



18th Annual Municipal Green Building Conference & Expo

Climate Change Solutions in the New Abnormal
Downey, CA April 18, 2019

Understanding
Zero-Emission Technologies
and Their Impacts

Use Energy
Responsibly

3COTECH
Redefining Sustainability

Figure IV: The Evolving Risks Landscape, 2009 – 2019

Top 5 Global Risks in Terms of Likelihood

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1st	Asset price collapse	Asset price collapse	Storms and cyclones	Severe income disparity	Severe income disparity	Income disparity	Interstate conflict with regional consequences	Large-scale involuntary migration	Extreme weather events	Extreme weather events	Extreme weather events
2nd	Slowing Chinese economy (<6%)	Slowing Chinese economy (<6%)	Flooding	Chronic fiscal imbalances	Chronic fiscal imbalances	Extreme weather events	Extreme weather events	Extreme weather events	Large-scale involuntary migration	Natural disasters	Failure of climate-change mitigation and adaptation
3rd	Chronic disease	Chronic disease	Corruption	Rising greenhouse gas emissions	Rising greenhouse gas emissions	Unemployment and underemployment	Failure of national governance	Failure of climate-change mitigation and adaptation	Major natural disasters	Cyber-attacks	Natural disasters
4th	Global governance gaps	Fiscal crises	Biodiversity loss	Cyber-attacks	Water supply crises	Climate change	State collapse or crisis	Interstate conflict with regional consequences	Large-scale terrorist attacks	Data fraud or theft	Data fraud or theft
5th	Retrenchment from globalization	Global governance gaps	Climate change	Water supply crises	Mismanagement of population	Cyber-attacks	High structural unemployment or underemployment	Major natural catastrophes	Massive incident of data fraud/theft	Failure of climate-change mitigation and adaptation	Cyber-attacks

Top 5 Global Risks in Terms of Impact

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1st	Asset price collapse	Asset price collapse	Fiscal crises	Major systemic financial failure	Major systemic financial failure	Fiscal crises	Water crises	Failure of climate-change mitigation and adaptation	Weapons of mass destruction	Weapons of mass destruction	Weapons of mass destruction
2nd	Retrenchment from globalization (developed)	Retrenchment from globalization (developed)	Climate change	Water supply crises	Water supply crises	Climate change	Rapid and massive spread of infectious diseases	Weapons of mass destruction	Extreme weather events	Extreme weather events	Failure of climate-change mitigation and adaptation
3rd	Oil and gas price spike	Oil price spikes	Geopolitical conflict	Food shortage crises	Chronic fiscal imbalances	Water crises	Weapons of mass destruction	Water crises	Water crises	Natural disasters	Extreme weather events
4th	Chronic disease	Chronic disease	Asset price collapse	Chronic fiscal imbalances	Diffusion of weapons of mass destruction	Unemployment and underemployment	Interstate conflict with regional consequences	Large-scale involuntary migration	Major natural disasters	Failure of climate-change mitigation and adaptation	Water crises
5th	Fiscal crises	Fiscal crises	Extreme energy price volatility	Extreme volatility in energy and agriculture prices	Failure of climate-change mitigation and adaptation	Critical information infrastructure breakdown	Failure of climate-change mitigation and adaptation	Severe energy price shock	Failure of climate-change mitigation and adaptation	Water crises	Natural disasters

■ Economic
 ■ Environmental
 ■ Geopolitical
 ■ Societal
 ■ Technological

Source: World Economic Forum 2009–2019, Global Risks Reports.

Note: Global risks may not be strictly comparable across years, as definitions and the set of global risks have evolved with new issues emerging on the 10-year horizon. For example, cyberattacks, income disparity and unemployment entered the set of global risks in 2012. Some global risks were reclassified: water crises and rising income disparity were re-categorized first as societal risks and then as a trend in the 2015 and 2016 *Global Risks Reports*, respectively.



COBRA EFFECT

Photo: Mohan Moolepetlu



COBRA EFFECT

UNINTENDED CONSEQUENCES

PERVERSE RESULT: INTENDED SOLUTION MADE A PROBLEM WORSE

ALSO: UNEXPECTED DRAWBACK & UNEXPECTED BENEFIT

Photo: Mohan Moolepetlu

Our Decision-Making Process

- 
- Do we realize elements of informed decision-making?
 - Do we have sufficient information?
 - Are we asking the right questions?
 - How do we deal with uncertainty?

Photo: Victoriano Izquierdo

MOTIVATED REASONING

*Emotion-biased
decision-making
phenomenon*

How Do We Deal with Uncertainties?

- Trends & Forecasting
- Lessons Learned
- Best Practices
- Known Unknowns
- Unknown Unknowns

How Do We Make Informed Decisions?

- Our Role In Decision-Making, Think “Long-Term”
- Information: Facts, Data, Insights
- Context and Local Dynamics
- Alternatives, Benefits, Risks and Other Uncertainties
- Our Understanding and Preferences
- Commit To Your Decisions But Stay Open Minded

Do We Know Where We Live?

Local & Regional Context: Southern California

QUESTION

California is the 5th largest economy in the world.
Does anyone know how the Southern California
economy ranks? (SCAG region)

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ANSWER

15th LARGEST ECONOMY IN THE WORLD

SCAG includes 6 Counties: Los Angeles, Ventura, Orange, San Bernardino, Riverside, and Imperial.

QUESTION

How many people live in the SCAG region?

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ANSWER

19.1 MILLION RESIDENTS

SCAG: 191 Cities, 48.1% State Population, 5.8% U.S. Population

QUESTION

How many travelers pass through LAX each year?

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ANSWER

85 MILLION PASSENGERS ANNUALLY

LAX is the busiest airport in the world by origination & destination

QUESTION

What is the market share of the San Pedro Bay ports?

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ANSWER

32% OF ALL U.S. CARGO COMES THROUGH THE PORTS

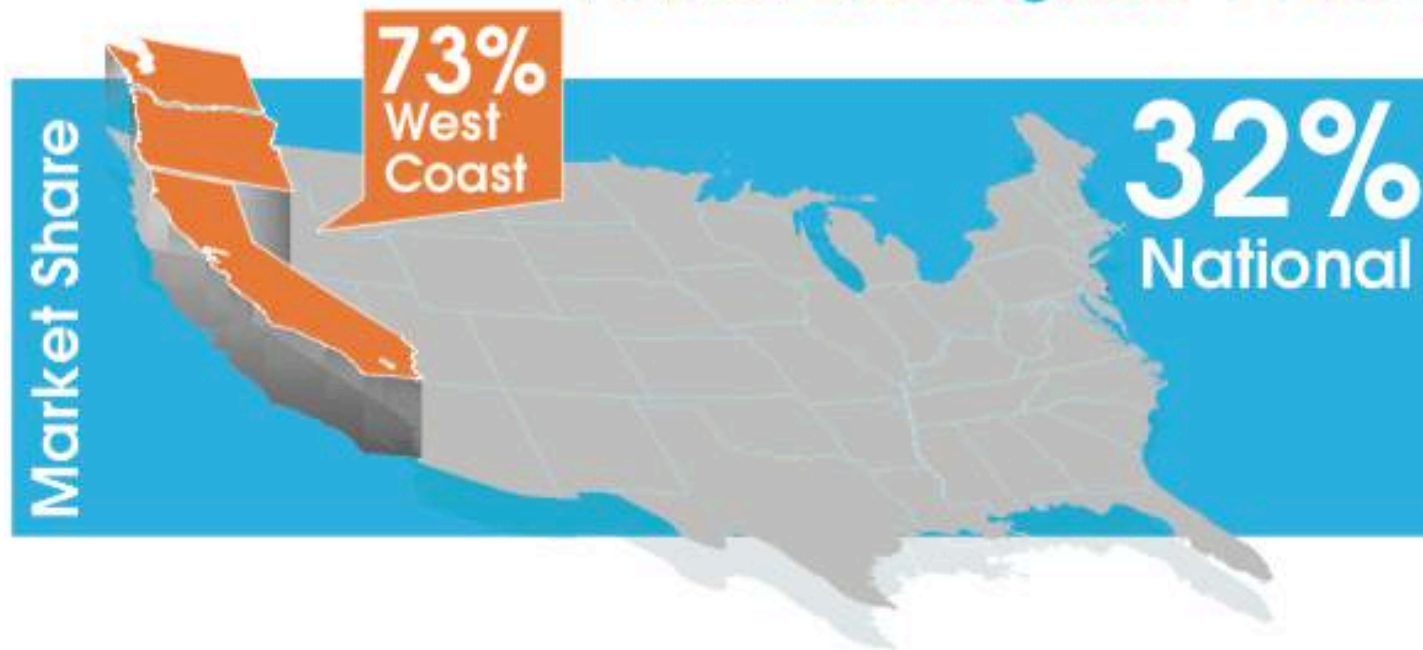
\$500 billion in the containerized trade or nearly 16 million TEUs in 2017

\$5 billion annually in revenues from Los Angeles-Long Beach for U.S. Customs

\$4.9 billion a year in local, state and general federal taxes from port-related trade

San Pedro Bay Port Complex

Port of Los Angeles + Port of Long Beach



- 190,000 jobs in Los Angeles/ Long Beach (1 in 12)
- 992,000 jobs in five-county region (1 in 9)
- 2.8 million jobs throughout the U.S.

Source: Port of Los Angeles

QUESTION

How many shoes can fit in the megaship Benjamin Franklin?

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How many shoes can fit in the megaship Benjamin Franklin?

ANSWER

90 MILLION SHOES



Photo: The Port of Long Beach



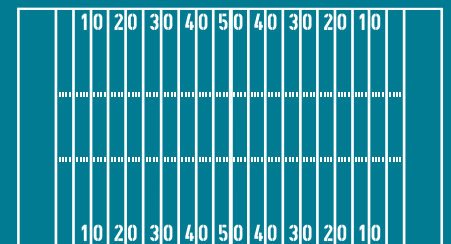
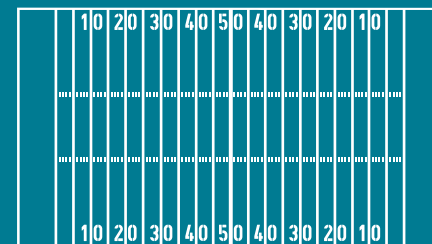
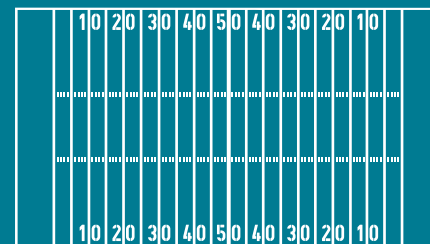
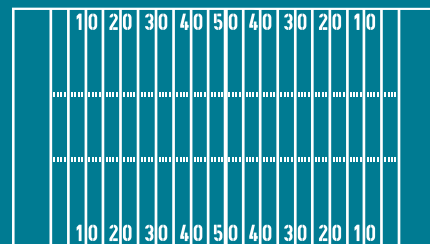
20
STORIES
TALL

CAPACITY of



90
MILLION
pairs of shoes

LONGER than



FOUR FOOTBALL FIELDS

Photo: Port of Long Beach

QUESTION

Which CA port trades the most bananas?

QUESTION

Which CA port trades the most bananas?

ANSWER

THE PORT OF HUENEME

The Port moves over 650,000 tons of bananas annually

Bananas are the Port's largest imports

If you lined up all the bananas that come through the Port each year, it would be enough to go nearly 13 times around the globe

Up to 40% of California's squid can be distributed through the Port of Hueneme on any given year

Go Bananas on September 28th 2019 at the Port's annual Banana Festival

QUESTION

What are the top exports through LA customs?

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ANSWER

CIVILIAN AIRCRAFT & PARTS, \$6.97 BILLION

Source: WorldCity 2018

Other top exports: Computer Chips, Diamonds, Gold, Motor Vehicles, Cell Phones, Cotton, Motor Vehicles Parts, Medical Instruments, and Computers

Top imports: Computers, Motor Vehicles, Oil, Cell Phones, TVs & Computer Monitors, Printers, Furniture, Toys & Bicycles, Shoes Made of Fabric, and Sweaters

QUESTION

How many square feet of industrial warehousing is in the LA area?

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ANSWER

1.7 BILLION SQ FT OF INDUSTRIAL PORT-DEPENDENT WAREHOUSING EXISTS IN THE LA REGION

50% is in Los Angeles County and about 24% in San Bernardino and Riverside

QUESTION

How long is the Alameda Corridor?

QUESTION

How long is the Alameda Corridor?

ANSWER

20 MILES

The Alameda Corridor links the Ports of Los Angeles and Long Beach to the transcontinental rail network near downtown Los Angeles. It eliminated conflicts at 200 at-grade crossings, and provided a 20-mile-long high-speed freight expressway.

The Alameda Corridor Transportation Authority (ACTA) is a joint powers authority formed by the cities of LA and LB.

The privately-owned Pacific Harbor Line operates this special-use corridor.

QUESTION

When did the SPB ports ban pre-1989 trucks?

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ANSWER

2008

The Clean Trucks Program introduced a progressive ban on all trucks that did not meet 2007 emission standards by 2012 and reduced port truck emissions by 90%.

The 2008 model year truck would only be allowable for operation in the state until 2023, per CARB's Truck and Bus Regulation.

The Ports have proposed to assess a rate on trucks beginning in 2020, unless they are near-zero or zero-emissions.

QUESTION

Which media company invested in infrastructure improvements in LA?

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ANSWER

NBC Universal

In addition to new attractions at the Universal Studios Hollywood theme park, the Evolution Plan creates new and innovative private sector solutions for transportation and transit enhancements, such as connectivity to many intermodal transit options and congestion-relief, as well as environmental improvements.



Photo: City of Los Angeles

QUESTION

How many solar panels have been installed in LA?

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ANSWER

419.88 MEGA WATTS TOTAL SOLAR PV INSTALLED

Source: Environment America Research & Policy Center

Solar PV per Capita: 104.98 Watts National Rank: 14

Total Solar PV Installed: 419.88 MW National Rank: 1

Small Building Rooftop Solar Potential: 5,444 MW

QUESTION

Where does our water come from?

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ANSWER

45% Imported & 55% Local Supplies

About 45% of Southern California's water supply comes from Northern California via the State Water Project and from the Colorado River via the Colorado River Aqueduct.

Local Supplies include recycled water, desalination, groundwater, exchanges & water banking, and conservation.

QUESTION

How many jobs are connected to goods movement?

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ANSWER

992,000 JOBS (1 in 9) REGIONAL JOBS IN 2018

Port-related employment

- 51,000 jobs in Long Beach (1 in 5)
- 148,000 jobs in Los Angeles (1 in 13)
- 576,000 jobs (or one in 20) in the five-county Southern California region
- 3 million jobs throughout the U.S. are related to SPB port-generated trade

QUESTION

What agency administers the Measure M program?

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ANSWER

LA METRO

Measure M is estimated to generate \$120 billion in revenue over the next 40 years.

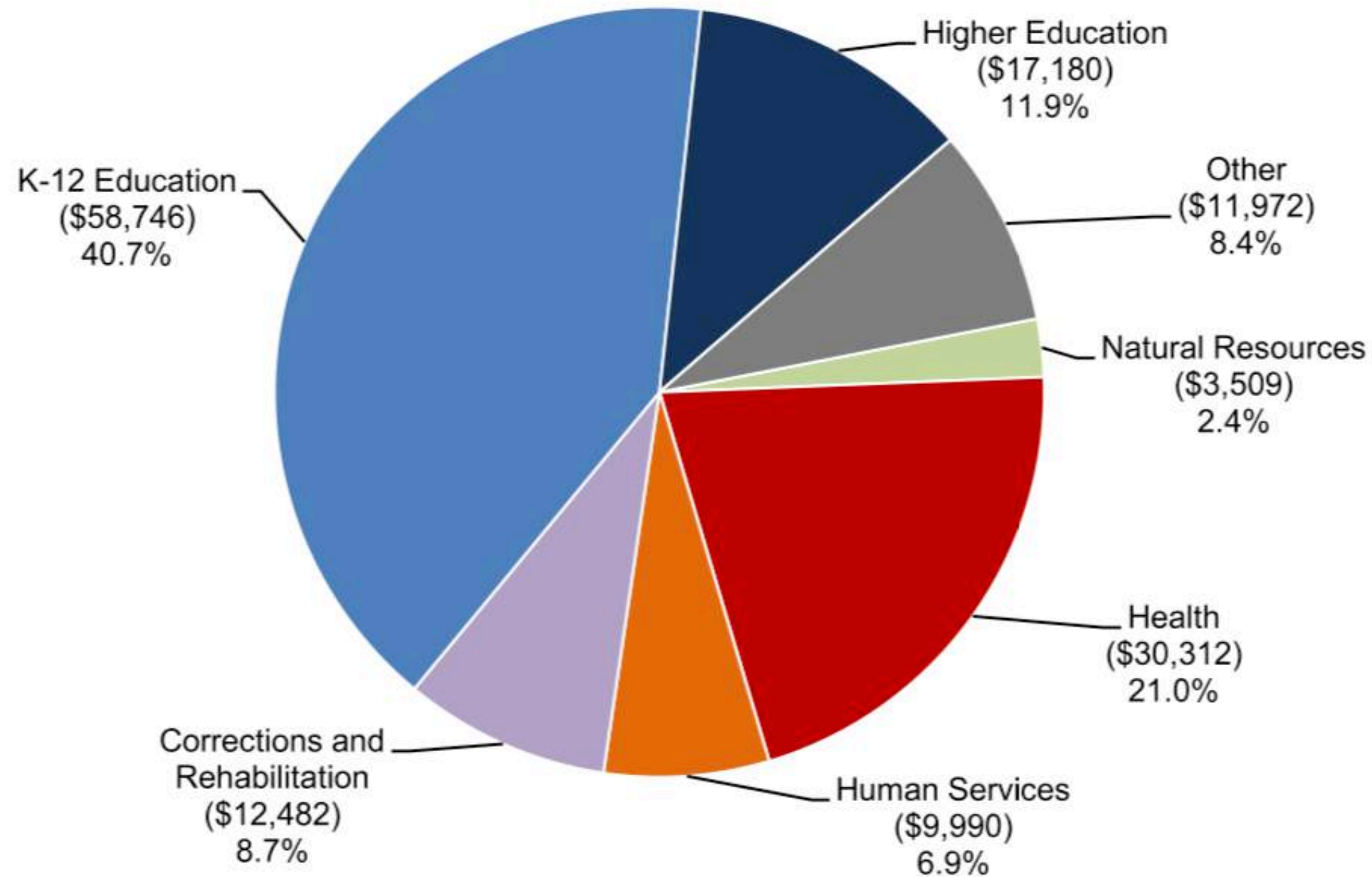
The measure is a half-cent sales tax with a no sunset provision that extends an existing half cent tax (Measure R) set to expire in 2039 to continue indefinitely.

California's Business Climate

- 2nd worst in the U.S., slightly better than New Jersey.
- In 2016, 1,800 companies left California, according to the Dallas Business Journal.
- The result: 275,000 jobs and \$76.7 billion in capital funds were diverted to other states in 2016 alone.
- North Face headquarters moving from Alameda to Denver, with 650 jobs.

Source: CalTax

2019-20
General Fund Expenditures
(Dollars in Millions)



Source: <http://ebudget.ca.gov/budget/2019-20/#/BudgetSummary>

Drivers - Snapshot

- SB1
- SB100
- 28 by '28
- LAX LAMP
- SPB CAAP and TAP
- MWD Innovation

YOUR TAX DOLLARS AT WORK

REBUILDING CALIFORNIA



BE WORK ZONE ALERT



Source: Caltrans

CALIFORNIA'S CLEAN ENERGY AND CLIMATE GOALS



Renewable Target Date	2017	2020	2030	2045
Renewable Target Goal	20%	33%	50%	100%
Date Legislation Passed	2002 (SB 1078)	2011 (SB 2 1X)	2015 (SB 350)	

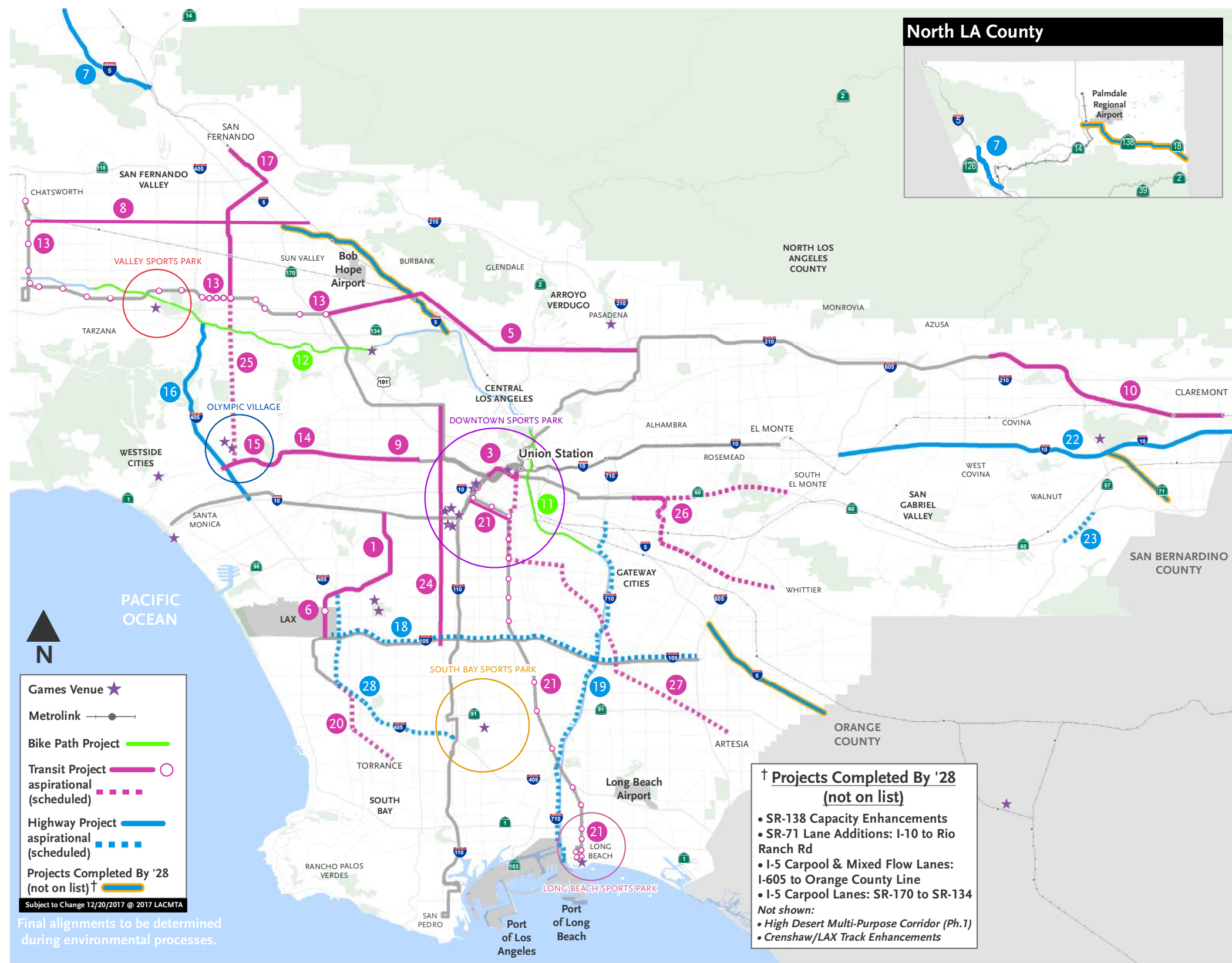
28 Years Back & 28 Years Ahead



RPS = Renewable Portfolio Standard

Source: CA Senate SB 100

DRAFT TWENTY-EIGHT BY '28 PROJECT LIST— TRANSPORTATION INVESTMENT GUIDE IN TANDEM WITH THE 2028 OLYMPICS AND PARALYMPIC GAMES



Transit Projects

- 1. Crenshaw/LAX Line
- 3. Regional Connector
- 5. Orange and Red Lines to Gold Line Transit Connector (North Hollywood to Pasadena)
- 6. Airport Metro Connector Station
- 8. North San Fernando Valley
- 9. Purple Line Extension Section 1
- 10. Gold Line Foothill Extension to Claremont (with ability to extend to Montclair)
- 13. Orange Line Travel Time and Safety Improvements
- 14. Purple Line Extension Section 2
- 15. Purple Line Extension Section 3
- 17. East San Fernando Valley
- 20. South Bay Light Rail Extension*
- 21. Blue Line Signal and Washington/Flower Junction Improvements**
- 24. Vermont Transit Corridor
- 25. Sepulveda Transit Corridor*
- 26. Gold Line Eastside Ext. to Whittier or South El Monte*
- 27. West Santa Ana Branch*

Highway Projects

- 7. I-5 North County Capacity Enhancements
- 16. Sepulveda Pass ExpressLanes
- 18. I-105 ExpressLanes*
- 19. I-710 South Corridor Early Action*
- 22. I-10 Express Lanes I-605 to San Bernardino Line**
- 23. SR-57/SR-60 Interchange Improvements*
- 28. I-405 South Bay Curve Improvements*

Bike Path Projects

- 11. LA River Waterway & System Bike Path
- 12. LA River Bike Path and Mobility Hub - San Fernando Valley
- Not shown: Microtransit**, New Bus Rapid Transit Corridors (Phase 1)
- * aspirational project (scheduled)
- ** non-Measure R nor Measure M project

Source: Metro

QUICK FACTS

The Automated People Mover (APM) is a 2.25-mile elevated guideway train system and the centerpiece of LAX's Landside Access Modernization Program (LAMP). The LAMP is designed to revolutionize the traveler experience by providing easy access to the airport and L.A. Metro's regional transportation system—improving reliability and mobility, while reducing congestion and emissions.

Construction Schedule:

Construction begins 2019;
fully operational in 2023

Design and Construction Cost:

\$2B

Job Creation:

More than 2,200
construction jobs

Ride Duration:

10 minutes end to end

Frequency:

Every two minutes

Cost to Ride:

Free for airport users

Source: LAWA

SAN PEDRO BAY PORTS CLEAN AIR ACTION PLAN (CAAP) 2017

FREIGHT
INFRASTRUCTURE
INVESTMENT AND
PLANNING



CLEAN VEHICLES,
EQUIPMENT
TECHNOLOGY AND
FUELS



FREIGHT
EFFICIENCY



ENERGY
RESOURCE
PLANNING



Photo: Port of Long Beach

MAKING CONNECTIONS THAT MATTER

Meet other entrepreneurs, investors and professionals through our innovation portal



SNAPSHOT OF SUCCESS



Outside technologies reviewed by **MWD** staff through our innovation programs: **280**



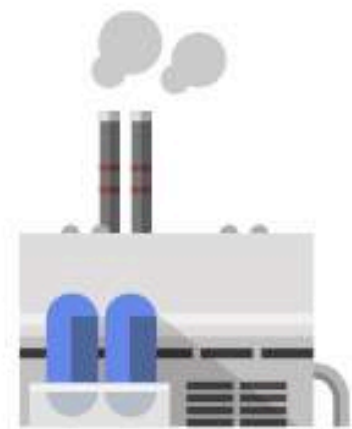
Participants in H2OTechConnect: **1000+**



Innovative conservation projects funded through the Water Savings Incentive Program: **79**



Total expected water savings from those **WSIP** projects: **29,561 acre-feet**



Pilot Projects funded under Innovative Funding Supplies: **13/\$3 million**

Source: Metropolitan Water District

The Power of the Community

- China Shipping
- Green Ports Policy
- SCIG




The California tradition of engaging with the public and private sectors, building partnerships, strategic coalitions, and special-purpose vehicles is like nothing else in the world.

Photo: Metro

Who Is a Stakeholder?

*“anyone who is affected by our actions,
has influence or power over it,
or has an interest in its success”*



In 2011, a coalition of environmental organizations and community groups led by the Natural Resources Defense Council filed a lawsuit against the Port of Los Angeles.

The port continued the construction until the court order stopped the work at the terminal in 2002. A few months later the port was forced to settle and pay more than \$80 million, which included delay damages to the client, programs to mitigate port-related impacts, and green development, including terminal equipment modifications, turn-off ship engines and shore power.

Photo: Kat Janowicz

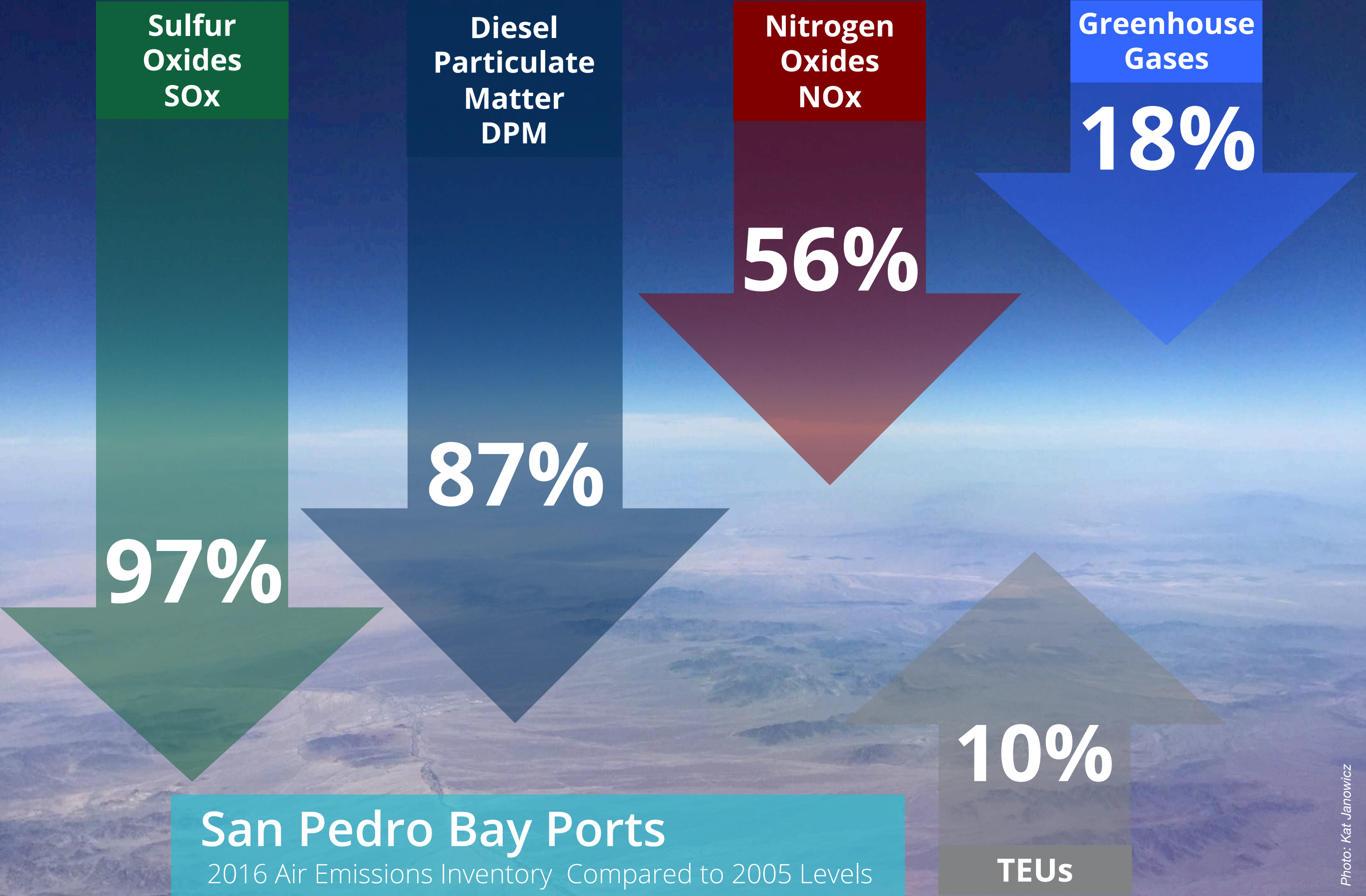


Photo: Kat Janowicz




In 2005, BNSF Railway proposed to build an intermodal facility and near-dock rail yard within the Port of Los Angeles.

The \$500-million Southern California International Gateway (SCIG) project would move cargo from both ports but was opposed by the City of Long Beach, Long Beach School District, business owners who leased property on the proposed site and several environmental organizations.

Photo: Jake Sloop

What Does It Take To Make a Community Emission Free?

A close-up photograph of a blue electric car parked at a public charging station. A blue charging cable is plugged into the car's charging port. The car's body is highly reflective, showing the surrounding urban environment. In the background, other vehicles and city buildings are visible but out of focus. A semi-transparent dark box containing white text is overlaid on the right side of the car.

*Can electric
cars make a
community
zero emission?*

Photo: YAY Images



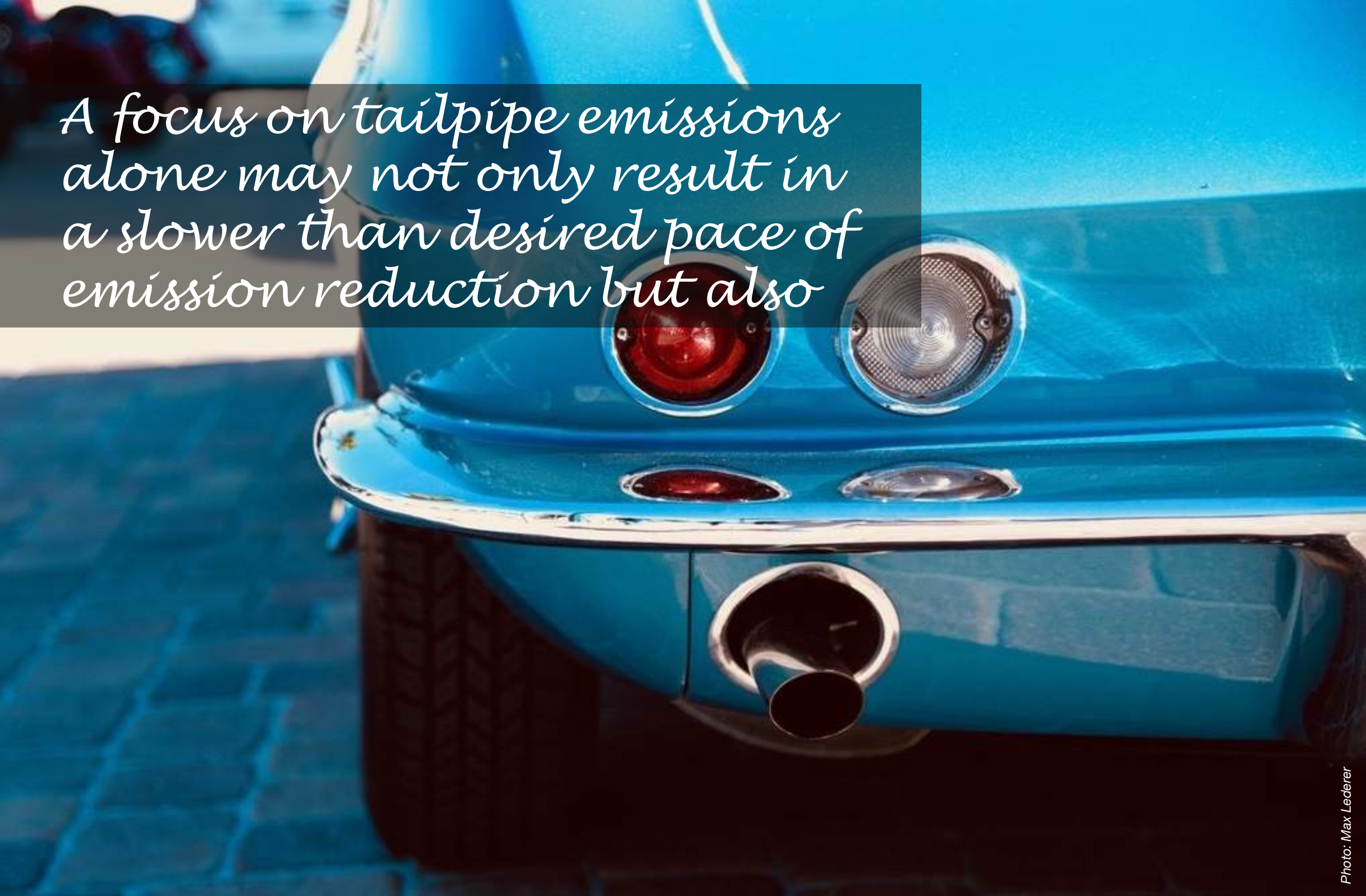
*What does it
take to make
an electric
car?*

Photo: YAY Images

A photograph of two men in a car repair shop. One man, wearing a blue jumpsuit, is holding a clipboard and a pen, looking down at it. The other man, wearing a yellow shirt, is looking at the clipboard with a concerned expression. They are standing next to a white car with its hood open. In the background, there is a blue car lift with the number '2' on it.

*What happens
when we no
longer need
it?*

Photo: YAY Images

A close-up photograph of the rear of a bright blue classic car. The image focuses on the rear end, showing two round taillights with red lenses and chrome surrounds. Below the taillights is a chrome bumper. A single, large, circular exhaust pipe is visible on the right side of the rear. The car is parked on a cobblestone street. A semi-transparent dark blue box is overlaid on the upper left portion of the image, containing white text.

A focus on tailpipe emissions alone may not only result in a slower than desired pace of emission reduction but also

Photo: Max Lederer



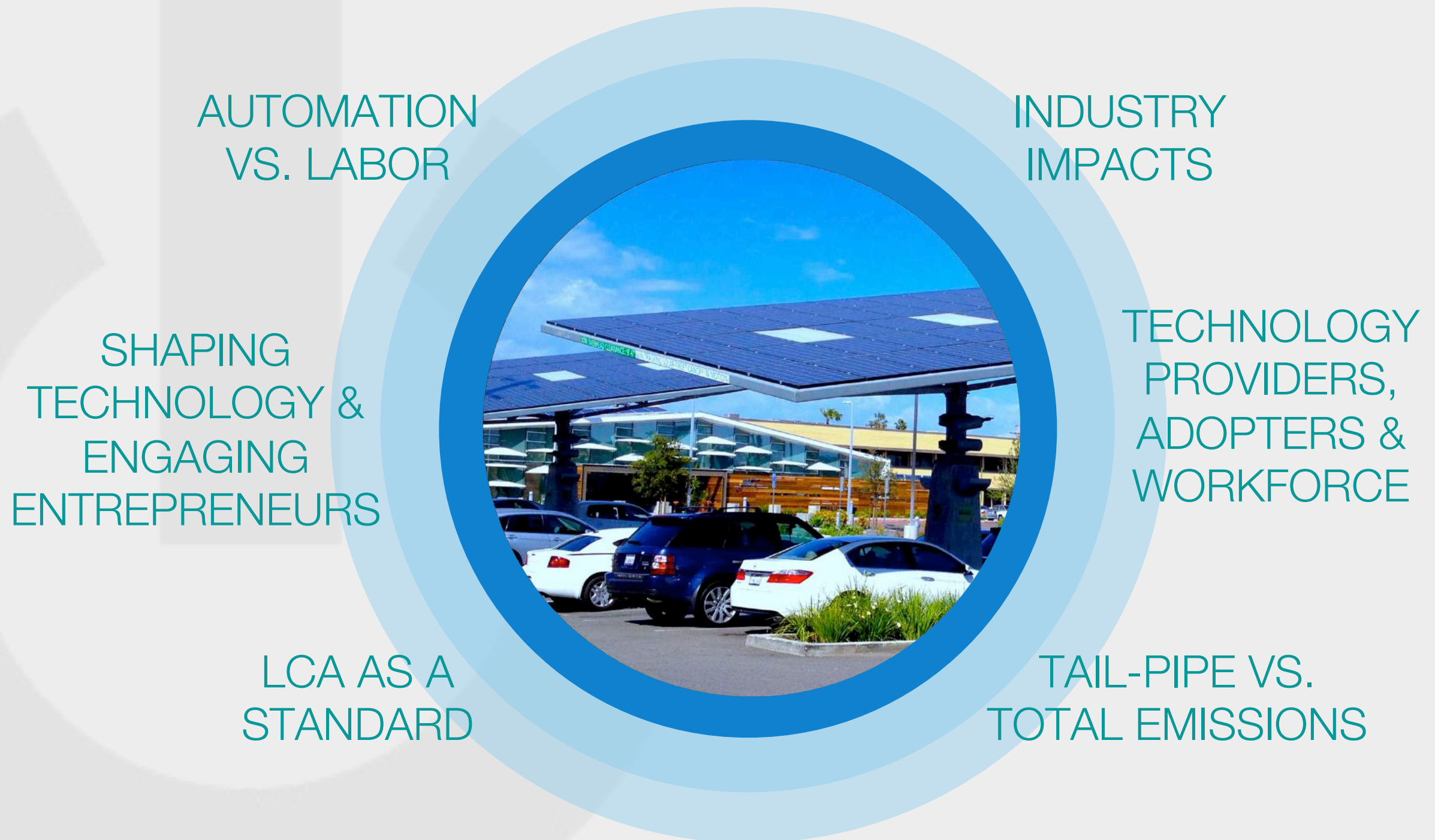
*an unsatisfactory shift
of emissions from one
particular area of
concern to another*

Photo: Nathan Dumlao

Complex Adaptive Systems

*where industrial, social, and sustainability considerations
are closely linked*

Zero-Emission Technologies



California Transportation

TRANSPORTATION
MODES

LIMITED ACCESS TO
PUBLIC TRANSIT

REDUCED
CAPACITY VS.
VMT

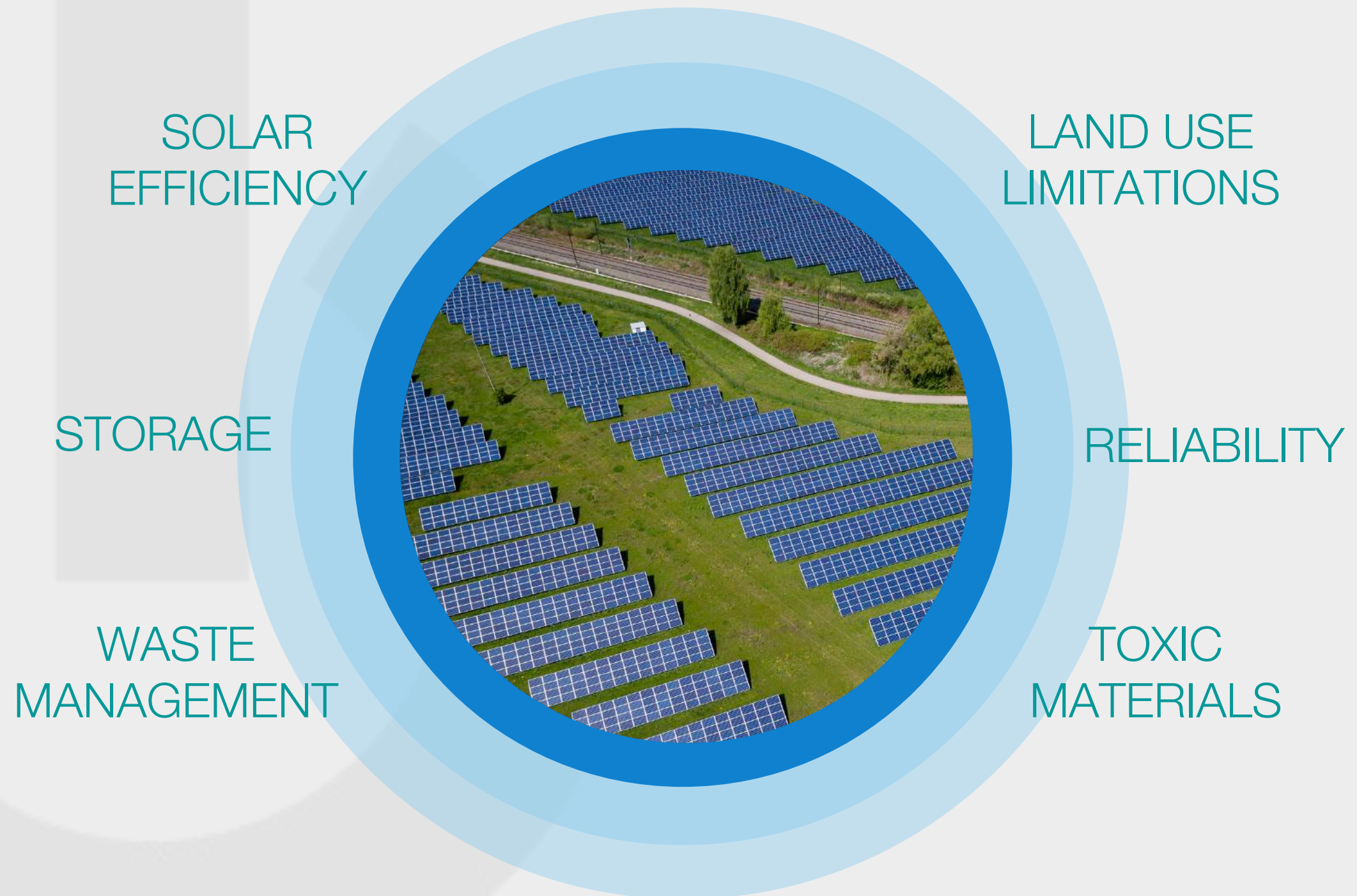
ADDRESSING
TRAFFIC &
CONGESTION

IMPACT ON
THE COMMUNITY &
ECONOMIC DEVELOPMENT

AIR QUALITY,
ENVIRONMENT &
TECHNOLOGY



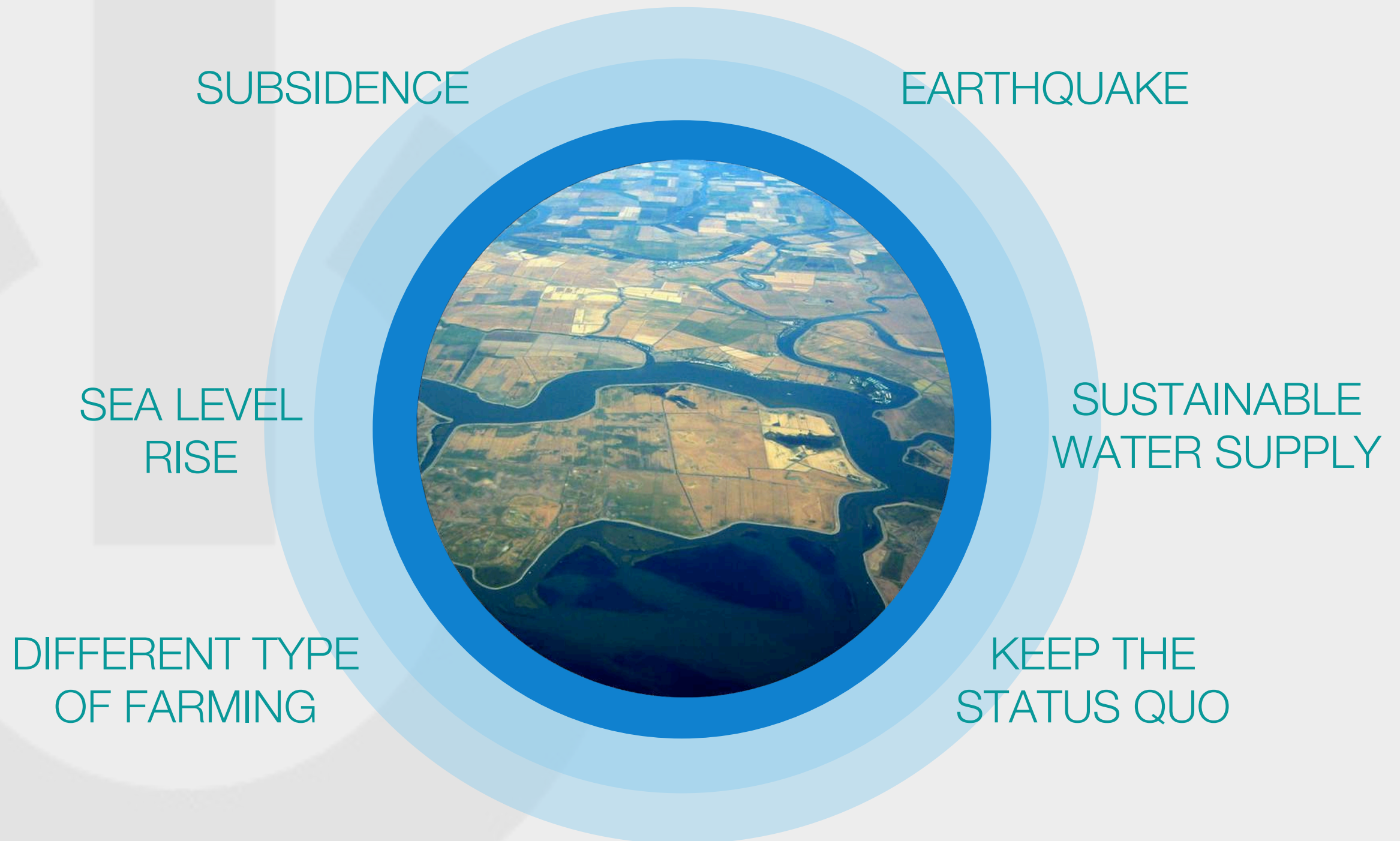
Renewables: Solar



Electric vs. Gas?



The Delta Sustainability





So How Will You Make Your Decisions?

Thriving & Healthy Community

AIR



WATER



FOOD



ENERGY



FUN



WORK



SOUTHERN CALIFORNIA REGIONAL OBJECTIVES

COMPETITIVENESS
& ECONOMIC
DEVELOPMENT



ENERGY, WATER &
ENVIRONMENTAL
SUSTAINABILITY



TECHNOLOGY &
INNOVATION



STAKEHOLDER
ENGAGEMENT



Thank you

Kat Janowicz, MSME, MBA, CEM, LEED GA, ENV SP
President

3COTECH, Inc.
224 W 8th Street
San Pedro, CA 90731
www.3cotech.com

310.853.1646
714.478.4434
kat@3cotech.com



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Photo: Sharon Mccutcheon