Sustainable Remediation Forum (SURF)
SURF 26: July 17, 2014
Webinar

Members participated in SURF 26 via webinar on July 17, 2014. The two-hour webinar marked the 26th time that various stakeholders in remediation—industry, government agencies, environmental groups, consultants, and academia—came together to discuss the use of sustainability concepts throughout the remediation life cycle. Meeting minutes and audio of the webinar are posted for members at www.sustainableremediation.org. Members should log in and access the minutes and audio by clicking "SURF Meeting Minutes" under "Member Resources."

Welcome

Nick Garson (SURF President) welcomed SURF members to SURF 26 and reviewed the organization's mission and structure (see Attachment 1). The organization chart presented shows the Board of Trustees, committees, and technical initiatives. (The chart is available to members on the website under "Member Resources," "Board Documents" at http://www.sustainableremediation.org/documents/.) Nick encouraged participants to get involved in SURF through leadership opportunities or in teams through committees or initiatives.

Updates from Committees and Technical Initiatives

Members provided updates on the recent progress of the Case Study Initiative and Social Aspects of Sustainability Initiative. Summaries of these updates are provided below.

- Case Study Initiative
  John Simon (Initiative Chair) provided a brief introduction of the purpose of this initiative and detailed recent accomplishments, including the development of a template and creation of an e-mail account for receiving case studies (see Attachment 2). Currently, initiative members are focusing on obtaining case studies. Contacts have been made with international groups, SURF Canada, SURF-UK, and Network for Industrially Contaminated Land in Europe (NICOLE). In addition, a case study will be featured every quarter in the *Remediation Journal*. The goal is to compile 50 case studies in the next year. Completed case studies and questions about the initiative may be directed to csi@sustainableremediation.org.

- Social Aspects of Sustainability Initiative
  Melissa Harclerode (Initiative Co-Chair) reviewed the objectives of the white paper that initiative members are writing (see Attachment 3). The goal is to complete the majority of the writing by October 1, 2014. Members of SURF Canada and SURF Taiwan are co-authors and have contributed text about the tools and indicators in their countries.

Volunteers are needed to help prepare the paper; interested individuals should contact Melissa or Kristin Mancini, the Initiative Co-Chairs.

ISO Soil and Site Assessment Standard

Paul Nathanail (University of Nottingham) provided a progress update on an ISO (International Organization for Standardization) standard being developed for soil and site assessment. The standard provides guidance on sustainable remediation, including standard terminology, information about the key components and aspects of a sustainable remediation assessment, and an assessment of the relative sustainability of alternative remediation technologies. Next steps were reviewed and are included in Attachment 4.

Integrating Sustainability into Department of Defense Acquisition Programs

Paul Yaroschak (Department of Defense) and Craig Cammarata (Enviance) discussed a sustainability analysis tool that combines a streamlined life-cycle assessment and life-cycle costs to compare alternatives. Using the tool, resulting impacts are compared and then monetized in a way that is compatible with the Department's cost structure. Use of the tool has shown that more informed decisions result, with more thought given to life-cycle implications. Presentation slides are provided in Attachment 5.

Discussions after the presentation focused on the development of external costs, including life-cycle costs. In addition, participants discussed slide 9 and noted that the model captures impacts and costs in time, which is not typical of a traditional life-cycle assessment.

Sustainable Return on Investment

Andrea Bohmholdt (URS) presented the sustainable return on investment (sROI) methodology, which is a nonproprietary methodology based on economic principles. The methodology is a quantitative approach that captures an expanded spectrum of values and criteria for measuring the triple bottom line impacts of a project in monetary terms. In addition, it includes an uncertainty analysis to demonstrate the likelihood of realizing costs and benefits. Presentation slides are provided in Attachment 6.

Imagine H_2O

Scott Bryan (Imagine H_2O) presented information about Imagine H_2O and discussed some of the ways that SURF and his organization could work together. Imagine H_2O is a nonprofit organization with the mission to inspire and empower people to solve water problems. Through business plan competitions that address specific water opportunities, the organization offers cash prizes and helps competing entrepreneurs turn their plans into reality. The process generates unique opportunities for collaboration. SURF members are welcome to participate in a competition or to serve as a judge or mentor. Presentation slides are provided in Attachment 7.

Attachment 1

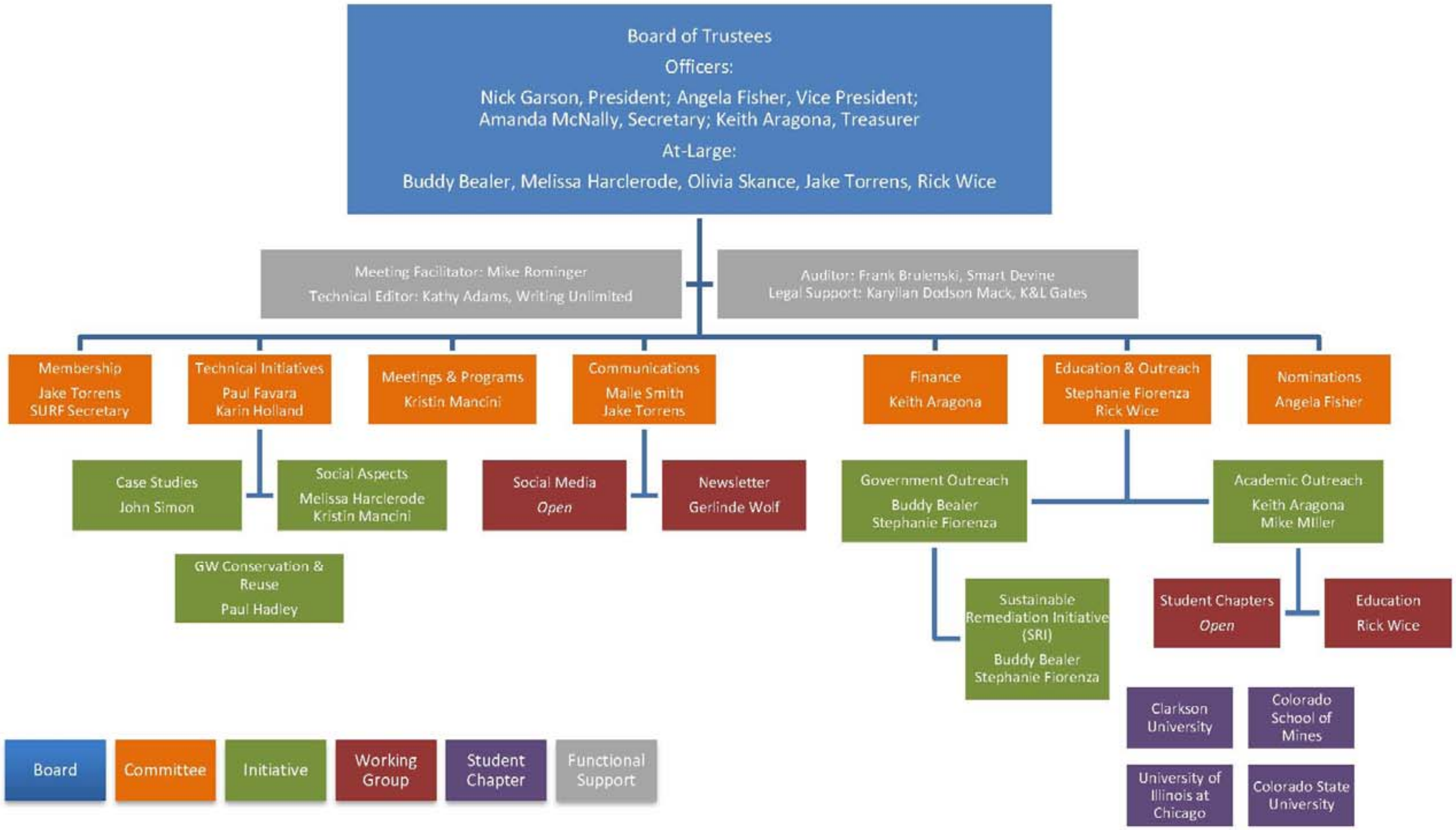
SURF Mission and Organization Chart

Mission Statement

The mission of SURF is to maximize the overall environmental, societal, and economic benefits from the site cleanup process by:

- Advancing the science and application of sustainable remediation
- Developing best practices
- Exchanging professional knowledge
- Providing education and outreach

SURF Organization



Attachment 2
Update: Case Study Initiative

Case Study Initiative

Team Members:

- Lead – John Simon
- Barbara Maco, Wactor & Wick
- Jake Torrens & Venkat Jayaraman, Amec
- Carl Lenker, Gannett Fleming
- Kevin Morris, ERM
- Amanda McNally, AECOM

- Board Liaison – Nick Garson

Objectives:

- Compile case study examples of sustainable remediation implementation

Accomplishments:

- Prepared final CSI report template, final tracking template, example case study and presentation format
- Prepared example case study
- Updated template instructions
- Created CSI-SURF email account
- Conveyed submission request to SURF members and LinkedIn site
- Received 2 case studies in mailbox
- Received 10 case studies from NAVFAC

Next Steps:

- Coordinate with SURF Canada – Met with S. Karnis on 5/21; plans to provide contact
- Coordinate with SURF UK & NICOLE – K. Morris to coordinate
- Submit case study to Remediation J. – August 30th
- Contact NAVFAC case study report authors – June 30th
- Collect case studies – ongoing
- Review 2 case studies received and convert the NAVFAC studies
- Populate data base - ongoing

Upcoming Meetings/Presentations:

- SURF Board update – July 17th
- Plan breakout session at Ferrara SustRem Workshop – September (B. Maco to lead)

Help Needed:

- **Help Needed: Board**
  - Promote SURF members to develop case studies
- Help Needed: Entice SURF members to complete case studies

SURF SUSTAINABLE REMEDIATION FORUM

Completed by: J. Simon
Date: July 6, 2014

Attachment 3

Update: Social Aspects of Sustainability Initiative

Social Aspect TI

Team Members:

- Co-Leads – Melissa Harclerode and Kristin Mancini
- Members:
    - Angela Fisher, Jake Torrens, Karina Tipton, Olivia Skance, Rick Wice, and Venkat Jayaraman
    - SURF Canada & SURF Taiwan Liaisons
- Board Liaison – Melissa Harclerode

Objectives:

- Prepare a White Paper to address the following:
    - Illustrate the importance of performing a complete sustainability assessment when evaluating contaminated site remediation projects.
    - Provide tools to the remediation sector for evaluating impacts to the social and socio-economic nexus of remediation.
    - Share knowledge of existing case studies where the impacts to the social and socio-economic nexus have been evaluated for the remediation sector.

Accomplishments:

- Section I Complete
- Outline Revised and Presented in Document Format
- Reached out to SURF Canada and SURF Taiwan

Next Steps:

- Distribute Document & Identify Subsection Writers

Upcoming Meetings/Presentations:

- Deadline for Draft White Paper October 1, 2014
- Next meeting schedule for October 2014.

Help Needed:

- Help Needed: Board
    - None at this time
- Help Needed: Membership
    - Volunteers to help prepare White Paper

Completed by: Melissa Harclerode
Date: 07/16/14

Attachment 4

ISO Soil and Site Assessment Standard

ISO/TC 190/SC 7/WG 12
Sustainable remediation progress update

Professor Paul NATHANAIL
(University of Nottingham and LQM)
Chair, ISO/TC 190/SC 7/WG 12 Sustainable remediation

Working group members

Active experts nominated by national standards bodies of:

- Australia
- Austria
- France
- Germany (inc DIN secretariat)
- Italy
- Japan
- Netherlands
- Sweden
- UK (inc Chair)

NB Much of the original text was written by a group that included many members of SURF and SURF Canada but their countries are not members of TC190 so cannot nominate anyone to WG12

Scope of the document

- The Standard provides guidance on sustainable remediation. In particular, it provides:
  - a standard terminology and information about the key components and aspects of sustainable remediation assessment.
  - Informative advice on the assessment of the relative sustainability of alternative remediation strategies.

Current Structure of document

1. Sustainable Remediation
2. Scope of the document
3. Sustainable development, regeneration and remediation

3.1. Sustainable Redevelopment and regeneration

4. Risk based contaminated land management
5. Integrated appraisals, metrics and evaluations

5.1. Tiered assessments
5.2. Tiered assessment frameworks
5.3. Sustainability assessment techniques
5.4. Holistic sustainability indicator sets

6. Decision making

6.1. Project framing
6.2. How to decide for a sustainable remediation approach
6.3. Key principles in decision making

7. Economic dimension
8. Social dimension - generic and remediation specific
9. Environmental dimension

9.1. Environmental indicators

10. Promoting sustainable remediation
11. The role of governance and institutional structures
12. Metrics and indicators: trends and thresholds

12.1. Quantification and Qualification
12.2. Options for Indicator and Metric Selection
12.3. Setting Objectives for Remediation

13. The role of sustainability assessment tools

13.1. Intended Objectives Addressed by Tools
13.2. Pre-Determined Metrics and Indicators
13.3. Geographic and Process Specific Information
13.4. General Questions for Understanding Tool Use and Applicability

14. Communication
15. Glossary
16. References

This is being modified to improve readability and comply with ISO rules

What's in

- Definition of Sustainable Remediation
- Site specific boundaries and constraints matter
- The need for differentiating indicators that can be measured or observed (metrics)
- Parsimony rules – KISS
- Clear definitions of key terms
- The need to consider social, environmental, economic and governance aspects
- Site specific (not generic) sustainability
- Relative (not absolute) sustainability

What's not

- Definitive list of indicators
- Weightings of different indicators
- Reviews of individual tools
- Recommended tools
- Reviews of other concepts including green, GSR, redevelopment
- Endorsement of existing methods including MCEA, SURF-UK or Taiwan

Sustainable remediation assessment is at the proof of concept stage
not *quite* at prototype stage and
far from the production line

Next steps

- Finalisation of text
- Formatting into ISO template
- Submission to TC190/SC7
- Voting by SC7
- Discussion at TC190 meeting (Berlin, October 2014)
- Adoption as Technical Specification
- Review 3 years after publication for a revision to a full Standard

What is the anticipated impact?

- Consistent definitions
- Recognised value of qualitative and semi quantitative sustainability assessements
- Raised awareness of SR in countries without a local SURF

Attachment 5
Integrating Sustainability into Department of Defense Acquisition Programs

Acquisition, Technology and Logistics

Integrating Sustainability into DoD Acquisition Programs

July 2014

Briefing for Sustainable Remediation Forum

Paul Yaroschak, P.E.
Deputy for Chemical & Material Risk Management
Office of the Deputy Under Secretary of Defense
(Installations & Environment)

Craig Cammarata
Director of Decision Analytics
Enviance Inc.

1

Acquisition, Technology and Logistics

Part 1 - Overview

2

Objective

Acquisition, Technology and Logistics

Better informed acquisition decisions leading to:

- **Increased sustainability of systems, and supporting infrastructure**
  - » **Minimize environmental/health impacts**
- **Lower Total Ownership Cost**

How? Sustainability Analysis Using Life Cycle Assessment (LCA) Methods

3

What is a Sustainability Analysis?

Acquisition, Technology and Logistics

Sustainability Analysis = SLCA + LCCs

Streamlined Life Cycle Assessment
Gives Relative Impacts
Must be "Doable"

Life Cycle Costs
Must be compatible with DoD cost structure

Used to Compare Alternatives!

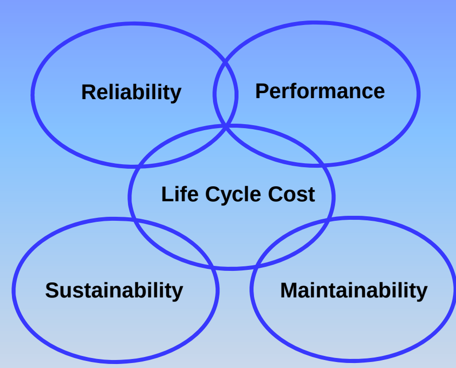
4

Sustainability Analysis Outputs

1) **IMPACTS. "Spider-web" diagram or bar charts that compares alternatives by showing their *<u>relative</u>* life cycle human health and environmental impacts**
   - A decision tool for making sustainable decisions

2) **COSTS. Life cycle costs for each alternative…informs Total Ownership Cost estimates**
   - Internal (to DoD)
   - External (to society)
   - Contingent (risks)

An Element in Trade Space Analysis



5 Steps of a Sustainability Analysis

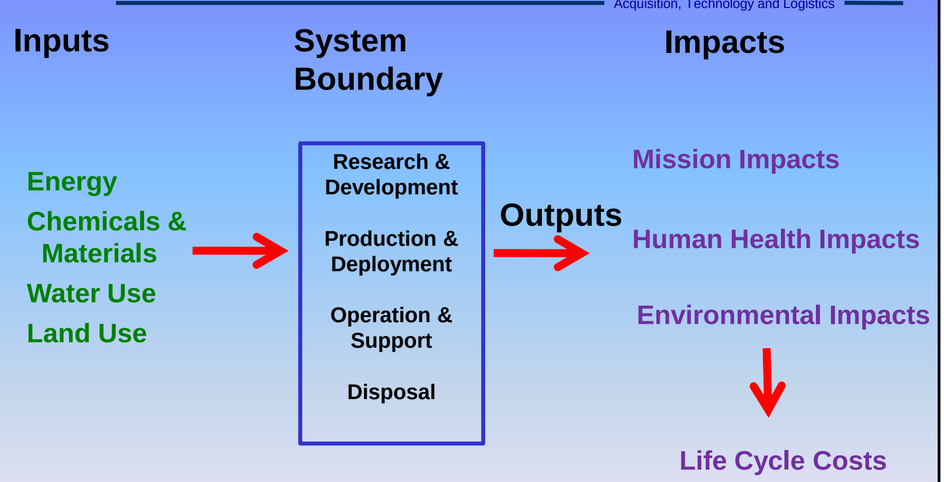
Acquisition, Technology and Logistics

Step 1	• Define the Scope - Establish functional unit (performance parameter) & system boundary
Step 2	• Develop the Life Cycle Inventory – provide system inputs (resources to be used)
Step 3	• Estimate Life Cycle Impacts – use pre-defined scoring factors
Step 4	• Estimate Life Cycle Costs – Internal, external, and contingent
Step 5	• Display Results & Compare Alternatives

7

SLCA Model for DoD

Acquisition, Technology and Logistics



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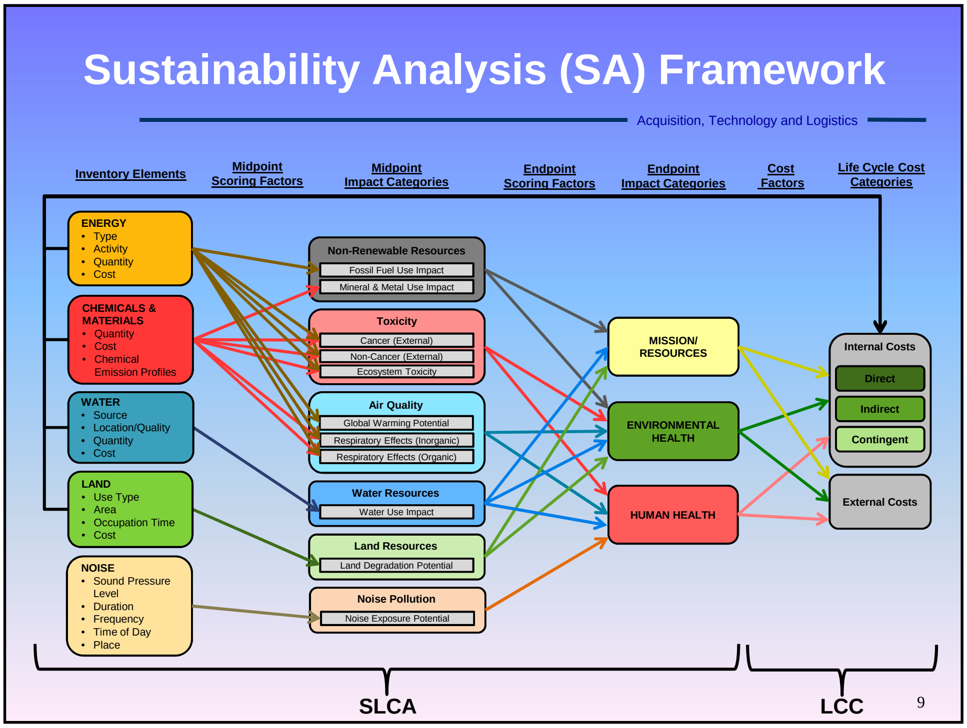
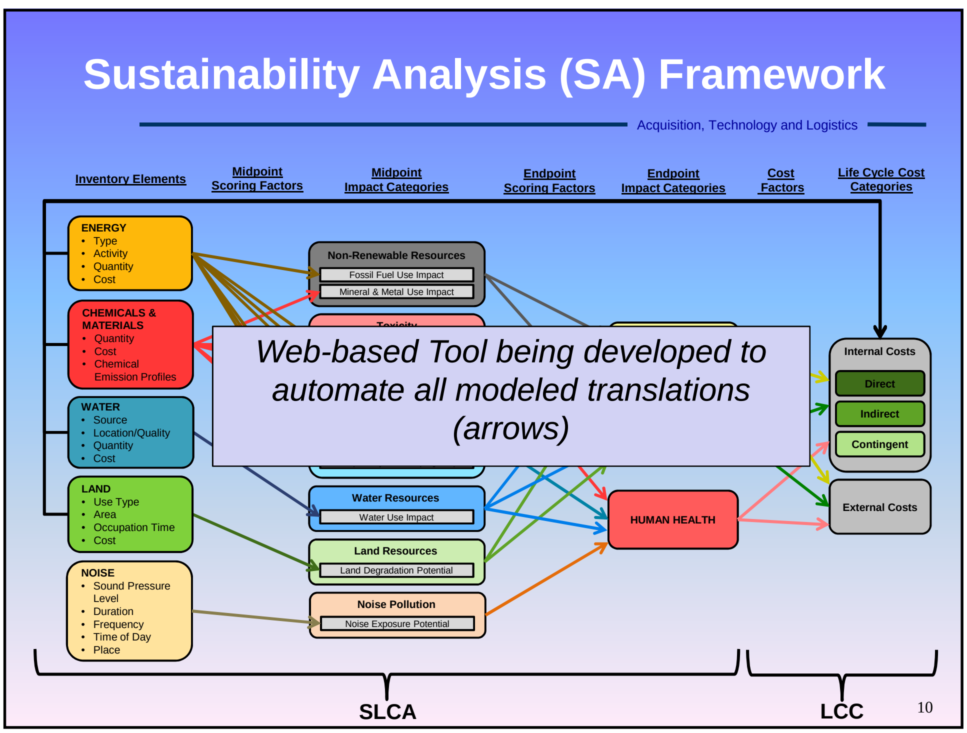

Sustainability Analysis (SA) Framework
Acquisition, Technology and Logistics
Inventory Elements
Midpoint Scoring Factors
Midpoint Impact Categories
Endpoint Scoring Factors
Endpoint Impact Categories
Cost Factors
Life Cycle Cost Categories
ENERGY
• Type
• Activity
• Quantity
• Cost
CHEMICALS & MATERIALS
• Quantity
• Cost
• Chemical Emission Profiles
WATER
• Source
• Location/Quality
• Quantity
• Cost
LAND
• Use Type
• Area
• Occupation Time
• Cost
NOISE
• Sound Pressure Level
• Duration
• Frequency
• Time of Day
• Place
Non-Renewable Resources
Fossil Fuel Use Impact
Mineral & Metal Use Impact
Toxicity
Cancer (External)
Non-Cancer (External)
Ecosystem Toxicity
Air Quality
Global Warming Potential
Respiratory Effects (Inorganic)
Respiratory Effects (Organic)
Water Resources
Water Use Impact
Land Resources
Land Degradation Potential
Noise Pollution
Noise Exposure Potential
MISSION/ RESOURCES
ENVIRONMENTAL HEALTH
HUMAN HEALTH
Internal Costs
Direct
Indirect
Contingent
External Costs
SLCA
LCC
9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Fossil Fuel Use Impact
Mineral & Metal Use Impact
Web-based Tool being developed to automate all modeled translations (arrows)
Water Resources
Water Use Impact
Land Resources
Land Degradation Potential
Noise Pollution
Noise Exposure Potential
HUMAN HEALTH
Internal Costs
Direct
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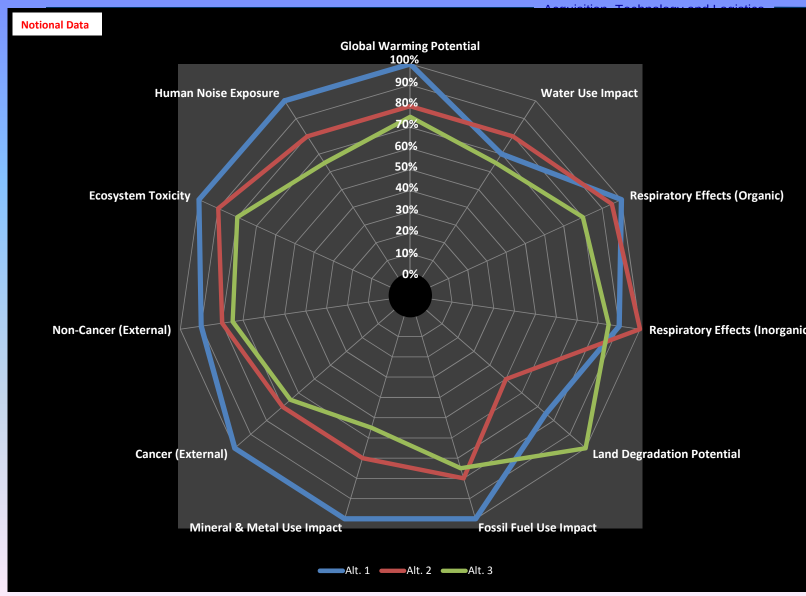
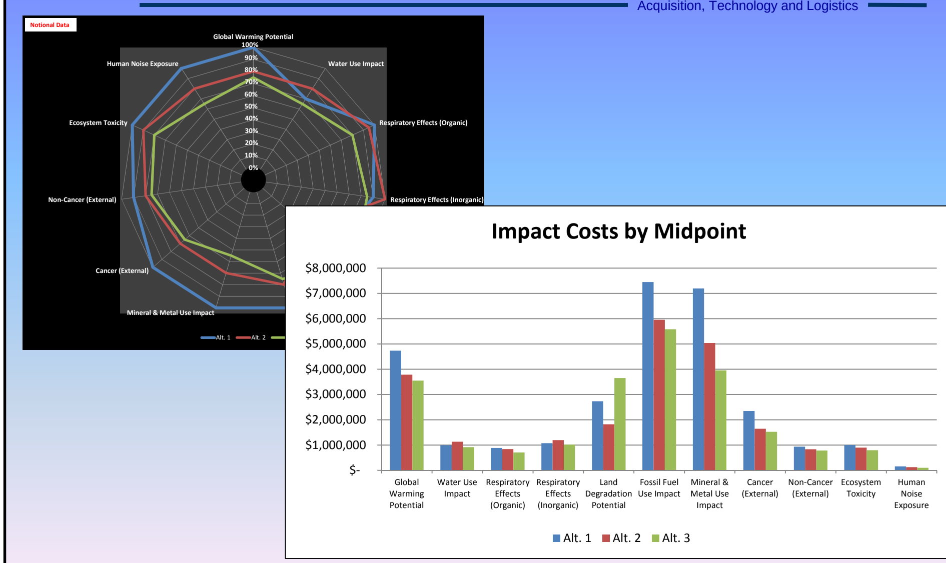
SLCA
LCC
10

Comparing Impacts

Spider-Web Diagram



Monetizing Impacts

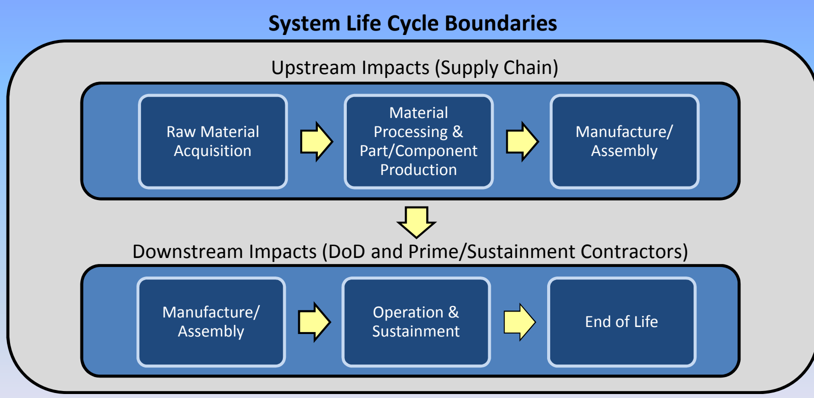


Benefits of Sustainability Analysis

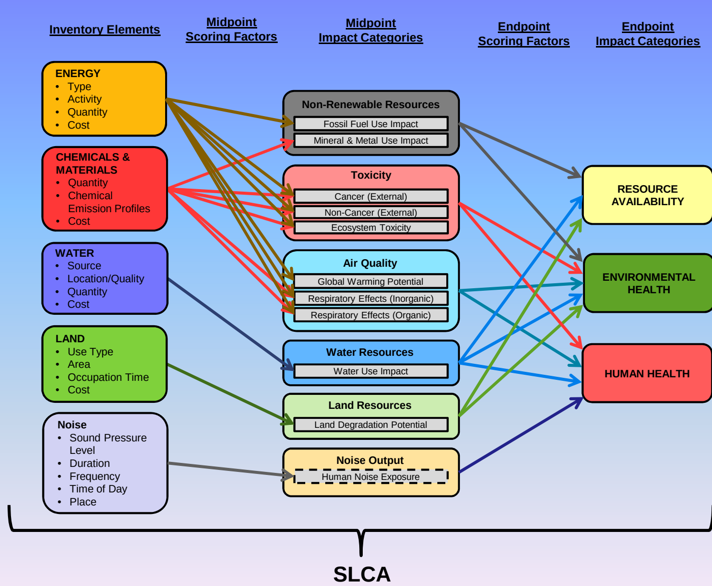
- **Provides a practical yet rigorous and consistent analyses**
- **Forces thinking about life cycle activities of system:**
  - Human health & environmental impacts
  - Life cycle costs of impacts
- **Bottom line: More informed decisions with more thought to life cycle implications**

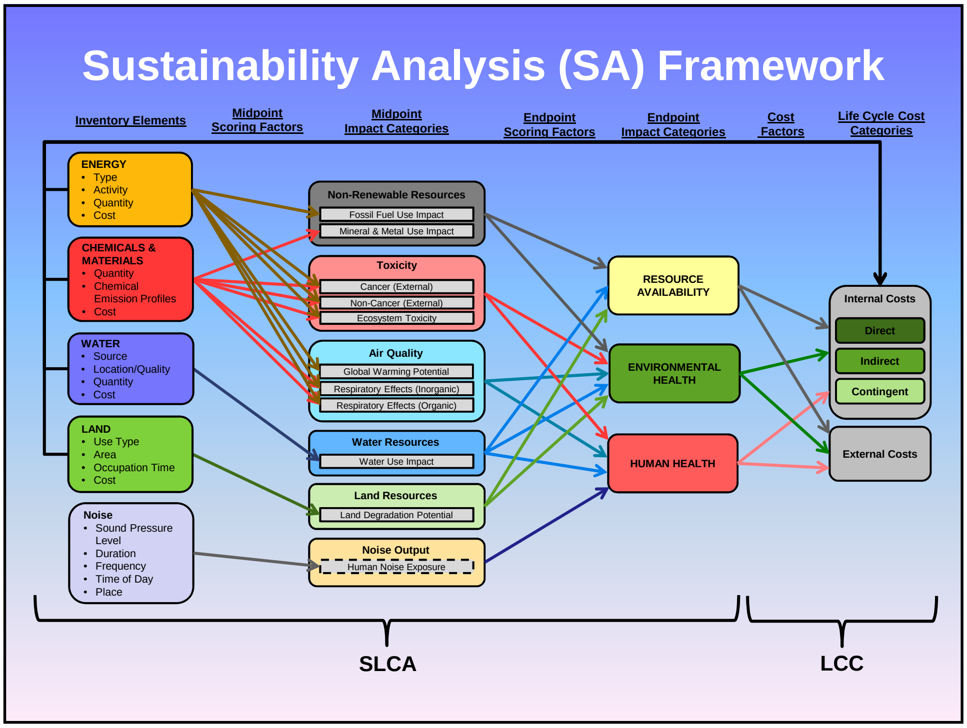
Part 2 – Sustainability Analysis Details

A Sustainability Analysis Covers Full Life Cycle



Sustainability Analysis (SA) Framework

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Ecosystem Toxicity
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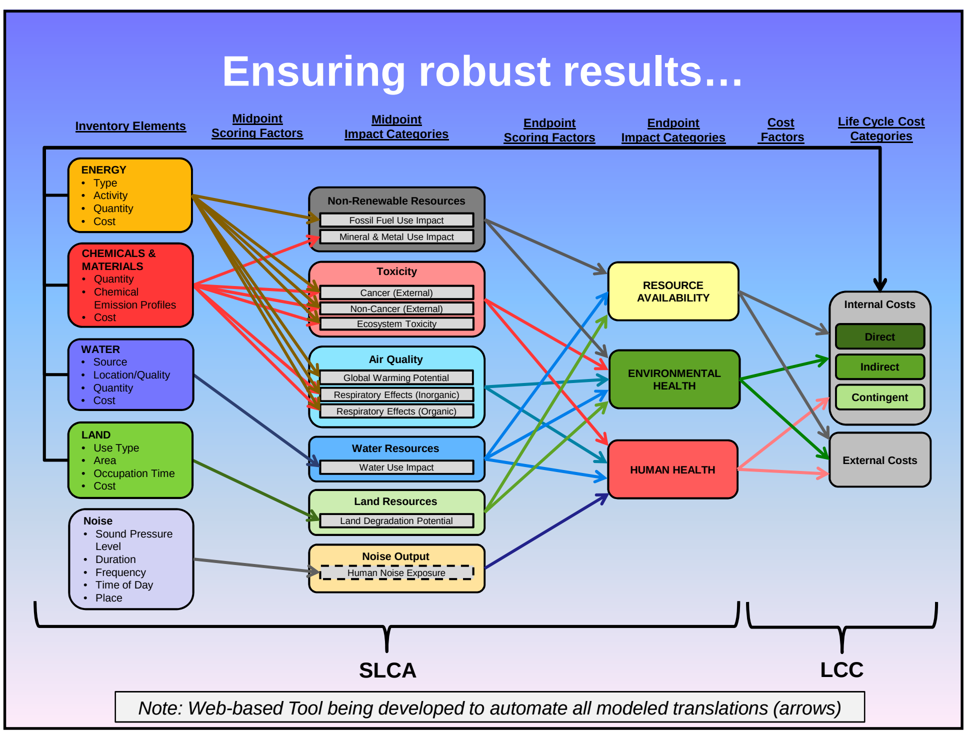
Global Warming Potential
Respiratory Effects (Inorganic)
Respiratory Effects (Organic)
Water Resources
Water Use Impact
Land Resources
Land Degradation Potential
Noise Output
Human Noise Exposure
RESOURCE AVAILABILITY
ENVIRONMENTAL HEALTH
HUMAN HEALTH
Internal Costs
Direct
Indirect
Contingent
External Costs
SLCA
LCC


Ensuring robust results…
Inventory Elements
Midpoint Scoring Factors
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Note: Web-based Tool being developed to automate all modeled translations (arrows)

With a user experience that…

Is simple and efficient to use

Guides the analyst along every step of the process

Clearly communicates design tradeoffs

Questions & Discussion

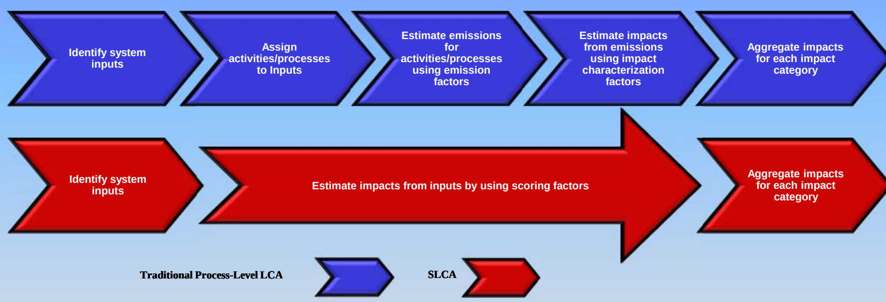
Backups

Paul Yaroschak
Deputy for Chemical & Material Risk Management
Office of the Deputy Under Secretary of Defense
(Installations & Management)

Midpoint Impact Categories

Impact Grouping	Midpoint Category	Metric	Explanation of Metric
Non-Renewable Resources	Fossil Fuel Use	MJ deprived	Indicator of resource availability, competing demand, and substitutability of a specified fossil fuel or source of electricity, measured in amount of energy deprived
	Mineral Resources Use	kg deprived	Indicator of resource availability, competing demand, and substitutability of a specified mineral or rare earth metal, measured in mass of mineral/metal deprived
Air Quality	Global Warming Potential	kg CO_2 eq	Quantification of all greenhouse gas emissions, measured in units of carbon dioxide equivalents
	Respiratory Effects (Inorganic)	kg $PM_{2.5}$ eq	Quantification of all inorganic air emissions that can result in respiratory illnesses, measured in units of particulate matter equivalents
	Respiratory Effects (Organic)	kg NMVOC eq	Quantification of all organic air emissions that can result in respiratory illnesses, measured in units of non-methane volatile organic compound equivalents
Water Resources	Water Use	m^3 deprived	Indicator of resource availability, competing demand, and substitutability of water withdrawn from a specified location, measured in volume of water deprived
Land Resources	Land Degradation Potential	ha.yr arable eq	Indicator of the biological quality of the incremental land being transformed and occupied, measured as area units of arable land equivalents per year
Toxicity	Cancer (External)	CTU_h	Quantification of an emission's potency in terms of its ability to cause cancer, measured in standardized human common toxicity units
	Non-Cancer (External)	CTU_h	Quantification of an emission's potency in terms of its ability to cause non-cancer illnesses, measured in standardized human common toxicity units
	Ecosystem Toxicity	CTU_e	Quantification of an emission's potency in terms of its ability to kill ecosystem species, measured in standardized ecosystem common toxicity units
Noise Output	Human Noise Exposure	person.dBA	Quantification of the magnitude and duration of noise exposure to human populations, measured as recorded decibels (A-weighted) multiplied by size of exposed population
	Ecosystem Noise Exposure	species.dBA	Quantification of the magnitude and duration of noise exposure to ecosystem populations, measured as recorded decibels (A-weighted) multiplied by size of exposed population

Comparing SLCA Methodology to LCA

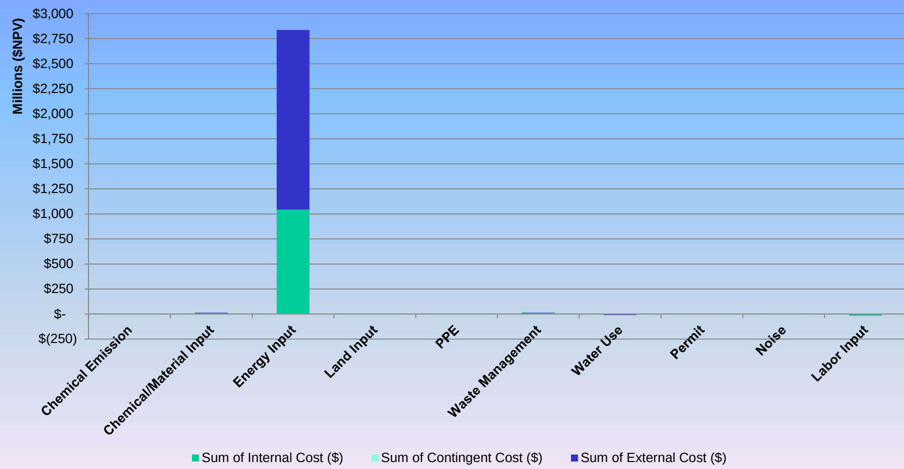


Steel vs. Composite Assessment

Hypothetical Example: Compare two material alternatives (steel vs. composite) for use in a the superstructure of a noncombat passenger ship

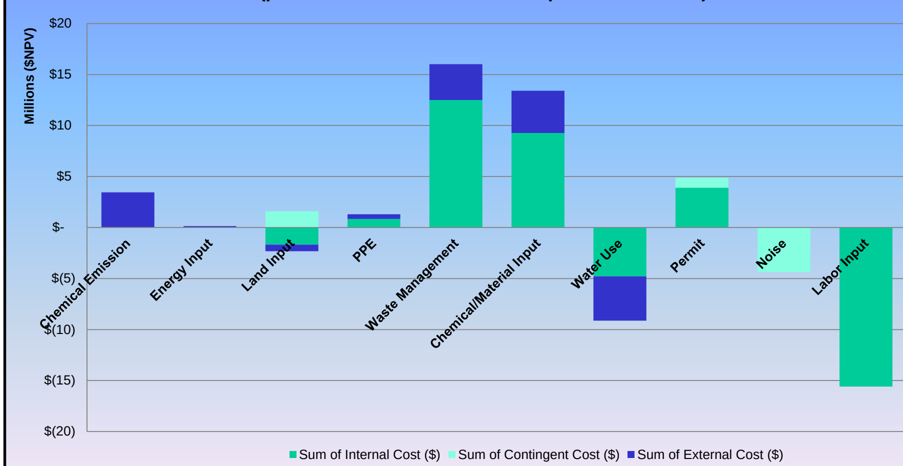
STEP 5 (continued)

Difference between Steel and Composite Superstructure over 30-yr Life by Inventory Category
(positive numbers favor the composite alternative)



STEP 5 (continued)

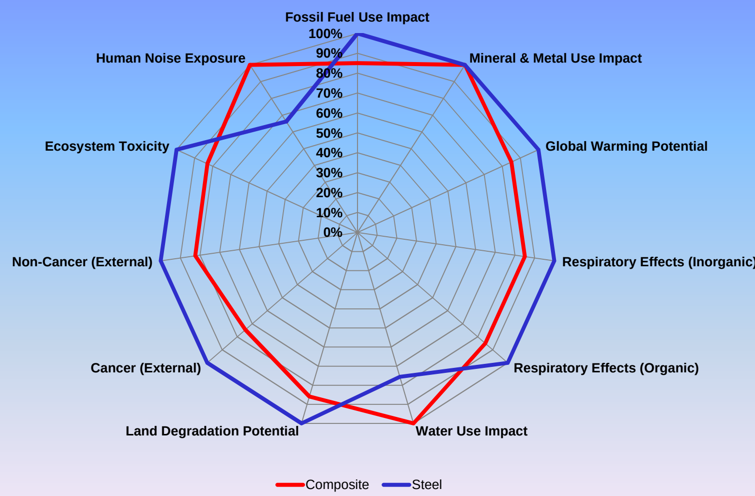
Difference between Steel and Composite Superstructure over 30-yr Life by Inventory Category (fuel for ship excluded)
(positive numbers favor the composite alternative)



STEP 5 (continued)

Acquisition, Technology and Logistics

Comparing Relative Midpoint Impacts



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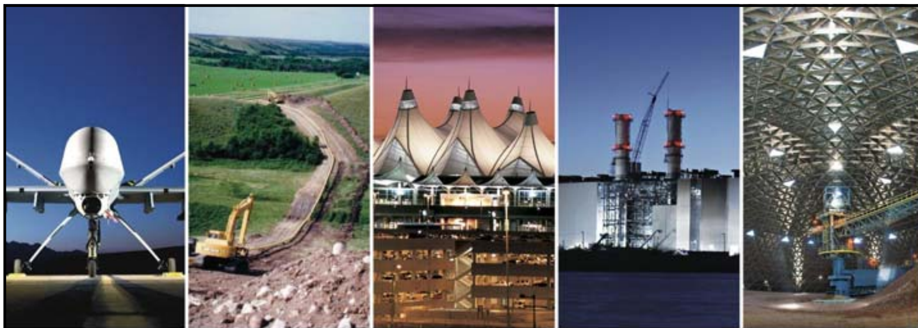
Attachment 6

Sustainable Return on Investment



URS

sROI (sustainable Return On Investment)

July 17, 2014

Andrea Bohmholdt
Senior Economist
andrea.bohmholdt@urs.com

URS

sustainable Return on Investment

Making Investment Decisions based on the Triple Bottom Line

Three Spheres of Sustainability

sROI is a full life-cycle cost accounting of environmental and social impacts in addition to economic performance

Traditional Return on Investment (ROI) measures the financial return of an investment but it does not account for social and environmental impacts

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sROI Framework

Translating Non-monetary Impacts Into Monetary Terms

Economic Impacts	Social / Community Impacts	Environmental Impacts
Capital Cost	Health & Safety	GHG Emissions
Operation & Maintenance	Property Values	Criteria Air Pollutants
Repairs	Community Satisfaction	Ecosystem Services
Replacement Costs	Aesthetics	Water Quality
Avoided Costs	Education	Waste Management
Decommissioning	Environmental Justice	Soil Impacts

sROI

3

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The Economics of sROI

- Economic Impact Analysis (EIA) addresses how an economy is likely to change as a result of an action (e.g. jobs, income or tax revenue).
- Benefit Cost Analysis (BCA) addresses whether an entity is better off by performing a certain action versus doing nothing or "business as usual".
- sROI is similar to a BCA but produces multiple metrics:
  - Financial ROI and sROI Ratios
  - Benefit to Cost Ratio
  - Discounted Payback Period
  - Internal Rate of Return

4

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sROI Methodology

1 Define Objectives

2 Identify Strategies

3 Establish Baseline and Boundaries

4 Monetize Incremental Impacts

5 Develop and Run Model

6 Evaluate Results

Step 1: Define the objectives and desired outcome of the investment / project

Step 2:Identify which strategies should be considered to meet project objectives

Step 3: Establish the conditions without the investment and the boundaries for the life-cycle analysis

Step 4: Incremental impacts are identified and monetized using economic methods and values are vetted through a charette

Step 5: Inputs are incorporated into the model, which is then run

Step 6: Sensitivity analysis is conducted and uncertainty analysis results are evaluated

5

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Economic Valuation Methods

Method	Description
Benefits Transfer	Uses estimations obtained from one context to estimate values in a different context or site
Choice Modeling	Survey approach where respondents choose preferred option from a set of alternative scenarios
Contingent Valuation	Willingness to pay values are elicited from survey respondents
Travel Cost	Value based on the cost of travel to utilize a resource
Replacement Cost	The cost to produce a man-made substitute represents the value of the resource or service
Avoided Cost	Costs that society avoids as a result of the resource or service (e.g. waste or water treatment)
Hedonic Pricing	The value of a resource is derived from its effect on market-priced goods (such as real estate)

6

sROI Methodology

Charette

Collaborative workshop conducted to refine assumptions and vet values

Project Team
Facilitator
Economists
Subject Matter Experts
Technical Specialists

Public Agencies

External Stakeholders

Case Study: Brevard, NC

- Manufacturing site for electrical components and X-ray film
- Off-spec films were disposed in industrial landfills
  - Ballfield Landfill
  - On-site Landfill

Case Study: Brevard, NC

- Step 1 – Objective: Cost effective and sustainable landfill remediation
- Step 2 – Strategy: Remove polyethylene terephthalate (PET) from both landfills and recycle
- Step 3 – Baseline: Without the project, only waste from the Ballfield Landfill would be recovered and disposed of offsite
- Step 4 – Impacts: Construction cost, disposal cost, greenhouse gas emissions, criteria air pollutants, and PET recycling benefits

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Case Study: Brevard, NC

- Step 4 – Quantifying inputs
- The benefits transfer method is used to estimate economic values by transferring information from reputable and relevant economic studies.
- The damage estimates for criteria air pollutants include damage to human health, materials, plants and animals, ecology, visibility and aesthetics.
- The damage estimates for greenhouse gas emissions include net agricultural productivity, human health, property damages from increased flood risk, and ecosystem services.

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Case Study: Brevard, NC

- Step 5 – Inputs are incorporated into the model

Base Case	
Construction Costs for Ballfield Landfill Only	$1,965,997
Disposal Cost	$713,700
Total Project Cost	**$2,679,697**

Recycling PET Alternative	
Construction Costs	$3,276,661
PET Recycling Revenue	($2,830,406)
Total Project Cost	**$446,255**

Economic Benefit	**$2,233,442**

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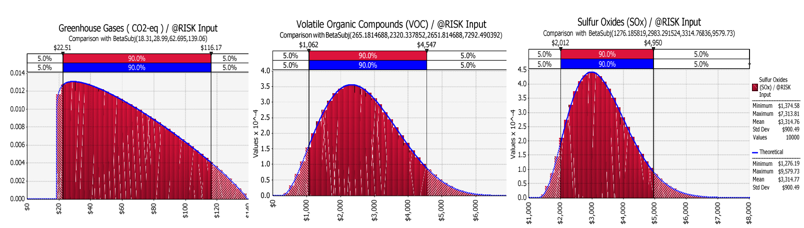
Case Study: Brevard, NC

Step 5 – Inputs are incorporated into the model

SOCIAL DAMAGE ESTIMATES FROM AIR EMISSIONS OF ENVIRONMENTAL EXTERNALITIES External Costs (2013$ per metric ton of air emissions)					
Pollutant	**# of Studies**	**Min**	**Median**	**Mean**	**Max**
Carbon Dioxide (CO2)	5	$18	$29	$63	$139
Sulfur Oxide (SOx)	10	$1,276	$2,983	$3,315	$9,580
Particulate Matter (PM)	12	$1,575	$4,641	$7,127	$26,850
Volatile Organic Compounds (VOC)	5	$265	$2,320	$2,652	$7,292



Input distribution shows the probability of a particular outcome

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URS

Case Study: Brevard, NC

Step 6 – Results are evaluated

Impact category	Incremental Impact (MT)	Value 2013$
Economic Benefit		$2,233,442
Climate change (CO2-eq)	14,426	$904,447
Particulate matter formation (PM)	(368)	($2,619,934)
Terrestrial acidification (SOx)	(10)	($32,830)
Photochemical oxidant formation (VOC)	(0.06)	($166)
	Net Benefit	**$484,959**
	FROI	**500%**
	sROI	**109%**

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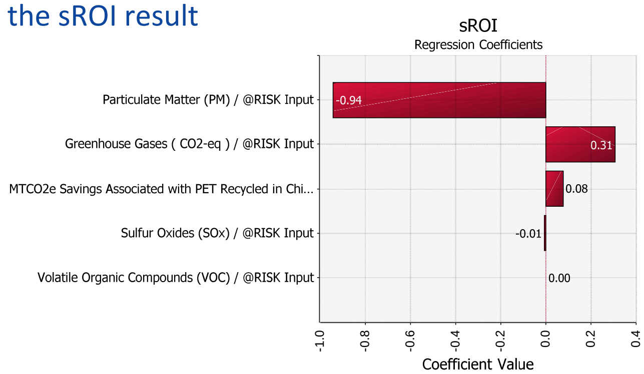
URS

Case Study: Brevard, NC

Step 6 – Results are evaluated

- Sensitivity Analysis:
  - The negative value of PM has the greatest effect on the sROI result



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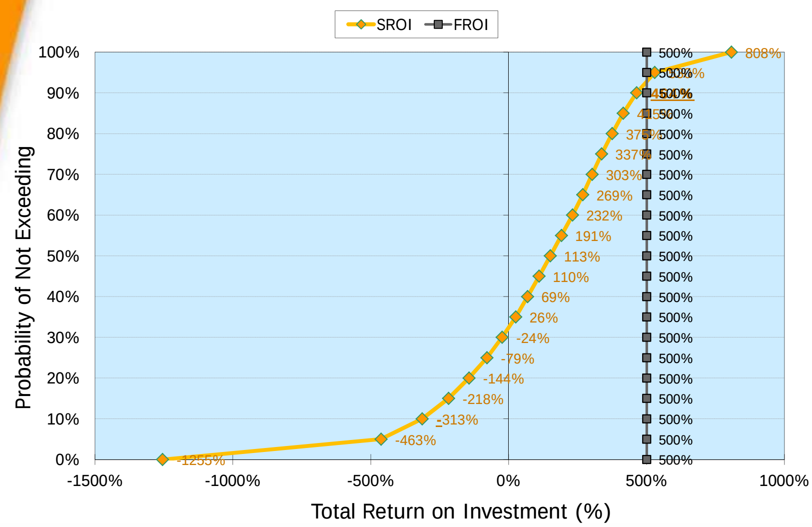
Case Study: Brevard, NC



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sROI Summary

- Provides a more comprehensive picture of investments
- Translates social and environmental impacts into monetary terms
- Includes an uncertainty analysis to demonstrate the likelihood of realizing costs and benefits
- Combines objective data and expert judgment
- Generates results that are defensible and transparent

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URS

Questions?

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Attachment 7

Imagine H_2O

IMAGINE H2O

Presentation to:

Sustainable Remediation Forum

Scott Bryan
COO

@ImagineH2O

IMAGINE H2O

WHY IMAGINE H2O?

A pervasive lack of awareness of water problems and the opportunities they provide means few innovators and few funders; Imagine H2O catalyzes innovation & investment

Market Failure:

Void In Innovation

Imagine H2O:

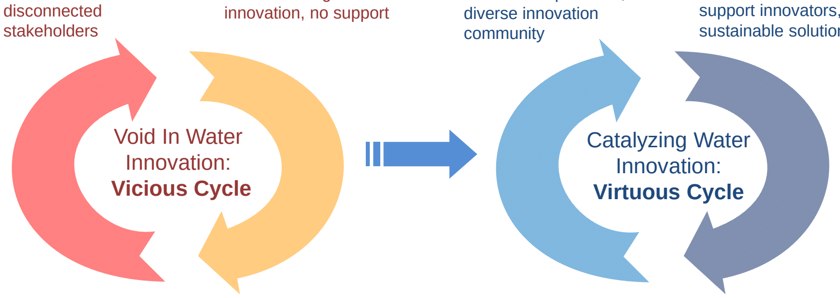
Catalyzing Innovation

Few entrepreneurs, disconnected stakeholders

Little financing for innovation, no support

Attract entrepreneurs, build diverse innovation community

Attract investment, support innovators, sustainable solutions



Confidential

Less than 1% of all venture capital goes to water

IMAGINE H2O — PROGRAMMING

BUSINESS LEADERSHIP POLICY

COMPETITION	ACCELERATOR	IMPACT	
Identify promising water innovation businesses	Advance winning ideas	Direct	Systemic

Imagine H2O's portfolio represents **1 in every 6 dollars** of early-stage financing in the water sector

IMAGINE H2O — PORTFOLIO HIGHLIGHTS

Food & Agriculture

TerrAvion

WatrHub

WellIntel

Consumer

Leak Defense Alert

nbd nano

Pave Drain

Wastewater

Nexus eWater

Tusaar Inc.

New Sky

Water-Energy

NLine Energy — Every drop of energy

mOasis — Innovative crop science

Puralytics

Efficiency

WaterSmart Software, Inc

Fruition Sciences

IMAGINE H_2O

PARTNERSHIPS

Accelerator Hubs	Utility Partners	Beta Partners
Massachusetts Clean Energy Center WaterTAP Technology Acceleration Project The Water Council Colorado Water Innovation Cluster BlueTech Valley	SFPUC Metropolitan EBMUD SNWA Tucson Water	Sun-Maid Wawona Frozen Foods Woolf Farming Straus Family Creamery Ingomar Packing Earthbound Farm Jain Americas Olam Wine Institute Stonyfield Farm Sustainable Conservation Organic Valley Paramount Farming Company

Campus Hosts

Stanford University
Princeton University
CU Boulder
Babson University
MIT
UC Berkeley
UC Davis
UC Santa Barbara

Industry Sponsors

American Water Works Association
Water Environment Federation — the water quality people

IMAGINE | H2O

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IMAGINE | H2O

COALABORATION OPPORTUNITIES

PROGRAMMING	PARTNERSHIPS

Volunteering
Judging
Mentorship
Speaking

Participation
Nominate or submit competition entries

Sector Partnerships
Trade groups and associations

Corporate Sponsors & Donors

Beta Partners
Provide "first customer" or beta testing opportunities in commercial settings

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