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Integrated Emissions Data Management Framework™ for Government and Corporate GHG Data Management, Modeling, and Reporting

U.S. EPA 15th Annual International Emissions Inventory Conference
New Orleans, May 18, 2006

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Presentation Outline

- Integrated Emissions Data Management (IEDM) Framework background, scope, users, reason for development
- Closing the GHG emissions data management gap with the IEDM Framework
- Summary of the IEDM Framework pillars and layers
- Summary of the IEDM Framework supporting IT Tiers
- Business and IT/Data benefits of the Framework
- Conclusions
- Questions

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Background

- Climate change action driving development of many mandatory and voluntary greenhouse gas (GHG) emissions reduction programs
- Climate change action driving shareholder and investment community activism
- GHG compliance requirements growing rapidly
- Effective GHG data management required for program success

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What Is the IEDM Framework?

The Framework is a Tool and Guideline to:

- Effectively manage the explosive growth in GHG Emissions Data
- Facilitate adherence to climate change Policies
- Facilitate adherence to globally accepted Standards and Best Practices

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Who can use the IEDM Framework?

- Government agencies involved in climate change action
- Corporations participating in mandatory or voluntary GHG emissions programs
- Practitioners, verifiers, and implementers who are preparing:
  - Governments to administer GHG programs
  - Corporations to participate in GHG programs
  - Entities to report, verify, and trade GHG emissions

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Why is the IEDM Framework Necessary?

- The IEDM Framework incorporates global GHG emissions Policies, Standards, and Guidelines
- *GHG policies and guidelines do not address the intricacies of data management* – the IEDM Framework provides guidance to entities who collect, analyze and report GHG emissions data
- The IEDM Framework facilitates more precise management of GHG inventories and emissions reductions data

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The GHG Emissions Data Management Gap

GHG Policies and Standards do not address the intricacies of Data Management

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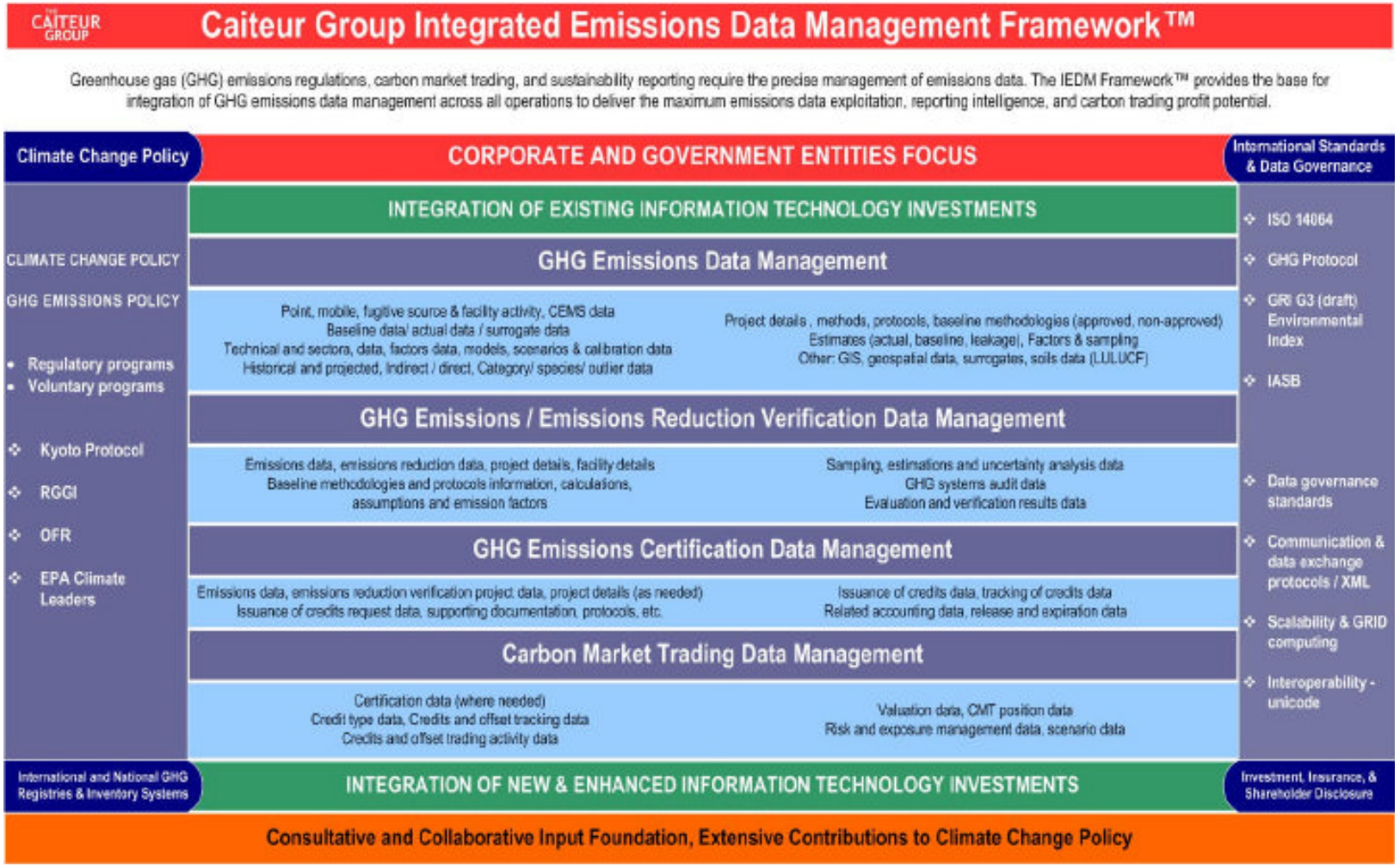
The IEDM Framework™ - A Summarized View



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10 Modules
(2 Pillars Support 8 Layers)

- **Framework focus:** both Corporate and Government
- **2 Pillars:** Climate Change Policy Pillar and International GHG Standards and Data Governance Pillar
- **IT Investments Integration:** Existing IT Investments and New and Enhanced IT Investments
- **Data Management Layers:**
  1. GHG Emissions
  2. GHG Emissions / Emissions Reduction Verification
  3. GHG Emissions Certification
  4. Carbon Market Trading
- **Framework foundation:** Consultative and collaborative input, extensive contributions to climate change policy

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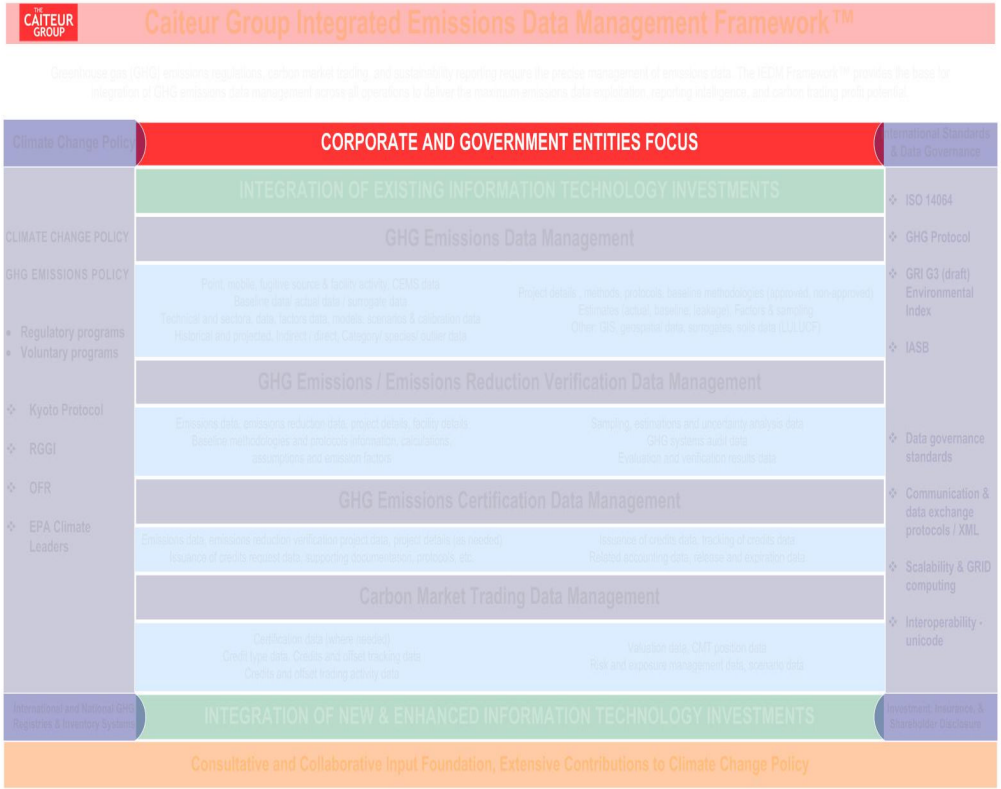
Focus: Both Corporate and Government Entities can use the Framework

- **Framework Scope**
  - Corporations
  - Government agencies

- **Framework Pillars** make it easy for participants to adhere to GHG Regulations, Standards, Guidelines



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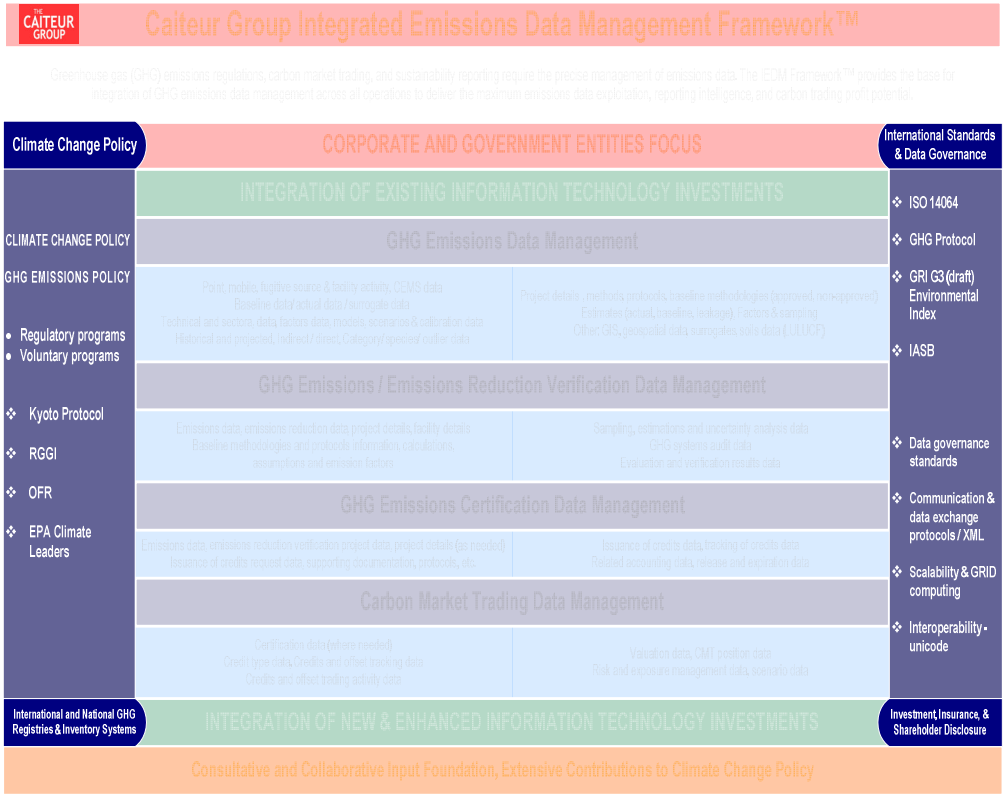
The Pillars – Regulations and Standards

- Climate change and GHG emissions regulation & policy
- International GHG standards and data governance
- Supported by ongoing consultation, collaboration, and contributions



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Support for Climate Change and GHG Emissions Policy and Regulation

- **Global focus, constantly updated**
- International, regional, and state programs – Kyoto Protocol and specific national programs, RGGI, ++
- Recognizes various mechanisms and cap-and-trade programs – EU-ETS, RGGI, ++

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Recognition of International GHG Standards and Guidelines

GHG Emissions Reduction Mitigation Efforts Driving Standards Development

- World Business Council for Sustainable Development and World Resources Institute
  - GHG Protocol
- International Standards Organization
  - ISO 14064
- Global Reporting Initiative
  - Sustainability Reporting Guidelines
- International Accounting Standards Board
  - IFRIC 3 withdrawn, new guidance upcoming

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Incorporation of Data Governance Standards

- **Data Exchange Standards**
  - International Transaction Log (ITL) DES
- **Interoperability**
  - UNICODE
  - XML
- **Communications**
  - Web Services

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The Data Management Layers

- Fundamental to the framework
- Incorporate GHG policies, standards and guidelines from the Pillars
- Modular
  - Avoid data redundancy and facilitates integration
  - Entities combine layers as required

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GHG Emissions Data Management

- **Provides Guidance and IT Considerations for**:
  - Measurement, Monitoring, and Modeling
  - GHG Inventories
  - Emissions Reductions
  - Reporting
- **Facilitates Specialized Tasks**
  - Developing Emissions Factors, Surrogates
  - Scenario Emissions Modeling, GIS data analysis
- **Ensures accurate and consistent data gathering, analysis, and reporting**

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GHG Emissions and Emissions Reduction Verification Data Management

- Provides guidance to manage emissions reduction and verification data
- Business and IT basis for **internal** GHG verification protocol and processes
- Prepares entities and projects for **third-party** GHG verification
- Improves data accuracy and data quality by integrating with GHG Emissions Data Management Layer

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GHG Emissions Certification Data Management

- Manages issued Credits and Allowances
  - **Kyoto** e.g. CERs, ERUs, AAUs
  - **Non-Kyoto** e.g. RGGI, other Aggregators
- Facilitates management of discrepancies between expected and verified reductions
- Can be used on its own by Certifiers

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Carbon Market Trading Data Management

- Manages Emissions Trading
  - Investments and valuations
  - Credit and Offset Trading activity and reporting, emissions trading risk management
- Recognizes tradable credits from multiple sources
- Ensures traceability of credits from origination to present

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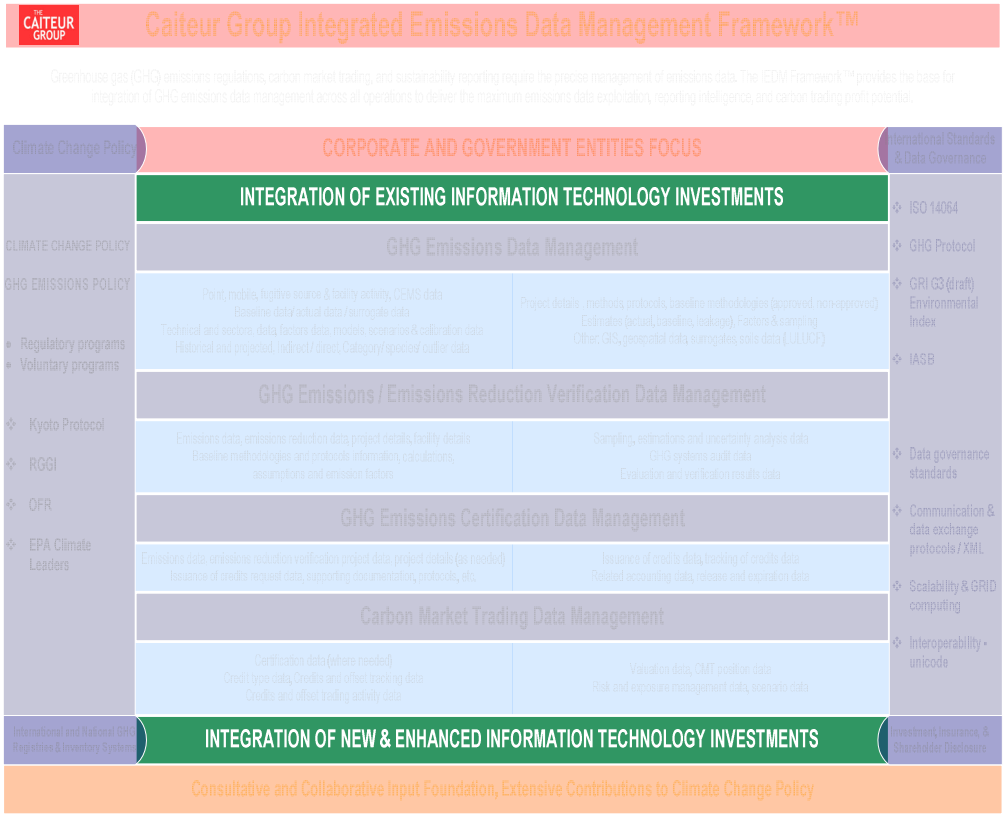
Information Technology Investments

- *Recognizes the value of existing IT Investments*
- Provides guidance to enhance existing and develop new systems
- Driven by policies, guidelines, standards, and data governance from the Pillars
- Supported by additional IT Tiers



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Integrating Existing IT Investments

- Governments and corporations have already made significant investments in Information Technology – these must be effectively integrated into GHG emissions strategy and EMIS
- Directly incorporates existing IT investments into the IEDM Framework
- Seeks to maximize system re-use by applying techniques such as defining Programming API's etc…

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Integrating New and Enhanced IT Investments

- Provides guidance for GHG data and systems development
- Policies, standards, and guidelines from the Pillars help to drive:
  - GHG emissions data strategy
  - EMIS requirements assessments

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Consultation, Collaboration, Contribution

- IEDM Framework foundation
- Policies remain under development
  - Regional
  - National
  - International
- Recognizes direct contributions to global climate change policy and guidelines

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Supporting IEDM Framework Tiers

- Information Technology Tier
  - Ensure System Scalability
  - Apply Best Practices

- GHG Emissions Database Framework Tier
  - Meta Data
  - Reference and Indicative Data
  - Volatile Data (Measurements, Transactions)
  - Operational Data

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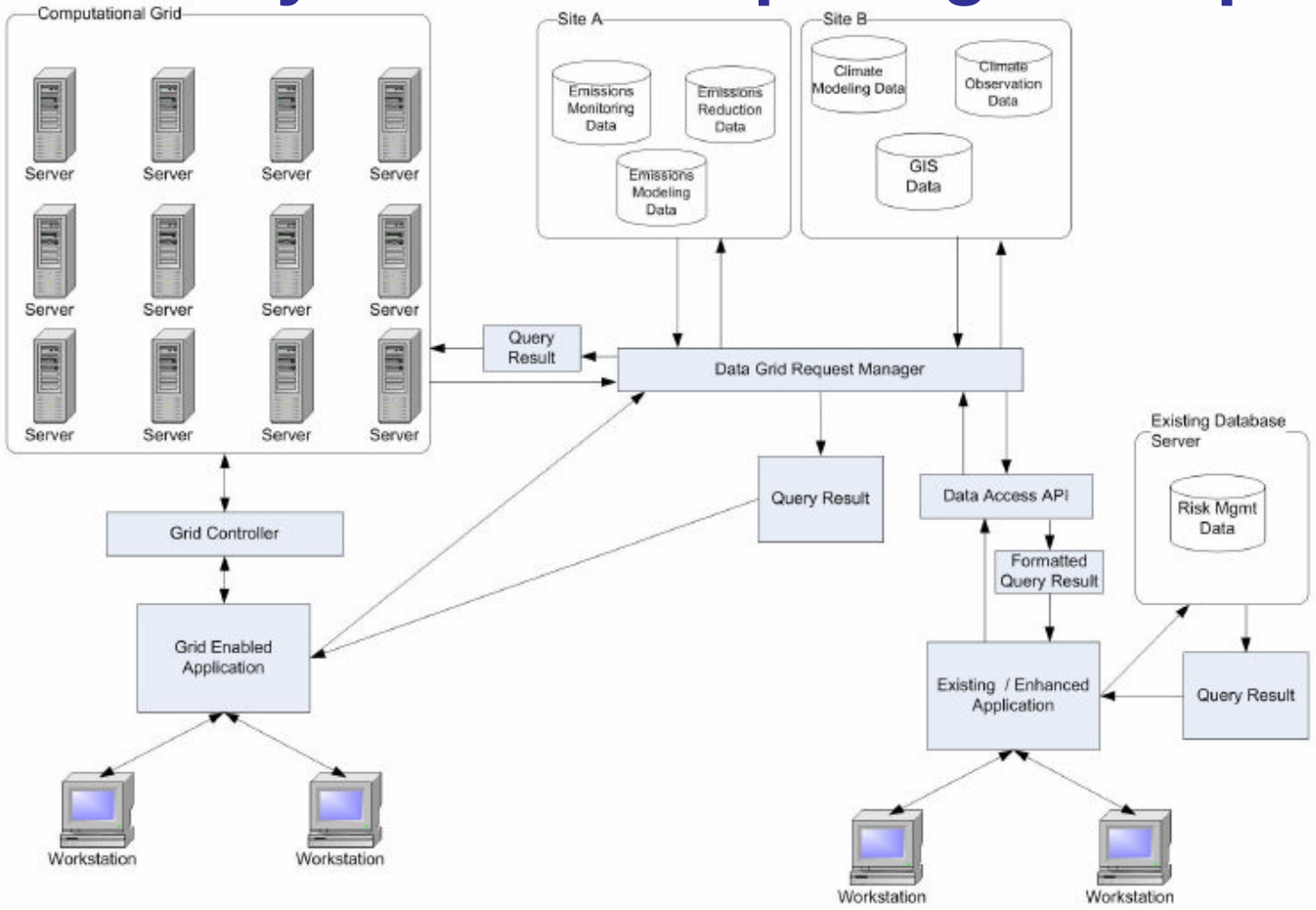
Scalability: GRID Computing Example



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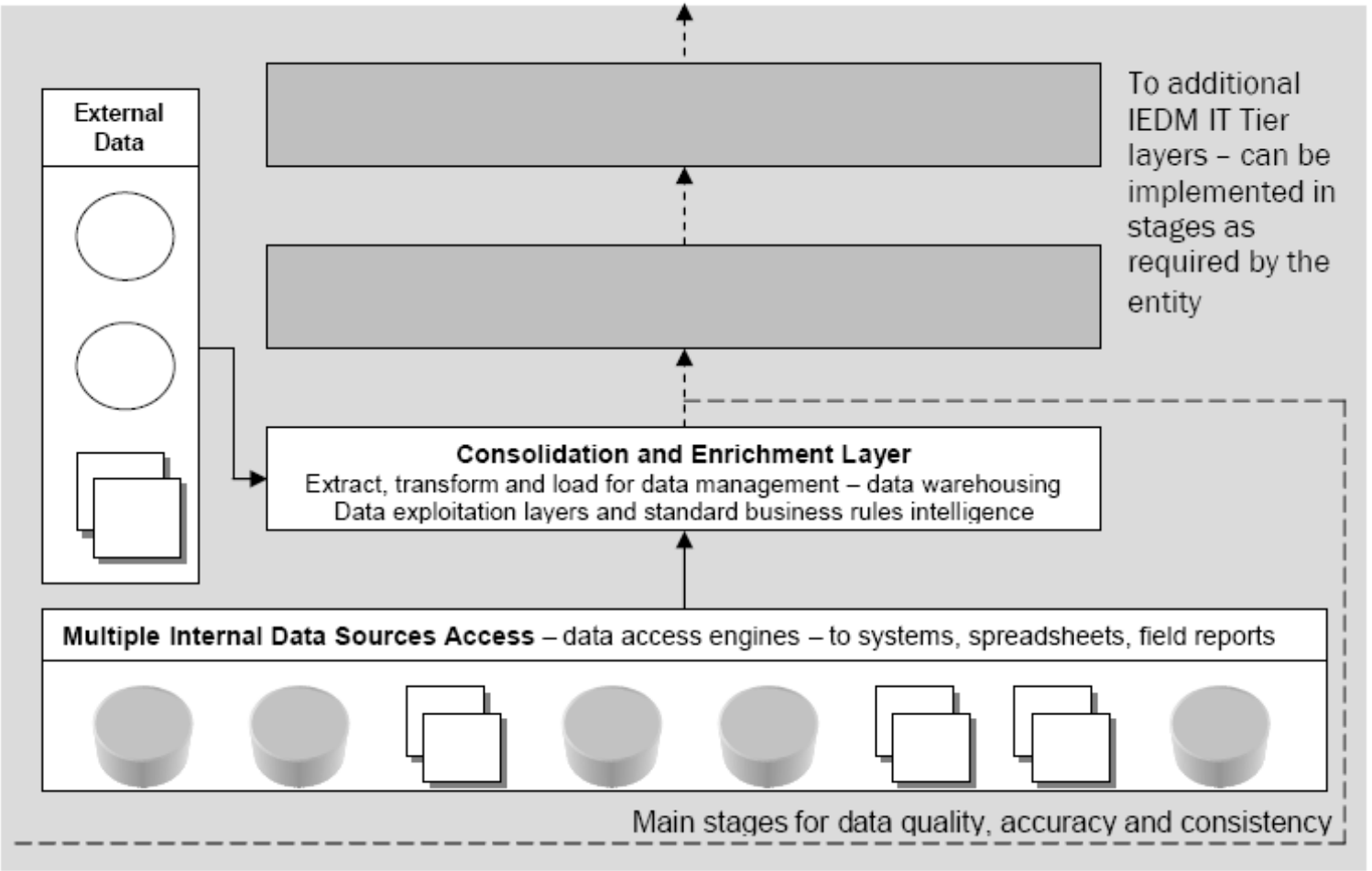
Data Quality, Accuracy, & Exploitation: IT Tier Example



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Business Benefits of IEDM Framework

- Supports Regulation, Standards and Guidelines
  - Supports constantly changing GHG policy via Pillars
  - Anticipates and reveals new and emerging GHG regulation and standards by recognizing ongoing consultations, collaborations and contributions
- Applicable to Voluntary Programs
  - Prepares entities for entry into mandatory GHG programs and emissions trading markets

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IT/Data Benefits of IEDM Framework

- **Information Technology**
  - Maximizes and integrates existing IT investments
  - Provides guidance for new IT investments and EMIS
- **GHG Data**
  - Harmonizes data across disparate platforms, facilities and functions – Monitoring, Measurement, Modeling, Verification, Trading
  - Improves data accuracy, consistency, and completeness for GHG quantification and verification
  - Eliminates data redundancies through functional and system integration

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Conclusions

- The IEDM Framework is a unique guidance tool to aid implementers with:
  - Conducting Needs Assessments
  - Maximizing existing IT Investments, defining incoming IT enhancements and new systems
  - Managing complex layers of GHG Emissions Data
- Adherence to policies and standards is key to any entity that manages GHG emissions data
  - These GHG policies, regulations, and standards are fundamental to the IEDM Framework

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