Commercializing Highways

A New Paradigm for 21st Century Roadways

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America's Highways: A 20th Century Success Story

- Autos used for 86% of all individual surface trips
- Trucks carry 90% (by value) of all freight
- Overall road system (federal, state, local) is nearly self-supporting (85%) via user taxes.

But Major Problems Loom as We Begin the 21st Century

- Traffic congestion
- Difficulties adding new capacity
- Funding shortfalls
- Anti-highway politics

Traffic Congestion

- In our 75 largest metro areas, motorists waste $69.5 billion/year in fuel and time, stuck in traffic.
- This number has increased every year for the past 20 years.
- Long-range transportation plans in nearly every metro area project congestion getting worse, not better, over the next 20 years.

Congestion is Directly Related to Roadway Capacity vs. Demand.

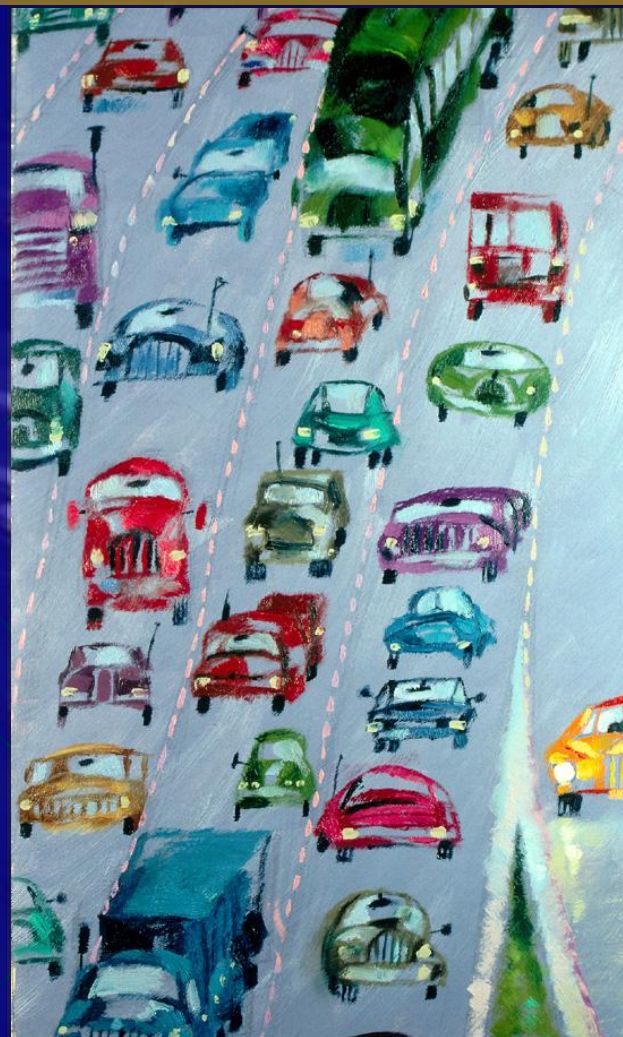
Metro area	Person Hours of Delay/Peak Traveler	Freeway Lane-Miles/ 1000 Daily VMT
Los Angeles	136	43
San Francisco	92	49
Washington, DC	84	55
Seattle	82	57
Houston	75	65
Salt Lake City	20	78
Pittsburgh	15	107
Oklahoma City	12	83
Rochester	8	91

Source: Texas Transportation Institute

Nationwide, We've Nearly Stopped Adding Capacity

From 1980 to 2000:

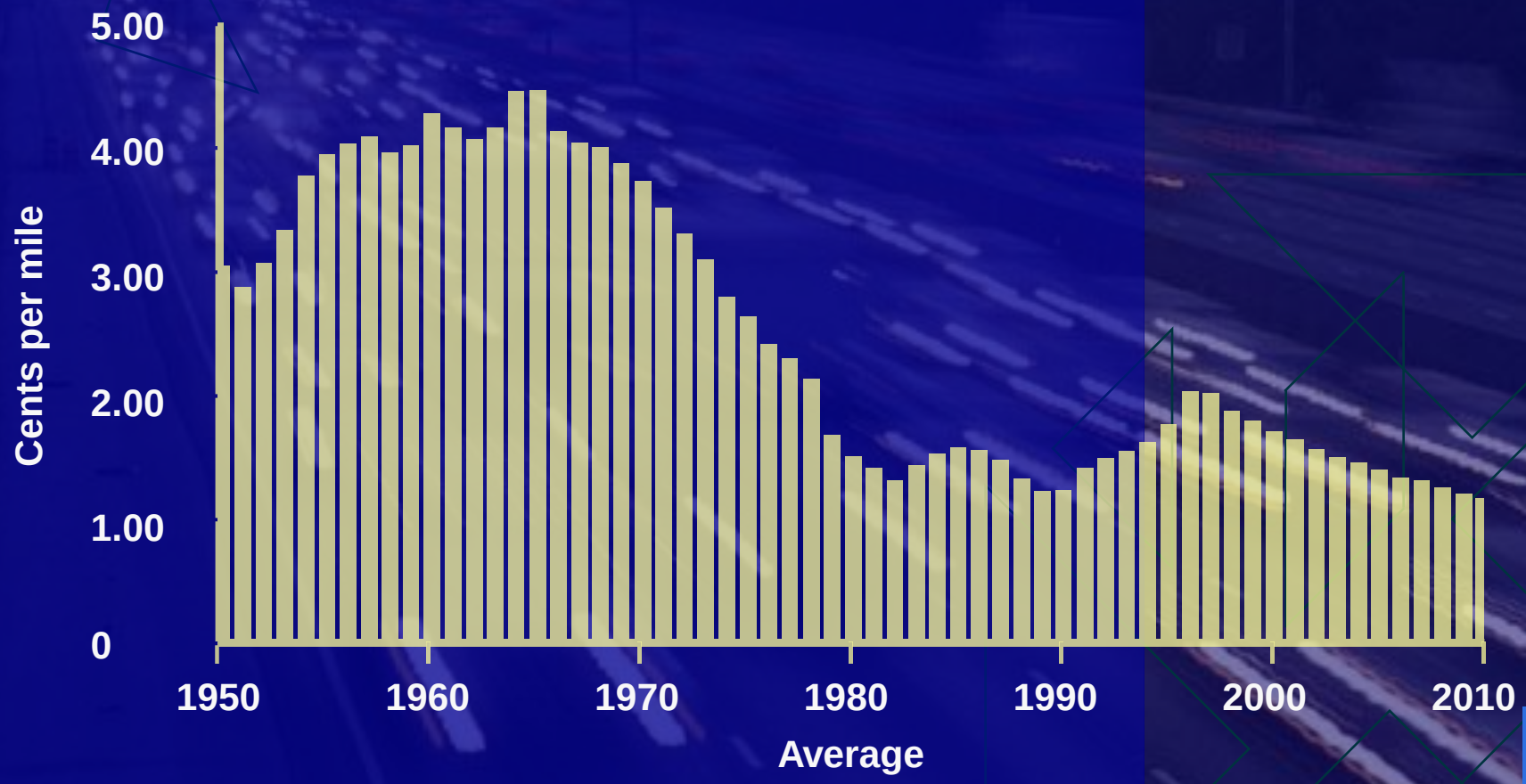
- Vehicle miles traveled (VMT) increased 82%
- Lane-miles of highway increased 4%



One Reason We Aren't Building Much: Major Funding Shortfall

- FHWA Conditions and Performance Report, every 2 years
- Latest one (2000) shows the following:
  - Annual capital spending: $65 billion
  - Investment needed to maintain asset value: $76 billion
  - Investment needed to maintain performance: $107 billion

Historical and Projected California and Federal Fuel Tax Paid ($1997 per VMT)



Another Reason We Aren't Building Highways is Anti-highway Politics

Three common beliefs:

- Adding capacity is futile; "we can't build our way out of congestion."
- Focus should be on transit to promote higher quality of life.
- Air pollution is largely due to autos and trucks, so we should reduce driving.

Is Capacity Expansion Actually Futile?

Those metro areas with adequate freeway capacity, relative to demand, have very little congestion.

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Los Angeles	136	43
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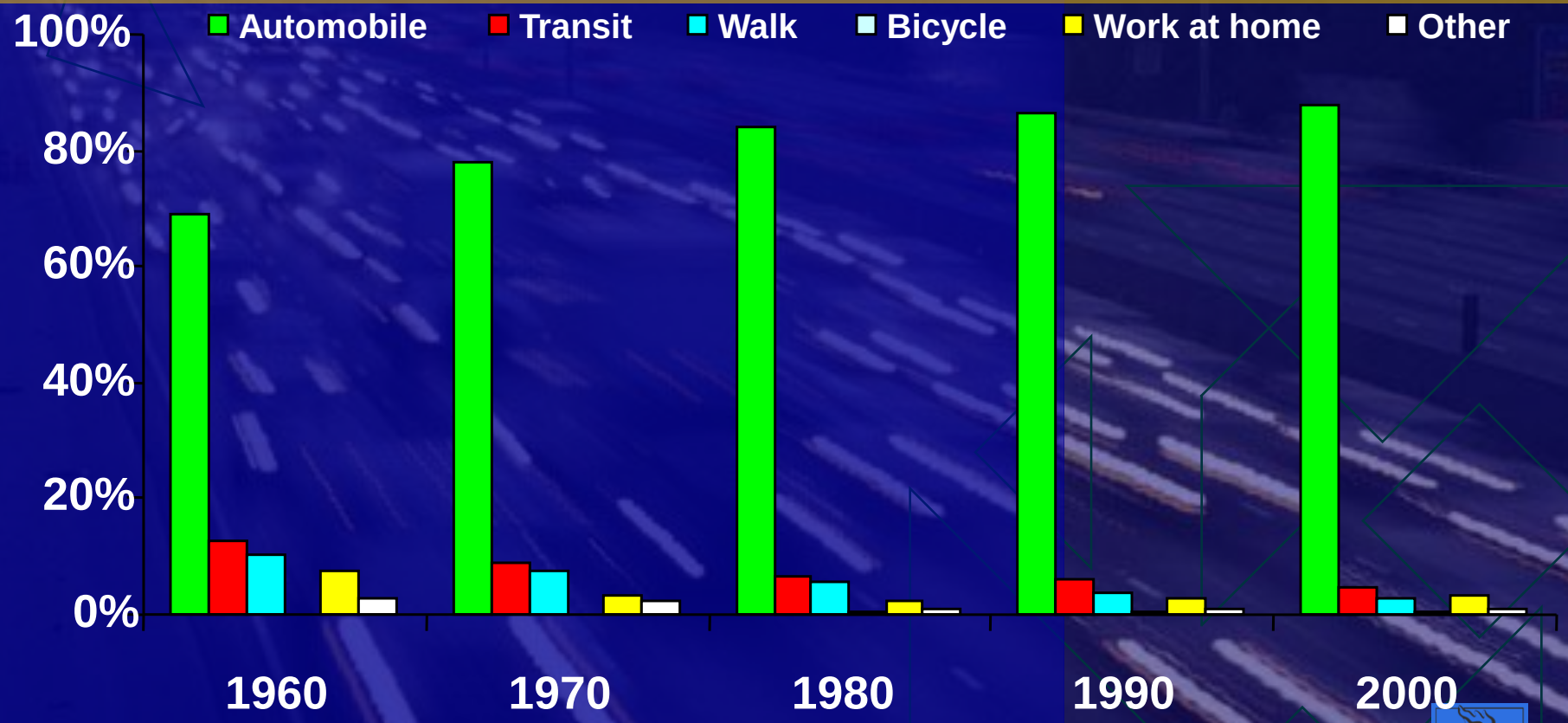
Is Transit Investment Working?

- Since 1964, more tax dollars have been spent on upgrading mass transit than the cost of the entire Interstate highway system.
- Today, up to 20% of federal surface transportation funding goes to transit.
- In many large metro areas, 50-70% of all capital spending is on transit rather than highways.

What have been the results?

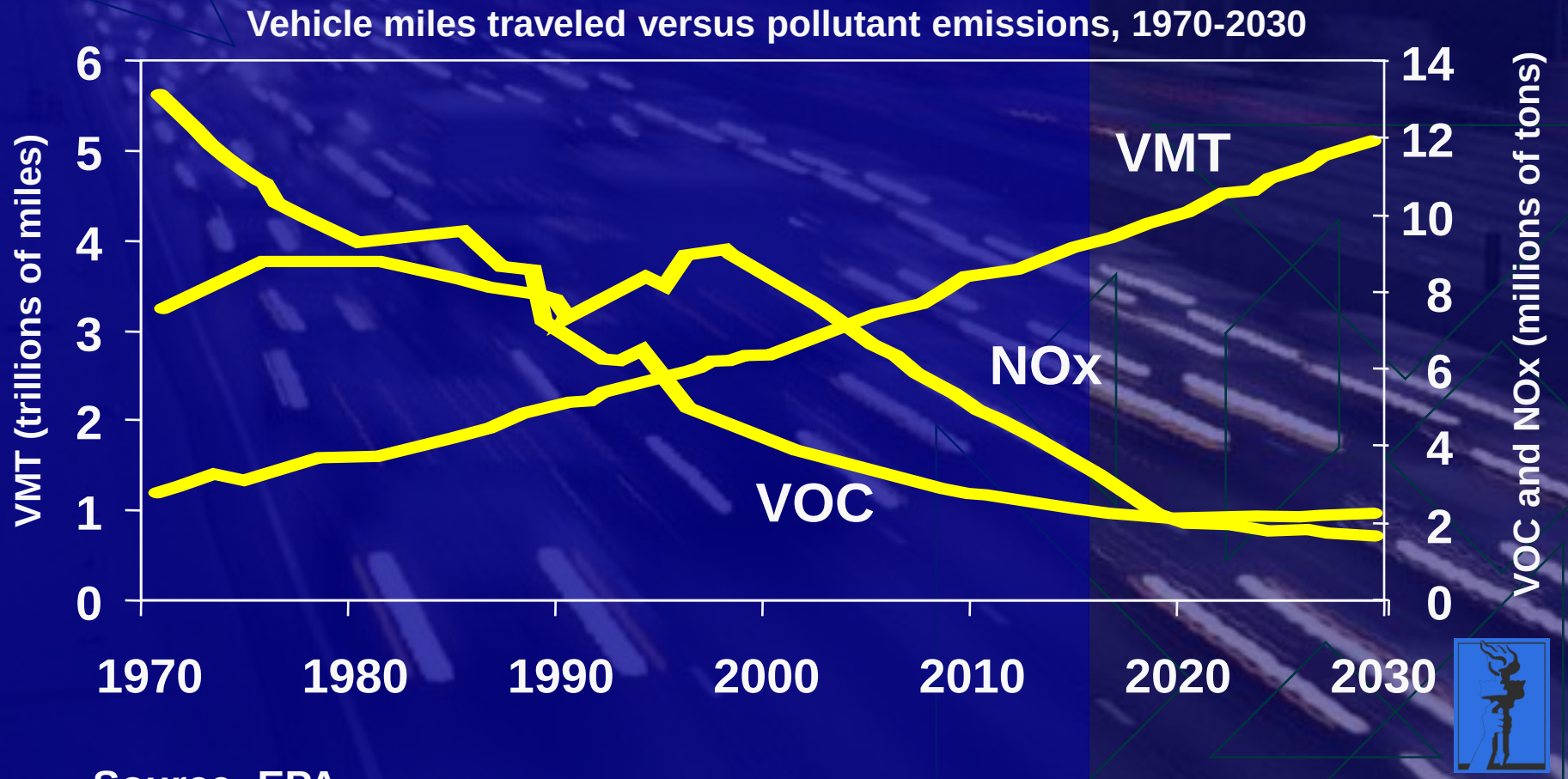
Commuting Trips by Mode of Travel



Source: U.S. Census

What About Air Quality?

Despite huge increase in VMT, vehicle emissions are trending sharply downward.



Source: EPA

The Highway System is in Trouble

- Failing to satisfy its customers
- Seen as a bad neighbor (noise, emissions)
- Inadequately funded, even to maintain itself.

Hence, time for a new paradigm

Key Insight from Former World Bank Transport Economist, Gabriel Roth:

U.S. actually has a "Soviet-style" highway system, in that:

- **It is centrally planned, from the top down;**
- **It makes investment decisions via politics, not economics;**
- **It fails to make use of pricing for its output.**

Source: Gabriel Roth, *Roads in a Market Economy*

Telecoms vs. Highways: A Provocative Comparison

	Telecom System	Highway System
Structure	Interconnected network, multiple providers	Interconnected network multiple providers
Ownership	Private sector investors	Public sector
Revenues	User charges	User taxes
Investment criteria	Return on investment	Political process
Pricing	Demand-based	Virtually non-existent
Response to congestion	Raise price, add capacity	Discourage use
Incentive for maintenance	Risk of decline in asset value	When appropriations permit
Response to new technology	Entrepreneurial	Cautious

Possible New Paradigm: Highway Corporations as Investor-owned Utilities

Suggested by former FHWA deputy secretary Steve Lockwood: Transcorps, franchised and regulated by state DOTs

- Applicable to freeways and major highways
- Service-based business
- Value-added pricing
- Shifts DOT role to policy and regulation, not funding and operation
- Reallocates risk and reward
- Users pay 100% of costs.

Is Anybody Taking This Seriously?

New Zealand got as far as legislation that would:

- Divest all roadways to 3 to 6 government highway corporations
- Require them to operate as commercial, tax-paying businesses
- Require them to be self-supporting via user charges
- Permit private firms to compete, on a level playing field.

National-level studies during the 1990s in:

- Australia
- Netherlands
- New Zealand
- United Kingdom

Proposal dropped when government changed hands.

Build-Operate-Transfer (BOT) Model Adopted Widely Overseas

- Long-term franchise awarded competitively for major highway, bridge, or tunnel project.
- Winning team must design, finance, build, and operate the project, transferring it back in good condition at end of franchise (typ. 30-50 years).
- First pioneered for toll motorway systems of France, Italy, Spain, Portugal (1960s, 1970s)
- Used for major new projects (1990s) in Australia, southern Asia, Greece, UK, Israel.
- Used to modernize major highways in South America and South Africa (1990s).

Four Major Sales of Existing Toll Highway Systems

- Italy—sold 1999, $6.7 billion, 38-year franchise
- Portugal—sold 1999, $2 billion, 33-year franchise
- Canada—sold 1999, $2.1 billion, 99-year franchise
- Spain—sold 2003, $1.8 billion, 34-75-yr franchises

How the New Paradigm Addresses Highway Problems

- Congestion
- New capacity
- Funding
- Politics

Congestion: Pricing is a Powerful Tool to Balance Demand and Supply

Evidence from three types of application:

- Cordon/area pricing
- Variable rates on existing toll roads & bridges
- Value pricing on specialized lanes

Cordon/Area Pricing

- Singapore CBD: 40% reduction in AM traffic
- Norway (Bergen, Oslo Trondheim) toll rings: 10% reduction in rush-hr. traffic
- Rome CBD (4.6 sq. km.): 20% reduction in daytime traffic
- London CBD (8 sq. mi.): 20% reduction in daytime traffic

Variable Rates on Existing Toll Roads

- French toll roads near Paris/weekends: 13% peak traffic reduction
- Seoul, two toll tunnels: 24% traffic reduction
- Lee County, FL: shoulder traffic up 19%, peak down 7%
- Port Authority of NY/NJ bridges & tunnels: 4-7% peak traffic reduction

Value Pricing: Charge to Use Specialized Express Lanes (HOT Lanes)

91 Express Lanes, Orange County, CA

- Rates vary by hour, on pre-set schedule
- With 33% of lane capacity, handles 40-45% of traffic at rush hour

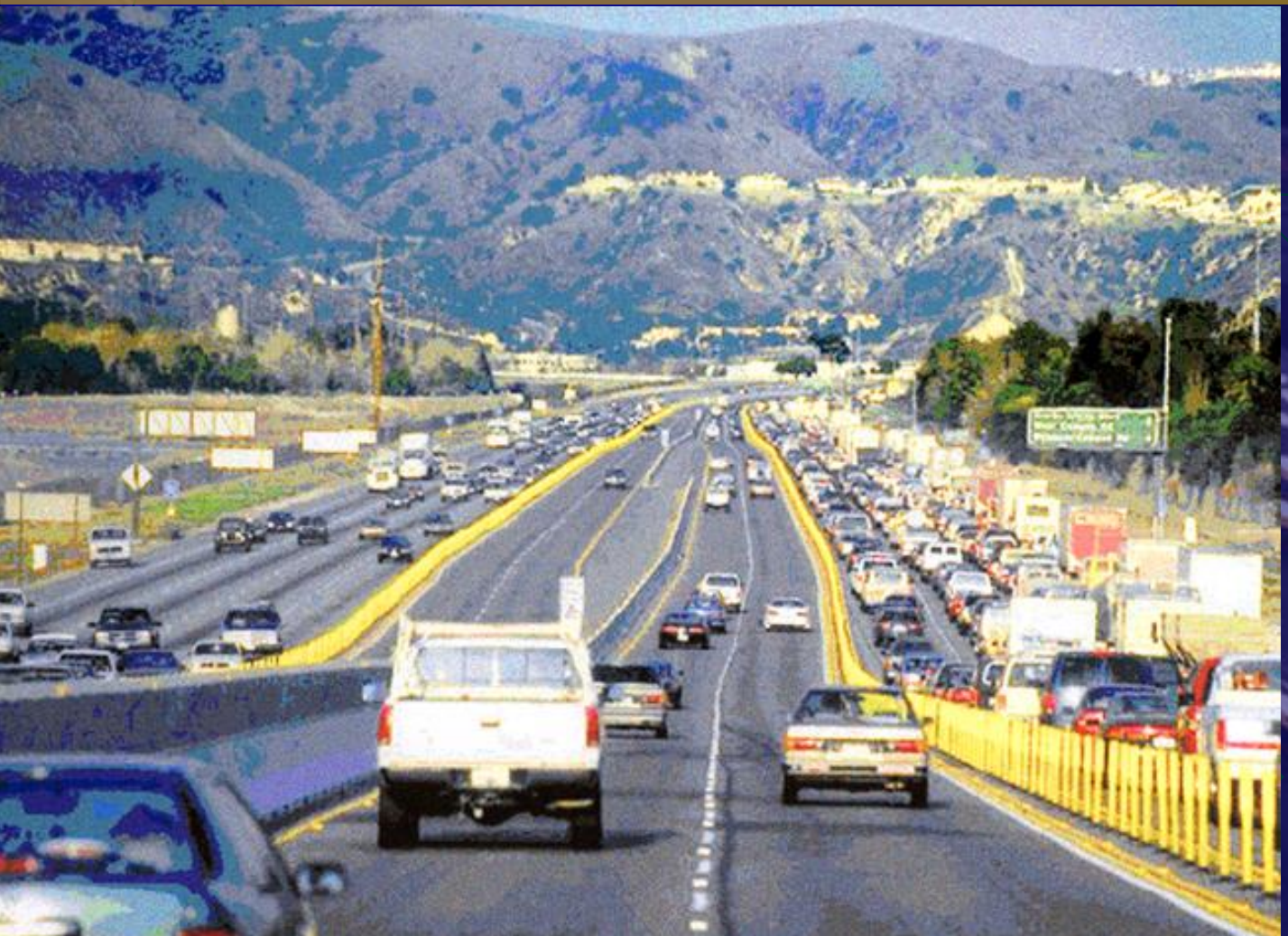
I-15 Express Lanes, San Diego

- Rates adjusted every 6 minutes
- Both paid use and HOV use significantly increased

I-10/US 290 Houston QuickRide

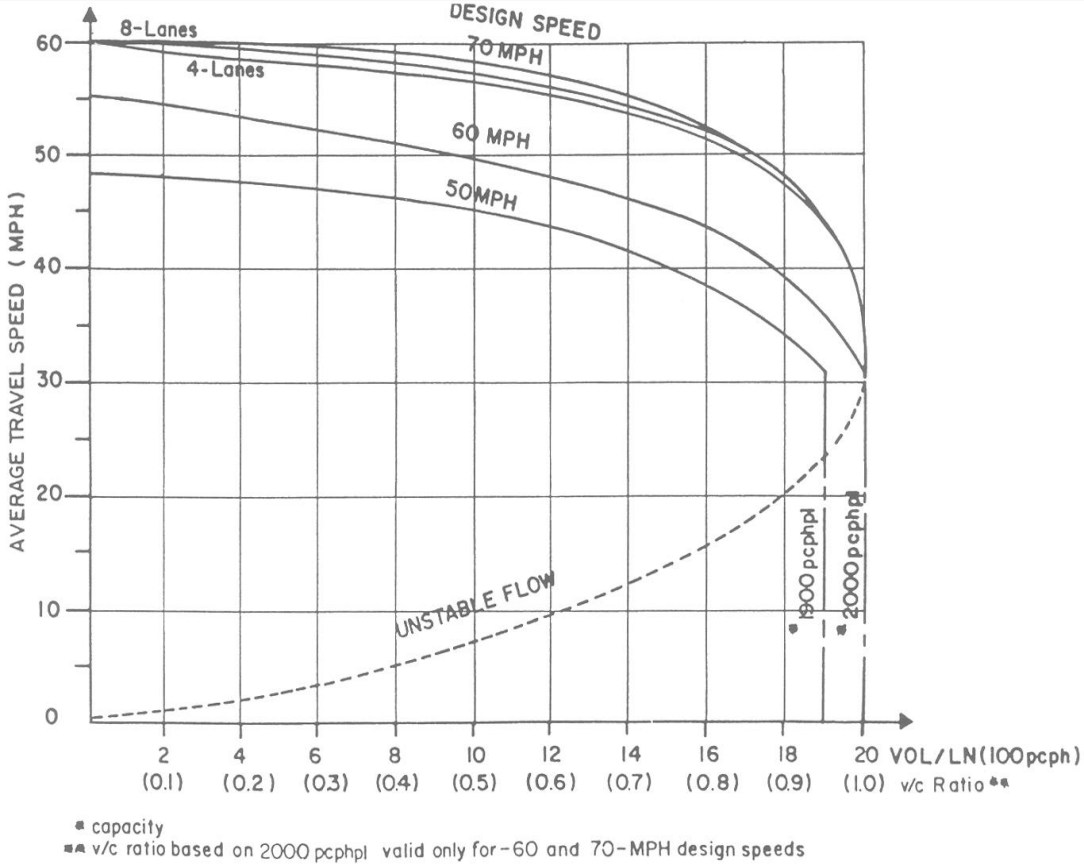
- Lets HOV-2 buy into HOV-3 lane
- Only 35-45 users per day
- Being replaced by larger HOT lanes project

91 Express Lanes, Orange County, California



Lessons Learned from Road Pricing

Speed and Flow Relationships Under Ideal Conditions TRB, 1985)



Pricing does work

- Fewer choose to drive on priced facility, in proportion to price
- Can keep traffic moving on “managed lanes” at high speed and capacity
- Move 45% of traffic with 33% of lane capacity

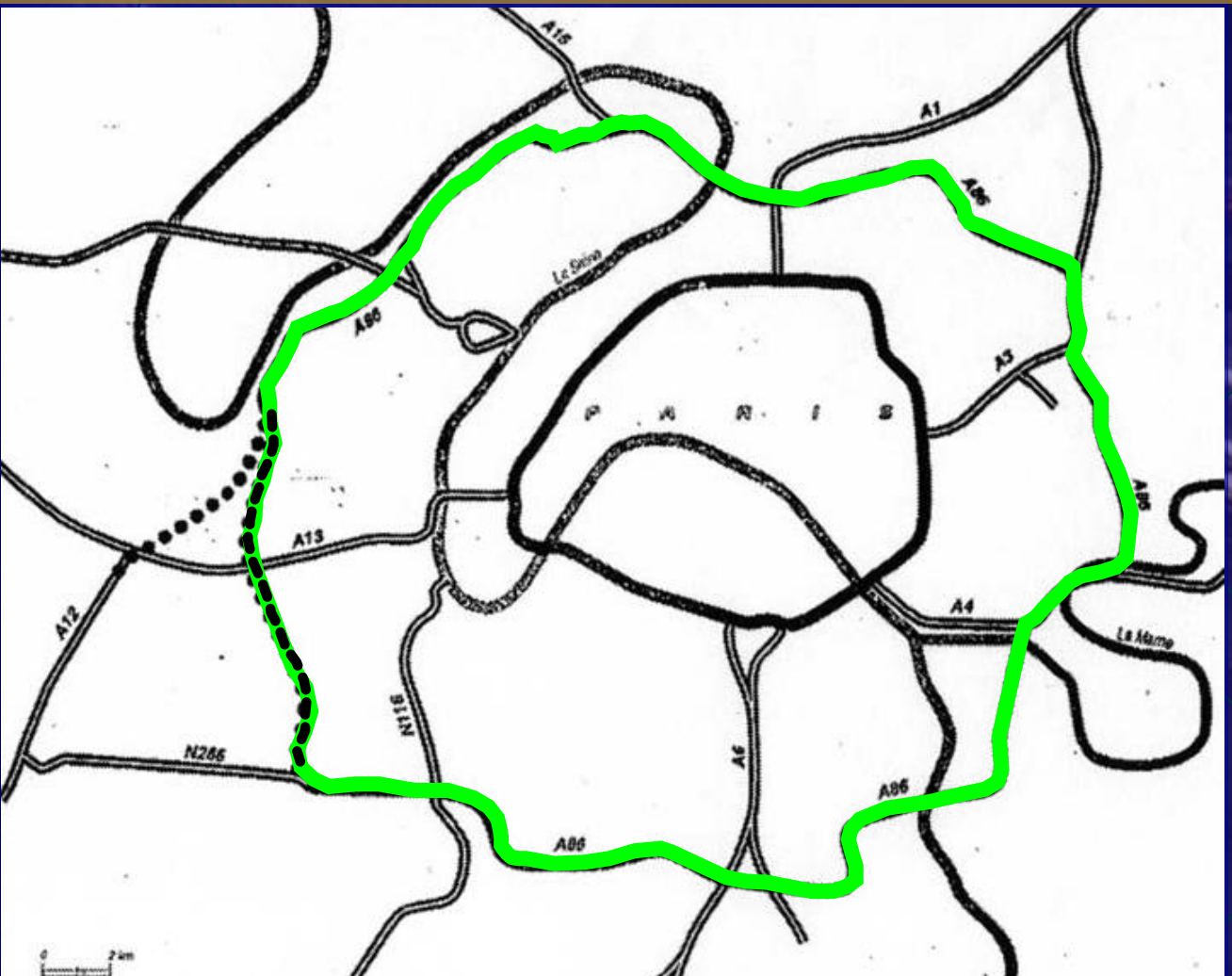
Politics of Pricing

- Most difficult is to put pricing on existing “free” roadways
- Easier to shift from flat to variable rates on existing toll roadways
- Also easier to put pricing on new lanes that add value for users
  - Specialized truck lanes for heavier rigs
  - Congestion-relief lanes for commuters
  - General term for this is “Managed Lanes.”

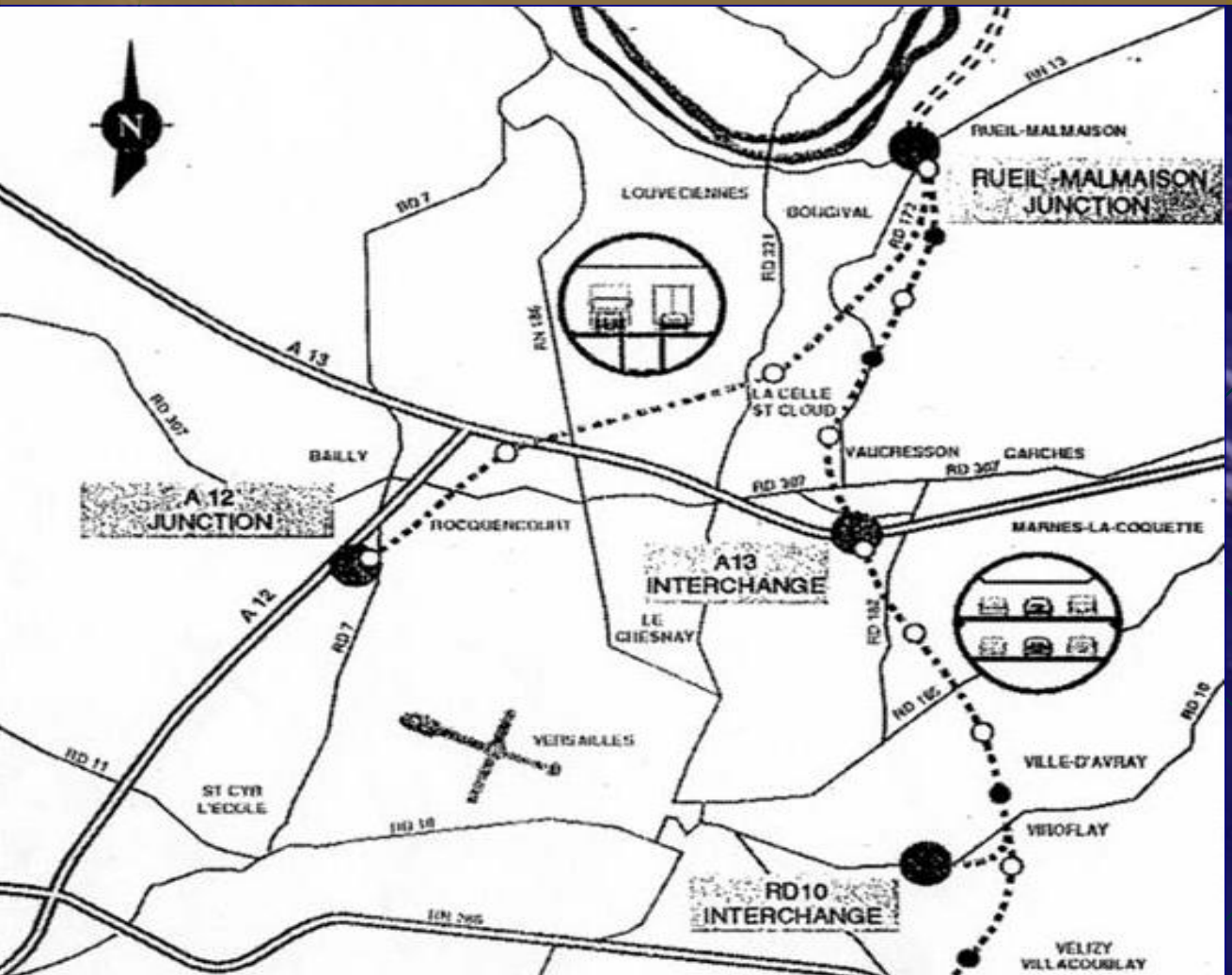
Fresh Thinking on Capacity Expansion

- Dilemma: major metro areas need more highway capacity—but there is fierce opposition to taking more land; also concerns over noise and emissions.
- Commercial solutions:
  - Go under—urban toll tunnels
  - Go up—elevated lanes within existing fight of way
  - Contain noise with new approaches
  - Charge highway providers for emissions

Paris Toll Tunnel: A86 Ring Road



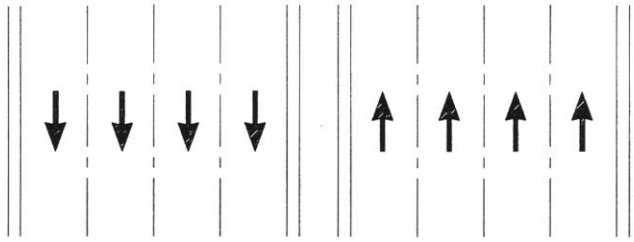
Paris Toll Tunnel: A86 Ring Road - Detail



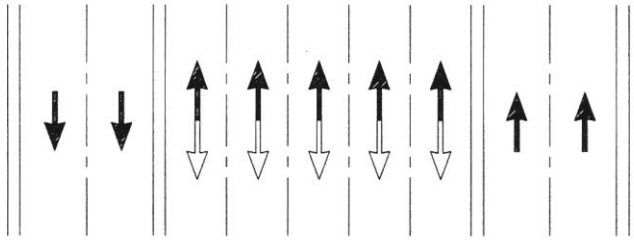
Other New Urban Toll Tunnels

- Melbourne CityLink—operational
- Marseilles Tunnel de Carenaga—operational
- Lyon Blvd. Peripherique tunnels—operational
- Sydney Airport Motorway tunnel--operational
- Sydney Cross-City Tunnel—under construction
- Prague Mrazovka Tunnel—under construction
- Dublin Port Tunnelway—under construction
- Dallas LBJ (I-635) HOT lane tunnels—design stage
- I-710 missing link, S. Pasadena--proposed
- Riverside-Orange County Tunnel—proposed

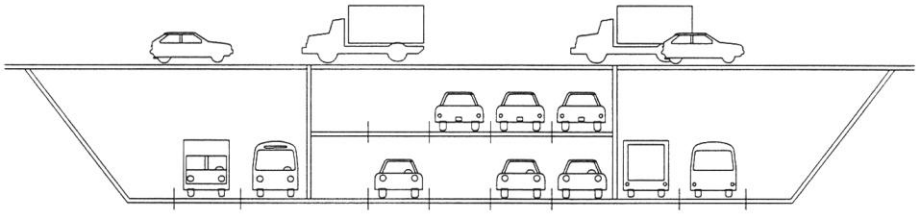
Elevated Lanes
Adding Capacity within Existing Footprint



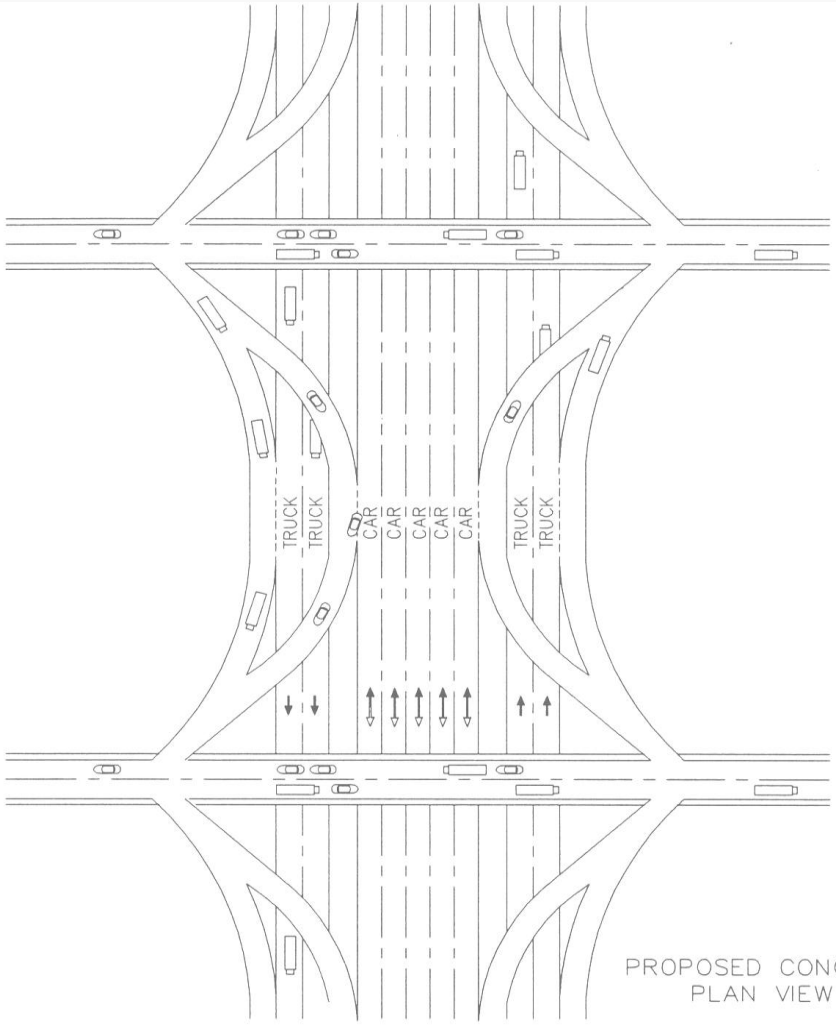
EXISTING 8–LANE FACILITY
PLAN VIEW



PROPOSED CONCEPT
PLAN VIEW



PROPOSED CONCEPT
CROSS–SECTION

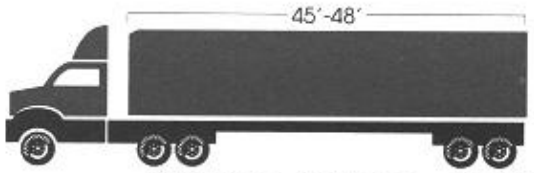


PROPOSED CONCEPT
PLAN VIEW

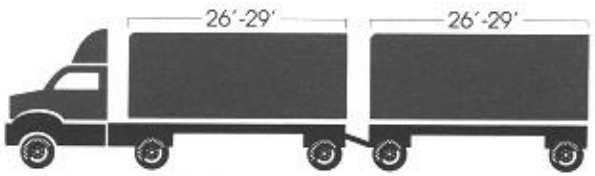
Toll Truckways:
A Win-Win Proposition

- Heavy-duty lanes designed for LCVs
- Built in existing right of way on long-distance Interstate routes
- Open (voluntarily) to all trucks; mandatory for LCVs in non-LCV states
- Self-funding from tolls, charged electronically

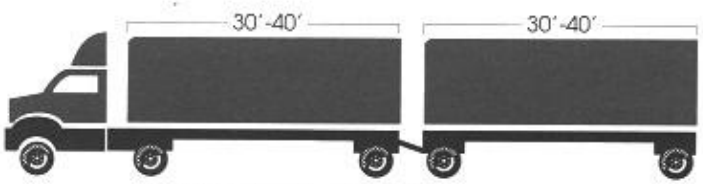
What Are LCVs?



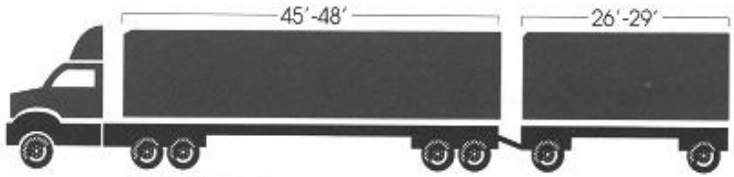
Standard Tractor - Semitrailer



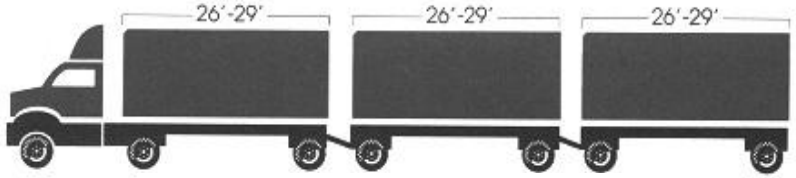
STAA Double



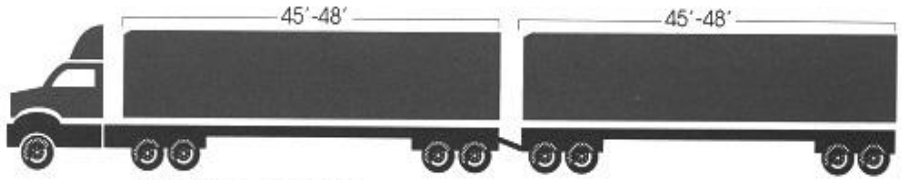
Intermediate Double



Rocky Mountain Double

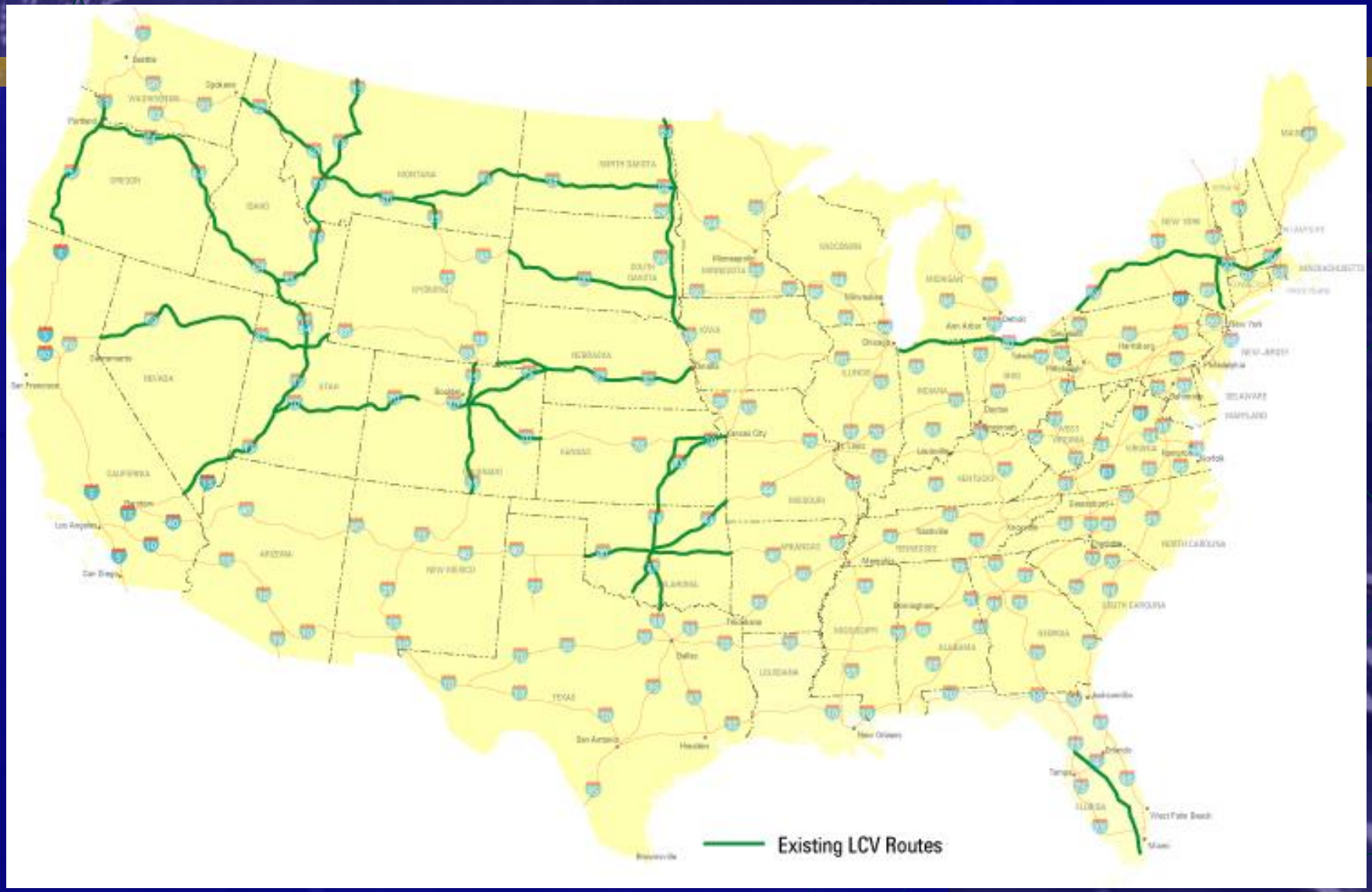


Triple

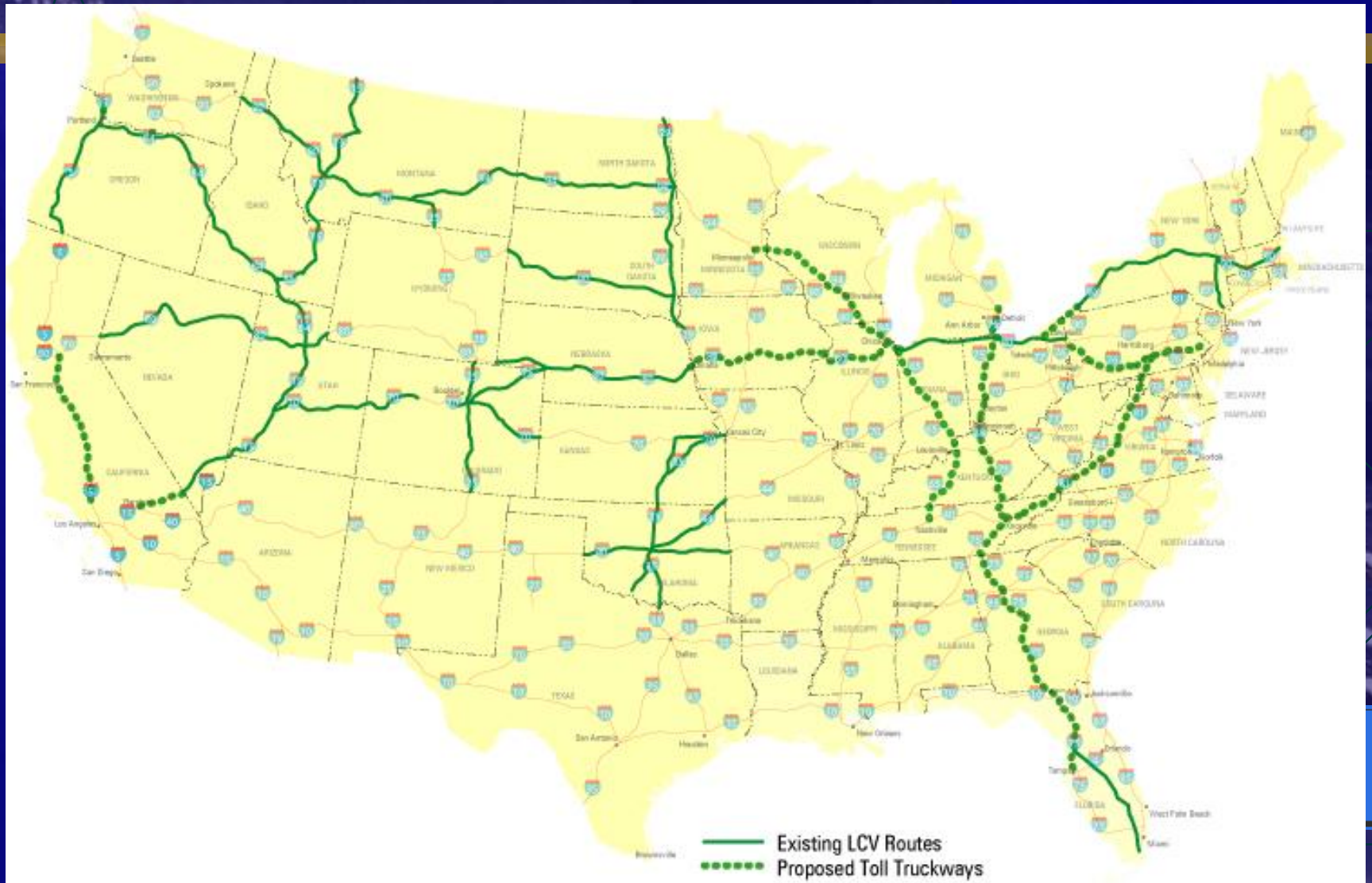


Turnpike Double

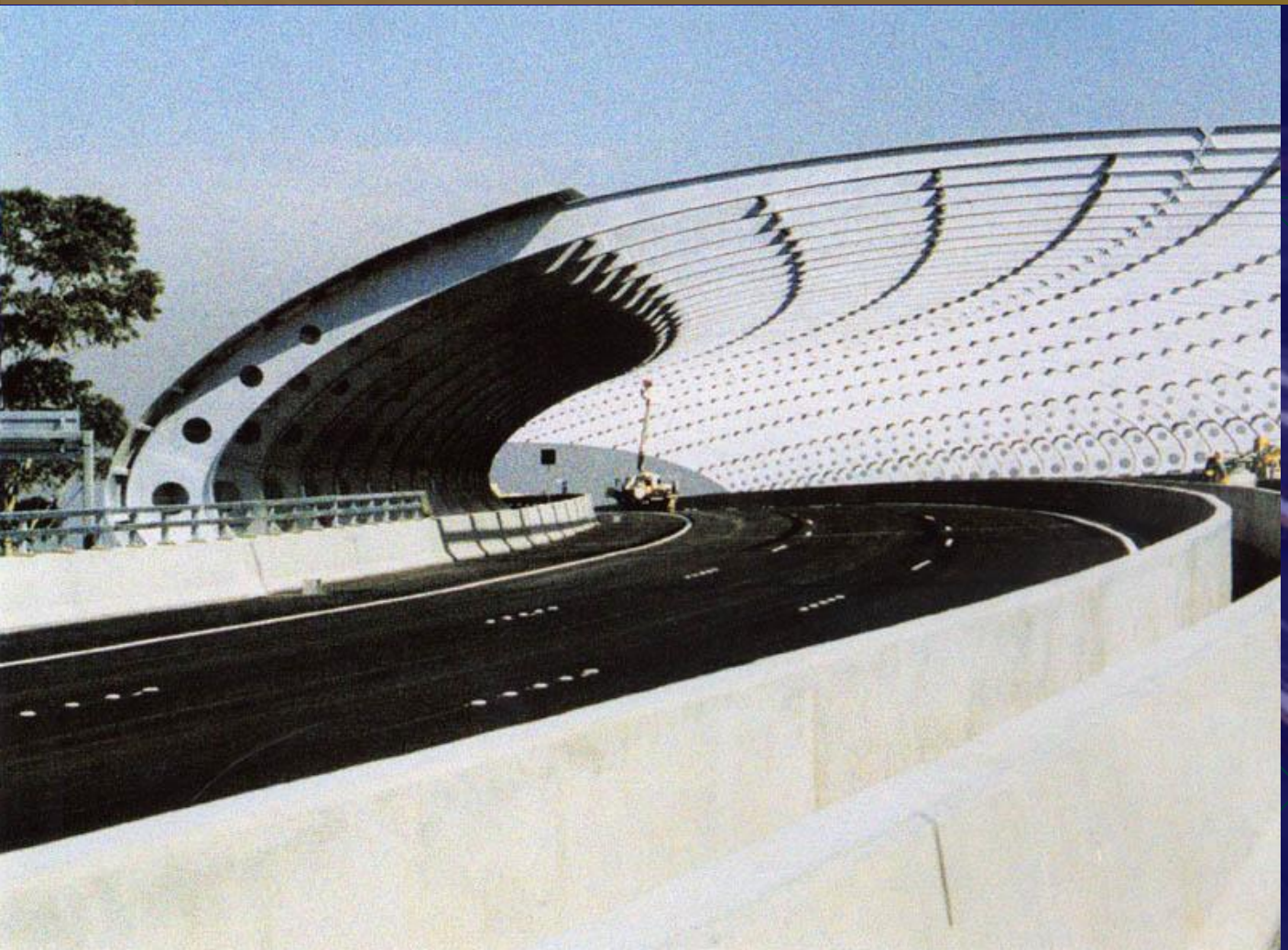
Existing LCV Routes



Proposed Toll Truckway Pilot Corridors



Noise Solutions



- New kinds of noise barriers
- Possible noise-canceling technology

Emissions Mitigation

- Tunnels—route exhaust to scrubbers in vent stacks
- Enclosed elevated lanes—likewise
- Other new capacity—charge emission fees to roadway company

How to pay for all this? Users should pay the full, real cost of new capacity.

Evidence from recent BOT projects

- Paris A-86 toll tunnels:
  $2 billion, all privately financed, to be covered by tolls
- Melbourne CityLink:
  $1.4 billion, likewise
- Cross-Israel Hwy:
  $1.1 billion, likewise
- Toronto 407:
  $2.1 billion, likewise

Other Advantages of Tolls and Private Capital

Risk transfer from taxpayers to investors

- Channel Tunnel vs. Big Dig

Weeding out of pork-barrel projects

- ROI, not political gain, key to project selection

Risk Transfer to Private Sector

	Traditional	Long-Term PPP
Funding Source	Highway trust funds	Toll revenue bonds, equity
Procurement Process	Design-Bid-Build	Design-Finance-Build-Operate
Cost Overruns?	Taxpayers	Investors
Schedule Slips?	Drivers	Investors
Traffic Risk?	Taxpayers	Investors
Maintenance Funds	Annual appropriations	Toll revenues
Maintenance Incentive	Public complaints	Asset value

Politics of Highway Commercialization

- Anti-toll sentiment
- Equity issues
- Auto-mobility—cars vs. transit

Addressing Concerns Over Paying Tolls

- ETC can eliminate all toll booths within the next decade—if we choose.
- Double-taxation argument: easy to provide rebates of gas taxes
- Privacy is a non-issue
  - Anonymous transponder accounts
  - Stored-value cards report only transaction amount

Equity is also a Non-issue

- First point: compared to what? Current transportation funding is regressive (fuel and sales taxes)
- We accept price/quality choices in airlines, electricity, telecom, restaurants, etc.—but also in government-provided Amtrak and Postal Service. Why not in highways?
- All income levels appreciate having choices when traveling
  - Single mom with child in day care
  - Plumber getting in one more call
- The poor use transit (most of which is bus) which will be improved via pricing.

Auto-mobility: Cars vs. Transit

- Philosophical choice: suburbs vs. “smart growth”
  - Highways generally follow, rather than leading, suburban growth
  - Transit a bad fit for low-density suburbs
  - New urbanism probably a niche market—but let the market decide
- Investment alternatives:
  - Highways are 85-100% user funded (capital + operations/maint.)
  - Transit is 100% taxpayer funded (capital) and only 20-40% user funded (O&M)

Highway commercialization will lead to a more level playing field between highways and transit

- With real costs of new highways presented to users, we'll only build what users will pay for—but that's probably more than they are getting now.
- With freeways priced, more will opt for transit.
- Congestion-free managed lanes can be made available to buses at no charge, as a condition of the franchise. Hence, they become busways.

HOT Networks: marriage of HOT lanes and Bus Rapid Transit

- Seamless network of priced, congestion-free lanes overlaid on existing freeway system.
- Incorporates/converts existing HOV lanes; adds new lanes and interchange connectors
- Buses and vanpools go free; all others pay market price.
- Modeled for eight major metro areas
  - Total capital cost = $43 billion
  - Toll revenue bonds would cover 2/3 of that cost.

Examples of HOT Networks

Steps toward the new paradigm

- 18 states now have public-private partnership laws for transportation
- 12 metro areas considering or planning new HOT lane projects
- Possible FAST lanes and variable pricing provisions in next federal surface transportation bill
- New TRB special committee studying replacement of fuel taxes for highway funding.

What's Now Pending in Congress (House and Senate bills)

Provision	House (HR 3550)	Senate (S.1072)
HOT Lanes	Permits conversion to HOT: - Exemption for LE/EE vehicles - Reduced tolls for low-income	Permits conversion to HOT: - Exemption for LE/EE vehicles
FAST Lanes	Allows adding new toll lanes to Interstates: - Must use ETC - Must remove tolls when "paid for" - Use must be voluntary.	Allows adding new toll lanes to Interstates: - Must use variable tolls & ETC - Surplus tolls may be used for any highway or transit project
Interstate Reconstruction	No provision	Up to 3 pilot projects using tolls to rebuild Interstates
Value Pricing	No provision	Office and grants, $11M/yr.
Dedicated Truck Lanes	Pilot program, $80-170M/yr. - Innovative financing encouraged	No provision
Toll/PPP Feasibility	$50M for one pilot project; Study on PPPs by NAS	Up to 10 PPP projects
Private Activity Bonds	No provision	Up to $15B for highway projects
TIFIA	Lowers min. to $50M	Lowers min. to $50M
SIBs	Expands to all 50 states	Expands to all 50 states