Urban Tree Planting: Benefits Outweigh Costs to Phoenix

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There are benefits to urban tree planting!

- Studies have found that new tree plantings can **increase** surrounding **property values** by 2-10%.

- Various functions of trees, such as their evaporative cooling effect, help to **reduce** the **urban heat island** (UHI) and heat stress-related fatalities.

- Trees provide significant storm water retention benefits by **absorbing rainfall** and by increasing the ability of soil to store water.

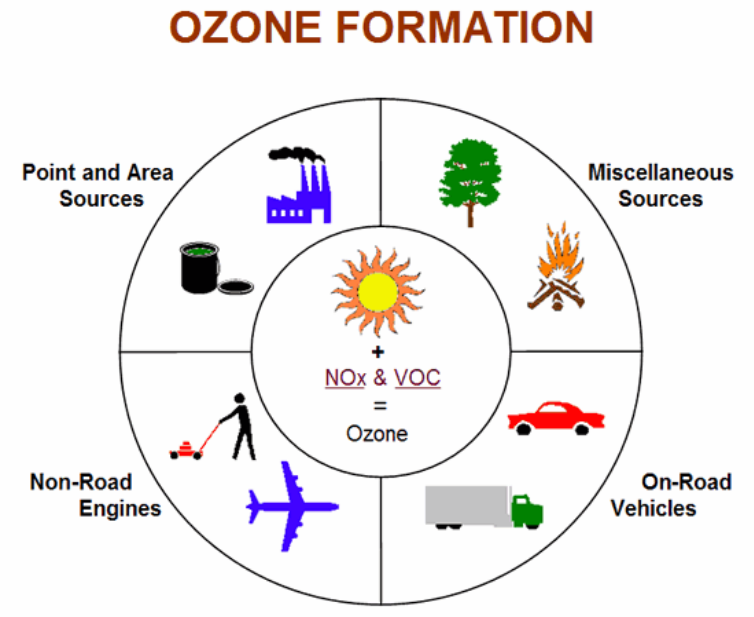
- Trees help to **cool down buildings** and reduce the need for air conditioning, which then decreases energy consumption.

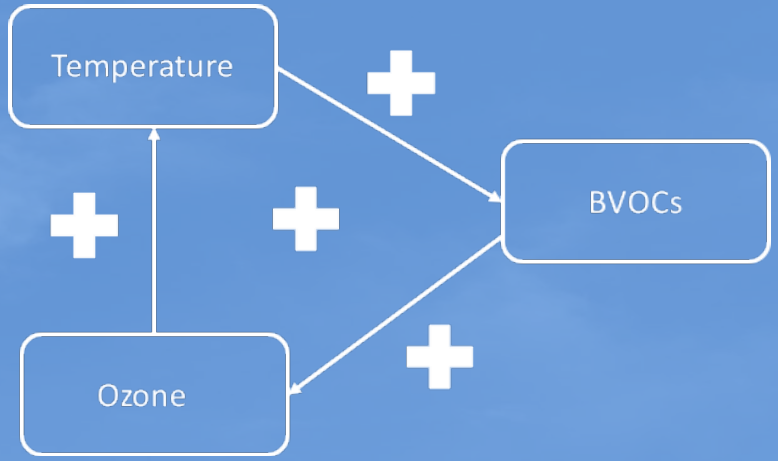
- Researchers have recently confirmed that green spaces actually **lessen brain fatigue.**

- Trees **improve city air quality** by intercepting particulate matter (PM10) and absorbing gaseous pollutants (NO_2, SO_2, and O_3).

But, what about those BVOC's?

- **BVOC**=biogenic volatile organic compound
  -Emitted by plants to help them better adapt and survive in the environment
- BVOCs, when combined with NOx, can form ground-level **ozone or smog**, an air pollutant hazardous to human health
- Generally in high traffic areas, where NOx concentrations are high, the rate of ozone formation is limited by BVOC concentrations
- Eucalyptus, oak, poplar, and willow = **high** BVOC emitting trees. Palo verde and mesquites = **medium** emitters. Pine, ash, cypress, desert willow, and jacaranda = **low** emitters.


OZONE FORMATION
Point and Area Sources
Miscellaneous Sources
+
NOx & VOC
=
Ozone
Non-Road Engines
On-Road Vehicles


Temperature
BVOCs
Ozone

Trees: A Smart Investment for Cities

- New York struggled with **poor air quality** due to harmful carbon emissions from vehicles and fossil fuel based power plants.

-With increasing its urban forests by 20%, New York has drastically **cut down on harmful air pollutants** and **saved $220,000**.

-Los Angeles **only** had **21% tree canopy coverage**. The National average is 27%.

-When Los Angeles started planting more trees, it saw **improvement in mental health** and increased consumer spending in tree-filled commercial areas.

-Philadelphia lost numerous trees to development and sprawl, causing serious threats to **ground level ozone.**

-Philadelphia Horticultural Society will **restore lost canopy coverage** by adding about 30% more trees.

Trees Can be Trusted!

Gathered research from: *CoP Tree and Shade Master Plan & PHX Community Forest Assessment: Desert Canopy*

Found:

- **$2.23:** Return on investment of planting trees in Phoenix
- **$40.25 million:** Annual combined functional benefits
- **$3.842 billion:** Cost to *replace* Phoenix urban forest

Each Year:

- Air pollution intercepted: **1,770 tons**
- Carbon sequestered: **35,400 tons**
  *-In addition to the **305,000** tons already stored in existing trees*
- Storm runoff avoided: **91.7 million cubic feet**
- Oxygen produced: **89,200 tons**

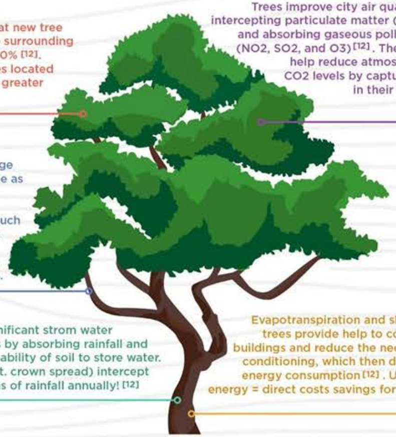
URBAN TREE PLANTING

BENEFITS OUTWEIGH COSTS TO PHOENIX

Desert cities across the globe are seeing rising temperatures due to the notorious Urban Heat Island (UHI) effect[7]. This phenomenon is largely due to urban infrastructure like roads, buildings, and sidewalks re-emitting heat at night that they absorbed throughout the day. Now, more than ever, we need to start bringing Nature's valuable, cooling powerhouse into our cities - trees are back!

Studies have found that new tree plantings can increase surrounding property values by 2-10% [12]. Apartments and homes located near a park have even greater increases in value!

Trees improve city air quality by intercepting particulate matter (PM10) and absorbing gaseous pollutants (NO_2, SO_2, and O_3)[12]. They also help reduce atmospheric CO_2 levels by capturing it in their trunks!



Studies have shown that large scale vegetated areas can be as much as 9 F cooler than non-green city centers[12]. Various functions of trees, such as their evaporative cooling effect, help to reduce the urban heat island (UHI) and heat stress-related fatalities.

Trees provide significant strom water retention benefits by absorbing rainfall and by increasing the ability of soil to store water. Large trees (-37 ft. crown spread) intercept over 2,000 gallons of rainfall annually! [12]

Evapotranspiration and shade that trees provide help to cool down buildings and reduce the need for air conditioning, which then decreases energy consumption[12]. Using less energy = direct costs savings for building owners!

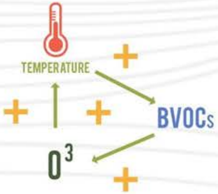
BVOC = BIOGENIC VOLATILE ORGANIC COMPOUND.

These are emitted by plants to help them better adapt and survive in the environment[4].

Why are we concerned about BVOCs?

☀ + BVOC & NOx = OZONE

BVOCs, when combined with NOx, can form ground-level ozone or smog, an air pollutant hazardous to human health[4]. Generally in high traffic areas, where NOx concentrations are high, the rate of ozone formation is limited by BVOC concentration. This is why certain trees that emit less BVOC's may be better suited for traffic-dense areas. Pine, ash, cypress, desert willow, and jacaranda are all low emitters.



Higher temperatures can result in higher BVOC production, which results in more ozone in the urban atmosphere. Because ozone prevents heat from escaping, this can increase temperatures even further[14]. By reducing our urban temperatures, we can also reduce BVOC production from trees.

Green spaces help to reduce stress and actually improve mental concentration. Researchers have recently confirmed, through an EEG brain-wave study, that green spaces can actually lessenbrain fatigue, making you feel more calm and focused[11].

New York City struggled with poor air quality due to harmful carbon emissions from vehicles and fossil fuel based power plants[8].

In 2006, the City of **Los Angeles** only had 21% tree canopy coverage[3]. The national average is 27%.

In recent decades, **Philadelphia** has lost numerous trees to development and sprawl, causing serious threats to ground level ozone.

New York has increased its urban forests by 20%, extensively cutting down on harmful air pollutants and saving them an astounding $220,000[8].

When **Los Angeles** started planting more trees, it saw improvements in mental health, lower energy costs, and increased consumer spending in tree-filled commercial areas[3].

As a counter to high pollution levels, **Philadelphia** Horticultural Society has pledged to restore lost canopy coverage by adding about 30% more trees.

TREES CAN BE TRUSTED

$2.23
Return on investment of planting trees in Phoenix[5]

$40.25 MILLION
Annual combined functional benefits of Phoenix urban forest[5]

$3.842 BILLION
Cost to *replace* Phoenix urban forest

EACH YEAR

1,700
Tons, air pollution intercepted

35,000
Tons, carbon sequestered
-In addition to the 305,000 tons already stored inexisting trees

91.7
Million cubic feet of storm runoff avoided

89,200
Tons, oxygen produced[10].

RESOURCES

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