



Nicholas School of the Environment and Earth Sciences - Duke University



## Real and Verifiable Carbon Offsets

North Carolina Legislative Commission on Global Climate Change  
December 4, 2007

Bill Chameides, Dean  
Nicholas School of the Environment  
Duke University




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## What are offsets?

- Actions that remove or prevent the emissions of greenhouse gases in one location
- And are used to “offset” an equivalent amount of emissions at another location  
–> Land Management Practices




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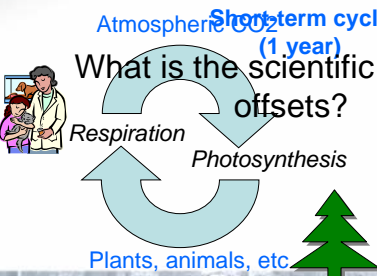
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## We have upset the natural balance: Earth's carbon cycle

Atmospheric  $\text{CO}_2$  **Short term cycle (1 year)**

### What is the scientific basis for offsets?



Plants, animals, etc




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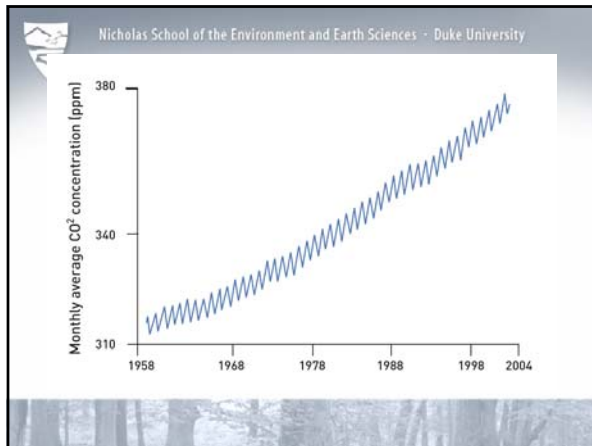
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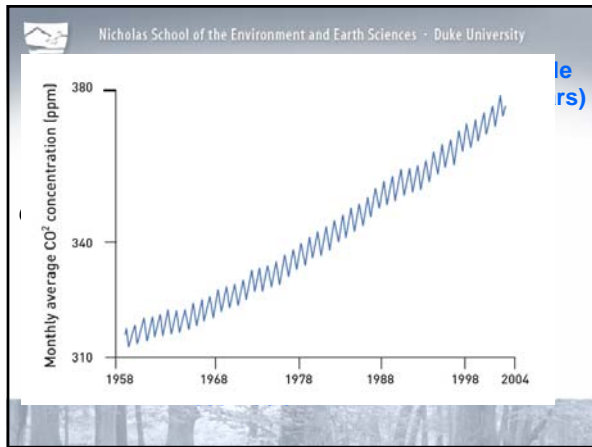
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### Land-management offsets: Examples

- Capture methane emissions from manure, land fills, etc



**Manure Digestion**

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graph TD
    A[Manure] --> B[Anaerobic digester]
    B --> C[Biogas]
    C --> D[Generator]
    D --> E[Electricity]
            
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## Land-management offsets: Examples

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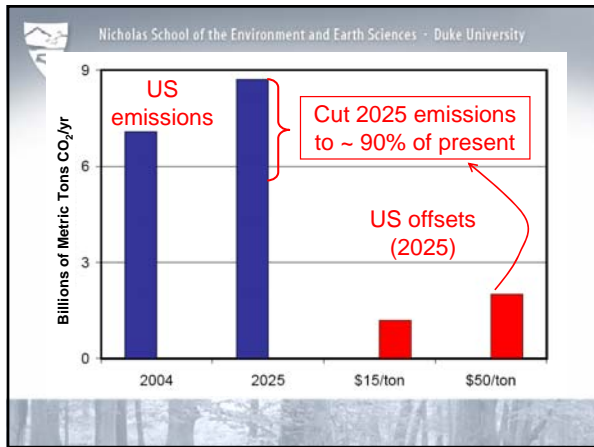
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## So...

- Offsets represent a huge opportunity
- But also the potential for a huge problem:
  - How do we know that a given offset is “*real?*”

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## Offsets

- Huge potential to advance climate mitigation.
- But also huge potential to frustrate climate mitigation if the offsets are not real.



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## Offsets Have Been Getting Some Bad Press



THE WALL STREET JOURNAL  
An Inconvenient Pool

BusinessWeek  
Another Inconvenient Truth  
Behind the big and hype of carbon offsets, some of the deals don't deliver



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[www.Cheatneutral.com](http://www.Cheatneutral.com)  
Helping you because you can't help yourself

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## Harnessing Farms and Forests in the Low-Carbon Economy

### How to Create, Measure, and Verify Greenhouse Gas Offsets

The Nicholas Institute for Environmental Policy Solutions

Edited by Zach Willey & Bill Chameides,

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To qualify as a marketable carbon offset, the greenhouse impact of a change in land management must have three critical attributes:

It must represent a net reduction in greenhouse gas (GHG) emissions, or a net gain in the amount of carbon stored.

The offsets must have a legal and specified owner.

Regulators of any relevant cap-and-trade system and the buyer, as well as the public, **must have strong confidence that the offsets have been accurately measured and quantified.**

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### Projects Considered

- >Sequester carbon in biomass through the cultivation of new forests and grasslands, or delays in the harvesting of forests.
- >Sequester carbon in soils through changes in farming practices, such as through the adoption of no-till farming.
- >Reduce greenhouse emissions of methane through changes in the practices used to process and dispose of manure.
- >Reduce greenhouse emissions of methane and nitrous oxide through changes in farming practices.

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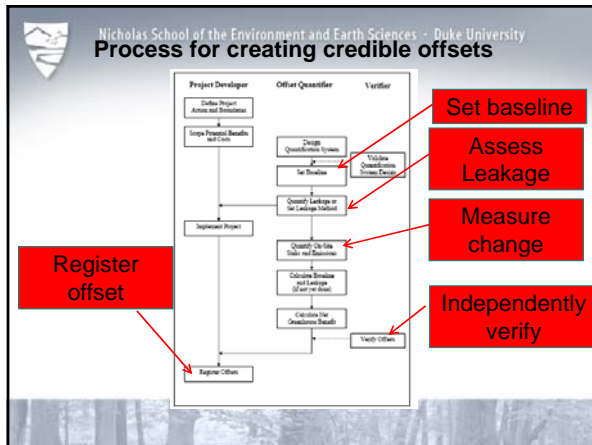
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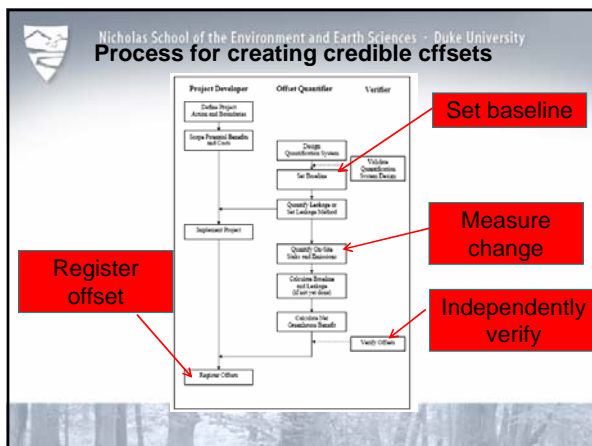
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## Summary

- Offsets can play a significant role in the new C economy
  - But only if they are quantified, independently verified and registered
  - The scientific methodology for doing this exists

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