

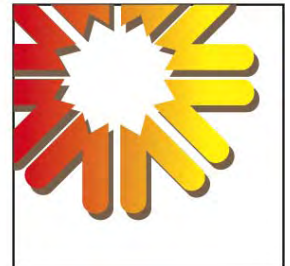
Energy Efficiency, Climate Change and EM&V

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Key Points

- ◆ Climate science tells us that massive reductions in GHG emissions are required for climate stabilization
- ◆ Energy efficiency is a key mechanism for climate mitigation
- ◆ Some issues for ESCOs to consider are:
 - Under a cap and trade system, efficiency reductions may not be “real”
 - Who owns the avoided emissions is an ongoing issue
 - “Additionality” and correct “boundary areas” can result in the energy savings calculated for “energy value” being different than those calculated for determining avoided emissions
 - Importance of accurate emission factors (e.g. tons of CO₂ per MWh)
 - The variety of climate registries and protocols for reporting baseline and avoided emissions

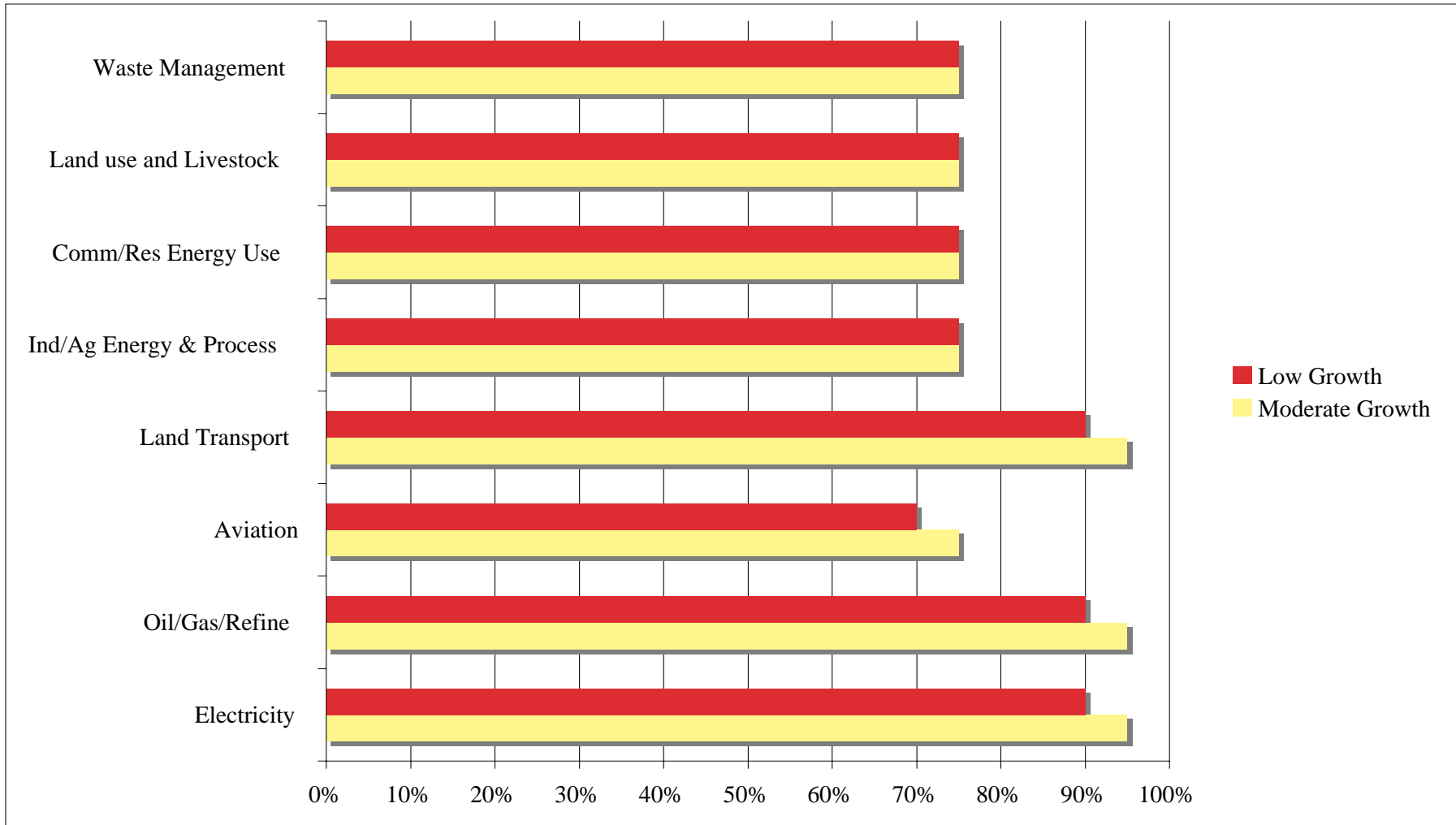
Climate Change Mitigation - It requires massive reductions in CO₂

- Limiting the planet to an average temperature rise of only 2°C requires global GHG emissions to peak before 2015, followed by global emission reductions of 50-85% by 2050 compared to 2000 (IPCC)
- Resulting policy examples:
 - ◆ EU has proposed developed countries to achieve:
 - 30% reduction by 2020 (compared to 1990)
 - 60% to 80% reduction by 2050
 - ◆ California:
 - About 30% reduction by 2020 (in law)
 - 80% reduction by 2050 (Governor Executive Order)

California Example: Percent Reduction

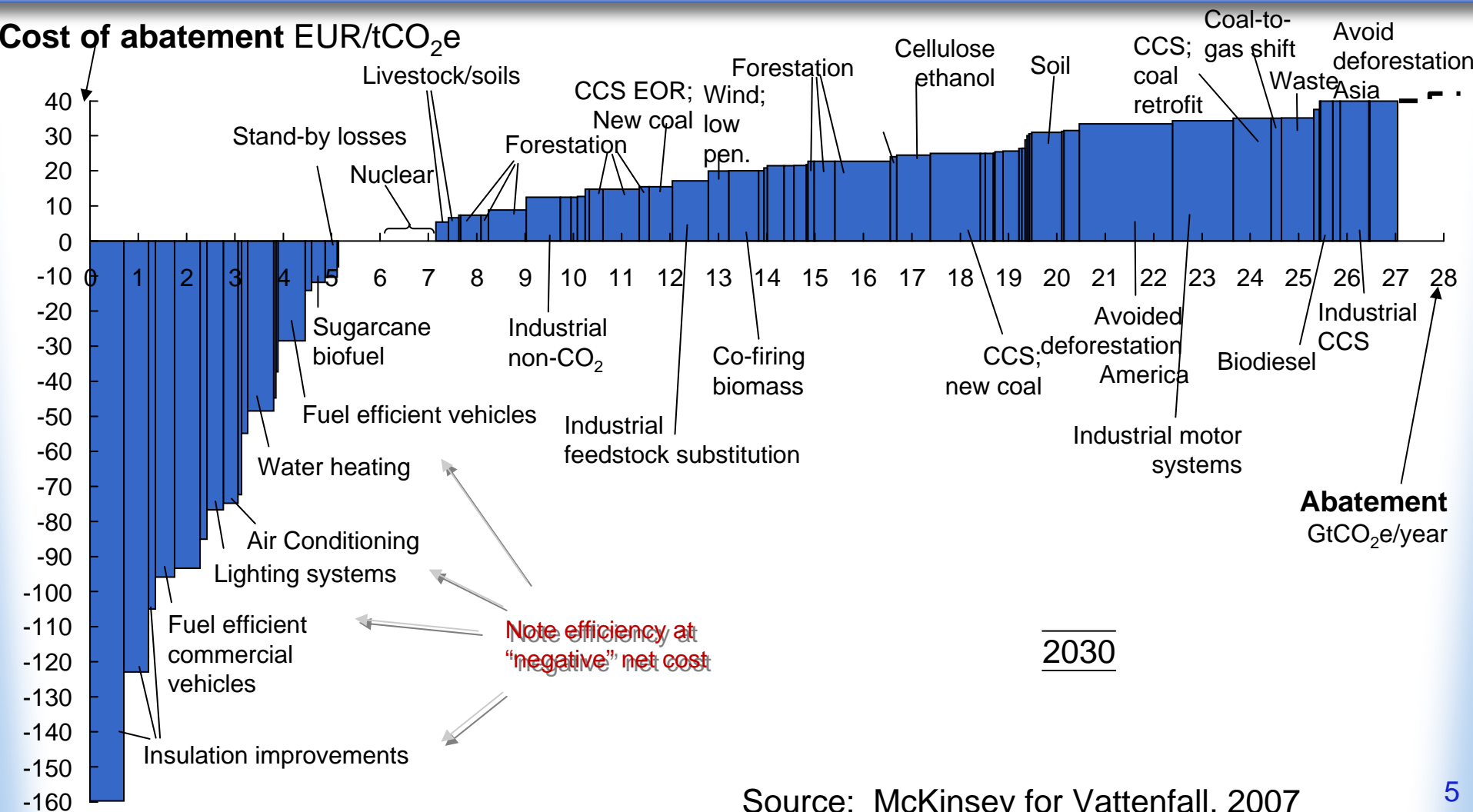
(from 2050 emissions rate)

Required to Meet 2050 Goal



Example of How To Get There

Global Cost Curve of GHG Mitigation



Source: McKinsey for Vattenfall, 2007

Energy Industry Mitigation Strategies

Efficiency

- Approximately 61% of all human induced GHG emissions (and about 75% of all CO₂ emissions) come from energy related activities
- Thus, mitigating climate change requires significant changes in the energy industry.
- Energy efficiency is particularly important for controlling GHG because of its inherent cost-effectiveness and the lack of commercially available greenhouse gas "scrubber" technologies.

Strategies

- End use efficiency
- Supply (generation, T&D) efficiency
- Renewables
- Lower carbon fuels - e.g, IGCC and the "nuclear option"
- Changes in operations (transportation, leakage)
- Sequestration

Emissions Regulatory Mechanisms For Meeting Environmental Goals

- Incentives and Voluntary Programs
- Command and Control - a standard is set for emission sources, either a technology or emission rate standard
- Market-Based Mechanisms - Trading (e.g., cap and trade)
- Environmental Taxes

Cap and Trade

- A regulating authority sets a cap on total mass emissions for a group of sources for a fixed compliance period (e.g., 1 year) - **example - 40,000 tons per year for CA**
- The regulating authority divides the cap into allowances, each representing an authorization to emit a specific quantity of pollutant (e.g., 1 ton of CO₂)
- Regulating authority distributes allowances - **SCE gets 2,000 tons per year**
- For the compliance period, each recipient of allowances measures and reports all of its emissions **SCE reports that it emitted 1,900 tons in 2006**
- At the end of the compliance period, each recipient of allowances must surrender allowances to cover the quantity of the pollutant it emitted
 - ◆ If it has excess (credits) it can sell them - **SCE can sell 100 tons**
 - ◆ If it does not have enough allowances, it can buy them
- If a source does not hold sufficient allowances to cover its emissions, the regulating authority imposes penalties

Issues for Efficiency in Cap and Trade

- Are there real reductions?
- Additionality
- Boundary Areas
- Emissions factors
- Transaction costs- programs versus projects
- Ownership of reductions

"Real" Reductions?

- With an allowance cap emissions cannot exceed the cap - they also are unlikely to be below the cap
- When emissions are not capped, energy efficiency reduces the output of electricity generators, boilers, etc. and results in reductions in emissions
- However, reductions in capped source emissions only results in the availability of extra allowances. – which can be used to emit more emissions
- Thus, true reductions only occur if the freed up allowances are retired

Additionality

- Additionality - will a project produce reductions in emissions that are additional to reductions that would have occurred anyway?
- There is no common agreement on the procedures for defining if individual projects or whole programs are truly additional, i.e. different than a baseline scenario
- Additionality is set by policy or by using “net to gross analyses”:
 - ◆ Self-reporting surveys
 - ◆ Enhanced self-reporting surveys combined with interviews and documentation review
 - ◆ Statistical models that compare participants’ and non-participants’ energy and demand
 - ◆ Stipulated net to gross ratios that are based on historic studies of similar programs
- End result - the baseline for calculating savings may be different or even equal to the “project” energy consumption - same thing can happen with unique assessment boundaries

Conclusions in a Cap and Trade System

- There may be no monetary value ($\$/\text{CO}_2$) if you claim actual reductions in GHG emissions
- What you thought were the energy savings may not be usable for emission savings
- Efficiency might be best addressed outside of cap and trade programs

Other Issues

- Transaction costs- programs versus projects
- Ownership of reductions
- Emission Factor Options:
 - ◆ Emission Factor Approach
Avoided Emissions = (Net Energy Savings) x (Emission Factor)
 - ◆ Scenario Analysis Approach
Avoided Emissions = (Base Case Emissions) - (Reporting Period Emissions)
 - ◆ Sources for emissions rates include the Ozone Transport Commission's "OTC Workbook", the Clean Air-Climate Protection Software (CACPS), and EPA's eGRID database
 - ◆ Dispatch Models are the preferred approach

Protocols and Reporting

Efficiency

Model Energy Efficiency Program Impact Evaluation Guide

This Guide will provide:

- A model impact evaluation process (procedure) that can be used by individual jurisdictions (states, utilities, etc.) to establish their own evaluation requirements
- Basic descriptions and guidance, in a policy neutral manner, of evaluation options and issues
- list of other reference documents and resources
- **Information on calculating avoided emissions from energy efficiency programs**

Available November 12th - Google “National Action Plan for Energy Efficiency”

Reporting and Documentation Climate Registries

- Enable the voluntary or mandatory recording of Kyoto GHG emissions in a consistent, certified format
- Qualify third-party organizations that have the capability to certify reported baseline emissions
- Maintain a record of all certified GHG emissions baselines and emissions results
- Adopt industry-specific reporting metrics
- Encourage actions to increase energy efficiency and reduce GHG emissions

US Climate Registries - all voluntary (currently)

- ◆ California Climate Action Registry (CCAR) - www.climateregistry.org
- ◆ "The" Climate Registry
 - www.theclimateregistry.org
- ◆ Programs that include registry functions:
 - US EPA Climate Leaders
 - US DOE 1605b Program
 - Private Project Trading - CCX, Climate Trust

The Climate Registry

- THE CLIMATE REGISTRY is a collaboration between states, provinces and tribes aimed at developing and managing a common greenhouse gas emissions reporting system. It will provide an accurate, complete, consistent, transparent and verified set of greenhouse gas emissions data from reporting entities, supported by a robust accounting and verification infrastructure
- The largest climate initiative in North America; States representing over 80% of U.S. population involved, along with Canadian provinces, Mexican states and Indian tribes



Project and General GHG Protocols

Three most known (US) GHG Protocol Sources are:

- ◆ World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD)
 - Corporate Accounting and Reporting Standard
 - Project Accounting and Reporting Protocol
 - Sector protocols - such as soon to be published electricity sector protocol
- ◆ ISO - 14064 - 3 parts (International Organization for Standardization)
- ◆ CCAR - General and project protocols - application of WRI documents used for order of 500 million metric tons CO2 registration

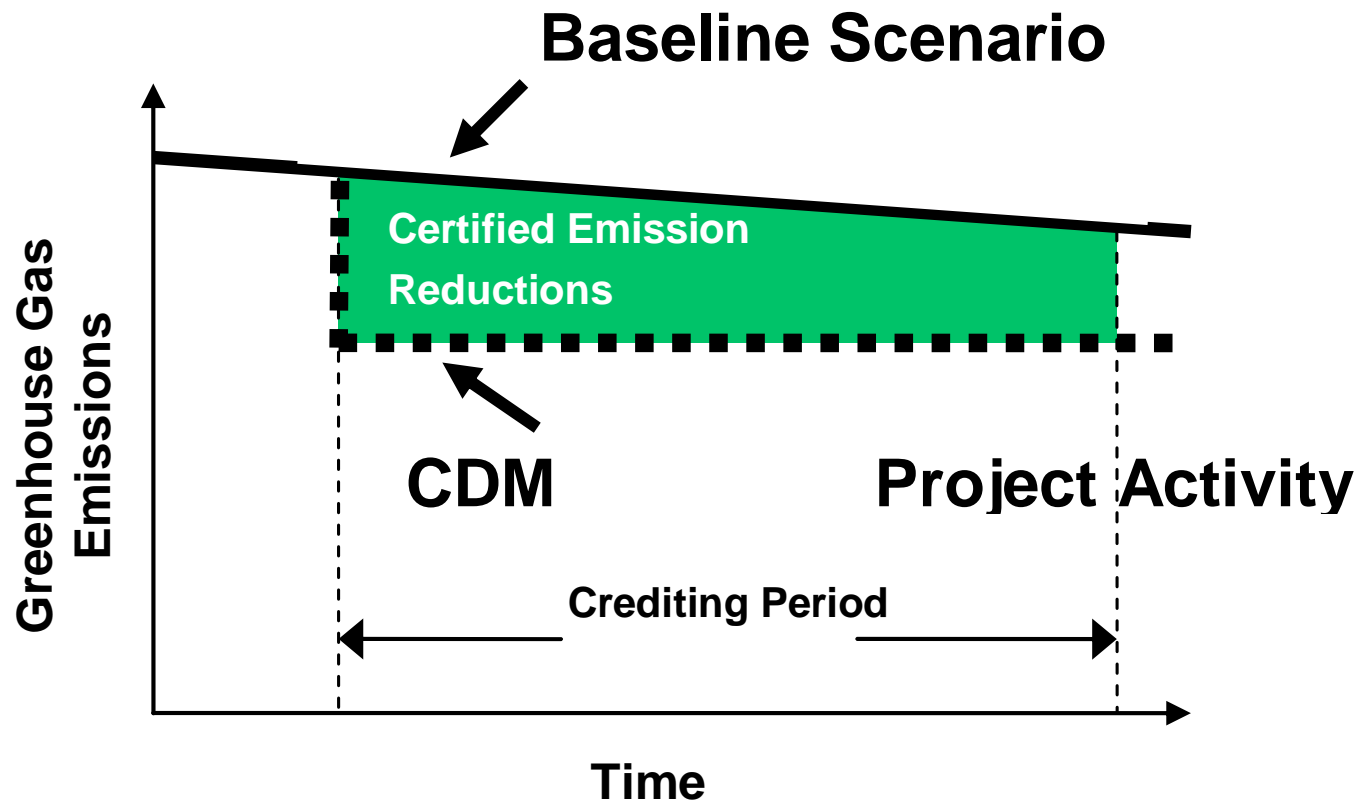
Other GHG Reporting Protocols

- Business Roundtable - Climate RESOLVE program
 - ◆ www.businessroundtable.org
- Carbon Disclosure Project
 - ◆ www.cdproject.net
- Chicago Climate Exchange
 - ◆ www.chicagoclimatex.com
- Dow Jones Sustainability Index
 - ◆ www.sustainability-index.com
- European Union - Emissions Trading System
 - ◆ ec.eu.int/govm/ertrac
- Global Reporting Initiative
 - ◆ www.globalreporting.org
- U.S. Department of Energy - 1605(b) Registry
 - ◆ www.eia.doe.gov/oiaf/1605/frntvrg.html
- U.S. Environmental Protection Agency - Climate Leaders Initiative
 - ◆ www.epa.gov/climateleaders
- World Wildlife Fund - Climate Savers
 - ◆ www.worldwildlifefund.net/climate/projects/climate_savers.cfm
- World Economic Forum - Emissions Registry
 - ◆ www.weforum.org

Clean Development Mechanism

- The mechanism provided by Article 12 of the Kyoto Protocol, designed to assist developing countries in achieving sustainable development by permitting industrialized countries to finance projects for reducing greenhouse gas emission in developing countries and receive credit for doing so.
- Developing Countries - they didn't cause climate change, but they are going to be the most affected and are the least able to adapt
- Win-Win - sustainable infrastructure for the developing world and the developing world offsets its emissions - and efficiency is an obvious sustainable infrastructure

How CDM Works



However -

- Of 225 CDM projects approved to date there are only three large-scale and five small-scale projects aimed at improving the efficiency of energy end-use
- In the most recent compilation from June 2006 - energy efficiency projects represent roughly 15% (95) of the total of 744 projects in the CDM project pipeline

Summary



Reprinted courtesy of Dan Piraro for the 4th Annual California Climate Change Conference presentation