



**Asia-Pacific
Economic Cooperation**

2011/SOM2/CTI/SEM/008

What Matters?

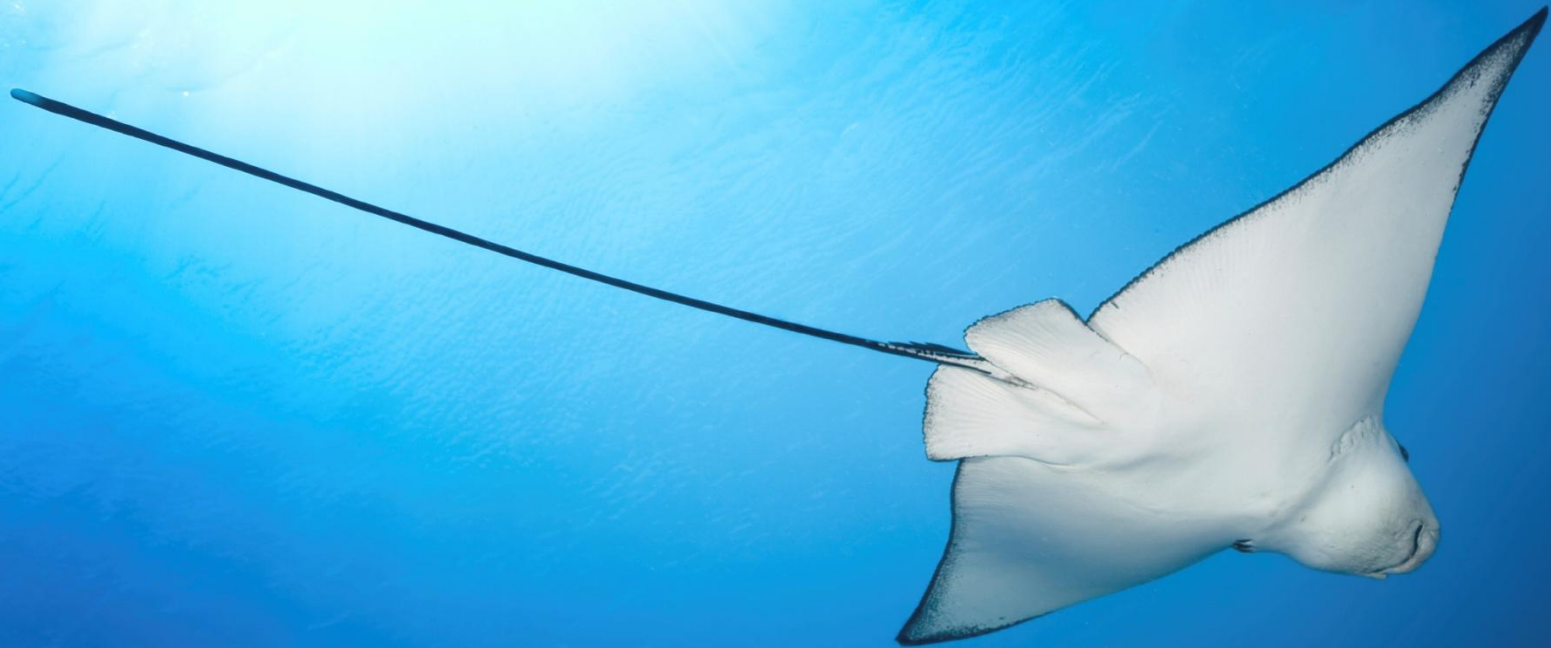
Submitted by: National Science Technology and Innovation Policy Office



**Seminar on Dissemination of
Environmental Technologies
Big Sky, United States
11 May 2011**

What matters?

Dr. Nares Damrongchai <nares@sti.or.th>



APEC Seminar on Dissemination of Environmental Technologies

11 May 2011, Big Sky, USA

Source of photo: istockphoto.com

Different Nature of Technologies

- ICT – fast moving, technology-driven, room for small players
- energy – high investment, technology-dependent
- biotech – long “time to market”, high risk-high return, room for small players
- manufacturing&electronics – market-pull, quickly commoditized

What matters in technology “dissemination”

Availability?

Lock-in?

Ownership?

New skills
set?

Access?

Strings-
attached?



The Three Growth Pole

Three wooden carvings of monkeys, each in a different pose, representing the Three Growth Poles. The monkey on the left is holding its hand to its ear, the middle one is holding its hand to its mouth, and the right one is holding its hand to its eye. They are all painted orange with black stripes.

Sustainable
Agriculture

Energy
Efficiency

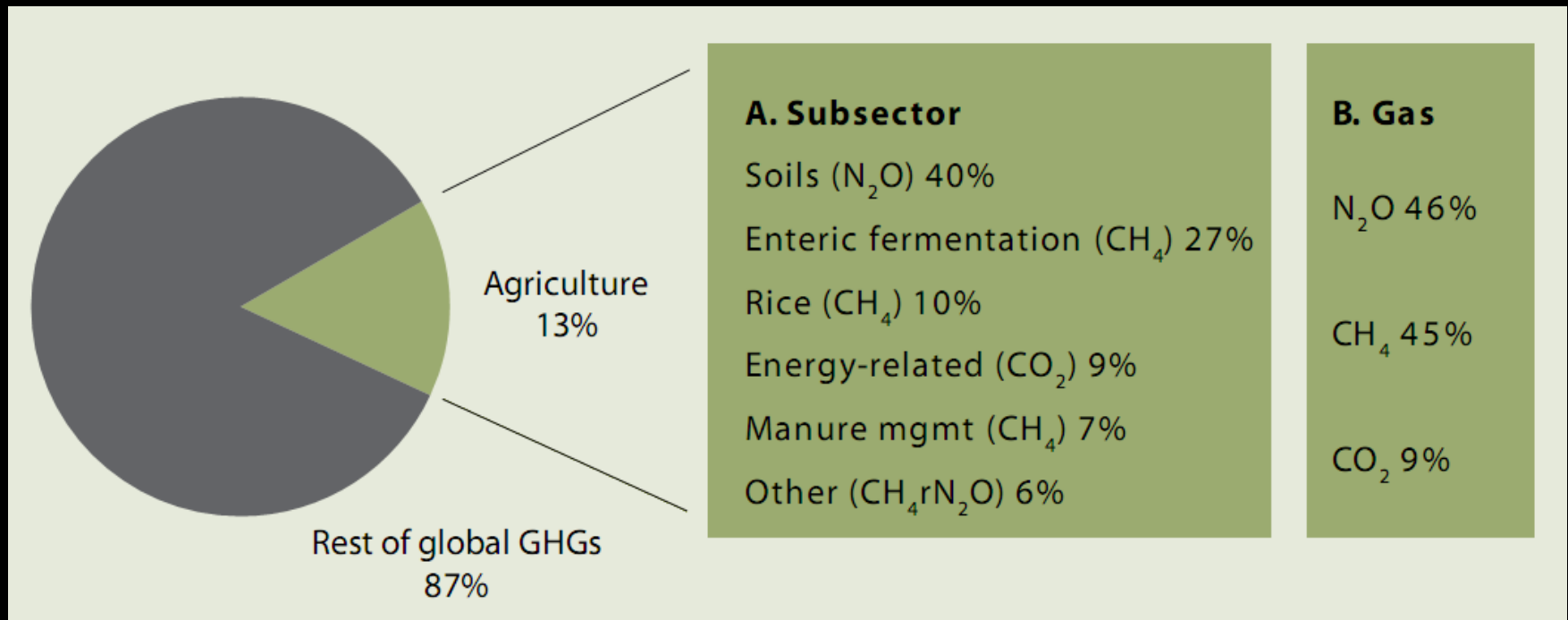
Renewable
Energy

Sustainable Agriculture



Source of photo: [istockphoto.com](https://www.istockphoto.com)

Greenhouse gas emissions from agriculture



Selected mitigation options in agriculture and the agri-food sector

| Sector | Part of agri-food supply chain | Selected mitigation options |
|-------------|--|---|
| Agriculture | Food production | Improved cropping and grazing land management to increase carbon storage Improved rice cultivation techniques and livestock to reduce methane emissions Improved nitrogen fertilizer application techniques to reduce nitrous oxide emissions |
| Energy | Energy for fertilizer production, food processing, tractors, consumer and retailers use, transport | Improved supply and distribution efficiency, fuel switching, nuclear and renewable energy, carbon capture and storage |
| Industry | Fertilizer production Food processing (e.g. corn wet milling) | Energy efficiency improvement and retrofit |
| Building | Lighting, cold storage in warehouses and retail outlets Consumer food preparation | Efficient lighting, more efficient electrical appliances and heating and cooling devices, improved cooking stoves |
| Transport | Food logistics Consumer travel to shops | More fuel-efficient vehicles More efficient aircraft |

Mitigation measures and their eligibility under the current climate change mitigation regime

| Mitigation strategies | Possible measures | GHG emission mitigation effects | | | Recognition of measure as a GHG mitigation activity | | Approved CDM/VCM methodology available |
|--|---|---------------------------------|-----------------|------------------|---|-----------|---|
| | | CO ₂ | CH ₄ | N ₂ O | CDM | VCS, 2007 | Yes/no |
| Cropland management | Low tillage/ residue management | ✓ | | | | ✓ | Available for reduced tillage – indicative only, with limited scope |
| | System of rice intensification (reduced flooded irrigation) | | ✓ | | ✓ | ✓ | No |
| | Use of organic fertilizers | | | ✓ | ✓ | ✓ | Yes, with limited scope |
| Management of organic soils | Avoiding drainage of organic soils | ✓ | | | | ✓ | No |
| Manure management/ animal waste management | Anaerobic digestion | | ✓ | | ✓ | ✓ | Yes |
| | Flaring of biogas; | | ✓ | | ✓ | ✓ | Yes |
| | Biogas for domestic use | | ✓ | | ✓ | ✓ | Yes |
| Energy efficiency and fuel switching | Improving energy efficiency of irrigation systems (e.g. drip irrigation, pump-sets); use of low-emission fuels in farming | ✓ | ✓ | | ✓ | ✓ | Yes, with limited scope |
| Renewable energy technologies | Wind, biomass, solar, biofuels | ✓ | | | ✓ | ✓ | Yes, with limited scope |

VCM - voluntary carbon market
VCS - voluntary carbon standard

Source: UNCTAD, Trade and Environment Review, 2009/2010

Energy Efficiency



Examples of EE technologies for mitigation

| Sector | Key mitigation technologies and practices currently available commercially | Key mitigation technologies and practices projected to be commercialized before 2030 |
|-----------|---|--|
| Transport | More fuel-efficient vehicles, hybrid vehicles, cleaner diesel vehicles. | Higher efficiency aircraft; advanced electric and hybrid vehicles. |
| Buildings | Efficient lighting, more efficient electrical appliances and heating and cooling devices, improved cooking stoves, better insulation, passive and active solar design for heating and cooling, alternative refrigeration fluids, recovery and recycling of fluorinated gases. | Integrated design of commercial buildings, including technologies such as intelligent meters that provide feedback and control, and solar photovoltaic panels incorporated into buildings. |
| Industry | More efficient end-use electrical equipment, heat and power recovery, material recycling and substitution, control of non-CO ₂ gas emissions, a wide array of process-specific technologies | Advanced energy efficiency, CCS for cement, ammonia and iron manufacture, and inert electrodes for aluminium manufacture. |

Available end-use technologies...

- are becoming steadily more energy efficient.
- Injection of capital creates an opportunity for deploying the most efficient technologies commercially available.
- Payback periods might be shorter in developing countries than OECD countries.

Energy Efficiency and Trade

- EE requirements aim to gradually remove inefficient products from the market and to increase market shares of energy-efficient products.
- Mostly EE standards and energy labelling
- Imports into major developed-country markets
 - The big share of imports into the EU (excluding intra-EU trade), the United States and Japan comes from a small number of developing countries, in particular China, Malaysia, the Republic of Korea and Thailand.

Renewable Energy



Examples of small-scale, off-grid energy systems

| Technology | Applications | Pros | Cons |
|---------------------------------|---|---|---|
| Diesel engines | <ul style="list-style-type: none"> - Water pumps - Mills - Refrigeration - Lighting and communication | <ul style="list-style-type: none"> - Easy maintenance - Continuous energy (24h/day) - Enables income-generating activities | <ul style="list-style-type: none"> - High fuel costs - Noxious and CO₂ emissions |
| Small biomass plants | <ul style="list-style-type: none"> - Water pumps - Mills - Refrigeration - Lighting and communication | <ul style="list-style-type: none"> - Enables income-generating activities - Base load operation, continuous operation possible | <ul style="list-style-type: none"> - Noxious emissions |
| Mini/micro-hydroelectric plants | <ul style="list-style-type: none"> - Mills - Lighting, communication and other - Ice-making (2-10kW) - Micro-irrigation (1-3kW) - Refrigeration (0.5-10kW) | <ul style="list-style-type: none"> - Long life, high reliability - Enables income-generating activities | <ul style="list-style-type: none"> - Site-specific - Intermittent water availability |
| Wind | <ul style="list-style-type: none"> - Water pumps - Mills - Lighting and communication - Ice-making (2-10kW) - Micro-irrigation (1-3kW) | <ul style="list-style-type: none"> - No fuel cost - Enables income-generating activities | <ul style="list-style-type: none"> - Expensive batteries - Intermittent energy service |
| PV/solar | <ul style="list-style-type: none"> - Basic lighting and electronic equipment (cell-phone charging) - Water-pumps for fish farms; - Micro irrigation (1-3kW) | <ul style="list-style-type: none"> - No fuel cost - Enables income-generating activities | <ul style="list-style-type: none"> - High capital costs - High cost of battery replacement - Needs further R&D |

Source: Adapted from IEA, 2002, table 13.4 and World Bank, 2008b, table 2.

What matters?

remove the barrier



Shifting of investment to end-user

- ...requires viable financing framework (IEA, 2006)
 - Individual
 - Household
 - Small industrial firm
- Reform the operation of the CDM to facilitate EE improvements in dispersed end-use sectors.
 - EE is underrepresented in the CDM port-folio

Updated CDM Projects by Category

| Type | CDM | | | | | | | |
|---|-------------|-------------|---------------|--------------|-----------------|-------------|-------------------|--------------|
| | number | | CERs/yr (000) | | 2012 CERs (000) | | CERs Issued (000) | |
| Total | 6147 | 100% | 823874 | 100% | 2756999 | 100% | 605098 | 100% |
| HFCs, PFCs & N2O reduction | 116 | 1.9% | 137147 | 17% | 742379 | 27% | 430633 | 71% |
| Renewables | 3835 | 62% | 353341 | 43% | 952799 | 35% | 93899 | 16% |
| CH4 reduction & Cement & Coal mine/bed | 1151 | 19% | 149860 | 18% | 545845 | 20% | 36660 | 6.1% |
| Supply-side EE | 587 | 10% | 110073 | 13% | 280636 | 10% | 28463 | 4.7% |
| Fuel switch | 135 | 2.2% | 56052 | 6.80% | 181325 | 6.6% | 13560 | 2.2% |
| Demand-side EE | 225 | 3.7% | 8076 | 0.98% | 24086 | 0.9% | 1524 | 0.3% |
| Afforestation & Reforestation | 61 | 1.0% | 4945 | 0.6% | 19737 | 0.7% | | |
| Transport | 37 | 0.6% | 4380 | 0.5% | 10193 | 0.4% | 359 | 0.06% |

What can APEC do?

- Harmonization
- Cooperation
- Transparency



What the international community can do

- Support EE strategies in developing countries
- Support sustainable development policy and measures (SD-PAM) proposed by World Resource Institute.
 - Could be more flexible than CDM.

