



Getting to True Sustainability

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Presentation Team

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Agenda



- Overview of the Framework for Sustainable Development
- Charrette Exercise:
 - Concept presentation
 - Small group breakouts
 - Small group summaries
- Wrap up discussion

Green vs. Sustainability

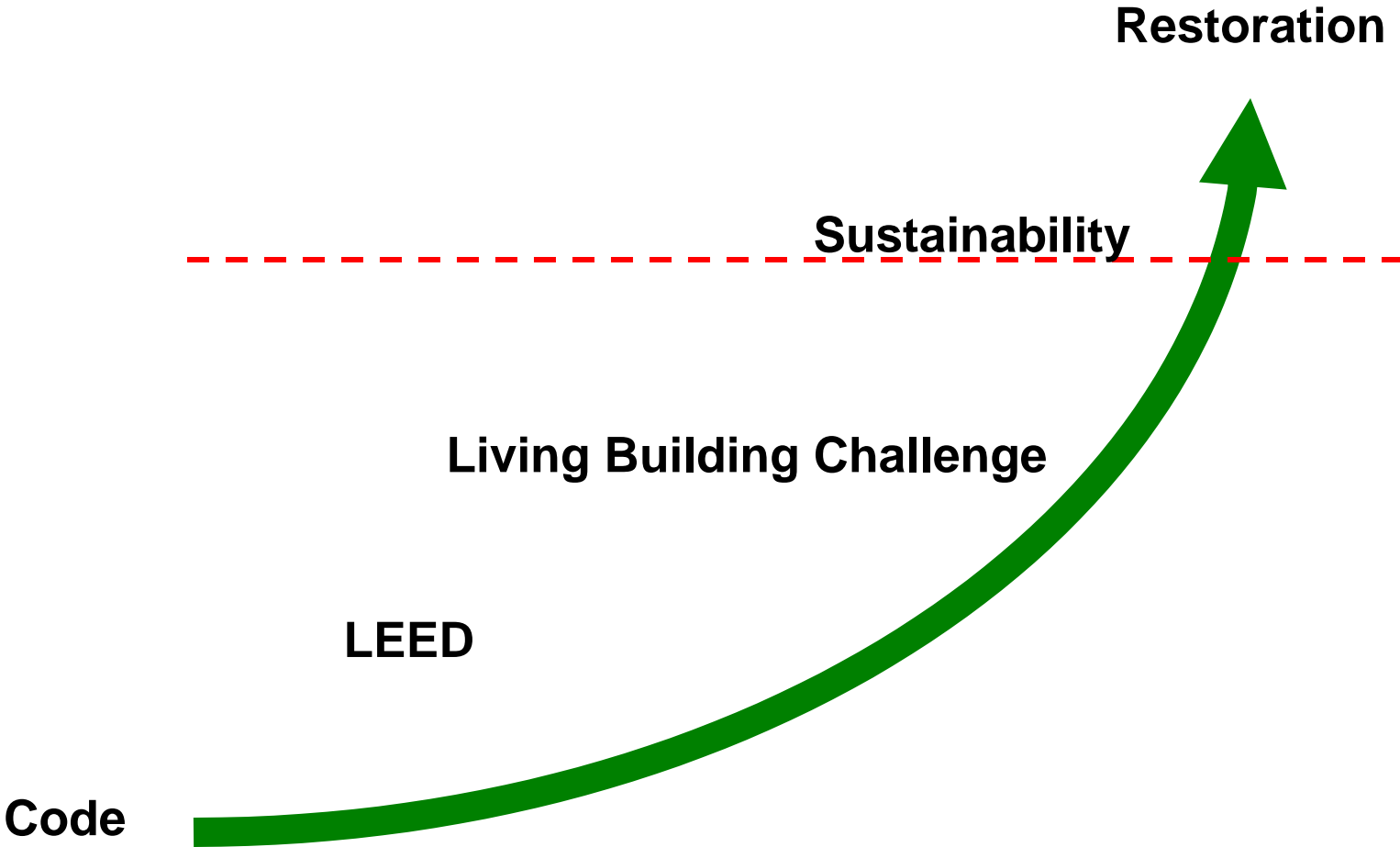
Green

- Detail focused
- Tactical
- Ecological
- Focus on being less “bad”
- Lacks common definition of success

Sustainability

- Whole systems focus
- Strategic
- Triple bottom line
- Focus on aligning with nature’s cyclical processes
- Capable of defining success

Path to Restoration



Which sustainability tools should I use?

- Natural Step
- Triple bottom line
- Cradle-to-cradle
- Natural Capitalism
- Precautionary principle
- Zero Waste
- Factor X
- Eco-footprint
- Life Cycle Assessment
- Environmental Management Systems – ISO14001, EMAS, SMS



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**Cleaner
Production**

www.cleanerproduction.net

Strategic sustainable development — selection, design and synergies of applied tools

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Abstract

The number of tools and approaches to develop sustainability is growing rapidly. Sometimes they are presented as if they are contradictory or in competition. However, a systems approach consistent with basic principles and the requirements of sustainability shows that these tools are complementary and can be used in parallel for strategic sustainable development. In fact, it is only when using these approaches outside of the systemic context of sustainability that they become contradictory. This paper is a collective effort of scientists who have pioneered some of these tools and approaches.

The paper maps essential elements for developing sustainability and documents how these elements relate to the application of the respective tools. The objective is to show how these tools and approaches relate to each other and build on each other when used for planning for sustainability. © 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Sustainable development; Sustainability; Systems thinking; Backcasting; Upstream thinking; Strategic planning; Factor X; Factor 10; Ecological footprinting; ISO 14001; EMAS; EMS; System conditions; Life cycle assessment (LCA); The natural step (TNS); Zero emissions (ZE); Cleaner production (CP); Sustainable technological development (STD); Natural capitalism

Five Level Model



Game of Chess

Chessboard, rules of the game

Capturing King - *Checkmate*

Strategies for opening, middle and end game

Tactics for moving pieces

Books, classes, computer programs

Five Level Model

Sustainability Game

Nature's laws & science
Social and economic principles

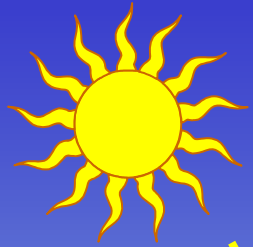


Basic Science of Sustainability

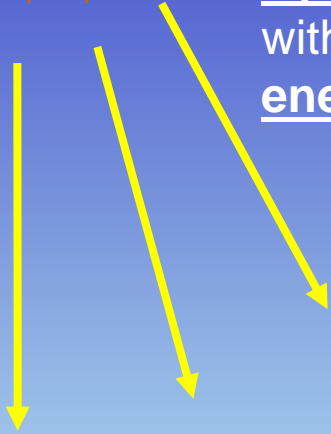
- Matter and energy do not disappear
- Matter and energy tend to disperse
- Value of matter is in its concentration and structure
- Photosynthesis is principal process by which net order is produced



Earth as a System

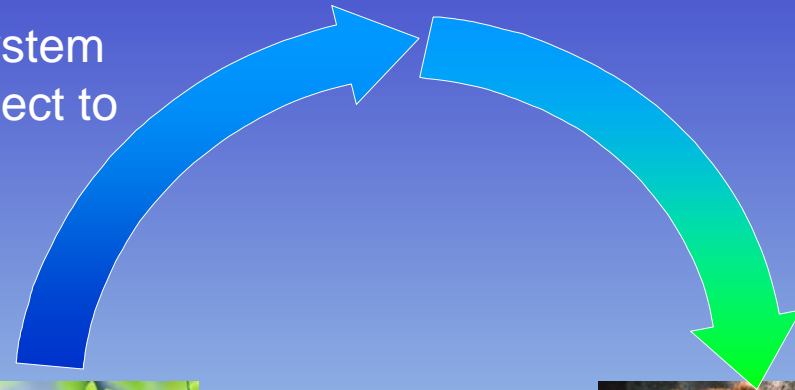


Open System
with respect to
energy

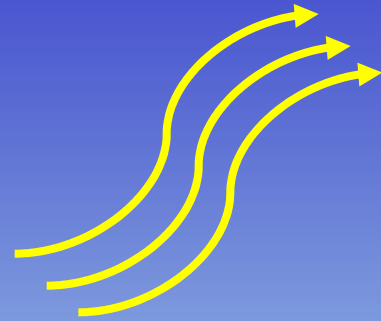


“Photosynthesis pays
the bills”

Slow geological
cycles - materials
from the Earth’s
crust

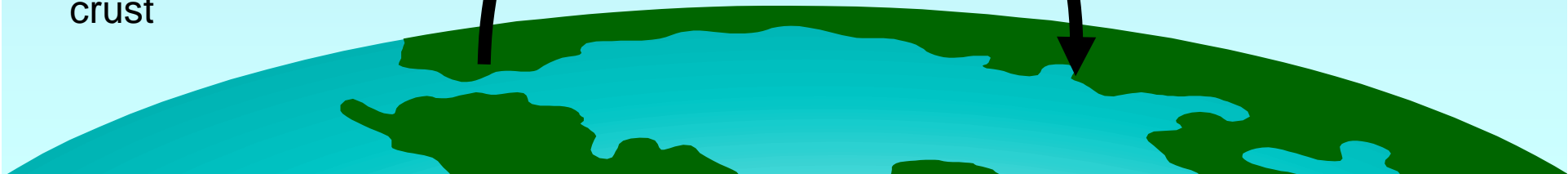
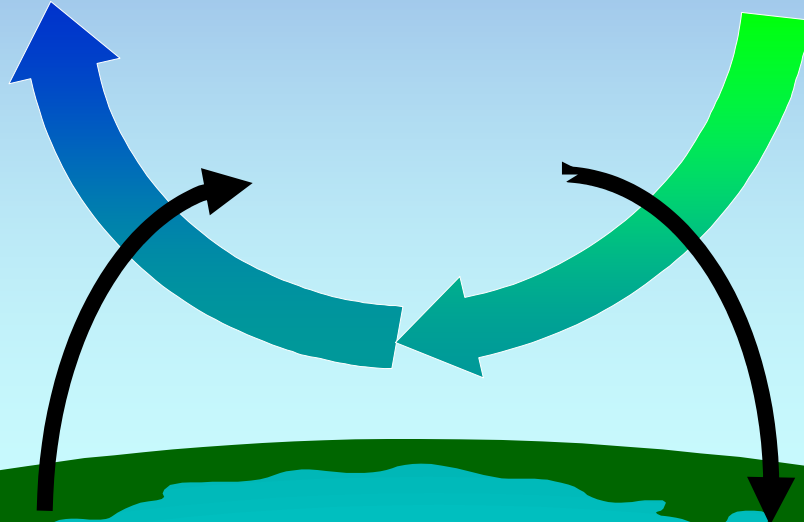


Closed System
with respect to
matter

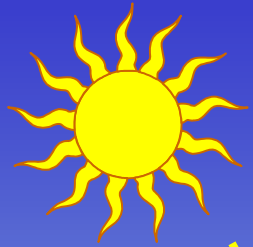


- 1) Nothing disappears
- 2) Everything disperses

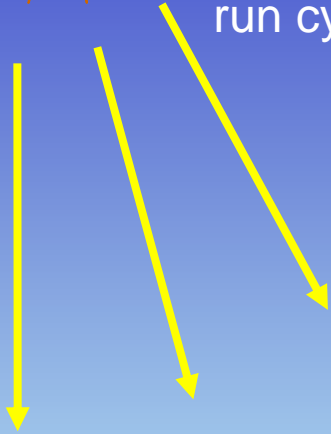
Sustainability is
about the ability of
these cycles to run
forever.



How we influence cycles



Physically inhibit
ability of nature
to run cycles

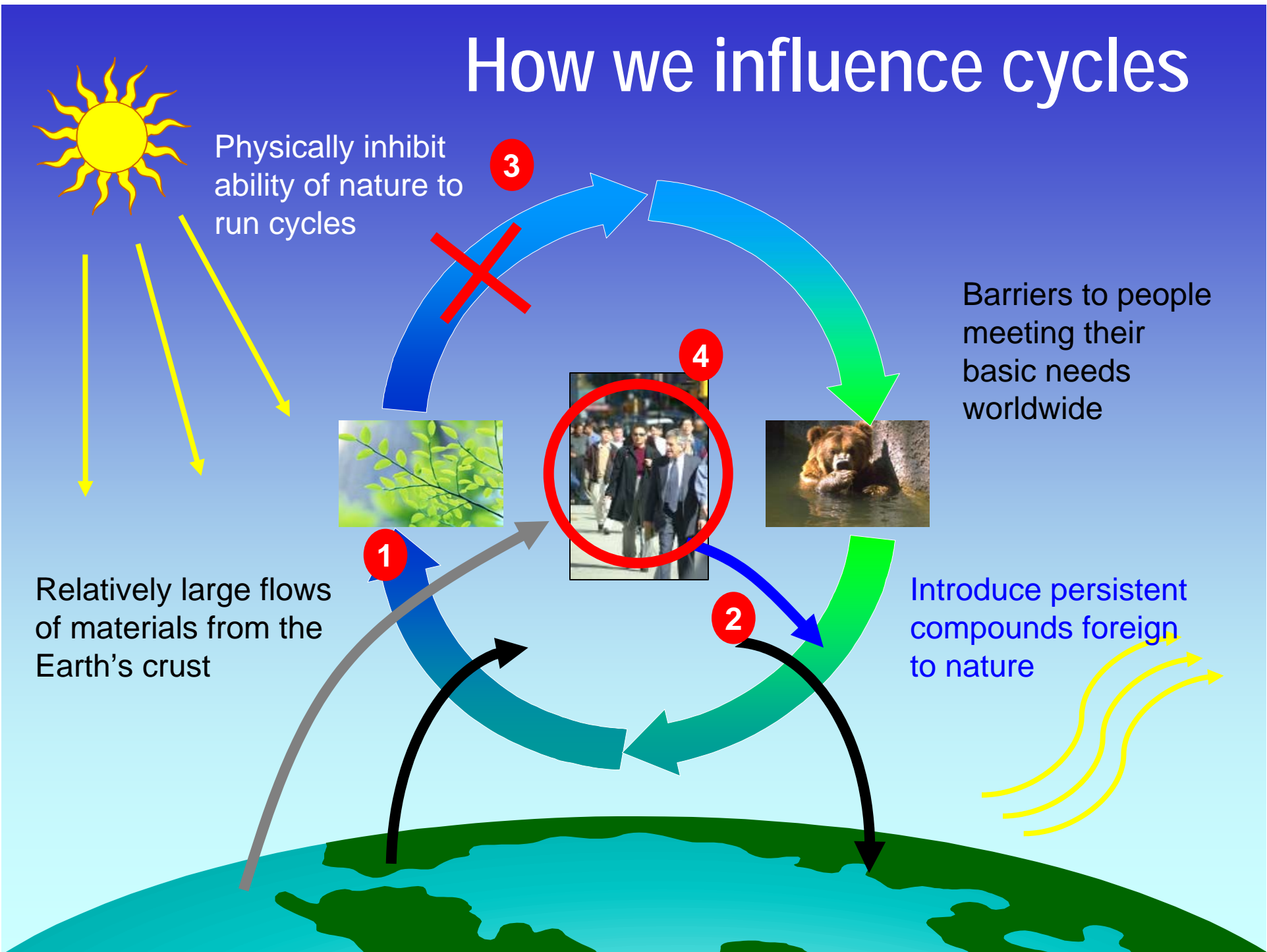
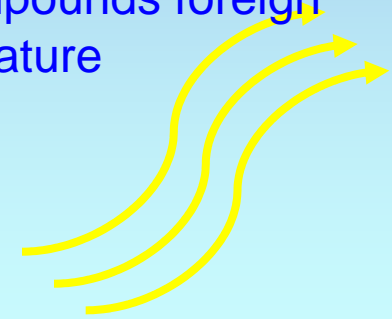


Relatively large flows
of materials from the
Earth's crust



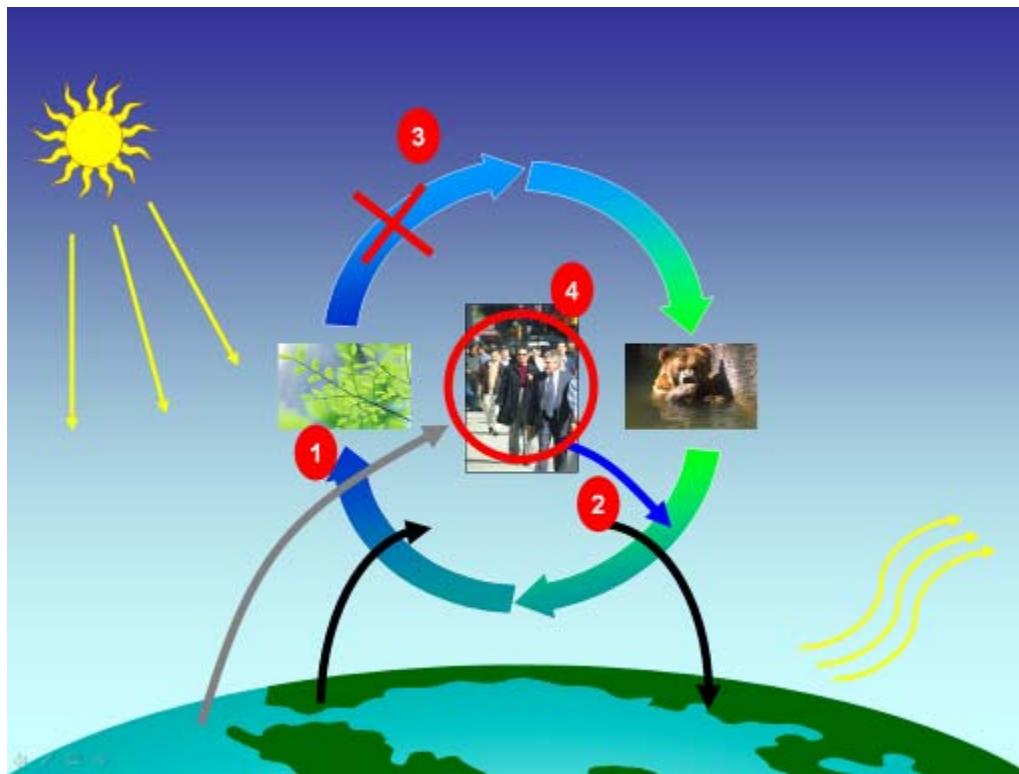
Barriers to people
meeting their
basic needs
worldwide

Introduce persistent
compounds foreign
to nature



Sustainability defined: *The four System Conditions*

In a sustainable society, nature is not subject to systematically increasing:



① Concentrations of substances extracted from the earth's crust

② Concentrations of substances produced by society

③ Degradation by physical means

and, in that society, people are not subject to

④ Conditions that systematically undermine their capacity to meet their needs.

Four System Conditions

In a sustainable society, nature is not subject to systematically increasing...

- 1. ... concentrations of substances extracted from the earth's crust;**
- 2. ... concentrations of substances produced by society;**
- 3. ... degradation by physical means;**
and in that society,
- 4. people are not subject to conditions that systematically undermine their capacity to meet their needs .**

Five Level Model



Sustainability Game

Nature's laws & science
Social and economic principles

TNS system conditions + economic
(Triple Bottom Line)

“Backcasting”, ABCD Planning Process

Sustainability Planning Process

A - Awareness

What do you know about sustainability and why it matters?

B - Baseline Mapping

What does your organization look like today?

C - Clear and Compelling Vision

What does your organization look like in a sustainable society?

D - Down to Action

How will you manage and prioritize steps to sustainability?

Using The Natural Step As A Framework Toward The Construction and Operation of Fully Sustainable Buildings

By the Oregon Natural Step Construction Industry Group¹

Introduction

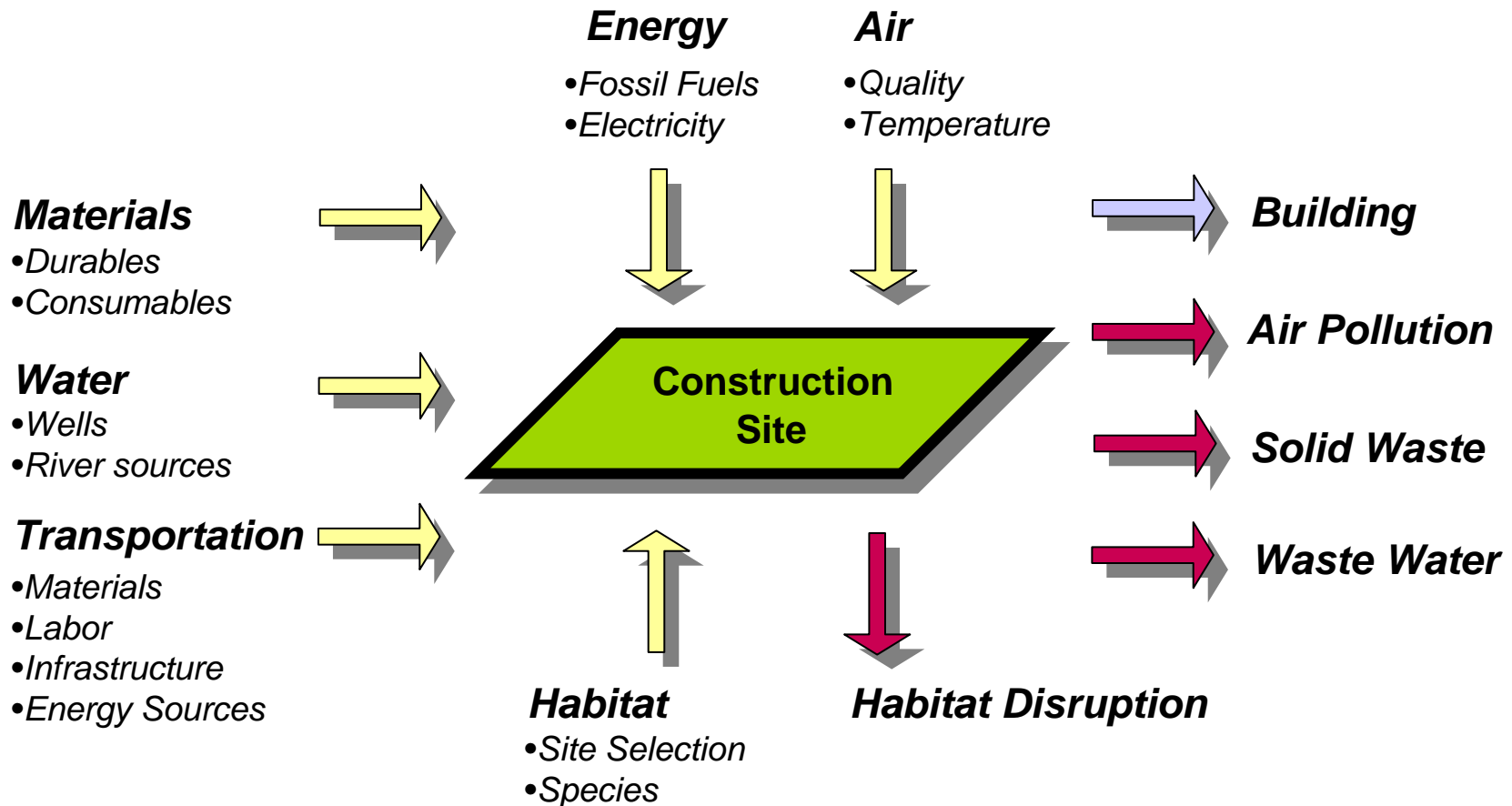
Interest in green building practices has existed for many years. These are ecologically oriented practices that focus on conserving energy and natural resources, protecting human health, preserving biodiversity and environmental quality while preserving or increasing a building's and site's long term value.

However, as the overall environment continues to deteriorate there is a growing awareness that "green" or environmental practices need to reach a level of environmental sustainability, a place where nature's ability to provide for the needs of both the current and future generations is not compromised.

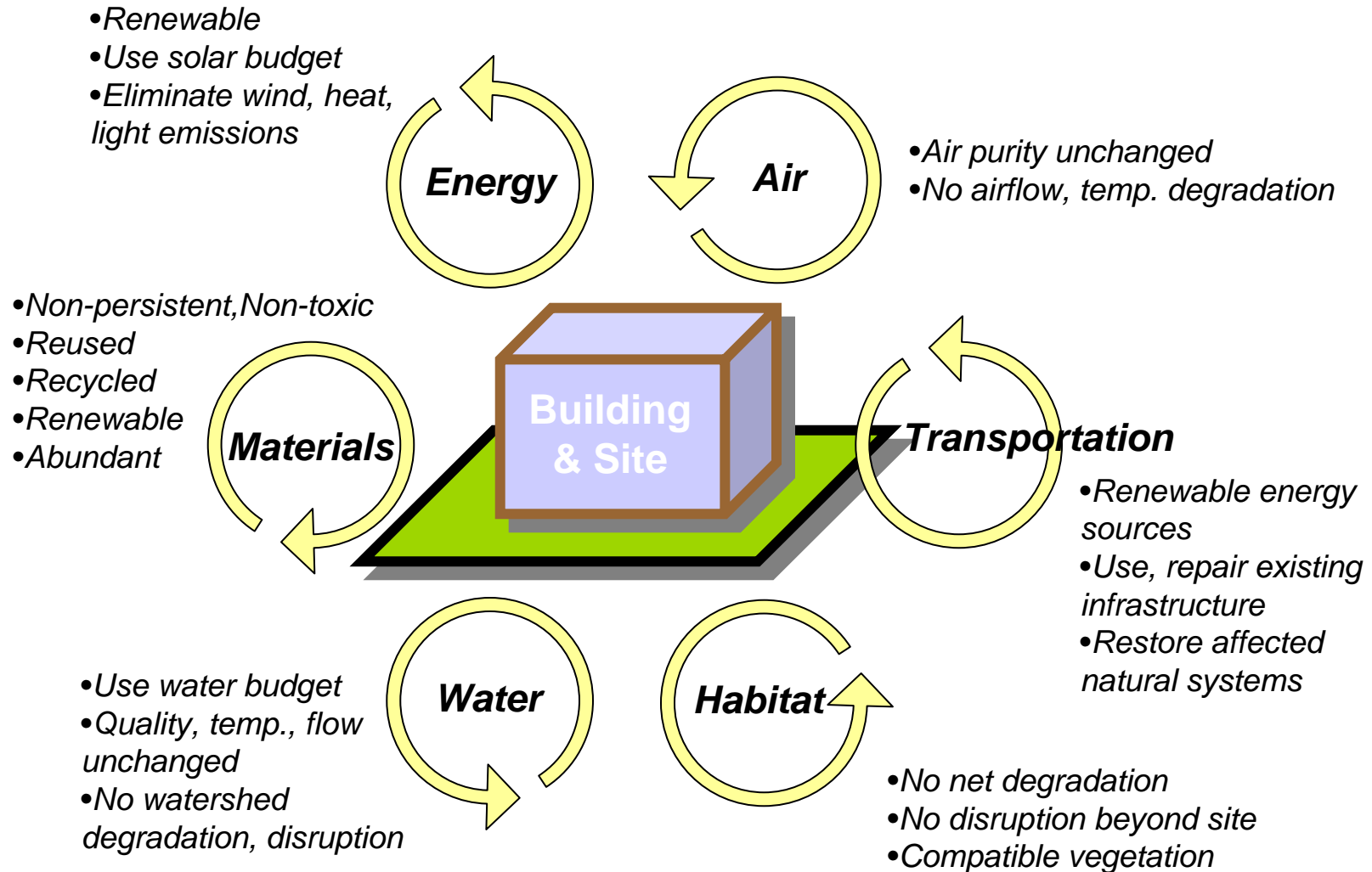
A useful tool for determining sustainability is The Natural Step, a set of four, scientifically-based, system conditions developed by Swedish oncologist, Dr. Karl Henrik Robert. A construction industry task force, organized by the Oregon Natural Step

<http://www.naturalstep.org/en/system/files/TNSConstructionPaper.pdf>

Construction Flow Chart



"Full Alignment" Flow Chart



Five Level Model



Sustainability Game

Nature's laws & science
Social and economic principles

TNS system conditions + economic
(Triple Bottom Line)

“Backcasting”, ABCD Planning Process

Recycling, energy efficiency, renewable
energy, water conservation, etc.

Living Building, Cradle-to-Cradle, LEED
Life Cycle Analysis, Env Mgt Systems

South Waterfront - *Portland*



- **Project Description**

- 130 acre urban redevelopment
- Integrated mixed use
- 5,000,000 SF office
- 400,000 SF retail
- 8000 residential units
- All LEED certified

- **District-wide**

- 40% of private land dedicated to open space
- 100% of public stormwater treated naturally
- In stream habit restoration for salmon
- Street car transportation

- **OHSU Center for Health and Healing**

- 60% energy savings
- 100% on-site waste water treatment
- Stormwater reuse for irrigation and toilets
- microturbines, PVs, Trombe wall
- LEED Platinum
- no cost premium after incentives + \$600k annual operating cost savings



Context

Who is David Evans and Associates, Inc?

a multidisciplinary consulting planning and engineering company doing business in the energy, transportation, water, and land development markets



What is Sustainable Transportation?



A Sustainable Mainstreet

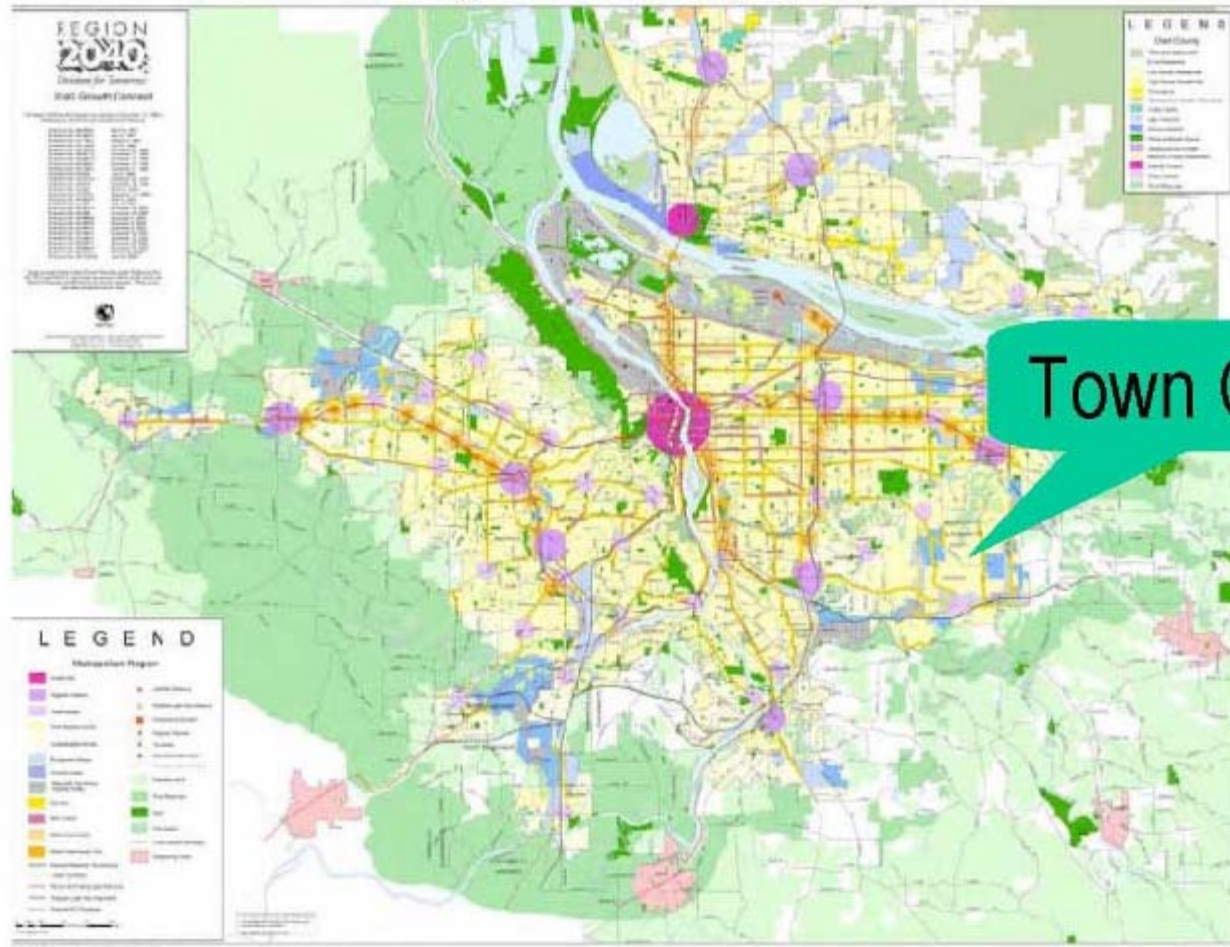
Case Study:

The new Damascus, OR Mainstreet



Regional Designation

Figure 1.3 2040 Growth Concept Map



Town Center

A Case for Early Stage, Collaborative Planning & Design

Goal of integrated design: to balance all of the different project elements into a form that in totality exceeds the performance of its individual components



A Case for Early Stage, Collaborative Planning & Design

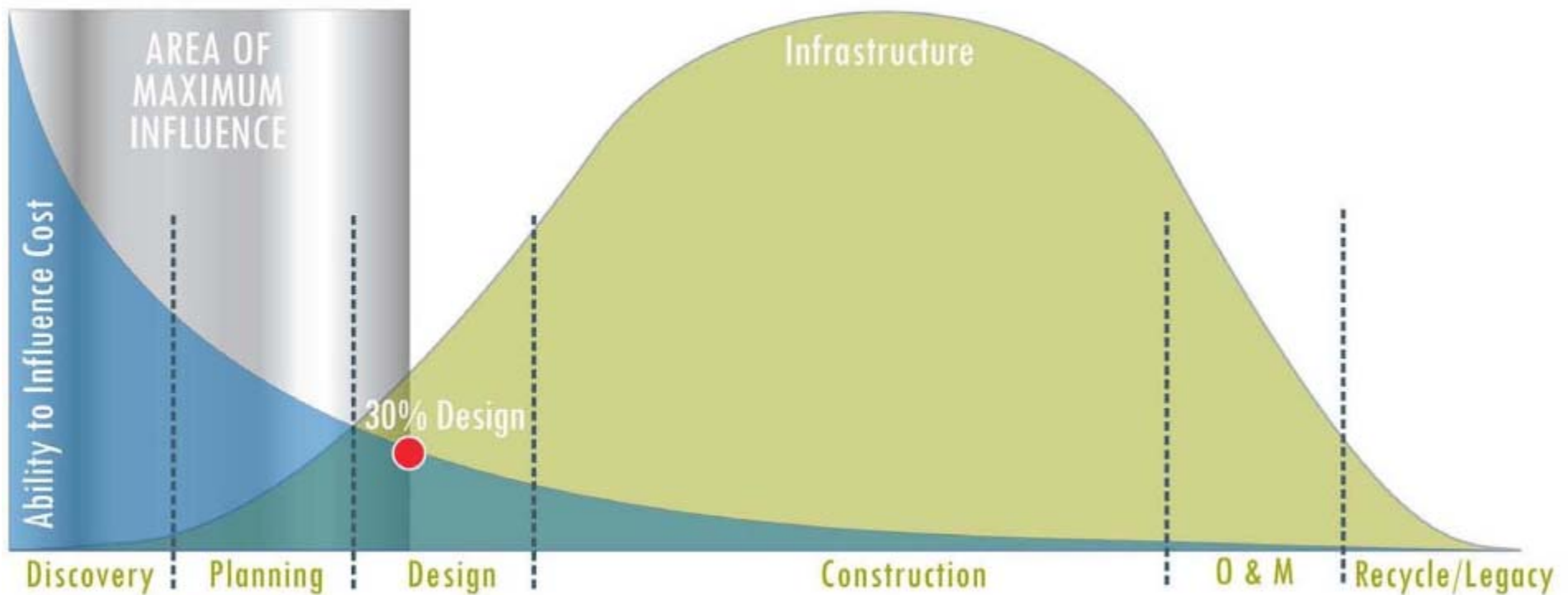
“By the time the design for most human artifacts is completed... 80-90% of their lifecycle economic and ecological costs have already been made inevitable.”

“All the most important mistakes are made on the first day.”

Natural Capitalism – 1999



PROJECT DELIVERY LEVERAGING OUTCOMES



DEFINE PROBLEMS/ASK THE DEEPER QUESTIONS

Explore leverage points, including but not limited to:

- Systems Thinking
- Sustainable Resource Management
- Funding & Financing/Leveraging
- Conservation Modeling

Source: David Evans and Associates, Inc.

Task 1 Describe current situation			Task 2 Visualize Full Alignment		Task 3 Implementation	
Describe project	components	System Violation	Vision	Strategy	Barriers	Opportunities
Asphalt	Oil	1,(2),3,4	A hard durable smooth surface with zero runoff impacts and supports community use	Concrete?	Need to run through system condition violations	
				Stone pavers	Bumpy, cost	Use in some places where bumpiness isn't as important; also has other features like permeability and improved aesthetics
				compacted soil	Less durable and less weather-resistant	Enhance with concrete finish (like earthen floors)
				Less asphalt	Load limits	Special truck route or bus route; limit vehicle sizes
				Make asphalt more durable	Cost, toxicity of additives	
	Aggregate					
Utilities (sanitary, storm, water, electric, gas)	Pipes (steel, plastic, concrete)	1,2,3,4	Provide utility services sustainably	No pipes - on-site stormwater	code, space, maintenance, aesthetics, soil types, water tables, upset hydrological cycle	Revise code, underground storage or vertical plantings, training and lifecycle cost analysis, examples of stormwater designs and rain garden tours, define new strategy for treatment, plant trees - evapotranspiration, store for small uses
				Source separation	code, higher first cost, more pipes, cultural acceptance	Funding strategy
				Greywater reuse		
				Localize source/sink		
				Reduce load - xeriscape		
				Wireless/solar		



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The Natural Step and LBC – Design Exercise

SUSTAINABILITY BACKCASTING PROCESS

Key Concepts

Goal = Get to Full Sustainability (or regenerative design)

Process = Understand what Full Sustainability means

Baseline what you would normally do and it's
"sustainability violations"

Create a Definition of Success (Vision)

Create a Plan to get there!

The Natural Step and LBC – Design Exercise

www.brightworks.net/resources

BRIGHTWORKS
intelligent strategies for sustainability

resources

home services projects our people news contact us

resources

overview philosophy process

Resources

Working to Protect the Environment
Rainforest Action Network
Oregon Wild
Environmental Working Group
Transition Towns Wiki
Sierra Club
NRDC

Sustainability
Natural Capitalism
The Natural Step
Other Sustainability Frameworks

Tools and Calculators
LEED Registration and Certification Fee Calculator
Oregon BETC Calculator

Cost/Benefit of Sustainability
CoStar Green Building Study
Davis Langdon Cost of Green Study
Making the Business Case for Sustainability, AIA COTE February 2009
Backcasting Instructions and Template

LEED and Green Building
Building Green/Environmental Building News
U.S. Green Building Council

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The Natural Step and LBC – Design Exercise

SUSTAINABILITY BACKCASTING TEMPLATE

BASELINE					FULL SUSTAINABILITY VISION		IMPLEMENTATION PLAN			
Describe Project:	S/C Violations				Definition of Success	Strategy	Action Steps	Barriers	Opportunities	Responsible Parties/ Next Steps
	1	2	3	4						
Supply from Renewables PVs	X	X	X	X	Energy from renewables w/materials that are non-toxic, non-persistent, closed loop or biodegradable + doesn't disrupt ecological function + socially equitable lifecycle + affordable	manufactured w renewable energy; closed loop water and material flows; equitable mining and factory conditions;	Seek to purchase systems that meet our requirements	Cost	Downsize other systems PPAs?	Architect, MEP and modler to evaluate options and report back
Wind						use abundant materials (silicon, aluminium); PVs from biobased materials?				

NOW:

- Groups of 10-12
- 30 minutes to practice
- 20 minutes to report out



Four System Conditions

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