THE TREE PROJECT:
Integrated Urban Environmental Improvement Through Tree Selection and Management

Stakeholder Advisory Workshop
November 6, 2008

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PREVIEW

- Workshop purpose
- Introductions
- Evaluation
  - Project goal
  - Stakeholder communication
  - Project outcomes
- Phase 3
  - TreeScapes
  - Trees for Stormwater Management
  - Colorado Urban Forestry Climate Coalition

INSTITUTE FOR ENVIRONMENTAL SOLUTIONS

Mission

Engage stakeholders to deliver proactive, technically sound solutions to complex environmental and natural resource problems that avoid unwanted side effects.

Approach

SCIENTIFIC SOLUTIONS FOR A BETTER ENVIRONMENT

WORKSHOP PURPOSE

- Evaluate The Tree Project through Phase 2 *(45 min.)*
- Discuss and plan Phase 3 *(45 min.)*

PROJECT OBJECTIVES

PHASE 1

- Engage key stakeholders
- Prepare project plan

PHASE 2

- Identify how urban trees can be used to optimize:
  - Air quality
  - Water conservation
  - Energy conservation
  - Carbon sequestration

PROJECT TIMELINE

2004-05	Background research
2006	SHWS 1 Project plan
2007	SHWS 2, 3, 4 Field research Data analysis
2008	Final Report Model Municipal Guidelines Strategic Plan Phase 3 initiatives

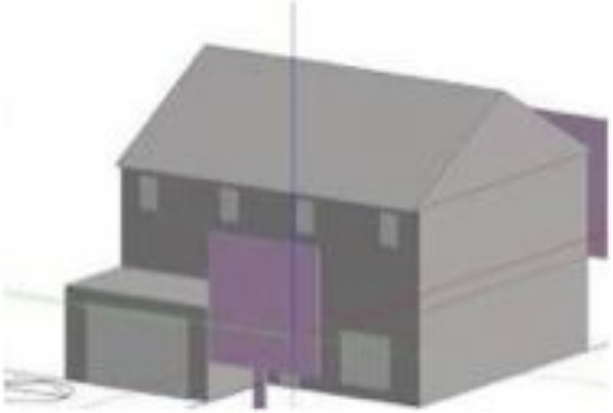
URBAN FORESTRY ANALYSIS

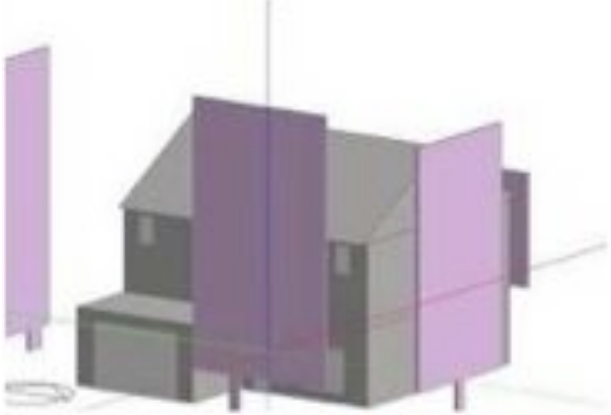
- Evaluated economic value of environmental services
- 119 sample plots
- Determined:
  - Carbon sequestration
  - Air quality impacts
  - Energy impacts

TREES AND WATER CONSERVATION

- Investigated trees' water conservation potential on irrigated lawns
- 14-day field program
- 1,344 soil samples

TREES AND ENERGY CONSERVATION





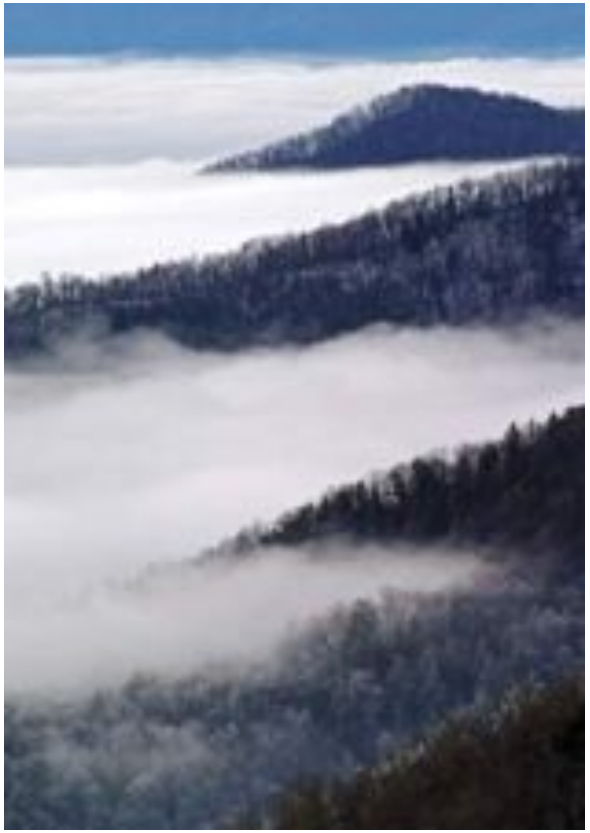
- Modeled real homes, comparing energy use under three landscape scenarios:
  - Existing trees
  - No trees
  - Additional trees

PUBLIC ATTITUDES AND KNOWLEDGE

- Revealed barriers to tree planting
- Survey data collection
- In person, at large public events

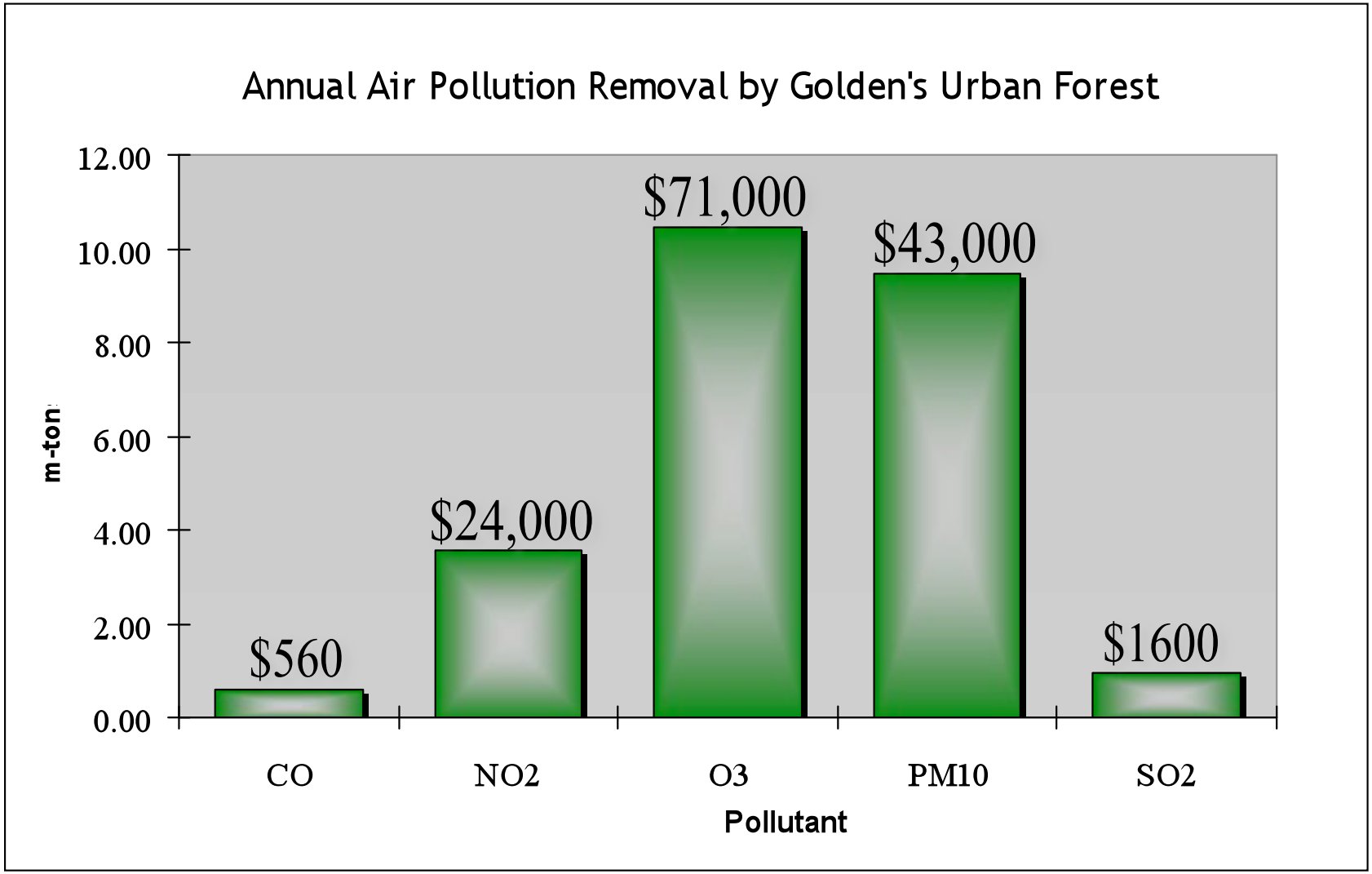
AIR QUALITY TRADEOFFS

- Temperature moderation
- Air pollution removal
- Summer power plant emissions reduction



- Winter heating emissions increase
- Maintenance emissions
- Biogenic volatile organic compounds (BVOC) emissions

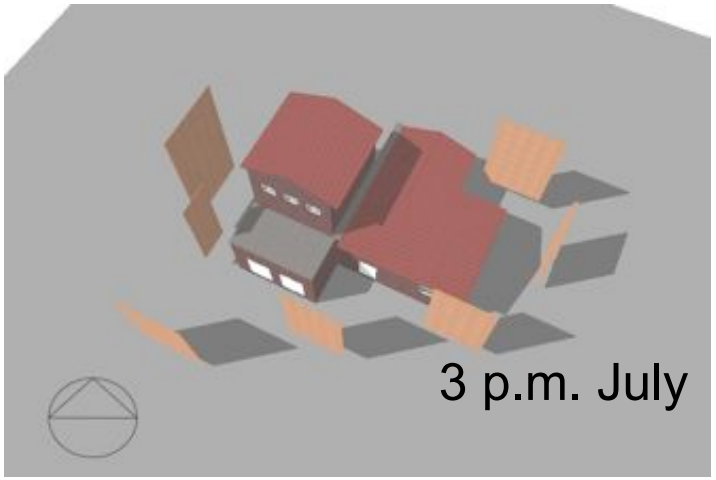
THE TREE PROJECT – AIR RESULTS



SCIENTIFIC SOLUTIONS FOR A BETTER ENVIRONMENT

ENERGY TRADEOFFS

- Ambient air temperature moderation
- Summer shading
- Winter wind block
- Winter shading

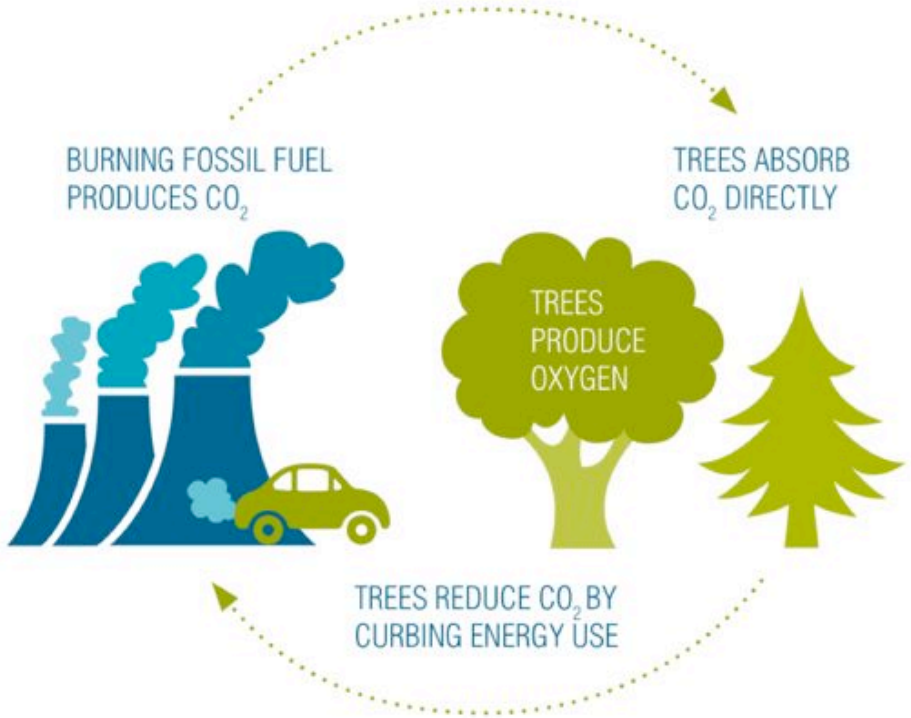


ANNUAL HOUSEHOLD ENERGY EFFECTS

Existing trees (versus no trees)		
Money saved	Net energy impact	C emissions avoided
$23	-276 kBtu	196 lb.
Improved trees (versus existing trees)		
Money saved	Net energy impact	C emissions avoided
$25	-742 kBtu	709 lb.

CARBON EFFECTS AND TRADEOFFS

- Sequestration vs. emissions
- Energy offsets vs. indirect emissions
- Carbon storage



1. Annual net carbon sequestration of Golden's forest: 500 tons.
2. Carbon stored by Golden's forest: 16,400 tons.
3. Average net carbon sequestration and storage value of a tree in Golden: $1,250.

WATER CONSERVATION EFFECTS AND TRADEOFFS

- Indirect water conservation
- Tree water use

- Soil beneath trees drier than similar treeless spaces
- Impact varies by species

STORMWATER MANAGEMENT EFFECTS

- Trees increase infiltration, filtration
- Trap water and slow runoff
- Increase soil porosity

- Average amount of runoff intercepted by a medium-sized tree in a year: **2,300 gallons**
- The value of the runoff volume and pollution reduction function of Golden's street trees: **more than $50,000 per year**

PHASE 1

- Engage key stakeholders
- Prepare project plan

PHASE 2

- Identify how urban trees can be used to optimize:
  - Air quality
  - Water conservation
  - Energy conservation
  - Carbon sequestration

Were project objectives met?

STAKEHOLDER COMMUNICATION

- SHWS 1: Scoping
- SHWS 2: Planning
- SHWS 3: Review
- SHWS 4: Results
- SHWS 5: Evaluation

- Website
- Project updates
- Presentations
- Articles
- E-mail

SCIENTIFIC SOLUTIONS FOR A BETTER ENVIRONMENT

Which aspects of our stakeholder communication were most beneficial for you?

What can we do to improve communication in the future?

What aspect of your participation was most meaningful?

Was there adequate opportunity for participation?

How can we make stakeholder participation more effective?

PROJECT OUTCOMES

- Detailed analyses: Golden's environmental ROI from urban forestry
- First study to look at all tree tradeoffs together
- First steps in characterizing trees' impact on water conservation
- Strategic Plan for tree planting in Golden
- Model Municipal Environmental Tree Guidelines

What are the most important aspects of the Tree Project results to disseminate and to whom?

PHASE 3

PHASE 3 PROJECT BULLPEN

- TreeScapes
- Trees for Stormwater Management
- Colorado Urban Forestry Climate Coalition
- Optimal Irrigation for Urban Trees
- Strategic Forestry for Ozone Mitigation
- Teach Trees

TREESCAPES

- Purpose
- Development
- Status

TREESCAPES PROFESSIONAL

- Resource for professionals
- Evaluate tradeoffs involved in landscaping with trees
- Interface with popular landscape design software

TREESCAPES PROFESSIONAL: NEXT STEPS

- Secure funding
- Establish new partnerships
- Form stakeholder advisory committee
- Determine scope for landscape architect online tool or data layer
- Plan and execute technical work

	Task				
	Research	Programming	Beta testing	Promotion	TOTAL
Labor	$32,000	$29,500	$3,000	$4,000	$68,500
Other	$0	$3,400	$2,500	$3,500	$9,400
					$77,900

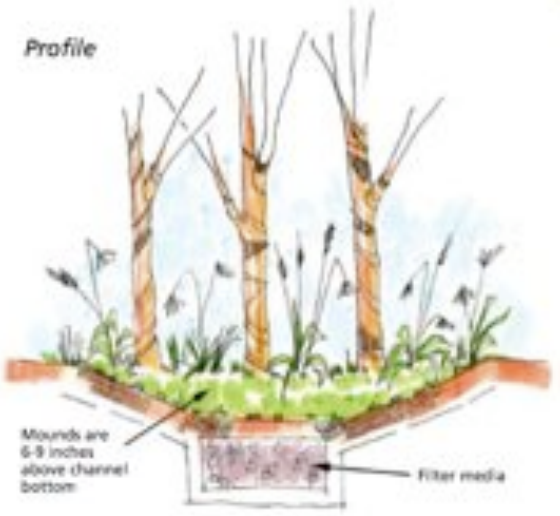
TREES FOR STORMWATER MANAGEMENT: PURPOSE

Goal: Take advantage of trees' ability to increase filtration and infiltration of runoff while optimizing trees' other environmental benefits.

PROJECT OBJECTIVES

1. Offer practical guidance to stormwater managers on applying trees to parking lot stormwater management

2. Evaluate the application of trees to parking lot stormwater management in terms of runoff volume and pollution reduction as well as cost-effectiveness



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STORMWATER: STATUS

TIMELINE

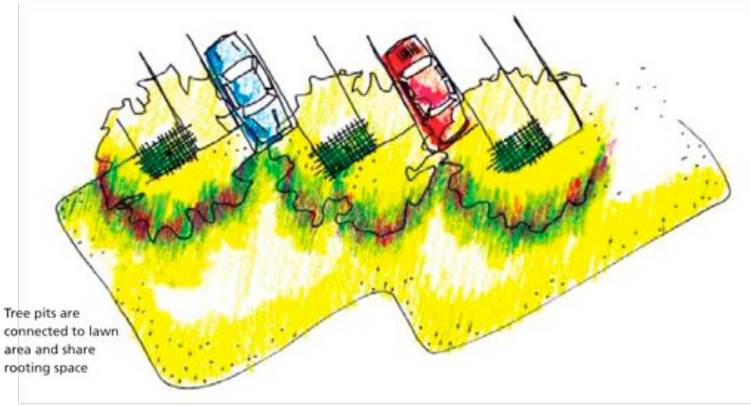
Research, stakeholder outreach, and experimental design
Fall / Winter 2008

Experimentation to test local adaptation of tree strategies
Spring / Summer 2009

Dissemination through presentations, documents, and the web
Fall / Winter 2009

NEXT STEPS

- New partnerships / funding
- Experimental design
- UDFCD "Volume III" update
- AWARE CO barrier analysis



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COLORADO URBAN FORESTRY CLIMATE COALITION: PURPOSE

Goal: Harness the greenhouse gas offset potential of urban forests for small and medium-sized towns while optimizing trees' environmental benefits.

CUFCC PROJECT OBJECTIVES

1. Assemble stakeholders for project planning and oversight
2. Characterize the critical environmental impacts of urban forestry
3. Aggregate urban forestry projects and sell them as offsets
4. Evaluate and share successes and setbacks with a national audience

CUFCC: STAKEHOLDERS

Businesses

- Offset greenhouse gas emissions with verified carbon credits
- Support local environmental improvement

Local government

- Generate revenue for local environmental improvement
- Increase awareness of ROI from urban forestry
- Become a recognized leader in local climate action

Foresters

- Increase awareness of environmental benefits of urban forest
- Improve sustainability of your forestry program

Other community members

- Promote long-term success of Colorado urban forestry
- Achieve multiple environmental benefits

CUFCC: STATUS

TIMELINE

Preliminary plan	Fall / Winter 2008-09
Stakeholder identification and outreach	Fall / Winter 2008-09
Scoping workshop / Final plan	Spring 2009
Impact investigation	Summer / Fall 2009
Baseline data / application	Spring / Summer 2010
Evaluation and reporting	Winter 2010-11

NEXT STEPS

- New partnerships / funding
- State carbon credit conference – 12/4
- Identify / recruit Steering Committee
- Interface with state efforts
- Develop broader outreach plan

CCX Chicago Climate Exchange

climate action reserve

IES partners in collaboration*

- Denver Metro Wastewater
- City of Golden
- Denver Water
- RAQC
- CDPHE
- U.S. Forest Service
- CSU
- Colorado Tree Coalition
- Grounds for Learning
- University of Denver
- CREEC – Consortium for Research and Education on Emerging Contaminants
- Xcel Energy
- Xcel Energy Foundation
- NCAR
- AWARE Colorado
- Colorado State Forest Service
- Colorado Alliance for Environmental Education
- FrontRange Earth Force
- Laura Jane Musser Fund
- NREL
- Colorado Watershed Assembly
- Roche Colorado Corp.
- National Carbon Offset Coalition, Inc.
- City of Boulder
- City of Westminster
- City of Aurora
- City of Thornton
- City of Broomfield
- City and County of Denver
- Boulder County Public Health
- South Suburban Parks and Rec.
- Center for Urban Forest Research
- American Society of Landscape Architects
- Tri-State Generation and Transmission Association
- Green Industries of Colorado
- Plant-it 2020
- U.S. EPA

*This is not a complete list.

PHASE 3 PROJECT BULLPEN

- TreeScapes
- Trees for Stormwater Management
- Colorado Urban Forestry Climate Coalition
- Optimal Irrigation for Urban Trees
- Strategic Forestry for Ozone Mitigation
- Teach Trees

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ENERGY • WATER • AIR

INSTITUTE FOR
ENVIRONMENTAL SOLUTIONS

EMERGING
CONTAMINANTS