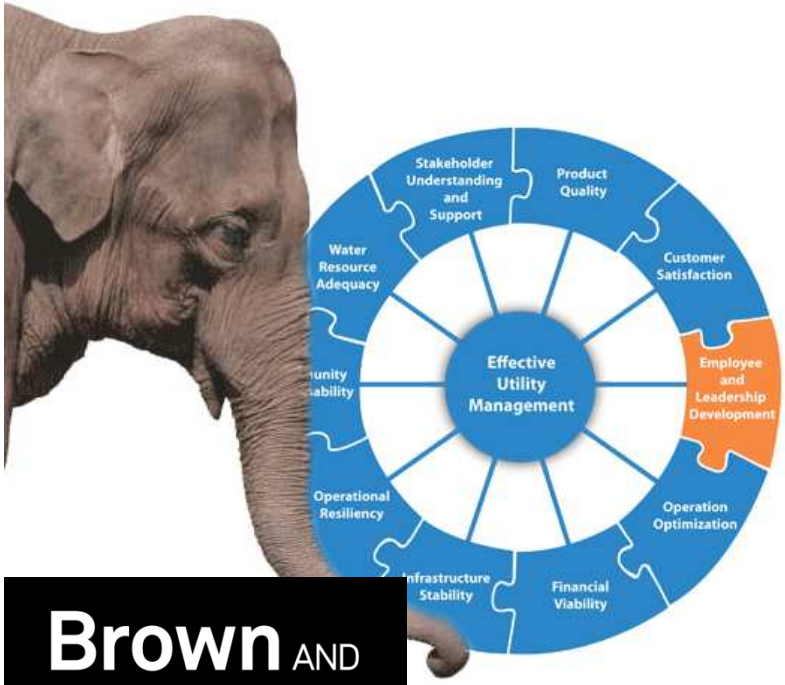


Brown AND Caldwell

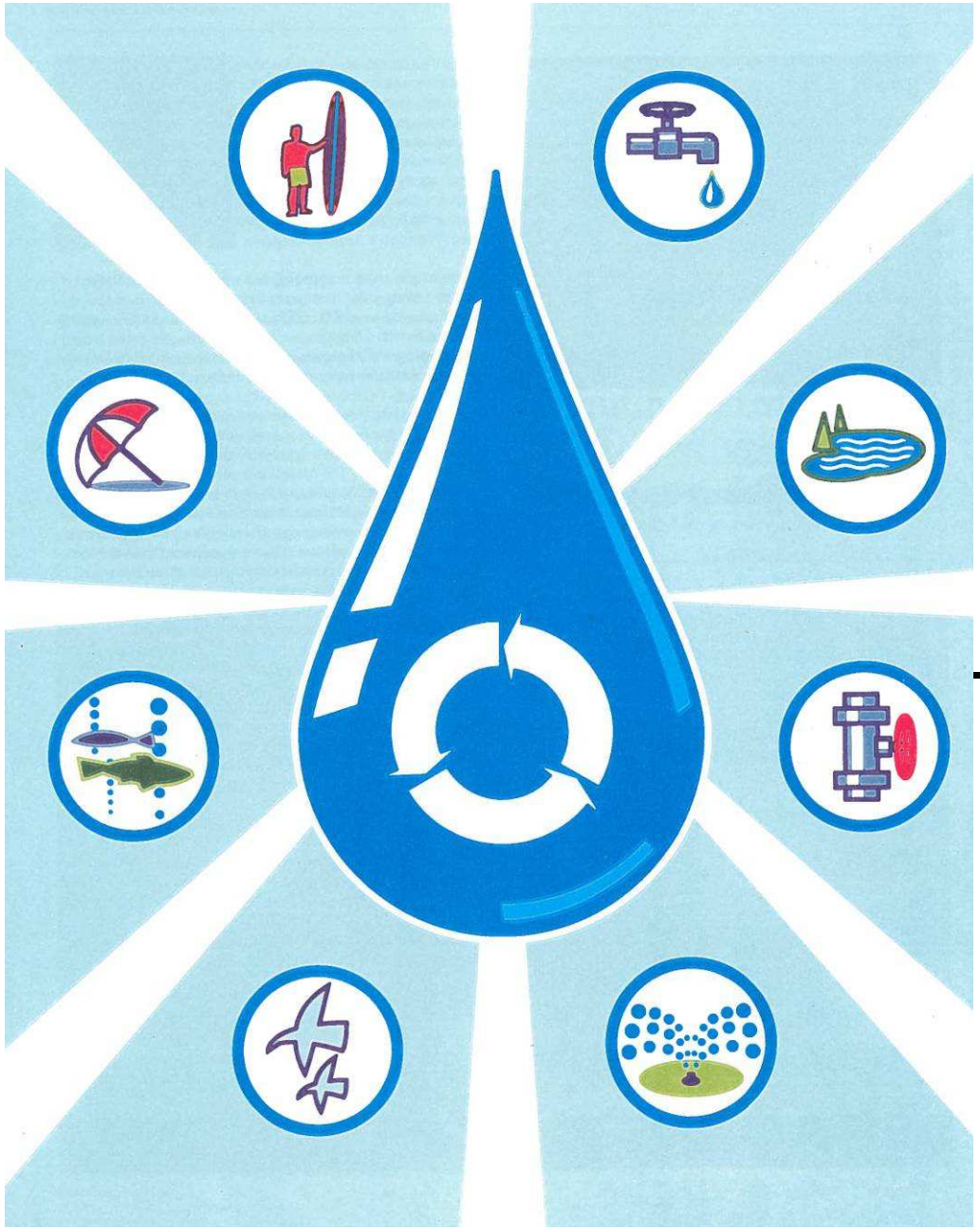
Craig Goehring, CEO

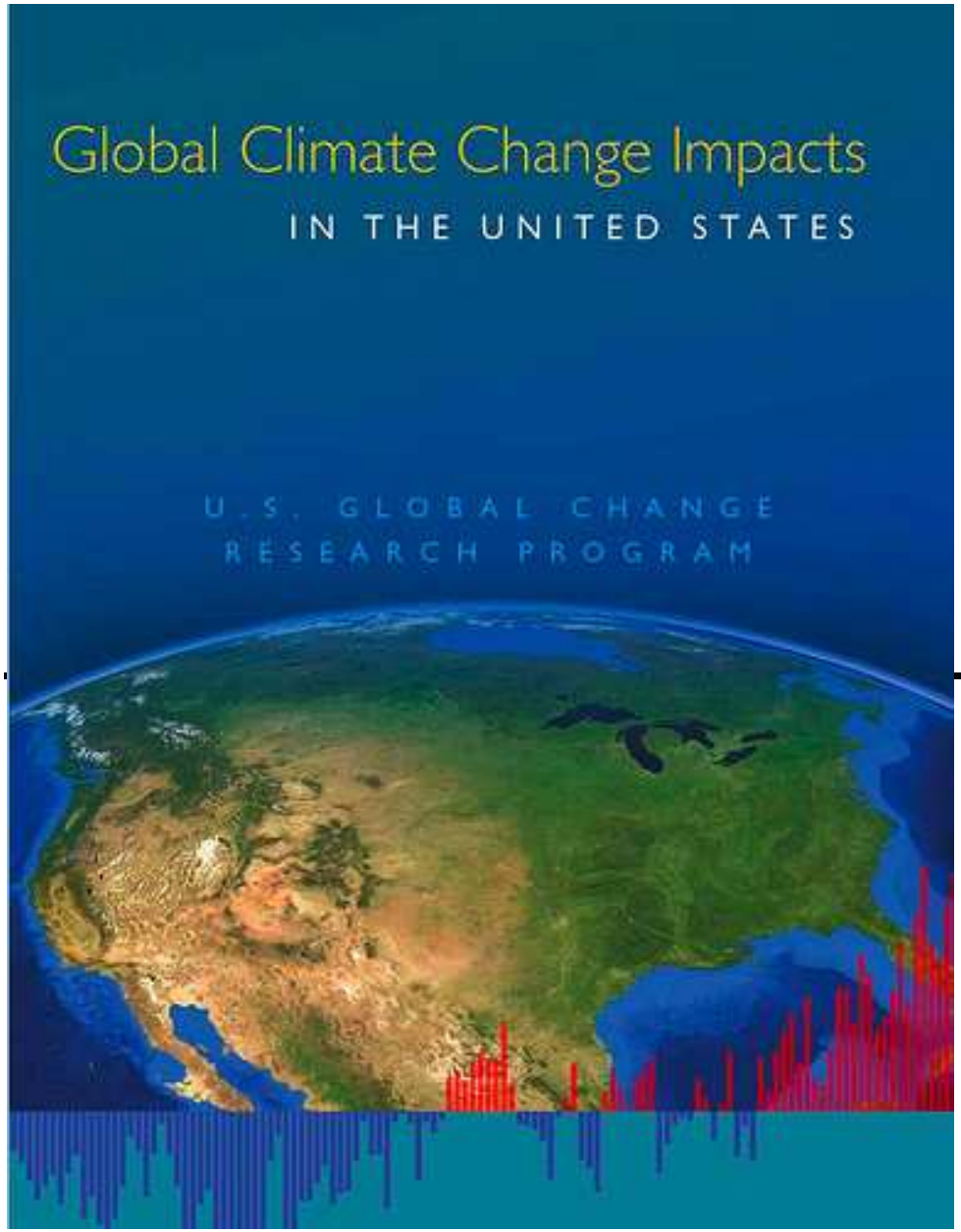
NACWA Winter Conference
Austin, February 2010

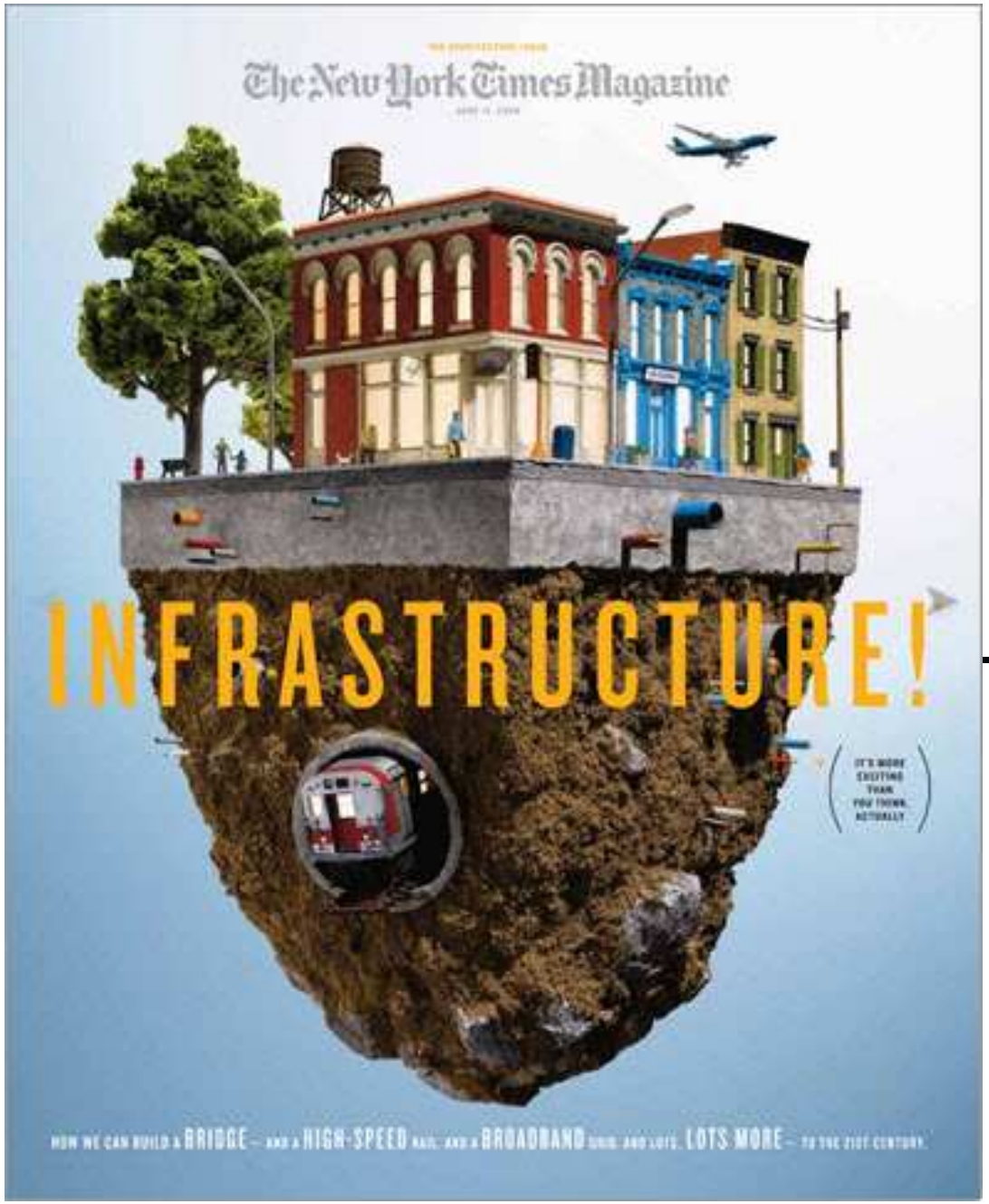
Brown AND Caldwell

New Normal


Think Things
Will be
the same
?????




Global Climate Change Impacts
IN THE UNITED STATES
U.S. GLOBAL CHANGE
RESEARCH PROGRAM


The New York Times Magazine
INFRASTRUCTURE!
IT'S MORE EXCITING THAN YOU THINK. ACTUALLY
HOW WE CAN BUILD A BRIDGE — AND A HIGH-SPEED RAIL AND A BROADBAND GRID AND LOTS, LOTS MORE — TO THE 21ST CENTURY.

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Getting Results in the New Normal

Getting results in the New Normal

Direction to the rider

Logical, holistic roadmap

Emotional, human factors

Culture, behavioral change

Brown AND Caldwell

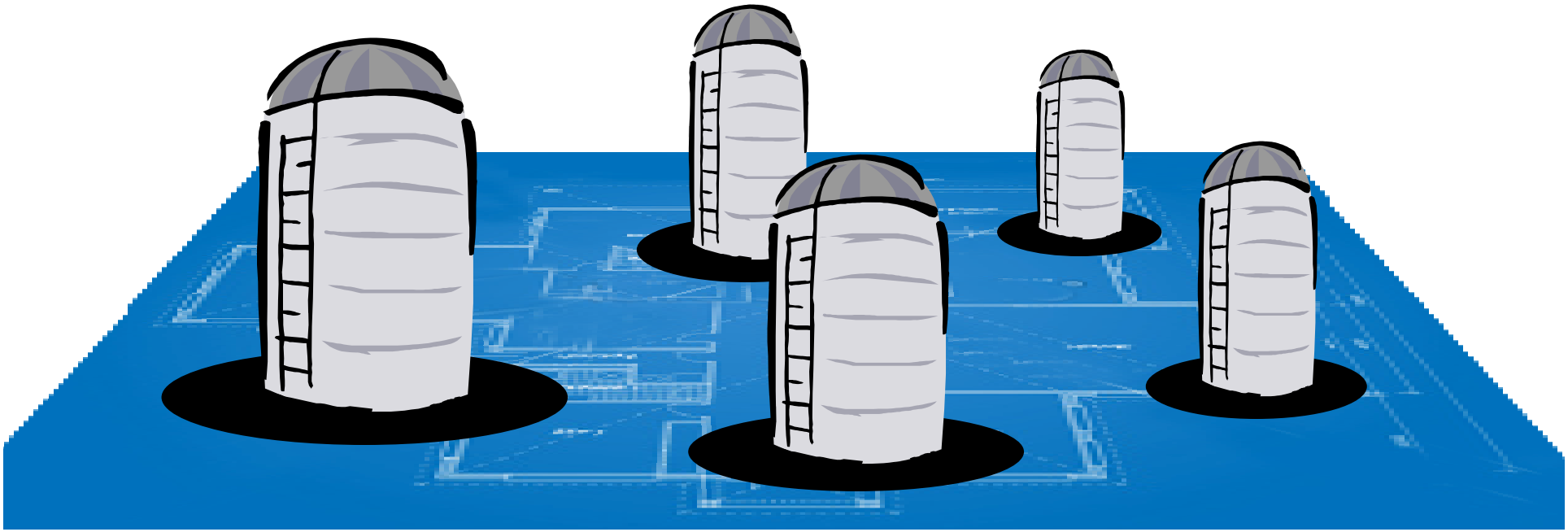
Getting results in the New Normal

- Organizational readiness
- Decision making

Brown AND Caldwell

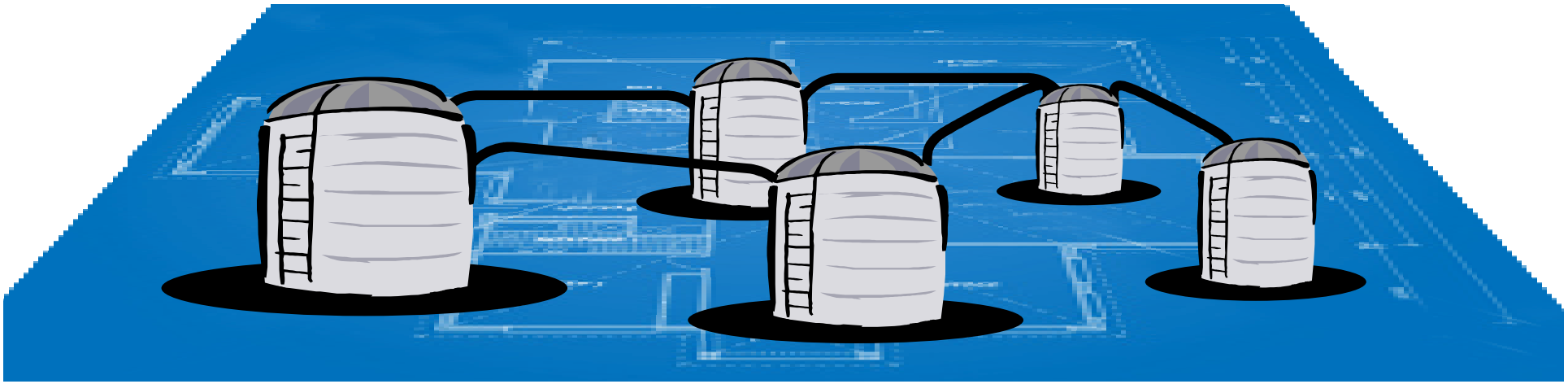
Common organizational challenges

Silos…more typical than not



Better results with…

cross-functional solutions



The Resource ToolBox -- Keys to Management Success

The Keys to Management Success are comprised of frequently used management approaches and systems that have been shown to help water and wastewater utilities manage more effectively. They provide a supportive climate for utilities working towards the outcomes outlined in the Attributes and they can help utilities integrate improvement efforts across the Attributes.

Click on one of the keys below to see the related resources from the Collaborating Organizations.

The Elephant awaits…

Effective Utility Management

Home > Keys to Management Success

The Resource ToolBox -- Keys to Management Success

The Keys to Management Success are comprised of frequently used management approaches and systems that have been shown to help water and wastewater utilities manage more effectively. They provide a supportive climate for utilities working towards the outcomes outlined in the Attributes and they can help utilities integrate improvement efforts across the Attributes.

Click on one of the keys below to see the related resources from the Collaborating Organizations.

Shaping the path

Effective Utility Management

Home > Keys to Management Success > 3. Organizational Approaches

Keys to Management Success

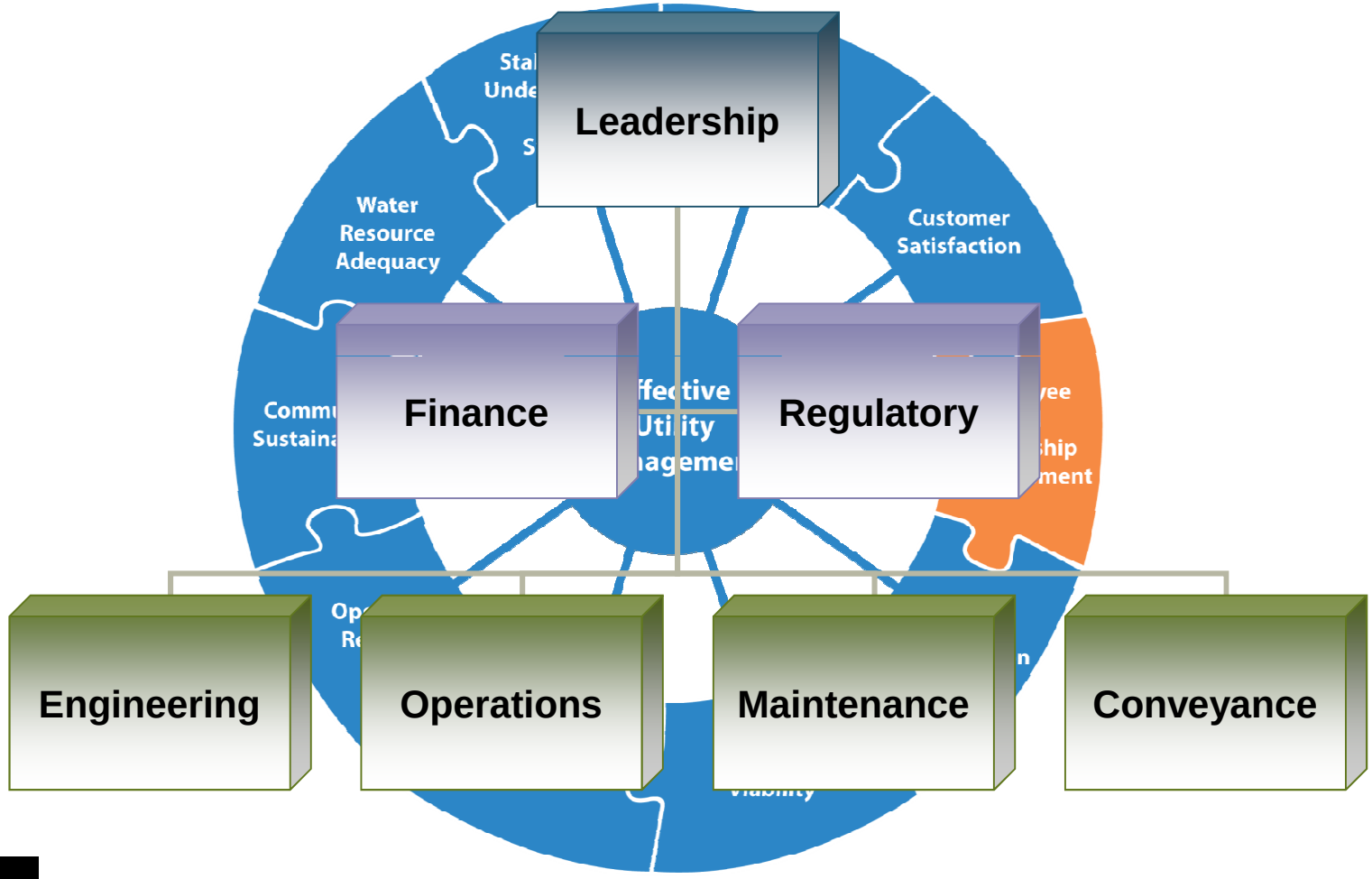
3. Organizational Approaches

Utility managers have identified a variety of organizational approaches as part of overall effective utility management and critical to the success of management improvement efforts. These include:

- Establishing a "participatory organizational culture" that actively seeks to engage employees in improvement efforts (e.g., establishing management improvement, employee empowerment, and cross-functional teams);
- Deploying an explicit change management process that anticipates and plans for change and encourages staff and managers to embrace rather than resist change; and
- Utilizing implementation strategies that seek early, step-wise victories that help utilities get started and remain motivated.

EUM - framework for change/results

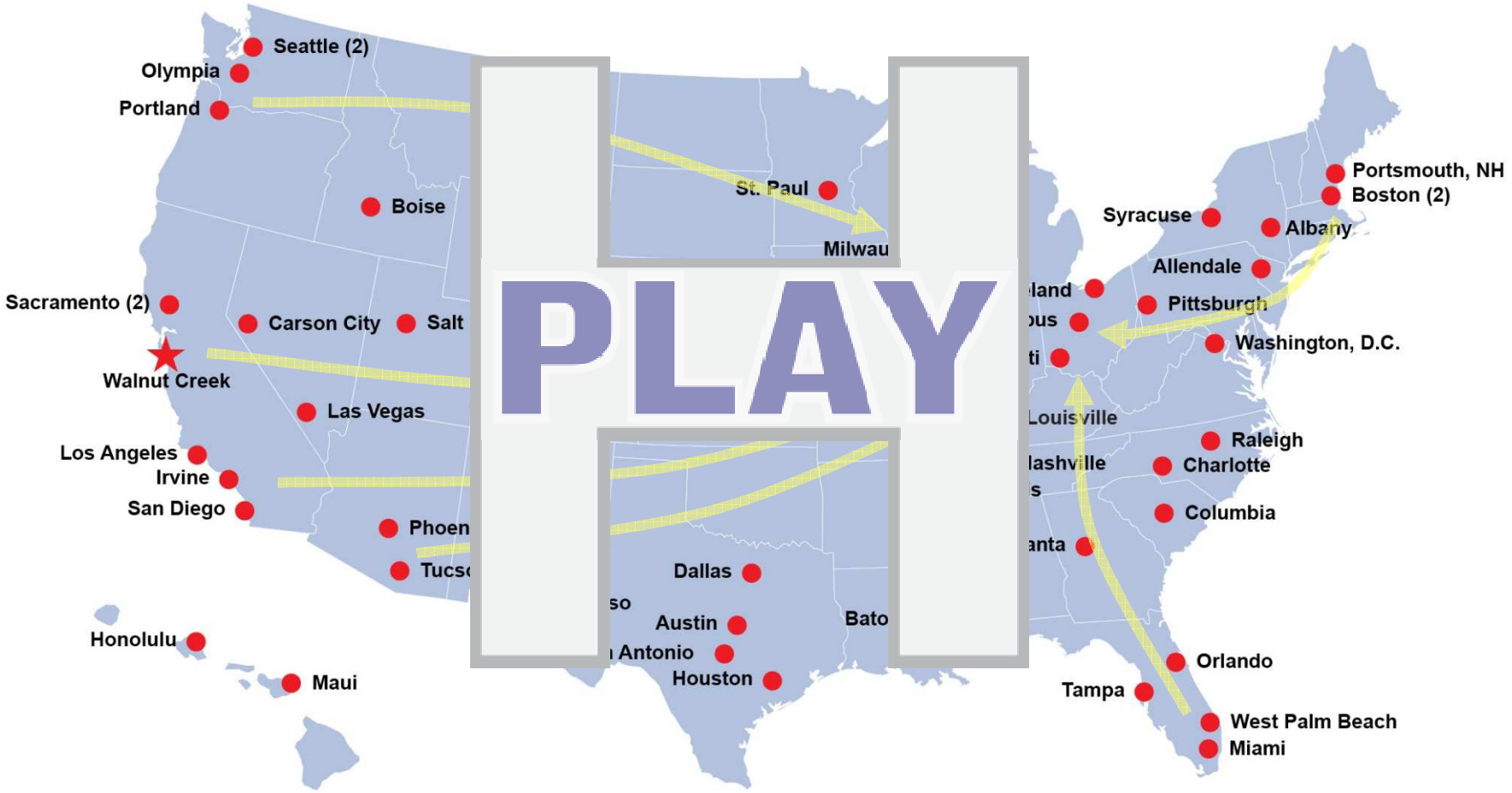
EUM - framework for change/results



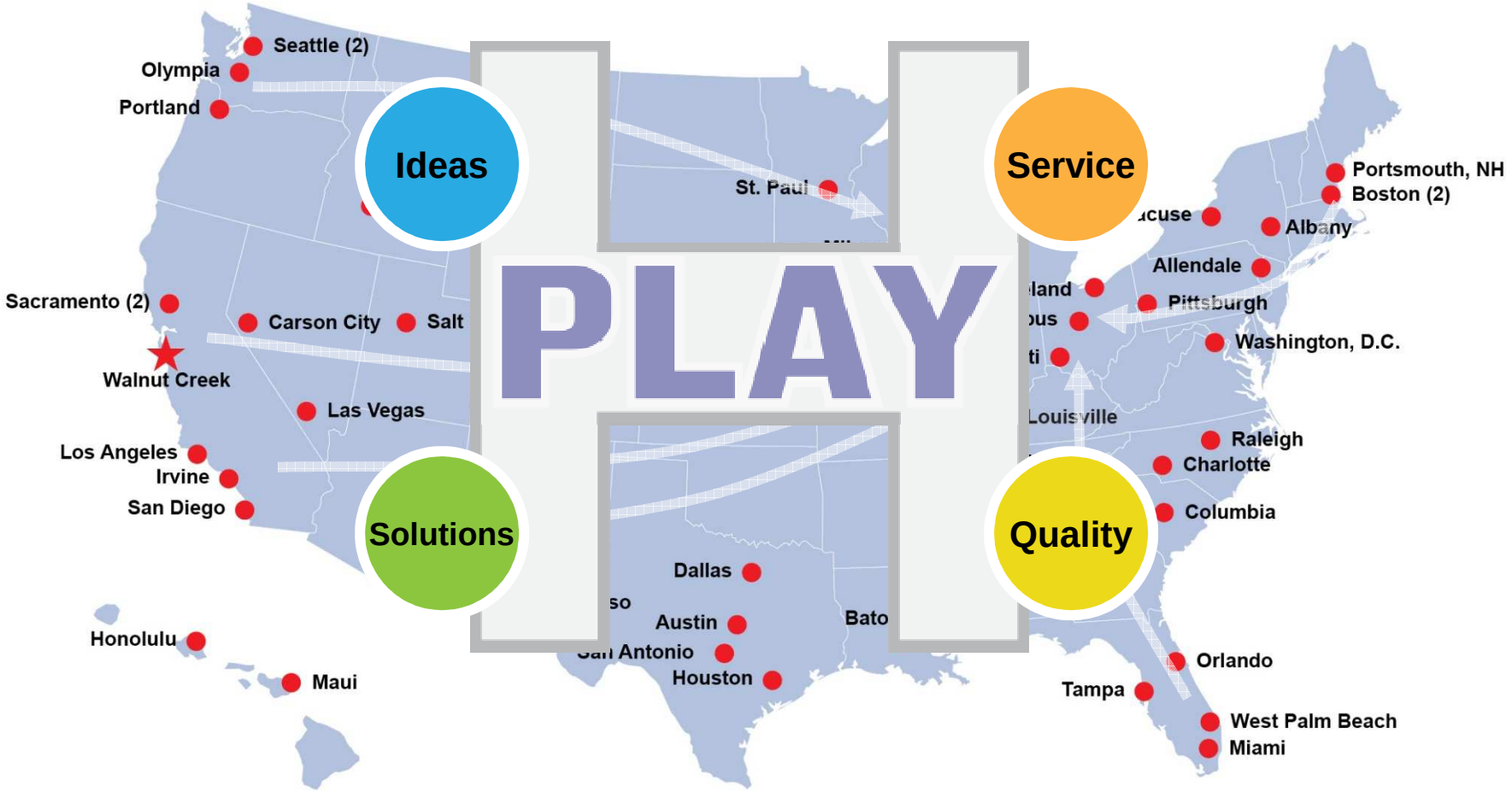
EUM - framework for change/results

BC footprint

BC H-Play


Seattle (2)
Olympia
Portland
Boise
Sacramento (2)
Carson City
Salt
Walnut Creek
Las Vegas
Los Angeles
Irvine
San Diego
Phoen
Tucs
Honolulu
Maui
St. Paul
Milwau
Dallas
Austin
Houston
Bato
Portsmouth, NH
Boston (2)
Syracuse
Albany
Allendale
Pittsburgh
Washington, D.C.
Louisville
Raleigh
Charlotte
Columbia
Orlando
Tampa
West Palm Beach
Miami
PLAY

BC H-Play


Seattle (2)
Olympia
Portland
Ideas
Service
PLAY
St. Paul
Portsmouth, NH
Boston (2)
Albany
Allendale
Pittsburgh
Washington, D.C.
Sacramento (2)
Carson City
Salt
Walnut Creek
Las Vegas
Louisville
Raleigh
Charlotte
Columbia
Los Angeles
Irvine
San Diego
Solutions
Quality
Dallas
Austin
Houston
Honolulu
Maui
Orlando
Tampa
West Palm Beach
Miami

Getting traction

Starting from where...and with what?

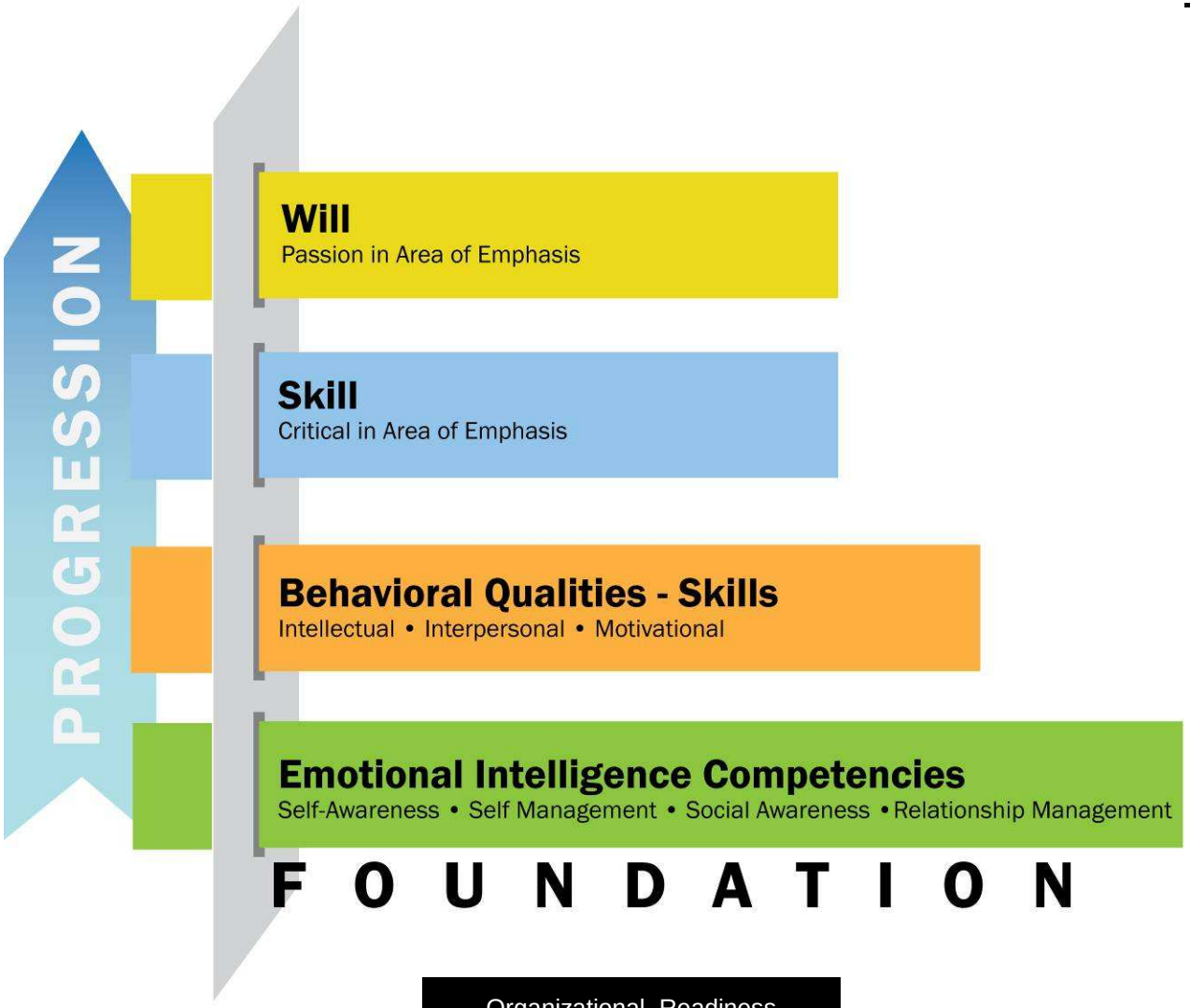
Slotting

Right person

Right role

Right time

People readiness



Collaboration

When it’s working…results flow

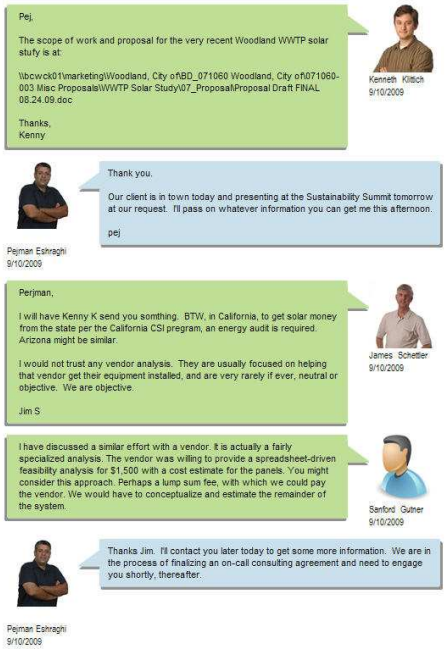
Collaboration – keeping it fresh

Energy Audit

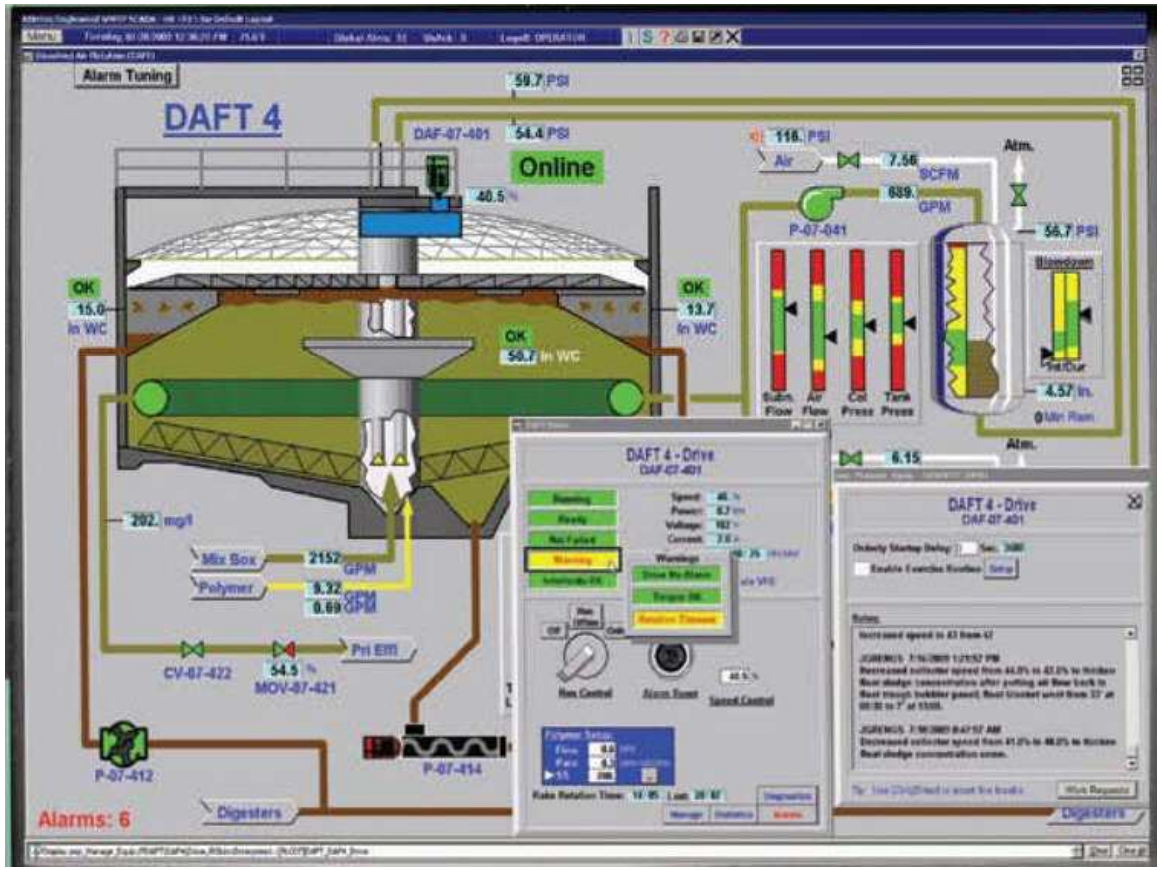
Pejman Eshraghi
9/10/2009

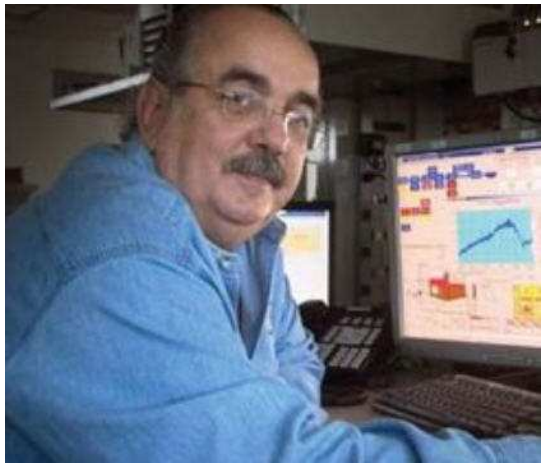
I have a client who is interested in purchasing solar panels for one of their resorts near Grand Canyon. However, she is interested to have a feasibility audit done before investing in the technology.

Who in the company does energy audit of this type?



Collaboration – pride in ownership





How and who…

Decision making framework

The Roles	The Questions
DT (Decision Team)	Who are the primary decision makers?
DM (Decision Manager)	Who is responsible for managing the decision making process?
R/I (Recommends/Input)	Who should provide relevant input to the process?
RD (Resolution/Direction)	Who resolves conflict if it arises and sets direction?
I (Inform)	Who should be informed of the decision, process and context?

Let's be clear...

Agree

Will support

Disagree

Disciplined “gating” of workflow

- **All Conditions met**
- **Conditions to Proceed**
  - All stakeholders
  - Critical decisions
  - Risk factors
- **Conditions to Proceed**

Sustainable performance tools

GHG Assessment

Management Alternat
Land utilization
Land application
Mine reclamation
Biosolids for fuel
Cement kiln
WTE: fluidized bed wit
WTE: fluidized bed wit
WTE: mass burn co-c
WTE: mass burn co-c
Soil amendment
Topsoil blend
Compost (best manag
Thermally dried produ
Biomass production (
Landfill of wet cake bi

Net Present Value Analysis

	Co-D	
	Compost Products	Topsoil Blending
Capital Costs		
Total capital costs	$262.9	$259.8
Present value of capital costs	$281.6	$278.4
O&M Costs		
Total O&M annual cost	$7.4	$7.1
Present value of total O&M cost	$263.3	$252.0
Revenues		
Biomethane recovery	$1.4	$1.4
Dried biosolids fuel		
Co-digestion tipping fees	$0.9	$0.9
Blended topsoil product		$0.3
Compost product	$0.3	
Sales from biomass production		
Thermally dried product		
Power savings		
Total revenue generated	$2.6	$2.6
Present value of revenue	$137.6	$137.1
Total Net Present Value	**$407.2**	**$393.4**

Triple Bottom Line

Criteria Group	No.	Criteria Categories	Measure Description	Weight	Dried Fertilizer	Top Soil Blend	Mine Reclamation	Land Application	Biomass Production	Compost Product	Cement Kiln Fuel	WTE - A	WTE - B	WTE - C	WTE - D
Economic	EC-01	Capital Costs	construction cost and markup for soft costs adjusted to midpoint of construction	6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.8	2.6	3.0	2.8
	EC-02	Capital Costs Eligible for Grants	Not available at this time	-	-	-	-	-	-	-	-	-	-	-	-
	EC-03	Tax Revenue Implications	cost to private property is taxed but revenue from reduced property values	1	3	3	3	3	3	3	3	3	3	3	3
	EC-04	Present Worth of O&M costs	O&M costs	6	3.2	3.0	3.1	3.1	2.9	2.8	3.2	3	3	3	3
	EC-05	Flexibility for Future Treatment Process Optimization	cost for additional tankage needed for process optimization	1	3	3	3	3	3	3	3	1	3	1	3
	EC-06	Expandability for Population Increases	additional space needed versus available to meet 2065 loading	1	3	3	2	2	2	3	3	4	3	5	3
	EC-07	Flexibility to Accommodate Future Regulations	additional space needed versus available to meet potential regulations	1	3	3	4	4	4	3	4	2	4	2	4
			Economic Subtotal (100 pts max):		61	59	60	60	58	58	62	55	57	57	59
Environmental	EN-01	Carbon Footprint	tons of CO_2 created	1.82	4	4	5	4	4	4	4	2	3	2	3
	EN-02	Heat Recovery Potential	Heat energy replacing natural gas	1.82	4	4	4	4	4	4	4	5	4	5	4
	EN-03	Water Reuse Potential	not applicable to this analysis	-	-	-	-	-	-	-	-	-	-	-	-
	EN-04	Biomethane Resource Recovery	Recovery of biomethane resources	1.82	5	5	5	5	5	5	5	1	5	1	5
	EN-05	Power Intensity - usage or generation	kilowatt hours per year consumed	1.82	2	2	2	2	2	2	2	4	3	4	3
	EN-06	Transmission Reliability	risk cost for transmission failure	1.82	5	5	2	4	2	5	5	5	5	4	5
	EN-07	Site Remediation	risk cost of site remediation	1.82	3	3	3	3	3	3	3	3	3	3	3
	EN-08	Pollution Discharge	air emissions discharged	1.82	3	3	3	3	3	3	3	3	3	3	3
	EN-09	Non-renewable Resource Use	Gallons of diesel consumed per year	1.82	3	3	1	2	1	3	3	3	3	2	3
	EN-10	Non-renewable Resource Generated	Biosolids production	1.82	4	5	3	3	3	5	4	1	3	1	3
	EN-11	Flexibility for Future Resource Recovery	Additional space needed to add 100% additional resource recovery	1.82	3	3	3	3	3	3	3	4	3	5	3
			Environmental Subtotal (100 pts max):		75	76	66	69	64	76	75	66	73	64	73
Social	SO-01	Impact on Property Values	Lost value to present community	1.82	5	5	5	5	5	5	5	5	5	4	4
	SO-02	Operations Traffic in Sensitive Areas	Cost of traffic inconvenience during operations	1.82	4	4	4	4	4	4	4	5	5	2	4
	SO-03	Operations Noise in Sensitive Areas	Cost of noise inconvenience	1.82	5	5	5	5	5	5	5	5	5	4	4
	SO-04	Odour Potential	Cost of odour issues	1.82	3	3	3	3	3	3	3	3	3	2	2
	SO-05	Visual Impacts	Perceived value of lost view	1.82	5	5	5	5	5	5	5	5	5	4	4
	SO-06	Construction Disruption	Cost of traffic inconvenience due to construction	1.82	3	3	3	3	3	3	3	3	3	3	3
	SO-07	Public and Stakeholder Acceptability	Lost time due to public disapproval	1.82	3	3	4	2	2	3	4	2	2	2	2
	SO-08	Impacts on Future Development	Loss of value of developable land adjacent to facility	1.82	3	3	3	3	3	3	3	3	3	1	1
	SO-09	Loss of Beneficial Site Uses	Loss of park land due to facility	1.82	3	3	3	3	3	3	3	3	3	3	3
	SO-10	Compatibility with Designated Land Use	Delay due to zoning changes	1.82	3	3	3	3	3	3	3	3	3	3	3
	SO-11	Cultural Resource Impacts	Risk cost of cultural site find	1.82	3	3	3	3	3	3	3	3	3	3	3
			Social Subtotal (100 pts max):		73	73	75	71	71	73	75	73	73	56	60
			TOTAL SCORE (300 pts max):		209	208	200	200	193	207	212	193	203	178	192

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GHG assessment

Management Alternative	Debits	Credits	Total
	Ton CO_2/yr		
Land utilization			
Land application	1,574	-9,944	-8,370
Mine reclamation	1,602	-13,727	-12,125
Biosolids for fuel			
Cement kiln	7,042	-16,366	-9,324
WTE: fluidized bed with raw sludge	2,096	-625	1,470
WTE: fluidized bed with digested biosolids	8,062	-8,197	-135
WTE: mass burn co-combustion of MSW and raw sludge [1]	5,385	-320	5,065
WTE: mass burn co-combustion of MSW and digested biosolids [1]	2,855	-7830	-4,948
Soil amendment			
Topsoil blend	1,513	-10,093	-8,580
Compost (best management practices)	1,523	-10,093	-8,571
Thermally dried product	2657	-10,093	-7427
Biomass production (hybrid poplar)	1,384	-9,520	-8,136
Landfill of wet cake biosolids with biogas purification on site	9,870	-8,598	1,272

Net present value analysis

	Co-Digestion Costs and Revenues, $million							Waste-to-Energy Costs and Revenues, $million			
	Compost Products	Topsoil Blending	Thermally Dried Fuel	Biomass Production	Thermally Dried Fertilizer	Land Application	Mine Reclaim.	Raw Sludge at WWTP Site	Digested Sludge at WWTP Site	Raw Sludge with MSW at Hartland	Digested Sludge with MSW at Hartland
Capital Costs											
Total capital costs	$262.9	$259.8	$254.9	$262.9	$254.9	$255.3	$255.3	$270.1	$293.0	$252.3	$265.4
Present value of capital costs	$281.6	$278.4	$273.6	$281.4	$273.6	$274.0	$274.0	$288.9	$313.3	$269.2	$284.1
O&M Costs											
Total O&M annual cost	$7.4	$7.1	$6.5	$7.3	$6.5	$6.8	$6.8	$7.4	$7.1	$7.4	$7.1
Present value of total O&M cost	$263.3	$252.0	$232.7	$258.7	$232.7	$243.2	$243.2	$261.8	$252.8	$264.8	$251.6
Revenues											
Biomethane recovery	$1.4	$1.4	$1.4	$1.4	$1.4	$1.4	$1.4		$1.3		$1.3
Dried biosolids fuel			$0.2								
Co-digestion tipping fees	$0.9	$0.9	$0.9	$0.9	$0.9	$0.9	$0.9		$0.9		$0.9
Blended topsoil product		$0.3									
Compost product	$0.3										
Sales from biomass production				$0.1							
Thermally dried product					$0.2						
Power savings								$0.5	$0.2	$0.9	$0.4
Total revenue generated	$2.6	$2.6	$2.4	$2.3	$2.4	$2.2	$2.2	$0.5	$2.4	$0.9	$2.6
Present value of revenue	$137.6	$137.1	$132.4	$127.9	$132.4	$126.2	$126.2	$18.0	$129.5	$40.9	$140.6
Total Net Present Value	**$407.2**	**$393.4**	**$373.9**	**$412.2**	**$373.9**	**$391.0**	**$391.0**	**$532.7**	**$436.6**	**$493.2**	**$395.1**

Triple bottom line

Criteria Group	No.	Criteria Categories	Measure Description	Weight	Dried Fer-tilizer	Top Soil Blend	Mine Rec-lamation	Land App-lication	Biomass Pro-duction	Com-post Product	Cement Kiln Fuel	WTE - A	WTE - B	WTE - C	WTE - D
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	EC-02	Capital Costs Eligible for Grants	Not available at this time	-	-	-	-	-	-	-	-	-	-	-	-
	EC-03	Tax Revenue Implications	cost of private property lost and lost revenue from reduced property values	1	3	3	3	3	3	3	3	3	3	3	3
	EC-04	Present Worth of O&M costs	O&M costs	8	3.2	3.0	3.1	3.1	2.9	2.8	3.2	3	3	3	3
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	EC-06	Expandability for Population Increases	additional space needed versus available to meet 2065 loading	1	3	3	2	2	2	3	3	4	3	5	3
	EC-07	Flexibility to Accommodate Future Regulations	additional space needed versus available to meet potential regulations	1	3	3	4	4	4	3	4	2	4	2	4
			Economic Subtotal (100 pts max)[1]:		**61**	**59**	**60**	**60**	**58**	**58**	**62**	**55**	**57**	**57**	**59**
Environmental	EN-01	Carbon Footprint	tons of eCO2 created	1.82	4	4	5	4	4	4	4	2	3	2	3
	EN-02	Heat Recovery Potential	Heat energy replacing natural gas	1.82	4	4	4	4	4	4	4	5	4	5	4
	EN-03	Water Reuse Potential	not applicable to this analysis	-	-	-	-	-	-	-	-	-	-	-	-
	EN-04	Biomethane Resource Recovery	Recovery of biomethane resources	1.82	5	5	5	5	5	5	5	1	5	1	5
	EN-05	Power (energy) usage or generation	kilowatt hours per year consumed	1.82	2	2	2	2	2	2	2	4	3	4	3
	EN-06	Transmission Reliability	risk cost of transmission failure	1.82	5	5	2	4	2	5	5	5	5	4	5
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	EN-09	Non-renewable Resource Use	Gallons of diesel consumed per year	1.82	3	3	1	2	1	3	3	3	3	2	3
	EN-10	Non-renewable Resource Generated	Biosolids production	1.82	4	5	3	3	3	5	4	1	3	1	3
	EN-11	Flexibility for Future Resource Recovery	Additional space needed to add 100% additional resource recovery	1.82	3	3	3	3	3	3	3	4	3	5	3
	EN-12	Terrestrial and Inter-tidal Effect	Habitat areas potentially disturbed	1.82	5	5	5	5	5	5	5	5	5	5	5
			Environmental Subtotal (100 pts max):		**75**	**76**	**66**	**69**	**64**	**76**	**75**	**66**	**73**	**64**	**73**
Social	SO-01	Impact on Property Values	Lost value to present community	1.82	5	5	5	5	5	5	5	5	5	4	4
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	SO-09	Loss of Beneficial Site Uses	Loss of park land due to facility	1.82	3	3	3	3	3	3	3	3	3	3	3
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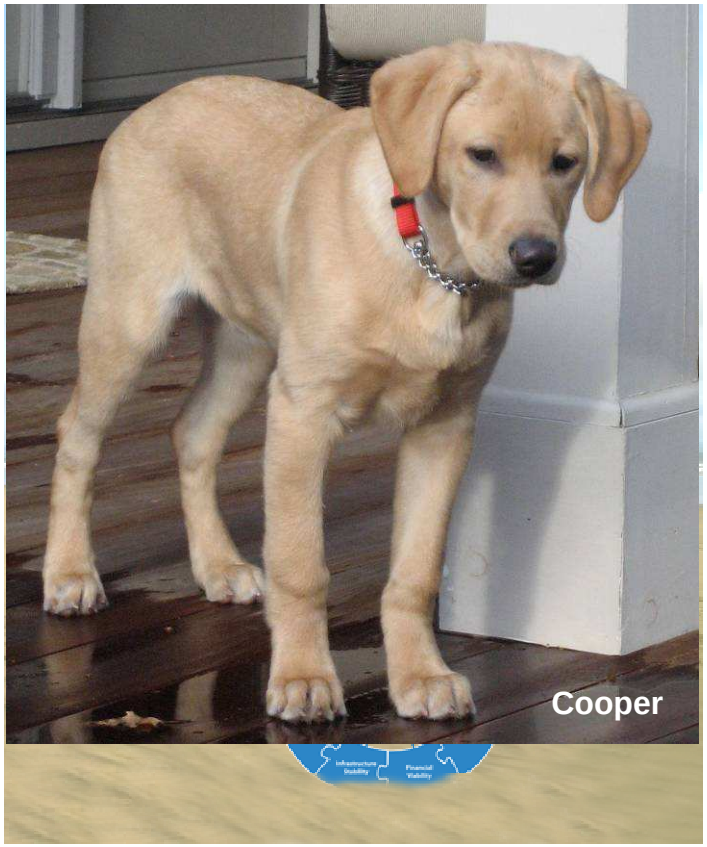
	SO-11	Cultural Resource Impacts	Risk cost of a cultural site find	1.82	3	3	3	3	3	3	3	3	3	3	3
			Social Subtotal (100 pts max):		**73**	**73**	**75**	**71**	**71**	**73**	**75**	**73**	**73**	**56**	**60**
			TOTAL SCORE (300 pts max):		**209**	**208**	**200**	**200**	**193**	**207**	**212**	**193**	**203**	**178**	**192**

Behavioral change key to results



Clear, simple direction

Repetition

Trusting environment

Positive rewards

Clearing the path…and bright spots