DEFINING CARBON NEUTRAL LANDSCAPES

HAWAII AS A MODEL SYSTEM FOR

UNDERSTANDING CARBON NEUTRALITY

DEFICITS AND ATTAINMENT

Christian P. Giardina
USDA Forest Service
Institute of Pacific Islands Forestry, Hilo, Hawaii

HB2182

§225P-B Zero emissions clean economy target. (a) Considering both atmospheric carbon and greenhouse gas emissions as well as offsets from the local sequestration of atmospheric carbon and greenhouse gases through long-term sinks and reservoirs, a statewide target is hereby established to sequester more atmospheric carbon and greenhouse gases than emitted within the State as quickly as practicable, but no later than 2045.

The CarbonNeutral Protocol

The global standard for carbon neutral programmes

Step 1: Define the Subject

Give a clear description of the subject

Step 2: Measure the Subject's Emissions

Provide a complete and accurate account of the GHG emissions of the subject

Step 3: Set Target

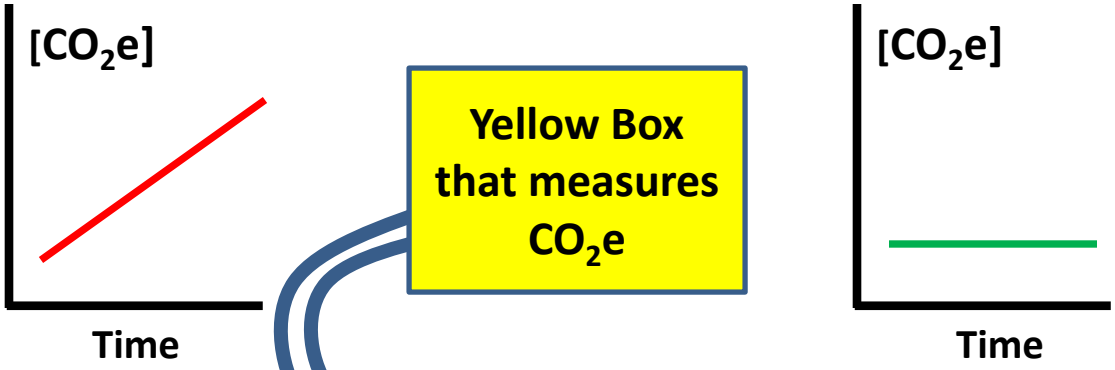
Set a target to achieve net zero emissions

Step 4: Reduce Emissions

Achieve the target through a combination of internal reductions and environmental instruments

Step 5: Communicate

Provide accurate and transparent information on how CarbonNeutral® certification is achieved



Yellow Box that measures CO_2e

Research & Development

Pacific Southwest Research Station

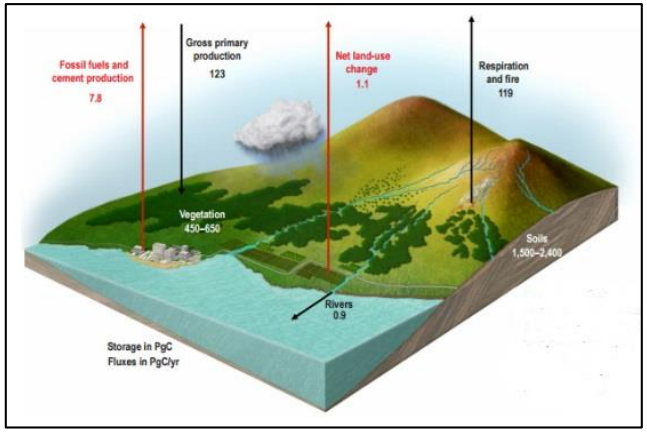
IPIF
Institute of Pacific Islands Forestry

The CarbonNeutral Protocol

The global standard for carbon neutral programmes

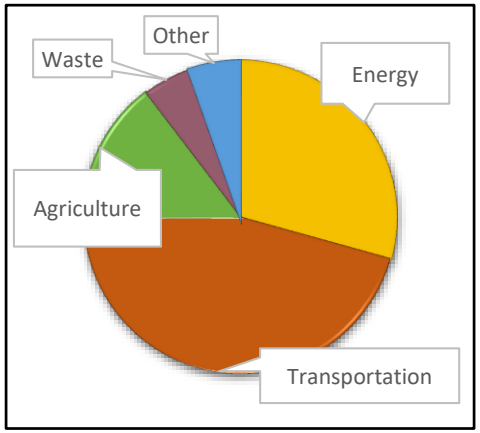
Step	Entities	Products[1]	Activities
1. Select GHG accounting protocol	The GHG Protocol Corporate Standard, or ISO 14064-1, or the Climate Registry's General Reporting Protocol or similar consistent protocols must be used.	The GHG Protocol Product Standard, PAS 2050, ISO/TS 14067 or methods set out in steps 2-7 below must be applied unless the CarbonNeutral certifier identifies valid reasons for using other methods.	The GHG Protocol Product Standard, PAS 2050 or methods set out in steps 2-7 must be applied unless the CarbonNeutral certifier identifies valid reasons for using other methods.
2. Define boundary	The boundary must include all sites, plants and vehicles owned by or under the direct management control of the subject.	The boundary must be consistent with the definition of the subject. For cradle-to-customer subjects, the boundary must extend to the point of customer delivery. For cradle-to-grave subjects, the boundary must extend to end-of-life disposal.	The boundary must be consistent with the definition of the subject and must include the sites and/or vehicles involved in the delivery of the activity.
3. Identify emissions sources	Assessments must include emissions sources as specified in **Annex B** – CarbonNeutral® certifications and their specific required assessment emissions sources.		
4. Identify GHGs to be measured	All Kyoto Protocol GHGs, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, sulphur-hexafluoride (SF_6) and nitrogen trifluoride (NF_3) must be measured in the assessment, insofar as they apply to the subject.		
5. Establish time period	Assessments must at a minimum be conducted annually and should relate to a 12 month data period. The final date of an assessment data period must not be earlier than nine months prior to start of CarbonNeutral® certification period (i.e. data more than 21 months old is not permitted).	For standard consumer products, assessments must at a minimum be every three years, unless a significant change to the product supply chain has occurred in which case another assessment must be undertaken. For one-off or custom produced products the timescale must relate to the production and delivery period.	For standard consumer activities, assessments must at a minimum be annual. For one-off or custom activities the timescale must relate to the production and delivery period.
6. Determine data validity	Primary data must be used in preference to secondary data, where it is readily available, up to date and geographically relevant. Estimates, extrapolations, models and industry averages may be used where primary data is unavailable. When this is done, these assumptions must be recorded by the party carrying out the assessment. A qualitative and/or quantitative description of the uncertainty associated with the client-supplied data should be made. In cases where the quality of client supplied data is not known (e.g. in online calculators), the dependency of results on the quality of input data should be made clear.		
7. Measure GHG emissions	The subject's GHG emissions must either be directly measured or quantified using national, regional, international, or other relevant emission factors, with preference given to emission factors most closely associated with the emissions source (e.g. DEFRA emission factors for UK-based assessments). The assessment must be reported in units of CO_2e according to the 100 year potential of each gas. Preference should be given to the GWP factors included within the latest assessment report of the Intergovernmental Panel on Climate Change (IPCC) (currently 5th). In instances where most relevant emission factors available use previous GWP factors, it is still acceptable to use these emission factors. GWP factors applied must be clearly stated in the assessment. Emission sources that are required to be assessed (see **Annex B**) but are estimated to represent less than 2% of the subject's total GHG emissions, but collectively no more than 5% of the subject's GHG emissions, may be calculated and reported using simplified estimation methods.		
8. Quality assurance	All GHG assessments must either be conducted or checked, and in the case of GHG tools and calculators, be approved, by an independent, expert third party approved by Natural Capital Partners to ensure they have met the above requirements in this table. **Annex F** details requirements and recommendations for the presentation of GHG assessments; and, **Appendix 2.8** provides further guidance on quality assurance and verification.		

Available Datasets…



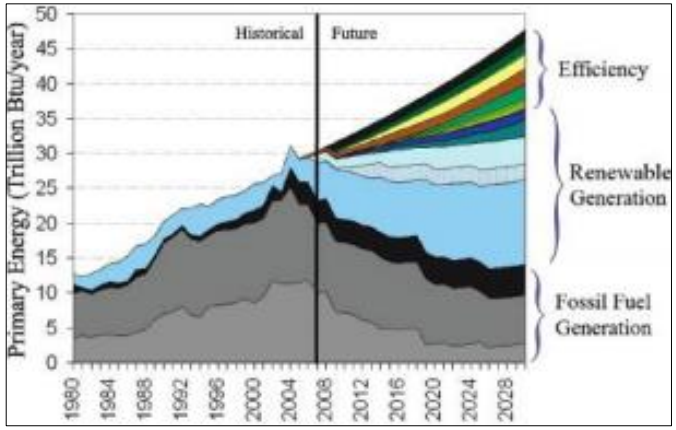
Hawaii Carbon Assessment

Doi.org/10.3133/pp1834



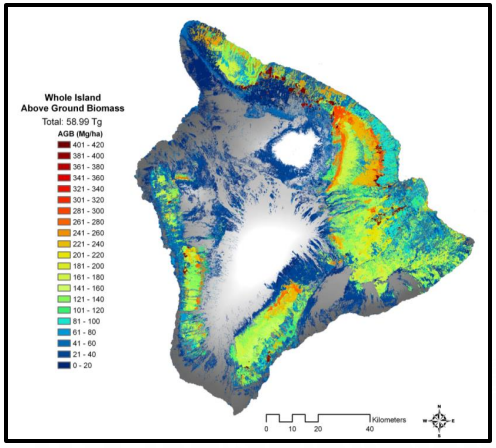
Hawaii Greenhouse Gas Inventory

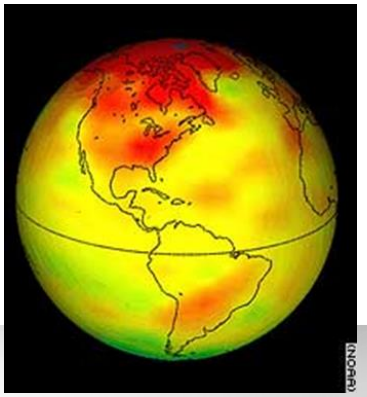
www.energy.Hawaii.gov/wpcontent/uploads/2011/10/ghginventory-20081.pdf



Hawaii Mass Energy Transfer Budgets

www.environment.yale.edu/profile/chertow





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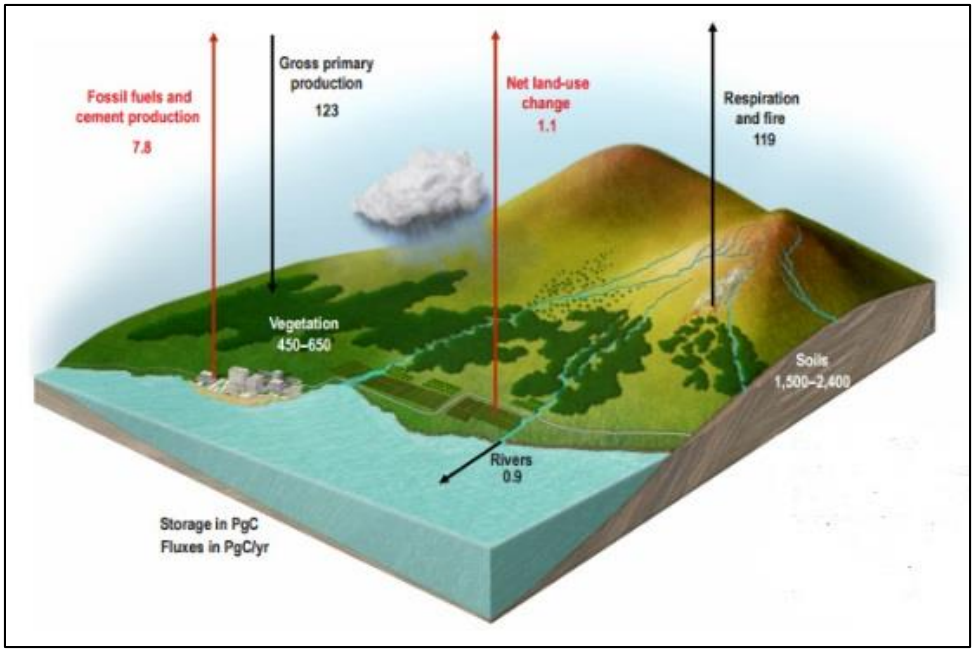

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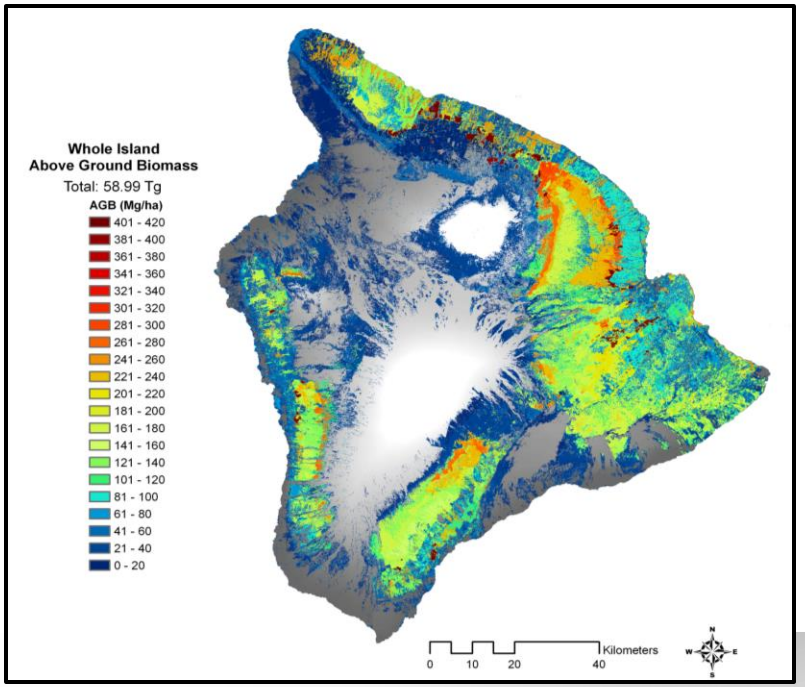

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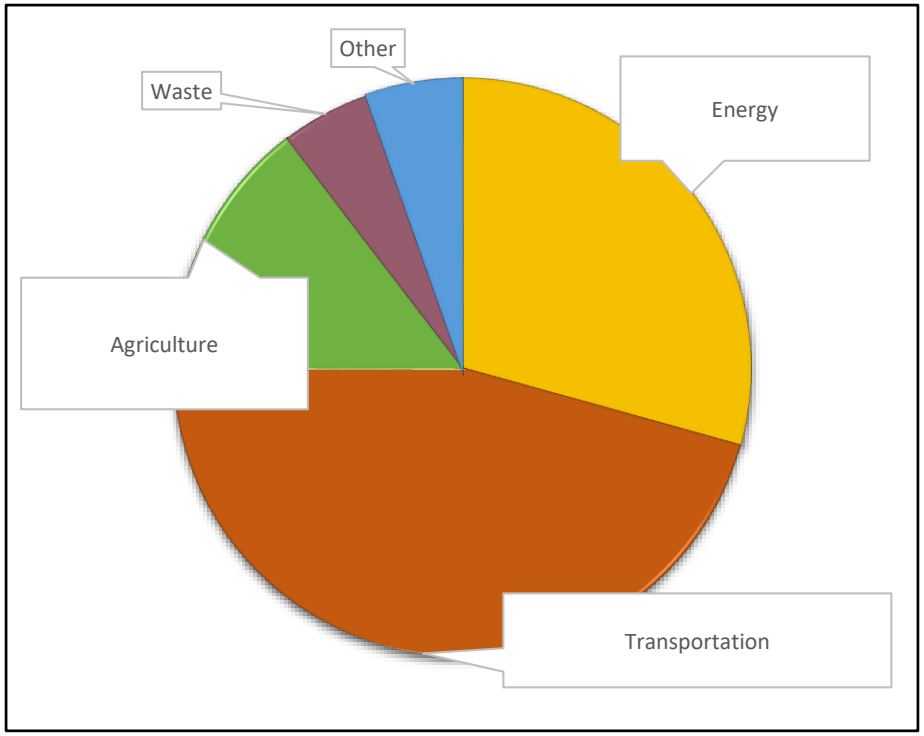

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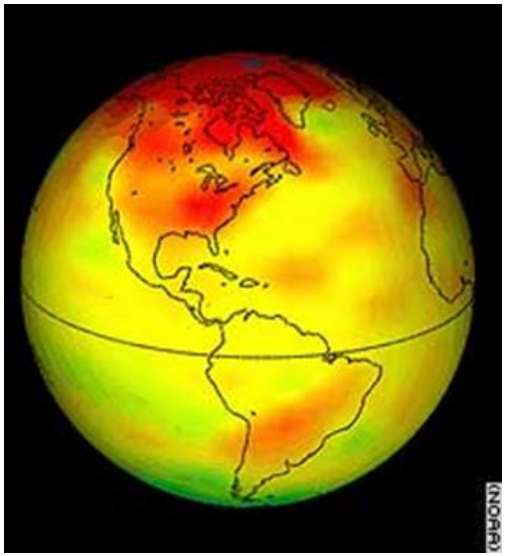

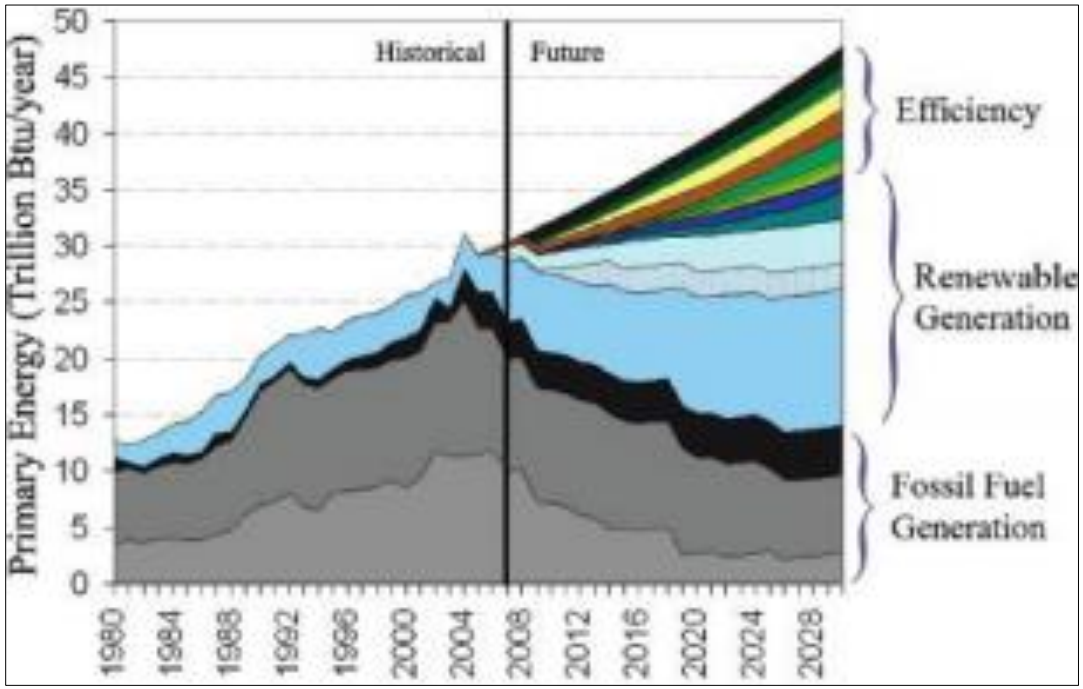

Hawaii Mass Energy Transfer Budgets

www.environment.yale.edu/profile/chertow

Technology by Sector

Land Management

Policy and Finance

Social Preferences

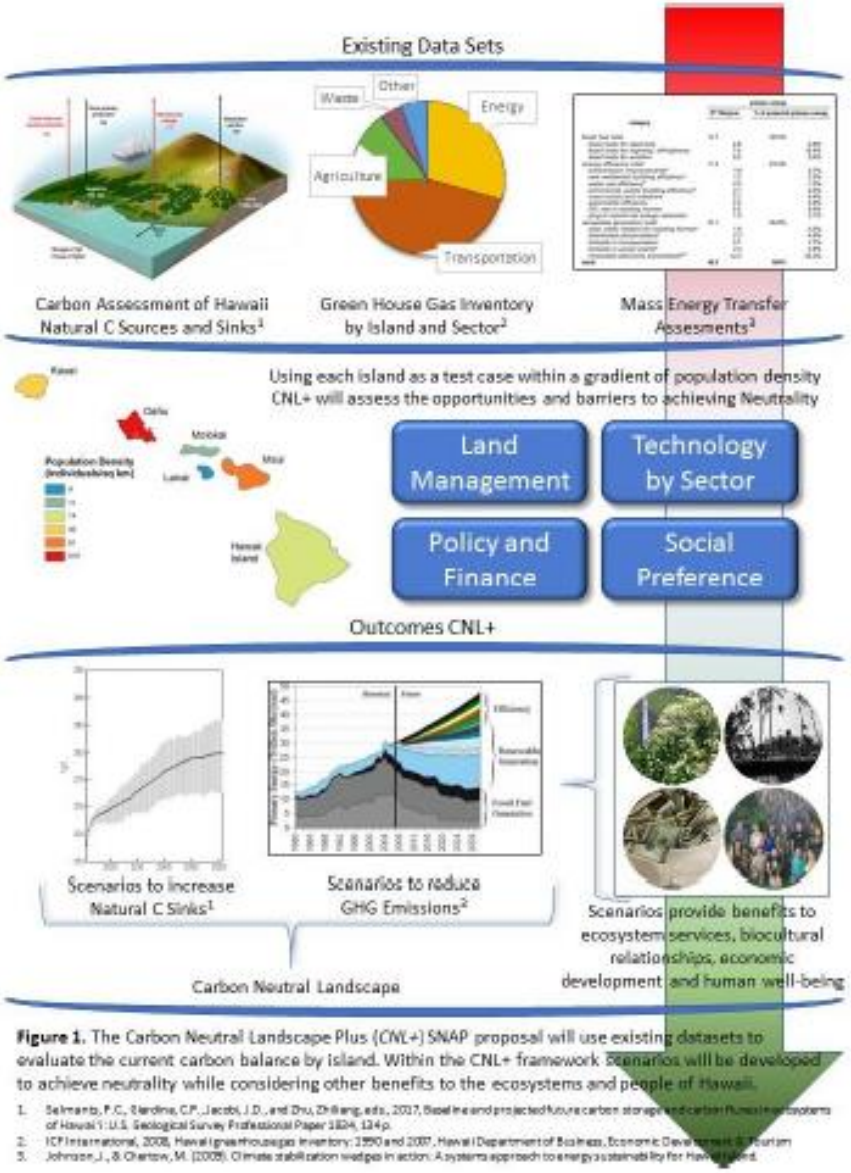

Figure 1. The Carbon Neutral Landscape Plus (CNL+) SNAP proposal will use existing datasets to evaluate the current carbon balance by island. Within the CNL+ framework Scenarios will be developed to achieve neutrality while considering other benefits to the ecosystems and people of Hawaii.

1. Selmants, P. C., Giardina, C.P., Jacobi, J. D., and Zhu, Zhiliang, eds., 2017, Baseline and projected future carbon storage and carbon fluxes in ecosystems of Hawai'i: U.S. Geological Survey Professional Paper 1824, 134 p.
2. ICF International, 2008, Hawai'i greenhouse gas inventory: 1990 and 2007, Hawai'i Department of Business, Economic Development & Tourism
3. Johnson, J., & Chertow, M. (2008). Climate stabilization wedges in action: A systems approach to energy sustainability for Hawai'i and

Transportation

Energy

Waste

Agriculture

Sequestration

Plus

State of Hawaii Law H.B. 2182

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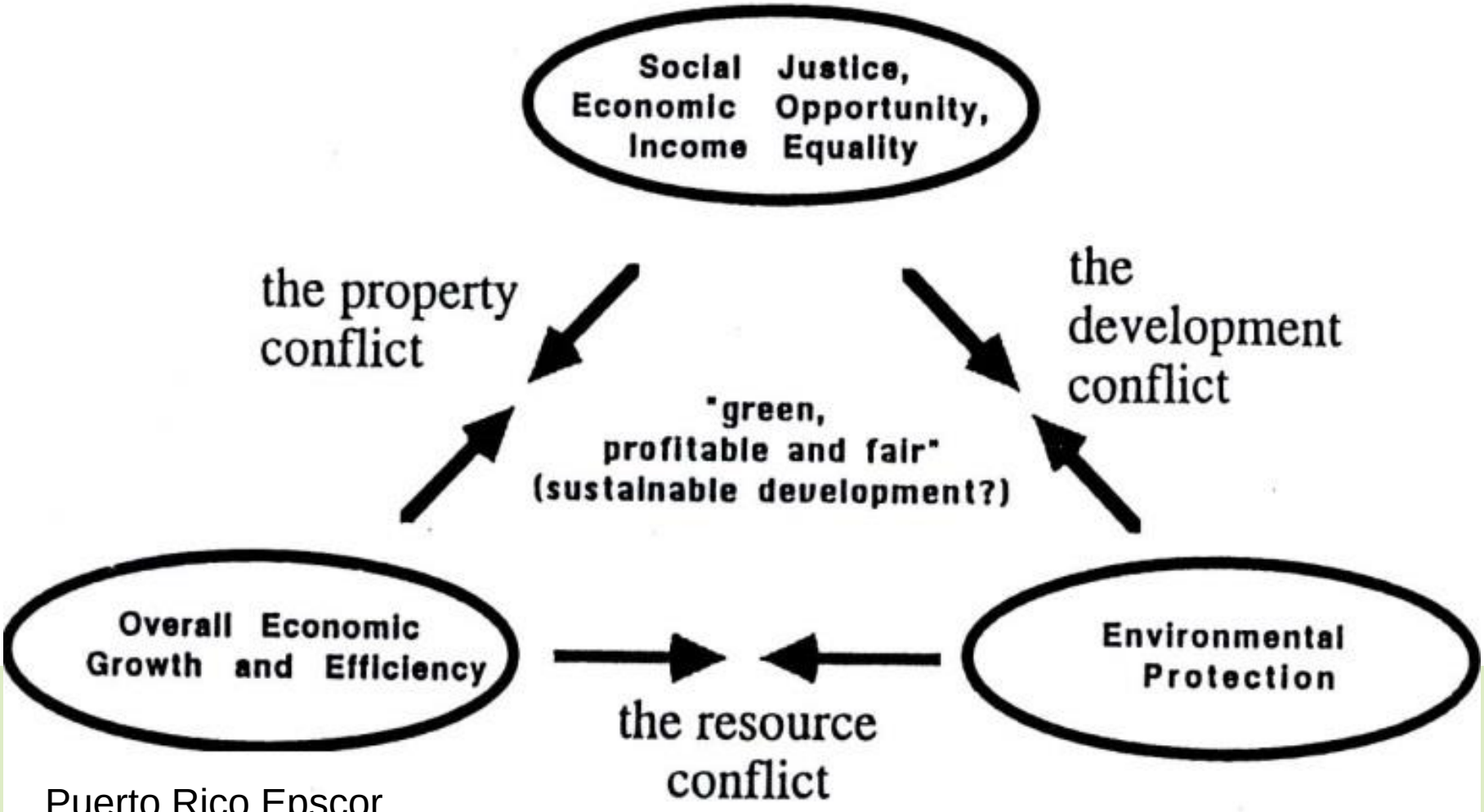
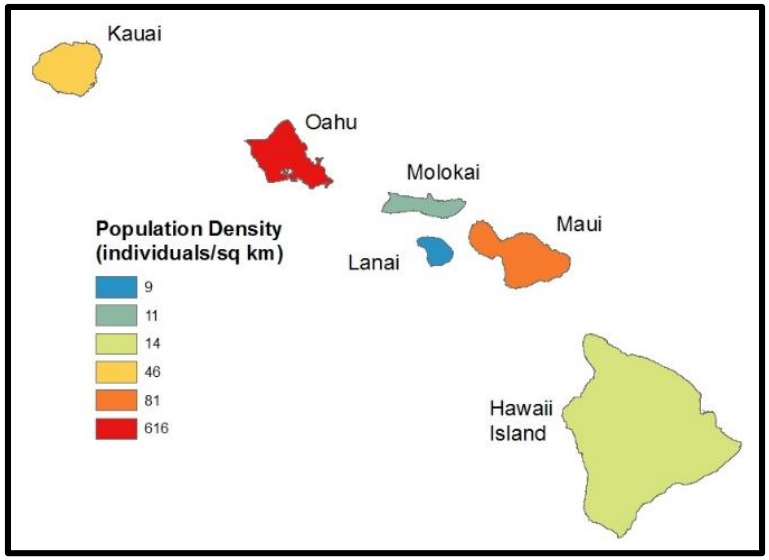
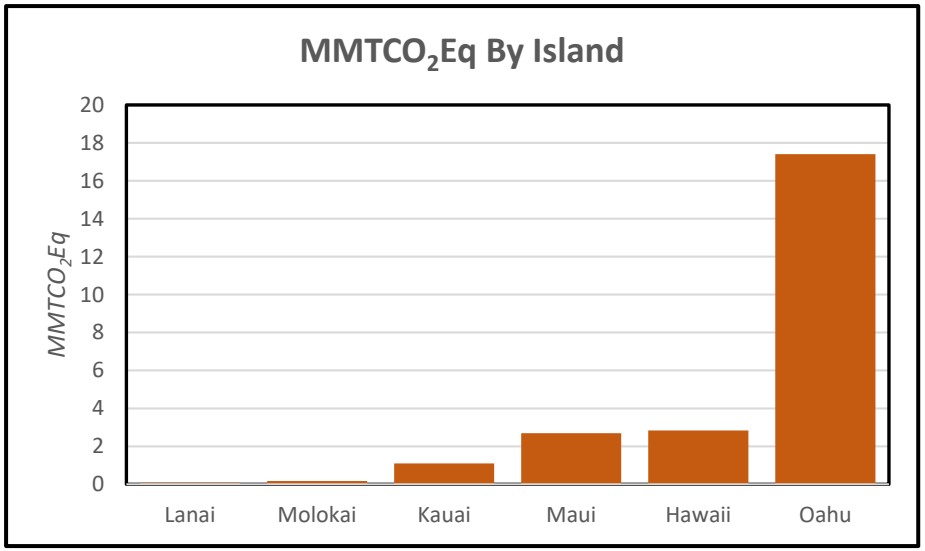
Social Acceptance and Adoption of Carbon Neutral Lifestyles:



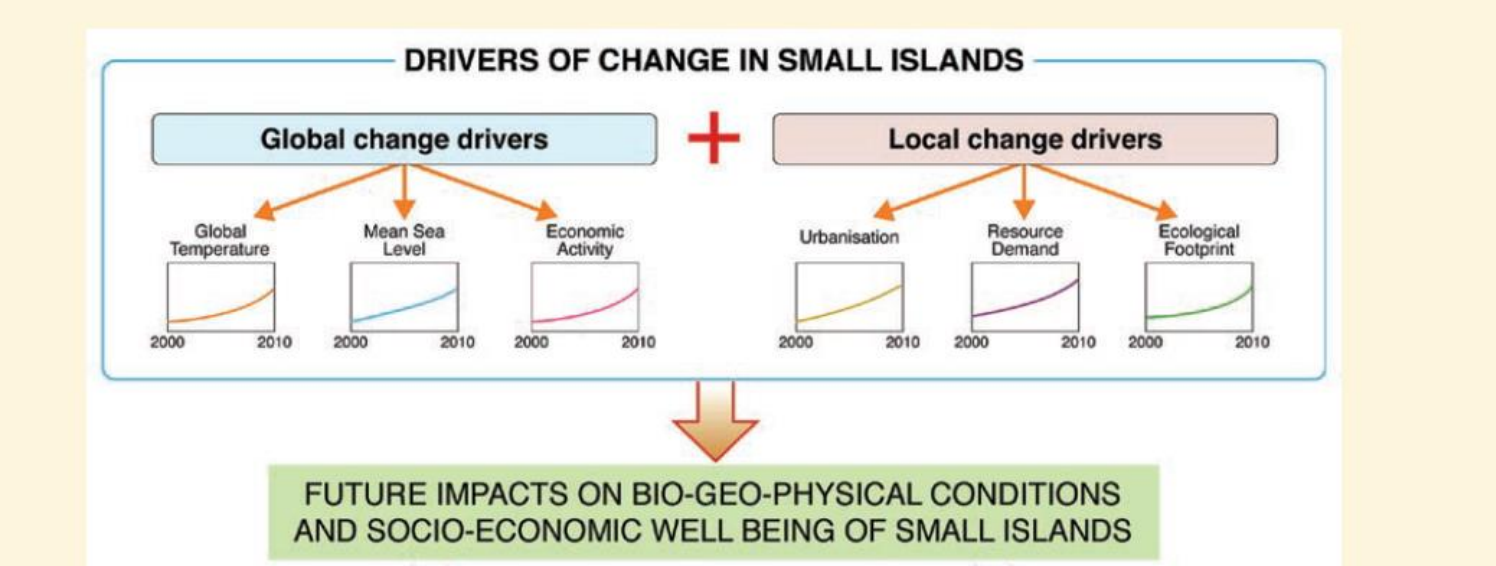
Hawaii as a model system:



Population Density by Island



CO_2 Emissions by Island



Mahalo!