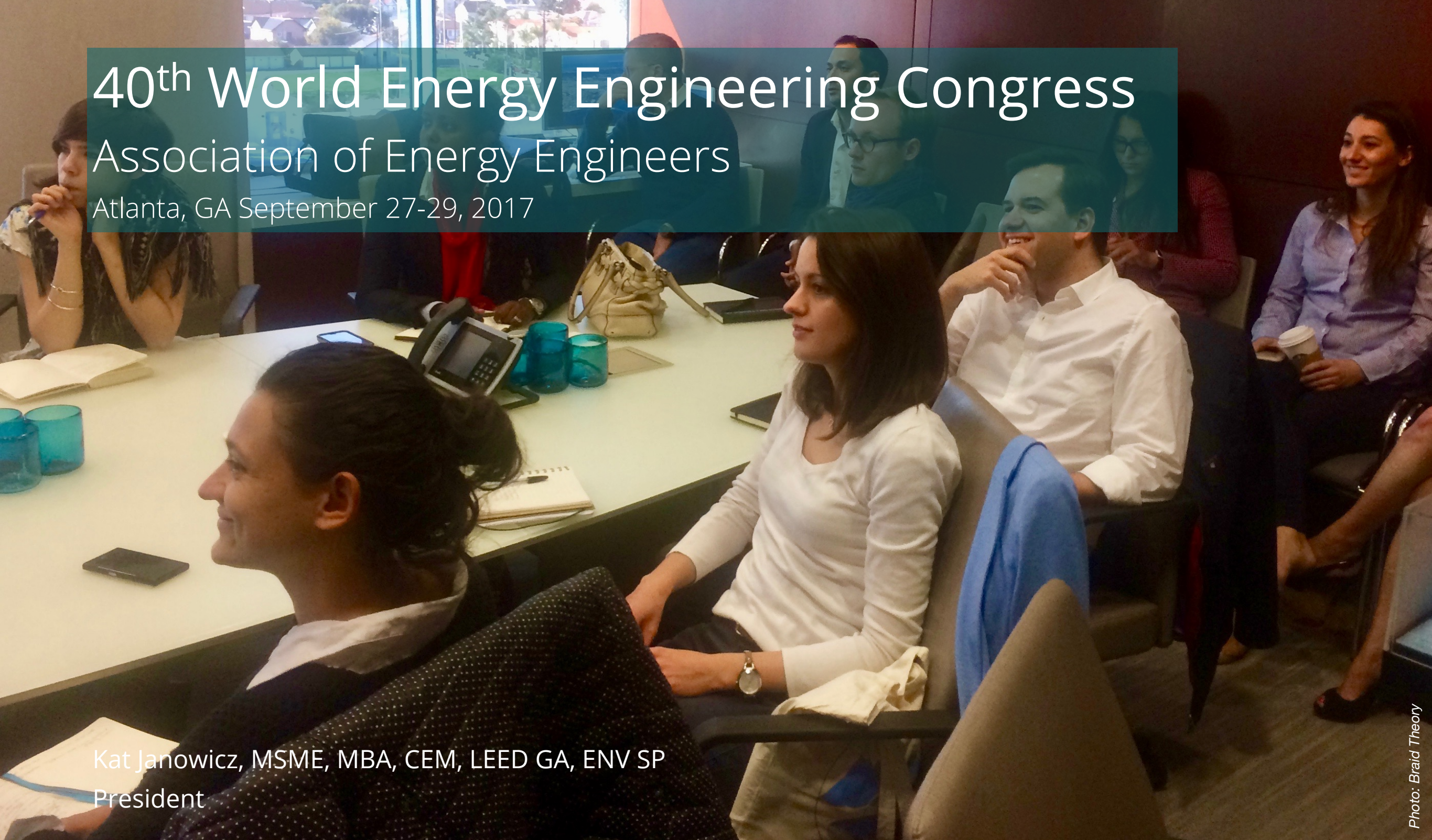


# 40<sup>th</sup> World Energy Engineering Congress

Association of Energy Engineers

Atlanta, GA September 27-29, 2017



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

Photo: Braid Theory

**Strategic Partnerships  
Drive Sustainable Energy  
Innovations**

Use Energy  
Responsibly

**3COTECH**  
Profitable Sustainability



# SOUTHERN CALIFORNIA REGIONAL OBJECTIVES

COMPETITIVENESS  
& ECONOMIC  
DEVELOPMENT



ENERGY, WATER &  
ENVIRONMENTAL  
SUSTAINABILITY



TECHNOLOGY &  
INNOVATION



STAKEHOLDER  
ENGAGEMENT







# San Pedro Bay Ports

Balancing environmental challenges  
with economic demands

Photo: Kat Janowicz



Sulfur  
Oxides  
SOx

Diesel  
Particulate  
Matter  
DPM

Nitrogen  
Oxides  
NOx

Greenhouse  
Gases

22%

56%

88%

97%

1%

TEUs

2016 Air Emissions Inventory

\*Compared to 2005 Levels



# 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



# EMISSION REDUCTION TARGETS

REDUCE POPULATION-WEIGHTED RESIDENTIAL CANCER RISK OF PORT-RELATED DPM EMISSIONS BY 85% BY 2020



REDUCE PORT-RELATED EMISSIONS BY 59 PERCENT FOR NOX, 93 PERCENT FOR SOX AND 77 PERCENT FOR DPM BY 2023



REDUCE GHGS FROM PORT-RELATED SOURCES TO 80% BELOW 1990 LEVELS BY 2050





# PORT-RELATED EMISSION SOURCES

ENERGY



TRUCKS



TRAINS



CARGO-HANDLING  
EQUIPMENT



SHIPS



HARBOR CRAFT







## TECHNOLOGY ADVANCEMENT PROGRAM

FACILITATE THE **DEVELOPMENT** AND  
**DEMONSTRATION** OF **CLEAN**  
**TECHNOLOGIES** TO SUPPORT CAAP  
**30+ PROJECTS** IN **10 YEARS**  
**MULTI-AGENCY PARTNERSHIPS**  
FOCUS ON **ZERO** AND **NEAR-ZERO**  
**EMISSION TECHNOLOGIES**  
**\$3M+** ANUALLY FROM PORTS  
AGENCIES (USEPA, CARB, CEC)  
INVESTED **\$55M+** IN PORT-  
RELATED DEMONSTRATIONS



# TECHNOLOGY ADVANCEMENT PROGRAM CRITERIA

RESEARCH NEW  
TECHNOLOGIES



ENSURE THAT  
APPROPRIATE FOR  
THE PROGRAM



FIND  
PARTNERS FOR  
PILOT PROJECTS



PURSUE GRANTS  
FROM OTHER  
SOURCES



ENGAGE IN  
COMMUNITY  
OUTREACH



Photo: Kaleb Kendall



# TECHNOLOGY ADVANCEMENT PROGRAM EXAMPLE PROJECTS

## SHIPS

Maersk Ship Efficiency Performance Management Project (ongoing)  
Evaluate and quantify the benefits of energy efficiency improvements for ocean-going vessels using multiple new high-resolution data streams.

Project Partners:

- Maersk Line
- Port of Long Beach
- Port of Los Angeles

Budget:  
\$125,000,000;  
Ports contribution  
\$1,000,000

## TRUCKS

SCAQMD Zero Emission Cargo Transport (ZECT) II Demonstration (ongoing)  
ZECT II encompasses the development of seven drayage trucks by five different contractors and includes PHEV, BEV and fuel cell technology.

Project Partners:

- US DOE
- OEMs
- SCAQMD
- CEC
- LADWP
- Port of Long Beach
- Port of Los Angeles
- SoCalGas

Budget:  
\$19,984,820;  
Ports contribution  
\$1,133,979

## TRAINS

VeRail Near-Zero Emissions Locomotive Demonstration (ongoing)  
The VeRail VR21C4-df locomotive will be equipped with two near-zero natural gas power modules and two 600 hp diesel back-up Tier 4 gen-sets (only for peak power needs).

Project Partners:

- VeRail Technologies Inc.
- Pacific Harbor Line
- US EPA
- Port of Long Beach
- Port of Los Angeles
- SoCalGas

Budget:  
\$5,100,000;  
Ports contribution  
\$600,000

## CARGO-HANDLING EQUIPMENT

LBCT EcoCrane™ (2011)  
Demonstration of a hybrid RTG equipped with an advanced energy capture and battery storage system. A second-generation EcoCrane™ hybrid RTG system is equipped with alternating current (AC) motors (eliminates the high power inverter), and a dual battery pack of batteries with a total capacity of 440 amp- hours (Ah).

Project Partners:

- Port of Long Beach
- Port of Los Angeles
- US EPA, US DOE, Metro

Budget:  
\$215,065;  
Ports contribution  
\$84,935

## HARBOR CRAFT

Foss Hybrid Tug Development Project (2010)  
The primary goal of this project was to develop and implement a test protocol to determine the emission benefits of a hybrid tug. The conventional tug was powered by 4 diesel engines, the hybrid tug operated on 4 diesel engines and 126 batteries. All diesel engines were EPA Tier 2 certified.

Project Partners:

- Port of Long Beach
- Port of Los Angeles
- CARB

Budget:  
\$2,389,920;  
Ports contribution  
\$1,389,920

## ENERGY

TransPower Electric Drayage Infrastructure and Improvement (EDII) Project (2016)

Improved electrical charging at existing sites and improve the advanced battery management system for the EDPCD project vehicles.

Project Partners:

- Port of Long Beach
- Port of Los Angeles
- TransPower

Budget:  
\$5,700,000;  
Ports contribution  
\$600,000



Port of Long Beach  
**ENERGY INITIATIVE**

ADVANCE GREEN  
POWER, GENERATED  
& PURCHASED

DISTRIBUTED SELF-  
GENERATION WITH  
MICRO-GRID  
CONNECTIVITY

COST-EFFECTIVE  
FUELING OPTIONS  
TO PORT  
OPERATORS

IMPROVE ENERGY  
& ENERGY-RELATED  
OPERATIONAL  
EFFICIENCIES

ATTRACT NEW  
BUSINESSES,  
CREATE NEW JOBS



Photo: Port of Long Beach





# LA Metro

Los Angeles County Metropolitan Transportation  
Authority's Sustainability Policy

Photo: LUCY NICHOLSON / Reuters



LA METRO

# SUSTAINABILITY PRINCIPLES & OBJECTIVES

CONNECT PEOPLE  
AND PLACES



CREATE  
COMMUNITY VALUE



CONSERVE  
RESOURCES



Photo: Kat Janowicz



SUSTAINABILITY  
CASE STUDIES



METRICS  
RESEARCH,  
SELECTION AND  
ANALYSIS



FRAMEWORK FOR  
PERFORMANCE  
TARGETS



HOSTING  
OPTIONS FOR AN  
INTERACTIVE  
DISPLAY



OUTREACH AND  
COORDINATION



LA METRO  
COUNTYWIDE SUSTAINABILITY ANNUAL REPORT AND PERFORMANCE METRICS



# LA METRO EXAMPLE PERFORMANCE METRICS

VEHICLE MILES  
TRAVELED  
(VMT)

AVERAGE TRIP  
LENGTH (MILES)  
AND TIMES  
(MINUTES)

ENERGY USE  
PER  
CONTAINER/TEU  
MOVED

PERCENT OF  
ROADWAYS  
WITH BIKE LANES

EMISSIONS FROM  
TRANSPORTATION  
AND GOODS  
MOVEMENT

INJURIES AND  
FATALITIES  
FROM TRAFFIC  
COLLISIONS PER  
100,000 PEOPLE

PERCENT OF  
FUNDING FOR  
MOBILITY  
PROJECTS SERVING  
DISADVANTAGED OR  
LOW-INCOME  
COMMUNITIES

PERCENT OF  
HOUSEHOLD  
INCOME  
SPENT ON  
TRANSPORTATION  
AND HOUSING  
COMBINED

Photo: Daniel Roizer



# STRATEGIC PARTNERSHIPS

Effective Ways to Collaborate



GOVERNMENTS  
AND AGENCIES  
SET LOFTY GOALS



LAWS AND  
REGULATIONS ARE  
ONE STEP BEHIND



COSTLY  
WORKFORCE  
DEVELOPMENT



TRANSFORMATIVE  
TECHNOLOGIES



LACK OF  
NECESSARY  
FUNDING





# Thank you

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

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