus* threshold). Alternatively, if a key goal of the Registry is to gather maximum quantity of data, even if the quality of the data is not all equal, then it may make more sense to have a materiality threshold only.

-CCAR: Both 5% *de minimus* and 5% materiality thresholds are defined in the CCAR General Reporting Protocol.

-RGGR: No *de minimus* threshold will be allowed; however language is currently being finalized around this issue to ensure that the level of flexibility for data collection on smaller sources will be equal to that in the CCAR, while still including information on all sources in the a company's inventory report.

3.7. The Reporting Requirements – Public Reporting and Aggregation of Data

Public reporting

A public GHG emissions report presents details on the reporting company's GHG emissions inventory to internal management and external stakeholders, such as shareholders, regulators, non-governmental organizations, and the general public. Decisions for the Midwest Registry to consider regarding reporting requirements include what information will be reported to the registry; what reported information will be made publicly available; and how this information will be made available (e.g., a registry website).

Deciding these issues requires identifying the necessary level of detail and transparency for ensuring a credible public reporting platform. The GHG accounting principles, described in Section 3.1 above, are helpful to consult in this regard, i.e., to be credible, reported information should be relevant, complete, consistent, transparent, and accurate.

According to the GHG Protocol, a public GHG emissions report must include the following information:

Description of the company and inventory boundary

- An outline of the organizational boundaries chosen, including the chosen consolidation (organizational boundary) approach.
- An outline of the operational boundaries chosen and -- if Scope 3 emissions are included -- a list specifying which types of activities are covered.
- The reporting period covered.

Information on Emissions

- Total Scope 1 and 2 emissions, independent of any GHG trades such as sales or purchases of allowances or offsets.
- Emissions data, reported separately for each Scope.
- Emissions data for all six GHGs, reported separately (CO₂, CH₄, N₂O, HFCs, PFCs, SF₆) in metric tonnes and in tonnes of CO₂-equivalent.
- Year chosen as base year, and an emissions profile over time that is consistent with program criteria for recalculating base year emissions.
- Appropriate context for any significant emissions changes that trigger base year emissions recalculation (acquisitions/divestitures, outsourcing/insourcing, changes in reporting boundaries or calculation methodologies, etc.).
- Emissions data for direct CO₂ emissions from biological sources (e.g., CO₂ from burning biomass/biofuels), reported separately from the Scope 1-3 emissions.
- Methodologies used to calculate or measure emissions, providing a reference or link to any calculation tools used.
- Any specific exclusion of sources, facilities, and/or operations.

The Midwest Registry may also wish to require additional information to meet other objectives. For example, facility level emissions data may be necessary if the registry hopes to include mandatory reporting from certain sectors or sources in the future. It may be important to be able to obtain disaggregated information which can be combined in a number of ways to create a variety of meaningful reports for different uses and users.

Presenting Disaggregated Data

In addition to deciding up to what level the data will be aggregated (see section 3.2), the registry will also need to decide the level of disaggregated data that the registry will require or allow:

- *Source type corporate-level data*—this means that a company could report emissions subdivided by one or more source types (e.g., stationary combustion, process, fugitive, etc.) from all facilities within the company, e.g., the amount of fuel used in stationary equipment would be collected from all business units, multiplied by one emission factor and presented as total emissions for the company from that source type (stationary combustion).
- *Facility-level data*—this means the company would provide emissions data to the registry at a facility-by-facility basis. If the reporting entity was corporate-level, facility data would be disaggregated for the public report, or for facility-level reporting, the numbers would simply be reported by facility.

- *Unit-level data*—this means that the company would need to report emissions for each GHG emitting unit separately. In other words the natural gas used in each boiler would be reported separately into the registry.
- *Mixed option*—this option can require certain levels of disaggregated data for sources that are particularly important (e.g., requiring facility- and/or unit-level data for large stationary combustion sources).

The level of data disaggregation required by a registry is generally a function of the use of the information by the GHG program. As noted in section 3.2, many mandatory programs require at least facility-level data. In some cases, such as for programs that are looking at specific large emitting sources, data is gathered at the stack/unit level. The advantage of collecting more disaggregated numbers is usually to improve accuracy and develop better GHG management capabilities. More site-specific emission factors can be used to determine actual emissions during the quantification steps. Also the quantification process at a facility/unit level is likely to help identify where specific units/facilities are especially inefficient or highly polluting. The main disadvantage of using a more disaggregated approach is its relatively high cost. In some cases, companies will anyway collect disaggregated information, and for these sources the cost difference may not be very large, however, for other source types, collecting information at the facility or unit level may be extremely difficult due to time constraints or lack of data.

Disaggregation data and public reporting

One potential reporting concern for GHG registries has to do with the confidential nature of some of the data that participants may be required to report to the registry. For instance, as noted above, in addition to entity-wide data, it may be important for registry participants to report on facility-level emissions data. However, some participants may consider such facility-level emissions data to be confidential. It therefore may make sense to not make available to the general public all emissions data that participants are required to submit to the registry. For example, the Midwest Registry could require participants to submit facility-level data to the registry, but then roll up those emissions so that only the participants' entity-wide emissions data is presented to the public.

-*CCAR*: Reporting on Scope 1 and 2 emissions is required, and reporting on Scope 3 emissions is optional. Participants can report facility-level data into the system (optional), but only entity-level data is presented in the public report. CCAR participants report their emissions to the registry using the Climate Action Registry Reporting Online Tool (CARROT). Through CARROT, limited information about each participant's emissions report and overall Registry participation is made available to the general public. This publicly available information includes:

- Entity-level emission report;
- California and US total reported emissions; and
- List of participants.

-*RGGR*: Reporting on Scope 1 and 2 emissions is required, and reporting on Scope 3 emissions is optional. Participants are required to report facility and unit-level to the registry. However, it is yet to be determined whether or not this facility and unit-level data will be made available to the

public. RGGR participants will report their emissions data to the registry using the US EPA's EATS reporting platform.

4. Calculation Protocols and Registry Database Options

This section analyzes two types of tools that will be necessary to operationalize the Midwest Registry: (1) GHG emission calculation protocols; and (2) Registry database software for tracking and reporting emissions. The decisions related to choosing, configuring, and applying these tools to the Midwest Registry will be examined in detail. To that end, this section also discusses the tools being used by the California Climate Action Registry (CCAR) and the Northeast Regional Greenhouse Gas Registry (RGGR).

For each type of tool (calculation protocols and registry software), the following topics are addressed:

- A description of the type of tool and its importance
- Midwest Registry options for adopting, acquiring, or creating these tools
- The advantages and disadvantages of the different options
- How other GHG registries/programs have approached these options

4.1 Calculation Protocols (Quantification Specifications and Calculation Tools)

Once an entity has defined its organizational and operational boundaries, the next step is to actually quantify the GHG emissions from the various sources/sinks that fall within these boundaries (See Figure 1 in the Part 2 Introduction). It is generally very helpful to provide calculation protocols to guide companies through this step. Calculation protocols usually consist of:

- a) *Quantification specifications*, i.e., a guidance document that includes:
 - An overview of the protocol with information on the sector, sources, and process(es) that it covers;
 - One or more approaches for determining CO₂ and other GHG emissions, e.g., direct measurement, mass balance, etc.;
 - Guidance on collecting activity data and selecting appropriate emission factors;
 - Likely emissions sources and the scopes they fall under (specific to a particular sector);
 - Additional information, such as quality control practices and program specific information.
- b) *Calculation tools*, i.e., spreadsheets or other software to help carry out any necessary emissions calculations.

There are two types of calculation protocols:

- *Sector-specific calculation protocols* that provide guidance for defining organizational, operational, and geographic boundaries for a specific sector; reporting a complete inventory of sources; identifying appropriate levels of accuracy in quantification methodologies and emission factors; and using appropriate default emission factors.
- *Cross-sector calculation protocols* that provide guidance on a single type of emissions source that may be common to multiple sectors, e.g., stationary combustion. These

protocols offer quantification methodologies for calculating emissions from that source type; identify appropriate levels of accuracy in quantification methodologies and emission factors; and provide default emission factors.

The primary purpose of calculation protocols is to help ensure that entities participating in the registry are using the same (or similar quality) methodologies to calculate their emissions. Although registries with voluntary programs tend to allow more flexibility by providing several options, or a tier system, for calculating emissions from different sources, mandatory programs may require that specific methodologies and/or emission factors be used and more rigorous monitoring methodologies be followed. Calculation protocols also allow programs to provide additional guidance or sector-specific metrics for certain sources beyond the general program specifications. For example, some calculation protocols may identify Scope 3 sources whose emissions could be particularly significant for a specific sector. Likewise some sector-specific protocols identify sources whose emissions are likely to be insignificant, and provide methods for demonstrating that their exclusion would not cause a material discrepancy in total inventoried emissions. Calculation protocols also provide additional guidance for reporters on where to find the necessary information needed for the calculations.

To date, the GHG Protocol Initiative has developed 16 calculation protocols and accompanying tools through an intensive stakeholder process. These protocols are program neutral and represent best practices for the quantification of emissions from numerous sources and sectors.

Cross Sector protocols/tools:

- Calculating emissions from *Stationary Combustion*
- Calculating emissions from *Purchased and Consumed Electricity, Heat and Steam*
- Calculating CO₂ emissions from *Mobile Source* fuel combustion
- Calculating HFC emissions from *Air Conditioning and Refrigeration Use*
- Measurement and Estimation *Uncertainty* for GHG emissions
-

Sector-Specific protocols/tools:

- Calculating GHG emissions from *Iron and Steel* Production
- Calculating GHG emissions from *Nitric Acid* Manufacturing
- Calculating GHG emissions from *Ammonia* Production
- Calculating GHG emissions from *Adipic Acid* Production
- Calculating GHG emissions from *Cement* Manufacturing
- Calculating GHG emissions from *Lime* Manufacturing
- Calculating HFC-23 emissions from *HCFC-22* Production
- Calculating GHG emissions from *Pulp and Paper* Production
- Calculating PFC emissions from *Semi-Conductor* Production
- Calculating GHG emissions for *Small Office-Based Organizations*
- Calculating GHG emissions from *Aluminum* Production

Various GHG initiatives globally have adopted or customized these protocols/tools for their own programs, including CCAR and the EU Emission Trading System. Both these program are also

continuing to develop further tools, e.g., CCAR, WRI, and Climate Leaders are collaborating to develop a Natural Gas Transmission and Distribution tool, CCAR and WRI have plans to develop an agricultural sector tool, etc.

Midwest Registry Options for Calculation Protocols

For Midwest registry, there are three options for customizing and/or adopting calculation protocols:

1. Customize cross-sector and sector-specific calculation protocols based on or informed by the GHG Protocol, and/or existing and/or emerging GHG registries/programs, specifically for the Midwest Registry;
2. Develop registry quantification specifications, but adopt (or allow the use of) calculation tools from existing and emerging GHG registries/programs and/or the GHG Protocol; and
3. Adopt registry quantification specifications and calculation tools from existing and/or emerging GHG registries/programs and/or GHG Protocol tools.

Of course, these options do not include what to do about developing new tools that do not yet exist in a corporate/facility level reporting framework, and may be significant for the Midwest Registry, e.g., an agricultural sector tool. However, thinking about these tools and how many there may be that need to be developed, may also help guide the decision of which option to take for existing tools.

Advantages and Disadvantages of Option 1

There are three reasons why the Midwest Registry may choose to follow option 1 and customize or develop their own calculation protocols for the registry:

- To provide further guidance on sector specific/program issues—e.g., CCAR realized that for the power sector in California the GHG emissions occurring at sources inside of California are very low, but that electricity imported in from facilities outside of California has relatively high emissions. In order to be sure that emissions for electricity imported into the state were accounted for by the California power companies, CCAR added an industry-specific metric, i.e., the generation metric, which covers emissions from all reporter-owned generation used to meet California demand, regardless of whether it is generated at facilities located inside or outside of California.
- To develop more rigorous monitoring requirements than may currently exist in the corporate inventory tools, which have primarily been developed for voluntary programs and are not always highly prescriptive.
- To engage in a stakeholder process that might help to promote buy-in and a sense of ownership by the future participants of the registry and the program.

However, both resource constraints and time limitations are two key considerations for the Midwest Registry in deciding whether to customizing it own protocols or adopt existing calculation protocols. CCAR, which has now developed three tools, has found that it takes from 6 -12 months to develop a new tool through a full multi-stakeholder process. The cost of developing a calculation tool depends on the information and methodologies already available for developing the tool, but can easily range from \$10,000 to \$50,000.

Advantages and Disadvantages of Option 2

Even if the Midwest Registry wants to specify its own quantification specifications, it may be easiest at the outset to adopt (or allow the use of) calculation tools from existing and emerging GHG registries/programs or the GHG Protocol. This option would require the Midwest Registry to outline as part of the program specifications the acceptable quantification methodologies, and possibly the emission factors, for specific sources or sectors.¹² However, the Midwest Registry could instruct participants to use spreadsheets or software from existing tools/protocols as long as the Registry's quantification specifications are followed. This would save the time and costs required to develop specific calculation tools.

Depending on how much the Midwest Registry defined in its quantification specifications, the main disadvantage of this approach is the lack of a stakeholder process to draw in potential participants to the registry.

Advantages and Disadvantages of Option 3

Fully adopting registry quantification specifications and calculation tools from existing or emerging GHG registries/programs, or the GHG Protocol, would be the least time and resource-intensive approach at the outset of the program. This approach may make sense if after reviewing the available calculation protocols—e.g., CCAR's or GHG Protocol's—it is decided that it is not necessary to provide further information or guidance to participants at this time. However, the monitoring requirements in available corporate tools may not follow a uniform tier approach or provide the rigor that may be desired by the Midwest registry in relation to its main goals and objectives. Also it is possible revisions might be required later on if it turns out the existing protocols and tools overlook issues specific to the Midwest region. Finally there would also be no stakeholder process related to this option.

Conclusions

None of the options above forego the possibility of the Midwest Registry revising/customizing current calculation protocols in the future, depending on demand and resources. However, the incentives to develop calculation protocols for those sectors for which sector specific guidance has not yet been developed should perhaps be considered when deciding where to allocate resources for tool development. For example, an agricultural sector calculation protocol would probably need to be developed on a priority basis to help encourage participants from this sector.

In addition, Midwest could follow a combination of the options outlined above—taking into account sector-specific needs, interests, resources, and time. If additional resources were available, the Midwest Registry could customize existing tools for those sources/sectors that are unique and significant in the Midwest following Option 1; the registry could also provide additional guidance document, e.g., with emission factors for tools where certain information could help increase the accuracy/ease of the quantification of the emissions, without remaking a full new tool following Option 2; and finally the registry could simply adopt a tool that is already

¹² The Midwest Registry could also consider including industry metrics in the program specifications for certain sources or sectors, and elaborating on monitoring requirements, e.g., how often data are gathered, fuel samples are collected, etc. Since this information could be quite lengthy, it might be preferable to have a separate guidance document to accompany the program specifications. This would facilitate updating this document as GHG quantification methodologies are refined.

available (Option 3) for those sources/sectors that are not expected to be significant in the Midwest.

Developing an Agricultural Sector Calculation Protocol

Many agricultural companies have GHG emissions from sources for which protocols and tools have already been developed, either in cross sector or sector specific tools. For example:

- Stationary combustion, e.g. boilers, etc
- Electricity, heat and steam, e.g., building lights, etc.,
- Mobile combustion sources
- CH₄ emissions from landfills, and
- CH₄ emissions from waste water treatment, e.g., anaerobic lagoons

However, an agriculture sector-specific tool could also provide methodologies and guidance for sector-specific GHG emission generating activities, including:

- CH₄ emissions from domestic livestock (enteric fermentation and manure management)
- CH₄ emissions from rice management
- CH₄, CO, N₂O emissions from agricultural burning
- CH₄, CO₂, N₂O emissions from agricultural soils

Finally, an agriculture protocol might also need to include CO₂ removals from tree plantations, land use changes, etc.

Methodologies for calculating the GHG emissions from these sources are available from both the IPCC GHG Inventory Reference Manual and the US EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks. However, the value of developing a sector specific tool often comes from having numerous technical experts not only identifying the sources, but helping clarify which sources are likely to be most significant and relevant both to the GHG program and to the reporting participant. For example the National Council for Air and Stream Improvement, Inc., who developed the Pulp and Paper Calculation Protocol adopted by the GHG Protocol, found that the costs and uncertainty of directly monitoring the CO₂ removals and carbon stocks associated with tree plantations outweighed the benefits.

Other Registry Experiences

-*CCAR*: CCAR has been developing its own calculation protocols. Currently they have three sector-specific protocols (i.e., cement, forestry, and power utilities), and plan on developing more (natural gas transmission and distribution, agriculture, and oil and gas). They allow companies to use other available tools, and tools developed internally by companies, if no CCAR tool is available. CCAR relies heavily on its verifiers to ensure that the quality of the methodologies and emission factors used is sufficient for CCAR's registry.

-*RGGR*: RGGR has decided to follow Option 2 in the short term and is currently working on the methodologies that will be included in RGGR's program specifications document.

4.2. Registry Database and Reporting Software

Database and reporting software provide the basic infrastructure of an emissions registry.

Database and reporting software can serve at least four functions:

1. To collect and store data from companies on their entity-level emissions;
2. To collect and store data from GHG reduction projects;
3. To serve as a platform for trading GHG reductions; and
4. To present certified/verified emissions inventories, or subsets of data within these inventories, to the public.

Since the GHG Protocol Initiative is not in itself a registry or a data collecting program in any way, it does not provide any data collecting or storage software. However, there are available software options developed through other initiatives, namely California's Climate Action Registry Reporting Online Tool (CARROT) and EPA's Emissions and Allowance Tracking System (EATS).

Potential registry database/reporting software options for the Midwest Registry include:

- Using an existing software platform, e.g., EATS or CARROT;
- Working with the EPA and CCAR to develop a modified version of EATS and/or CARROT for the Midwest Registry to use (possibly involving a hybrid version of the two platforms);
- Developing a completely new software platform for the Midwest Registry to use.

Summary of CARROT and EATS Software

WRI surveyed CCAR and USEPA on the following questions related to the CARROT and EATS database/reporting software:

A) Which of the following purposes does this software serve and how easily can the software be modified to perform additional functions:

1. To collect and store data from companies on entity-level emissions;
2. To collect and store data from GHG reduction projects;
3. To serve as a platform for trading GHG reductions; and
4. To present certified/verified emissions inventories, or subsets of data within these inventories, to the public.

B) Are there any additional functions/ purposes that the software is designed for?

C) Where and how has the software been used?

D) What costs are involved with the adoption and use of this software?

E) Would this software be available immediately for use by GHG registries, or would customization be required?

F) If customization is required, would a specific consultant need to be used?

G) What other information might be pertinent to the Midwest states and LADCO as they consider the two software platforms?

CARROT

The CARROT software is a state-of the-art, user friendly web-based reporting tool that can:

1. Collect and store data for organizations reporting their annual GHG emissions at a source, unit, facility, business unit and/or entity level in one or more states, and in one or more countries.
2. Collect and store data about discrete GHG emissions reduction projects at either an entity level and/or as a “facility” within an entity report. Reporters can also voluntarily report information about various activities, as defined by industry. CCAR is also now working to develop stand-alone emission reduction project modules that will track emissions according to a project baseline that can be reviewed independent of the entity’s total emissions baseline.
3. Serve as a platform through which:
 - reporters record and manage their emissions information,
 - third-party certifiers review reported information
 - the validating entity reviews reported and certified information, and
 - the public accesses certified summary information by reporter.

CARROT does not currently support tracking of GHG emissions trading transactions. CARROT could be modified to interface with a GHG emission transaction log or could have its own GHG trading mechanism developed.

In addition to the functions identified above, CARROT can also be an effective GHG emissions management tool. In this respect, CARROT:

- Currently accommodates reporters in over twelve sectors with annual GHG emissions ranging from three to millions of tons of CO₂/year.
- Calculates GHG emissions from fuel inputs for stationary combustion sources, mobile combustion sources, and electricity purchases.
- Provides flexibility to track GHG emissions at a source, unit, facility, business unit and/or entity level.
- Tracks carbon intensity metrics that allow comparisons across companies and across facilities.
- Tracks changes in emissions performance over time at a facility or entity level.
- Tracks emission performance goals over time at a facility or entity level.
- Permits reporters to highlight information about their respective GHG management programs, goals, projects, etc.
- Hosts documents (.pdf, .ppt, .doc, .xls) that provide additional information, attestations, or accounting methods relating to a reporter’s GHG emissions inventory.

CARROT also serves as a platform to support third-party review of GHG emissions inventories by independent verifiers, the GHG program, or the public.

Users

CARROT Version 1.0 was launched in October 2002, and Version 2.0 was released April 2005. Since its launch, CCAR members from over 60 companies have used CARROT to calculate, report, and certify annual GHG emissions inventories. Emissions information has been reported for sources, units, facilities, and entities located in most of the 50 US states, as well as in Canada, Mexico, Europe and China.

The tool has performed remarkably well with no downtime to date, and users cite the tool's flexibility, ease of use and convenience as its primary attractions.

Additionally, a modified version of CARROT was created to serve the needs of the World Economic Forum's Global GHG Register. The GHGR was launched in January 2004, and supports the registration of worldwide GHG emissions entity inventories and emission reduction project activities for 15 multinational corporations.

Costs and Necessary Changes

Likely costs of using the CARROT software would depend on some organizational decisions, and a great number of variables factoring into these decisions, including:

1. desired modifications
2. anticipated number of users (hosting costs)
3. level of technical support to users and the Midwest Registry staff

If the Midwest Registry preferred to use CARROT "as-is," CCAR could make it available with a small number of minor modifications designed to accommodate Midwest Registry participants, e.g., creating a new user type (a Midwest Registry user) that would direct the users to Midwest Registry contact points for help and create a "Midwest Registry" report. The cost for programming and deploying these modifications could be as low as \$3-10,000.

Beyond that, it is difficult to estimate the cost of modifications, without having a better idea of the order of magnitude of potential changes.

The ability to use the software straight 'as is' would again depend on modifications requested by the Midwest Registry. To create a Midwest Registry "look", CCAR suggests the following changes to CARROT:

1. Create a unique Midwest Registry log-in page
2. Create a new Midwest Registry user; this new user type would tell CARROT to present the user with the Midwest Registry look instead of the California look.
3. Update links to Midwest Registry's information web page.
4. Create a unique Midwest Registry report that would summarize GHG emissions within the Midwestern region.

This is approximately 2-4 days' work for one programmer, so could be implemented quite quickly. Legally, any consultant could be used to do the work; however CCAR suggests that their developer (CH2M Hill) should be given an equal opportunity to bid on any customization or support contract.

Additional Information

CCAR feels that using CARROT has the following overarching benefits:

- *Significant Cost Savings:* Many of the features that might be desired by the Midwest Registry are already designed and functional in CARROT, which avoids duplication of effort and thus creates significant cost savings in developing a new tool. For a very

minimal cost, a unique Midwest Registry solution could be developed that could very quickly serve reporting needs.

- *Proven Technology:* CARROT provides a flexible reporting platform and calculation tool that has successfully served over 60 companies to date in multiple states and countries. Additionally, CARROT serves as the platform for the World Economic Forum’s Global GHG Register, and has served this program well on a global scale.
- *Full Service Support:* The CA Registry can provide development support, share lessons learned, help manage and troubleshoot the Midwest Registry’s experience from start-up, development and hosting a database, as well as other elements of supporting a registry program. This presents an efficient solution and helps minimize partner resources required—both in the start-up phase, as well as in an ongoing capacity.
- *Familiarity:* Many of the CA Registry’s members have operations in the Midwest. Use of CARROT may help with recruiting reporters for a new Midwestern reporting initiative.
- *Programmatic Synergy:* CARROT is regularly updated to incorporate best practices and new standards in GHG accounting. Updates made to a California solution, e.g., incorporating modifications to the GHG Protocol, can easily be transferred to a Midwestern solution at no or minimal cost.
- *Policy Cooperation:* Beyond the technical reasons for choosing a CARROT solution (or a CARROT+EATS combination), harmonizing reporting tools sends a clear message that state action is gaining momentum and supports the broader goals of a state collaboration.

EATS

The EATS software is a registry software application developed by the US EPA to support other agencies and countries developing emissions registries or trading programs. EATS can:

1. Directly collect and store the data from companies for entity level accounting. EATS includes a Calculation, Reporting, and Verification (CRAVe) module that allows companies to report emissions of any pollutants (conventional and GHG) at the unit, facility, or company level. Once companies report the data, third party or government verifiers can review the reports and certify the submissions.
2. Collect and store data from GHG reduction projects. EATS has a project module to collect information about projects including host and investor information, baselines, and emissions.
3. Serve as a platform for trading GHG reductions, EATS allows
 - *Allowance tracking:* customers can transfer allowances or offset credits to other accounts, including compliance and cancellation accounts.
 - *Emission offset tracking:* customers can create and maintain project-level information on emission offset programs and identify credits linked to the project.
 - *Emission and allowance reconciliation:* customers can reconcile reported emissions and held allowances to determine compliance with program rules.

4. Present certified/verified inventories, or certain data within these inventories, to the public. EATS has a number of built-in reports, including emissions inventories. The registry administrator can decide whether a specific report is available to the public and/or source representatives. Additional reports and a custom query tool are under development.

In addition to these key functions EATS provides several useful features, such as:

- Customized labels (i.e., ability to change all labels from “enterprise” to “company”)
- A modular design that allows for integration, customization and add-on components.
- Multi-program and multi-media capability that allows governments to operate one or more trading programs using the same system.
- Adaptability to accommodate program rules through a “rules engine” that ensures all actions are consistent with program rules.
- Roles and responsibility tools that allow the registry administrator to limit access to different features based on a customer’s assigned “role-type” and security.
- Standardized protocols that facilitate communication and interaction with other data systems, such as emission inventory systems and trading registries.
- The ability to attach reports and spreadsheets (e.g., GHG Protocol tools) to emission submissions
- A secure environment that protects data integrity.

Users

EATS is currently being adapted to meet all four of the registry database/software functions and is being customized for: RGGR and RGGI, the New Zealand GHG Trading Registry, and the Clean Development Mechanism (CDM). EATS is also being used by a number of states for their NO_x and SO₂ emission trading programs.

Costs and Necessary Changes

The EATS software is provided to interested governments through a no-cost license. There are some third-party software products and hardware, however, which are necessary for the operation of the registry. The actual costs will vary with the type of installation. In general, the following components are required to operate EATS over the Internet—a server running Windows or Linux, Cold Fusion MX 6.1, Microsoft SQL Server 2000, and Apache or Microsoft IIS. These software products are readily available through numerous resellers and application service providers. The licensing costs for these software packages vary based on the type of installation and the size of the customer base. If EATS is run on a single PC (laptop or desktop), all of these software products are available at no charge.

EATS is ready for a GHG registry application, although minor customizations of the rules and labeling maybe necessary, e.g., entity vs. facility, etc. However, customizing EATS does not require changes to the underlying program. EATS was built using a rules-based design so most customization can be done simply by creating new rules for the system. For example, the administrator may create a rule that sources cannot report emissions for dates that span more than one calendar year (e.g., 12/1 - 1/31). The customization could be done by any consultant. However, EPA recommends that Perrin Quarles Associates be used as they programmed the software and have an excellent understanding of the underlying design of the software.

The Hybrid Option

Both CCAR and RGGR have discussed the possibility of merging CARROT and EATS or creating a hybrid version that incorporates aspects of both software platforms. However, upfront costs have been a limiting factor for both parties thus far. However, because CCAR believes that they may need the GHG project tracking and trading components for CARROT, and because of the Registry Alliance work, it is thought that there is a potential to develop a meaningful and cost effective hybrid of the two software systems.

Advantages and Disadvantages of EATS and CARROT

The possible advantages and disadvantages of using one of these two software platforms, or a hybrid, will require further research. Also a better understanding of needs and characteristics of the Midwest Registry, as recommendations regarding the program specifications are developed, will also help in deciding which software will be more appropriate. WRI can help facilitate conversations between the US EPA, CCAR and the Midwest Registry as the question of software becomes more relevant.

If the Midwest wanted to develop a new software platform, it will be necessary to speak further to the developers of CARROT and EATS regarding the time and cost required to do so.

Annex A. Application of Consolidation Approaches – An Example

An example to illustrate how GHG Protocol consolidation approaches (Section 3.2) may be applied is provided below.

Company ALPHA participates in five facilities, of which only one is fully owned and the rest are joint operations. Its business relationship with each of the facilities is shown below.

Facility	Ownership	Financial Control (> 50%)	Operational Control (Operator)
A	25%	NO	NO
B	51%	YES	YES
C	100%	YES	YES
D	30%	NO	YES
E	49%	NO	NO

Company ALPHA applies the consolidation rules to the total emissions of each of these five facilities separately to calculate its total emissions for all three approaches.

Facilities	Total Facility Level Emissions	Emissions		
		Equity	Control	
			Financial Control	Operational Control
A	500	125	0	0
B	1000	510	1000	1000
C	1000	1000	1000	1000
D	5000	1500	0	5000
E	2000	980	0	0
Company Alpha		4115	2000	7000