How Countries Track Their Emissions and Mitigation Actions

And how they can do better.

As nations take on increasingly ambitious climate mitigation goals, they face a heightened need to track their greenhouse gas emissions and mitigation actions. Good systems for measurement, reporting, and verification (MRV) support effective policy by giving policymakers and stakeholders feedback on progress towards their goals, allowing them to track the performance of policies, and signaling emerging challenges and opportunities for improvement. Weak MRV systems can undermine policy objectives, lead to waste of public resources, and diminish public confidence.

CPI has reviewed domestic MRV practices in four countries — China, Germany, Italy, and the United States — to help demystify these complex and often obscure systems and support domestic and international efforts to improve them.

Our analysis:

1. Describes the MRV systems currently in place in these four countries — who tracks emissions and mitigation actions, what they do, and how.
2. Evaluates those systems against a common set of criteria.
3. Identifies emerging MRV needs, and — based on the strengths and weaknesses of existing systems — assesses how well-placed each country is to meet those needs.

Our evaluation framework assesses the extent to which MRV systems meet six criteria: **transparency, comparability, reliability, usefulness, timeliness,** and **completeness**. Systems with these characteristics are better placed to track progress towards goals and inform policymaking, regardless of the particular policy tool and national context. We judge the extent to which each country's MRV systems meet these criteria based on the presence of a set of specific, observable indicators.

The evaluation yields insights on shared challenges, opportunities, and areas for collaboration, both within and among countries. Key general findings are listed below, with country-specific summaries on the following pages. The full reports are available at CPI's website.

Key Findings to Date

- Systems to track emissions are relatively well-established in these four countries, although the level of resources devoted to preparing emissions inventories varies. MRV systems are better-developed for energy than for non-energy related emissions. Good emissions tracking systems allow countries to determine if they are meeting their overall mitigation targets.
- All four countries are struggling to track the impact of their climate policies comprehensively and consistently. Systems to track mitigation actions are stronger for international policies and major, mandatory domestic policies, and tend to focus on forecasts of future outcomes rather than retrospective analysis of actual policy effects.
- For the most part, existing MRV systems do not allow countries to identify the most effective and resource-efficient policies. It is very difficult to track the mitigation impacts and costs of varied climate policies in a rigorous, comparable manner. However, improvements on this front would be very useful to policymakers who must make decisions about future policy directions and allocate limited public resources.
- Some tracking systems are well-integrated with policymaking and are able to effectively inform policy design and target-setting. MRV systems can best serve this purpose if they include an impartial review process, timely reporting, and a clear mechanism for data to feed back into the policymaking process.

CLIMATE POLICY INITIATIVE

MRV in China

Key Findings

- China is strengthening its institutional capacity to produce consistent, reliable GHG inventories; until recently this capacity was very limited. Preparing biennial inventories will require significant new effort.
- Climate change progress reports provide a comprehensive view of mitigation actions, although they provide little information on data sources and methods.
- China's most important mitigation actions relate to its energy-saving targets, and China has an extensive system to track energy usage; reporting is less comprehensive for non-energy activities. As targets are devolved to sub-national governmental entities, strengthening the reliability of sub-national and sectoral energy and emissions tracking systems will be a priority.
- China's MRV systems lack transparent expert and public review of data and methods.

MRV Systems

	System	Description	Emerging Needs
Emissions	Greenhouse Gas Inventory	First inventory covered 1994 emissions of three major GHGs; published in 2004. Second inventory covers 2005 emissions of all six major GHGs; published in 2012.	Biennial updates to GHG inventory. Tracking progress toward carbon intensity reduction targets in the 12th Five-Year Plan.
Mitigation Actions	National Communications to UNFCCC	List of climate mitigation activities. First report prepared in 2004, second report published in 2012. Includes some quantitative estimates of policies and measures' impact on energy savings and other metrics, but not mitigation impact.	Biennial reporting on mitigation actions. Establishing MRV systems to monitor control of total energy consumption. Establishing regional emissions data systems for low-carbon development pilots. Implementing MRV systems for carbon emissions trading pilots.
	Statistics Indicators, Monitoring, and Examination (SME) system	Extensive reporting on energy production and consumption. Comprehensive energy reports are prepared by bureaus of statistics at the provincial level.	
	China's Policies and Actions for Addressing Climate Change - The Progress Report	China's most direct effort to track and evaluate its GHG mitigation actions. The reports summarize mitigation actions and provide qualitative and quantitative data on mitigation impact.	

Evaluation Matrix

Emissions	Mitigation Actions
SOMEWHAT TRANSPARENT	NOT VERY TRANSPARENT
SOMEWHAT COMPARABLE	SOMEWHAT COMPARABLE
SOMEWHAT RELIABLE	SOMEWHAT RELIABLE
FAIRLY USEFUL	FAIRLY USEFUL
NOT VERY TIMELY	FAIRLY TIMELY
SOMEWHAT COMPLETE	FAIRLY COMPLETE

See full report for details.

MRV in Germany

Key Findings

- The German system for tracking emissions functions very well and is well-placed to meet new needs, including preparing additional emissions projections and reporting more fully on emissions from certain sectors.
- There are well-developed systems to track some major individual mitigation actions, particularly renewable energy support policies and mitigation actions related to EU directives. However, Germany's efforts to track its mitigation efforts as a whole suffer from a lack of institutional coordination, which has limited the availability of comprehensive national reporting.
- Germany must identify key indicators and implement data collection systems to track progress of its energy transition, including updating the energy statistics law to enable timely, comparable, and consistent monitoring of key energy market indicators.

MRV Systems

	System	Description	Emerging Needs
Emissions	Greenhouse Gas Inventory	Annual estimate of emissions of six major GHGs. Uses rigorous methods for data analysis, extensively documented and reviewed. Cross-checked with data from the EU Emissions Trading System.	Biennial reporting on progress toward climate mitigation goals. Meeting new requirements for preparing emissions projections. Expanded reporting on land use, land-use change and forestry (LULUCF), aviation, and other areas.
Mitigation Actions	National Communications to UNFCCC	Primarily pre-implementation modeling of sectoral mitigation action impacts. Produced every 4-5 years as required by UNFCCC.	Biennial reporting on mitigation actions. Monitoring the energy transition: Defining goals and indicators for tracking implementation progress.
	EU Monitoring Mechanism	Description of policy, pre-implementation mitigation estimates, projections of aggregate impact of mitigation actions. Every 2 years.	
	Energy transition monitoring (currently in development)	Data analysis and comparison with pre-implementation estimates of costs and mitigation impacts for a suite of climate and energy policies. Annual monitoring report, progress report every 3 years.	
	Individual policy tracking systems	Frequent reporting on renewables policies; less frequent data collection and monitoring for some other mitigation actions.	

Evaluation Matrix

Emissions	Mitigation Actions
VERY TRANSPARENT	SOMEWHAT TRANSPARENT
VERY COMPARABLE	SOMEWHAT COMPARABLE
VERY RELIABLE	FAIRLY RELIABLE
VERY USEFUL	FAIRLY USEFUL
VERY TIMELY	FAIRLY TIMELY
VERY COMPLETE	FAIRLY COMPLETE

See full report for details.

MRV in Italy

Key Findings

- Italy's emissions inventory is very comprehensive. Italy has strong institutional expertise and is well-placed to meet new requirements for preparing emissions inventories and projections.
- Individual policy tracking systems appear reliable, but often use inconsistent methodologies to estimate policy impacts. National tracking of energy efficiency and renewable energy uses more consistent methods, although it does not include post-implementation estimates of mitigation impact.
- Italy's national plan for emissions reduction, and decree implementing the renewable energy directive, create some new tracking needs. These include more detailed analysis of the impact of specific financial incentives on renewable energy deployment and the economy, and tracking new policies and measures. Italy can draw on existing expertise to meet these needs.

MRV Systems

	System	Description	Emerging Needs
Emissions	Greenhouse Gas Inventory	Annual estimate of emissions of six major GHGs. Uses rigorous methods for data analysis, extensively documented and reviewed. Cross-checked with data from the EU Emissions Trading System.	Biennial reporting on progress toward climate mitigation goals. Meeting new requirements for preparing emissions projections. Expanded reporting on land use, land-use change and forestry (LULUCF), aviation, and other areas.
Mitigation actions	National Communications to UNFCCC	Description of policy, pre-implementation mitigation estimates. Produced every 4-5 years.	Biennial reporting on mitigation actions. Monitoring new mitigation actions under national emissions reduction plan. Tracking effectiveness and co-benefits of renewable energy policies.
	EU Monitoring Mechanism	Description of policy, pre-implementation mitigation estimates, projections of aggregate impact of mitigation actions. Every 2 years.	
	National tracking of energy efficiency and renewable energy	Annual reporting on progress toward targets for energy savings and renewable energy deployment. Some pre-implementation estimates of mitigation impact.	
	Individual policy tracking systems	Reporting schedule and content are defined in individual policies; agencies provide mitigation estimates where possible.	

Evaluation Matrix

Emissions	Mitigation Actions
VERY TRANSPARENT	SOMEWHAT TRANSPARENT
VERY COMPARABLE	SOMEWHAT COMPARABLE
FAIRLY RELIABLE	SOMEWHAT RELIABLE
FAIRLY USEFUL	FAIRLY USEFUL
VERY TIMELY	FAIRLY TIMELY
VERY COMPLETE	FAIRLY COMPLETE

See full report for details.

MRV in the United States

Key Findings

- The United States' systems to track GHG emissions are very strong; they are able to effectively inform domestic and international stakeholders and support future policymaking. In contrast, tracking systems for mitigation actions do not allow policymakers to identify the most effective and efficient policies. There is no unified method for estimating and reporting the impact of mitigation actions, making it difficult to determine which policies are working best.
- A key priority to inform domestic policy, as well as for international reporting, is to make measurement and reporting of policy impact more comprehensive and comparable across the full climate policy portfolio. This means expanding post-implementation assessment of policy outcomes, including mitigation impact and cost-effectiveness.
- At the level of individual policies, there are some well-developed systems to track compliance and gather program data, and federal oversight mechanisms help ensure accountability.

MRV Systems

	System	Description	Emerging Needs
Emissions	Greenhouse Gas Inventory (national)	Annual estimate of emissions of six major GHGs. Uses rigorous methods for data analysis, extensively documented and reviewed.	Biennial reporting on progress toward climate mitigation goals.
Emissions	Greenhouse Gas Reporting Rule (facility-level)	Annual reporting on emissions from large facilities. Data published online in detail, with user-friendly data viewer.	
Mitigation actions	National Communications to UNFCCC	Description of policy, mitigation estimates. Produced every 4-5 years as required by UNFCCC.	Biennial reporting on mitigation actions. Measuring the impact of the current U.S. climate policy portfolio.
Mitigation actions	Policy-level reporting	Usually annual reporting; content usually includes spending and program activities, not necessarily mitigation impact.	Monitoring implementation of GHG emissions limits for large emitters. Tracking cost-effectiveness and co-benefits of climate policies.
Mitigation actions	Federal oversight processes	Ad hoc reviews, usually not focused on mitigation.	Tracking sub-national climate action.

Evaluation Matrix

Emissions	Mitigation Actions
VERY TRANSPARENT	SOMEWHAT TRANSPARENT
VERY COMPARABLE	NOT VERY COMPARABLE
VERY RELIABLE	SOMEWHAT RELIABLE
VERY USEFUL	SOMEWHAT USEFUL
VERY TIMELY	FAIRLY TIMELY
VERY COMPLETE	FAIRLY COMPLETE

See full report for details.

Contact

General and United States: Julia Zuckerman, CPI San Francisco (julia@cpisf.org)

China: Ariel Yuqing Yu, CPI Beijing (yu.yuqing@cpibeijing.org)

Germany: Alex Vasa, CPI Berlin (alexander.vasa@cpiberlin.org)

Italy: Valerio Micale, CPI Venice (valerio.micale@cpivenice.org)

CPI Publications on MRV

Tracking Emissions and Mitigation Actions: Current Practice in China, Germany, Italy, and the United States (February 2012): Describes national MRV systems for GHG emissions and mitigation actions.

Tracking Emissions and Mitigation Actions: Evaluation of MRV Systems in China, Germany, Italy, and the United States (May 2012): Evaluates national MRV systems against a common set of effectiveness criteria.

Meeting Emerging MRV Needs in China, Germany, Italy, and the United States: Are Countries Prepared? (November 2012).

About CPI

Climate Policy Initiative (CPI) is a policy effectiveness analysis and advisory organization whose mission is to assess, diagnose, and support the efforts of key governments around the world to achieve low-carbon growth.

CPI is headquartered in San Francisco and has offices around the world, which are affiliated with distinguished research institutions. Offices include: CPI Beijing affiliated with the School of Public Policy and Management at Tsinghua University; CPI Berlin; CPI Hyderabad, affiliated with the Indian School of Business; CPI Rio, affiliated with Pontifical Catholic University of Rio (PUC-Rio); and CPI Venice, affiliated with Fondazione Eni Enrico Mattei (FEEM). CPI is an independent, not-for-profit organization that receives long-term funding from George Soros.