

**Charting** a course to


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**Clarity**

**Charting** a course to \_\_\_\_\_



**Atmospheric Deposition  
Pollutant  
Control Opportunities**

\_\_\_\_\_ **Clarity**

# Atmospheric deposition analysis

Load reduction estimates based on emission reduction estimates

Customized update of *California Air Resources Board Emissions Inventory*

Considered:

mobile sources, paved roads & parking, unpaved roads, construction disturbance, wood combustion

Used published equations / relationships to estimate reduction from each source

# Atmospheric deposition emission inventory summary

**Table 2-8. Annual average percent contribution of sources of pollutants in the Basin**

Source	Percentage of pollutant from a specific source		
	Inorganic nitrogen	Phosphorus	Inert species
Mobile	87	<1	1
Stationary (non-RWC)	10	< 1	< 1
RWC	3	7	2
Unpaved Roads	–	44	46
Paved Roads	–	40	43
Building Construction	–	7	5
Paved Road Construction	–	5	2

# Atmospheric deposition treatment tiers

## Tier 2

**Suggested combination of pollutant control opportunities based on literature values to provide realistic estimates of potential load reductions**

## Tier 3

**Suggested combinations of pollutant control opportunities that provides upper bound on load reduction.**

# Tier 2 pollutant control opportunities

## Transportation Infrastructure & Stationary

- Bi-weekly PM-effective street sweeping (all paved roads)
- Pave dirt roads at access points
- Limit speeds on unpaved roads
- Gravel 50% of unpaved roads
- Require adequate soil moisture during earth moving operations
- Use dust suppressants on road building projects
- 20% reduction in residential wood burning emissions

## Vehicle Emissions

- 10% VMT reduction through user fees and incentives
- Comprehensive transit service

# Tier 3 pollutant control opportunities

## Transportation Infrastructure & Stationary

- Tier 2 controls plus
- Weekly street sweeping (all paved roads),
- Pave all unpaved roads,
- Use dust suppressants on building construction projects,
- Adjust residential wood burning emissions reductions from 20% to 50%

## Vehicle Emissions

- 25% VMT reduction through user fees and incentives (entry fees)
- Comprehensive transit service

# Atmospheric deposition pollutant control opportunities applied to tiers

**Table 2-2. PCOs selected for atmospheric sources of pollutants**

Source category	PCO	Tier 3	Tier 2
Mobile	M1. Fee for visitors	X	X
	M2. Shuttle service for visitors and residents	X	X
	M3. Commercial boating restrictions	X	X
Paved Roads	1. PM-efficient vacuum sweeper	Weekly	Biweekly
	2. Switch from sand/cinders to deicers	X	X
	3. Pave unpaved roads at access points	X	X
Unpaved Roads	4. Pave road	X	
	5. Gravel for 50% of roads		X
	6. Speed restriction for 50% of roads		X
Construction Sites	7. Chemical suppressant	X <sup>a</sup>	X <sup>b</sup>
	8. Speed restriction		X
	9. Require > 12% soil moisture during earthmoving operations	X	X
Res. Wood Combustion	10. 50% curtailment	X	
	11. 20% curtailment		X

<sup>a</sup> For road and building construction projects

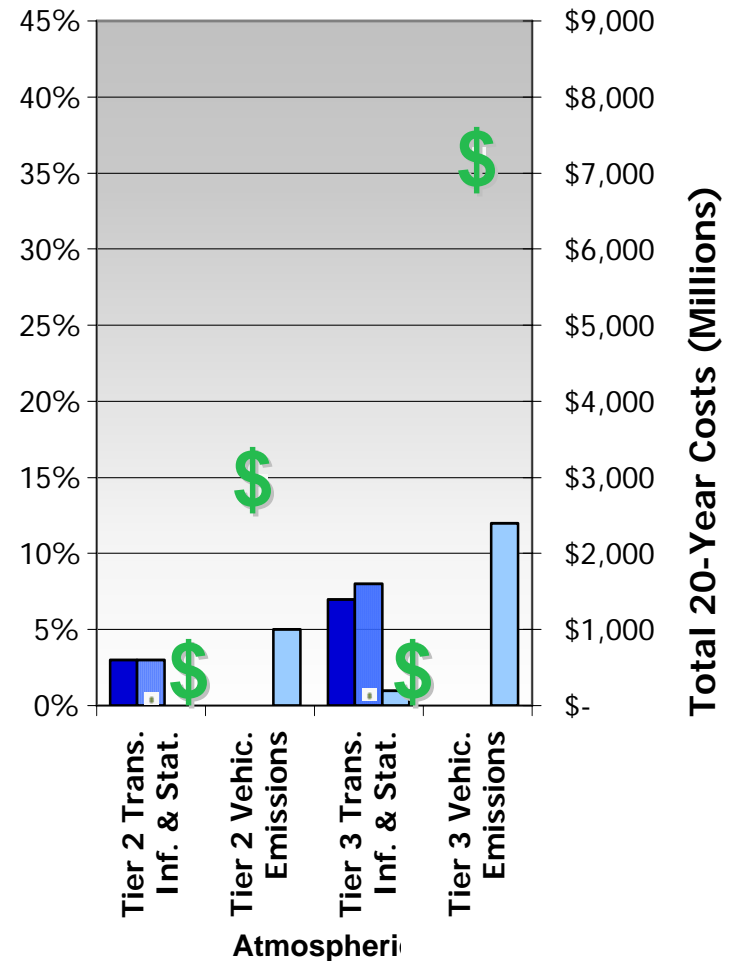
<sup>b</sup> For road construction projects only.

# Atmospheric deposition tiers

**Tier 1: baseline – no reduction estimated**

**Tier 2: transportation infrastructure & stationary source controls, and reduce Vehicle Miles Traveled (VMT) by 10%**

**Tier 3: reduce VMT by 25% and increase transportation & stationary source controls**



What strategy should we implement to reduce pollutant inputs to Lake Tahoe?

# Atmospheric deposition - additional VMT consideration

- VMT and transportation contributes to road dust re-suspension as well as vehicle emission.
- Initial estimates of Basin-wide fine particle reduction from reduced VMT:

0.4% from Tier 2 or 10% VMT reduction

0.9% from Tier 3 or 25% VMT reduction

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# Atmospheric deposition recommendation

Given:

- 1) the large affect of fine particle reduction on lake clarity,
- 2) the lower affect of N-reduction on clarity,
- 3) the high cost associated with mobile source control for N,
- 4) the lower impact of significant VMT reductions on Basin-wide fine particle reduction:

... it is recommended that in early efforts to meet the Clarity Challenge, atmospheric pollutant reduction strategies focus on particle/P control. Efforts to reduce VMT for the purpose of N-control should be considered based on a larger discussion of transportation.

TRPA and others should continue to engage in VMT reduction discussions to meet other Thresholds

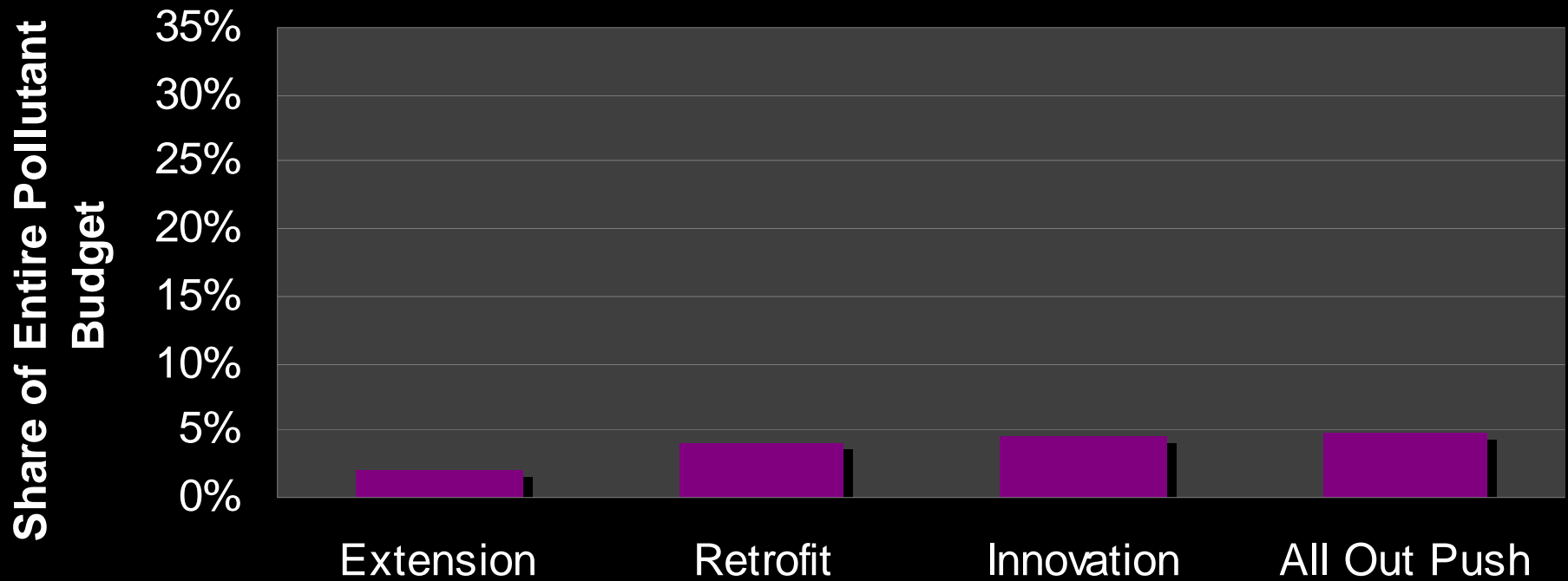
# Atmospheric deposition

## For consideration:

- ✓ Street sweeping,
- ✓ Use of traction materials for particle/P removal
- ✓ Restoration of unpaved surfaces

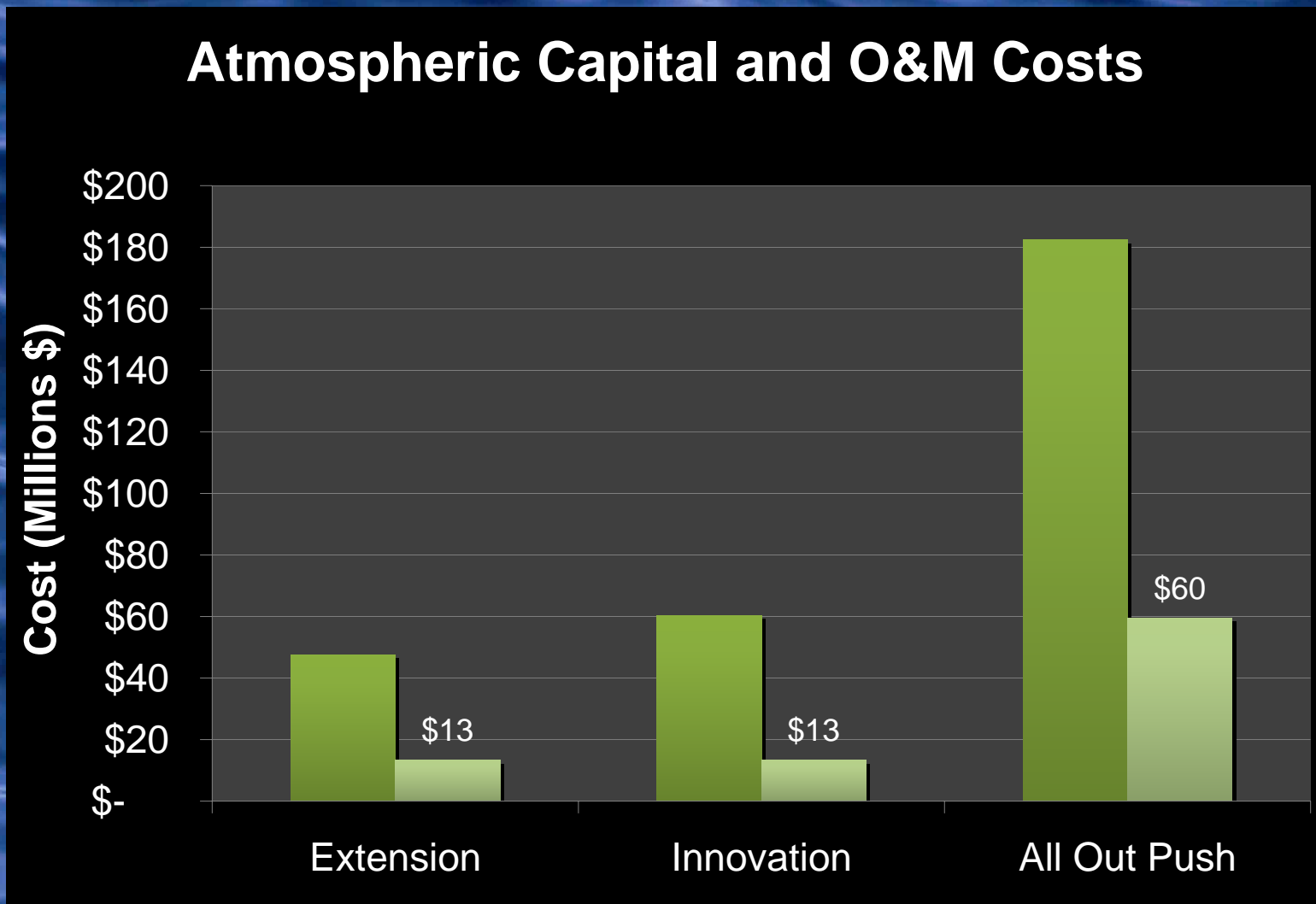
# Atmospheric Deposition Results

## Atmospheric Particle Reductions



What strategy should we implement to reduce pollutant inputs to Lake Tahoe?<sup>13</sup>

# Atmospheric Deposition Costs



What strategy should we implement to reduce pollutant inputs to Lake Tahoe?<sup>14</sup>