

Measuring Sustainability Performance: Benchmarks, Roadmaps, and Certification

Presented to:
**4th International Conference on Sustainability
Engineering and Science: Transitions to Sustainability**

The New Zealand Society for Sustainability Engineering and
Science

Darlene S. Schuster
Executive Director
Institute for Sustainability

December 1, 2010

“Sustainability is a path of continuous improvement, wherein the products and services required by society are delivered with progressively less negative impact upon the Earth”

The Road To Sustainability

Impact Assessment
Risk Assessment
Risk Management

Benign
by Design

WASTE
MINIMIZATION



Computer
Modeling

Green
Chemistry
CLEAN CATALYSTS

SEPARATION
CHNOLOGIES

Clean
Products

Life Cycle
Assessment
(LCA)

Systems
Analysis

Ecosystems
Modeling

CLEAN ENERGY
Renewable Sources
Electrochemistry
Solar, Wind, Biomass

Credit Trading
Design

Watershed
Protection

Industrial
Ecology



The Institute for Sustainability

- A community of sustainability “practitioners”
 - Companies
 - Professionals—industry and academic
 - Youth
- Organized under the American Institute of Chemical Engineers
 - Professional membership organization
 - Non-profit 501c(3)
 - Provides operational support
- Operation
 - Managing Board and Project Experts
 - Chairs
 - Deborah Grubbe, Chair ‘10-
 - Subhas Sikdar
 - Calvin Cobb
 - E. Beaver

Overview of the Institute

Mission: to serve the needs of and influence the efforts of professionals, academes, industries, and governmental bodies that contribute to the advancement of sustainability and sustainable development.

SEF

745 AIChE **members**
950 Other professionals
\$25 dues

CSTP

Industry Group

35 companies engaged in ,
9 roundtables putting
sustainability into practice

YCOSST

Partnership w/ SustainUS
9750 **students**,

Incorporates sustainability
into undergrad research,
sponsors awards & student
chapters

Projects of IfS

1. Sustainability Index
2. ICOSSE Aug 09
3. Founder Societies Carbon Management
4. Engineers Forum
5. Sustainable Packaging Symposium
6. *Credentials and BOK*



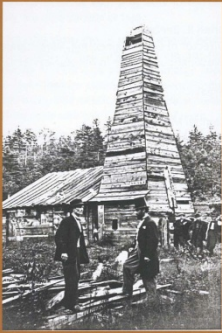


AIChE® American Institute of Chemical Engineers
THE AIChE ENERGY INITIATIVE
The primary forum for chemical engineers to discuss, learn about and impact energy issues.


November 2008

AIChE-Pittsburgh and ACS Energy Technology Group

Western Pennsylvania's Energy Heritage and Future

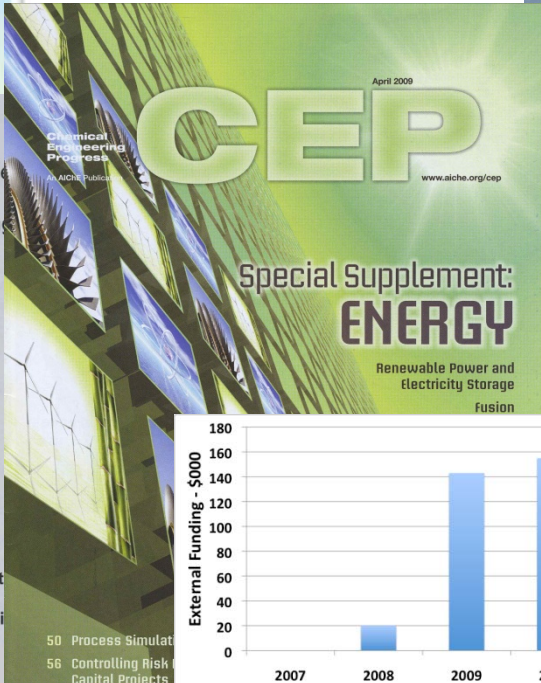


Convocation of Professional Engineering Societies and the National Academy of Engineering



Key Dimensions of America's Energy Future AND Engineering the System of Healthcare Delivery


National Academy of Engineering



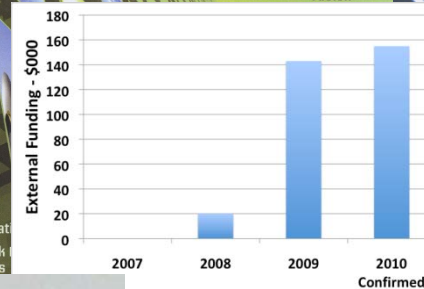
April 2009
www.aiche.org/cep

Special Supplement: ENERGY
Renewable Power and Electricity Storage
fusion

50 Process Simulation
56 Controlling Risk Capital Projects



The AIChE Energy Initiative
User's Guide to Energy Focused Events
April 26-30, 2009
09 AIChE Spring Meeting, Tampa, Florida



**COMMITTEE ON
Science and
Technology**

2009 ENGINEERING PUBLIC POLICY SYMPOSIUM

LEAD SPONSORS: United Engineering Foundation, ASME, AIChE, AIME, ASCE, IEEE-USA
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Carbon Management

AIChE ASME AIME IEEE ASCE

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- Newsletters
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- Publications
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- Resources & Links

**Pittsburgh Section
ChemLuminary Award Finalists**

"Putting Engineering and Science Back into Energy Policy"

Measuring Sustainability Performance

Key Questions

- What is the system you want to evaluate?
 - Companies/Organizations
 - Processes and Development
 - “Products”
 - Individuals, Sustainability Practitioners
- What are the metrics; appropriate to the system under consideration?

Measuring Sustainability Performance

Key Questions

- What is the system you want to evaluate?
 - Companies/Organizations
 - *AIChE Sustainability Index Benchmarking*
 - Processes and Development
 - *CSTP Sustainability Roadmap*
 - Individuals, Sustainability Practitioners
 - *IfS Body of Knowledge and Certification*
 - “Products”
- What are the metrics appropriate to the system under consideration?

Companies/Organizations

AIChE Sustainability Index Benchmarking

Purposes of a Sustainability Index

- Investment guides
 - Ethical investment/SRI
 - Long-term return (“stock picks”)
- Stock market indices
- Stakeholder ratings
- **Benchmarks** for company management

Examples of Financial SI's

	Investment Guide?	Market Index?	Management Benchmark?	Consult to Companies?
DJSI	✓	✓	✓	✓
FTSE-4Good	✓	✓	✓	✓
GS- Sustain	✓	✗	✓	✗
Innovest	✓	✗	✓	✓

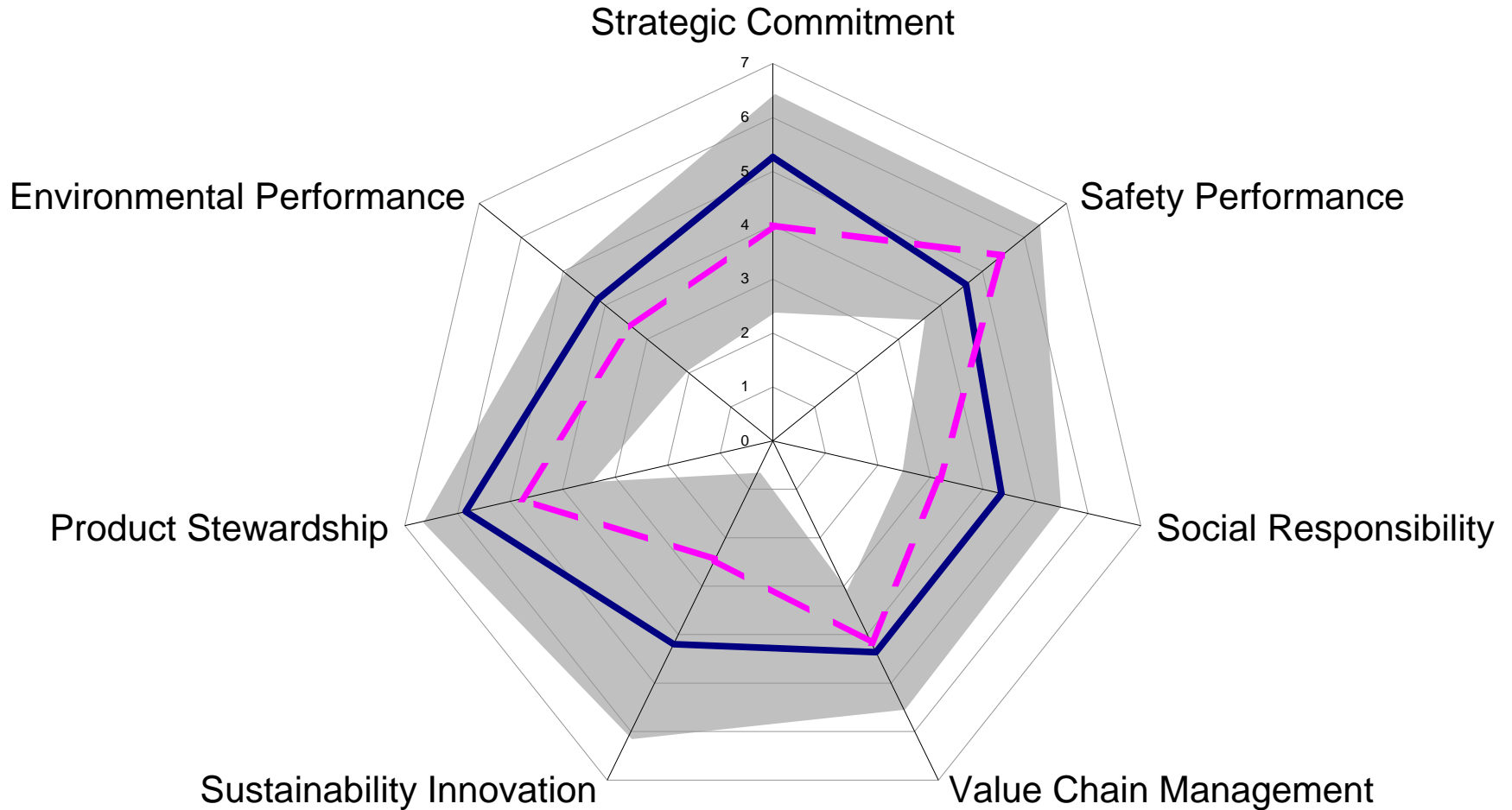
Concept of the AIChE Sustainability Index™

Benchmark

- Based on the Wright Killen Refinery Survival Index (Oil and Gas Journal)
- Meant to fill a gap:
 - Relies more heavily on quantitative performance indicators
 - Provides a *heavier weighting* applied to various indicators of safety and environmental performance and to technological innovation towards SD
 - Available to range of sectors, company size
 - The scoring: robust methodology designed to account for subjectivity in a transparent manner.
- Designed to avoid the ‘black box’ problem of other indices
- Intended for executives and directors to manage company business lines
- Global, initially focusing on major chemical companies
- Publication remains silent on individual company ratings
- Companies find it useful to benchmark themselves relative to a set of companies

AIChE Sustainability Index TM

- Sustainability strategy, commitment, and goals
- Innovation, including role of sustainability in R&D
- Resource use
- Waste and emissions
- EH&S performance and management
- Supply chain management
- Product and Process Safety and environmental impacts
- Transparency
- Third-party ratings



— Net Revenue > \$10 Billion USD
- - Net Revenue < \$10 Billion USD

Subscribers to the AIChE Sustainability Index (sm) receive:

- Details behind the computations made to obtain your company's metrics
- Comparisons to the benchmark averages of other indexed companies for better understanding of current sustainability practices in relevant industries
- Recommendations on how to improve sustainability practices and reporting of them based on how the community and public view current company sustainability practices
- Inclusion as desired in all Sustainability Index press materials
- A Seat at the Sustainability Index roundtable to improve your understanding of sustainability measures and help the index evolve to best meet your needs

Value Chain Management Details

- *Environmental Management System*
 - Corporate level environmental management system – ISO14001, RC-14001, RCMS or EMAS certified
 - Facility level environmental management system – ISO14001, RC-14001, RCMS or EMAS certified
 - % certified
 - Indication of presence/current effort
- *Supply Chain Management*
 - Presence of a supply chain policies and procedures related to sustainability
 - Sustainability evaluation required of suppliers
 - Audits of supplier practices
 - Policies extended to suppliers' suppliers

Value Chain Management

Ideal Score of 7

- **Value-Chain Management—Project Orientation**
- System in place to manage sustainability performance in operations and project delivery
- System in place to manage sustainability performance of sub-contractors and other suppliers
- Significant number of projects demonstrate excellence in long-term environmental and social performance
- **Value-Chain Management—Product Orientation**
- Externally recognized environmental management system in-place at the corporate level and at all major facilities
- Presence of company-wide supplier management policies and procedures related to sustainability, applied and enforced to all supply-chain entities with potentially significant impacts

Status

- Launch
 - Methodology Published June '07
 - AIChE SI being published yearly in *CEP*
 - Additional sectors: Construction and Energy/ Power Sectors
- Requests to explore development of index
- December-- yearly Users meeting of company users.

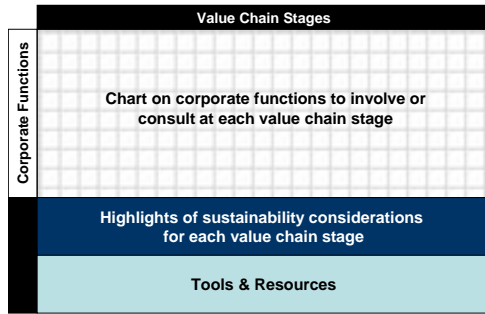
Contact ifs@aiche.org for invitation

Processes and Development *CSTP Sustainability Roadmap*

- CSTP formed in 2005 as part of the AIChE's IfS
- Supported by member companies
- Tailored collaborative projects and pre-competitive research
- Utilize members to conduct project work
 - Project: Development of Case studies and evaluation of Decision Support Tools in industrial Use
 - Project: Focus Groups for Survey of Sustainability in the Chemical Industry (PriceWaterhouse Coopers)
 - Project: R&D Checklist for Sustainability
 - **Project: Sustainability Roadmap**
- Corporate Chairs
 - Laura Rosato, Honeywell
 - Carol English, Cytec Inc.
 - Charlene Wall, BASF



- **Project: EPA Grant 2005: Case Studies of Industry Decision Support tools for Sustainability**
- *Identified gaps & challenges*
 - Great tools, not widely used
 - Need for better integration of sustainability into business processes
 - Understand context of management and technology decisions along value chain
 - Understand key decision points, relevant SD considerations, and key functional areas/decision makers involved
 - Need to understand the broader set of tools, approaches, and other resources to help integrate SD into the organization



Main Page: Overview

Key corporate functions & resources

Sustainability Considerations	SAS Topics												End of Life				
	Human Resources	Community & Environment	Materials	Energy	Water	Waste	Transportation	Information	Product	Process	Supply Chain	Customer					
Strategic Considerations																	
1. What is the company's total energy and how is it produced? (Include all energy used in the company's operations, including purchased energy and on-site generated energy.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. What is the company's total water and how is it produced? (Include all water used in the company's operations, including purchased water and on-site generated water.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. What is the company's total waste and how is it produced? (Include all waste generated in the company's operations, including purchased waste and on-site generated waste.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. What is the company's total greenhouse gas emissions and how are they produced? (Include all emissions generated in the company's operations, including purchased emissions and on-site generated emissions.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. What is the company's total transportation and how is it produced? (Include all transportation generated in the company's operations, including purchased transportation and on-site generated transportation.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. What is the company's total information and how is it produced? (Include all information generated in the company's operations, including purchased information and on-site generated information.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. What is the company's total product and how is it produced? (Include all products generated in the company's operations, including purchased products and on-site generated products.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. What is the company's total process and how is it produced? (Include all processes generated in the company's operations, including purchased processes and on-site generated processes.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. What is the company's total supply chain and how is it produced? (Include all supply chains generated in the company's operations, including purchased supply chains and on-site generated supply chains.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. What is the company's total customer and how is it produced? (Include all customers generated in the company's operations, including purchased customers and on-site generated customers.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Composite Checklist –
Questions to guide sustainability consideration at each value-chain stage



Question	Findings	Action Items	Responsible Party	Status	Sources & Documentation
...	...	➤ ... ➤	● ✓	...
				●	
				●	
				○	

Summary Table –
Form to record answers, action plans, responsible parties, status and documentation



Sustainability Dimension	Raw Materials	Production (Manufacturing)	Delivery of Product (Transportation)	Product Use	End-of-life (Disposal)
Resource Usage					
Energy Usage					
Water Usage					
Land Usage					
Human Health Factor					
Toxicity					
Hazards					
Process Safety					
Environmental Impact					
GHG Emissions					
Air Emissions					
Solid Waste					
Societal Impact					
Local Community Impact					
Global Societal Impact					
Economical Impact					
Corporate Financials					
Customer Financials					

Scoring Framework
Highlight issues and opportunities, updated at each stage



SD Roadmap Summary Table

- 192 Key Sustainability Questions
- Where to ask them during process and product development
- Who should be included in the “answers?”

Microsoft Excel - Summary Table Completed.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

C3 Assessment

A	B	C	D	E
1	CSTP SD Roadmap - Summary Table			
2	Revised July 17, 2007			
3				
4	Sustainability Considerations	Assessment	Rating ■ Serious Concerns ■ Some Concerns ■ Good	Assessed by
14	<ul style="list-style-type: none"> What policies and processes are in place to assure sustainable performance of the supply chain (e.g. EMS requirements)? 	Gov. and private regulations on sustainable agriculture practices	Good	Certification & Services n.d., Code o
15	<ul style="list-style-type: none"> What tools are available to evaluate the sustainability performance of the supply chain? 	Few formal tools, Net Energy Balance gives good, comprehensive evaluation, GREET model measures all GHG emissions	Some Concerns	Pimentel (2003), Ethanol: Energy W
16	Supply Chain & Product Stewardship			
17	<ul style="list-style-type: none"> Which supply chain partners are aware of and interested in sustainability and what are their sustainability standards and needs? 	Oil/automotive companies who dictate end use of product may not support sustainability, Process otherwise sustainable in many aspects	Some Concerns	Brower (2007)
18	<ul style="list-style-type: none"> Which potential supply chain partners are positioned to support a sustainable technology initiative/product/process? 	BP energy company has invested millions in biofuel research, Some oil companies oppose ethanol	Some Concerns	Energy Efficiency and (2006)
19	<ul style="list-style-type: none"> What opportunities exist for industrial symbiosis and shared information? 	Process/Product more at a development stage, Much symbiosis among supply chain and by-product use	Good	Neuhauser et al (1999)
20	Stakeholder Engagement			
21	<ul style="list-style-type: none"> Who are the key SD stakeholders (internal & external, along the supply chain) and how does the company communicate with them (e.g. employees, shareholders, NGOs, governments)? 	Government organizations, private farmers, etc., The breadth of the operation may limit communication possibilities	Some Concerns	
22	<ul style="list-style-type: none"> Does the company participate in external SD organizations/coalitions/initiatives that can provide guidance or input? 	CSTP	Good	About the WBCSD n.d, Strengtheni
23	<ul style="list-style-type: none"> What are the sustainability standards of your business partners? 	Oil/automotive companies are key partners	Serious Concerns	
24	Resource Usage: energy, land, water			
25	Energy Use			
26	<ul style="list-style-type: none"> How energy intensive is the feedstock? Which feedstock materials are the most energy intensive and are there energy-efficient alternatives? 	High NEB reflects low energy intensity, Small use of fertilizers and almost non-existent use of pesticide/herbicide	Good	Positive Impacts n.d.
27	<ul style="list-style-type: none"> Can the feedstock be produced using renewable energy? 	Biodiesel for farm equipment, but no good alternative for fertilizer	Some Concerns	
28	<ul style="list-style-type: none"> Can any byproducts be used as energy? 	Lignin, ground and burned to produce electricity	Good	Brower (2007)
29				
30	Upstream Input	Commercialization		

Ready

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Environmental	Resource Use	Energy use, material intensity, water use, land use
	Environmental Impact	GHG emissions, air emissions, solid waste, (pollutant effects)
Social	Health & Safety	Toxic reduction, hazards, process safety
	Societal Impact	Workers' well-being, local community impacts/QOL, global societal impacts/contributions
Econ.	Economic Impact	Financials along value-chain (corporate, customers, ...)
Business Perspective	Management	Internal process, value-chain partnership, stakeholder engagement
	Business Strategy	Alignment with business strategy, core values & competencies, market & regulatory drivers

- **Energy Use**

- How energy intensive is the feedstock? Which feedstock materials are the most energy intensive and are there energy-efficient alternatives?
- Can the feedstock be produced using renewable energy?
- Has energy consumption been optimized for the selected process?
- Can any byproducts be used as energy ?
- Will energy be saved or conserved in the distribution of this product vs. alternative products/processes?
- Will the use of this product save or conserve energy for the customer versus alternative products/processes?
- Would there be opportunities to use renewable energy in the production, distribution or use of the product/process?
- Are there alternatives for more energy efficient transportation/distribution system?
- Could the product be reused/recycled to reduce life-cycle energy use?

- **Water Use**

- How water intensive is the feedstock? Which feedstock materials are the most water intensive and are there water-efficient alternatives?
- Has water use been optimized for the selected process as both a reagent and processing medium?
- Have water source alternatives been evaluated and considered?
- Have water quality considerations been aligned with use requirements?
- Will the product/process be more water efficient in production and use?
- Has water been reused and recycled appropriately?
- Have equipment and technology alternatives been evaluated for optimizing water use?

Checklist along the Value Chain

Sustainability Considerations	Business Strategy Development & Alignment	Upstream Input	Product & Process Development								Production	Distribution	Industrial Consumer Use	Customer Use	End of Life	
			Idea Generation Innovation	Concept	Scoping	Definition	Development	Scale-up	Commercialization	Facility					Molecule	
Strategic Considerations																
Business Strategy & Core Values																
<ul style="list-style-type: none"> What is the company's <u>global</u> strategy and how can it support sustainable development? 	■															
<ul style="list-style-type: none"> What are the company's <u>regional</u> strategies and how can they support regional sustainable development? 	■															
<ul style="list-style-type: none"> What are the company's core values? 	■															
SD Objectives & Targets																
<ul style="list-style-type: none"> How can sustainability support the business strategy? 	■															
<ul style="list-style-type: none"> Does the company have objectives to support sustainable development (e.g. emission reductions, renewable energy use, conducting life-cycle analyses of products, developing renewable-resource based products?) 	■		■													
<ul style="list-style-type: none"> What are the company's metrics and targets related to sustainable development? 	■		■						■	■						
Core Competencies																
<ul style="list-style-type: none"> What are the company's core competencies and how can they support sustainable development? 	■															
Market Drivers																
<ul style="list-style-type: none"> What are the key markets for the business? 	■															
<ul style="list-style-type: none"> Are there sustainability-related trends, drivers and opportunities in these markets? 	■															
<ul style="list-style-type: none"> Is there a demand for sustainable products by the end-use consumer? 																
<ul style="list-style-type: none"> What is the competitive environment for a new sustainability technology? 																
<ul style="list-style-type: none"> How would new environmentally sound technologies, service or information-based offerings meet the market or customer need? 												■	■			
<ul style="list-style-type: none"> Can a new product/process enhance the company's reputation in any area of sustainable development (economic, social, or environmental)? 			■													

Value Chain Axis

Sustainability Considerations
Specific questions, applied and modified along the value chain whenever appropriate

The CSTP Sustainability Roadmap

A Process for Sustainable Decision Making

- How is your Company's Sustainability Performance Enhanced?
 - Via the value chain?
 - By corporate decision making?
 - By job function?
- Provides list of considerations asked as questions by key decision makers at each stage
 - Ability to score responses
 - Track improvement to sustainability concepts through each stage
 - Provides list of resources and tools

Individuals, Sustainability Practitioners *IfS Body of Knowledge and Certification*

- Do individuals have the appropriate knowledge base?
 - Consultants
 - New hires
 - Existing employees
- What is the Body of Knowledge of Sustainability?

The Current Situation

- Difficult to identify and define the sustainability professional
 - Especially for the Chemical Processing Sector
 - Body of Knowledge has not been defined
- As Chem E's become more entrepreneurial, the need to differentiate from others is growing
 - Young Professionals want to differentiate their knowledge
 - More and more downsized professionals moving into consulting
- Industry business case for specialized knowledge exists
 - Sustainability expertise with a chemical background –needed in multiple industrial sectors
 - Many filling the roles do not have engineering degrees
 - Many sustainability MS classes emerging in ChemE Depts

Established Certification Programs

- Credentials exist for LEED
 - industry segment specific --- N/A
- Other programs based on PE first, but...
 - Less than 14% of chemical engineers Hold a PE
 - BOK for our industry is not apparent
- Credential programs—IChemE; IMechE—based on experience
 - Experience in field is still being established

Established programs don't fill our need

The IfS Response

- AIChE Credentials- a credential for domain/content knowledge
- Developing the Body of Knowledge
- Differentiation from PE, but complimentary
 - First step for many chemical engineers on way to licensure
 - Can be viewed as the fundamental domain/content knowledge base
- Goal: Leverage with emerging University based Sustainability Courses

Program Vision

- Develop BOK -- Building upon knowledge in sustainability established by our stakeholders
 - Benchmarking AIChE Sustainability Index ®
 - Full Cost Accounting: Beyond life cycle (Total Cost Assessment TM)
 - CSTP Sustainability Roadmap
- Integrate with University Based Chem E Courses
 - How many?
 - Which ones?
- Capstone course from AIChE with case study working with a graduate of the program
- No rubber stamps; no grandfathered credentials

Body of Knowledge Team Formation Stages

- Subhas Sikdar, US EPA
- Glenn Schraeder, U of Arizona
- Jim Cobb/Bill Parish, AIChE Chem E BOK Team
- Felicia Davis, United Negro College Fund Energy Professionals and Campus Sustainability Program
- Laura Rosata, Honeywell Global Product Steward
- Carol English, Cytec SHE Services
- Talitha Hampton, Merck
- Alessandra Carrion, EIT, LEED certified, AIChE Young Professional

Path Forward

- Rolling out to key stakeholders for active input and feedback
- Continue market study to identify stakeholders and customers
- Formation of Advisory Board
 - Will include diverse groups outside the ChemE sector in order to gain perspective and increase chances of wide range success and acceptance.
- Body of Knowledge Team
 - T of C developed (Spring '10)
 - Write Sections (Summer/Fall '10)
 - Send for review and feedback (Winter '10/'11)
 - Industry– Center for Sustainable Technology Practices
 - Others certified in LEED and other established programs
 - Academic
- Identification of all University Based Courses (Winter '10/'11)
- Refined Market Survey (Winter '10/'11)
- Initial Class of Thought leaders for Pilot ('11)

**All the benefits & blessings
flowing from the use of the
earth were held to be the
rightful heritage of all
generations**

The Old Testament-
Genesis & Deuteronomy

**“...treat the earth as though we
are tenants, rather than
owners”we must leave
behind ‘enough and as good’ for
others”**

John Locke, Two Treatises of
Government, 1689

**“Then I say the earth belongs to
each...generation during its course...no
generation may contract debts greater
than may be paid during the course of its
own existence”**

Thomas Jefferson, 1789

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