



**ASCE**  
**GRAND**  
**CHALLENGE**

Rethink What's Possible

*Leif G. Wathne, P.E.*

*American Concrete Pavement Association*

# Context... Challenges of Tomorrow?

- **ACPA assembled 27 experts to serve on a Blue Ribbon Panel during the fall of 2017**
- **Amazing & interesting initial discussion... more work to do.**
- **Challenged panelists to look ahead to 2040 – given broad latitude!**
  - **What will transportation look like in the future?**
  - **What are public agencies' future needs for pavement solutions?**



**Blue Ribbon panel is an impressive and diverse group of stakeholders... federal agencies, state DOTs, TRB, CP Tech, consultants, contractors, etc.**

# What does the future hold...?



*[Image: Google Images]*

*Prediction is very difficult....  
especially about the future.*

*Niels Bohr (S. Peterson)*

# Change is Coming!

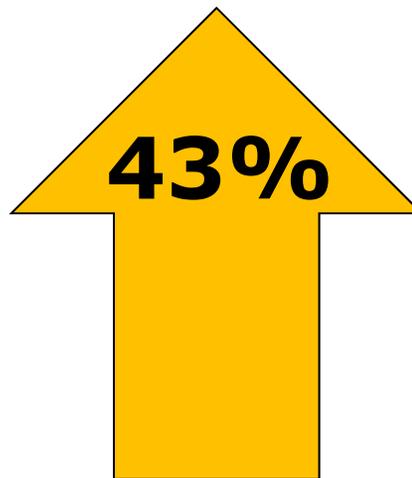
## Population Increase

2015: **320 million people**  
2045: **390 million people**

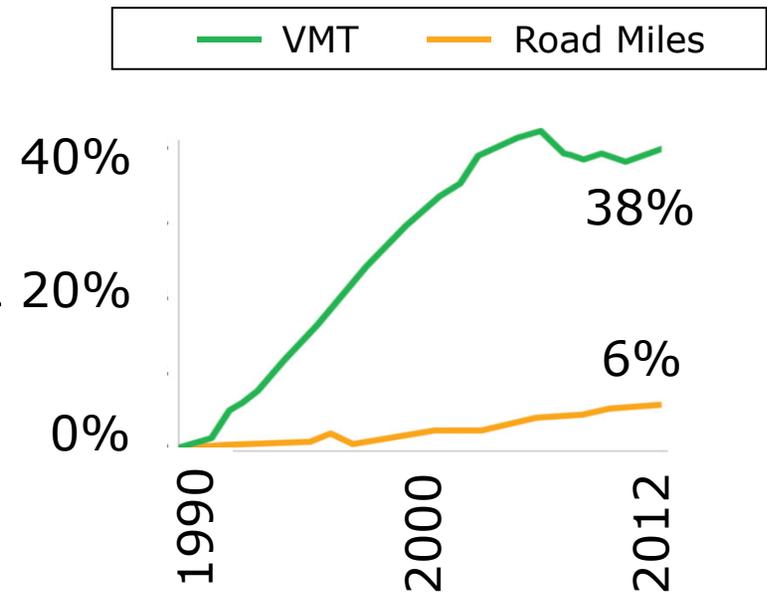
In 30 years our population is expected to grow by about

# 70 million

... that's more than the current populations of



**TRUCK FREIGHT**



[Source: USDOT]

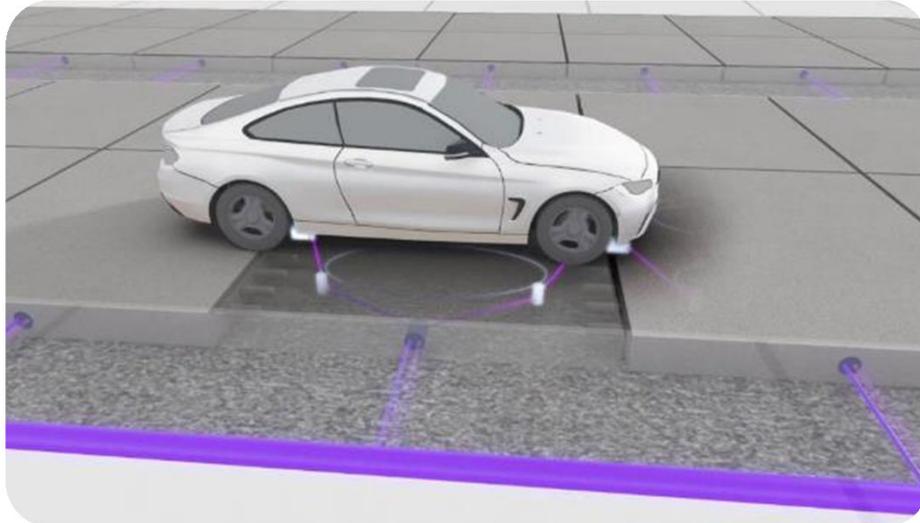


# Freight Movement...

- Freight moves on dedicated freight corridors largely via autonomous connected trucks.
- Likely on NHFN defined in the Fast Act
- Axle loads, tire pressures, road-trains, platooning ?



# To cope with this enormous challenge...



[Image: Google Images]

- Agencies will need better, adaptable, resource efficient pavements that have reliable long-term performance... accommodating variety of sensing and measurement technologies needed for connected vehicles of the future

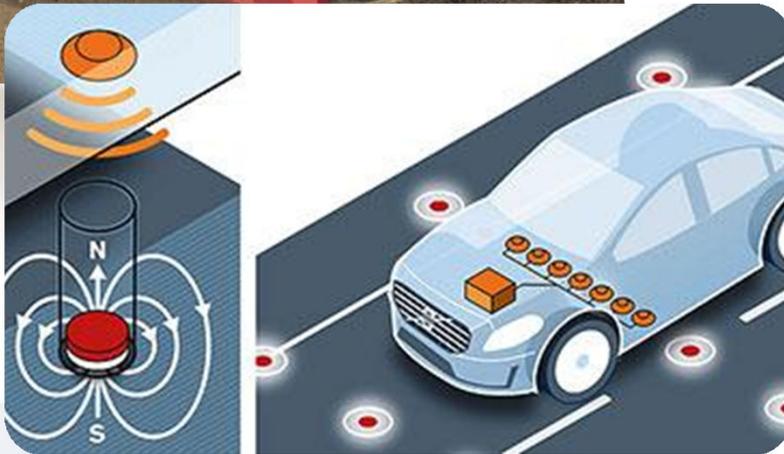
# Connected Vehicles...



[Image: Google Images]

Vehicle fatalities reduced through improved safety with autonomous and connected vehicles.

# In urban areas...



[Image: Google Images]

- Open and adaptable pavement design options for multifunctionality and ease of utility access
- Incorporate new and emerging technologies related to energy generation, energy storage, charging, LED arrays etc...

# Vast Rural Road Network...

- Require resurfacing solutions that extend service life in a cost effective and sustainable way...
- Capitalize on equity in existing structure...



# Resilience...



[Image: Google Images]

**Pavement design considers resilience, to more effectively survive and function under more frequent and intense climate events.**

# Disruptive forces...

- Unpredictable developments that disrupt evolution...
  - E-mail, Amazon, Drones, Uber, etc...
- For pavements and infrastructure...what will that disruptive force be???



[Image: Google Images]

***Can Engineers Play a Role...?***

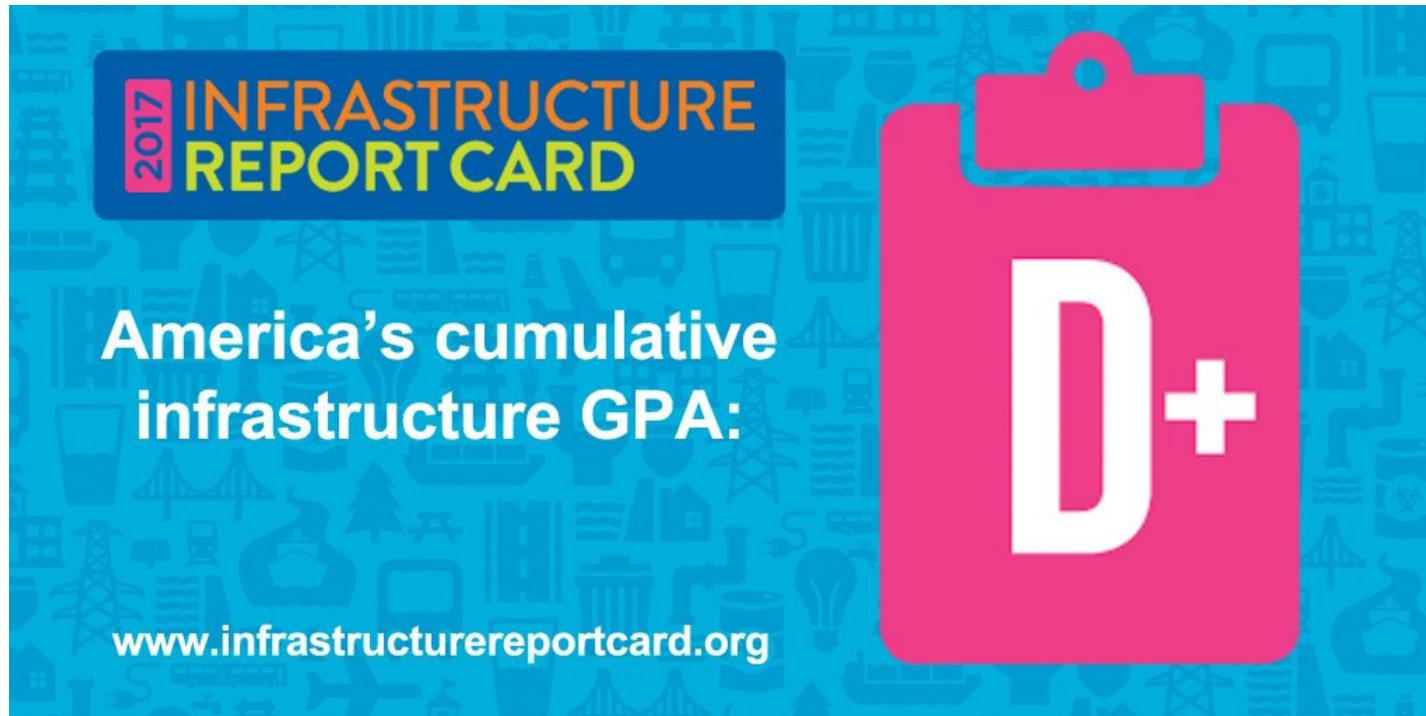
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# ASCE Grand Challenge



**Reduce the life cycle cost of infrastructure by 50 percent by 2025 and foster the optimization of infrastructure investments for society.**

# The State of Today's Infrastructure



Investment needed by 2025: \$4.59 Trillion

Currently underfunded by: \$2 Trillion

# The Cost of Inaction is Steep!



## FAILURE TO ACT

CLOSING THE INFRASTRUCTURE  
★ INVESTMENT GAP ★  
FOR AMERICA'S ECONOMIC FUTURE

▶▶ We've only been paying **1/2** of America's infrastructure bill leaving an investment funding gap that hurts the **U.S. economy, businesses, workers and families.**

### WHAT POOR INFRASTRUCTURE MEANS TO YOU

Poor roads and airports mean travel times increase. ▶▶ An aging electric grid and inadequate water distribution make utilities unreliable. ▶▶ Problems like these translate into higher costs for businesses to manufacture and distribute goods and provide services. ▶▶ These higher costs, in turn, get passed along to workers and families.

#### COST TO U.S. GDP

**\$3.9**  
TRILLION BY 2025

#### LOST BUSINESS SALES

**\$7**  
TRILLION BY 2025

#### LOST JOBS

**2.5**  
MILLION JOBS IN 2025

#### COST TO FAMILIES

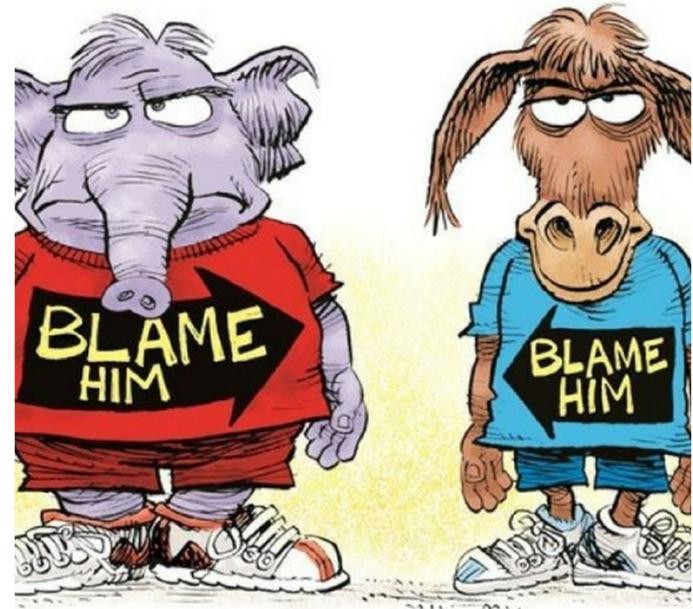
**\$3,400**  
PER YEAR



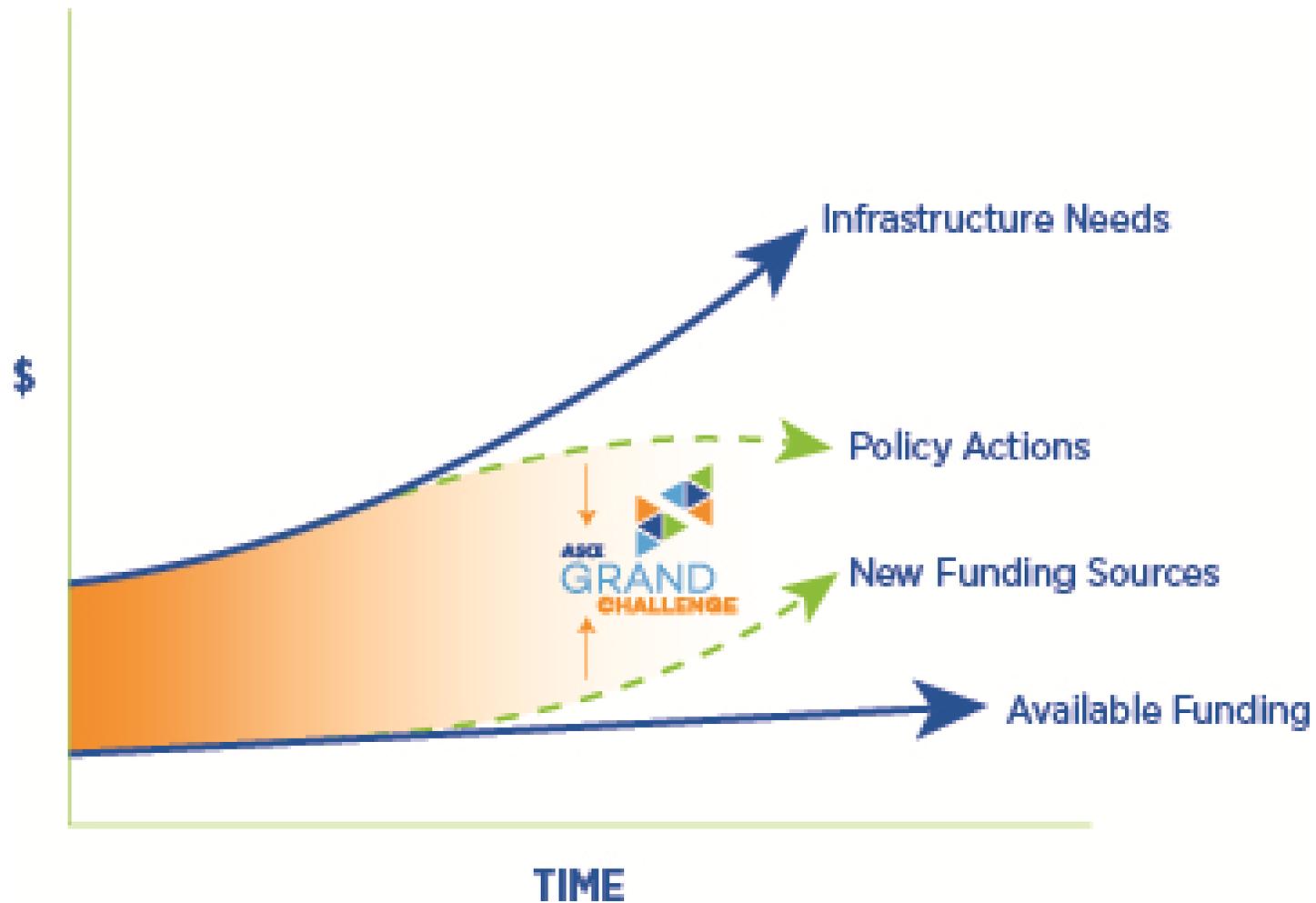
# Infrastructure Investment...?

***“No one ever went broke under-estimating the ability of Congress to do its job”***

*Tanya Snyder, Politico*



# Closing the Infrastructure Gap





# ASCE Grand Challenge Benefits



Reduces the national infrastructure funding requirements while increasing investments to close the significant funding gap



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# What will it take to meet the Grand Challenge?



Challenge Our Assumptions and Be Open to Change

Create New Possibilities and Solutions

Continuously Improve Our Practices, Processes, Solutions and the Profession

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# How is ASCE addressing the Grand Challenge?



Creating a Comprehensive Focus on Improving Infrastructure Delivery

- Enhanced Resilience
- Innovation
- Life Cycle Cost Analysis
- Performance Based Standards

Leveraging our complementary efforts on policy and infrastructure funding to help close the infrastructure gap

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# How Can You Help Achieve the Grand Challenge?



Civil Engineers are global leaders building a better quality of life.

- Lead and contribute to work related to life cycle cost analysis, performance based design, sustainability, innovation and resilience
- Author or present papers on topics that advance the Grand Challenge
- Recognize successes with awards and recognition
- Promote innovative business models within your company, agency or with clients
- Share your success story [www.ASCEGrandChallenge.com](http://www.ASCEGrandChallenge.com)

# How Can You Help Achieve the Grand Challenge?

- Take the pledge!

[collaborate.asce.org/ascegrandchallenge/home](https://collaborate.asce.org/ascegrandchallenge/home)

Then click

I'M IN!

Toolkit

Resources

Share Your Stories

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# ASCE Grand Challenge



Reduce the life cycle cost of infrastructure by 50 percent by 2025 and foster the optimization of infrastructure investments for society.

**Together we can close  
*the infrastructure gap!***



[www.asce.org/grandchallenge](http://www.asce.org/grandchallenge)