Proposed Emission Reduction Plan for Ports and Goods Movement in California

Air Resources Board Meeting
April 20, 2006
Long Beach

Air Resources Board

California Environmental Protection Agency

Need for Plan

- Administration's Goods Movement Action Plan
- Community health and environmental justice
- ARB's Diesel Risk Reduction Plan
- Air quality standards and plans (SIPs)

Overview

- Health impacts
- Plan development
- Emissions and strategies
- Benefits and costs
- Major issues
- Near term actions
- Staff recommendations

- **Health Impacts**

Air Pollutants from Goods Movement

- Particulate matter (PM)
  - Diesel PM
  - Nitrates (NOx) and sulfates* (SOx) that form particles
- Ozone
  - From NOx and reactive organics (ROG)

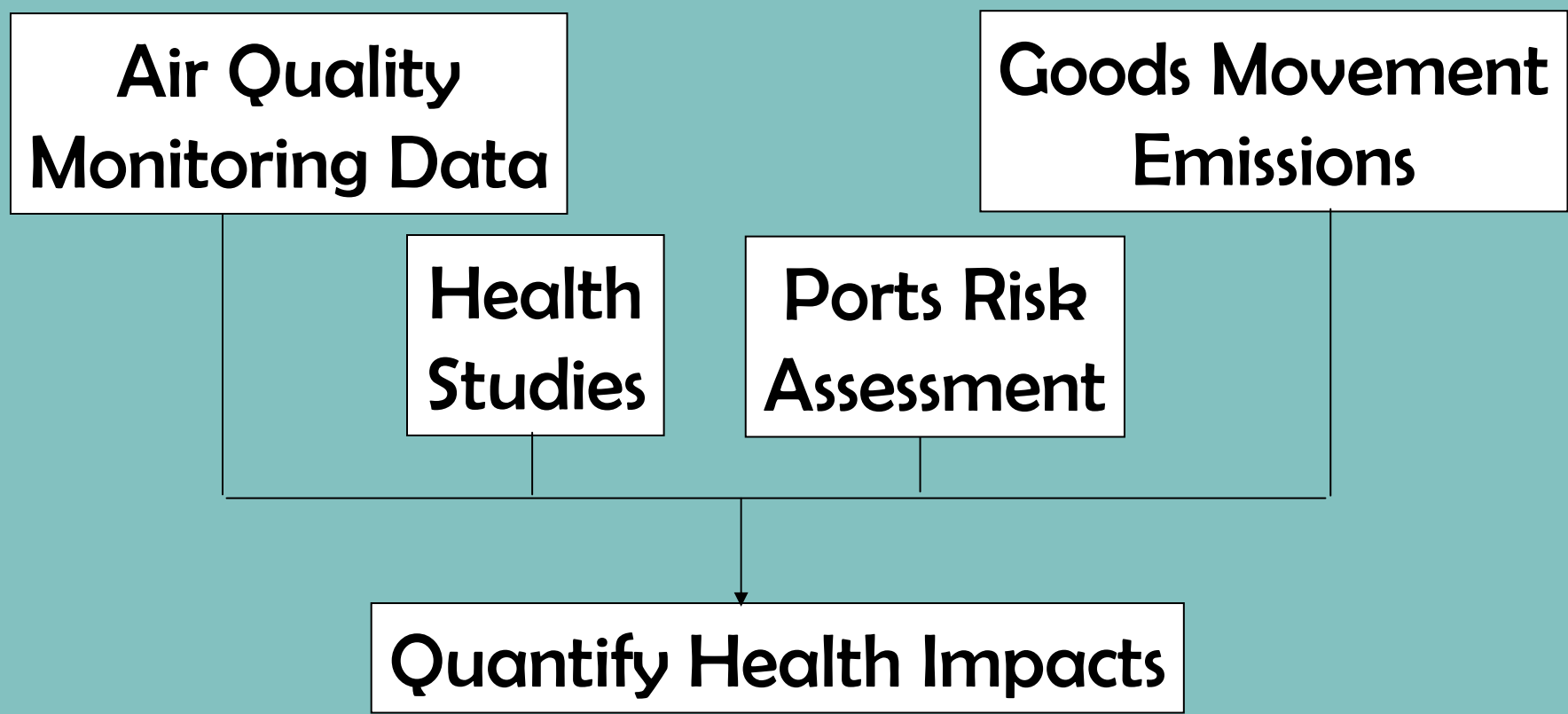
*Not yet included in goods movement analyses

2005 Health Impacts from Goods Movement

	Cases/Year
Premature death*	2,400
Hospital admissions (heart)	830
Hospital admissions (lung)	2,000
Acute bronchitis	5,100
Asthma/other respiratory	62,000
Absences/restricted days	4.4 million

**Uncertainty range is 720 to 4,100 deaths/year*

Elements of Methodology



PM and Premature Death

- American Cancer Society study (~500,000 adults, 1982-1998)
  - For PM2.5, over 300,000 adults in 51 cities
  - Pope (2002) analysis
  - Jerrett (2005) analysis for Los Angeles
- Staff working to incorporate other data
  - New studies on PM and premature death
  - Sulfate particle impacts

Health Endpoints Quantified

- Plan recognizes over 20 discrete health endpoints from PM and ozone exposure
- Staff sought sufficient evidence to quantify
- 8 outcomes now quantified, including some combined endpoints (all-cause mortality, asthma and respiratory effects)
- Remaining endpoints are addressed qualitatively

Ports—Increased Cancer Risk

Ports of Los Angeles & Long Beach*

Year 2002

Lifetime Risk (chances/million)	People impacted
>500	50,000
>200	400,000
>100	1 million
>10	>2 million

*October 2005 Draft ARB Study

Rail Yards—Increased Cancer Risk

Roseville Rail Yard*

Year 2000

Lifetime Risk (chances/million)	People impacted
100-500	20,000
10-100	150,000

*October 2004 ARB Study

Freeways—Increased Cancer Risk

Freeways and High Traffic Roads*

Lifetime Risk
(chances/million)

300-1,700

*April 2005 ARB Land Use and Air Quality Handbook

Context for Health Estimates

- Impacts from PM and ozone levels above the State standards =
  9,000 premature deaths* annually
- Range of average air toxic cancer risk in California's urban areas =
  500-1,000 chances/million

**Uncertainty range is 3,000 to 15,000 deaths/year*

Economic Value* of 2005 Impacts

($ in millions)

Premature death	$19,000
Hospital admissions (heart)	$34
Hospital admissions (lung)	$67
Asthma/other respiratory	$1
Acute bronchitis	$2
Absences/restricted days	$395

**Uncertainty range total is $6,100 to $36,000*

Scientific Peer Review

Prof. James Corbett (University of Delaware)
Prof. John Froines (UC Los Angeles)
Prof. Michael Jerrett (USC)
Prof. Jane Hall (CSU Fullerton)
Aaron Hallberg (Abt Associates, Inc.)
Prof. Robert Harley (UC Berkeley)
Prof. Michael Jerrett (USC)
Dr. Melanie Marty (OEHHA)
Dr. Bart Ostro (OEHHA)
Prof. Costantinos Sioutas (USC)
Prof. Akula Venkatram (UC Riverside)

Conclusions on Health

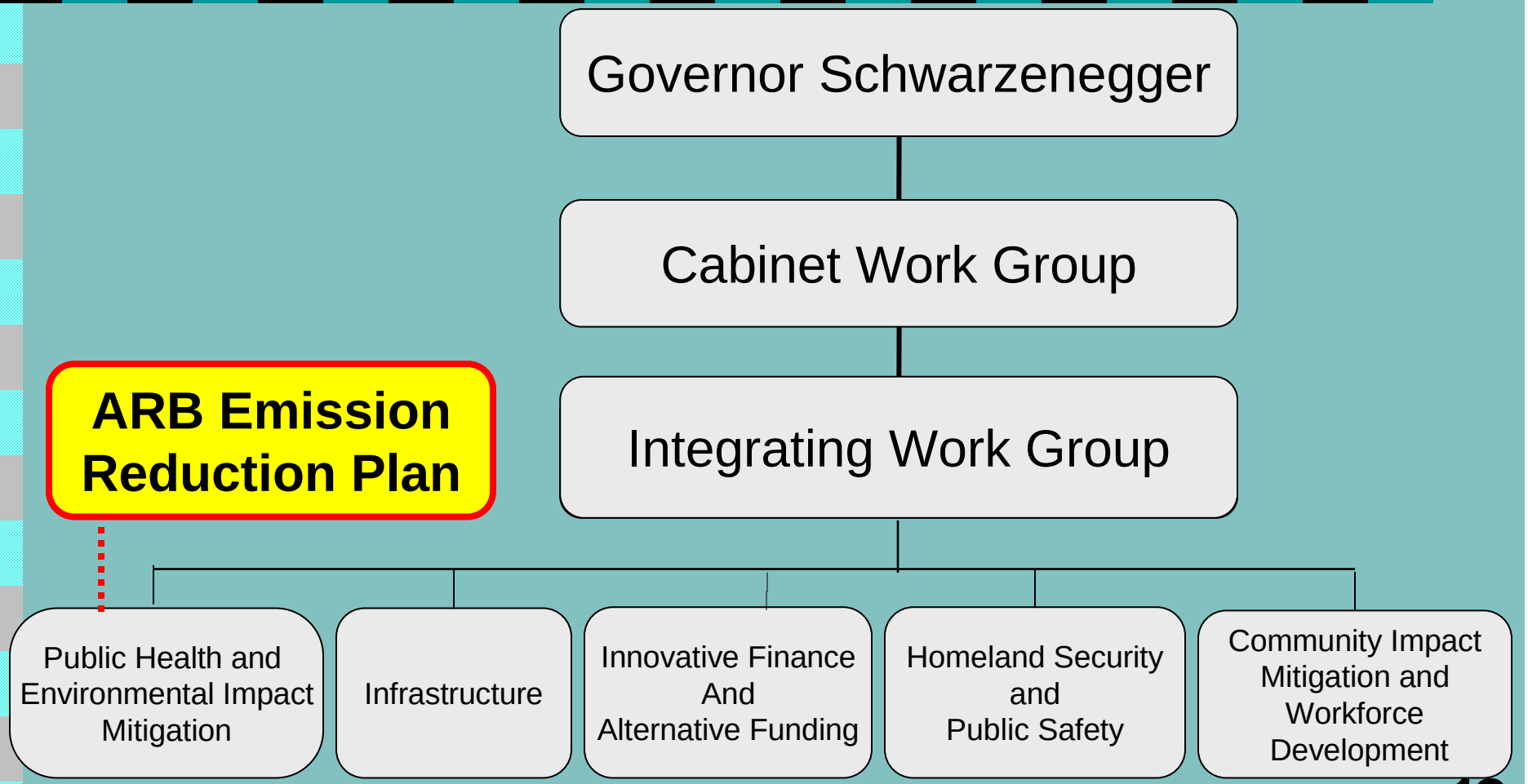
- Plan uses best available information on impacts of air pollution on health
- PM is the pollutant of greatest concern
- Goods movement accounts for a substantial fraction of the total health impacts

Next Steps on Health

- Develop best method to incorporate other PM studies into premature death analyses
- Formal peer review process
- Update Board on health impacts from goods movement in late 2006

Plan Development

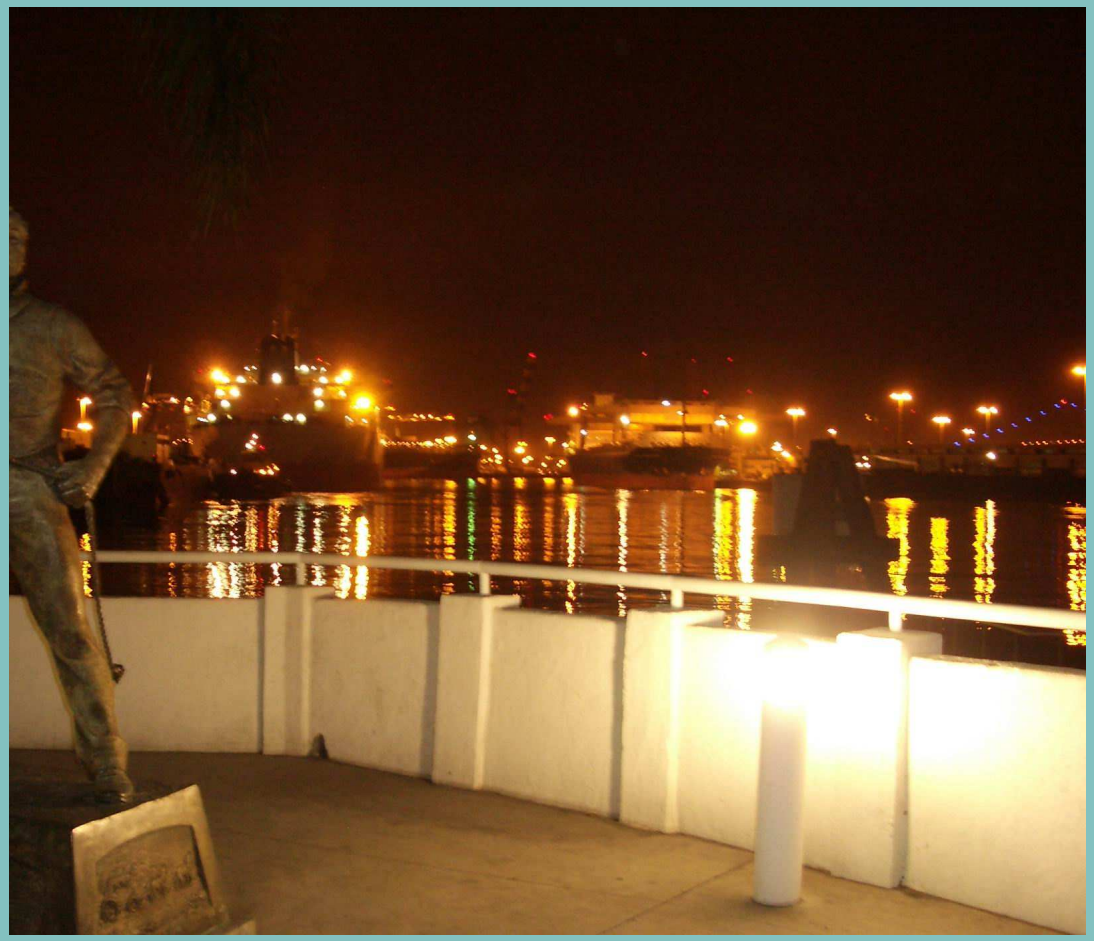
Goods Movement Action Plan Process



Emission Reduction Plan Development

- December 2005 draft plan
  - Ports and international goods movement
- March 2006 proposed plan
  - Expanded to include all goods movement
  - Regional analyses added
  - Now meets stated goals

Meetings in Highly Impacted Communities 2005-2006



Emissions and Strategies

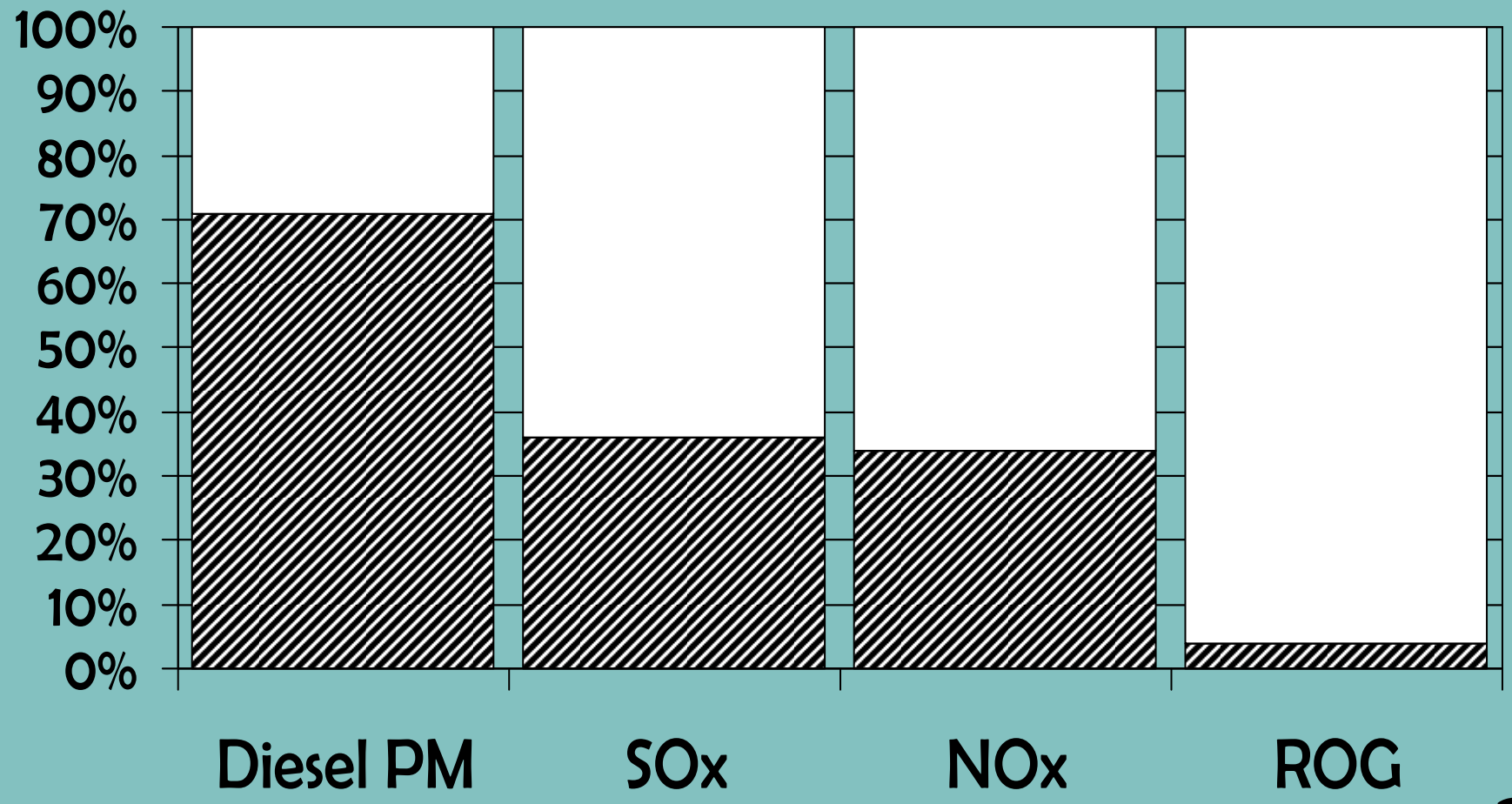
Nature of the Problem

- Existing emissions impacts, especially near ports, rail yards, high traffic corridors
- Growth in international trade and goods movement in general
- "Legacy" fleets of diesel engines needing controls or replacement

Key Emission Sources

- Heavy diesel trucks
- Locomotives
- Ships
- Harbor craft
- Cargo handling equipment

Goods Movement Contribution to Statewide Emissions in 2005



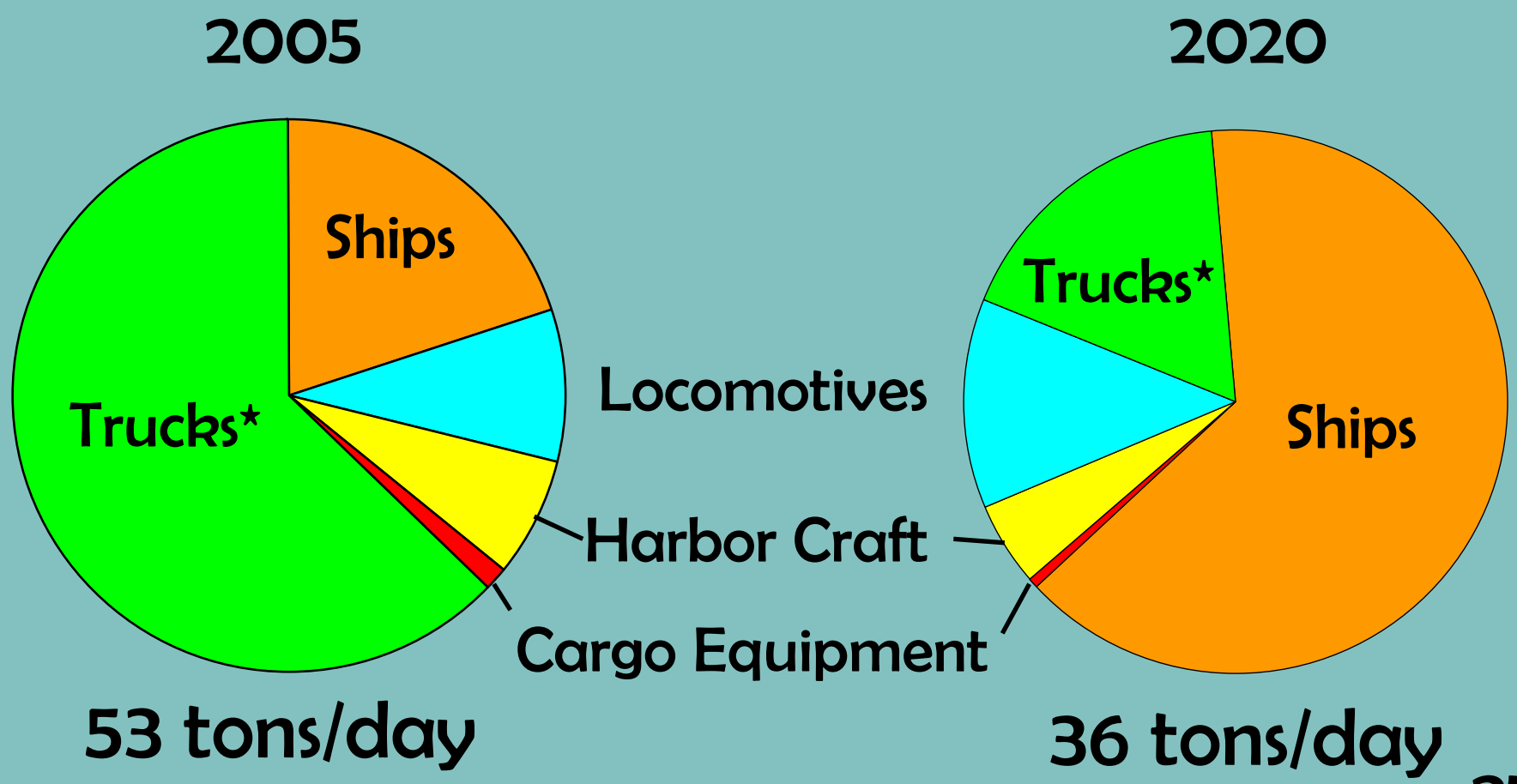
Growth Projections

2001-2020

- Continued increase in international trade -- cargo through ports triples by 2020
- California population grows 25%
- Truck travel increases 50%
- Cargo carried on rail grows by 110%
- Emissions grow at a slower rate due to controls and efficiency improvements

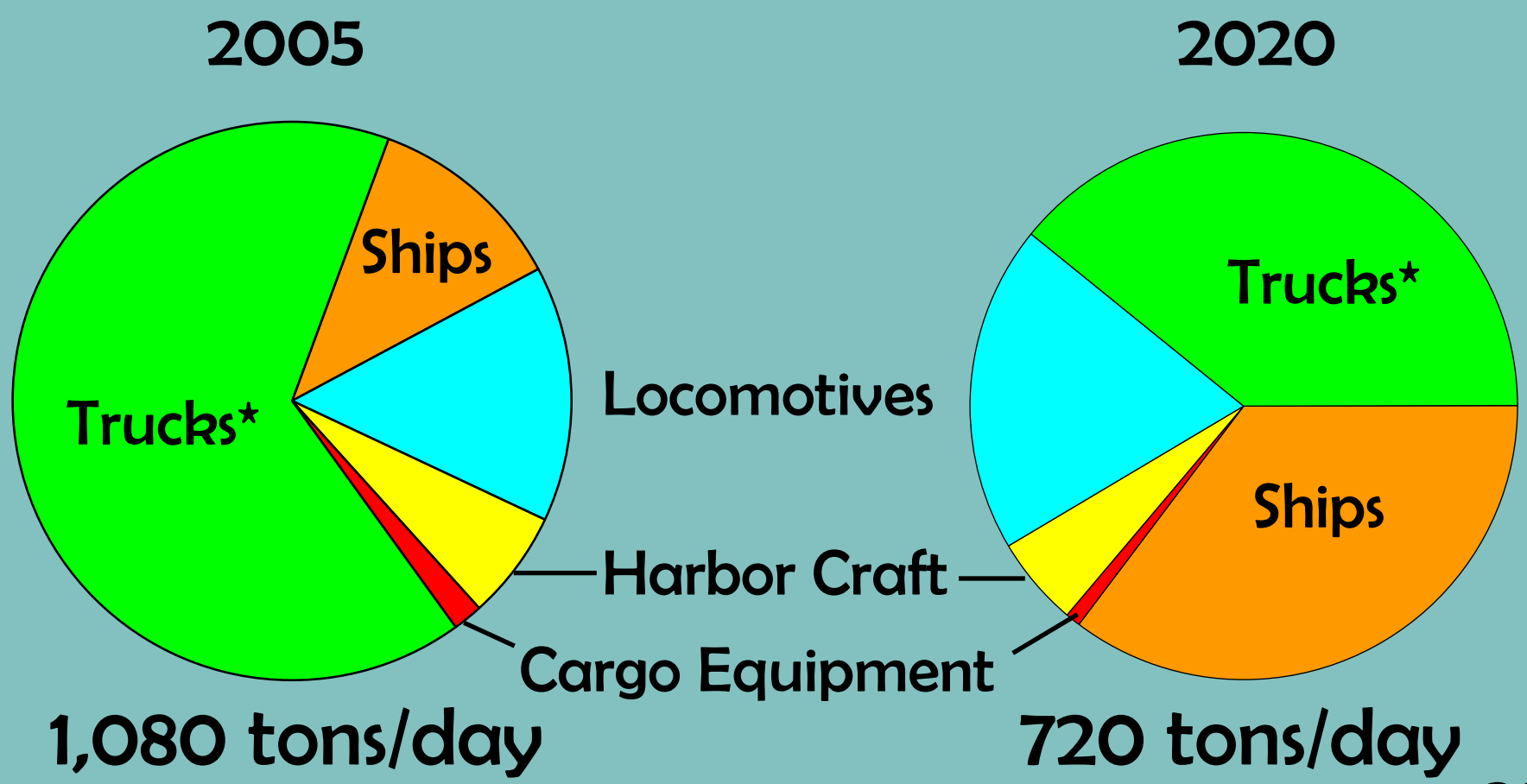
All Plan numbers include growth

Diesel PM from Goods Movement



* Includes TRUs

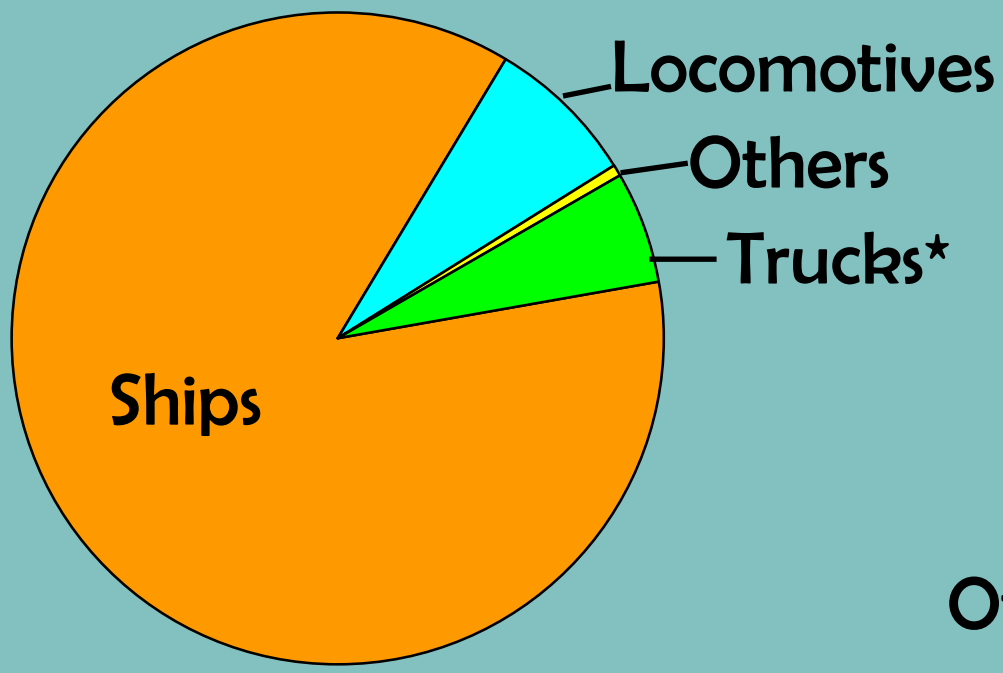
NOx from Goods Movement



* Includes TRUs

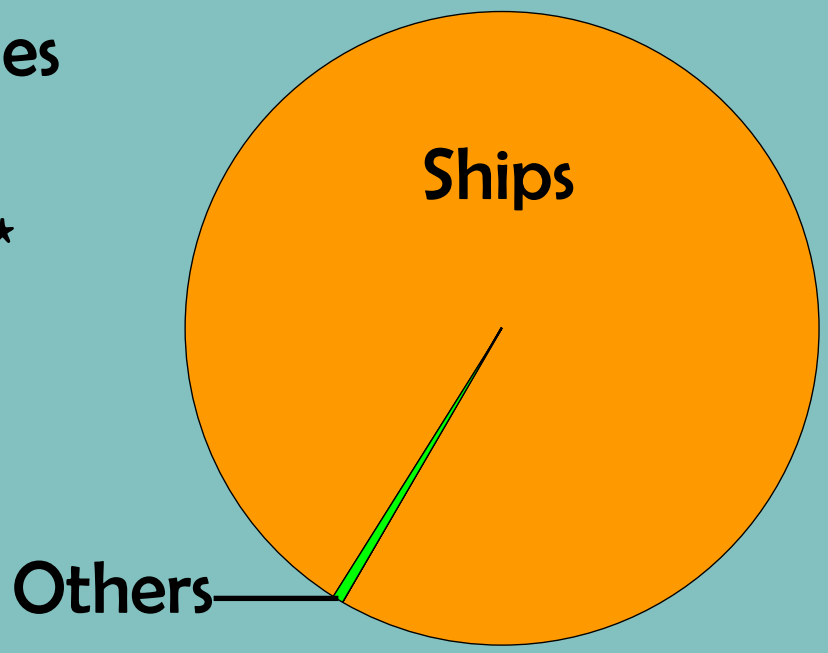
SOx from Goods Movement

2005



90 tons/day

2020



180 tons/day

* Includes TRUs

Goals for Goods Movement

"No net increase"

1. By 2010, reduce statewide emissions back to 2001 levels and below

Diesel PM risk

2. By 2020, reduce statewide risk 85%

Goals for Goods Movement

Attainment of federal standards

3. Reduce South Coast NOx 30% in 2015 and 50% in 2020 (preliminary targets)
4. Apply strategies statewide to aid all regions in attaining standards

Future Work

- Achieving attainment of California and more stringent air quality standards
- Abating remaining "hot spots"

Regulations and Strategies

- Regulatory actions are, and will remain, the framework for emission reductions
- Incentive programs are essential
- Leases, agreements, or trading are potential mechanisms

Ships
Background

- Ship emissions will more than double by 2020
- International standards are inadequate
- US EPA standards limited to US flagged ships
- High sulfur fuels are used

Ships
New Strategies

- Cleaner new engines and fuels
- Add-on emission controls
- Operational changes
- Shore-based electrical power in port (aka, "cold ironing")

Ships In/Near Port

- ✓ ARB rule for cleaner auxiliary engine fuel (Adopted December 2005)
- Strategy to cut dockside emissions
  - Use of plug-in shore power
  - Alternative at-dock technologies (like channeling exhaust through barge-mounted control devices)

ARB Report on Shore Power

"Evaluation of Cold-Ironing Ocean-Going Vessels at California Ports" (March 2006)

- Most cost-effective for passenger, container, and refrigerated cargo ships
- Prime candidate ports: LA, Long Beach, Oakland, San Diego, SF, Hueneme
- 2/3 of capital & benefits at LA/Long Beach

Targets for At Dock Controls

- Plan seeks increasing percentage of ship visits to use shore power or alternatives

	Ship Visits by Year		
	2010	2015	2020
Shore Power	20%	60%	80%
Alternate Measures	20%	40%	20%

Ships at Sea

- Cleaner propulsion engine fuel
- Retrofit controls for existing engines
- Bring cleaner ships to California service
  - Step 1: 30% lower NOx and PM emissions than existing standards, beginning 2010
  - Step 2: Best technology at 90% NOx and at least 60% PM control, beginning 2015

Targets for Cleaner Ships

- Plan seeks increasing percentage of ship visits by vessels using cleaner technology

	Ship Visits by Year		
	2010	2015	2020
30% Lower Emissions	20%	50%	40%
Best Technology	--	25%	50%

SOx Emission Control Area (SECA) or Alternative

- Up to 45,000 ppm sulfur in ship fuel now
- A SECA caps fuel sulfur at 15,000 ppm
- ARB doing extensive SECA analyses
  - Need 5,000 ppm sulfur or less by 2015
- May not go far enough or fast enough
- Alternative is ARB rulemaking for CA only

Commercial Harbor Craft

Background

- Current US EPA standard achieves 30-45% control for new engines
- ARB rule requires low sulfur fuel in 2007
- Fishing boats may need incentives

Harbor Craft
New Strategies

- ARB fleet rule for existing engines (underway)
- Shore-based electrical power in port
- Tighter U.S. EPA emission standards for new engines (or ARB adoption)

Heavy Diesel Trucks

Background

- 2010 standards for new engines
- Downward emissions trend
- Existing fleet is the problem, especially older, dirtier trucks in port service
- Some truck fleets may need incentives

Trucks
New Strategies

- Port "drayage" truck modernization program
- ARB rule for privately-owned truck fleets (underway)
- Enhanced enforcement of truck idling limits in communities

✓ ARB rule for international trucks (Adopted January 2006)

ARB Report on Port Truck Modernization

- "Evaluation of Port Trucks and Possible Mitigation Strategies" (April 2006)
- Basic elements in plan
  - Incentives to replace oldest trucks and retrofit controls on the rest
  - ARB rule to push owners to incentives
  - Ports as gatekeepers for clean fleet

Private Truck Fleets Rule

- Part of 2000 Diesel Risk Reduction Plan
- Staff just launched public process in April
- Plan assumptions draw on prior diesel fleet measures; specifics are very preliminary
- Many details to work out in public rule development process

Locomotives
Background

- South Coast fleet will be 65% cleaner by 2010
- Growth overcomes the statewide benefits of current controls by 2020
- Low sulfur diesel fuel being introduced
  - Intrastate locomotives in 2007
  - 80%+ of interstate locomotives by 2008
  - Nationwide beginning in 2012

Reducing Risk at Rail Yards

- 2005 MOU reduces localized risk from diesel PM at rail yards
- Idling restrictions in place, training and enforcement underway
- Community meetings and health risk assessment process have begun
- Public meeting to identify potential new control measures scheduled for April 25

Rail Yard Locomotives
New Strategies

- Upgrade switcher/local yard locomotives
  - Multiple off-road engines (gen-sets)
  - Diesel-electric engines (Green Goats)
  - Alternative fuels

Long-Haul Locomotives
New Strategies

- National Tier 3 locomotive standards
  - 90%+ PM and NOx control on new engines, cleaner rebuilds, diagnostics, anti-idling
- Tier 3 locomotives brought to California service

Cargo Handling Equipment
Background

- 2012 standards for new engines
- ARB port risk assessment indicated this equipment is a priority

Cargo Equipment
New Strategies

- ✓ ARB rule for new and existing equipment (Adopted December 2005)
- 85% PM control on all engines

Other Activities Underway

- Plan highlights activities of ports, railroads, local agencies, and US EPA to reduce emissions or improve efficiency
- These programs are important contributors to the benefits in the plan
- We expect these efforts to continue

Partnerships Critical to Success

- Ports and shippers
- Railroads
- Truckers
- Air districts
- Local governments and communities
- US EPA/federal government

Benefits and Costs

Plan Meets Goals

- ✓ Goes further than no net increase by 2010, bringing emissions 20-40% below 2001 levels
- ✓ Reduces diesel PM risk 85% by 2020
- ✓ Achieves preliminary South Coast SIP targets for 2015 and 2020
- ✓ Achieves substantial reductions in South Coast, SJ Valley, Bay Area, San Diego, & Sacramento

Plan Benefits Public Health

- By 2020, over 1,500 premature deaths would be avoided
- Corresponding reduction in:
  - Hospitalizations for heart & lung disease
  - Asthma
  - Acute bronchitis
  - Absences from school or work

Cumulative Costs and Benefits

- Cumulative cost to implement plan strategies (2006-2020): $6 to $10 billion
- Goods movement contributes more than $200 billion/year to California's economy
- Plan provides $3-8 in benefits for each $1 spent on controls

- **Major Issues**

Accuracy of Health Assessment

- Commenters assert that the health impacts analysis underestimates premature deaths
- Jerrett study and others would change estimates of mortality from all PM
- Staff seeking expert advice on how to best incorporate new analyses
- We expect to resolve later this year

Stringency of Goals

- Commenters urge Board to apply "no net increase" goal to each sector in 2010
- Achieved for all sectors except ships
- Not feasible for ships unless number of visits to California ports are restricted

Localized Impacts

- Concern that plan reduces, but doesn't eliminate, localized health risk
- Staff is proposing process to address
- Land use decisions matter
- Staff will continue advising local land use decision makers

Funding

- All industries involved in goods movement must share investment costs
- Incentives critical for some sectors
- Bond issue pending
- Role of container fees or other potential funding sources uncertain

Enforceability

- Use regulatory power to maximum extent
- Convert strategy into SIP commitments by region, as appropriate

Role of MOUs and Trading

- All options on the table for discussion
- Any voluntary agreements would be subject to new Board and public process for development and approval
- Any trading program would need to consider community impacts

Truck Strategies

- Concerns over inclusion of these strategies
- Many questions on specifics of each
- Port truck report evaluates multiple options
- Private fleets rule just starting development
- Public process will determine best course
- Plan does not constrain ARB rulemaking

Near Term Actions

ARB Rulemakings

- ✓ Low sulfur fuel for trucks, equipment, harbor craft, in-state locomotives
- ✓ Truck idling limits
- ✓ Marine auxiliary engine fuels
- ✓ Cargo handling equipment fleets
- ✓ Ban on cruise ship incineration
- ✓ International border trucks

Other ARB Actions

- ✓ Roseville Rail Yard risk assessment
- ✓ 2005 agreement on diesel PM at rail yards
- ✓ Ports of LA/Long Beach risk assessment
- ✓ Shore power feasibility study
- ✓ Port truck modernization report

2006-2007 ARB Rulemaking or Effective Alternatives

- Port trucks
- Privately-owned truck fleets
- Low sulfur marine propulsion engine fuel
- Shore power for ships and harbor craft
- Harbor craft fleets
- New harbor craft engine standards
- Upgrade switcher/yard locomotives
- Bring cleaner ships to California

2006-2007 Pending US EPA Rulemaking & Actions

- Advanced technology standards for NOx/PM
  - New and rebuilt locomotives
  - Auxiliary/main engines on ships in US waters
  - New harbor craft engines
- SOx Emission Control Area for West Coast of North America

Link to Cal/EPA-BTH Action Plan

"Simultaneous and continuous improvement"

- Relies on ARB Plan to set emission targets by corridor for 2010, 2015, 2020
- Calls on ARB to verify progress toward targets
- Proposed ARB Plan consistent with progress goals and verification, but broader due to other drivers

Staff Recommendations

Recommendations

We recommend that the Board approve:

- Plan goals
- Overall strategy
- Near-term action items

Recommendations

And direct staff to:

- Expeditiously pursue proposed ARB rules and other actions
- Initiate public process to identify additional strategies to reduce localized health risk
- Report back in November and every 6 months thereafter