



## **Forests as Carbon Sinks**

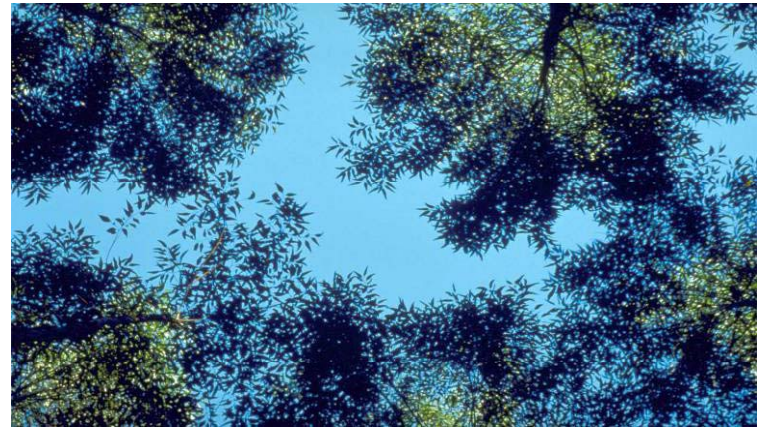
---

Pöyry Management Consulting

January 2009

# What does it mean: forests as carbon sinks?

- Definition:  
*Forests act as carbon sinks through collecting (sequestering) carbon in their photosynthesis. They draw CO<sub>2</sub> from the atmosphere and use it to build themselves and make oxygen. The part of CO<sub>2</sub> that remains in the tree as trunk, branches, roots, etc. is what we call sequestered carbon.*
- Use of forests as carbon sinks is largely related to land use issues (Land Use, Land Use Change, Forestry or LULUCF)
- In national Kyoto calculations only changes in forest cover are counted (re/afforestation, harvests)
- There are commercial Kyoto mechanisms for using forests as carbon sinks
  - Only reforestation and afforestation are accepted for CDMs (Kyoto projects in developing countries)
- Re/afforestation is a popular mechanism in voluntary carbon markets
- There is growing emphasis on maintaining the status quo in land use through protecting existing forest cover
  - Agriculture places significant pressure on land use change



**Pöyry offers impartial, professional help in land use and forest related issues as well as financing issues.**

**Pöyry's Auckland remote sensing team of experts covers carbon assessment techniques etc.**

## Abbreviations in climate change -related issues

---

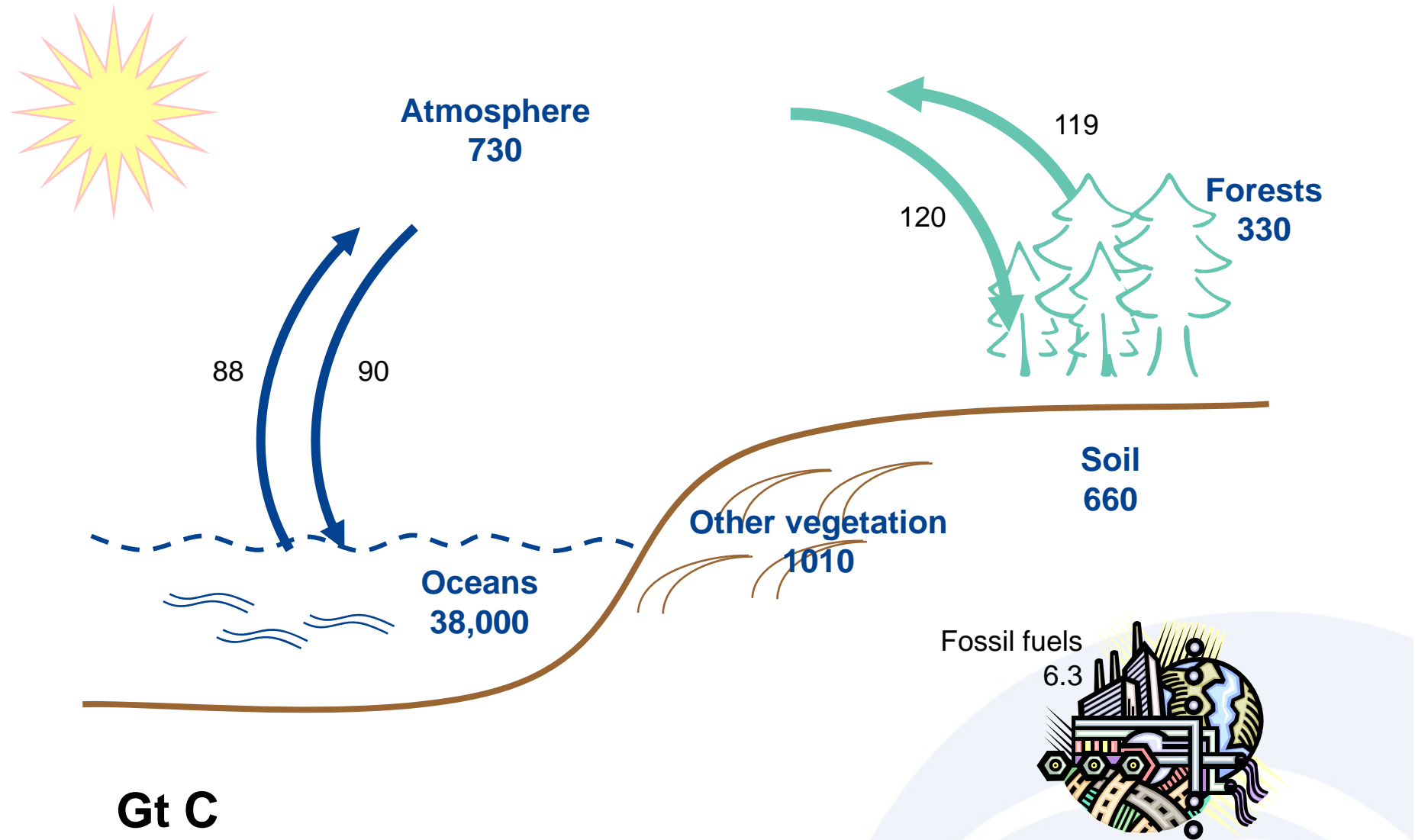
- AAU – Assigned Amount Unit (used in emissions trading between countries)
- CH<sub>4</sub> – Methane
- CDM – Clean Development Mechanism
- CDM EB – CDM Executive Board
- CER – Certified Emission Reduction
- CO<sub>2</sub> – Carbon Dioxide
- COP – Conference of the Parties to UNFCCC
- DNA – Designated National Authority
- DOE – Designated Operational Entity
- ERPA – Emission Reduction Purchase Agreement
- ERU – Emission Reduction Unit
- EU ETS – European Union’s Emissions Trading Scheme
- EUA – Emission Allowance in EU ETS
- GHG – Greenhouse Gas (mainly CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O)
- GIS – Green Investment Scheme
- IE – Independent Entity
- IET – International Emission Trading
- IPCC – Intergovernmental Panel on Climate Change
- JI – Joint Implementation
- JI SC – JI Supervisory Committee
- LULUCF – Land Use, Land Use Change, Forestry
- MOP – Meeting of the Parties to UNFCCC
- N<sub>2</sub>O – Nitrous oxide
- NAP – National Allocation Plan
- PDD – Project Design Document
- PIN – Project Idea Note
- UNFCCC – United Nations Framework Convention on Climate Change
- VER – Voluntary Emission Reductions

# Contents

---

- ➔ 1. Drivers behind using forests as carbon sinks
- 2. Expected demand from the market
- 3. Pöyry's consulting services
- 4. Pöyry's resources
- 5. Selected reference projects

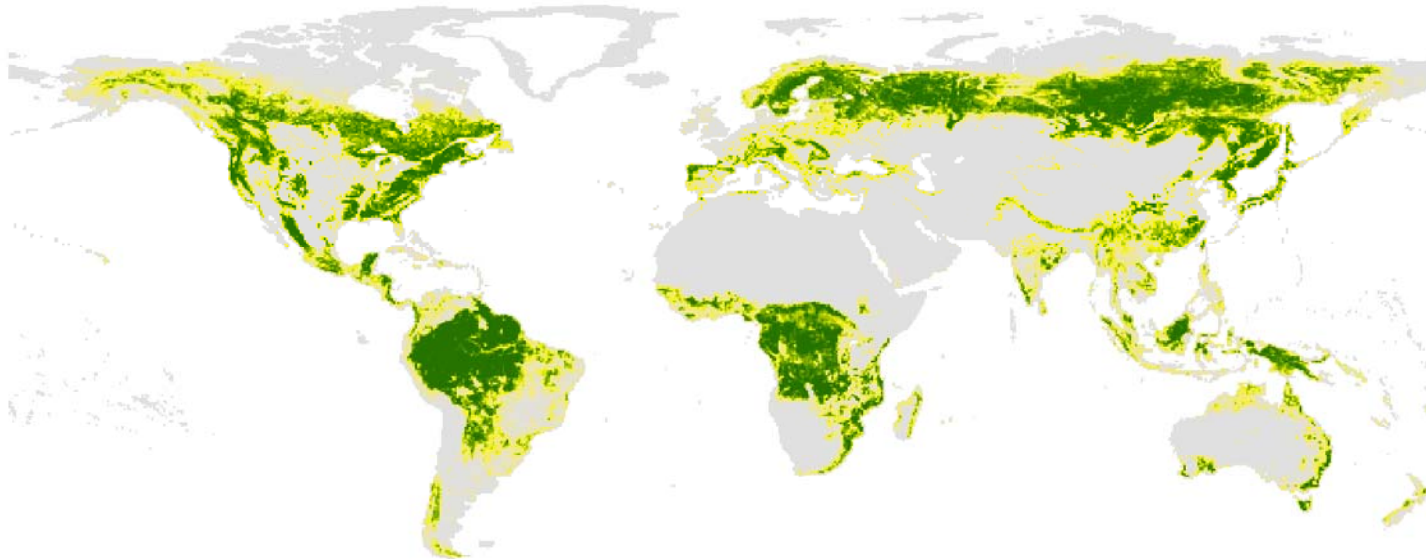
# Forests sequester some 330 Gt of carbon



We lose around 7.3 million ha of forest cover every year

**The main drivers for land use change are farming and grazing.**

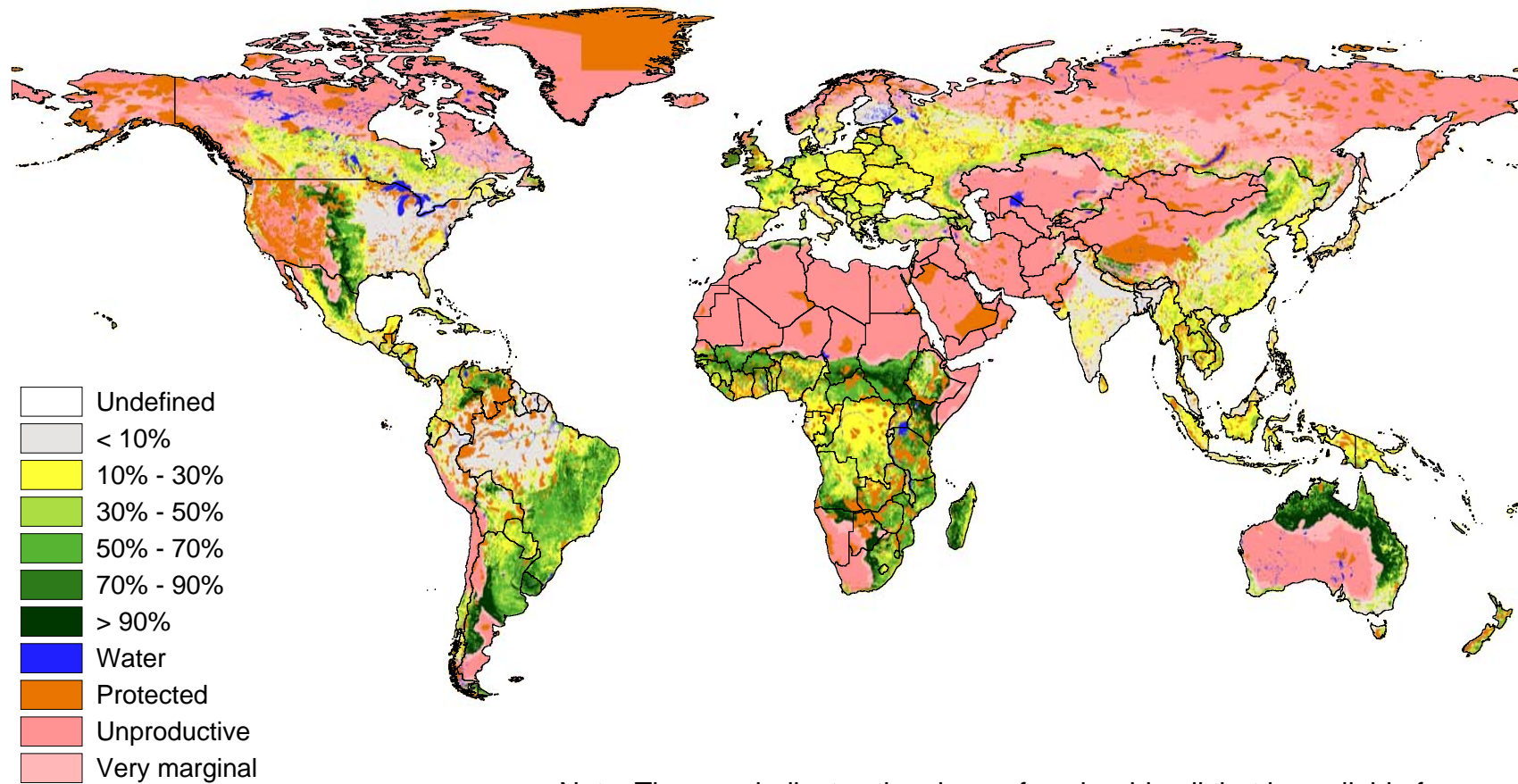
Forest cover 2005



Source: FRA 2007, IIASA

# There is only 250-300 million ha of available land left

**Food, energy and the forest industry compete for the same land.**



Note: The map indicates the share of each grid-cell that is available for use.

Source: GAEZ 2007, IIASA-LUC/FAO

## Forest use increasingly includes potential value as a carbon sink

- There is immense interest in maintaining the status quo in land use
  - The main reasons for forest cover loss are agriculture and grazing
  - Food consumption is estimated to increase rapidly when new economies change consumption habits (e.g. from rice to pork)
  - Forest cover loss increased in 2007 due to food production and new, bio-based energy production
- There are existing projects aimed at maintaining the current levels
  - Norwegian Climate and Forest Initiative has promised USD1 billion to protect the Amazon
- LULUCF was one of the main issues in the Bali meeting
  - Likely to be on the agenda in Copenhagen as well

# Contents

---

1. Drivers behind using forests as carbon sinks



2. Expected demand

---

3. Pöyry's consulting services

4. Pöyry's resources

5. Selected reference projects

## Likely demand

---

	Advantage	Disadvantage
<b>Companies</b>	<ul style="list-style-type: none"> <li>• Both Kyoto and voluntary mechanisms for carbon sink –projects (some companies already use these efficiently)</li> <li>• Potential new value generation models for forest use</li> <li>• Plantations</li> </ul>	<ul style="list-style-type: none"> <li>• Land prices already soaring</li> <li>• Increased issues in land-use could further increase prices / introduce new barriers to forest use</li> </ul>
<b>Land/forest owners</b>	<ul style="list-style-type: none"> <li>• Potential new earning mode</li> </ul>	<ul style="list-style-type: none"> <li>• Potential legislative changes in land use rights could infringe on ownership rights</li> <li>• Not enough clarity about the issue</li> </ul>
<b>Governments</b>	<ul style="list-style-type: none"> <li>• One of the easiest ways to reach Kyoto goals</li> <li>• Market-financed ways to reforest countries</li> <li>• Good way to receive financial support for land use issues</li> </ul>	<ul style="list-style-type: none"> <li>• Controversial issue due to alternating opinions about biodiversity and forest use</li> </ul>

# Contents

---

1. Drivers behind using forests as carbon sinks
  2. Expected demand
  - ➔ 3. Pöyry's consulting services
  4. Pöyry's resources
  5. Selected reference projects
-

# Pöyry's services cover all stages of climate change 1 (2)

## LULUCF



### Calculation of carbon value of forests

- Land use / land use change modelling
- LCAs (Life Cycle Analyses)
- Scenario analyses & improvement plans
- Warning systems (vegetation stress, drought..)
- Soil studies & land potential analyses
- Identifying carbon leakage

## Forest strategies



### Strategies and plans on maximising carbon value of forests without endangering biodiversity, social diversity or economic potential.

- Identifying carbon leakage
- Forest strategies & forest use plans
- Plantations

## Forest monitoring



### Monitoring and related services

- Monitoring (continuous and non-continuous)
- Change detection through different methodologies

## Pöyry's services cover all stages of climate change 2 (2)

---

### Socio-economic issues



Social and economic consequences of land use change

- Local development
- Economic opportunities in forests
- Impact on environment & biodiversity
- Capacity building
- Impact analyses and adaptation strategies & implementation

### Policy tools



Projects, information dissemination and policies

- Information flows in a project
- Real-time tools
- Strategic planning and implementation

Pöyry is unique in being able to offer the whole range of services and activities related to forests as carbon sinks.

# Pöyry is a global leader and a local partner



The Pöyry Group is a consulting and engineering company with three divisions:

■ ENERGY

*European leader in energy engineering and consulting*

■ FOREST INDUSTRY

*Worldwide market leader*

■ INFRASTRUCTURE & ENVIRONMENT

*Leading position worldwide*

PÖYRY 2007 RESULTS	ENERGY	FOREST INDUSTRY	INFRASTRUCTURE & ENVIRONMENT	GROUP TOTAL
Revenues [M€]	218	277	223	718
Employees	1838	2961	2378	7177

## All services under one roof – around the world

---



- Asia and Australia
  - Australia, Brunei, China, India, Indonesia, Malaysia, New Zealand, Philippines, Republic of Korea, Singapore, Taiwan, Thailand, Vietnam
- Europe
  - Austria, Czech Republic, Estonia, Finland, France, Germany, Great Britain, Hungary, Italy, Norway, Latvia, Denmark, Lithuania, Poland, Russia, Slovakia, Spain, Sweden, Switzerland
- Middle East and Africa
  - Iran, Nigeria, Oman, Saudi Arabia, Senegal, South Africa, United Arab Emirates
- North and Latin America
  - Argentina, Brazil, Canada, Mexico, Peru, USA, Venezuela

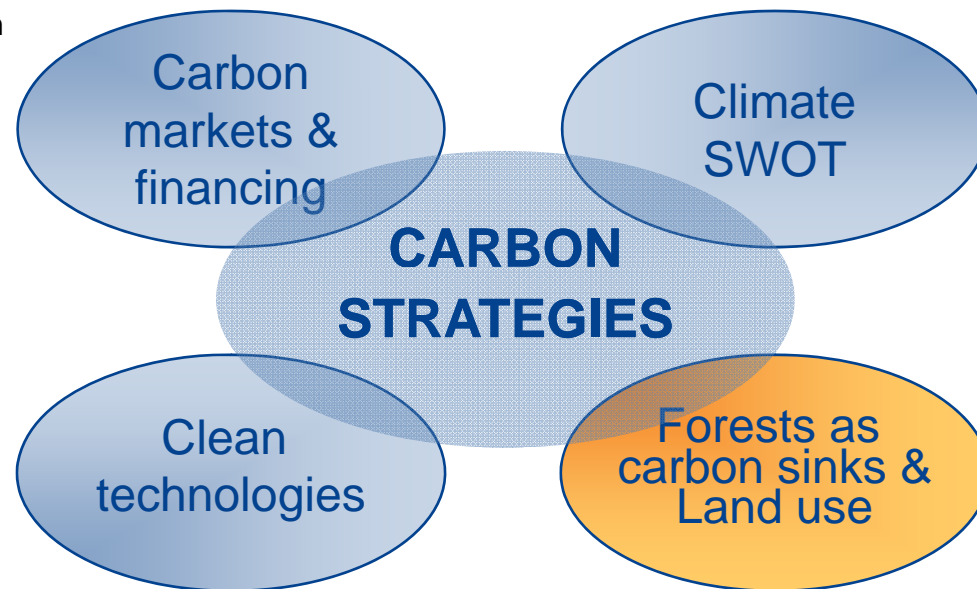
# Pöyry provides a wide variety of carbon-related services

---

## EU ETS & financing

- Market analysis
- Price forecast 2008-2012
- Post-2012 assessment
- Carbon offsetting
- Portfolio optimisation
- Carbon pass-through

- Carbon footprint
- Carbon-related risks and opportunities
- Business effects of carbon
- Development of JI/CDM projects
- Due diligence of CDM/JI projects
- Purchase/Sale strategy



- Renewable energies
- Energy efficiency
- CHP
- Carbon capture & storage

- Land-Use, Land-Use Change, Forestry (LULUCF)
- Forest Strategies
- Forest Monitoring
- Socio-economic issues
- Policy tools

# Pöyry works with leaders



# Contents

---

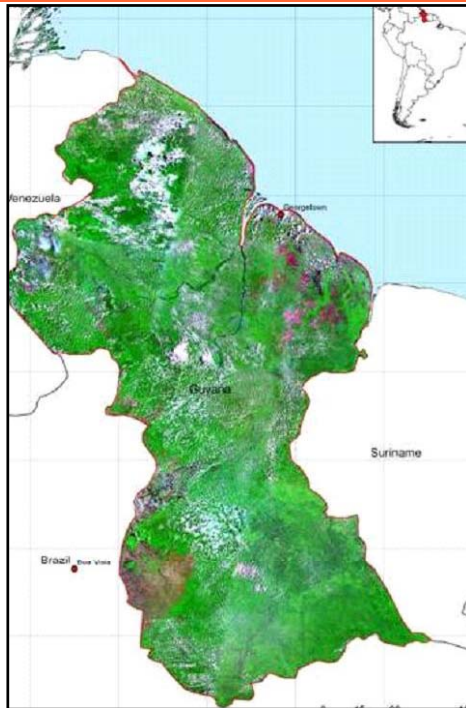
1. Drivers behind using forests as carbon sinks
  2. Expected demand
  3. Pöyry's consulting services
  - ➔ 4. Pöyry's resources
  5. Selected reference projects
-

# Agenda

---

1. Drivers behind using forests as carbon sinks
  2. Expected demand
  3. Pöyry's consulting services
  4. Pöyry's resources
  - ➔ 5. Selected reference projects
-

# National Detection of Forest Change



The purpose of this project is to support forest law enforcement.

The project uses satellite data to detect forest change caused by harvesting and roading activities.

## Site:

Guyana (South America)

## Project:

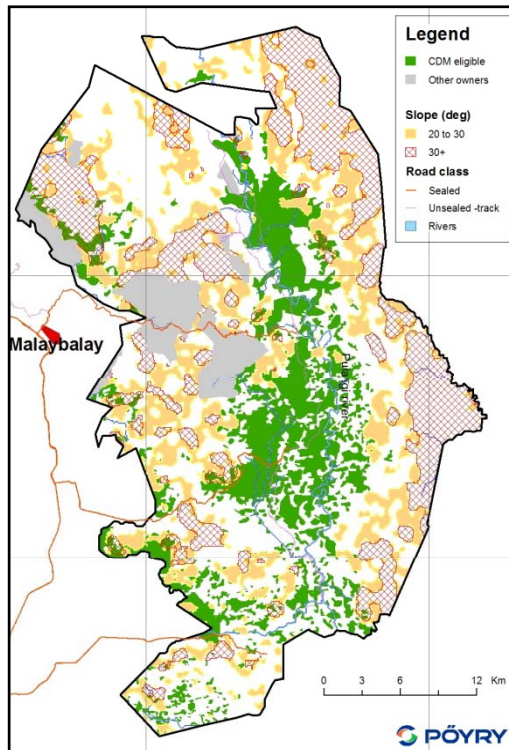
ITTO-funded project to monitor and record annual rates of deforestation

## Pöyry's role in the project:

Pöyry established a GIS system and procedures to enable The Guyana Forest Commission (GFC) to effectively track country-wide deforestation.

This system is operational and provides GFC with the tools to monitor annual forest changes.

# Evaluation of CDM Potential



This project assessed the eligibility of an area for CDM.

The process involved determination of land suitability for CDM and calculation of carbon sequestration and carbon-related revenue.

## Site:

Mindanao (Philippines)

## Project:

A/R CDM Analysis

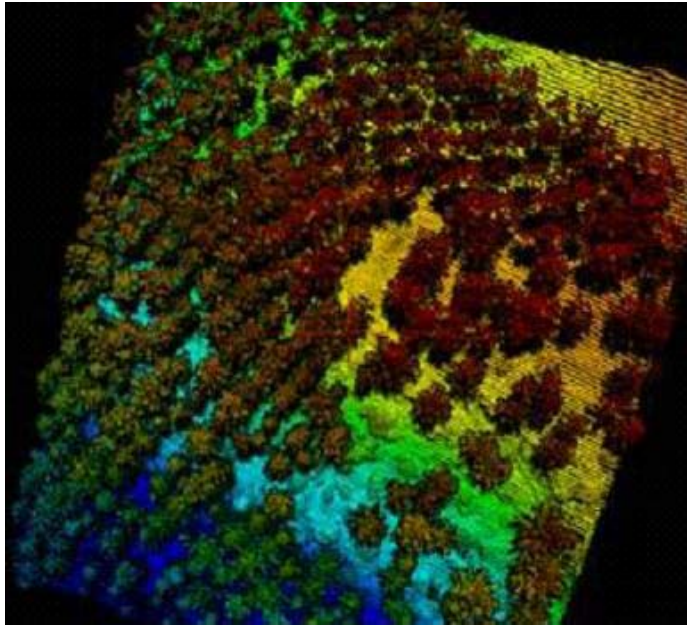
## Pöyry's role in the project:

Pöyry determined the CDM eligibility of the land base using a time series of satellite imagery.

Field inspections and subsequent resource modeling methods were used to calculate potential carbon stocks

# National Measurement of Above-ground Carbon

---



Light Detection & Ranging (LiDAR) is used to measure forest carbon remotely.

The methods developed are used operationally to provide forest measurements that are used to report New Zealand's commitments under the Kyoto Protocol.

## Site:

New Zealand

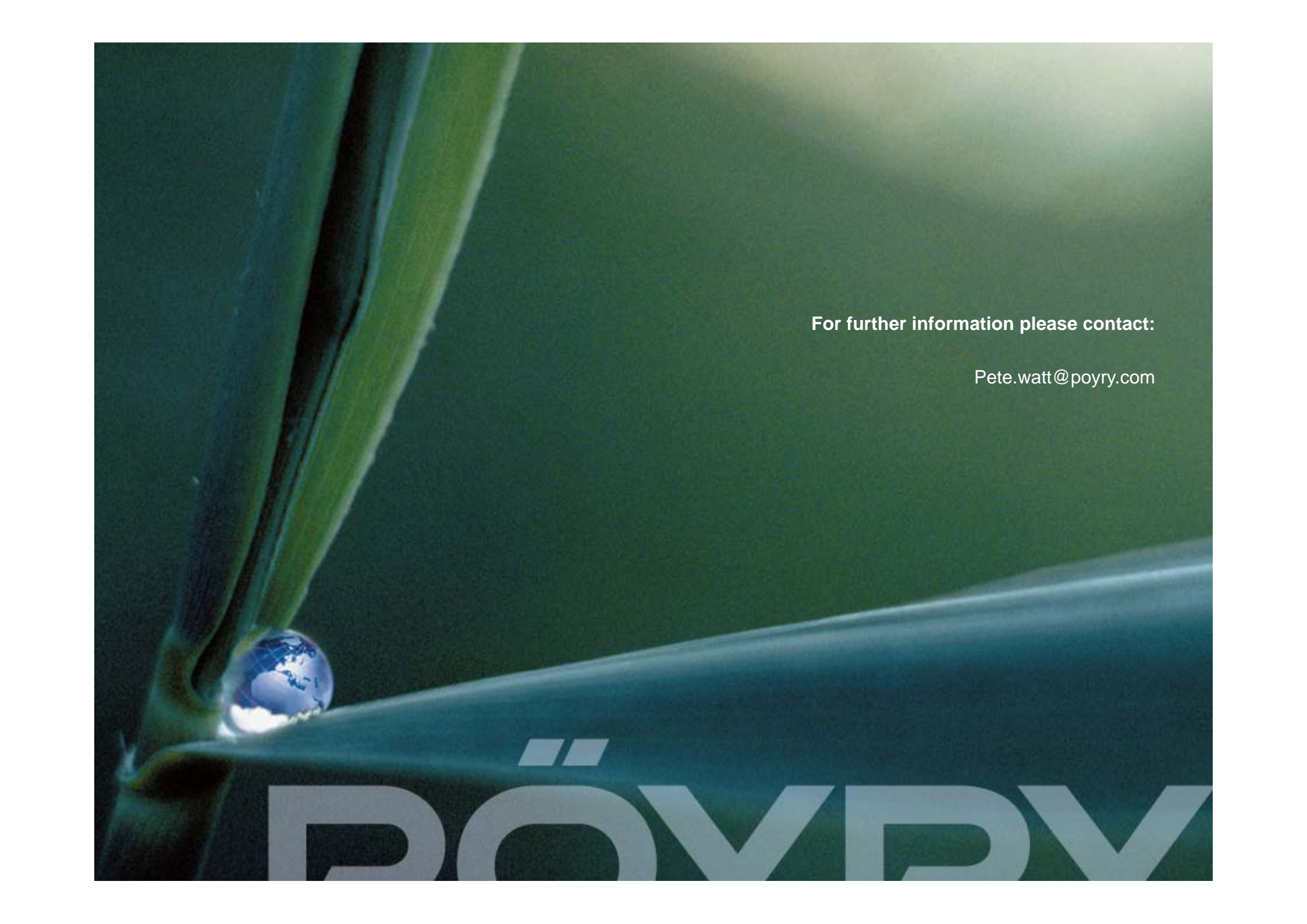
## Project:

Calculation of forest carbon using LiDAR

## Pöyry's role in the project:

**Pöyry established the relationships between forest measurements and LiDAR.**

**Ongoing assistance and quality control of LiDAR-based inputs used nationally to determine forest carbon**



For further information please contact:

[Pete.watt@poyry.com](mailto:Pete.watt@poyry.com)

POYRY