Biochar:

The Sustainability Challenge

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The Energy Imperative

- Energy demand continues to rise
- Declining availability of cheap fossil fuels
- Increasing pressure for domestic and renewable energy
- Increasing demand for wide variety of biomass, multitude of locations

The Productivity Imperative

- Food demand continues to rise with population, food sources less secure
- Declining availability of cheap fossil fuels to farm using current systems
- Rising transportation costs affecting affordable and adequate distribution
- Declining forest health and catastrophic wildfires

The Biomass Allure

- Ubiquitous
- Wide variety of sources
- Wide variety in shape, size, weight, energy density
- Currently much found in waste stream
- Portable, transportable, accessible
- **Renewable**

Biomass for Energy

High potential to become a leading source of electrical power, heat and transportation fuels globally

Renewability + Availability + Accessibility + Demand

=

HIGH POTENTIAL FOR OVERUSE

Sustainability

Benefitting from the use of resources
in a way that does not preclude
their use and enjoyment
by future generations – of all species.

Biomass

According to us humans:

Any carbon-based material, which when sufficiently dry, can be thermally converted to energy and other by-products.

But…

According to nature:

Biomass is a complex structure
of nutrients and moisture
and temperature regulators,
providing shelter, food,
homes and carbon sequestration.

Sustainability of Biomass

- Recognizing and respecting the difference in the definitions of biomass between humans and nature.
- Reconciling the differences in perceptions and beliefs.
- Understanding ecological limitations.
- Understanding social limitations.
- Rebuilding trust from past bad examples.
- Education by demonstration.

Biomass Use Concerns

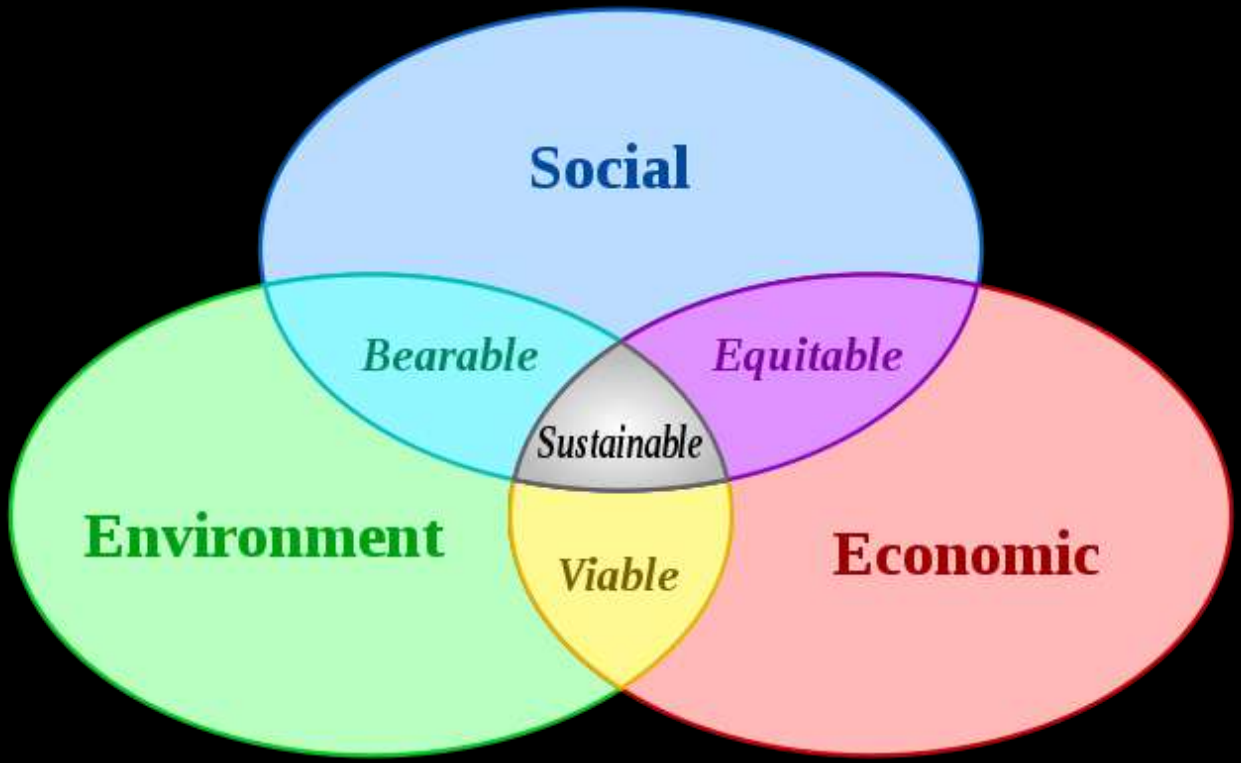
- Replacing croplands for food and animal feed with biomass crops
- Overuse and depletion
- Conversion of native forests, prairies or CRP lands to plantations
- Clearcutting mature timber/roading
- Shorting current uses/users
- Deleterious effects on soil nutrient levels, habitat, water and air quality, wildlife
- Loss of up-cycling opportunity

Baseline for Sustainability

Maintain or enhance:

- Soil productivity and structure
- Biodiversity and habitat
- Water and air quality
- Visual quality
- Landscape and community character
- Sound EROEI (energy return on energy invested)
- Environmental quality
- Environmental justice/social equity
- Balance flow of outputs with sustainable flow of inputs

Finding the “Sweet Spot”



USBI and Sustainable Biochar Practices

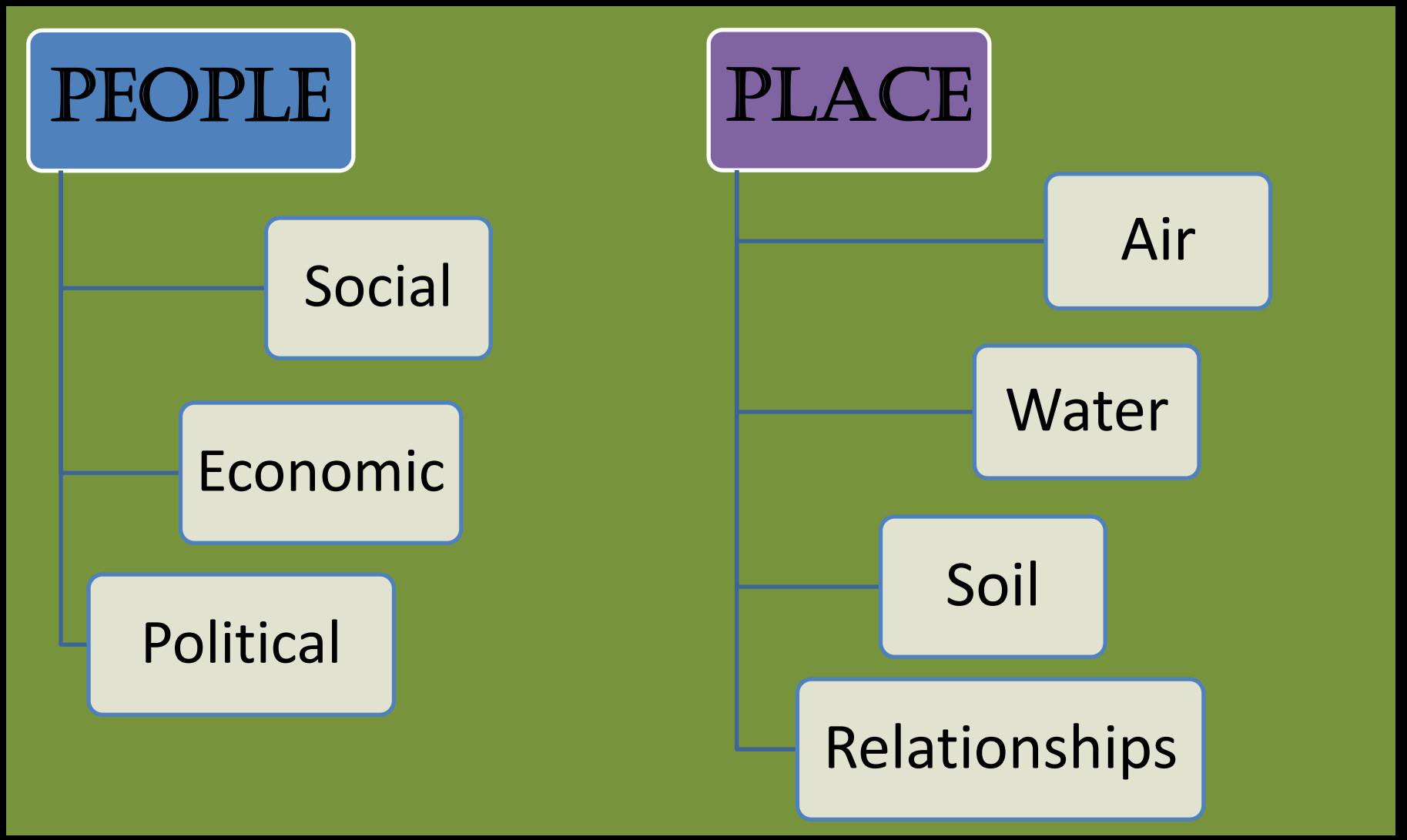
RISING TO THE CHALLENGE

Sustainable Biochar…

…is derived from terrestrial non-fossilized bio-carbon produced in way that, on a life-cycle assessment basis,:

- Reduces competition for & use of natural resources and energy
- Preserves habitats and ecosystems
- Maintains or improves soil quality
- Reduces greenhouse gas emissions
- Avoids GMO’s
- Provides community benefits, jobs and fair labor

Guiding Principles



Guiding Principles: People

Political

- Just, Ethical Policies
- Demo-cratic Process
- Shared Leader-ship
- Inclusive

Economic

- Subsidy Free
- Carbon Markets
- Water Markets
- Nutrient Markets

Guiding Principles: People (con.)

Social

- Food Security
- Local
- Fair Wage
- Safe Work

My brush crew enjoying yet another break…

Guiding Principles: Place

Air & Water

- No net GHG increase
- Water Efficiency
- Maintain Water Quality
- Maintain Air Quality

Soil & Energy

- No Toxic Chemicals
- Improve Soils
- Create & Conserve Energy
- Protect Wetlands

Guiding Principles: Place (con.)

Relationships

- Enhance Bio-diversity
- Maintain Habitats
- Avoid Land Use Conver-sion
- Enhance Produc-tivity

Sustainability Standards/Guides

Potential METRICS

- Scale
- Scope
- Monitoring
- Life Cycle Assessment
- Certification
- Economics
- Natural Capital
- Ecosystem Services

Potential ELEMENTS

- Social Equity
- Science-driven Policy
- Land Use
- Soil Quality
- Hydrologic Systems
- Nutrient Cycling
- Biodiversity
- Feedstock Procurement
- Waste & Energy Mgmt

Role of USBI

- Establish sustainable practices as the norm
- Monitor to ensure practices are effective, implementable & produce expected results
- Ensure beneficial EROEI
- Self-policing through Best Management and Sustainability Practices field guides
- Support Sustainability Certification Process(es) to grow and expand pubic trust

True sustainability means
that all of our choices
are conducive to life.

Thank you for being here.

Remember - Insatiable is not sustainable.

APPENDICES SLIDES

U.S.-FOCUSED BIOCHAR REPORT

BIOCHAR SUSTAINABILITY IN:
BIOCHAR AND SUSTAINABLE PRACTICES

USBI

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Leading U.S. Sustainability Guidelines

- Pacific Northwest Biochar Initiative – Comprehensive, focus on biochar
- Sustainable Biodiesel Alliance- comprehensive, focus on biodiesel
- Council on Sustainable Biomass Production – biomass to bioenergy.

Sustainability Standards/Guides

INTERNATIONAL FRAMEWORK

- United Nations World Council on Sustainable Development
- International Union for the Conservation of Nature
- Forestry Stewardship Council

IMPLEMENATION MECHANISMS

- Mandatory/Regulation/ Standards vs. Voluntary/Guidelines/ Recommendations
- Oversight Board vs Self-policing

Leading Int'l Certification Efforts

- Roundtable on Sustainable Biofuels (project of National Polytechnic School of Lausanne) – Certification System based on EU sustainability criteria - focused on land use and sourcing
- Forest Stewardship Council (international group) – expands to include social and economic issues - indigenous rights, community integrity