Greenhouse Gas Sequestration Task Force

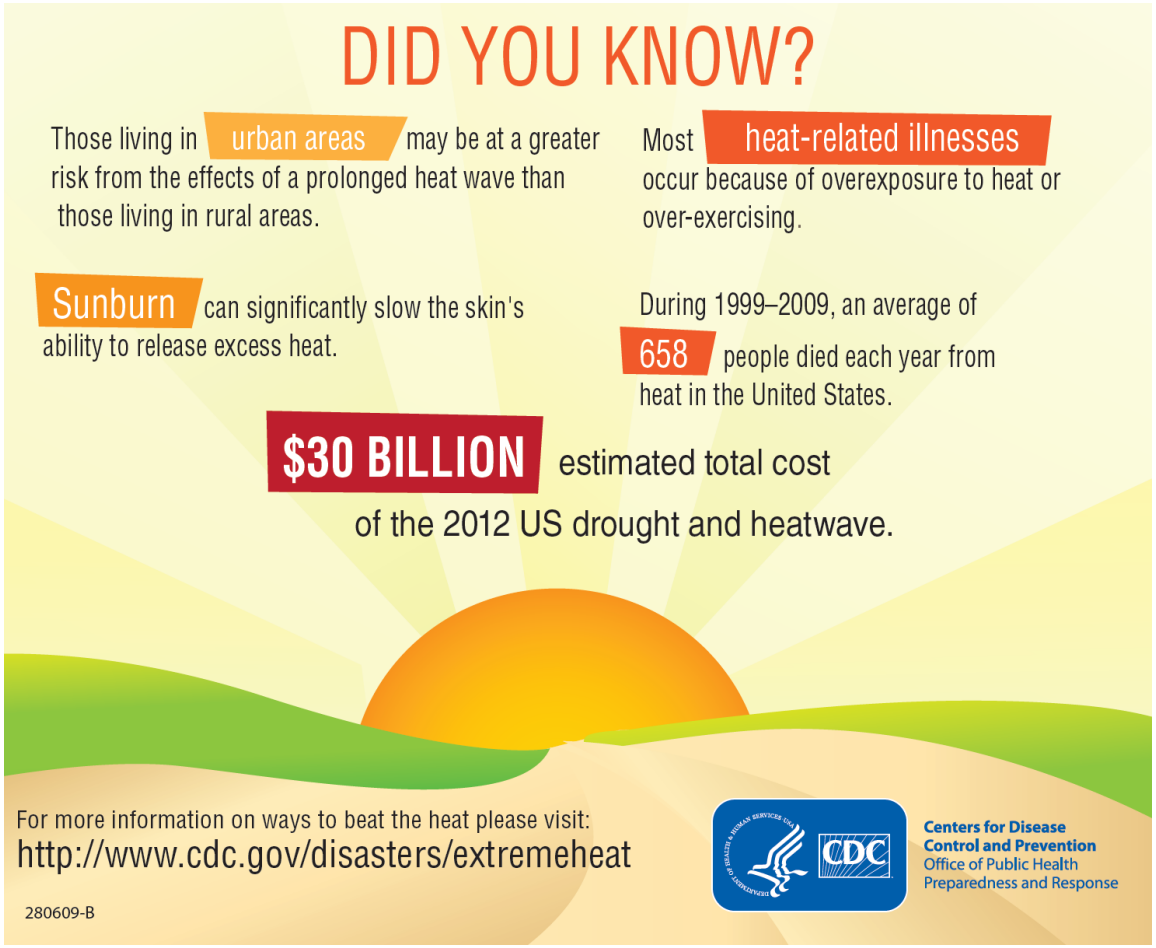
Hawaii State Capitol

November 2019

Office of Planning
State of Hawaii

Safety Moment – Climate Edition

Heat and Heatwaves



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Safety Moment – Climate Edition

Heat and Heatwaves

WHAT:

Extreme heat or heat waves occur when the temperature reaches extremely high levels or when the combination of heat and humidity causes the air to become oppressive.

WHO:

Children

More males than females are affected

Older adults

Outside workers

People with disablities

WHERE:

Houses with little to no AC

Construction worksites

Cars

HOW to AVOID:

Stay hydrated with water, avoid sugary beverages

Stay cool in an air conditioned area

Wear lightweight, light-colored, loose-fitting clothes

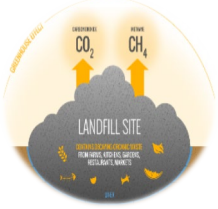
Safety Moment – Climate Edition

Heat and Heatwaves

- Weather Attribution associated with Climate Change:
  https://www.worldweatherattribution.org/analysis/heatwave/
  - Towards reliable extreme weather and climate event attribution
    https://www.nature.com/articles/s41467-019-09729-2

- Recent Highlights in Published Science on Heatwaves and Climate Change
  - Physical Understanding of Human-Induced Changes in U.S. Hot Droughts Using Equilibrium Climate Simulations
    https://journals.ametsoc.org/doi/abs/10.1175/JCLI-D-18-0611.1
  - Temporally Compound Heat Wave Events and Global Warming: An Emerging Hazard
    https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018EF000989
  - Quantifying excess deaths related to heatwaves under climate change scenarios: A multi country time series modelling study
    http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002629
  - Droughts, heatwaves and floods: How to tell when climate change is to blame
    https://www.nature.com/articles/d41586-018-05849-9

Status Update



- ✓ **November 2018 –January 2019**: Consultant services sought through an RFP
- ✓ **February 2019 – April 2019**: Planning and coordination for Carbon Offset Symposium
- ✓ **April 10, 2019**: Carbon Offset Symposium held at Hawaii State Capitol
- ✓ **February 2019 – November 2019**: Investigation for Carbon Offset Program Report

Next Steps:

- ➢ **November 2019**: Presentation to Greenhouse Gas Sequestration Task Force
- ➢ **December 2019**: Final Report Due to the State Legislature and the State Climate Mitigation and Adaptation Commission

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Carbon Offset Symposium

Hawaii State Capitol Auditorium

April 10, 2019

Office of Planning
State of Hawaii

Carbon Offset Symposium

Hawaii State Capitol Auditorium

April 10, 2019

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9:00 **Welcoming Remarks, Safety Moment, and Symposium Overview**
Erin Dunable, AECOM

Greenhouse Gas Offsets, Offset Markets and Feasibility

9:25 **Greenhouse Gases 101**
Michael Conrardy, AECOM

Mr. Conrardy will provide a brief overview of climate change, the connection to greenhouse gas emissions, and the need for emissions reductions. Information will also be provided regarding global warming potential and greenhouse gas inventory basics.

9:50 **State of Hawaii Greenhouse Gas Policy and Inventory**
Mike Madsen, PE, State of Hawaii, Department of Health

Mr. Madsen will provide a brief overview of the State of Hawaii's greenhouse gas policy, the results of recent greenhouse gas inventories, and anticipated future trends.

10:00 **Greenhouse Gas Offsets, Protocols, Standards, and Registries**
Michael Conrardy, AECOM

Mr. Conrardy will introduce terms and definitions related to offsets for use during the remainder of the symposium. He will provide an overview of offsets including information on existing greenhouse gas offset registries, standards, and examples of protocols. Mr. Conrardy will also review the quality criteria required to evaluate offset creation.

10:30 - 10:40 **Break**

10:45 **Greenhouse Gas Offset Markets and Financials**
Steve Baczko, NatureBank

Mr. Baczko will provide an overview of current offset markets including both regulated and voluntary markets. This section will also include information on offset transactions, market participants, and the current market value for offsets.

11:30 **Q&A**

11:45-12:45 **Adjourn for Lunch Break**

Hawaii-Based Greenhouse Gas Reduction Project Examples

Each presentation will include a technical explanation of the action or process that reduces greenhouse gas emissions as well as an approximation of total emissions reduced and associated costs of the project or action. Each presenter will also provide any unique details of their projects, including co-benefits.

1:00 **Carbon Sequestration through Forestry**
Leah Laramee, State of Hawaii, Department of Land and Natural Resources, Division of Forestry and Wildlife

1:20 **Biogas Capture**
Aaron Kirk, Hawaii Gas

1:40 **Electric Vehicle Adoption Encouragement through Charging Systems**
Jimmy Yao, Hawaiian Electric

2:00 - 2:10 **Break**

Connecting Greenhouse Gas Reduction Projects to Offset Project Feasibility and Beyond

2:15 **Environmental Justice**
Trisha Kehaulani Watson, JD, PhD, Honua Consulting

Dr. Watson will provide an overview of environmental justice in the context of greenhouse gas emissions and the impacts of decision making on indigenous peoples and local communities.

2:30 **Hawaii-based Projects in the Context of Offset Creation Feasibility**
Michael Conrardy, AECOM and Steve Baczko, NatureBank

This portion of the symposium will consist of an audience participation exercise using the AECOM developed "Offset Gate Key" tool. The Offset Gate Key will walk attendees through the four "gates" that represent the decision criteria for creating offsets:

1. Quality
2. Additional
3. Financial Viability
4. Environmental Justice

The facilitators will use the information presented on Hawaii-based greenhouse gas emission reduction projects and the Offset Gate Key to help the audience better understand how to evaluate the feasibility of offset creation.

3:30 **Additional Market-based Tools**
Michael Conrardy, AECOM and Steve Baczko, NatureBank

The team will discuss alternatives to offsets, such as impact investment, voluntary action funds, and other governmental tools. The discussion will include audience participation and will carry into the Final Q&A and the Parking Lot.

4:20 **Next Steps**
Danielle Bass, State of Hawaii, Office of Planning

4:25 **Closing Remarks, Adjourn**
Erin Dunable, AECOM

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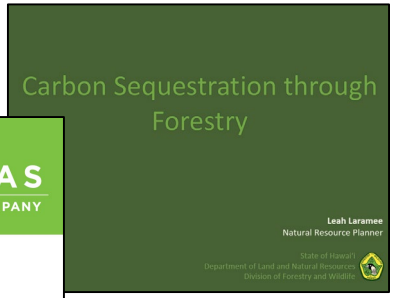

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Feasibility and Implications of Establishing a Carbon Offset Program for the State of Hawai‘i

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Table of Contents

Greenhouse Gas Offset Overview

Definition of Terms

Offset Verb - Offsetting

- Reduce GHG emissions offsite
- Reductions not officially certified

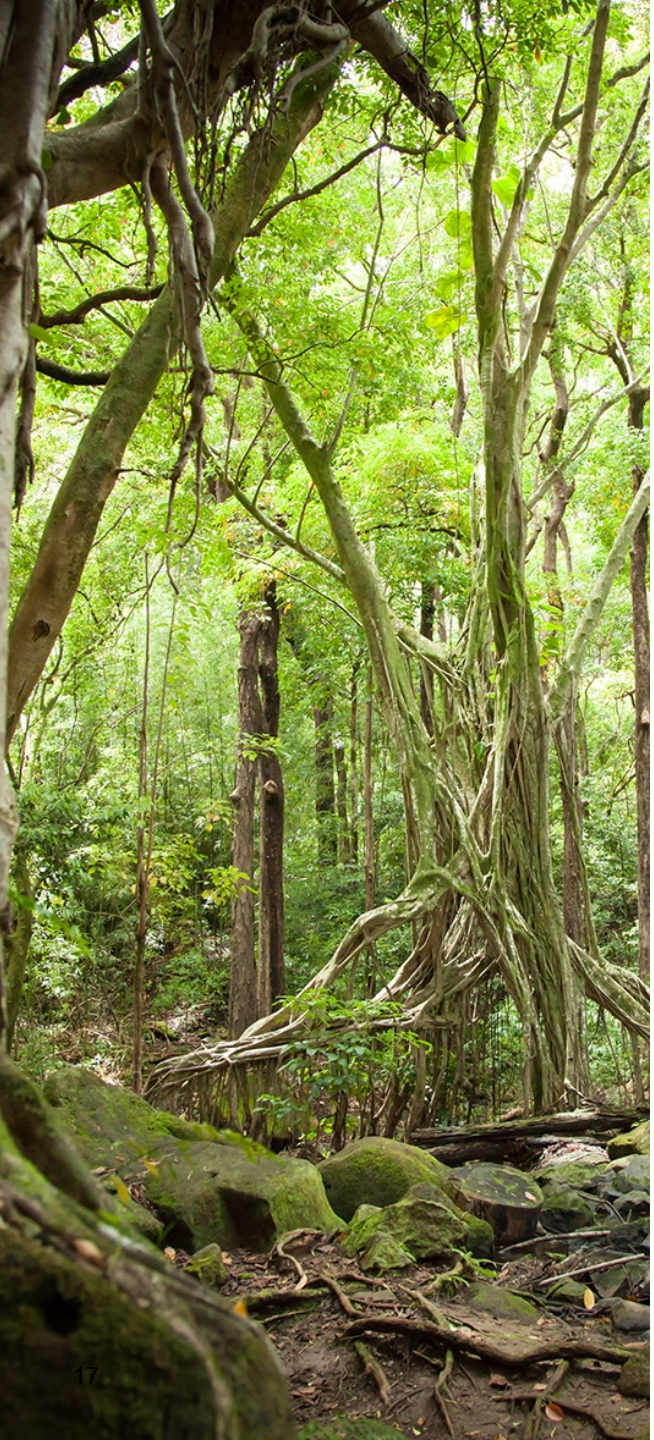
Offset Noun - GHG Offset Credit

- Officially certified credit representing reductions
- The focus of this analysis

Definition of Terms

Offset:
An offset credit, sometimes referred to as “GHG emissions reductions credit,” “offset certificate,” “offset instrument,” “carbon offset”, “GHG offset” or simply “offset,” is a credit for mitigating 1 metric ton (MT) carbon dioxide equivalent (CO_2e) by paying someone else to avoid 1 MT CO_2e elsewhere. Offset credits are monetarily tradeable as well as evaluated, certified, and guaranteed by a standard or program.

Important Note: GHG emissions reductions, including sequestration, are *not* necessarily offsets.



Offsets' primary purpose are to mitigate climate change by bridging the gap between high and low cost GHG reductions

GHG reductions from an offset credited project are independently verified to a specific protocol and then assigned to a third party registry, certifying that the offset credits meet the following requirements:

1. **Real / Actual:** Quantified through technically and scientifically sound accounting practices that represent actual emissions reductions beyond a baseline.
2. **Quantifiable / Quantification:** The ability to consistently manage, measure, and calculate the total quantity of offsets produced.
3. **Permanent / Permanence:** The GHG emissions reductions will last in perpetuity without reversal.
4. **Enforceable / Enforceability:** Assurance that the offset credits are trackable and supported by regulatory or third-party framework that defines their creation, provides transparency, and guarantees exclusive ownership.
5. **Verifiable / Verification:** An auditing process performed by an approved party according to the offset project's program, whereby the project's offset credits are calculated according to the approved protocol.
6. **Additional / Additionality:** The requirement that a GHG reduction project that would not have been implemented in a baseline or "business-as-usual" scenario.

The primary tests for determining additionality include:

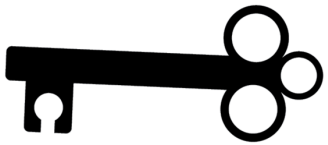
- Legal Requirement Test: The GHG reduction is not required by any federal, state, or local law, statute, rule, regulation, ordinance, court order, or other legally binding mandate.
- Performance Test: The project achieves greater GHG reductions or removals than the standard performance threshold for the given project type, demonstrating the emissions reduction would only occur through development of the offset credit.

Primary Purpose

Offsets are a commoditized and tradable reduction in GHG emissions. If the right conditions are met, then any GHG reductions action could be converted to an offset.

Use the 4 Gates to determine the initial feasibility of any GHG reduction project converting to an offset. If the GHG reduction project can pass each Gate, then review the process to create an offset, and begin if desired. If offset creation is determined not to be the appropriate path for the GHG reduction project, then consider alternative pathways to support implementation of the GHG reduction.

Note: It is rare for the right conditions to be met for converting a GHG reduction into an offset, and therefore most GHG reductions are not offsets.



4. Environ

3. Financial Viability

2. Additional

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1. Quality

Is there an existing protocol? If yes, go to Gate 2.
If no, GHG reductions must meet all of the following criteria:

- **Real:** GHG emissions reduced below an established baseline, based on scientifically sound practices.
- **Quantifiable:** The ability to consistently manage, measure, and calculate the total quantity of GHG emissions reduced.
- **Permanent:** The GHG reductions will last in perpetuity, without reversal.
- **Enforceable:** Offset credits must be supported by a regulatory or third party framework that guarantees transparency, traceability, and exclusive ownership.
- **Verifiable:** An auditing process performed by an accredited third party, to ensure the GHG reductions are calculated according to an approved protocol.

If all 5 Quality Criteria are met, proceed to Gate 2.

4. Environ

3. Financial Viability

2. Additional

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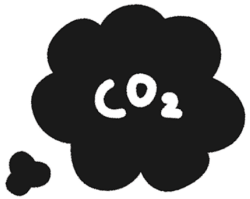
2. Additional

The GHG reduction project must be an additional project, not one that would have been created in a baseline scenario. The primary tests for determining additionality include:

- **Legal Requirement Test:** The GHG reduction is not required by any federal, state, or local law, statute, rule, regulation, ordinance, court order, or other binding mandate.
- **Performance Test:** The project achieves greater GHG reductions or removals than the standard performance threshold for the given project type, as determined and defined in the applicable protocols.

Does the GHG reduction meet the Additionality Criteria?
If yes, then proceed to Gate 3.



Prima

4. Environmental Justice

3. Financial Viability

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3. Financial Viability

- **Quantity** - What are the expected annual GHG reductions?

* If the expected quantity of annual GHG reductions exceed 30,000 MTCO2e, then proceed to Costs below. If not, then reconsider offset creation or apply additional scrutiny to the analysis.

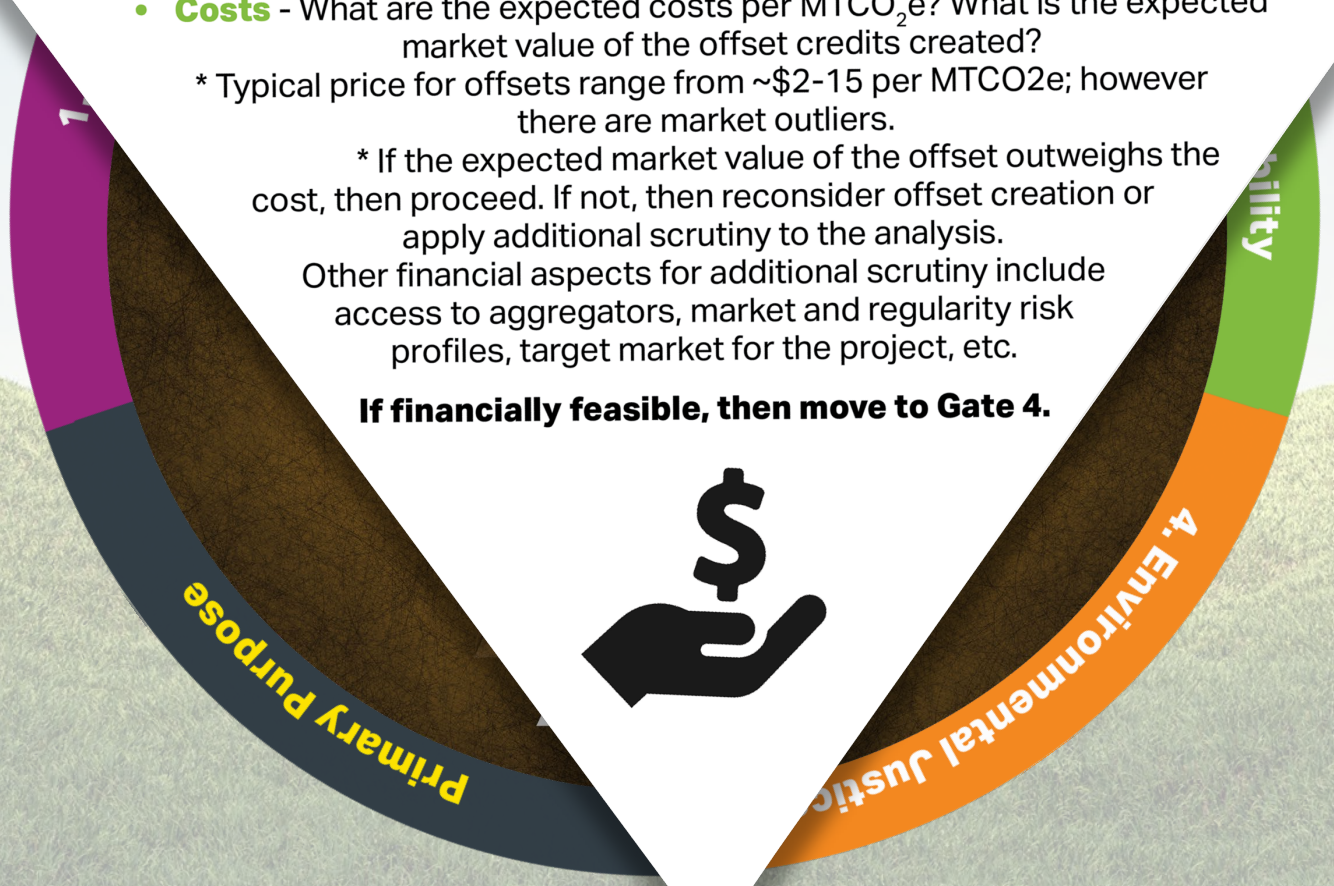
- **Costs** - What are the expected costs per $MTCO_2e$? What is the expected market value of the offset credits created?

* Typical price for offsets range from ~$2-15 per MTCO2e; however there are market outliers.

* If the expected market value of the offset outweighs the cost, then proceed. If not, then reconsider offset creation or apply additional scrutiny to the analysis.

Other financial aspects for additional scrutiny include access to aggregators, market and regularity risk profiles, target market for the project, etc.

If financially feasible, then move to Gate 4.



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4. Environmental Justice

- **Has climate change** been considered as a global issue where the solutions require an interconnected approach between global communities? If no, then reevaluate offset creation.
- **Will the GHG reduction** project adversely affect indigenous peoples or local communities it is developed in? If yes, then reevaluate offset creation.
- **Will the GHG reduction** project adversely affect developing communities or indigenous peoples around the world through shifts in supply and demand or resources? If yes, then reevaluate offset creation.

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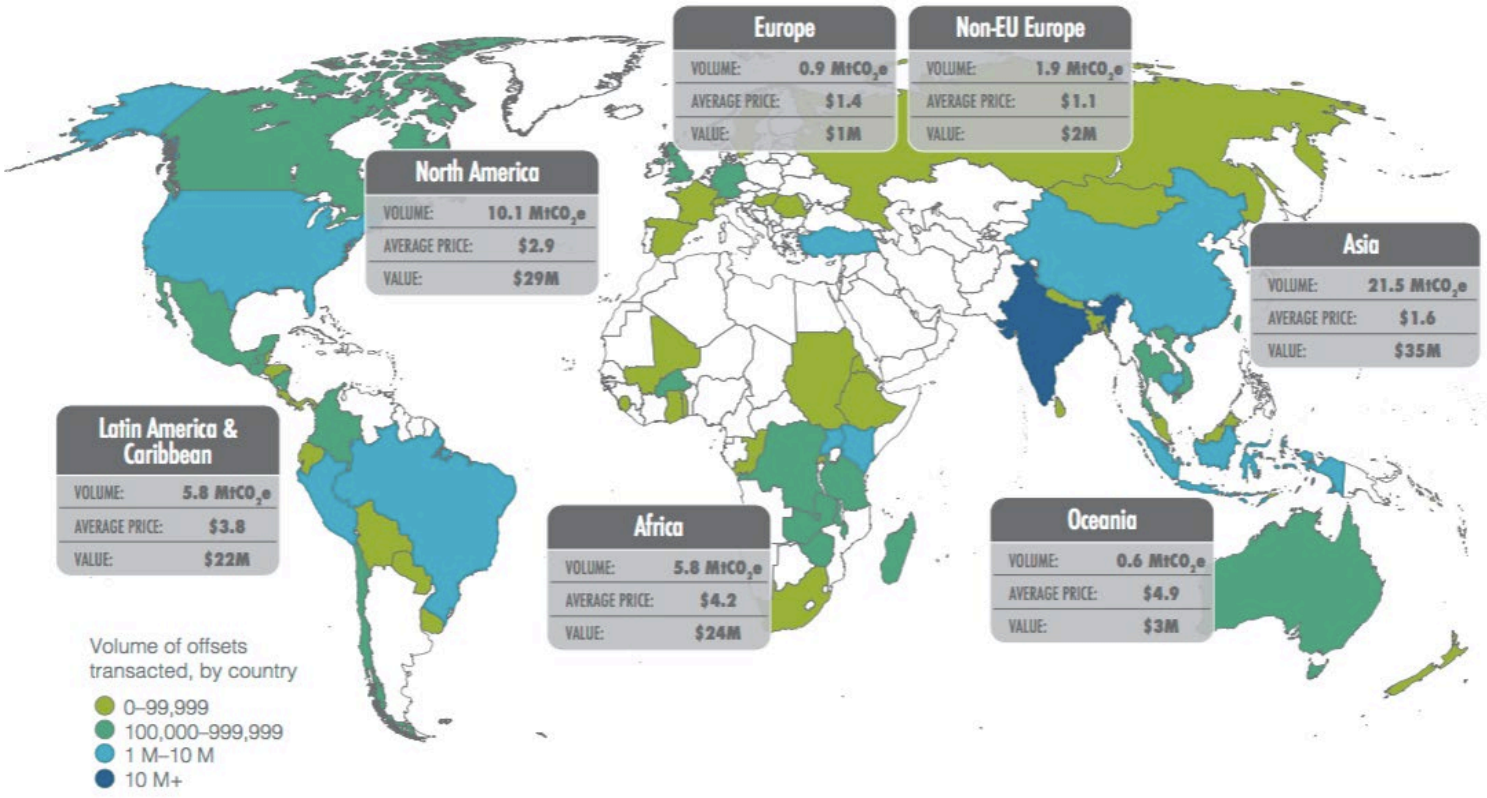
Sample Offset Pricing

Market	Product	Standard	Price
California (WCI)	CCO	CARB	$12 - $13.63
Alberta		Alberta	$24
EUETS	CER	CDM	$.25
Voluntary	VER	VCS	$.50 -$12 Average $3
Voluntary	REDD+	VCS CCBA	$3 - $7
Voluntary	VER	Gold Standard	$3 - $15

Global Voluntary Market Value

Figure 8: Market Size by Project Region and Country, 2016



Notes: Based on 769 transactions representing 46.5 $MtCO_2e$ in 2016.

Fixed Costs Development Assumptions

Development task	Description	Estimated costs (varies based on market program)
Project feasibility assessment	Initial project screening for eligibility and credit generation	$15K - $30K
Protocol/methodology development	Needed if no methodology exists	~$100K
Project development	Implementation thru verification	~$300K (varies based on project type and protocol)
Legal	Contracting with buyers, third parties, verifiers	~$50K
Initial verification	Third party verifier site visit, desk review and verification report	$75K
Annual verification	Based on protocol and market	$40K
Registry fees	Fees based on issued volume	20 cents/ton (varies based on program)
Program annual fees	Based on specific program	$500
Listing fees	Based on specific program	$750

Development costs can range from $250K to $500K depending on project type, location and standard

Key takeaways . . .

- Developing an offset project can be a very complicated, expensive and multilayered process
- Development costs can vary widely based on project type and standard
- Verification costs will always be higher then expected
- Early stage feasibility assessment is essential to determine project eligibility and financial returns

Further Market Based and Government Tools

- **Carbon Pricing**
  - Fees, Taxes and Cap-and-Trade
  - Note: Offsets are Part of Carbon Pricing
- **Codes and Building Standards**
- **Voluntary Funds**

Conclusions and Recommendations

Program Administrator

- If the state government chooses to act as an offset program administrator, the state would not receive revenue from the sale of offset credits. Any offset credit revenue would go to entities that reduce greenhouse gas emissions and develop offset projects for those reductions. An offset program administrator simply facilitates these transactions.

Project Developer

- If the state government chooses to act as an offset project developer or project owner, then there is minimal possibility of revenue generation for the state. It is unlikely that significant profits would be produced from offset generation within the state, considering the costs for enacting greenhouse gas reductions, the administrative costs of offset credit generation, and the current offset market value. The financial case to be made is project dependent.

Conclusions and Recommendations

Regardless of the use of offsets, the state government should take all actions at its disposal, with appropriate financial consideration, to explore and implement all feasible greenhouse gas reduction and sequestration measures.

Conclusions and Recommendations

Offsets are a specific implementation mechanism used to foster greenhouse gas reductions and, while valuable, the uses are narrow.

The State of Hawai‘i should build on its existing policies and programs to develop the most economically viable mechanisms to facilitate reaching the zero emissions statutory target by the year 2045.

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Question and Answer

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