

Project Indicators - A New FIDIC Management System For Ensuring Project Sustainability

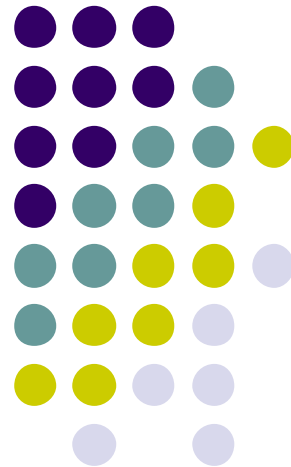
Workshop: WS7

FIDIC Annual Conference, 2004

Copenhagen, Denmark

Presented by

John Boyd and Bill Wallace



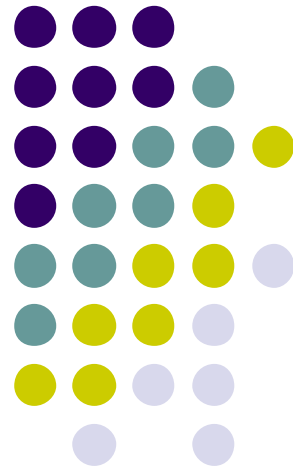
Agenda

- Introduction
- Project Sustainability Management
- Feedback
- Case study



Introduction

- *The issue*
- *The premise for Project Sustainability Management (PSM)*



The Issue

- Sustainable development is the issue of the 21st century



The Evidence Is Clear

We are using up the world's resources and carrying capacity faster than they can be replaced or replenished



A Few Examples...

- Water: 20% lack access to safe water
- Sanitation: 40% lack basic sanitary facilities
- Climate Change: by greenhouse gas emissions
- Food: 11 of 15 most important fishing areas critically exploited
- Pollutants: Long range transport and bioaccumulation of persistent organic pollutants



Global Actions Are Required



- UN Brundtland Commission Report: 1987
 - Environment and economy are inextricably linked
 - Cannot continue with our present form of development
 - Defined sustainable development
 - “...development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Global Agendas, Priorities and Goals



- 1992 Earth Summit, Rio de Janeiro
 - 30,000 people from 100 countries
 - Produced *Agenda 21*
 - *40 chapter, 800 page agenda for action*
- *2002 World Summit on Sustainable Development, Johannesburg*
 - *Millennium Development Goals*
 - *Specific targets and schedules*

Industry is Responding



- WBCSD member survey, Sept. 2003
 - Three-quarters said that sustainable development activities would lead to better stock performance
 - Two-thirds said that they were working to incorporate sustainability into company operations

WBCSD members' views on the business case for sustainable development.

Reason	Percent
Risk reduction	31%
Market opportunities	19%
Operational efficiency and effectiveness	18%
Enhancement of Brand and creation of Goodwill	13%
The meaning of life	8%
Protecting the resource base of raw materials	6%
Recruitment & retention of talent	6%

Government is Responding



- Cities, municipalities are competing world wide for economic growth and development
 - 6000 committed to Agenda 21
 - Quality of life the deciding issue
- World Bank is applying sustainability to project financing
 - Use of the Equator Principles
 - Projects to be socially and environmentally responsible

Summary

- Sustainable development is a real and urgent problem
- The task is enormous
- Our CLIENTS are committed
- Achieving sustainability will be a long journey, spanning many, many decades



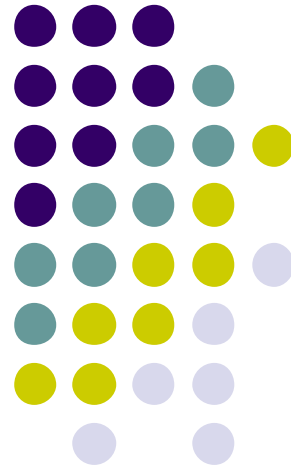
Conclusions



- Hence sustainability will be delivered incrementally, project by project
 - If we are to achieve a sustainable world, it will be the result of
 - Society's demand
 - Clients' needs
 - Engineers' ability

The Premise for Project Sustainability Management

- *We will achieve sustainability one project at a time*
- *As engineers, we are on the pointy end of this effort*
- *We need to measure our progress*



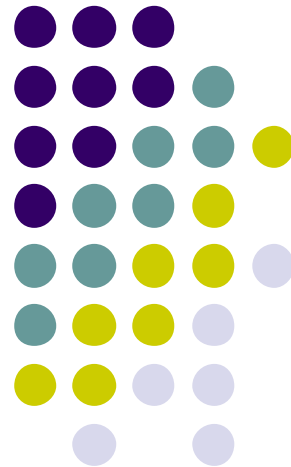
Design principles



1. Sustainability is a location dependant whole society concept
2. Sustainability is a moving target
3. Sustainability will be achieved one project at a time
4. Sustainable projects do not have to be perfect
5. Sustainability targets are defined by Agenda 21
6. Sustainability requires an environment of innovation

Project Sustainability Management

- The framework
- Role of project goals and indicators
- The Project Sustainability Management (PSM) process



The “Steamboat Principles”



1. Align globally, adjust locally
2. Educate and be educated
3. Create an environment for innovation
4. Strive for continuous improvement
5. Don't expect perfection, but expect commitment



Creating the Framework



- For projects intended to contribute toward sustainability...
 - Must set comprehensive sustainable development goals and indicators
 - Linkage to the “whole society” goals of Agenda 21, Millennium Development Goals
 - Must incorporate substantive stakeholder input throughout the project life cycle
 - Be open and transparent
 - Provide mechanisms for feedback, assessment of results, sustainable performance benchmarking, and knowledge sharing

Critical Element: An Environment for Innovation



- Working conditions in which learning and creativity are fostered and celebrated
- Project owners urged to set stretch goals
 - Seek to establish higher benchmarks for sustainable performance
- Consulting engineers encouraged to innovate
 - Try out new approaches, test new technologies

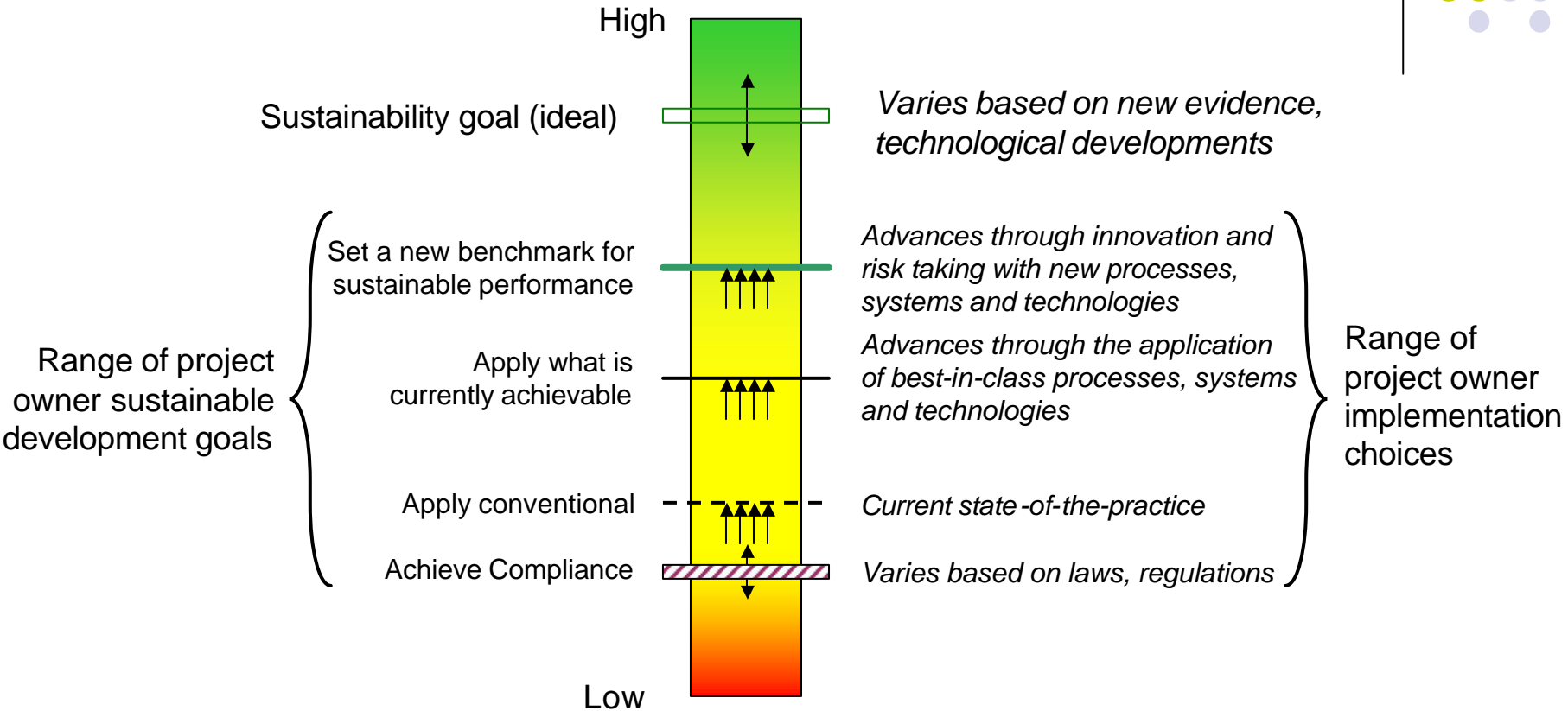
Role of Project Goals and Indicators



- Project goals set direction
 - Must be comprehensive
 - Encompass the full range of sustainable development performance
- Project indicators provide the means to measure progress toward those goals

“If you don’t know where you are going, then any road will get you there.” Lewis Carroll

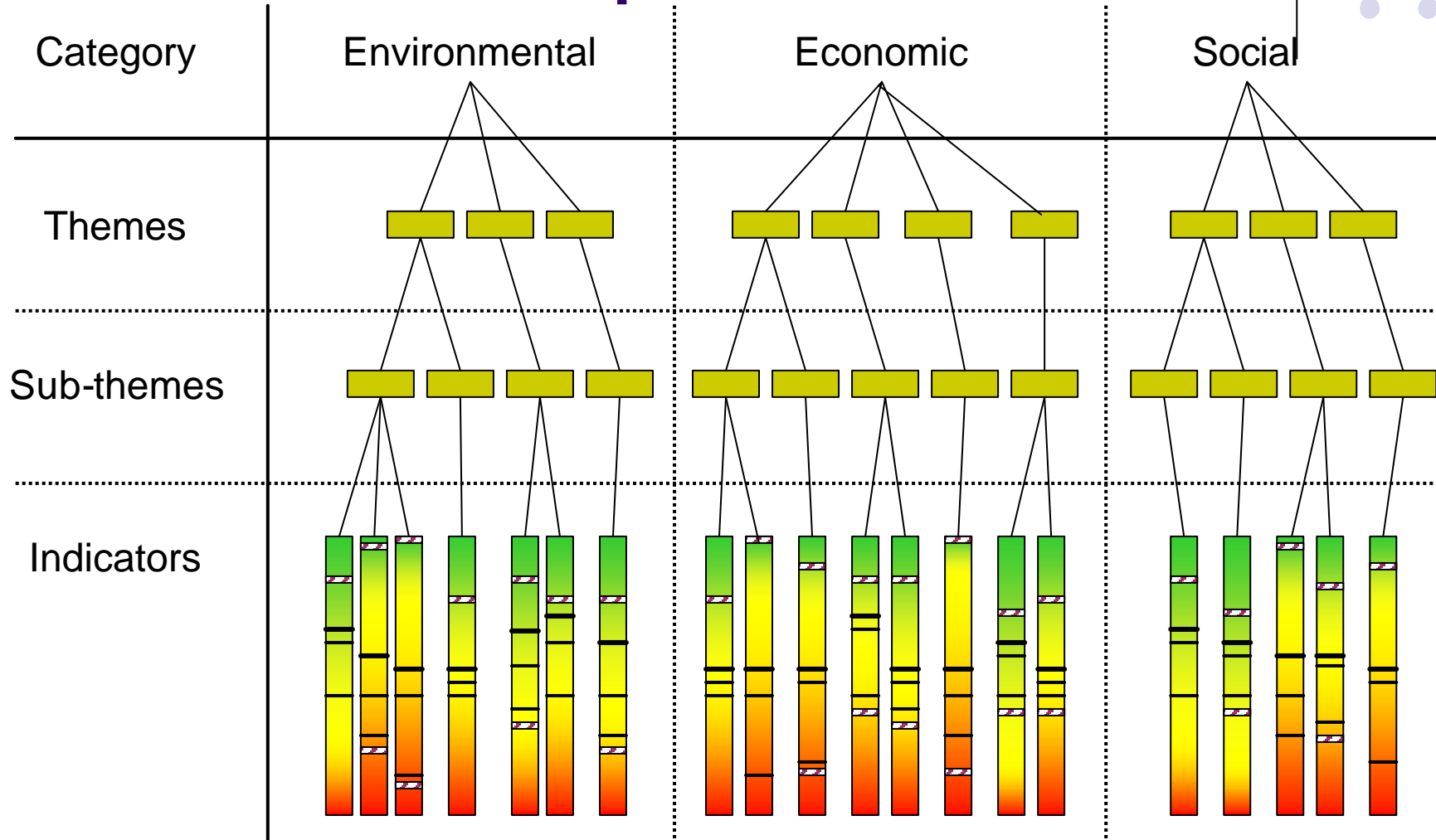
Sustainable Development Project Objectives and Indicators



Sustainable Development Objectives and Indicators

Examples: water consumption per person, total GHG emissions, percent use of recycled materials.

Sustainable Development Indicator Set



FIDIC Approach for Creating Sustainable Development Project Goals and Indicators



- Demands a whole-society concept
- Represents a moving target
- Depends on project location
- Requires an environment for innovation



The new living roof is one of the prominent features of an innovative \$2 billion modernization of Ford's 84-year-old Rouge River manufacturing complex in Detroit.

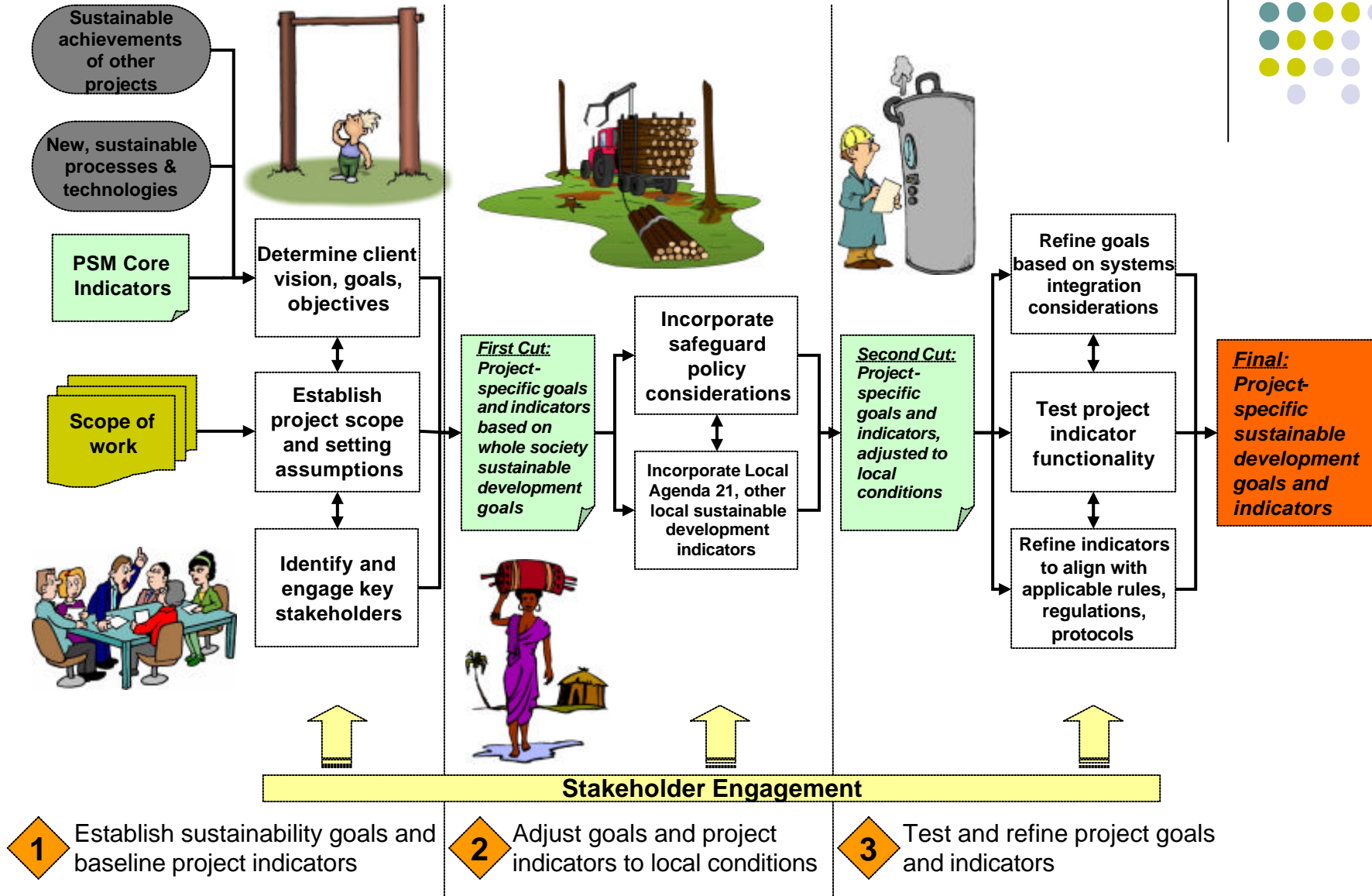
© Ford Rouge Design Team. Courtesy William McDonough + Partners.



FIDIC Approach, continued

- Start with the goals and indicators developed by the UN Commission on Sustainable Development (CSD)
 - CSD translated Agenda 21 into a set of goals and indicators to be used by decisionmakers
- Convert those whole-society goals and indicators to project-based goals and indicators
 - PSM Core Indicator Set
- Adapt PSM Core Indicators to the project

PSM Process



Project Sustainability Management



- Stage One: Establish sustainability goals and baseline project indicators
 - Establish the project scope and setting assumptions
 - Determine the project owner's vision, goals and objectives for the project
 - Identify and engage key stakeholders
- Stage Two: Adjust goals and project indicators to local conditions
 - Incorporate applicable safeguard policy considerations
 - Identify and incorporate Local Agenda 21 or other local indicator development activities
- Stage Three: Test and refine project goals and indicators
 - Refine goals based on systems integration considerations
 - Test project indicator functionality
 - Refine indicators to align with applicable regulations, and protocols

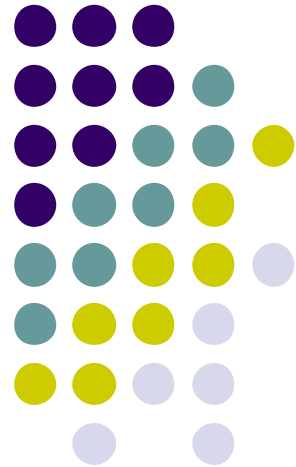
Results in the Application of PSM



- Can achieve and demonstrate real progress toward sustainability
 - Based on comprehensive whole-society goals and indicators
 - Customized to local conditions, stakeholder concerns
- Creates a mechanism for continuous improvement
 - Learn what others have achieved
 - Set goals for even better performance

Workshop Input

Tell us what you think.....





Three Questions

- Do you agree with the basic premise that our industry has the responsibility for delivering sustainability?
- Is PSM an approach that you are prepared to try with your clients?
- What else can FIDIC do to help support your efforts?

Case Study

Sustainable School Design and Construction

Poudre School District,
Fort Collins, Colorado,
USA



Zach Elementary School in the City of Fort Collins, Colorado. The school was designed and built in accordance with sustainability principles. Photo courtesy of the Poudre School District



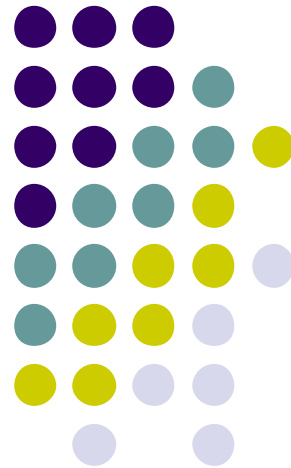
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Stage One: Establish sustainability goals and baseline project indicators

- Establish the project scope and setting assumptions
- Determine the project owner's vision, goals and objectives for the project
- Identify and engage key stakeholders



“Building sustainable buildings is a challenge for our contractors because it requires them to change the way they have been doing business.”

Establish the Project Scope and Setting Assumptions

- Located in the City of Fort Collins, Colorado, USA
 - 44 schools for 22,500 students
 - Fort Collins population 130,000
 - Excellent and well-educated labor pool
 - Excellent quality of life



**Historic Avery Building in Old Town Square in Fort Collins, Colorado.
Source: City of Fort Collins.**





Project Funding

- Fort Collins voters passed US\$175 million school bond issue
- Additional resources
 - US\$100,000 in funds and in-kind services for design and construction of sustainable school buildings
 - Partnerships with the State of Colorado, U.S. Department of Energy, various universities

Determine the Project Owner's Vision, Goals and Objectives for the Project



- The vision of the Superintendent of Schools:
 - “[W]e stand committed to sustainable design and are confident it will yield positive outcomes for our students and the community.”
- Be proper stewards of the bond funds slated for building new or upgrading existing schools.
- Achieve the anticipated cost savings and sustainable performance in the school buildings.



School Design Philosophy

- Build high performance schools
 - Provide a superior learning environment
 - Reduce life-cycle costs through conservation of energy and natural resources
- Students learn and perform better, attend more often if they are schooled in a sustainable building
 - Daylight, fresh air, comfortable temperatures
 - “Buildings that teach” incorporated into all designs

‘A school designed to ‘code’ is the worst facility you can legally build’



Project Goals and Objectives

- Enhance student performance and attendance
- Teach principles of sustainable design
- Harmonize with the natural landscape
- Provide higher quality lighting
- Consume less energy
- Conserve materials and natural resources
- Enhance indoor environmental quality, and
- Safeguard water

Identify and Engage Key Stakeholders

- Core “Green Team”
 - School district employees
 - Teachers
 - Local public interest groups
 - Suppliers and vendors
- Other “high performance” partners
 - The City of Fort Collins
 - Xcel Energy (power utility)
 - The U.S. Environmental Protection Agency
 - Berkley Laboratories (University of California)
 - EnergyStar
 - U.S. Department of Energy
 - National Renewable Energy Laboratory

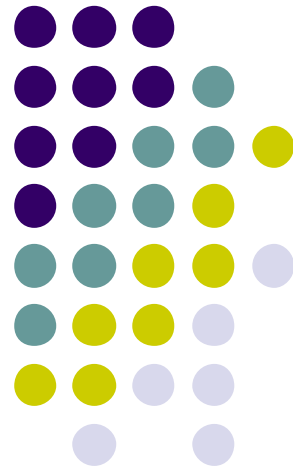


Ice storage for building cooling



Stage Two: Adjust goals and project indicators to local conditions

- Incorporate applicable safeguard policy considerations
- Identify and incorporate Local Agenda 21 or other local indicator development activities



Incorporate applicable safeguard policy considerations



- The U.S. has extensive laws and regulations governing:
 - Protection of the environment
 - Use of land and natural resources
 - Societal impacts
- No safeguard policies required for this project





Identify and incorporate Local Agenda 21 or other local indicator development activities

- The City of Fort Collins has no local Agenda 21 or local sustainable development indicators
- A workshop was held in which several additional project goals were established
 - Enhance student performance and attendance
 - Teach principles of sustainable design
 - Provide higher quality lighting

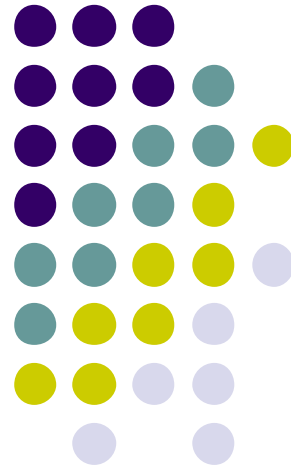


Additional Project-specific Goals and Indicators

Theme	Sub-Theme	Goals	Measures
Social			
Education	Performance	<ul style="list-style-type: none"> •Reduced absenteeism •Better grades than state average 	<ul style="list-style-type: none"> •Student absentee rate •Overall occupant satisfaction with the building and facilities •Student test scores
Education	Learning tools	<ul style="list-style-type: none"> •Teach principles of sustainable design 	<ul style="list-style-type: none"> •Use of learning tools, computer kiosks •Extent to which teaching tools are incorporated into buildings
Health	Lighting	<ul style="list-style-type: none"> •Provide higher quality lighting 	<ul style="list-style-type: none"> •Degree of use of daylighting
Housing	Connection to natural surroundings	<ul style="list-style-type: none"> •Visibility of natural surroundings to school users 	<ul style="list-style-type: none"> •Extent to which users can see natural areas

Stage Three: Test and refine project goals and indicators

- Refine goals based on systems integration considerations
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Refine Goals Based on Systems Integration Considerations



- Project goals were set using a “high performance” team approach
- Project timeline allows time for evaluating new products and systems
- Use of building commissioning
 - Started early in the project



Learning wall cutout

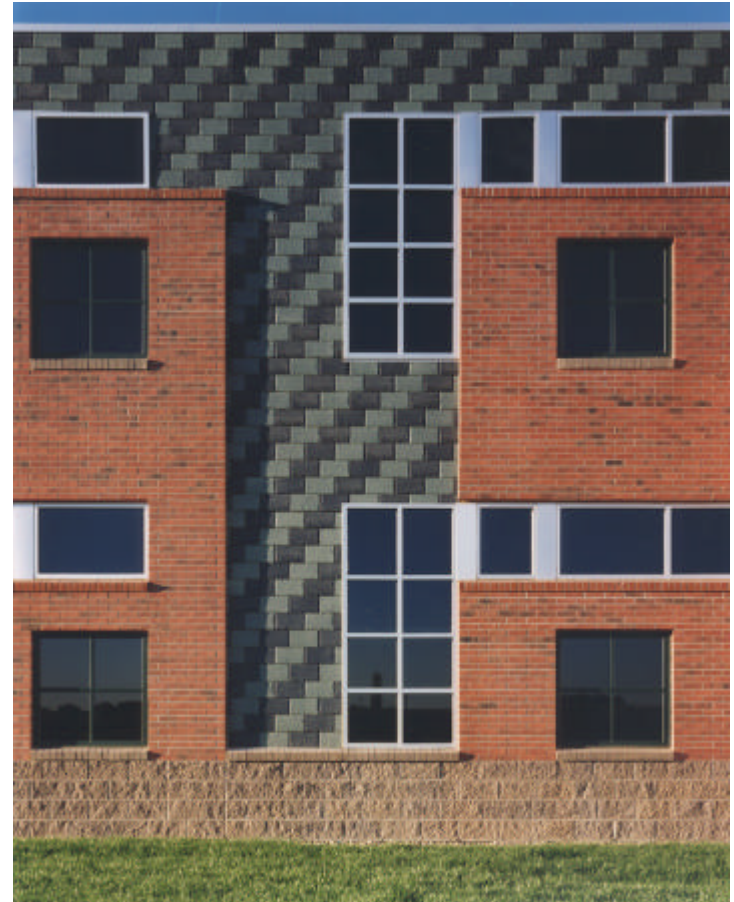


Recycling of construction wastes

Test Project Indicator Functionality



- Assumed to be functional
 - Based on CSD indicators
 - Added only 4 locally-derived indicators to the indicator set



Exterior wall made from recycled engine head gasket material

Refine Indicators to Align With Applicable Regulations and Protocols

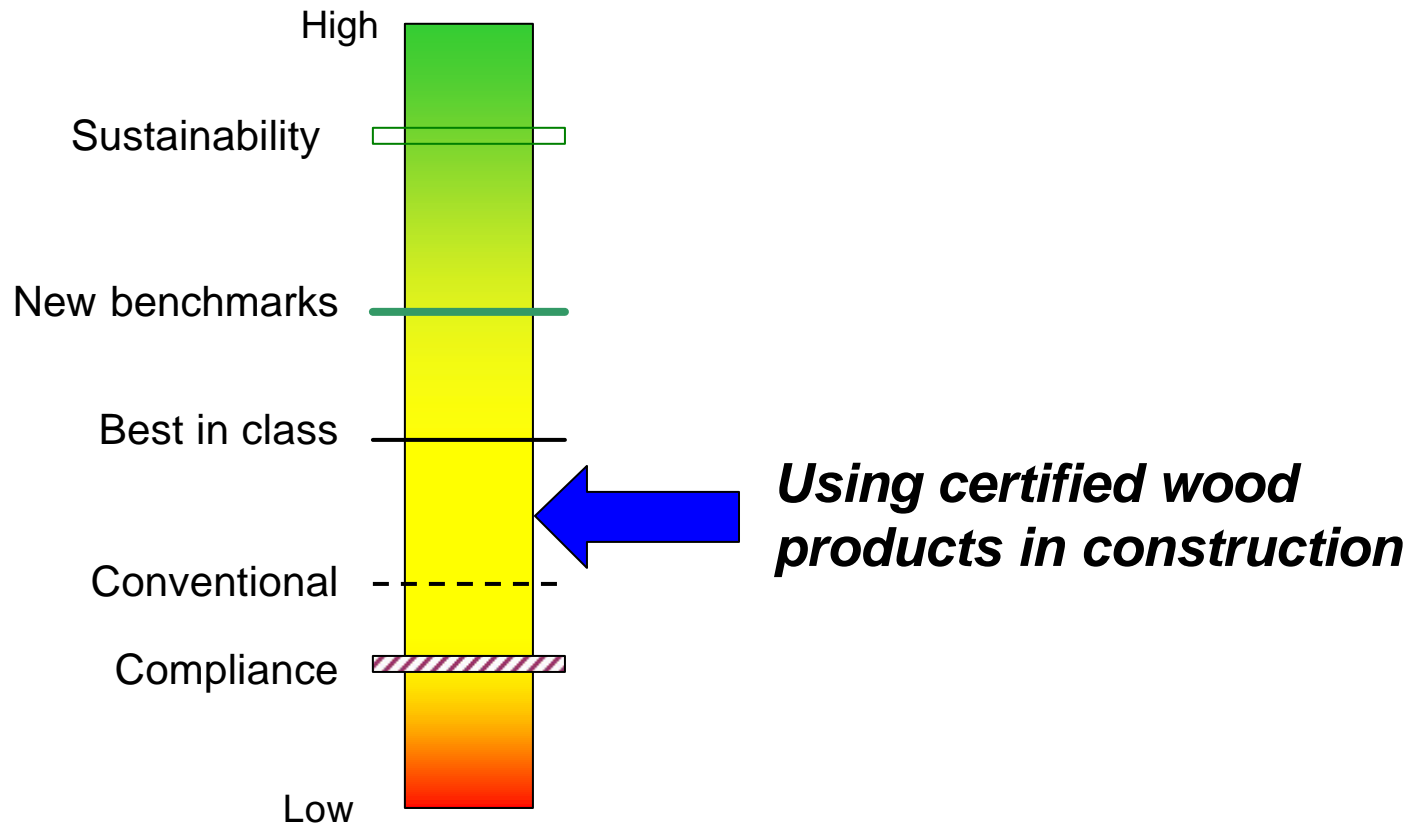


- Poudre School District intends to use the LEED rating standard as a benchmark for comparing different design proposals
- Does not intend to apply for a LEED rating
- No need to add or modify the indicator set

Achievements

Sustainable site planning and design: Use green materials where possible

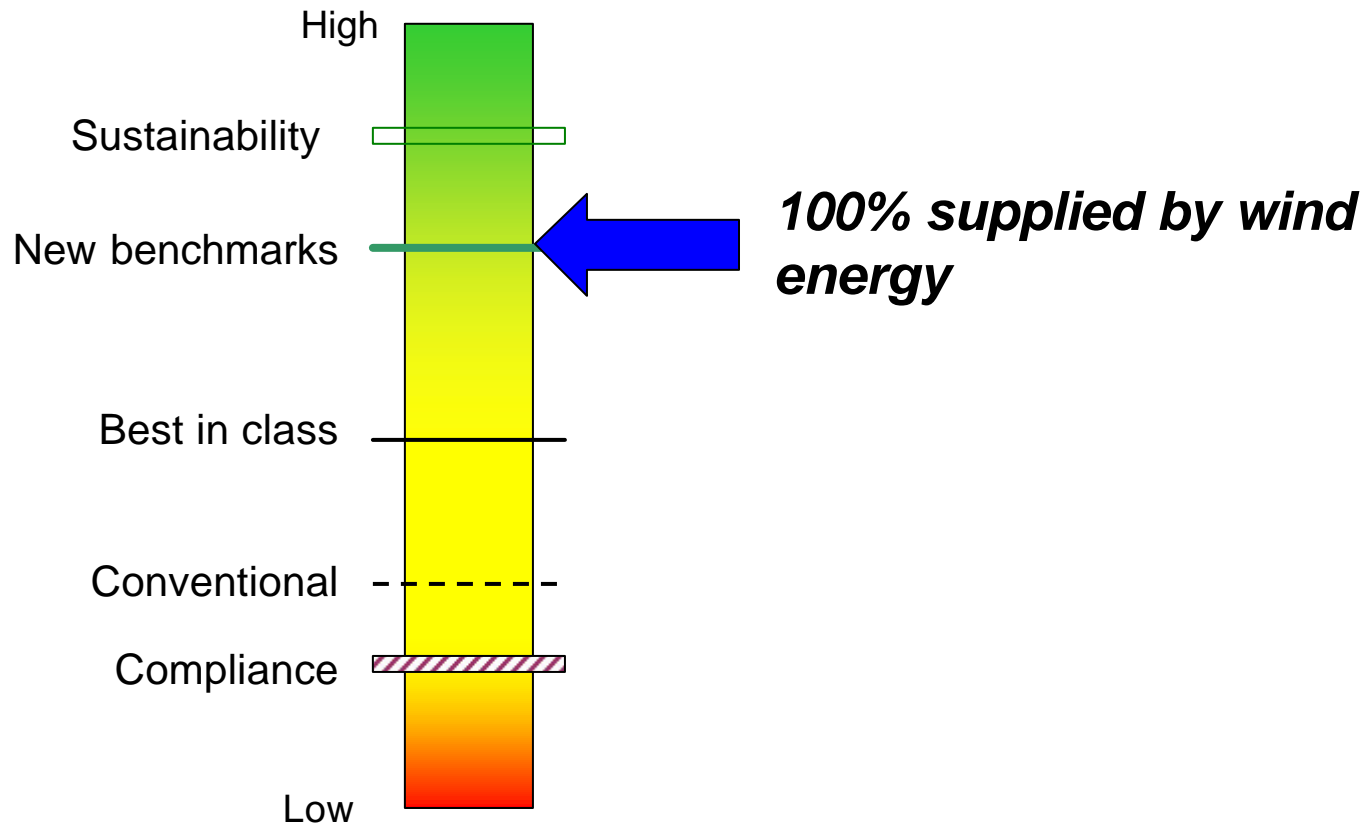
Target: Meet LEED standards in the use of green materials



Achievements

Use of renewable energy sources

Target: Substantial percentage of energy supplied by renewables

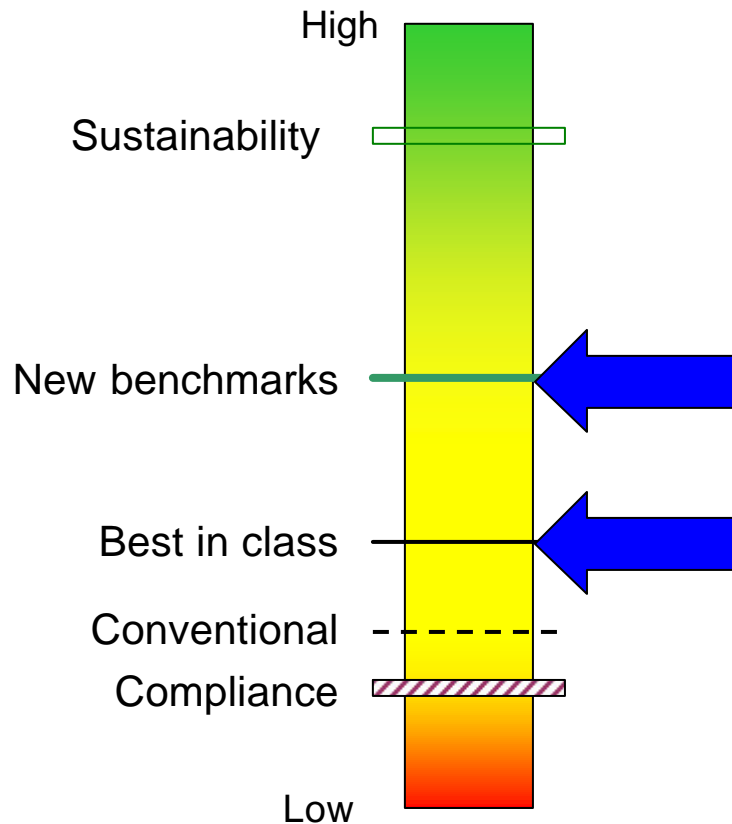


Achievements

High Quality and energy-efficient lighting

Target: Extensive use daylighting

Target: Electric lighting: <1 watt per square foot



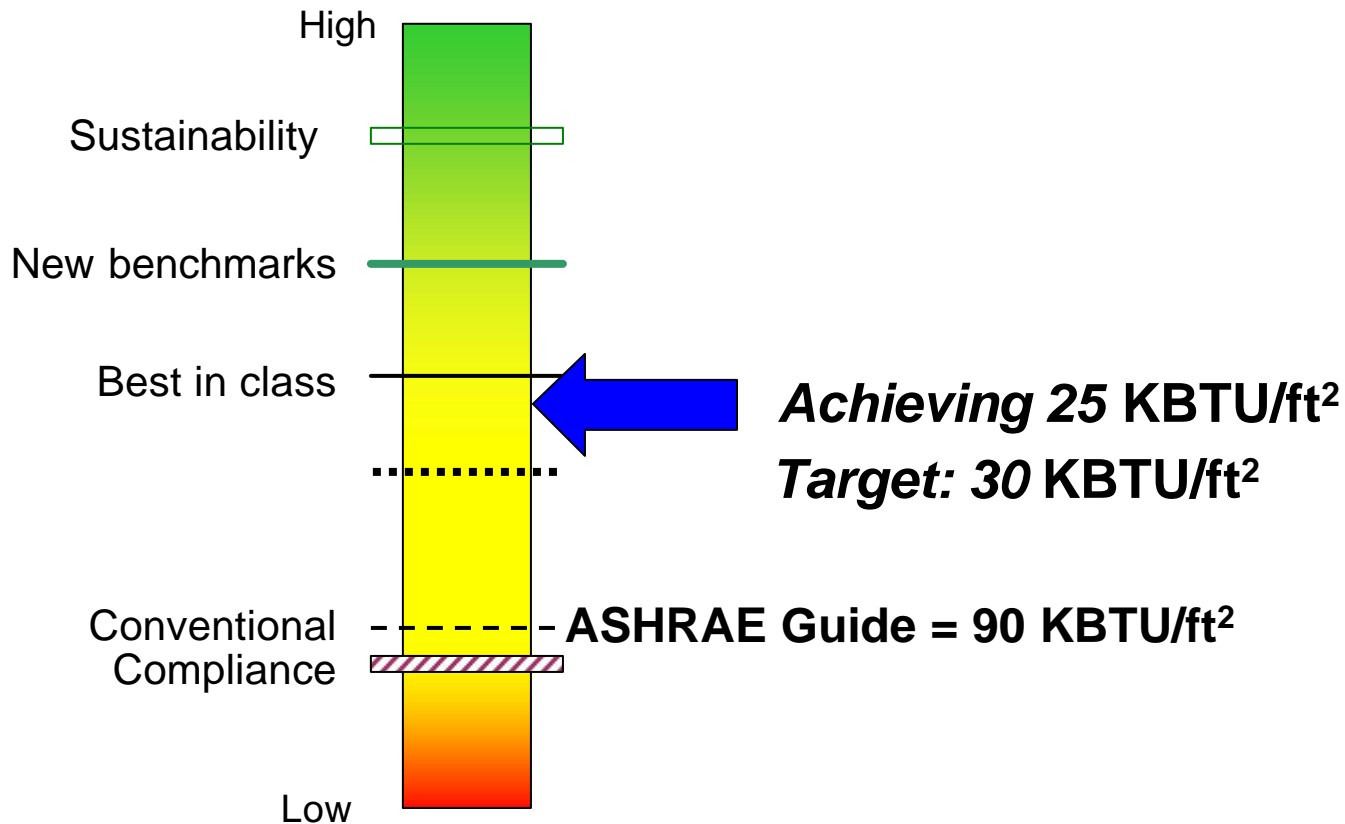
***Daylighting used in 95%
of rooms, hallways***

***Electric lighting:
Achieving less than 1
watt per square foot***



Achievements

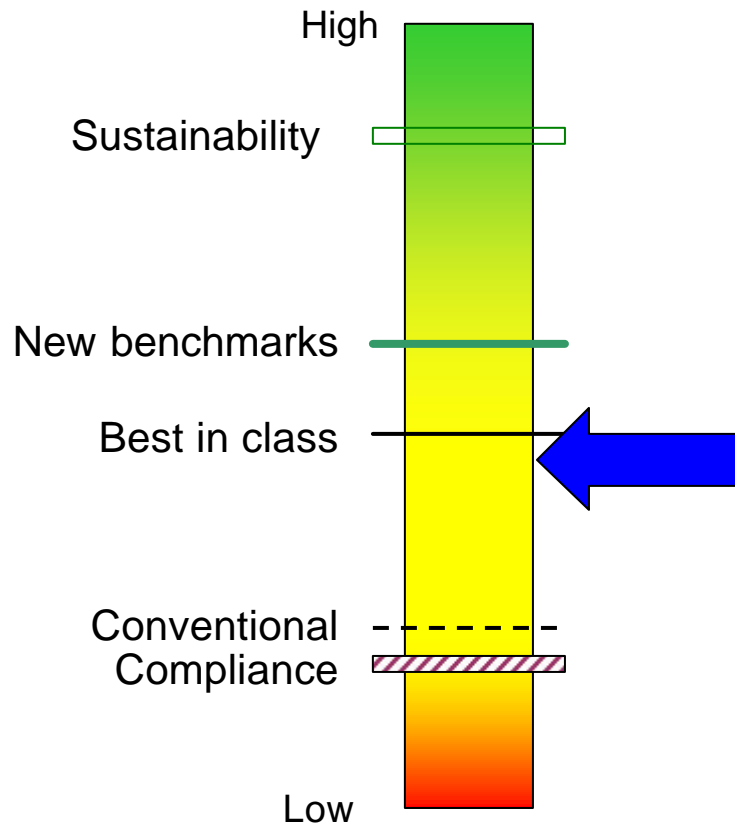
Energy-efficient heating, ventilation and air conditioning
Target: Achieve 30 KBTU/square foot or better



Achievements

Construction waste reduction and recycling

Target: Waste reduction, recycling substantially better than conventional practices



***75% wastes diverted
away from landfills***



Conclusions

- Performance is substantially better than conventional practices
- Keys to success
 - A knowledgeable and engaged project owner
 - Set high but achievable goals and objectives
 - Technical knowledge and support from universities, government agencies
 - Use of high performance project teams
 - Keep team on track, focused on achieving goals
 - Sharing knowledge with other school districts

