Integrative Process (IP) and Eco-Charrette Training

September 30, 2014

King Street Center

8th Floor Conference Center

King County Green Tools

Powered by the Solid Waste Division

INTRODUCTION

King County Strategic Plan

Goal:

Environmental Sustainability – safeguard and enhance County's natural resources and environment.

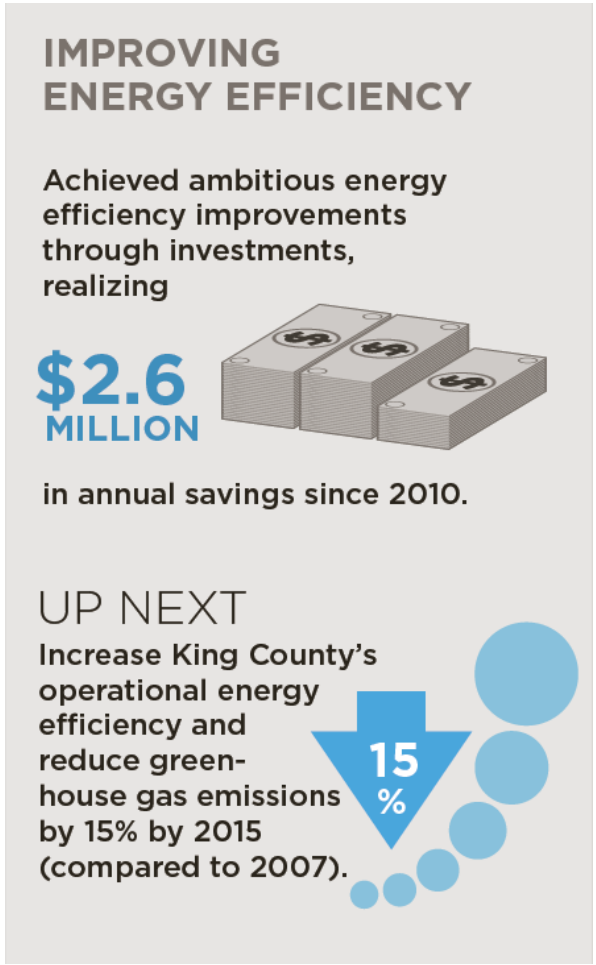
Objective:

Minimize County's operational environmental footprint

Green Building and Sustainable Development Ordinance 17709

The intent of this policy is to ensure that the planning, design, construction, remodeling, renovation, maintenance and operation of any King County-owned or financed capital project is consistent with the latest green building and sustainable development practices.

Executive Dow Constantine



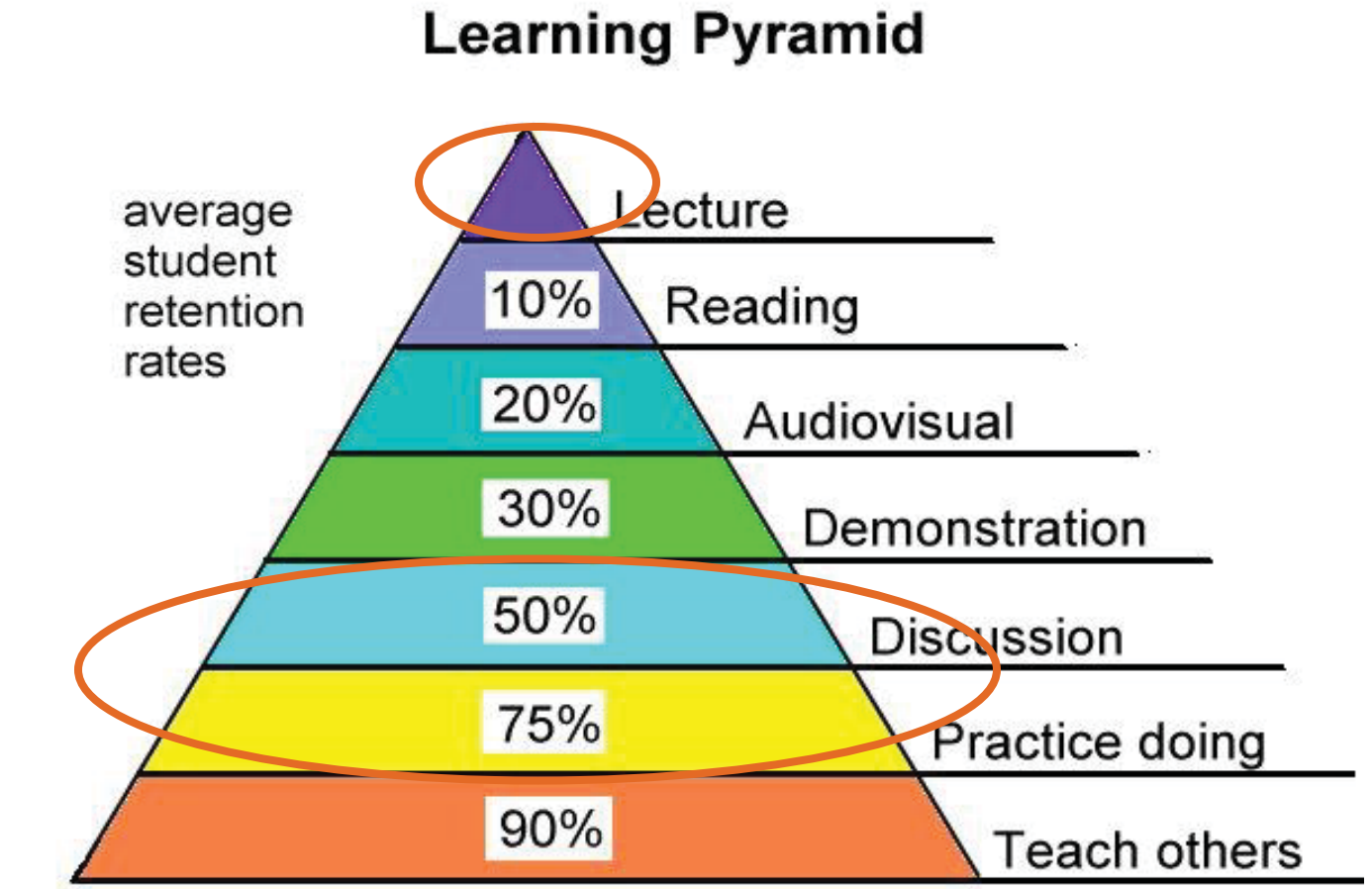
"By embracing the highest green-building standards in the nation, we are taking action to meet our goal of cutting in half the climate impact of County operations. At the same time, we will save money on the energy needed to operate our facilities."

Introduction: Ground Rules

- Team Dynamics
  - Active Listening
  - Openly sharing ideas, perspectives, & information
- Logistics
  - Start and end on time (or early)
  - Follow an agenda
- Design Innovation
  - Listen together for patterns, insights, & common ground

Bike Rack

Today's Roadmap



Source: National Training Laboratories, Bethel, Maine

Today's Roadmap

- Integrative Process
  - Using IP to overcome challenging situations
  - IP Overview
  - Role of Analysis and the IP timeline

Break

  - IP Meetings – Charrettes & Workshops
  - Planning an Eco-Charrette
  - Practicing an Eco-Charrette

Learning Objectives

- **Articulate** the benefits of IP in overcoming conventional challenges in conventional design practice.
- **Describe** the types of analyses that can be part of the IP process and how they result in financial, environmental, and operational benefits to the project.
- **Plan** an eco-charrette or other IP meeting

Integrative Process (IP)

**If you approach a project as a collection of parts,
you get a collection of parts.**

Alternatively

Long-term Outcomes

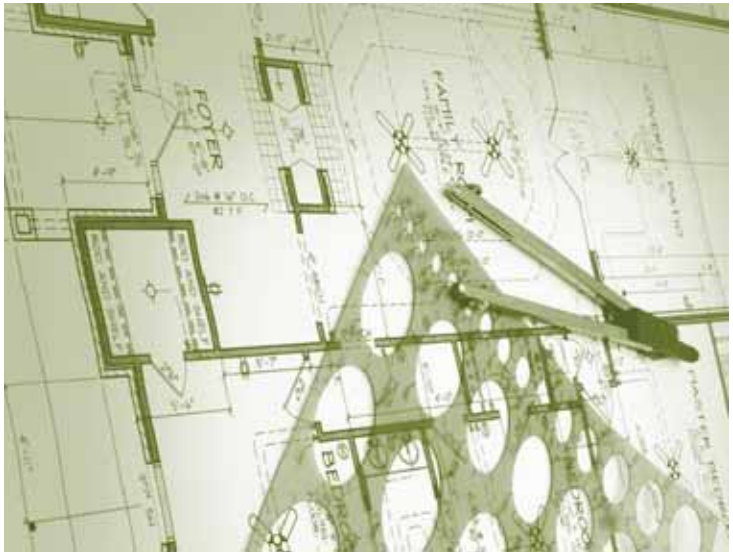
- Incorporate IP into your projects and work
- Save your projects money and improve environmental performance
- Collaborate with coworkers and divisions to maximize effectiveness
- Teach others within your divisions and project teams about IP application and charrette facilitation

Exercise #1 – How IP overcomes project challenges

- Take 5 minutes to independently brainstorm a recent challenging experience with the design/construction process.
- Pair up with a neighbor introduce your name, role, and your project example.
- Brainstorm how and why an integrated process could have improved this situation

IP OVERVIEW

What is IP?



IP and Sustainability

"You can use the integrative process and achieve a high quality design…but it isn't necessarily sustainable unless you have sustainable building goals.

On the other hand you can't achieve a truly sustainable building without an integrative process."

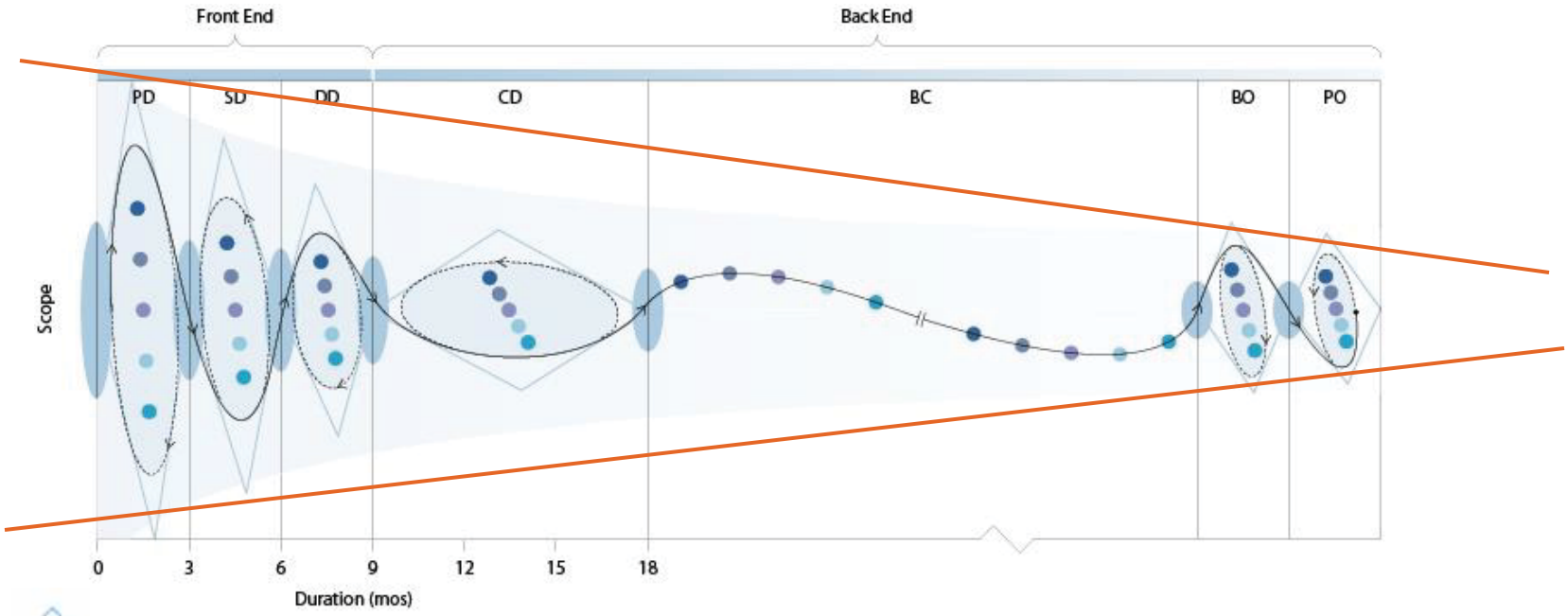
-- Kathleen O'Brien

How does this relate to government?

"NLC promotes the "triple bottom line" definition of sustainability, encompassing the intersections of environmental stewardship, economic prosperity, and social responsibility. For Local governments, sustainability can be used as an organizing framework to comprehensively **plan** and **evaluate** their activities."

- National League of Cities

Integrative Process



Project Constraints

Exploratory Design Process

All Team Workshop

Focused Team Workshops

Iterative Process

Additional Iterations as necessary

PD Pre-design

SD Schematic Design

DD Design Development

CD Construction Documents

BC Bidding, Construction Commissioning

BO Building Operation (start up)

PO Post-Occupancy (long term)

Source: Roadmap for IDP, page 13

Merrill Hall Case Study

Priorities

- Flexible, efficient building that brings nature into the building
- Feature water as a renewable resource

Priorities

- Minimize material use and use green materials
- Demonstrate “good wood” use
- Reduce energy use and use natural strategies

Eco-charrette

Sustainability Plan

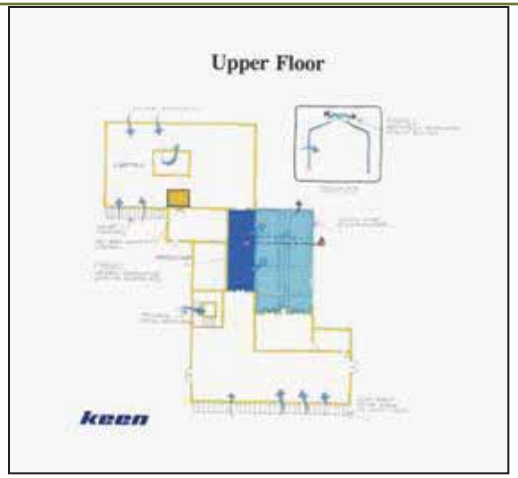
Sustainability

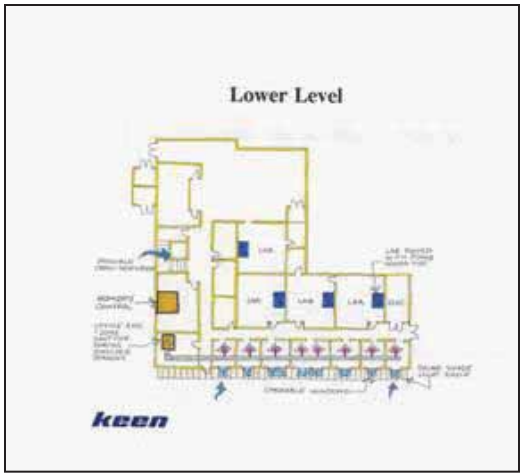
- Over 30 low-to-no cost green features in specifications
- Additional donor funding green strategies

LEED

- Well positioned for certified level (26-32 points)
- Continued to track through project

Testing and Verifying the Plan





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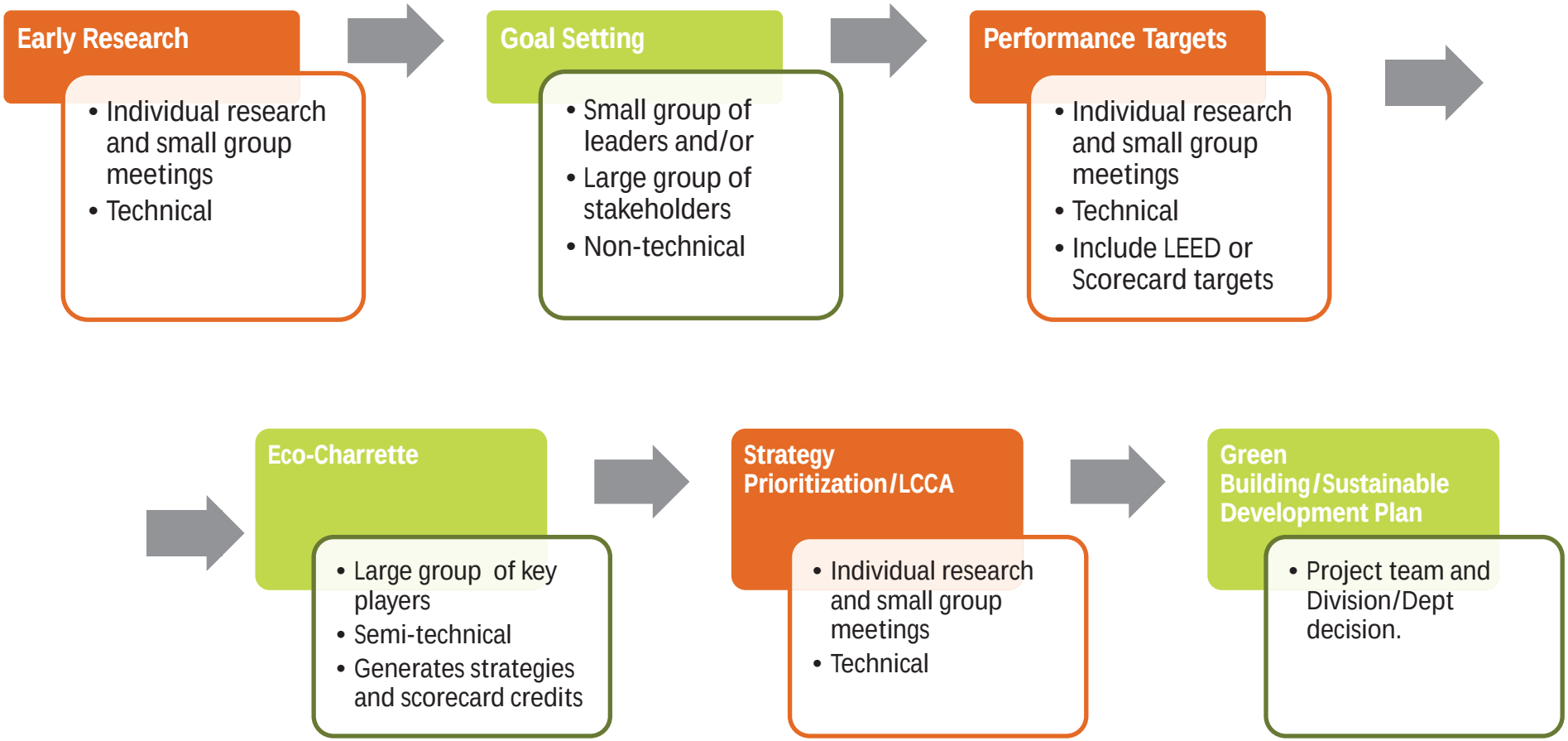
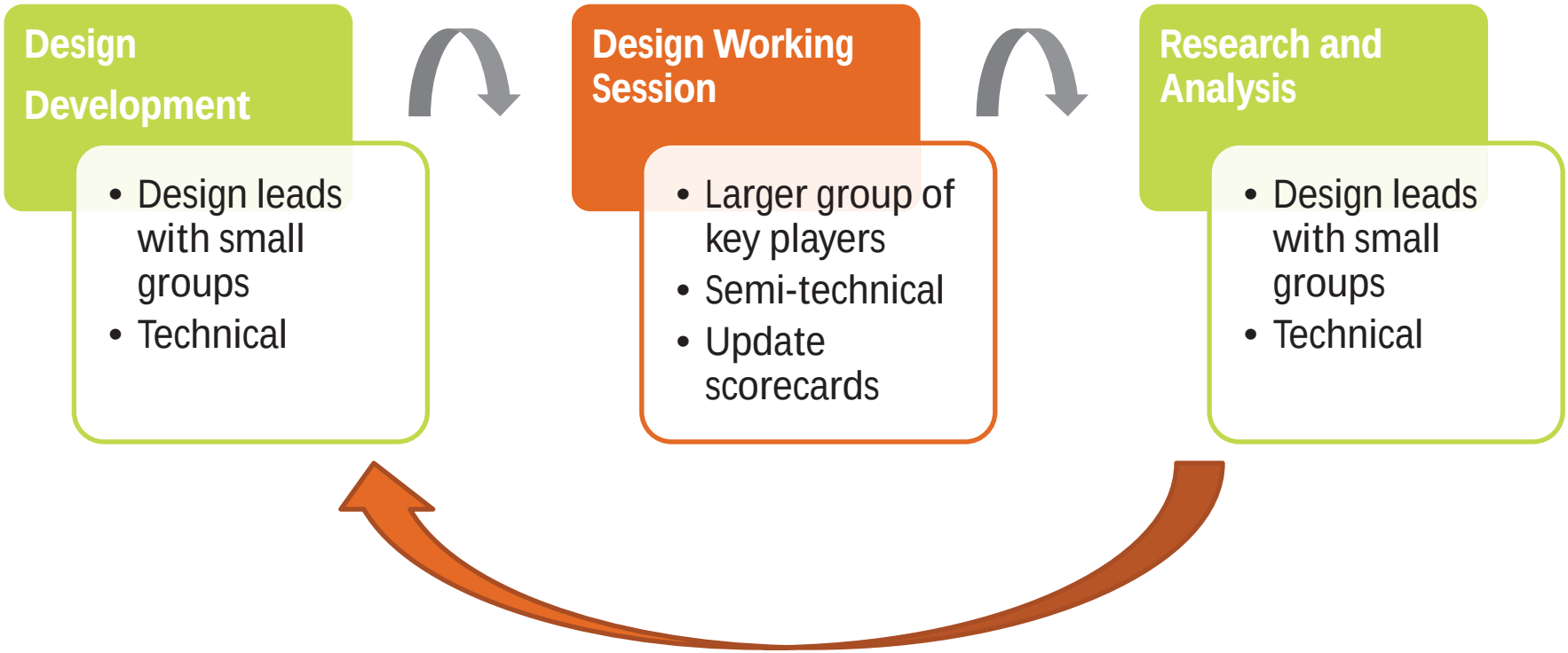
Early Project (before 30%)

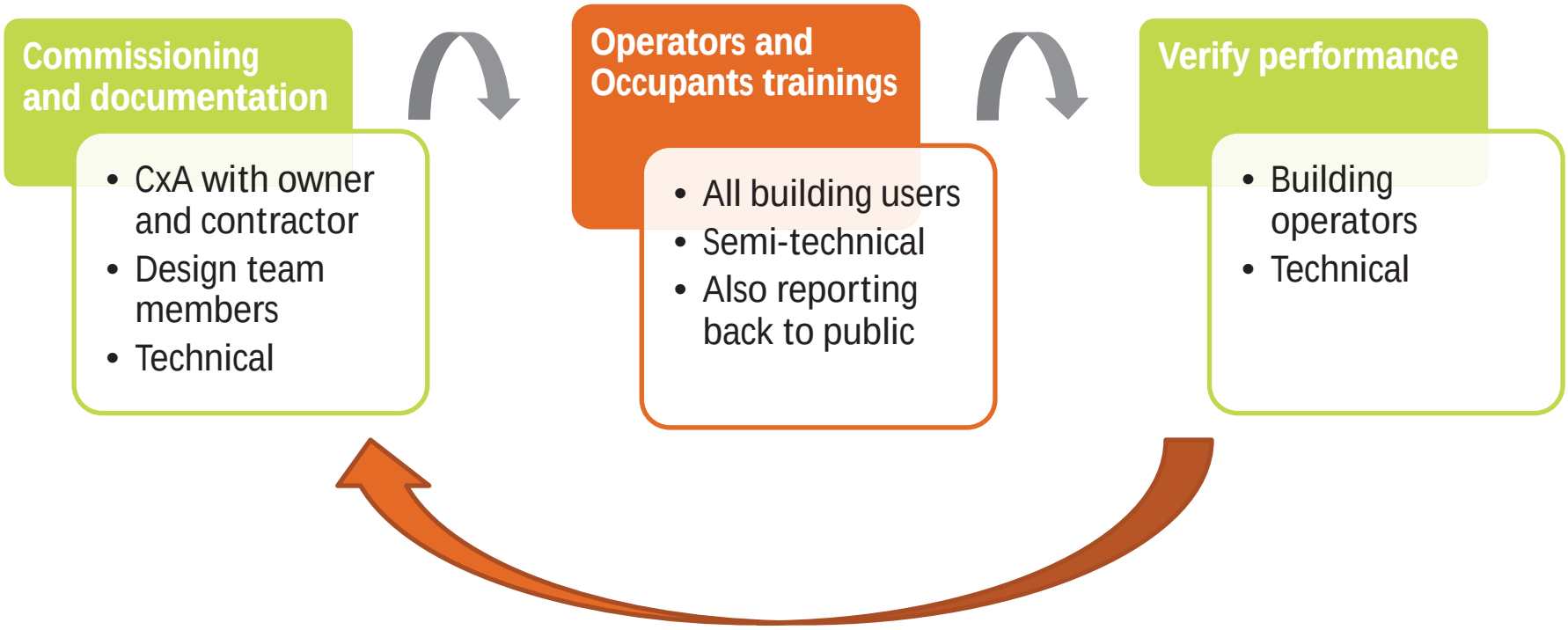


30% and Beyond



These help achieve:
King County Strategic Plan – Environmental Sustainability Goal:
Reducing Government's Environmental Footprint

Construction and Operations



These help achieve:
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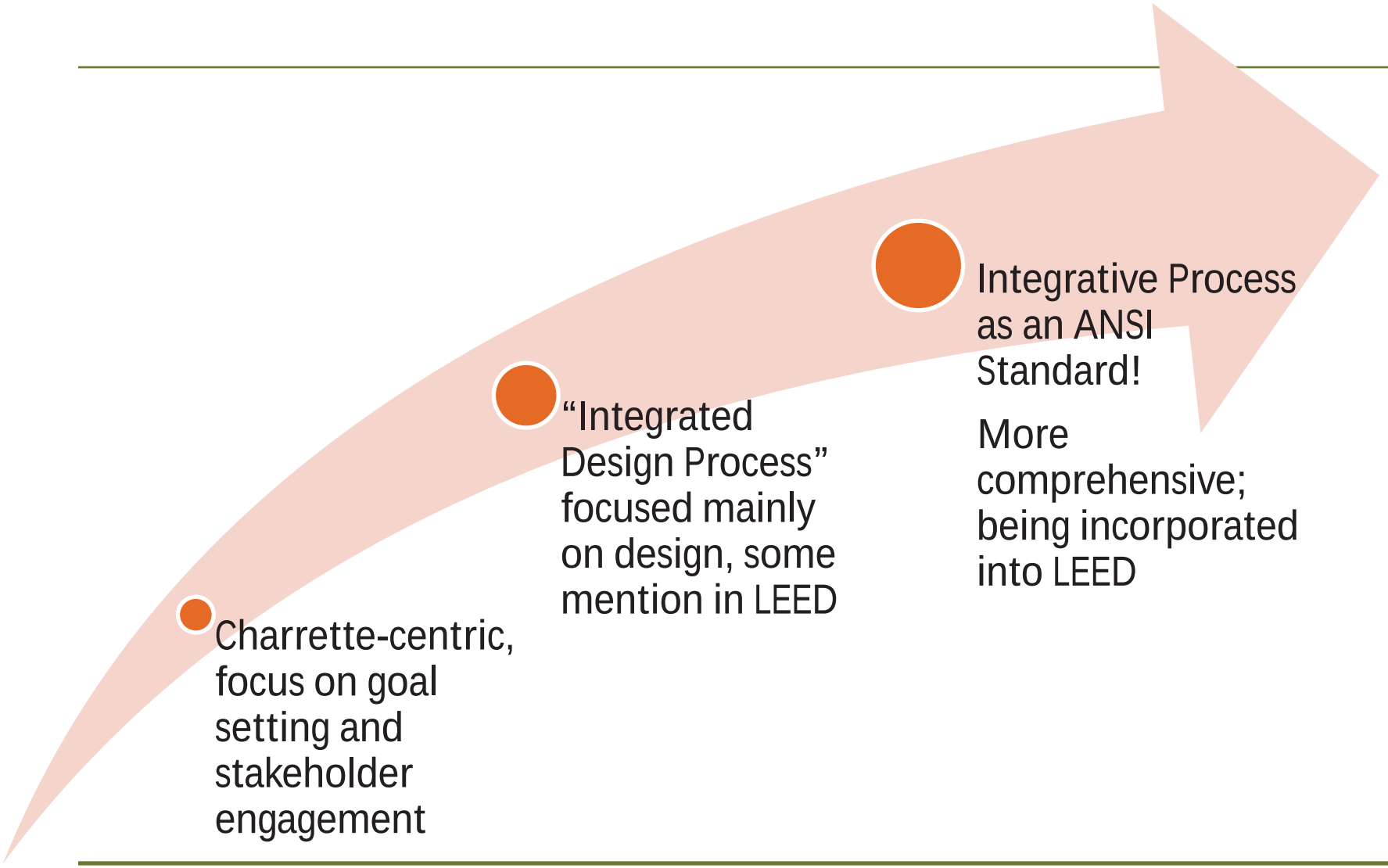
Evolution of IP



IP: ANSI Standard

Why is this important?

- Simple to follow, but specific enough to function as a guideline for practitioners
  - Part A: Discovery
  - Part B: Design & Construction
  - Part C: Occupancy
- Each Part includes very clearly defined stages with tasks outlined

ANSI American National Standards Institute

MTS 2012:1 Integrative Process (IP)© - ANSI Consensus National Standard Guide© Design and Construction of Sustainable Buildings and Communities

ANSI Standard Definition

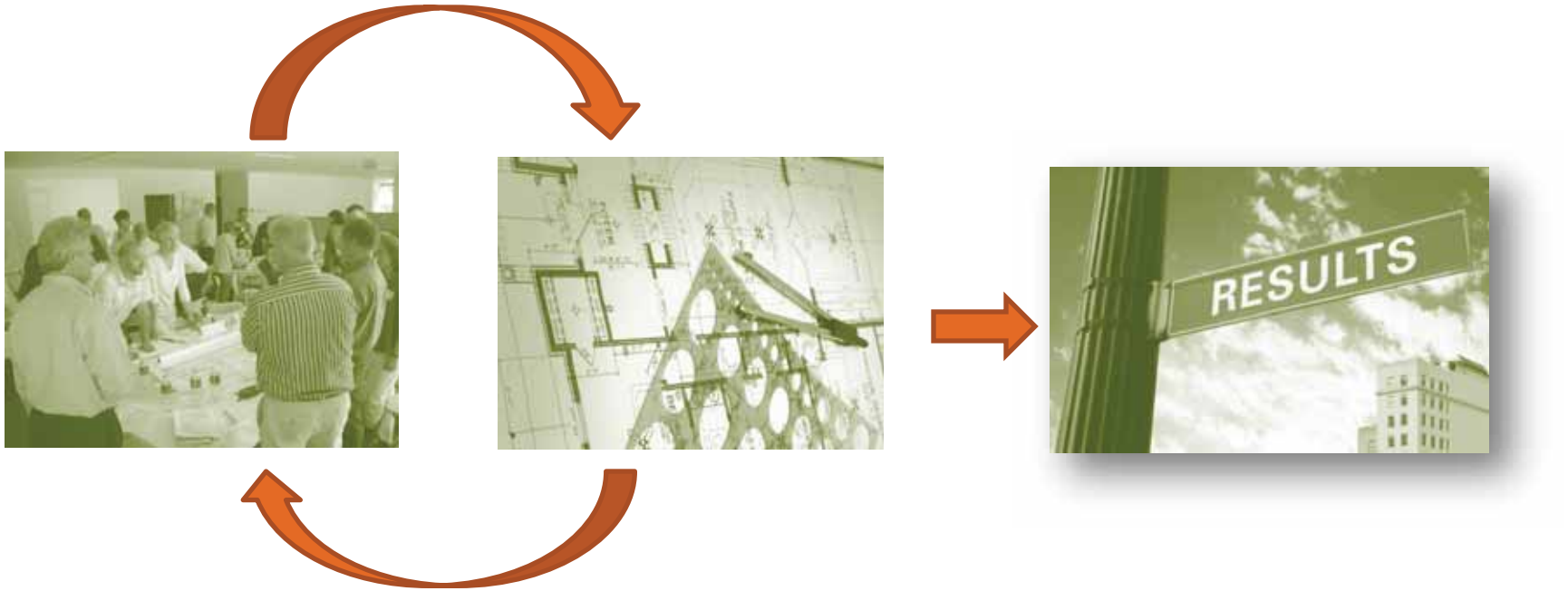
- The Integrative Process seeks to design and construct buildings that are **cost-effective** over both the **short and the long terms**, in a way that unifies technical and living systems into an increasingly life-enhancing **whole system**.

KC Green Building Ordinance Definition

- An approach to achieve **high performance** on a wide variety of well-defined environmental and social goals while staying **within budgetary and scheduling constraints**. It relies on a **multidisciplinary and collaborative team** whose members make decisions together based on a shared vision and a holistic understanding of the project. It is an **iterative process** that follows the design through the **entire project life** from predesign through operation.

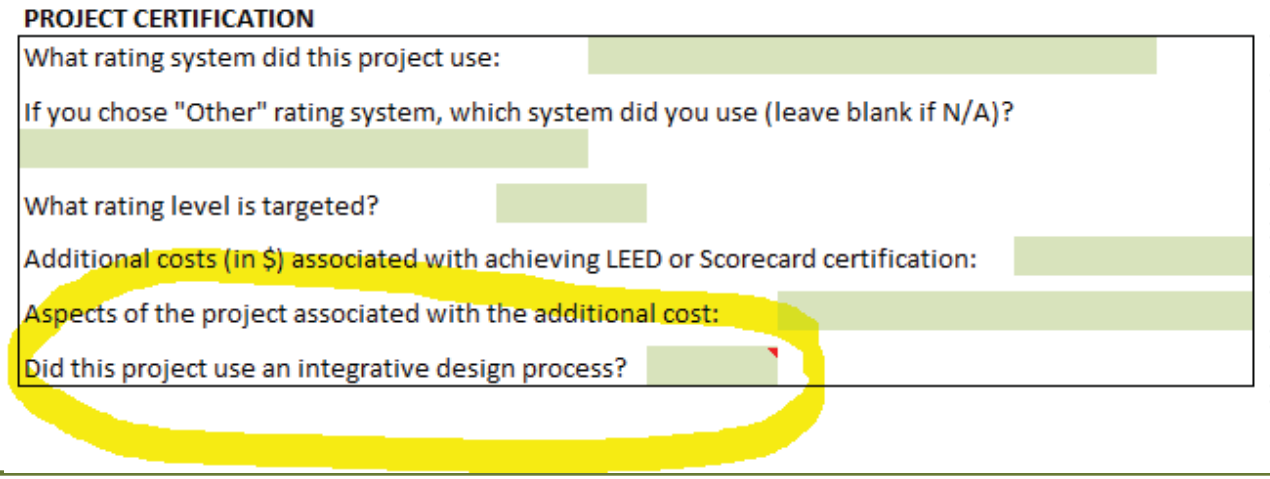
IP and Rating Systems

- Set and test performance
- Require or encourage IP



King County Green Building Ordinance

- All LEED eligible capital projects must register with the USGBC and achieve a **LEED Platinum rating**.
- All non-LEED eligible projects must incorporate sustainable development practices and fill out a **Scorecard** that shows the strategies that are being used.
- County projects should **use an integrative process** and triple-life cycle assessment to optimize design approaches.



PROJECT CERTIFICATION

What rating system did this project use:
If you chose "Other" rating system, which system did you use (leave blank if N/A)?
What rating level is targeted?
Additional costs (in $) associated with achieving LEED or Scorecard certification:
Aspects of the project associated with the additional cost:
Did this project use an integrative design process?

Maleng Regional Justice Center Eco-charrette

- Tenant Improvement
- Expected LEED Certified given budget

- Eco-charrette "Headlines"
  - First King County Courthouse Certified!
  - "No news is good news" or "no complaints" with regards to mechanical systems
  - Courthouse utilizes *all* LED lights
  - County saves money on O&M costs
  - King County reaches LEED Platinum on a certified budget

Maleng Regional Justice Center Analyses and Results

- LEED Analysis at Charrette – LEED Gold feasible without cost impact
- LEED Specifications review
- Commissioning
- Awaiting LEED Platinum certification

ANALYSES AND IP

Exercise #2 – Analyses & IP

- Look at the analysis described on your card. Where within the integrative process will your analysis have the optimal impact?
- Stand near the appropriate milestone along the timeline posted on the wall.
- If you have questions or aren't sure where to be, talk to your neighbors.

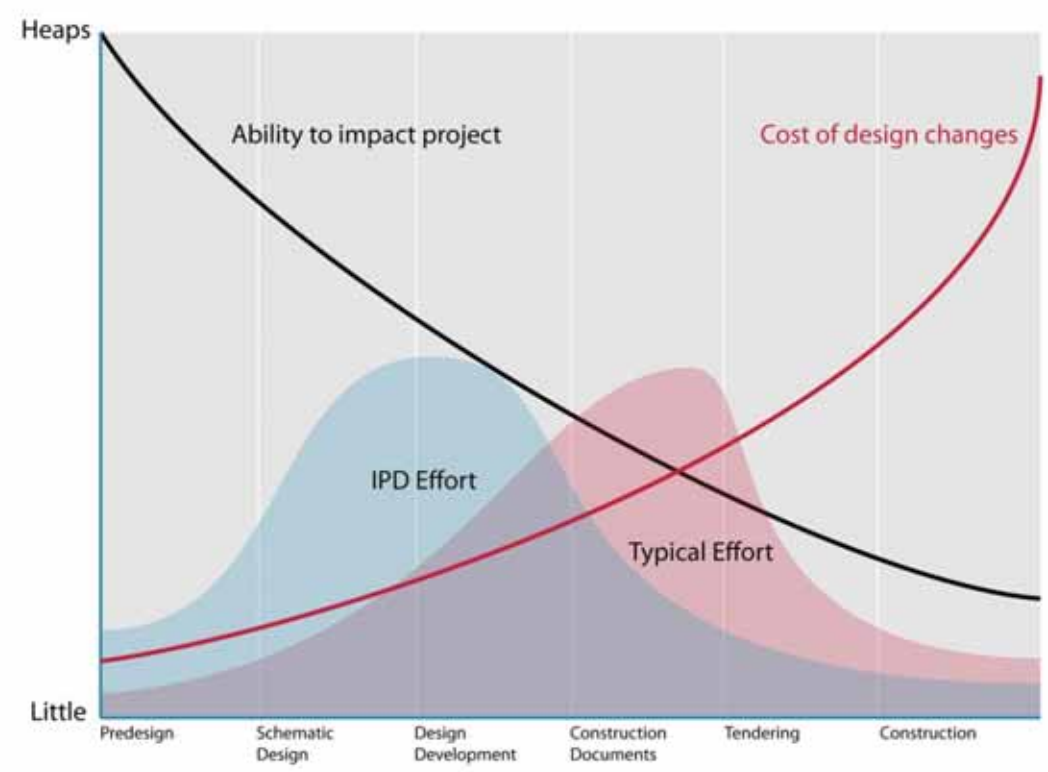
Exercise #2 Debrief

- Are these analyses familiar?
- Do any of them need to be moved? Copied?
- Can you identify example analyses that may benefit your current or future projects?

Making the Case for IP

- With streamlined project management inherent in the integrative process, mistakes and change orders can be reduced.
  - In 2000, The Economist reported that inefficiencies, mistakes, and delays accounted for nearly 1/3 of the $650 Billion spent on construction in America every year.
  - Research by the NIST estimates that poor communication costs $US15.8 billion in the US capital facilities.
  - The Navy found that the integrative process has cut change orders on its projects by 90 percent.

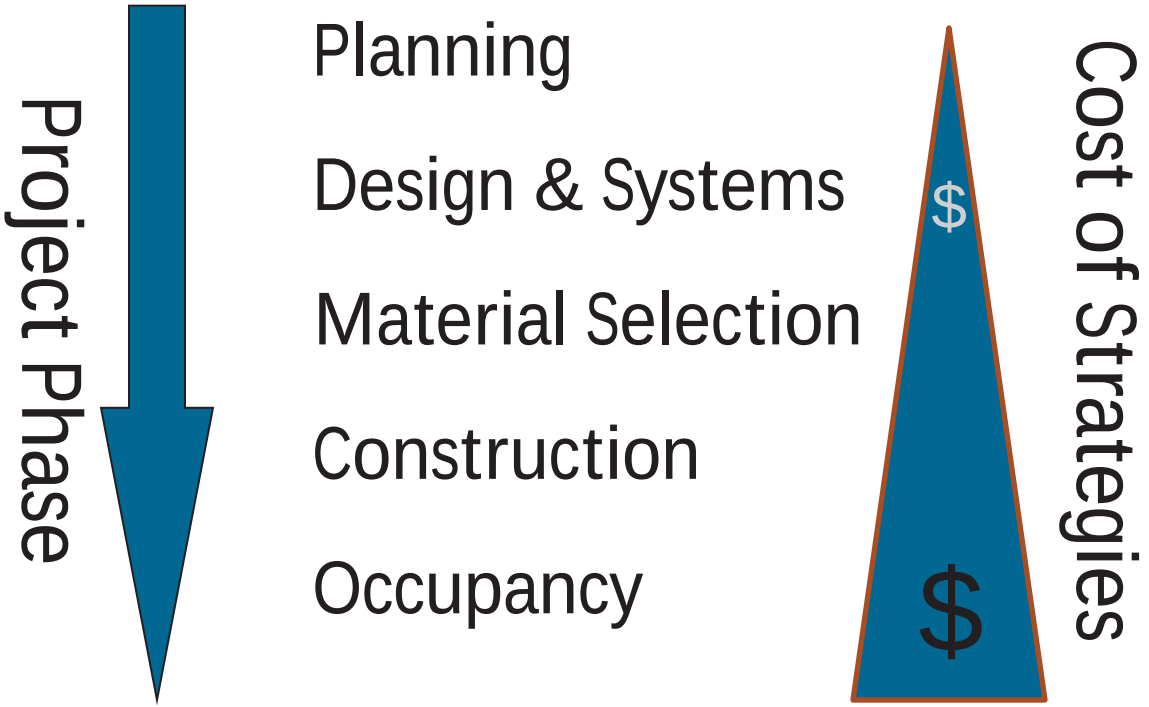
Maximizing Positive Outcomes



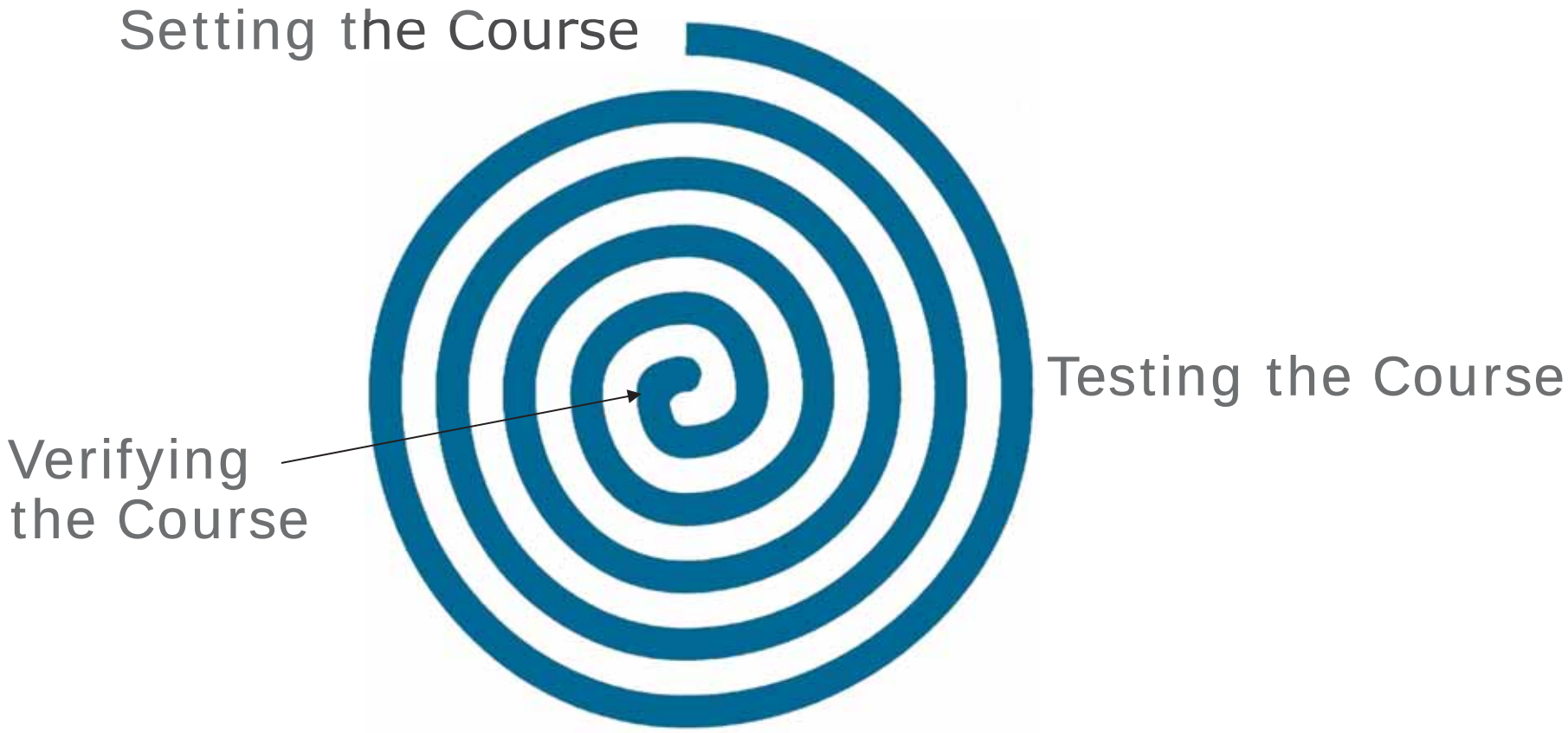
"For sustainable strategies, the rule of thumb is the later you think of it, the more it will cost and less benefit you'll get." -- Kathleen O'Brien

What are the Benefits?

The later you think of it, the less benefit you'll get and the more you will pay for it.

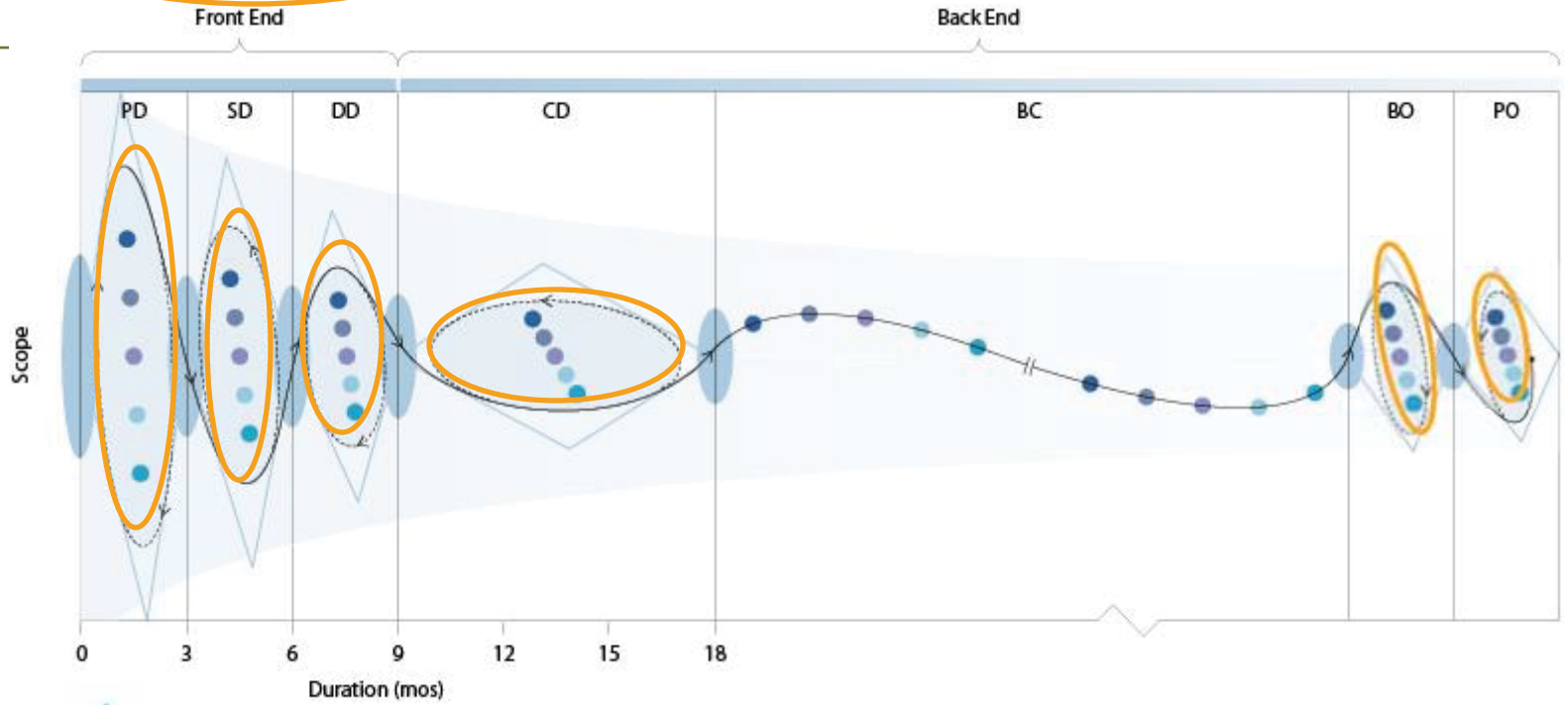


Key Element to Successful IP - Analysis



Adapted from Building Green: Adding Value Through Process

Analyses Depend on Timeline



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Source: Roadmap for IDP, page 13

Analyses: Early Project

- Site Assessment (impacts, IEQ)
- Water budget (sources, uses)
- Stormwater (flow, treatment)
- Energy (siting, sizing, lighting, comfort)
- Materials (LCA), Deconstruction & Reuse Opportunities
- Owner's Project Requirements (OPR)

Site Assessment Questionnaire

Based on your site walk observations, fill in your responses to t
provided on the following pages. Feel free to also jot down you

Sounds & Smells

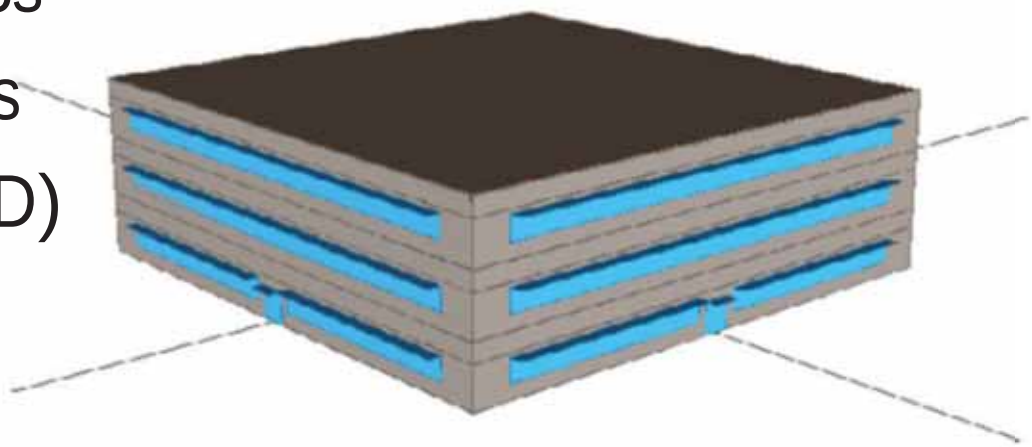
What sounds do you hear? What do you smell?

Views

Where are the best views? What are the significant features on
from? What are the worst features on or near the site?

Analyses: Before 30%

- Eco-charrette
- Shoebox energy modeling
- Climate assessment and mitigation analysis
- Daylight studies
- LID/stormwater calcs
- Water reuse analysis
- Basis of Design (BOD)



Analyses: 30% and Beyond

- Synergies of Systems
- Water and Energy Models
- LCCA
- Submit Scorecard or LEED Checklist to Green Building Team Division representative at 30% Design and at Project Completion

Analyses: Occupancy

Maximize the Benefits:

- Third Party Certification
- Commissioning
- Post Occupancy Evaluation
- Feedback from all systems
- O&M Activities (see the Guidelines!)

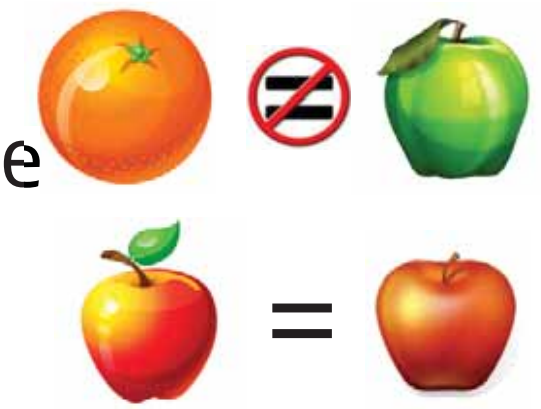
Thermal Comfort Survey

Analyses required in the Green Building Ordinance

- All capital projects do LCCA
- LEED if eligible, Scorecard if not, or alternative rating system
- LEED Checklist or Scorecard due by 30% Design and at Project Completion to GBT rep
- Energy and climate
- C&D plan
- Stormwater management

LCCA

- Decide what to compare
- Perform modeling, if applicable
  - e.g.: Energy, Water
- Gather cost data
- Confirm LCCA default criteria
- Use the KC LCCA calculator



Commissioning

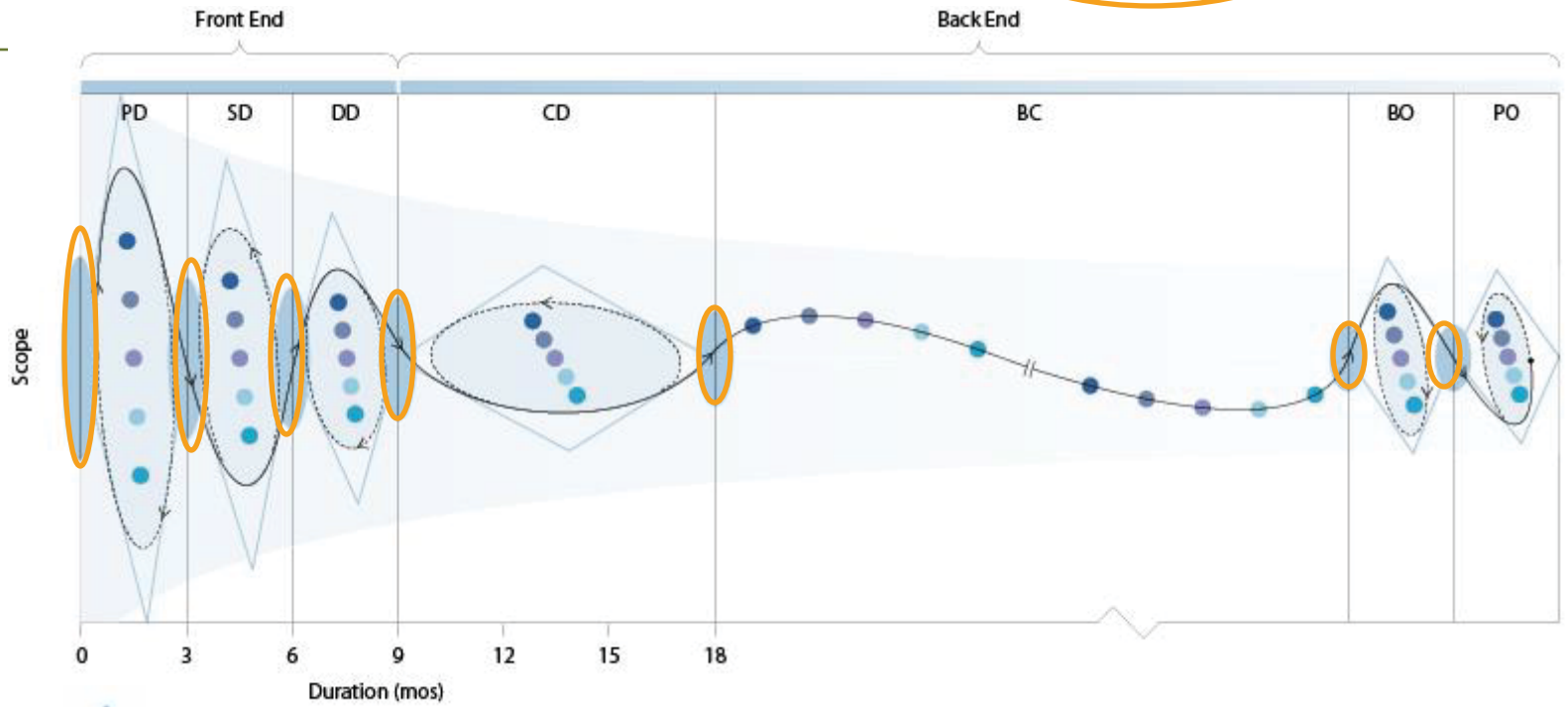
- Owner's Project Requirements (OPR)
  - Develop early, check in often!
  - Early project sessions establish this
- Basis of Design (BOD)
  - Develop early, check in often!
  - Each discipline should develop systems narratives
  - These help identify synergies, explain technical concepts

BREAK!

PLANNING IP MEETINGS

Early/Pre-Design

When do you meet?



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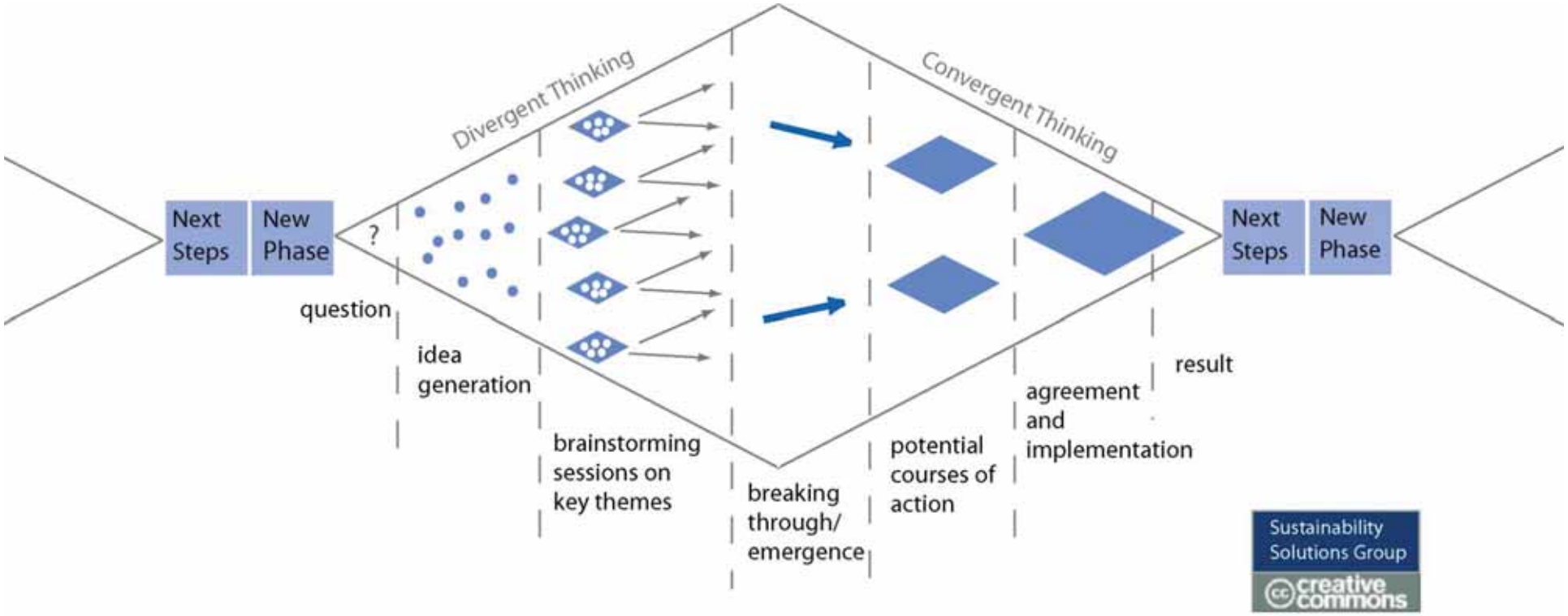
Source: Roadmap for IDP, page 13

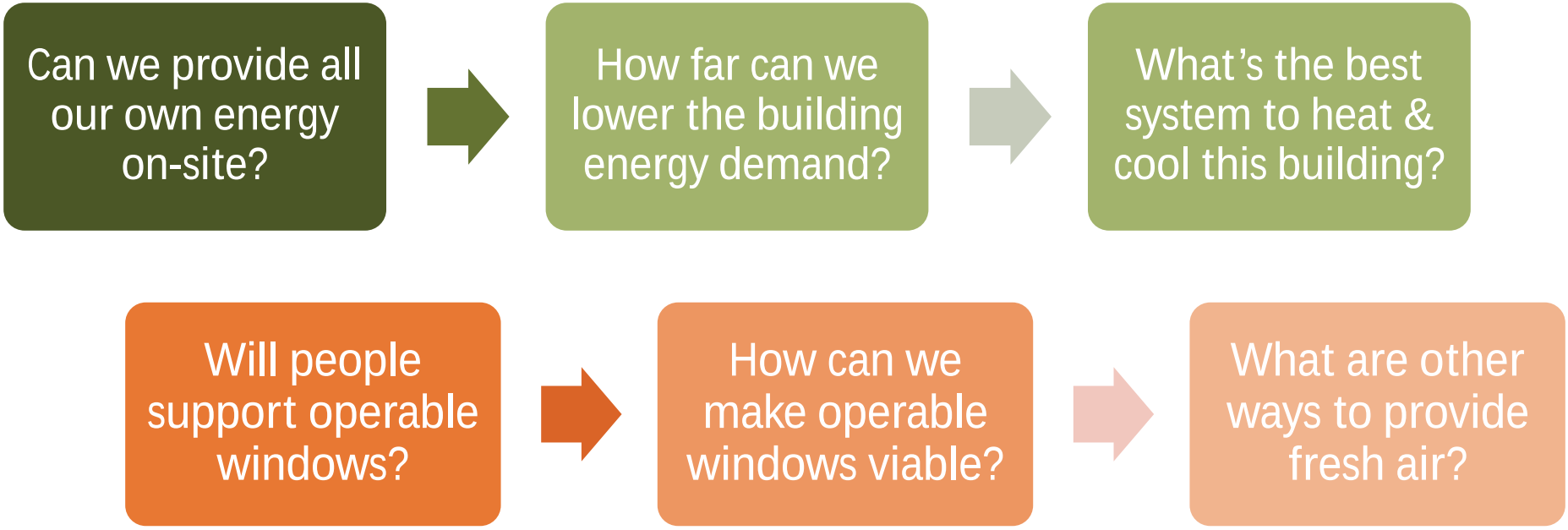
Integrative Process Module – A Meeting!



Source: IDP Facilitation Resource Guide

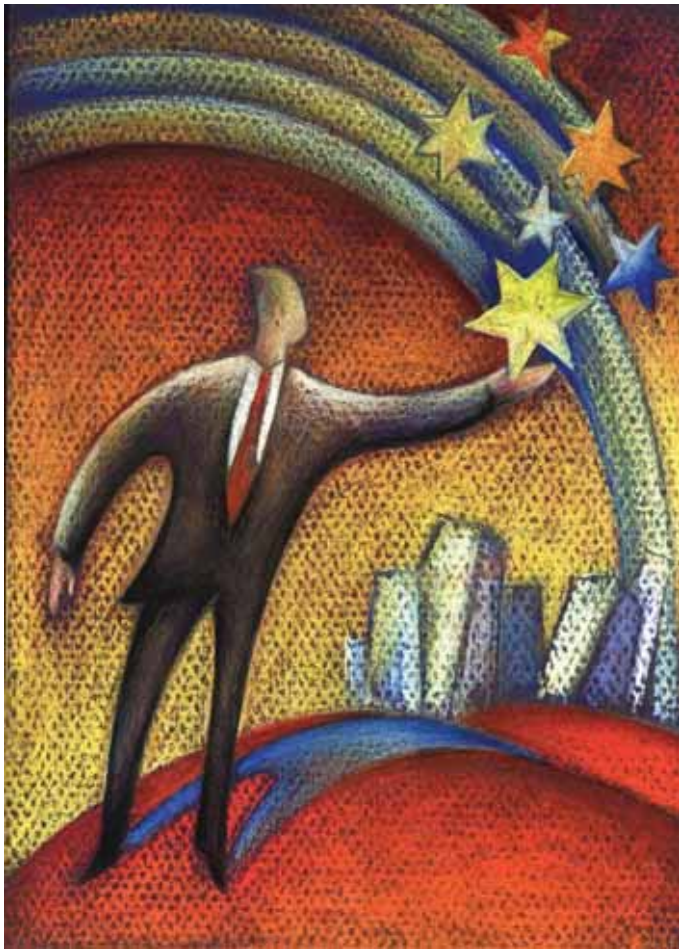
Questions

- Each phase or meeting starts with a series of questions, for example:



High Level Goals

- Based on project discovery
- Expresses purpose of the project
- Aspirational rather than measurable
- Integrative – can influence many parts of the project



High Level Goals Examples

- Accommodate transportation connectivity (TOD project)
- Ensure long term affordability (affordable housing project)
- Preserve history (historic renovation)
- Create a high performance building (operations building)

Performance Metrics

- Precipitate from the goals
- Address all areas of sustainability
- Measurable
  - Quantity
  - Clearly observable quality
  - Can be tested and verified in some way
- Not prescriptive
  - i.e. not the strategy or solution

Performance Metrics Examples

GOALS

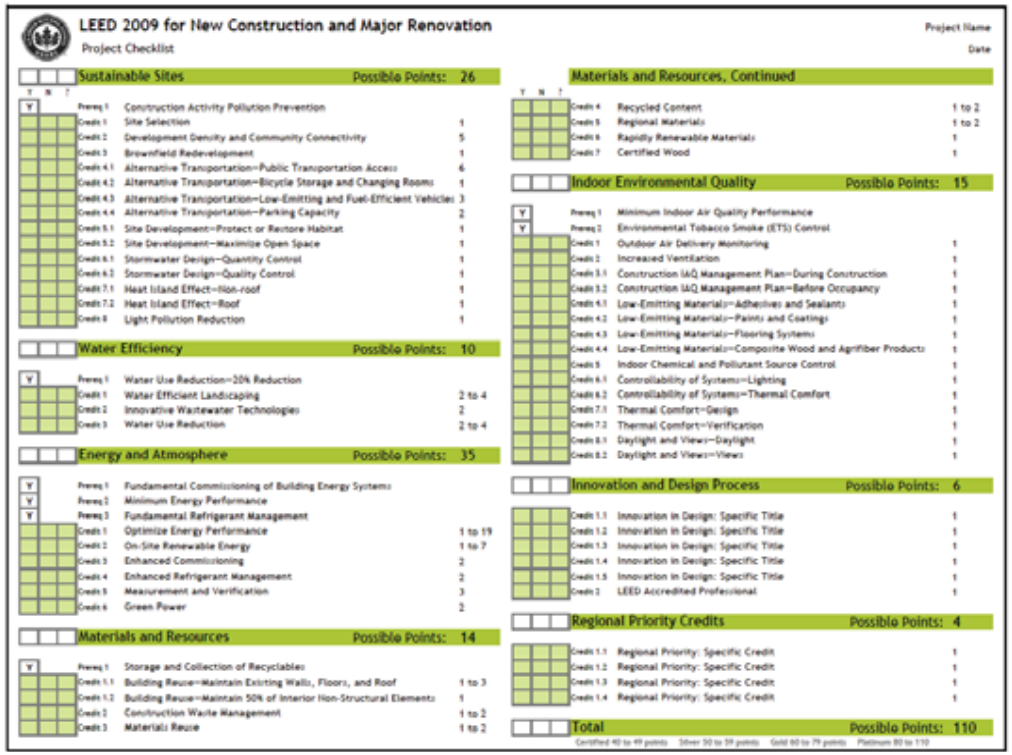
- Innovative water management
- Integrate urban agriculture
- Sustainability visibility, demonstration, and education
- Support company carbon neutrality goals

PERFORMANCE METRICS

- Use 40% less water than LEED baseline
- Each tenant has a gardening space
- Provide tours and classes on sustainability 3 times per week.
- Reach Arch 2030 – 60% reduction goal for building type

Rating Systems as Performance Metrics

- Best use
- Resource for establishing other metrics



LEED 2009 for New Construction and Major Renovation

Project Checklist

Project Name

Date

Sustainable Sites Possible Points: 26

Y	N	?			
Y			Prereq 1	Construction Activity Pollution Prevention	
			Credit 1	Site Selection	1
			Credit 2	Development Density and Community Connectivity	5
			Credit 3	Brownfield Redevelopment	1
			Credit 4.1	Alternative Transportation—Public Transportation Access	6
			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
			Credit 4.4	Alternative Transportation—Parking Capacity	2
			Credit 5.1	Site Development—Protect or Restore Habitat	1
			Credit 5.2	Site Development—Maximize Open Space	1
			Credit 6.1	Stormwater Design—Quantity Control	1
			Credit 6.2	Stormwater Design—Quality Control	1
			Credit 7.1	Heat Island Effect—Non-roof	1
			Credit 7.2	Heat Island Effect—Roof	1
			Credit 8	Light Pollution Reduction	1

Water Efficiency Possible Points: 10

Y	N	?			
Y			Prereq 1	Water Use Reduction—20% Reduction	
			Credit 1	Water Efficient Landscaping	2 to 4
			Credit 2	Innovative Wastewater Technologies	2
			Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere Possible Points: 35

Y	N	?			
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
			Credit 1	Optimize Energy Performance	1 to 19
			Credit 2	On-Site Renewable Energy	1 to 7
			Credit 3	Enhanced Commissioning	2
			Credit 4	Enhanced Refrigerant Management	2
			Credit 5	Measurement and Verification	3
			Credit 6	Green Power	2

Materials and Resources Possible Points: 14

Y	N	?			
Y			Prereq 1	Storage and Collection of Recyclables	
			Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
			Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
			Credit 2	Construction Waste Management	1 to 2
			Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	N	?			
			Credit 4	Recycled Content	1 to 2
			Credit 5	Regional Materials	1 to 2
			Credit 6	Rapidly Renewable Materials	1
			Credit 7	Certified Wood	1

Indoor Environmental Quality Possible Points: 15

Y	N	?			
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
			Credit 1	Outdoor Air Delivery Monitoring	1
			Credit 2	Increased Ventilation	1
			Credit 3.1	Construction IAQ Management Plan—During Construction	1
			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
			Credit 5	Indoor Chemical and Pollutant Source Control	1
			Credit 6.1	Controllability of Systems—Lighting	1
			Credit 6.2	Controllability of Systems—Thermal Comfort	1
			Credit 7.1	Thermal Comfort—Design	1
			Credit 7.2	Thermal Comfort—Verification	1
			Credit 8.1	Daylight and Views—Daylight	1
			Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process Possible Points: 6

Y	N	?			
			Credit 1.1	Innovation in Design: Specific Title	1
			Credit 1.2	Innovation in Design: Specific Title	1
			Credit 1.3	Innovation in Design: Specific Title	1
			Credit 1.4	Innovation in Design: Specific Title	1
			Credit 1.5	Innovation in Design: Specific Title	1
			Credit 2	LEED Accredited Professional	1

Regional Priority Credits Possible Points: 4

Y	N	?			
			Credit 1.1	Regional Priority: Specific Credit	1
			Credit 1.2	Regional Priority: Specific Credit	1
			Credit 1.3	Regional Priority: Specific Credit	1
			Credit 1.4	Regional Priority: Specific Credit	1

Total Possible Points: 110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED Gold

40% water savings

35% energy savings

What is an Eco-Charrette?

- Usually refers to the first meeting in the integrative process
- Broad participation to build engagement and identify opportunities early

Achieving the greatest effectiveness in cost and environmental performance requires that every issue and every team member be brought into the project at the earliest point.

- Integrative Process ANSI Standard

Sustainable Infrastructure Scorecard Prerequisite

Required				
Yes	No	N/A		Co
☑			Prerequisite 1	Hold an eco-charrette or similar meeting
☐			Prerequisite 2	Use Life Cycle Cost Assessment
☐			Prerequisite 3	Account and mitigate for greenhouse gas emissions

An eco-charrette is a facilitated meeting for a project design team that explores sustainable and high performance themes and strategies that can be applied to a project.

Sustainable Infrastructure Scorecard

Intent

- To **educate** the team participants about environmental and green building practices, to create a **common language** to explore these issues, to begin the **collaborative approach** necessary for successful integrative design, and to **establish sustainable goals** for the project. When sustainable goals are established collectively and early in the design process at an eco-charrette or similar event, the opportunity to **develop synergistic and cost-effective solutions** are optimized.

Requirements

- To meet this prerequisite, hold an eco-charrette or similar planning meeting in the early phases of project planning -- pre-design, **no later than conclusion of the schematic phase**. Participants in the meeting must include **all design team members and selected stakeholders**. A brief report of the eco-charrette or similar meeting, including summaries of the presentations and discussions, will be used to document completion of this prerequisite.

Green Building Requirements

- Hold an Eco-Charrette:
  - LEED-HC Innovation Credit
  - Sustainable Infrastructure Scorecard
  - Sustainable Sites Initiative Prereq.
  - Living Building Challenge

Exercise #3 – Prepare for an Eco-Charrette

1. FMD is doing a major renovation on a 911 call-center first built in the 80's. The current center is inadequate for modern call-center technology and lighting and HVAC systems negatively impact the comfort of and stress on 911 operators.

2. A local government is planning to replace and improve a culvert. The existing culvert is collapsing and undermining the integrity of the road. The culvert is also a partial barrier to fish passage. A new improved box culvert will meet state standards for fish and debris passage.

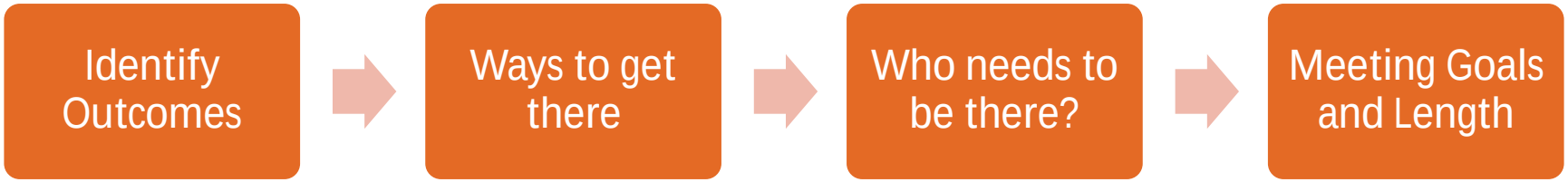
Exercise #3 Debrief

- What information do you need?
- What questions do you need answered?
- Who needs to be at the charrette?

FACILITATING IP MEETINGS

(including the eco-charrette)

IP Meetings: Purpose and Length



Eco-charrette: Purpose and Length example

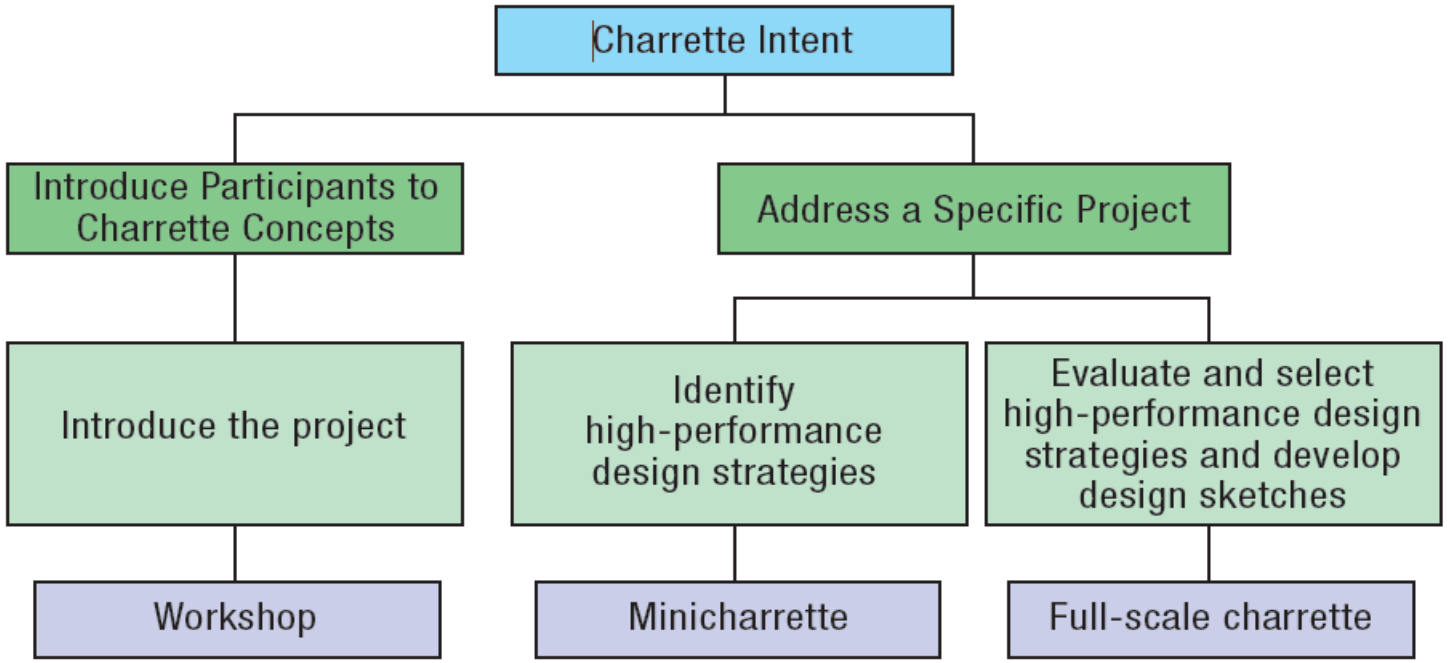


Figure 2. Flow Chart for Determining Type and Length of Charrette

Source: A Handbook for Planning and Conducting Charrettes for High-Performance Projects, NREL

IP Agendas

- Welcome and Introductions
- Overview of project and goals
- Information needed to get to the outcomes
- Facilitated “work” to get to the outcomes
- Report outs and synthesis
- Identification of next steps

IP Facilitation

- What is facilitation?
- Facilitation is the commitment to work in and with groups to find and articulate their collective wisdom.

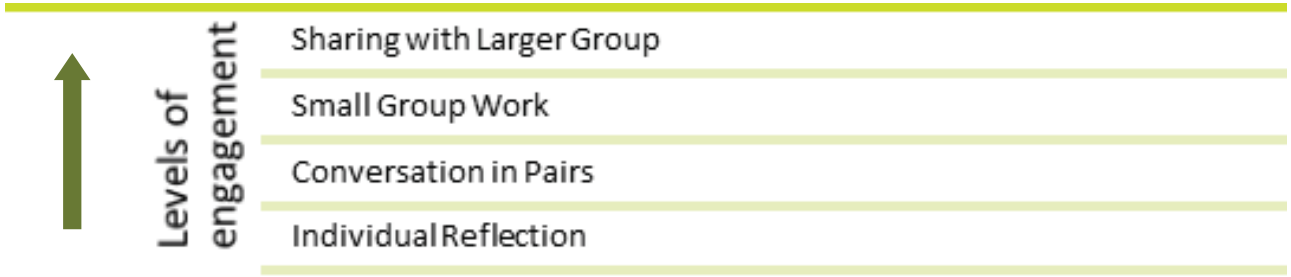
Getting Started

Introductions

- Use name tags or name tents to facilitate discussion with peers by name
- Use introductions to get to know each other better or as part of the brainstorming – or both!

Levels of Engagement

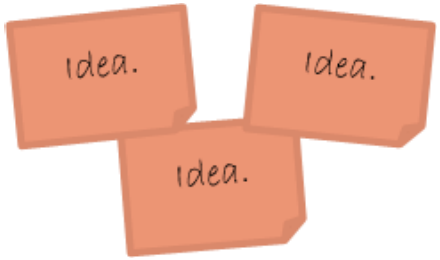
- Start with smaller levels and work up over the course of the workshop



Brainstorming Tools

Structured Brainstorming

- 5 minutes of individual brainstorming
- Round robin sharing of 1 idea at a time until all are on board
- Group discussion



Role play

- Give individuals roles (or randomly draw them) outside of what they normally do
- Ask them to generate ideas and solutions in that role

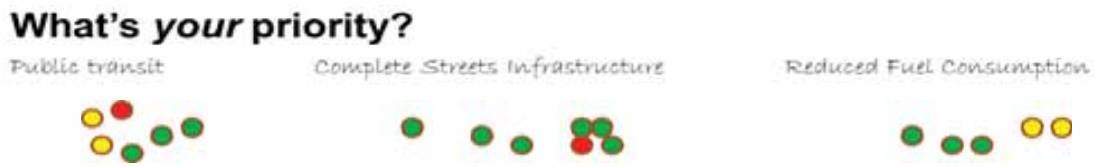
Getting Results

Dot voting

- Allows individual voting and then observation by groups to see trends.
- Use stop light colors, with a small number of "red" allowed per person, or just a single color and number of votes per person.

Thumbs up, Thumbs Down

- Once you have a general solution or language for a goal
- Ask everyone to show thumbs up, thumbs down, or a middle "flat" hand sign. Identify issues.
- Keep discussing and re-voting until no thumbs down or flat hand signs remain.



Staying On-track

Bike Rack

- Have a place to record ideas that need further discussion so sticking points can be captured and addressed in another forum.
- Also called a “parking lot” but how eco is that?

Agenda Check

- Stop and review the meeting objectives and remaining items.
- Ask participants what is most important to them at this juncture.
- Agree as a group on changes to the objectives or agenda.

Exercise #4 – Conduct an EcoCharrette

- Each of you will be assigned a role for this exercise.
- Brainstorm ideas (from the perspective of your role) that meet the priorities for the same scenario in Exercise #3.

911 Call Center	New Fish Culvert
Support the latest call-center technology and adapt to new technologies in the coming years	Ensure traffic safety for vehicles, pedestrians, and other users
provide a support and stress reducing environment for call-center operators	Improve the habitat and fish passage through culvert
demonstrate leadership in meeting the County's Green Building Ordinance and implementing the Strategic Plan	Make a public demonstration of green methods and materials
	Protect/restore a healthy watershed

Exercise #4 Debrief

- Facilitator: were you able to encourage brainstorming while also "managing" the table?
- Other roles: how did your "role" ideas differ from what you, in your actual role, would contribute?
- What would be the most valuable "next step" in this process?

What's Your IP Role in Your Division or Department?

- What are the challenges you foresee with incorporating IP in your practice?
- What are the solutions to these challenges?
- Identify one way you are going to move toward using IP as a result of this workshop?

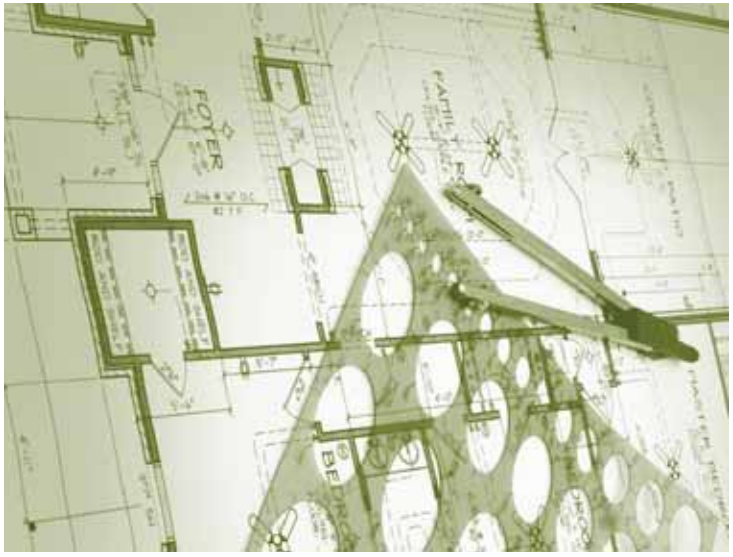
Learning Objectives

- **Articulate** the benefits of IP in overcoming conventional challenges in conventional design practice.
- **Describe** the types of analyses that can be part of the IP process and how they result in financial, environmental, and operational benefits to the project.
- **Plan** an eco-charrette or other IP meeting

Long-term Outcomes

- Incorporate IP into your projects and work
- Save your projects money and improve environmental performance
- Collaborate with coworkers and divisions to maximize effectiveness
- Teach others within your divisions and project teams about IP application and charrette facilitation

What is IP?



Q & A

Resources

- *Integrative Design Process* by 7group and Bill Reed
- *Roadmap for the Integrated Design Process* by the BC Green Building Roundtable
- *A Handbook for Planning and Conducting Charrettes for High-Performance Projects* by National Renewable Energy Laboratory
- *Whole Building Design Guide: Planning and Conducting Integrated Design (ID) Charrettes*

Resources

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Thank You!

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