



Sustainable Transportation and STARS

Workshop for
APA California Northern

December 8, 2011





Welcome! On behalf of . . .

- **APA Sustainability Committee (SC)**
 - Scott T. Edmondson, AICP (co-chair; also, principal, Sustainability 2030)
- **Sustainable Transportation Council (STC)**
 - Paul Horton, co-founder & vice chair, STC; principle consultant, LeighFisher
 - Kelly Rodgers, Program manager, STC
- **LeighFisher**



Today's Agenda

- 2:00 Welcome and Context
- 2:15 Sustainability: What is it?
- 2:30 Sustainable transportation:
 - Are we heading in the right direction? *Discussion*
 - What would a sustainable transportation system look like?
Exercise
- 3:00 What is STARS? STARS-Project, STARS-Plan, & STARS Safety, Health, & Equity Credits
- 4:00 Discussion: What are policies that promote the triple bottom line?
- 4:30 Exercise: Applying STARS & the Triple Bottom Line
- 5:00 ADJOURN



How to apply sustainability to transportation

SUSTAINBLE VISION

What is a fully sustainable transportation system?



TOOLS & STRATEGIES

STARS
tool box



APPLICATION TO CONTEXT

Local plans
and projects



Introductions

- Name
- Organizational Affiliation
- Title
- Why here/what hope to get?



Sustainable Transportation

The CA & SF Bay Area

Regulatory & Planning Context



Multiple Legacy & New Sustainability Layers

Federal: Not yet, but something will come.

State Leads Nation/World: Climate law/action:

- **AB32:** reduction to 1990 levels by 2020 (30%); then 80% below 1990 by 2050
- **SB375:** 7 & 15% reduction in per capita passenger vehicle emissions via LU/T planning (2020/2035).

Regional Leadership:

- Legacy: ABAG LU Projections + RTP + RHNA (Regional Housing Need Allocation) + Home Rule
- NEW: SB375-Inspired Plan Bay Area: RTP + SCS (Sustainable Communities Strategy) 2040.



Current *Plan Bay Area 2040*

- ABAG & MTC, BAAQMD & BCDC, 9 counties, 101 cities.
- Produce integrated land-use/transportation plan.
- Pop Growth +2M: 7M 2011 to 9M 2040.
- Meet the SB375 emissions reductions (below 2005):
 - 7%/15% percent per-capita reduction by 2020/2035
- By: Developing compact land use patterns
 - Prioritizing infill housing & emp. growth at transit hubs
 - Meeting all new housing demand in the region
 - Mitigating health hazards from nearby freeways, and
 - Voluntarily, based on local jurisdiction's home rule.
- Emerging new roles for Transportation Planning
 - Often defining the response and nature of sustainable T.



Performance Targets – SCS/RTP 2040

- 1. Climate:** 15% GHG Reduction per capita from passenger vehicles.
- 2. Housing:** 100% need in region
- 3. Health & Safety:** reduce PM-deaths (PM2.5 10%, PM10 30%)
- 4. Health & Safety:** Reduce collision fatalities (incl. bike & ped) by 50%
- 5. Health & Safety:** Increase avg. daily walking/biking time per person by 60% (15 min/day).
- 6. Open Space/Ag:** No urban development from ag land conversions.
- 7. Equitable Access:** 10% reduction in share of household income for transpo & housing for low- and lower-middle income HHs.
- 8. Economic Vitality:** avg. annual GDP growth rate of 2% (90% for period).
- 9. Transportation System Effectiveness (TSE):**
 - Reduce non-auto trip time by 10%
 - Reduce auto VMT per cap by 10%
- 10. TSE:** maintain system capital and infrastructure in good repair.

Source: <http://www.onebayarea.org/pdf/PerfTargetsSCS-RTP.pdf>



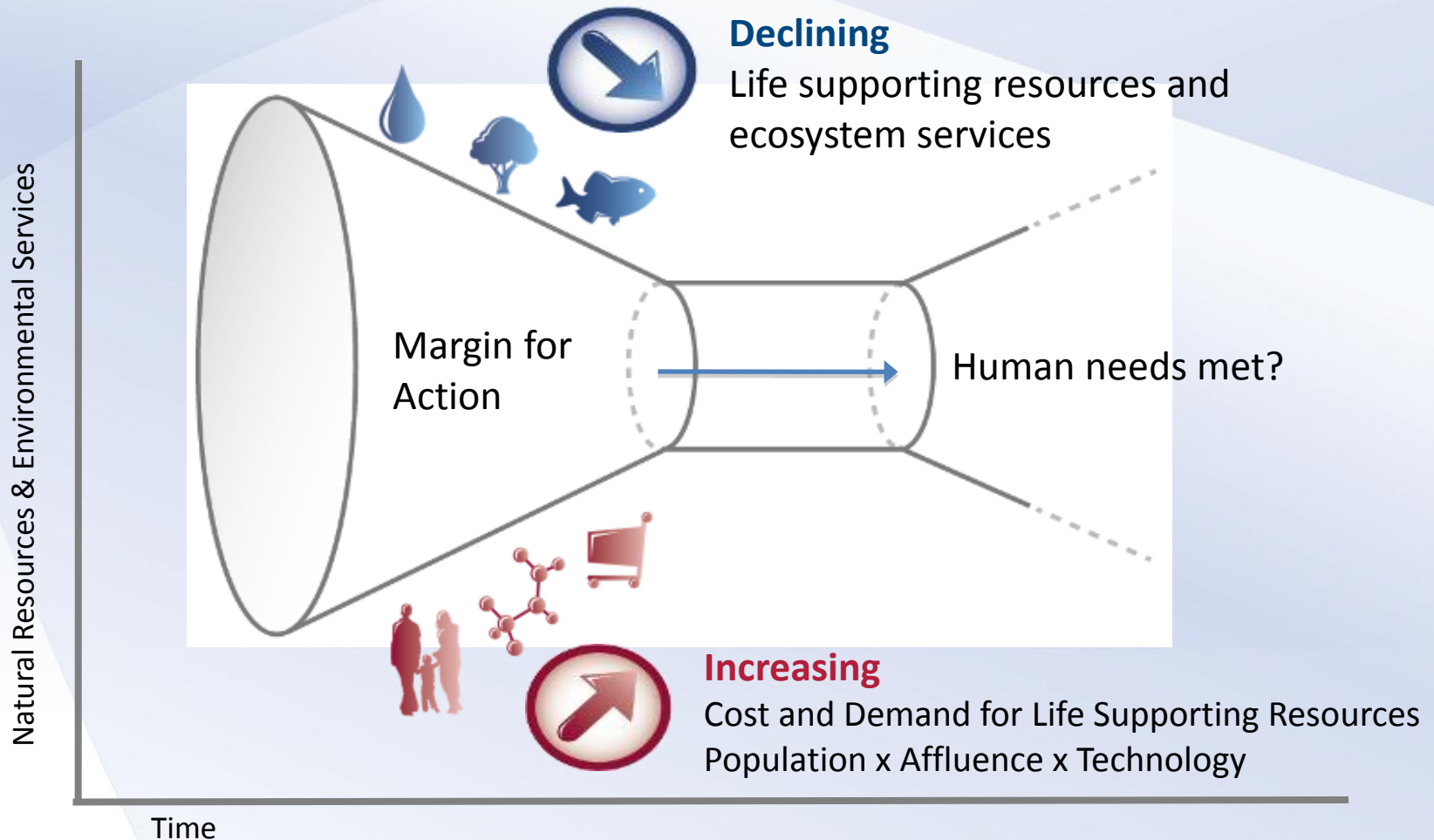
Sustainability

What is it?



What Happens at the Systems Level?

Metaphor of the funnel





Global Climate Change

Largest signal of a non-sustainable economy!

TREND: Actual warming appears to be outpacing the 2007 IPCC modeling.

Climate warming is the huge front line of the larger sustainability challenge.

Need to respond to climate change in ways that also advance sustainability.

Otherwise, will make matters worse.





What happens at the systems level?

Defensive vs. Strategic Agencies

Ecological - species, atmosphere, oceans, land ,water

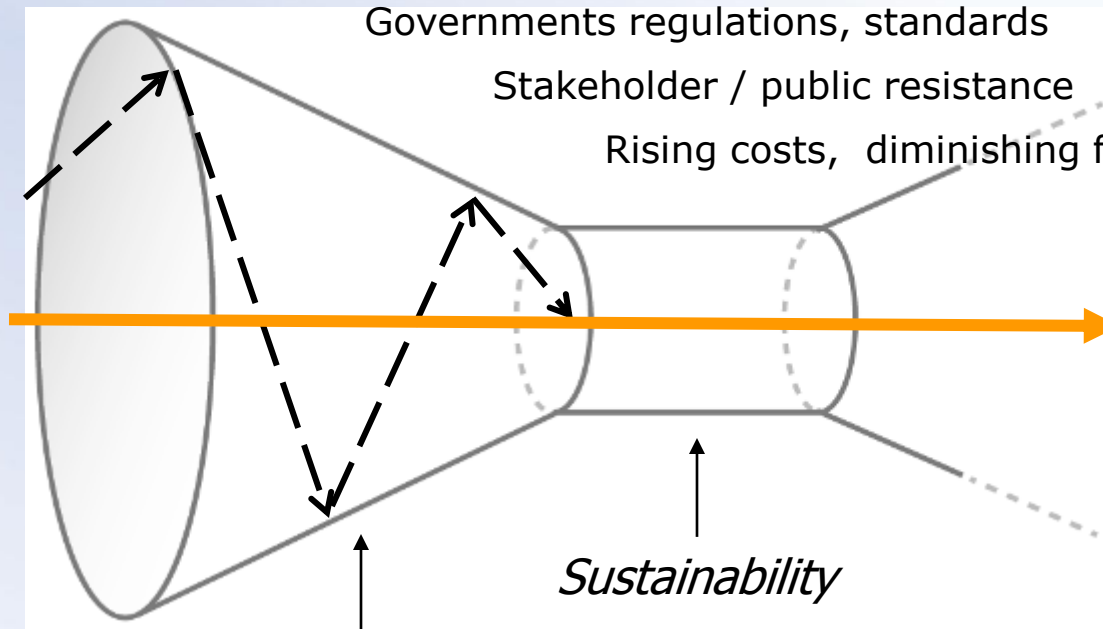
Public health, well being

Governments regulations, standards

Stakeholder / public resistance

Rising costs, diminishing funding

Defensive
Agencies
Strategic
Agencies



**Long Term
Success =
Restorative
Society**

Non-Sustainable Society

Sustainability



Sustainable Development



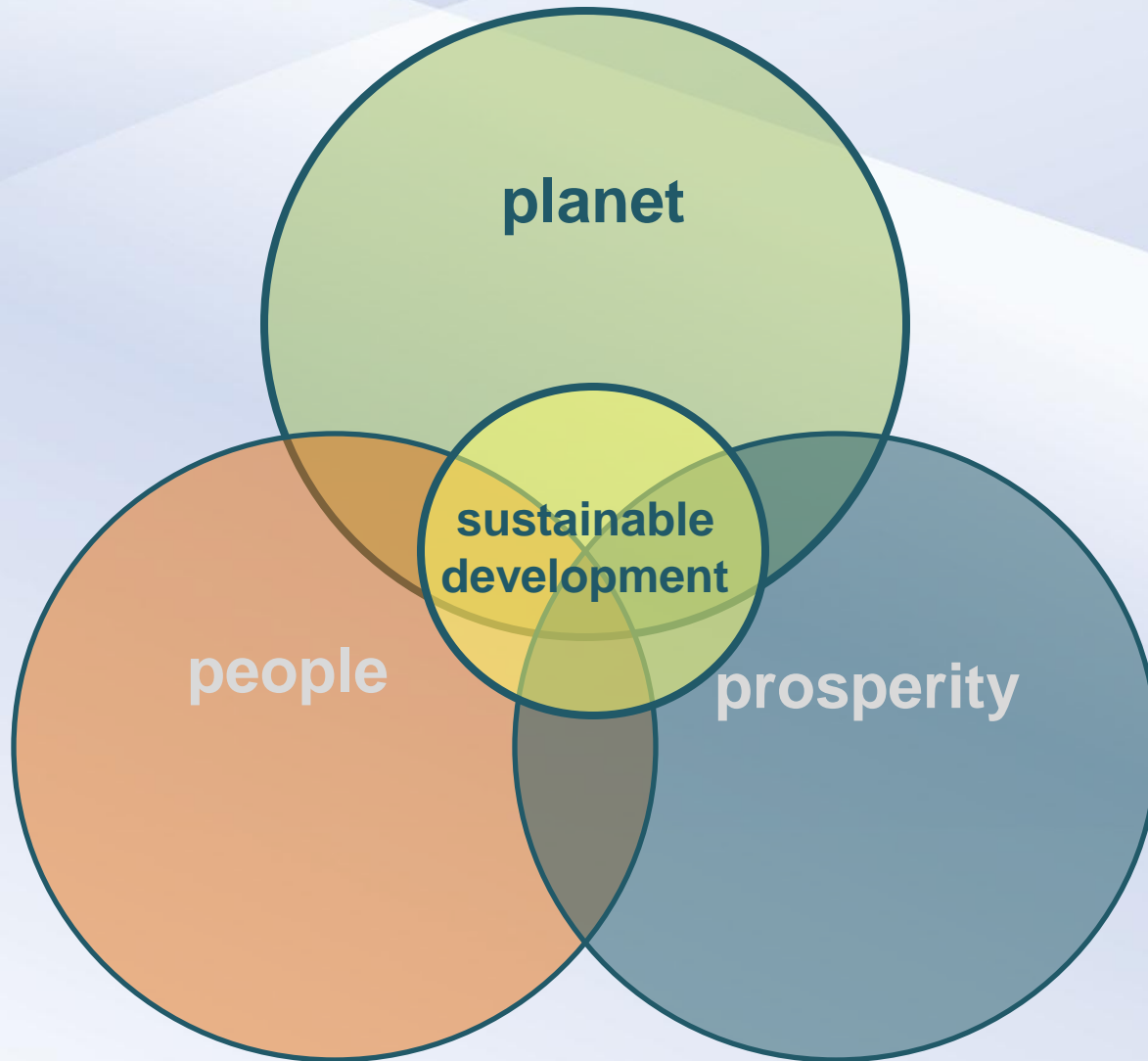
Sustainable Development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs.

World Commission on Environment and Development (The Bruntland Report)

Adopted by more than 178 countries at Rio in 1992



The Triple Bottom Line

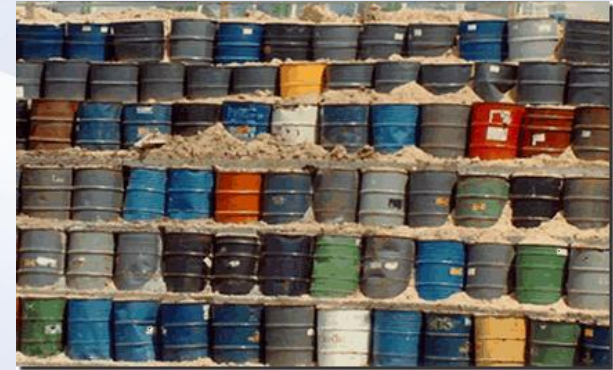




Sustainability: A Systems Perspective

The Basic Science

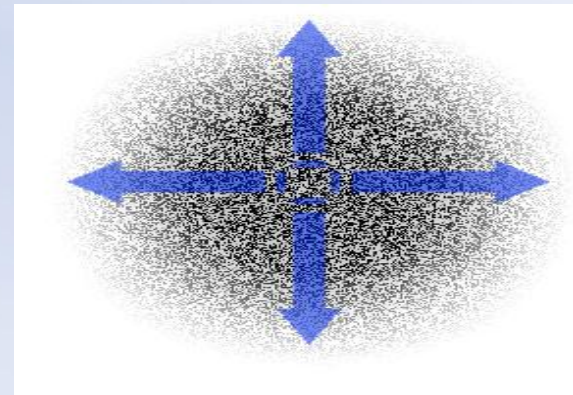
1. Nothing Disappears
2. Everything Spreads
3. Photosynthesis pays the bills



1. Conservation Principle : The First Law of Thermodynamics



3. Free Energy: A Law of Nature



2. Entropy: The Second Law of Thermodynamics



The Natural Step: Four Principles of Sustainability

In a sustainable society, nature is not subject to systematically increasing...



... concentrations of substances extracted from the Earth's crust,



... concentrations of substances produced by society,



... degradation by physical means,

and, in that society...



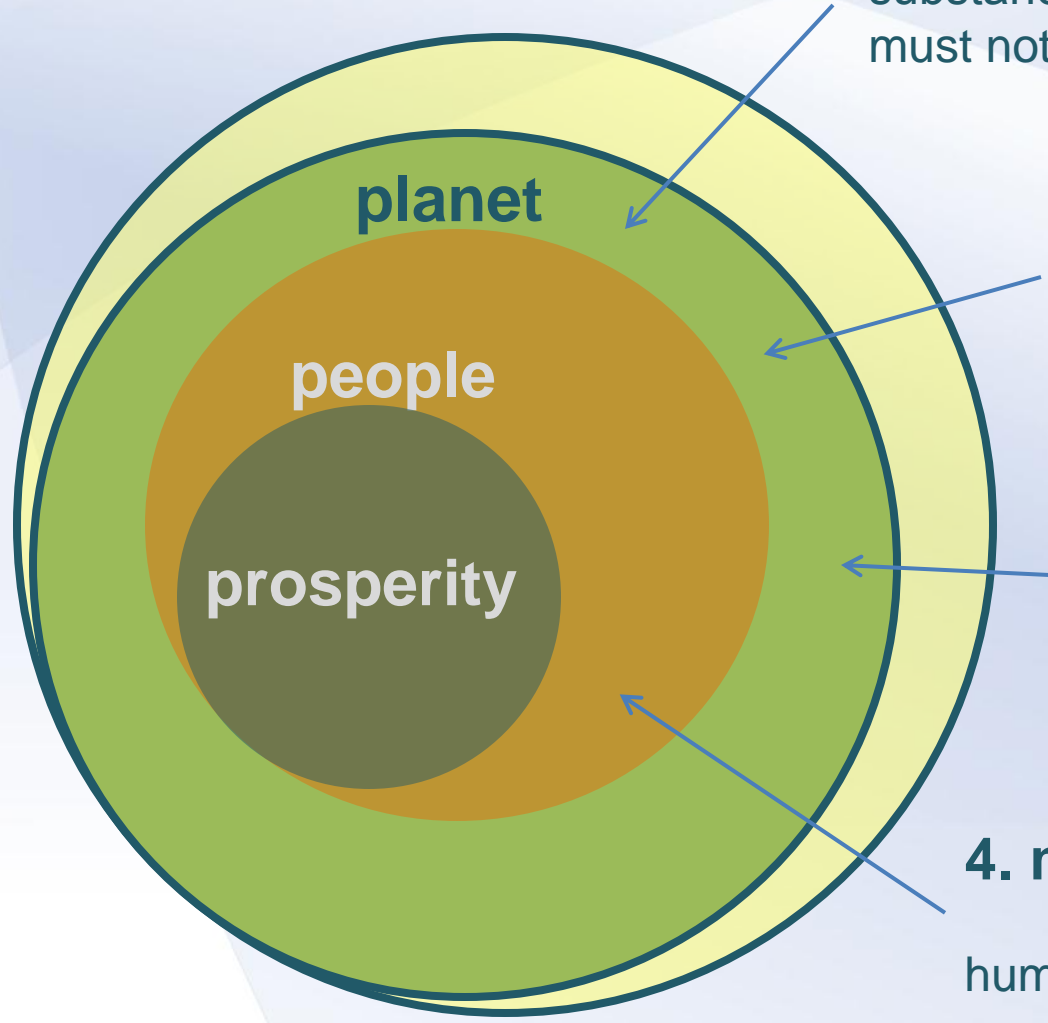
... people are not subject to conditions that systematically undermine their capacity to meet their needs.

www.naturalstep.org

Leigh|Fisher
Management Consultants



The Natural Step



1. mineral resources

substances from the Earth's crust must not increase in nature.

2. synthetic materials

man-made materials must not accumulate in nature.

3. biological productivity

plant and animals harvested sustainably. biodiversity not reduced.

4. meeting human needs

human needs are met fairly for all.

Sustainable Transportation



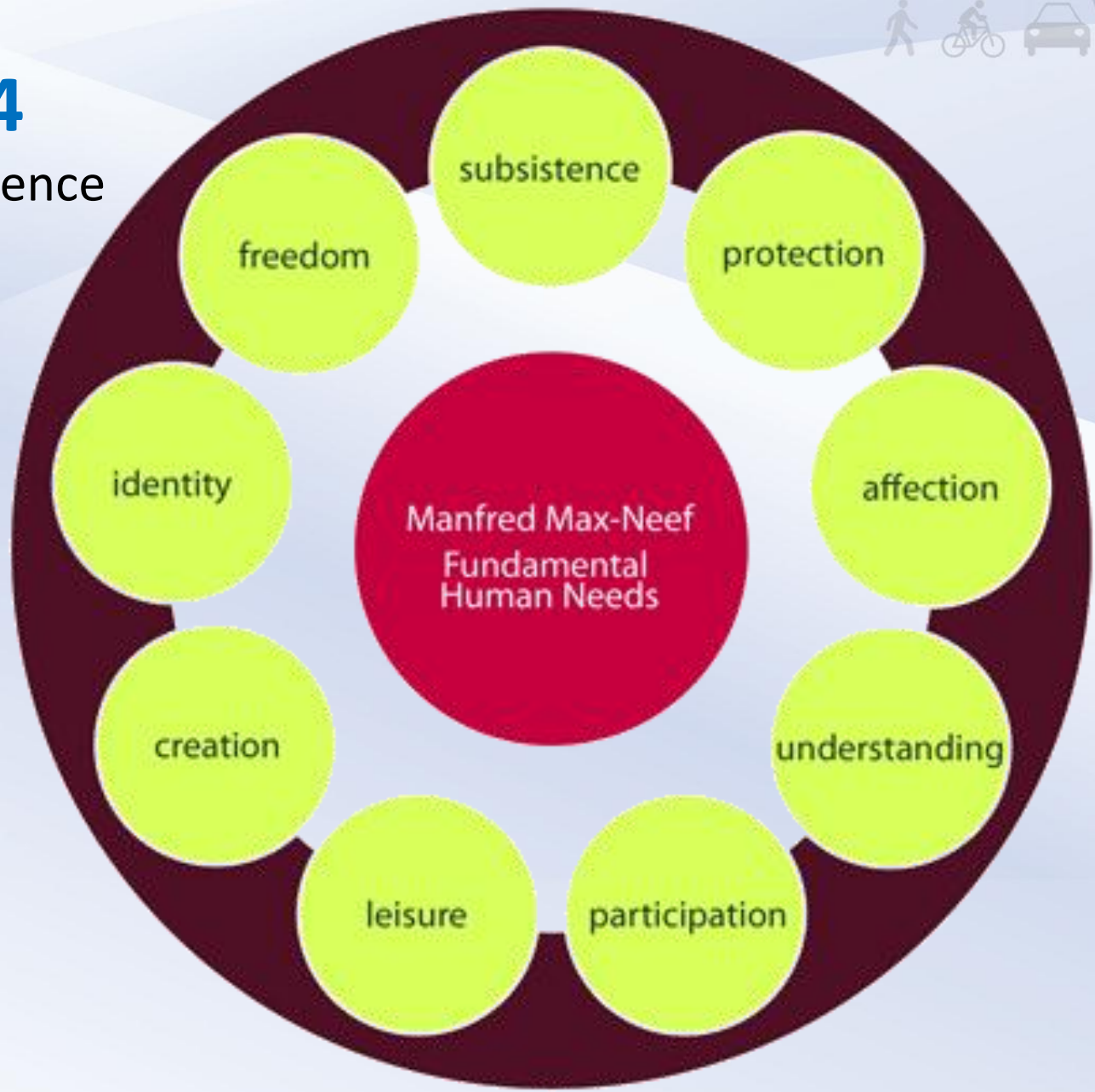
Meeting the Natural Step System Conditions

Does this decision move us systematically towards...	Yes	No
<ul style="list-style-type: none">eliminating dependence on materials from the earth's crust?	✓	
<ul style="list-style-type: none">eliminating dependence on compounds produced by society that <input checked="" type="checkbox"/> accumulate in nature?		✓
<ul style="list-style-type: none">increasing the physical basis for productivity and biodiversity in nature?	✓	
<ul style="list-style-type: none">increasing the efficiency and fairness with which resources are used?	✓	



Principle 4

The Basic Science





Sustainable Transportation

Are we heading in the right direction?



Transportation Impacts

- Directly accounts for 28% of total U.S. GHG emissions, 2006 (2nd to electricity generation)
- 97% of transportation emissions are from direct combustion of fossil fuels
- Transportation is the largest end-use sector emitting CO₂. Largest source is passenger cars (34%)



Transportation Impacts

- Investments can often be costly and may not provide equitable benefit to communities
- Tend to limit choices and may discourage active transportation options
- Lowest income families pay more for transportation as a percentage of total income than other income groupings
- American's spend more on transportation than food (17.9 cents on the dollar vs. 19.0 cents on shelter)
- Americans spend more to get around

STPP report, Driven to Spend - <http://www.transact.org/report.asp?id=236>



Large group discussion #1

How does our current transportation system violate sustainability principles?



Backcasting: Vision



Small group exercise #2

What does a fully sustainable transportation system look like?

- *How would people travel? For what kinds of trips?*
- *What would neighborhoods look like?*
- *What kind of infrastructure and services would we need?*



Sustainable Transportation: One Definition

A sustainable transportation system is one that:

- Allows the basic **access** needs of individuals and societies to be met safely and in a manner consistent with **human and ecosystem** health, and with **equity** within and between generations
- Is **affordable**, operates efficiently, offers **choice** of transport mode, and supports a **vibrant economy**
- **Limits emissions** and waste within the planet's ability to absorb them, minimizes consumption of non-renewable resources, limits consumption of renewable resources to the sustainable yield level, reuses and recycles its components, and **minimizes the use of land** and the production of noise

Sustainable Transportation



Meeting the Natural Step System Conditions

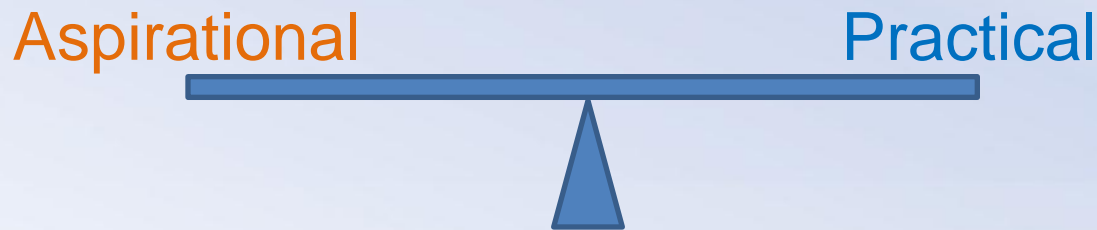
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<ul style="list-style-type: none">increasing the efficiency and fairness with which resources are used?	✓	

Establishing a Clear and Compelling Vision



Concept:

- Start by describing what you would really like to achieve
- Accept that there will be a gap between aspiration and practicality, which will shift over time



- Start from the general, move to the specific



Definitions: Sustainability ≠ Green

Incremental improvement

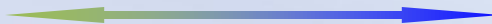


60 miles per gallon

Recycled asphalt

Bio-diesel buses

Shorter trips



Zero emissions

No new road needed

Fully accessible network

Compact, complete communities

Transformative vision



What is STARS?



What is STARS?

Sustainable Transportation Analysis & Rating System



What is STARS?

- Like LEED and the Living Building Challenge
- Framework for:
 - Projects
 - Plans
 - Programs
- Voluntary, national system

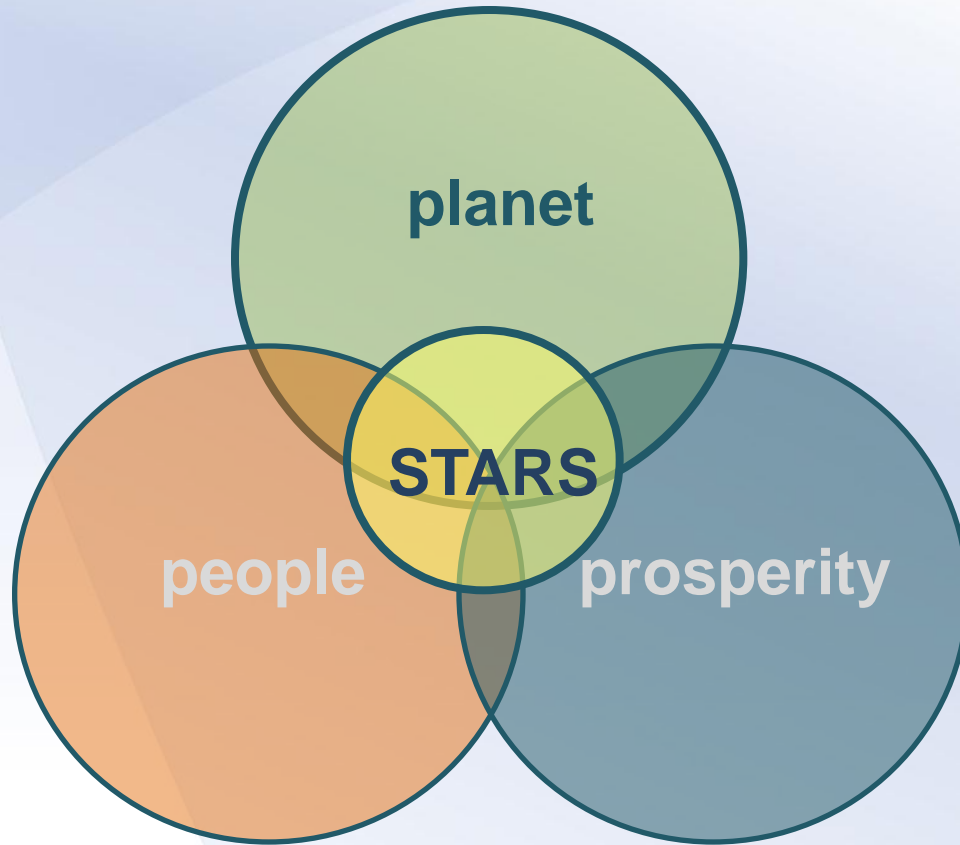


What is STARS?

- Outcome-based objectives and measures
- Analyze performance in short, medium and long-term (life cycle analysis)
- Multimodal:
 - Compares performance across modes
 - Allows focused comparison of alternatives



STARS Based on Triple Bottom Line



- What impact does this have on *people*?
- What impact does this have on the *planet*?
- What impact does this have on *prosperity*?



Who is Developing STARS?

- North American Sustainable Transportation Council
- Portland Bureau of Transportation
- Santa Cruz County Regional Transportation Commission
- Transportation professionals operating at local, state, and federal levels of government
- National private sector transportation & green building firms
- Academic peer reviewers



Typical STARS Process

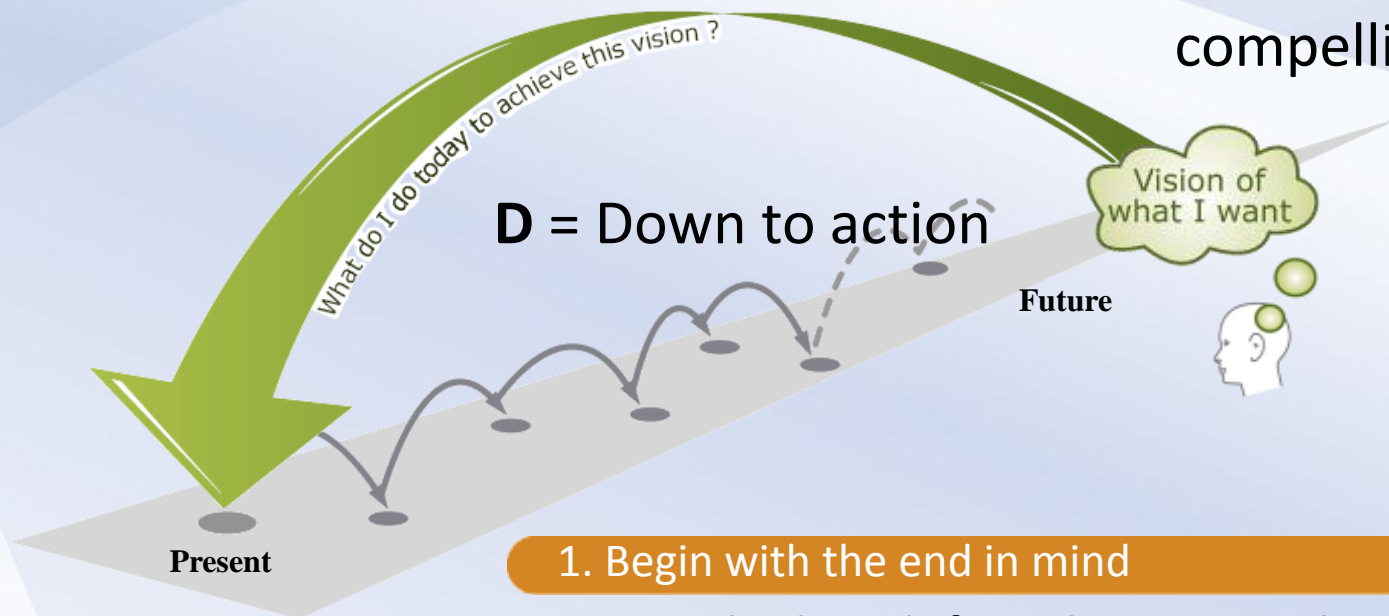
1. Establish goals, objectives, and measures – backcast targets
2. Develop and evaluate alternatives
3. Rating and certification (?)



Backcasting

A = Alignment & Awareness

C = Clear & compelling vision



B = Baseline

1. Begin with the end in mind
2. Move backwards from the vision to the present
3. Move step by step towards the vision

	Alternative 1	Alternative 2
Reduce VMT (per capita)	-10%	-17%
Travel Time Consistency	+7%	+9%
Improve Safety	+14%	+22%
Greenhouse Gas Emissions (p.c.)	-15%	-24%
Economic Benefit	+\$6m/year	+ \$10m/year



Why Use STARS?

- Save time and money via simplified process and focused goals and objectives
- Increase healthy transportation: walking, cycling, transit by employees & residents
- Help meet economic, climate, livability and equity goals
- Broaden public support



Why is STARS Unique?

- Uses backcasting to establish future conditions
- Uses explicit sustainability frameworks
- Is outcome based
- Includes private vehicle costs, not just public costs
- Shows the economic value of reducing fuel consumption



The STARS Toolbox

- STARS-Plan
 - Transportation System Plans
 - Regional Transportation Plans
- STARS-Project
 - Corridor-level projects
- STARS Safety, Health, & Equity Tool
 - Integrates into STARS-Project
 - Stand-alone tool



STARS Project

Corridor-level projects



What is STARS-Project?

- Corridor-level project planning and/or evaluation tool
- Required “goal-setting” credits
- Credits: you decide which you want to pursue
- Points accrued to earn certification level: more points = higher level
- Rewards evaluation, implementation, and performance separately



STARS-Project Credits

- Six credit categories
 - Integrated Process
 - Access
 - Climate & Energy
 - Ecological Function
 - Cost Effectiveness Analysis
 - Innovation



Multi-Discipline Project Team (IP2)

Baseline Data

STARS Project Boundary

Corridor Stakeholder Committee

Sustainability Workshop

Project Goals:

Access

Climate & Energy

Budget

Ecological Function

Public Engagement (IP3)

Integrated Process (IP1)

Innovation Credits

Objectives

A 1

CE 1

EF 1

Evaluate

A 2-6

CE 2-8

CEA 1

EF 2-4

Implement

A 7-8

CE 9-10

CEA 2

EF 2-4



STARS-Project Example: Access Credit

STARS Access Goals

1. Improve modal access
2. Increase non-drive alone mode shift
3. Reduce vehicle miles traveled
4. Improve travel time consistency
5. Improve travel quality
6. Ensure the majority of new capacity is managed through non-drive alone trips

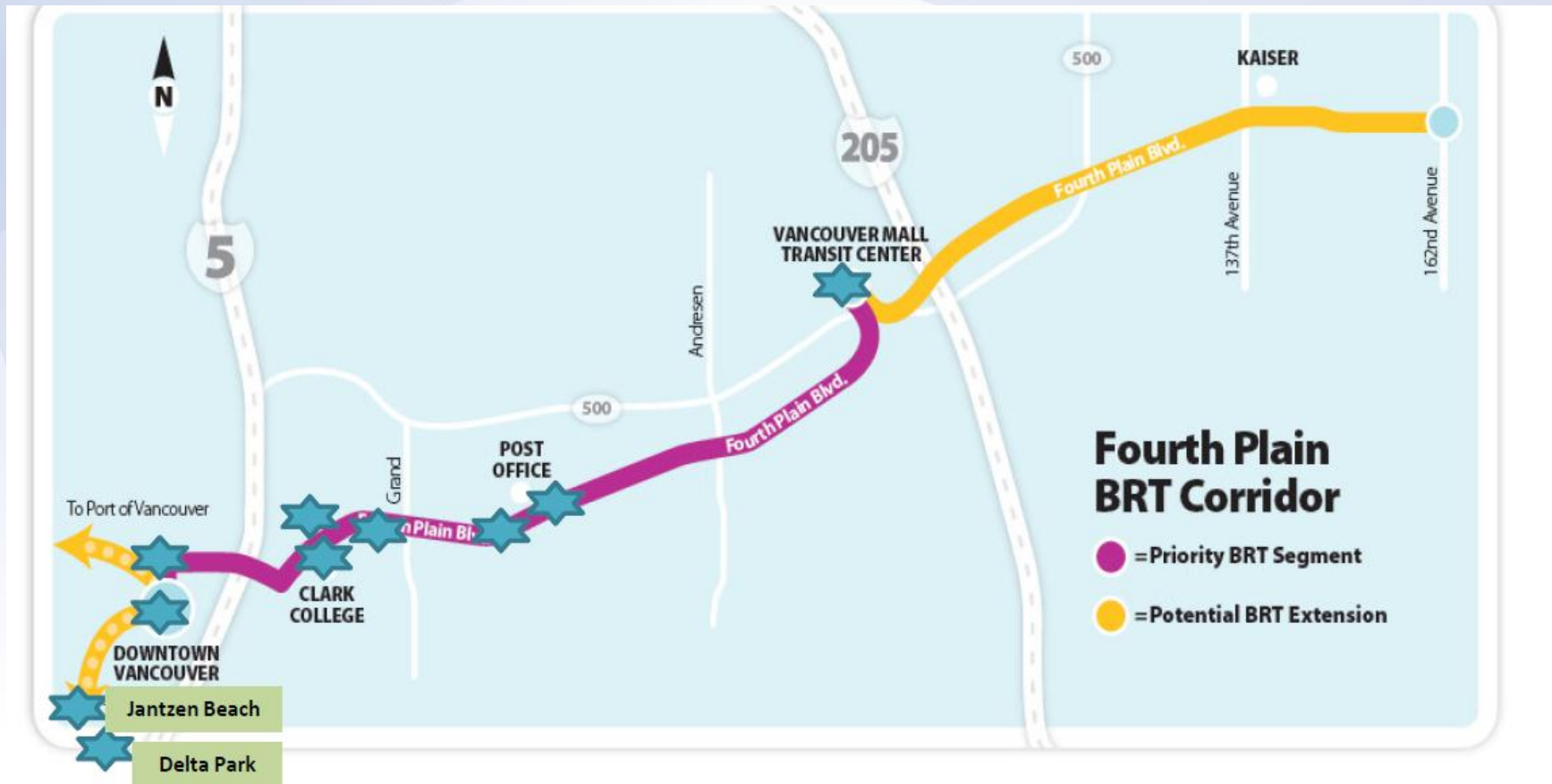


Fourth Plain Boulevard

Transit Improvement Project



Fourth Plain Corridor



Top 10 locations by usage; Jantzen Beach and downtown stops are grouped together for this analysis.



Transit Project Purpose & Need

Capacity issues:

- >6,000 rides/day, 30% of total C-TRAN system
- Overcrowding during much of day
- Wheelchair/disabled areas frequently filled

Poor service reliability:

- 30-40% weekday runs are late

Continuing increases in delays and travel time:

- Travel times up 50% over past 20 years
- Expected to increase as travel demand grows

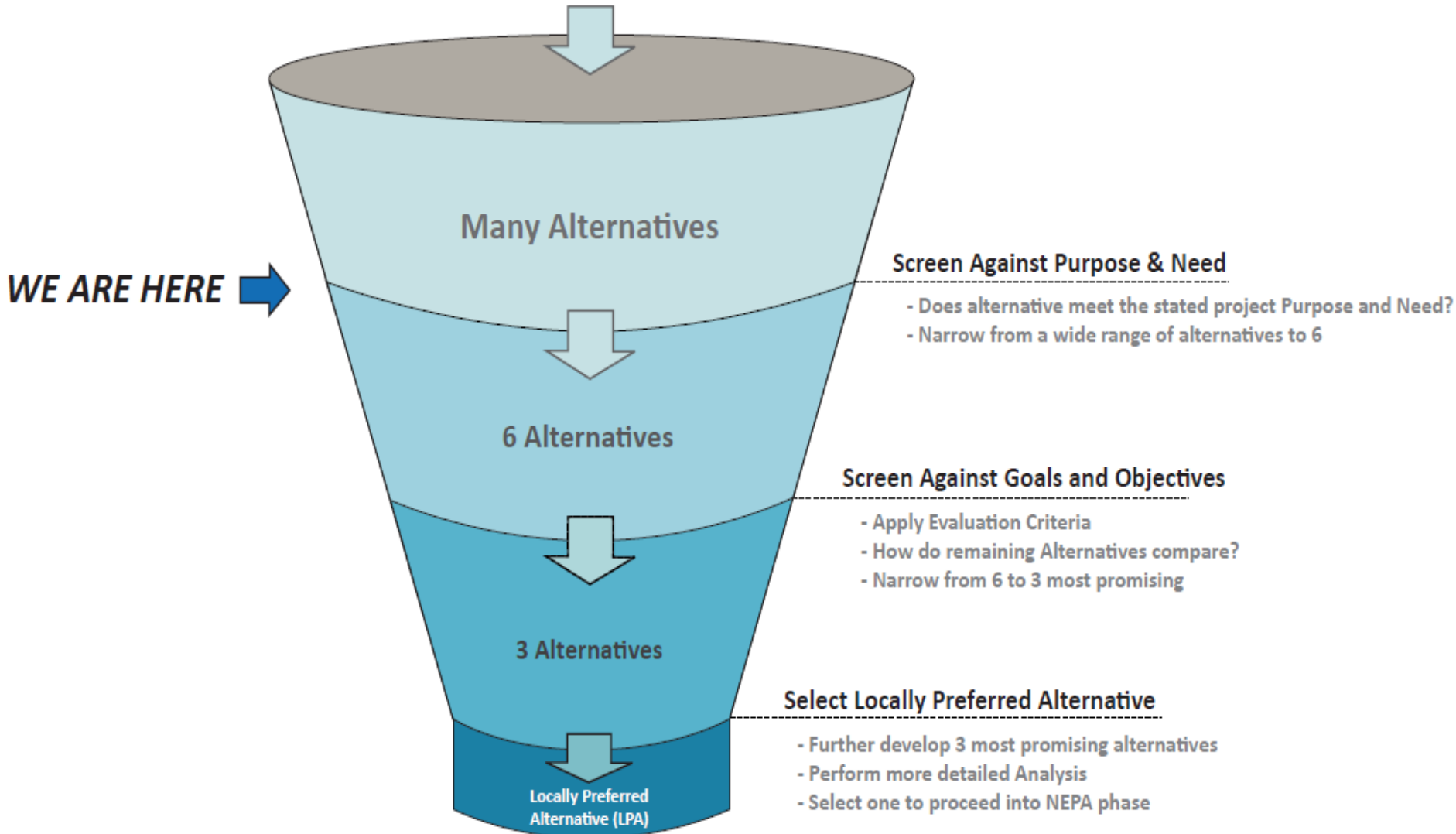


Fourth Plain STARS Workplan

Applies to:

- Goals & Objectives
- Evaluation Criteria
- Alternatives Development & Analysis
- LPA Selection

Develop Range of Alternatives





STARS Safety, Health, and Equity Tool

STARS Safety, Health, and Equity Tool

- Partnership with Multnomah County Health Department, Upstream Public Health, and STC
- Integrates issues of safety, health, and equity into STARS
- Can be used as a stand-alone tool



STARS Safety, Health, & Equity Tool

Integrating Safety, Health, and Equity into Transportation Projects

DRAFT November 29, 2011

North American Sustainable Transportation Council
Upstream Public Health
Portland Bureau of Transportation
Multnomah County Health Department



STARS Plan

Regional and local transportation plans

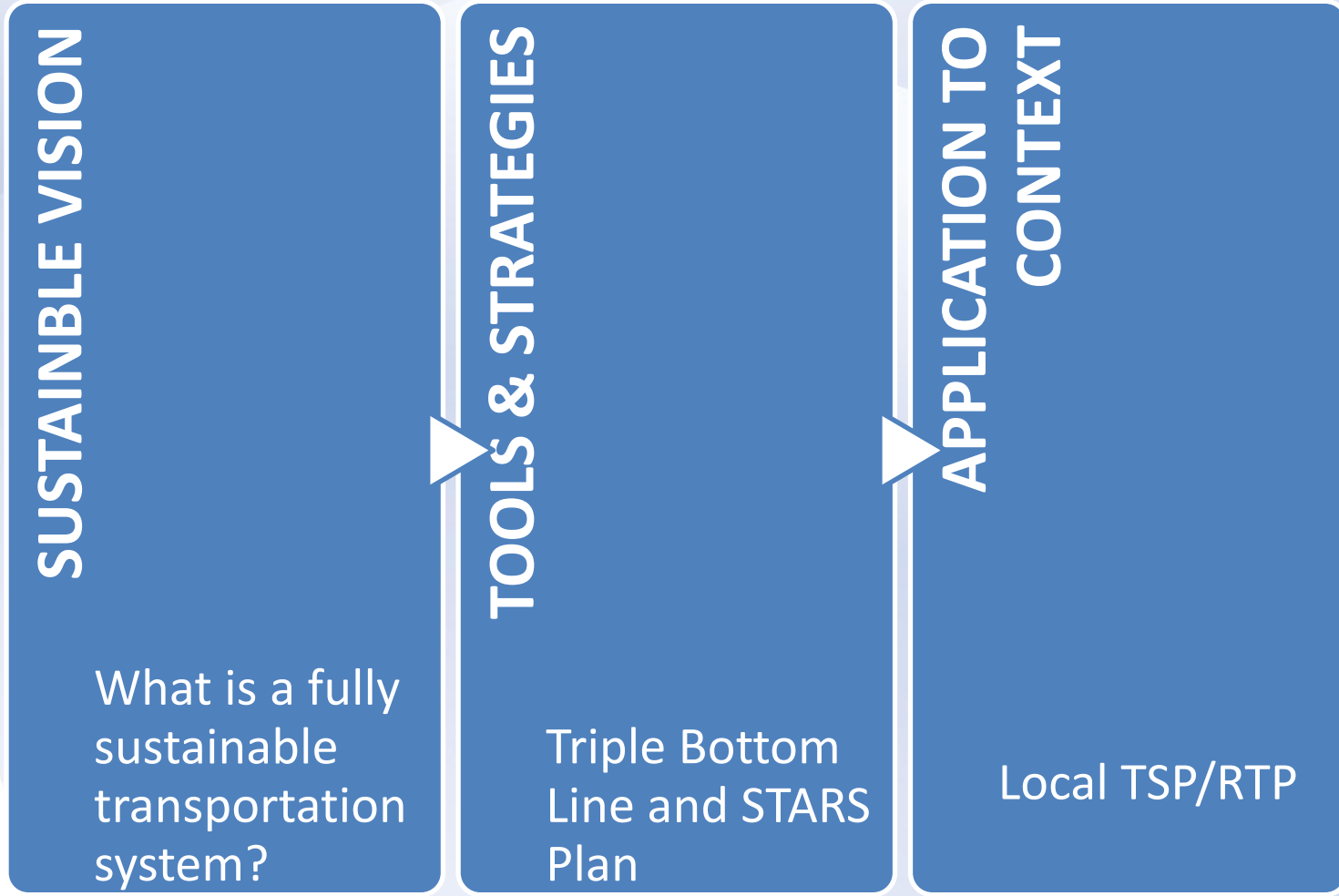


What is STARS-Plan?

- A decision-making tool and sustainability framework for transportation plans
 - Develop goals and objectives
 - Evaluate potential policies and projects
 - Intentionally multi-dimensional in its approach
 - Phase 1 complete in December 2011



How does STARS relate to TSPs/RTPs?





STARS Plan Credit Categories

1. Access & Mobility
2. Safety & Health
3. Economic Benefit
4. Equity
5. Climate & Energy
6. Cost Effectiveness
7. Ecological Function
8. Community Context



How STARS Could Be Used in Transportation Plans

- Help establish goals & measurable objectives
- Develop policy, project and program alternatives
- Evaluate performance of alternatives
- Rate the Transportation Plan
- Monitor performance over time



City of Eugene, Oregon

Transportation System Plan



Eugene's Transportation System Plan...

- Is a long-range ***transportation vision*** that meets the needs of people living, working, and playing in Eugene
- Serves as ***an update to TransPlan***, addressing ***all*** modes of transportation
- Will be ***coordinated*** with other local planning efforts and ***consistent*** with regional and state long-range transportation plans



How Eugene is using STARS

- As a tool to identify goals, objectives, and policies for the Eugene TSP, using the triple bottom line approach
- As a framework for engaging key stakeholders and community leaders on the concept of sustainability and sustainable transportation in Eugene





Santa Cruz County, California

Regional Transportation Plan



Purpose of the Santa Cruz County RTP

- Engage public
- Guide planning & funding decisions
- Evaluate investments
- Comprehensive & long range planning





Santa Cruz RTP

Key:

- Public
- Committees
- Agencies & Staff
- Governing Boards/ Decision Makers



- Environmental Review
- Description of Transp. System





A closer look at STARS-Plan

Goals and Objectives



Goals and Objectives

“People”



Integrated Process

- Action 1: Acquire baseline data
- Action 2A: Provide sustainability education
- Action 2A: Engage the community
- Action 3: Backcast goals, objectives, and performance measures



Access & Mobility Goal 1:

Increase people's ability to meet most of their daily needs without having to drive

- To improve access to key destinations within a 30-minute walk, bicycle, and transit trip



Access & Mobility Goal 2: Improve the convenience and quality of walk, bicycle, transit, car/vanpool, and freight trips

- To improve **travel time reliability** and **speed consistency** between key origins and destinations for transit, car/vanpool trips, and freight trips
- To improve **travel time and/or reliability** for pedestrian and bicycle trips between key origins and destinations



Safety & Health Goal 1: Improve multimodal safety, especially for the most vulnerable users

- To decrease fatalities and injuries for all travel modes



Safety & Health Goal 2: Increase physical activity by people using the transportation system

- To increase the percentage of walk, bicycle, and transit trips



Safety & Health Goal 3: Improve air quality

- To decrease the quantities of harmful airborne pollutants



Equity Goal 1:

Reduce disparities in healthy, safe access to key destinations for transportation-disadvantaged populations

- Demonstrate that planned investments reduce disparities in access, safety, health, and economic benefit between transportation-disadvantaged and non-transportation-disadvantaged populations



Equity Goal 2:

Demonstrate that planned investments do not disproportionately impact transportation-disadvantaged populations

- Demonstrate that transportation investments do not disproportionately impact transportation-disadvantaged populations from the construction of operation of the project



Goals and Objectives

“Prosperity”



Economic Benefit Goal 1: Re-invest in the local economy

- To reduce expenses from fuel consumption and related vehicle use

24.3 Median commute miles per day for
33 most populous US metro areas

20.3 Average daily miles for
Portland area commute

2.9 B Miles saved compared
to median

Transportation costs saved
compared to median \$1.1B

\$15 per hour Estimated value of time
spent commuting

100 million hours less
traveled per year saves \$1.5B

Total savings
per year \$2.6B



Economic Benefit Goal 2: Improve economic access

- To provide access to employment centers within a 30-minute trip by multiple modes



Economic Benefit Goal 3: Improve travel time reliability and speed consistency for high-value trips

- To improve travel time reliability and speed consistency for freight between representative origins and destinations



Cost Effectiveness Goal 1: Optimize benefits and costs over the life- cycle of the project

- To optimize benefits relative to **public, private, and social** costs over the plan's time horizon



Cost Effectiveness Goal 2: Maintain and enhance the existing system

- To maintain pavement condition on roadways to 75% (streets)
- Demonstrate cost of routine maintenance to useful life vs. cost of deferred maintenance (streets)
- To maintain average asset age no more than 50% of the useful life (transit)



Draft Goals and Objectives

“Planet”



Climate and Energy Goal 1: Reduce greenhouse gas emission and fossil fuel use

- To reduce fuel consumption
- To improve speed consistency between origins and destinations, by multiple modes
- To reduce fossil fuel use for operations



Ecological Function Goal 1: Improve or avoid habitat

- To avoid or minimize impacts to local, state, or federally defined sensitive areas
- To improve habitat in and adjacent to the right-of-way
- To increase tree canopy in the rights-of-way



Ecological Function Goal 2: Improve water quality and stream flows

- To manage and treat stormwater volumes and flow on-site through LID practices



Certification Process and Prioritizing Objectives



Certifying Transportation Plans

- Certification by Sustainable Transportation Council
- Could occur after Goals and Objectives, after adoption, or during implementation
- Could raise profile of TSP/RTP projects & programs with funding agencies



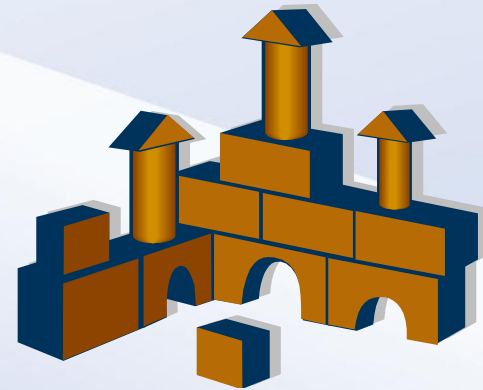
Small group exercise

What types of projects and policies could help advance the triple bottom line in the transportation system?



Triple Bottom Line Exercise

- Step 1: Review objectives
- Step 2: Become familiar with game board
- Step 3: Identify which aspect(s) of the triple bottom line (people, prosperity, planet) benefit from each objective.
- Step 4: Expand on existing objectives, if needed
- Step 5: Place objective block within that circle on the game board



- Step 6: Identify policies that could achieve all three areas of the triple bottom line
- Step 7: Explain how two objectives or policies on your group's game board advance all triple bottom line areas.



Outstanding Questions?



Feedback

- What worked well today?
- What would you do differently?



Thank you!

- Let us know if you have any plans or projects that might benefit from using STARS.



Principle 1:

Substances from the Earth's crust must not increase in nature.



Transportation Conflicts:

- Oil as the primary fuel source
- Petrochemical fluids to operate vehicles
- Tar and rock to build roadway surfaces
- Use of heavy metals (aluminum and steel) in infrastructure and mobility
- Coal to electrify roadway systems



Principle 2:

Man-made materials must not accumulate in nature.



Transportation Conflicts:

- Synthetic motor fluids
- Synthetics in roadway surfaces
- Roadway striping
- Automobile components
- De-icing chemicals



Principle 2:

Man-made materials must not accumulate in nature.



Transportation Conflicts:

- Synthetic motor fluids
- Synthetics in roadway surfaces
- Roadway striping
- Automobile components
- De-icing chemicals



Principle 3:

Plant and animals harvested sustainably; biodiversity not reduced.



Transportation Conflicts:

- Degradation of forests and grasslands
- Pollution into waterways
- Roadway habitat fragmentation
- Automobile collisions
- Enables new development (sprawl)



Principle 2:

Man-made materials must not accumulate in nature.



Transportation Conflicts:

- Synthetic motor fluids
- Synthetics in roadway surfaces
- Roadway striping
- Automobile components
- De-icing chemicals



Principle 4:

Human needs are met fairly for all.



Transportation Conflicts:

- Transportation high as a percentage of income
- Unequal access to transportation services
- Limited choice
- Health and safety issues
- Sprawl limits choice and opportunity