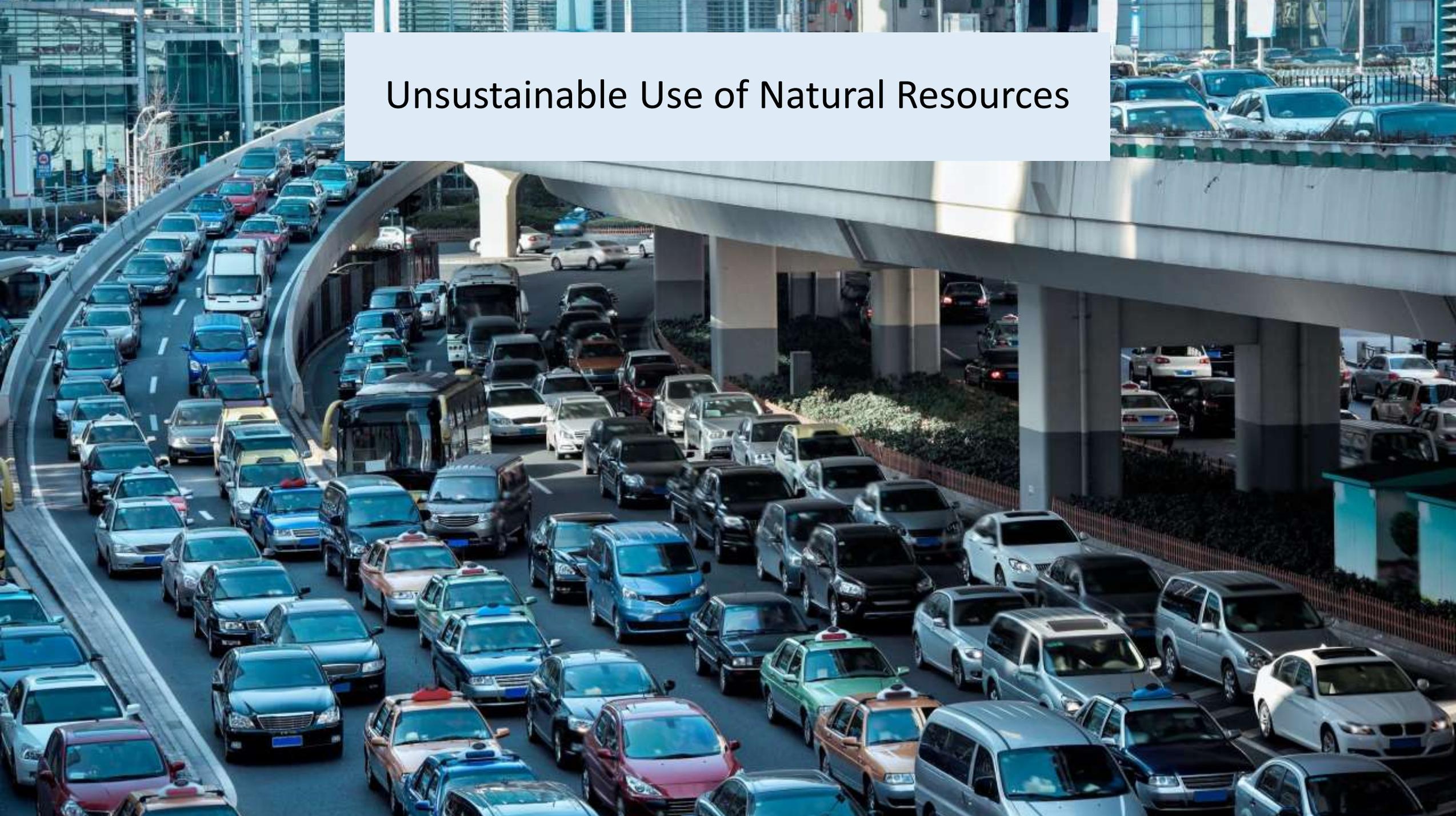


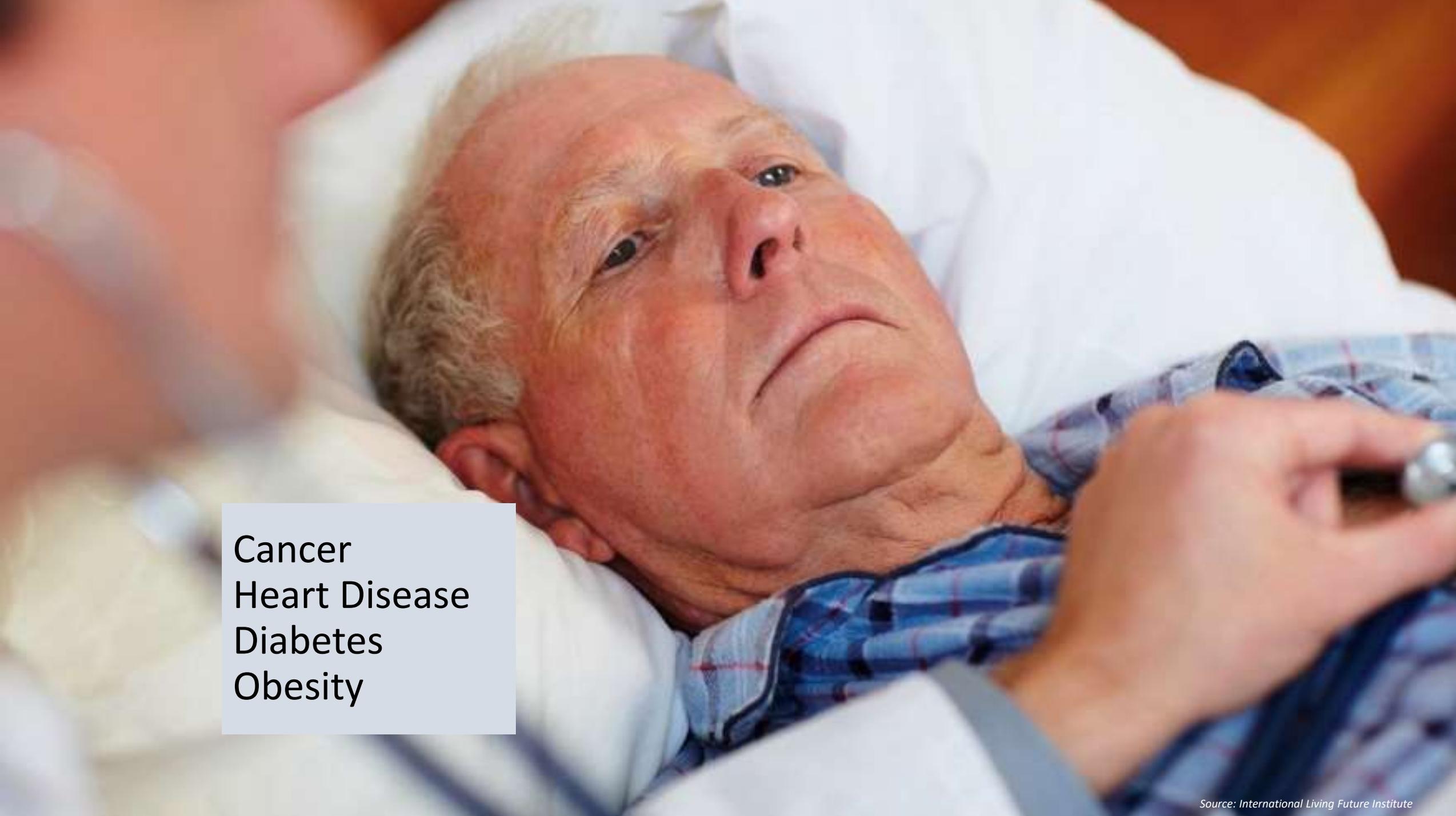


Unsustainable Use of Natural Resources



Climate Change, Habitat Destruction,
Loss of Biodiversity, Environmental
Racism and Global Inequities



An elderly man with white hair is lying in a hospital bed, looking upwards with a thoughtful expression. He is wearing a blue and white plaid shirt. A hand is visible on the right side of the frame, holding a small object. A semi-transparent white box is overlaid on the left side of the image, containing a list of chronic diseases.

Cancer
Heart Disease
Diabetes
Obesity



Human and Environmental
Health Are Connected



Transformation is feasible

How to achieve the Sustainable
Development Goals within
Planetary Boundaries

A report to the Club of Rome, for its
50 years anniversary 17 October 2018





Figure 1.3 The UN 17 Sustainable Development Goals (SDGs), implemented by all the world's countries in 2016.

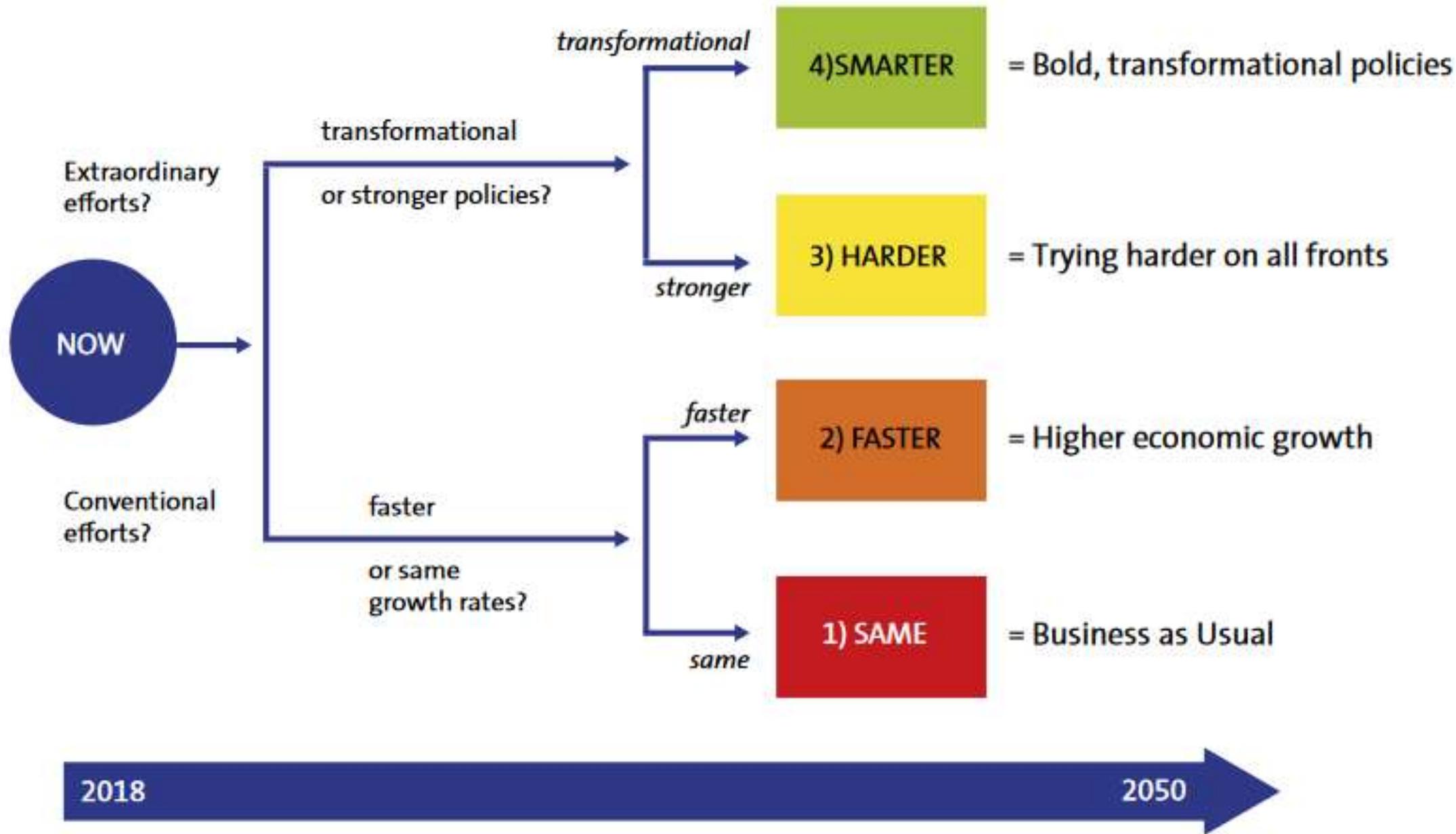


Figure 2.1 The "scenario logic" that determines the main characteristics of each scenario.

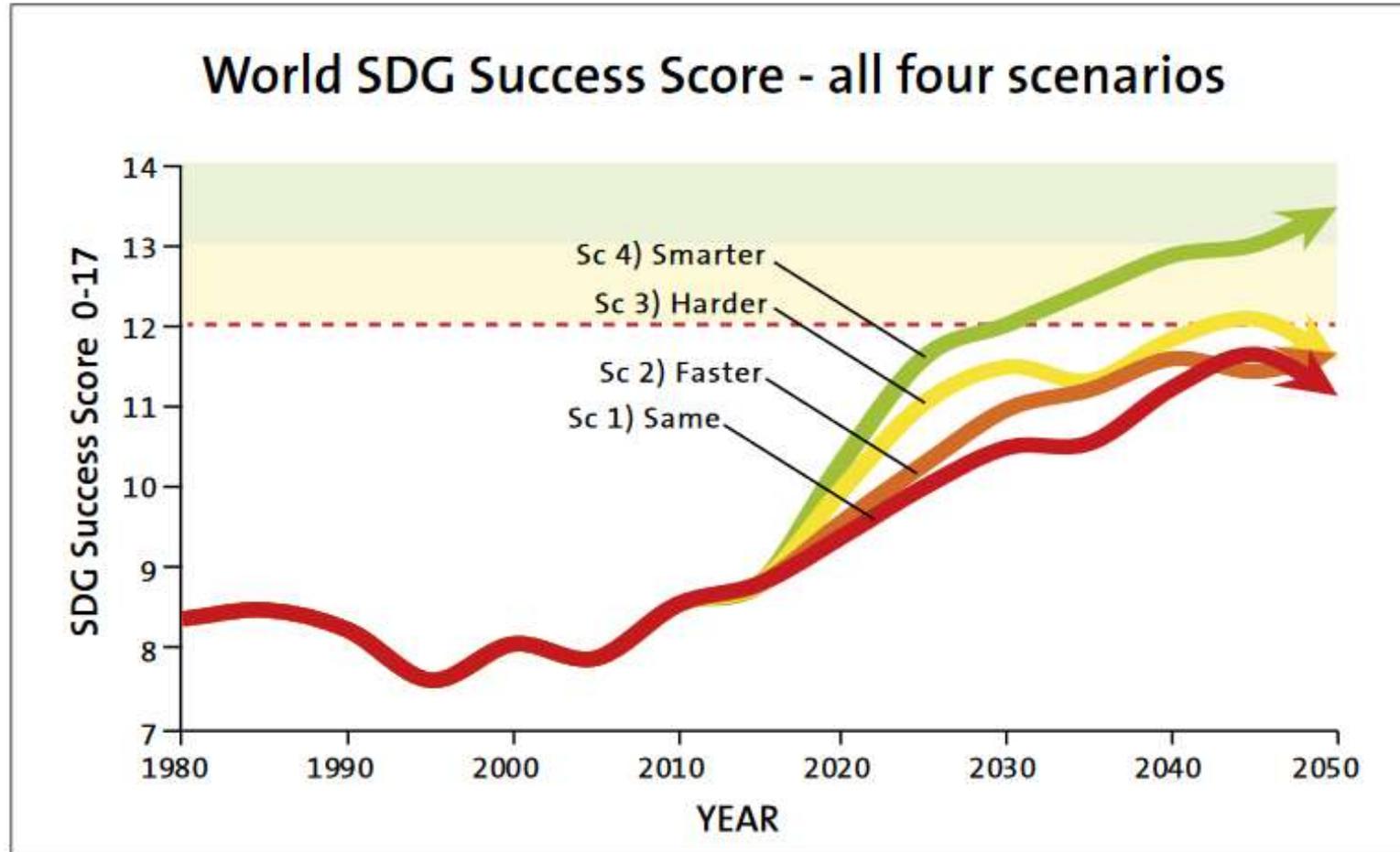


Figure 1.5 The world's SDG Success Score for each scenario. The score is calculated as the sum of the regional success indices, weighted by population, for each scenario.



3 Out of 4 Scenarios Put Us Out of the Safe Zone for:

- Global Warming
- Pollution
- Loss of Biodiversity

Transformation

Four Different Paradigms for Interacting with the World

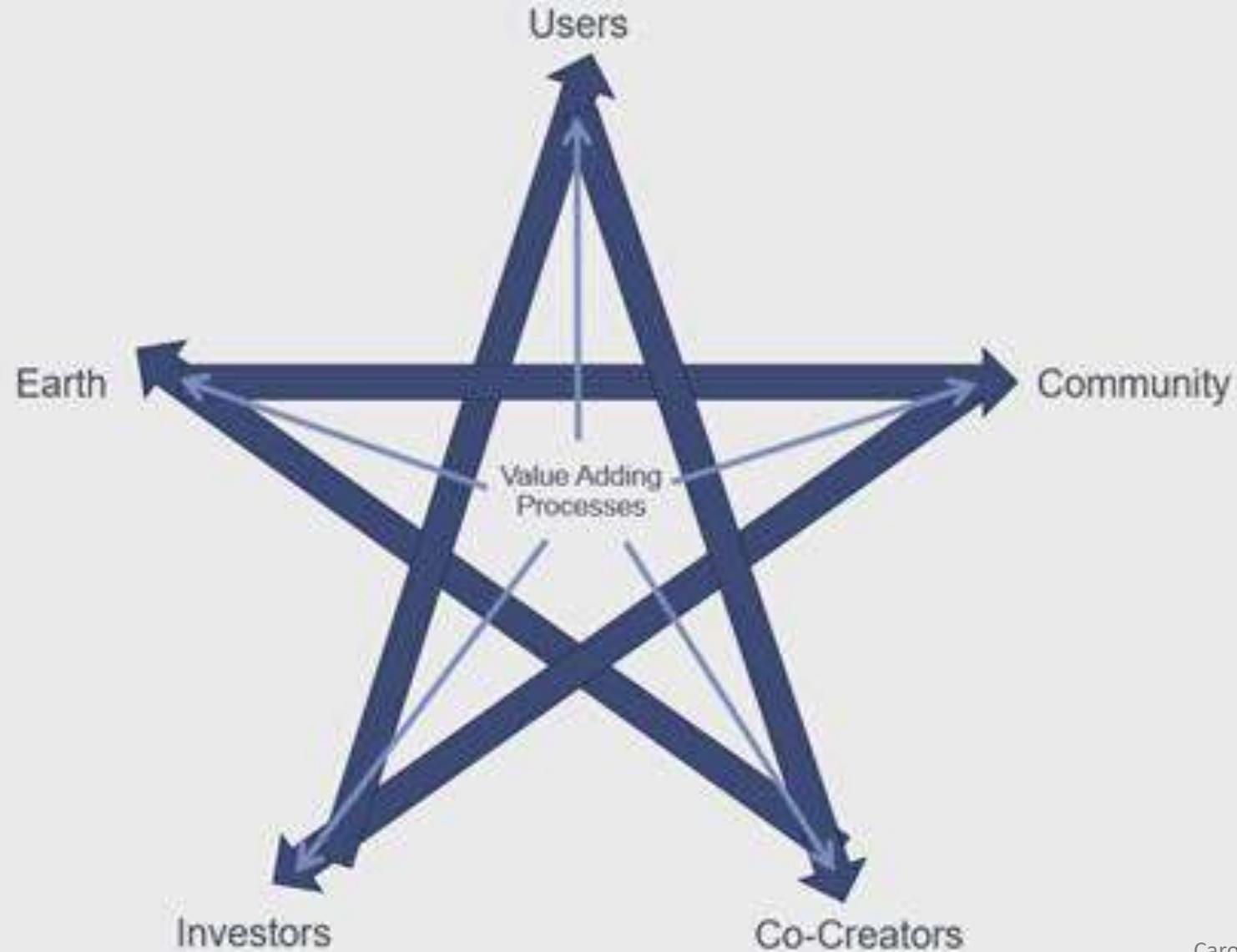
Exchange Value	Less Bad	Do Good	Regenerative
About Me	About Us Inter-connectedness	About Us Reciprocity	About Us Relationships
Fragments	Fragments Stabilize them	Fragments Improve them	Whole
Exchange or Extract Value	Stabilize or Arrest Disorder	Improvement	Evolve Capacity

Source: Carol Sanford

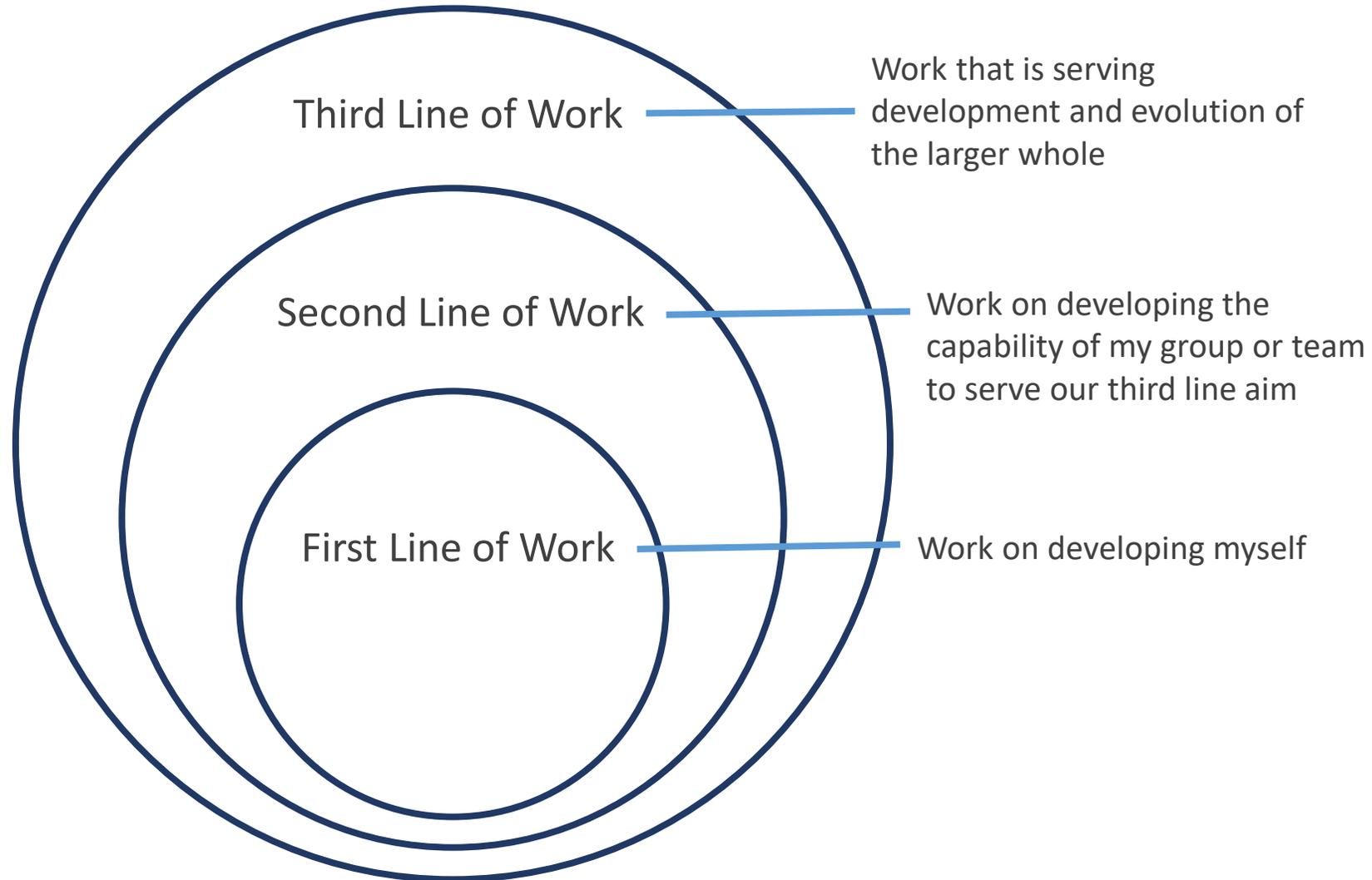
Seven Principles of Regenerative Thinking

- **Wholes** – Everything is a whole – not fragments
- **Essence** – Every living being is unique
- **Potential** – Focus on potential - not problems
- **Nestedness** – Understanding our role embedded in larger systems
- **Nodal** – Seeking interventions at the point of highest systemic return
- **Reciprocity** – Operating with living dynamic systems where exchanges are mutually beneficial
- **Development** – Increasing capacity of everything and everyone to be vital & viable based on their own individual essence

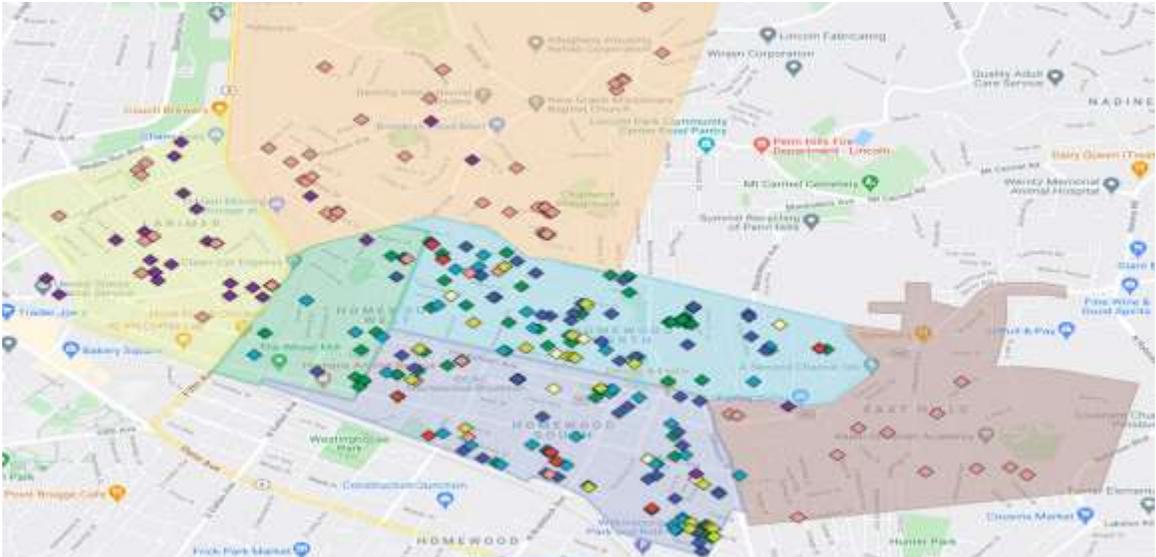
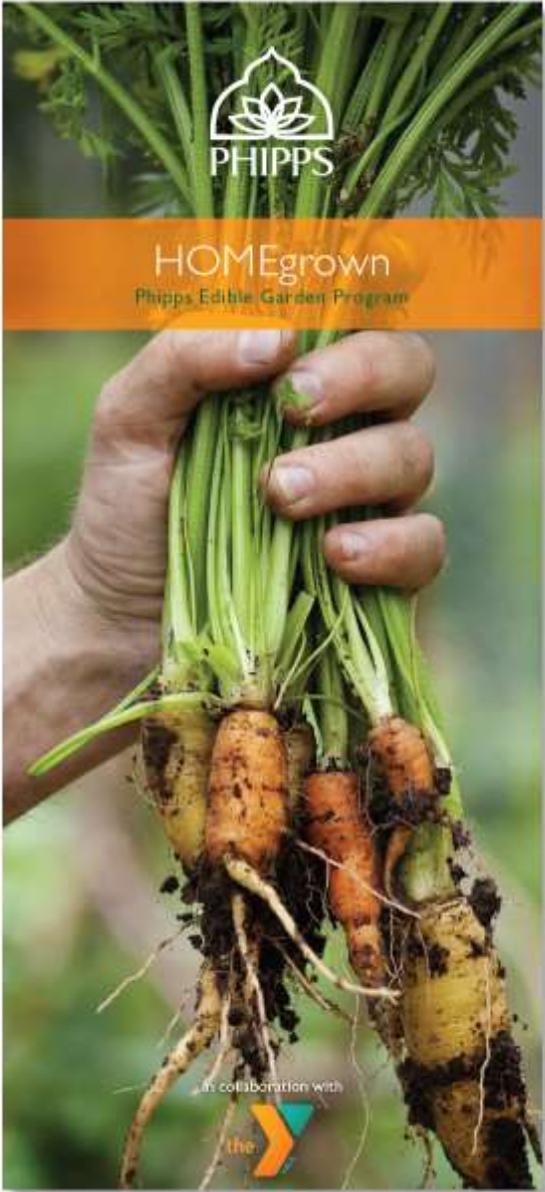
Living Systems Stakeholders



System Transformation: Three Lines of Work



Homegrown



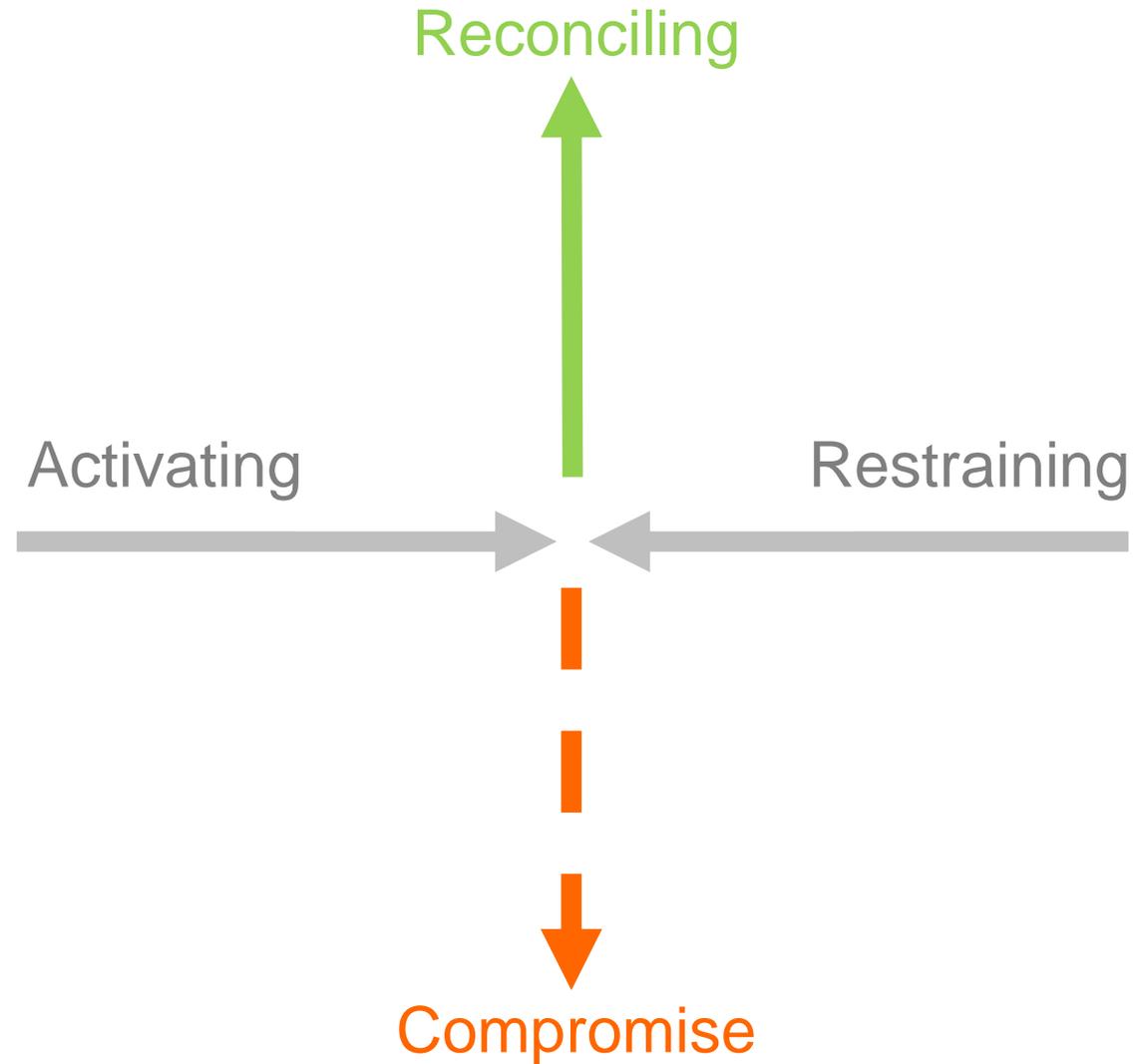
The Climate Toolkit

For Gardens, Museums and Zoos

an opportunity to **SHARE, MENTOR and LEARN** with fellow gardens, museums and zoos who want to want to aggressively address climate change in their operations, **lead by example and inspire their members and visitors**

climatetoolkit.org

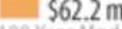
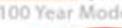
The Law of Three



Reconciling

- Essential Staff
 - Collections & Facilities
- Exhibits and Programs
- Projects at Phipps
- Standard Operating Procedures
- Databases
 - Members, Plants, Photos and History
- AAM
- Went Virtual
 - Classes & Programs
- Called 18,000 Members
- Continuing Education
- Planned for Safe Opening

Taking a Long-Term View

	Construction	FFE	Design	Net Present Value	
Living Building  <ul style="list-style-type: none"> 100 Year Building 45' Wings Solar Orientation Natural Daylighting Natural Ventilation Living Machine® 	 \$12.9 m	 \$1.7 m \$16.6 m	 \$2.0 m	 \$18.7 m 30 Year Model  \$19.6 m 60 Year Model  \$20.8 m 100 Year Model	Living Building 
LEED™ Platinum  <ul style="list-style-type: none"> 100 Year Building 45' Wings Solar Orientation Natural Daylighting Natural Ventilation 	 \$12.1 m	 \$1.6 m	 \$1.7 m	 \$18.5 m 30 Year Model  \$23.7 m 60 Year Model  \$62.2 m 100 Year Model	LEED™ Platinum 
LEED™ Gold  <ul style="list-style-type: none"> 80 Year Building 65' Wings Solar Orientation Natural Daylighting 	 \$11.5 m	 \$1.6 m	 \$1.5 m	 \$18.5 m 30 Year Model  \$27.8 m 60 Year Model  \$95.8 m 100 Year Model	LEED™ Gold 
LEED™ Silver  <ul style="list-style-type: none"> 60 Year Building 90' Wings Natural Daylighting 	 \$11.3 m	 \$1.5 m	 \$1.5 m	 \$19.7m 30 Year Model  \$36.7 m 60 Year Model  \$166.9 m 100 Year Model	LEED™ Silver 
Market  <ul style="list-style-type: none"> 40 Year Building 120' Wings Big Box 	 \$10.0 m	 \$1.3 m \$12.6 m	 \$1.3 m	 \$22.7 m 30 Year Model  \$62.9 m 60 Year Model  \$348.9 m 100 Year Model	Market 

The True Cost of Conventional Building:

Operational and Maintenance Expenses

BUILDING TYPE	UPFRONT DESIGN+BUILD COST	NET PRESENT VALUE		
		30 YEARS	60 YEARS	100 YEARS
Living Building	\$16.6 m	\$18.7 m	\$19.6 m	\$20.8 m
Market Rate Building	\$12.6 m	\$22.7 m	\$62.9 m	\$348.9 m

Status quo.

Finally, executives (like most people) would rather stay the course than face the risks that come with change. The status quo bias derives in part from our well-documented tendency to avoid a loss even if we could achieve a big gain.

—executives often resist abandoning existing metrics in favor of more-suitable ones.

[Michael J. Mauboussin](#) Harvard Business Review October 2012

Phipps Opens in 1893
Extractive





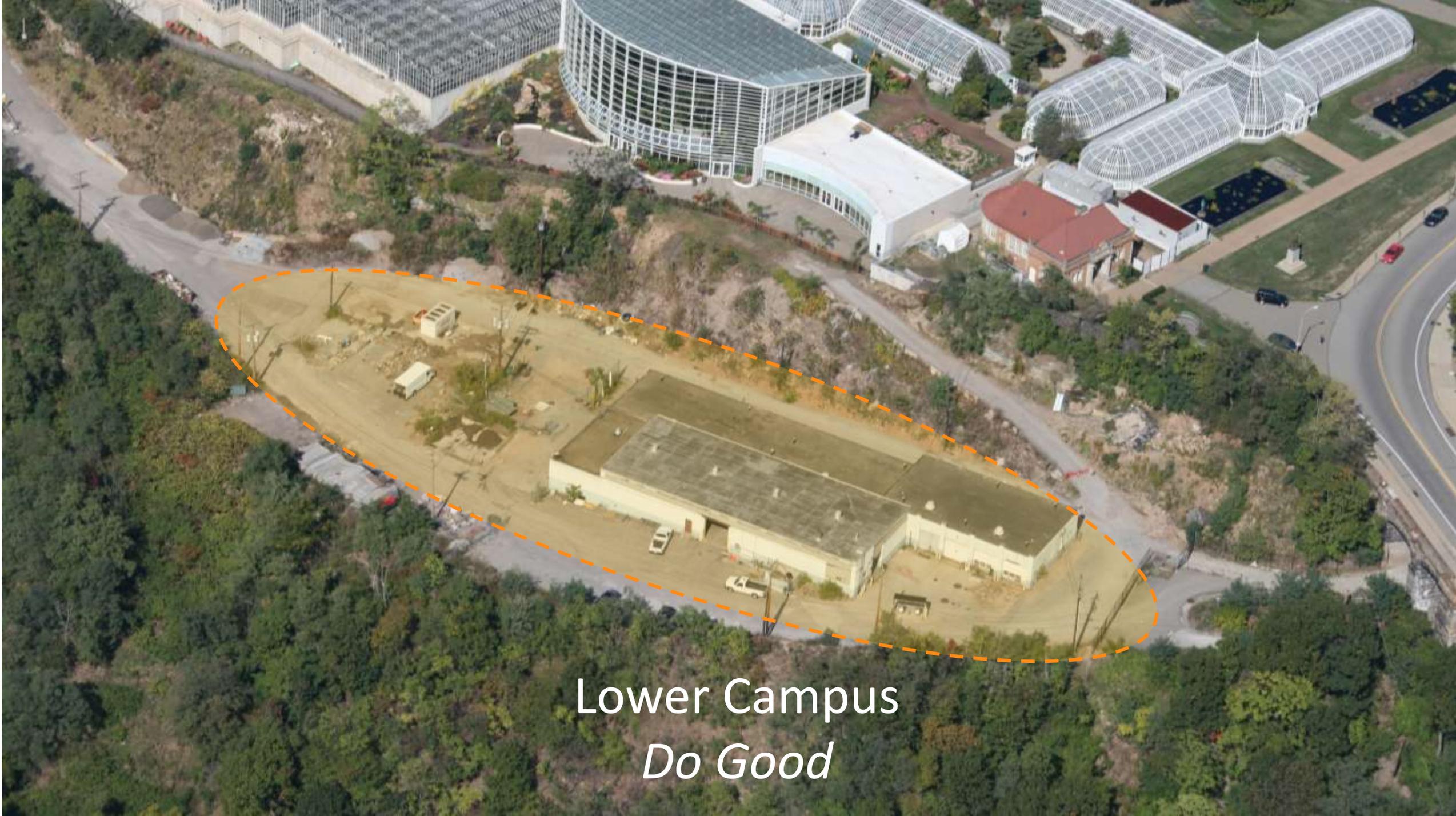
First LEED Visitor Center *Less Bad*



Greenhouses and Conservatory

Less Bad





Lower Campus
Do Good

Center for Sustainable Landscapes *Regenerative*



NET-ZERO ENERGY

The Nature Lab *Regenerative*



Pursuing



LIVING
BUILDING
CHALLENGE™
2.1



Regenerative



Exhibit Staging Center

Phipps Conservatory and Botanical Gardens, Pittsburgh, PA

Pursuing:



LIVING
BUILDING
CHALLENGE™
2



Our Evolving Thinking and Action

- 2005
 - First LEED Visitor Center in a Public Garden
 - 100% Renewable Electricity Campus-wide
- 2006
 - No plastic disposable service ware
- 2009
 - No disposable bottled water
- 2010
 - Offset all carbon produced to heat all our buildings
- 2011
 - No soda no junk food in café
 - No factory farm meats
- 2012
 - First Zero-Energy Building
- 2015
 - Second Zero-Energy Building
 - Re-invested energy investments into renewables
- 2017
 - Switch to ESG Socially responsible investments
- 2018
 - Third Zero-Energy Building
 - Focus on reducing single use plastic
- 2019
 - Greater than 70% of Café menu is vegetarian/vegan
- 2022-3
 - 40% reduction in fossil fuel steam heating



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climatetoolkit.org

in partnership with



American
Alliance of
Museums



American
Public Gardens
Association



**BOTANIC
GARDENS**
CONSERVATION
INTERNATIONAL

ENERGY

- Meet the Paris Climate Agreement Targets for CO2 reduction
- Reduce fossil fuel use by 25%
- Build all new buildings as zero-energy buildings or Living Buildings
- Ensure all building renovations reduce energy use by 25%
- Generate or purchase 100% renewable electricity
- Offset all carbon from heating

FOOD SERVICE

- Ensure 40% of food service menu selections are vegan or vegetarian
- Make 10% of all food purchases within 100-mile radius of site

TRANSPORTATION

- Offset carbon for all work-related staff travel
- Make 25% of vehicle fleet electric (excluding tractors)
- Incentivize employees to carpool, bike, bus or otherwise forgo single-occupant car transportation to work
- Incentivize visitor sustainable travel

WASTE

- Eliminate all single-use plastic in food service, horticulture, gift shop, and all other facilities and operations.
- Compost 100% of food waste
- Eliminate sale and use of bottled water
- Recycle or reuse all recyclable materials including metals, glass, and plastic

WATER

- Reduce use of municipal water by at least 25%
- Reduce potable water for irrigation by at least 25%

LANDSCAPES AND HORTICULTURE

- Ensure 25% of all lawn/garden maintenance equipment is electric
- Ensure 50% of pesticides and fertilizers used are fossil-free
- Reduce lawn areas by 10% and encourage native plant replacements
- Support reforestation to sequester carbon
- Convert parking spaces into greenspaces to combat rising temperature in cities

INVESTMENTS

- Divest from fossil fuel investments
- Invest in socially responsible investments

INTERNAL AND EXTERNAL ENGAGEMENT

- Create and employee incentivization program for reducing emissions
- Establish a green team to support employee-related climate action
- Assist visitors in switching to household renewable energy
- Educate visitors on sustainable, fossil-free horticulture
- Educate visitors on growing organic food
- Educate visitors on the impacts of food choices and waste on climate change
- Teach facts and best practices to mitigate and reduce global climate change

RESEARCH

- Conduct region-specific research related to climate change



Adkins Arboretum
Ridgely, Maryland



Anchorage Museum
Anchorage, Alaska



artsPlace
Alberta, Canada



Asheville Art Museum Association Inc
Asheville, North Carolina



Bernheim Arboretum and Research Forest
Clermont, Kentucky



Bernice Pauahi Bishop Museum
Honolulu, Hawaii



Bok Tower Gardens
Lake Wales, Florida



California Botanic Garden
Claremont, California



California Indian Museum and Cultural Center
Santa Rosa, California



Cambridge University Botanic Garden
Cambridge, United Kingdom



Carnegie Museums of Pittsburgh
Pittsburgh, Pennsylvania



Cedarhurst Center For the Arts
Mount Vernon, Illinois



Chanticleer Garden
Wayne, Pennsylvania



Chesapeake Bay Maritime Museum
St. Michaels, Maryland



Cincinnati Art Museum
Cincinnati, Ohio



Coastal Maine Botanical Gardens
Boothbay, Maine



Cornell Botanic Gardens
Ithaca, New York



Denver Botanic Gardens
Denver, Colorado



Discovery Museum
Little Rock, Arkansas



Duke Farms
Hillsborough Township, New Jersey



Filoli Center
Woodside, California



Florida Aquarium
Tampa, FL



Folger Shakespeare Library
Washington, D.C.



Green Bay Botanical Garden
Green Bay, Wisconsin



Hillwood Estate, Museum and Garden
Washington, D.C.



Holden Forests and Gardens
Kirtland, Ohio



Horniman Museum and Gardens
London, United Kingdom



Huntsville Botanical Garden
Huntsville, Alabama



Jacksonville Arboretum & Botanical Gardens
Jacksonville, Florida



Jardin botanique de Montréal, Espace pour la vie/ Montreal Botanical Gardens, Montréal Space for Life
Québec, Canada



Key West Tropical Forest & Botanical Garden
Key West, Florida



Lady Bird Johnson Wildflower Center
Austin, Texas



Lewis Ginter Botanical Garden
Henrico, Virginia



Marie Selby Botanical Gardens
Sarasota, Florida



Marine Aquarium & Regional Centre, Zoological Survey of India
West Bengal, India



Meadowlark Botanical Gardens
Vienna, Virginia



Monterey Bay Aquarium
Monterey, California



Morris Arboretum
Philadelphia, Pennsylvania



Morton Arboretum
Lisle, Illinois



Mount Auburn Cemetery
Cambridge, Massachusetts



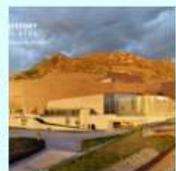
Mt. Cuba Center
Hockessin, Delaware



Museum of Discovery and Science
Fort Lauderdale, Florida



National Nordic Museum
Seattle, Washington



Natural History Museum of Utah
Salt Lake City, Utah



New York Botanical Garden
Bronx, New York



Norfolk Botanical Garden
Norfolk, Virginia



North Carolina Botanical Garden
Chapel Hill, North Carolina



Oakland Zoo and Conservation Society of California
Oakland, California



Oxford Botanic Garden and Arboretum
Oxford, United Kingdom



Phipps Conservatory and Botanical Gardens
Pittsburgh, Pennsylvania



Pittsburgh Zoo and Aquarium
Pittsburgh, Pennsylvania



Quest Science Center
Livermore, CA



Red Butte Garden
Salt Lake City, Utah



Royal Botanic Garden Edinburgh
Edinburgh, UK



Royal Botanic Gardens, Kew
England, UK



Sacramento History Museum
Sacramento, California



San Diego Botanic Garden
Encinitas, California



Santa Barbara Botanic Garden
Santa Barbara, California



Santa Fe Botanical Garden
Santa Fe, New Mexico



Sarah P. Duke Gardens at Duke University
Durham, North Carolina



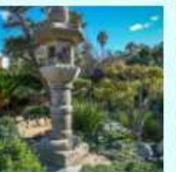
Science Museum of Minnesota
Saint Paul, Minnesota



Science World
Vancouver, British Columbia



Smithsonian Gardens
Washington, D.C.



South Coast Botanic Garden
Palos Verdes Peninsula, California



Strawbery Banke Museum
Portsmouth, New Hampshire



The Jerusalem Botanical Gardens
Jerusalem, Israel



Tower Hill Botanic Garden
Boylston, Massachusetts



University of Washington Botanic Gardens
Seattle, Washington



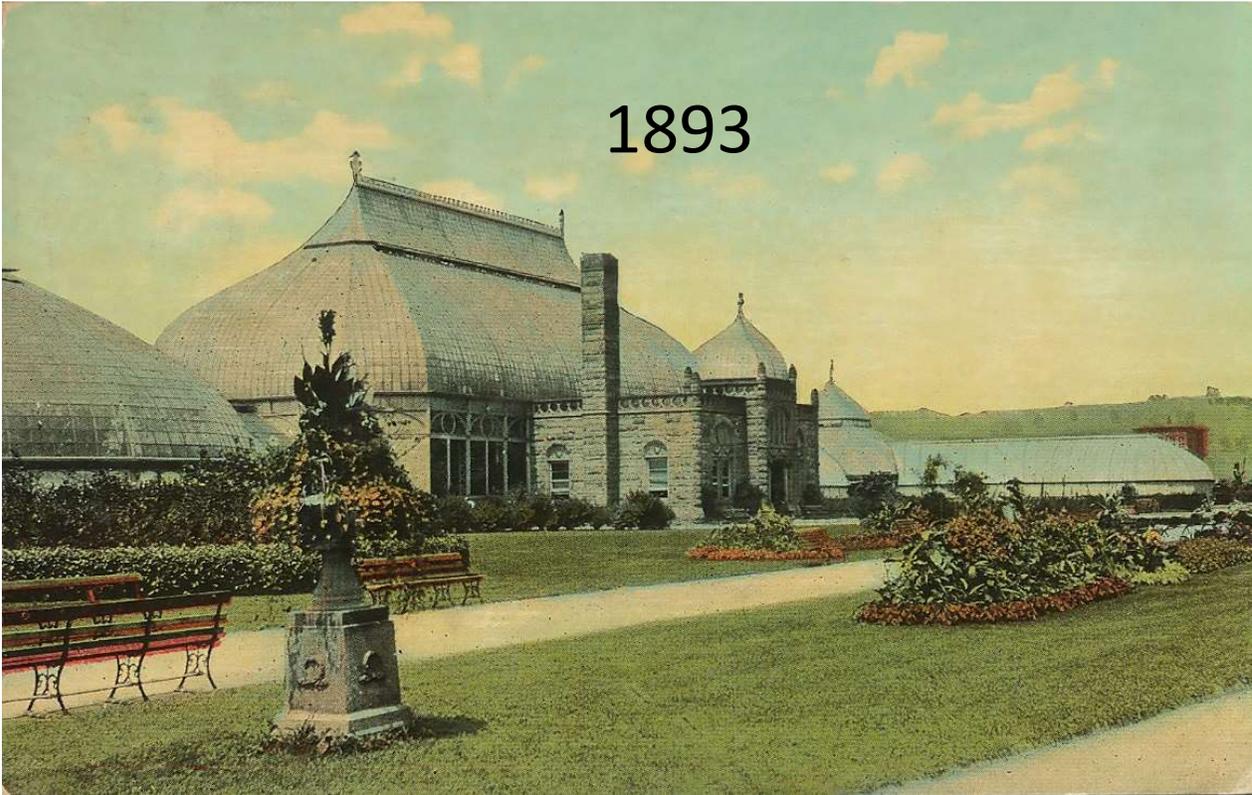
Visual Arts Center of New Jersey
Summit, New Jersey



Watermen's Museum
Yorktown, Virginia



1893



2023



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