

# Vision on Hydrogen Valleys

Mission Innovation "Hydrogen Valleys"  
workshop  
26 March 2019

# An inclusive group covering the whole value chain

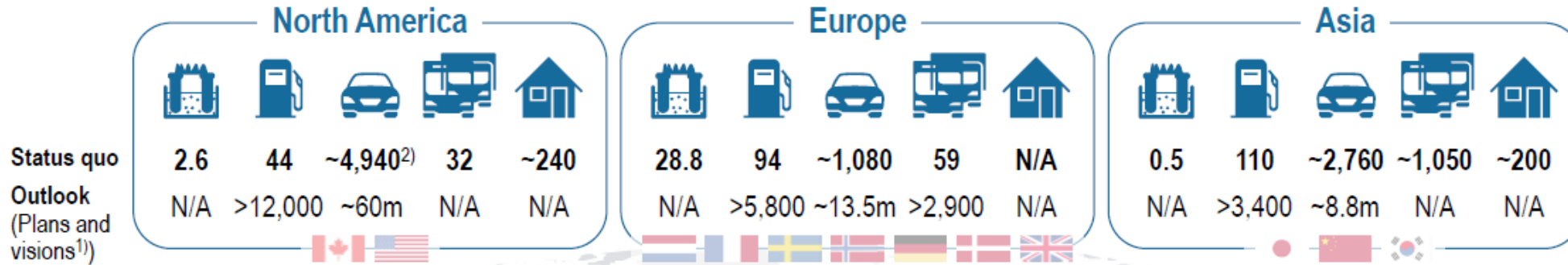


More major players should join the Hydrogen Council in 2019

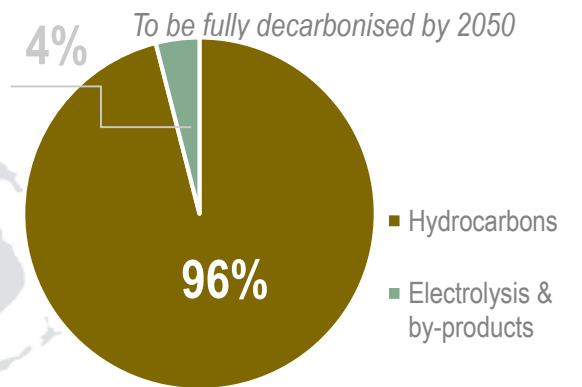
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# STATUS OF HYDROGEN DEPLOYMENTS

Status and publically stated plans of deployment of FCH technology by continent



## HYDROGEN SOURCES

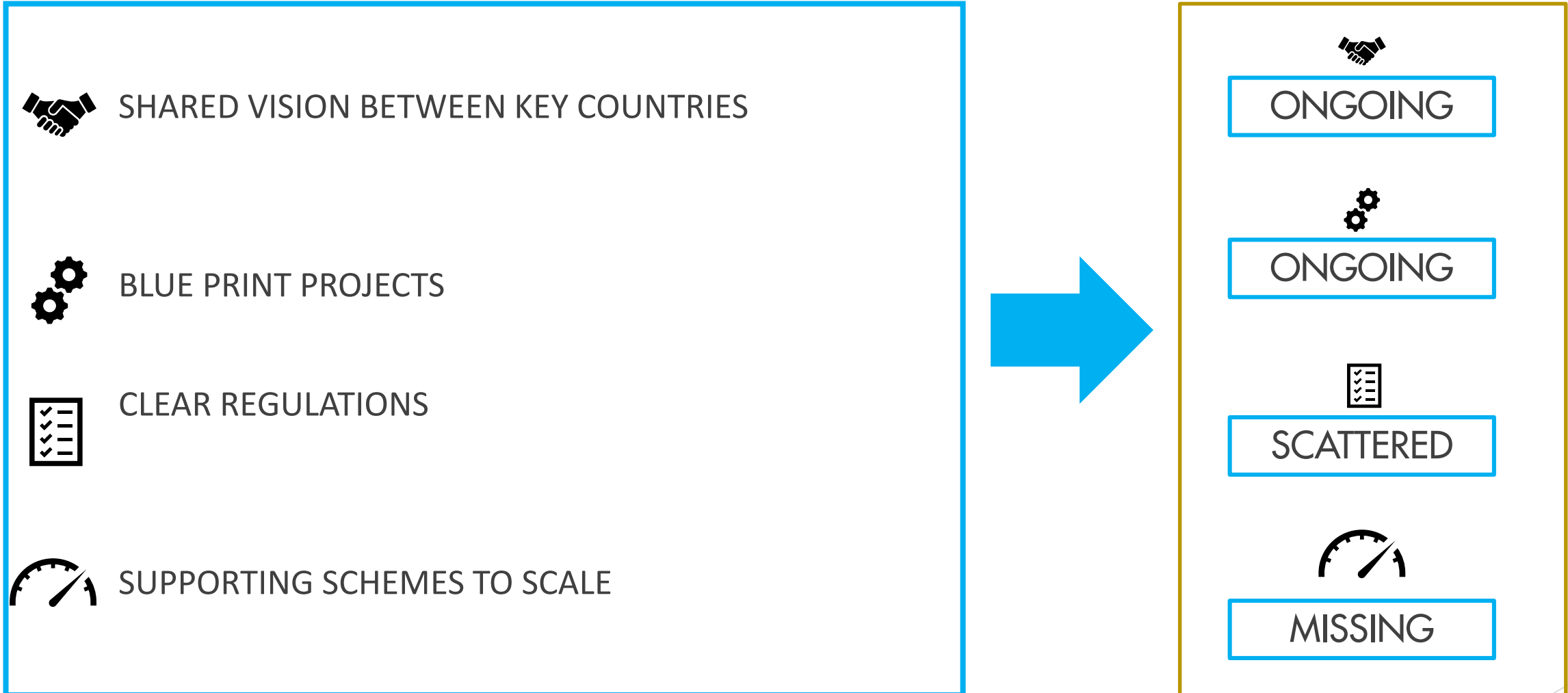


Electrolysis [in MW]  
 HRS [#]  
 FCEVs [#]  
 Commercial vehicles (Buses and trucks) [#]  
 FC CHP [MW]

1) Sum of government's publically stated ambition worldwide (Long-term 2030+) 2) 4,926 FCEVs in California  
 Source: Public reports and databases; Desk Research; Roland Berger

Source : IRENA, data 2016

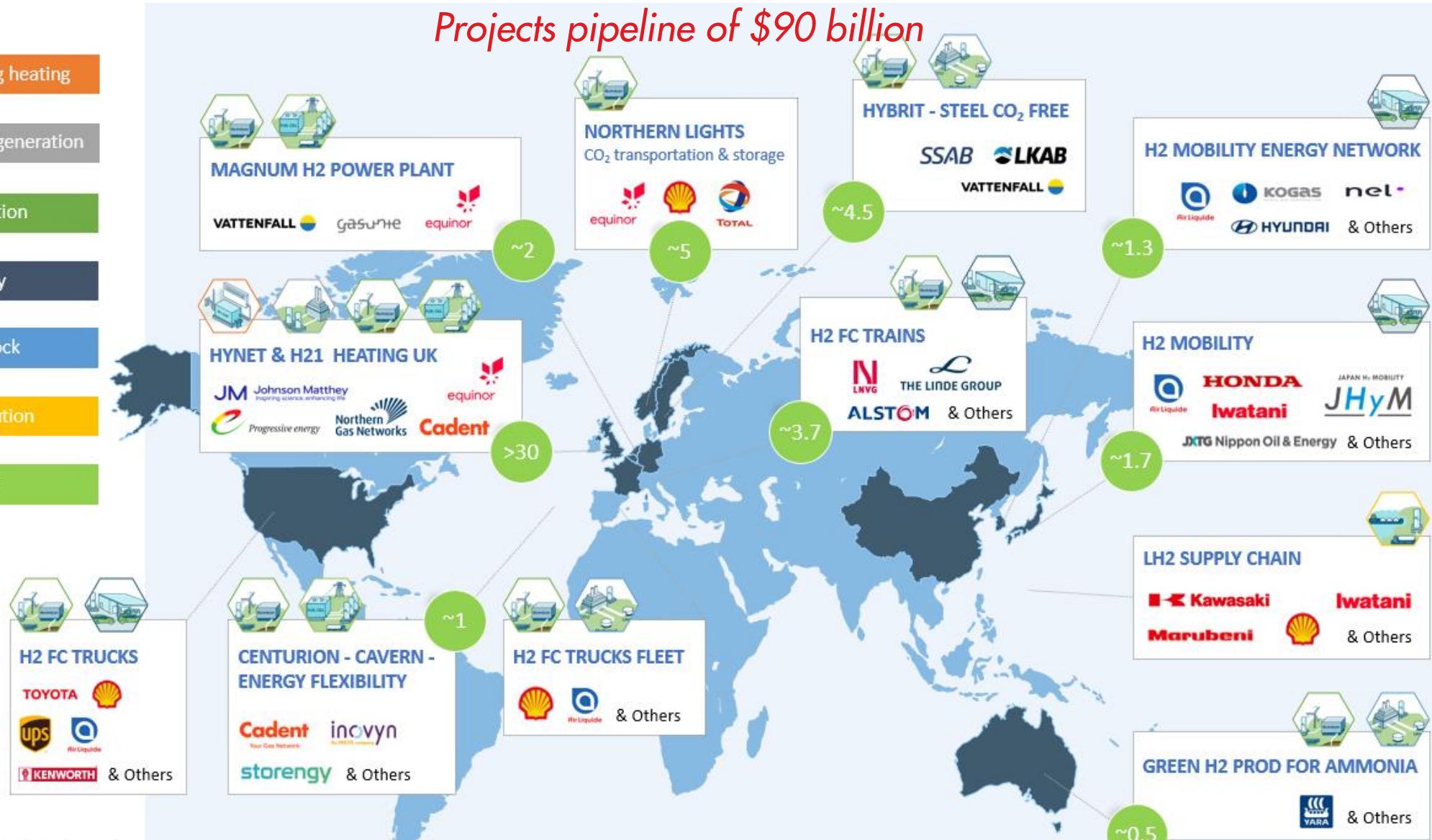
# KEY NEEDED STEPS FOR WIDER DEPLOYMENTS



# SCALE – EXEMPLE OF FLAGSHIP PROJECTS

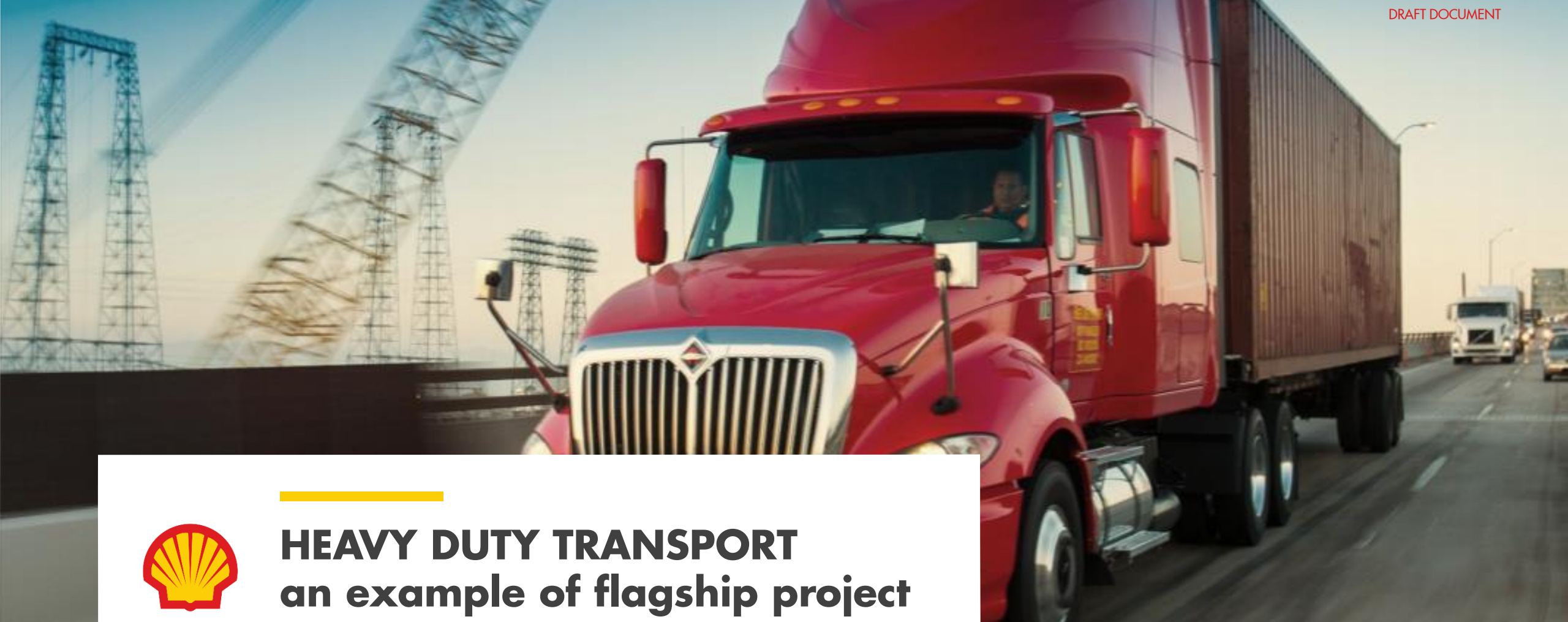
*Projects pipeline of \$90 billion*

-  Building heating
-  Power generation
-  Production
-  Mobility
-  Feedstock
-  Distribution
-  Storage



X Foreseen CO<sub>2</sub> abatement of project at scale (Mt)

**SOME KEY ON GOING LARGE « FLAGSHIP » PROJECTS**



# HEAVY DUTY TRANSPORT

## an example of flagship project



Shared Vision, Blue Print, Clear regulation, Supporting scheme

# Ports of Los Angeles and Long Beach

The Port of Los Angeles and Port of Long Beach comprise the San Pedro Bay port complex, which handles more containers per ship call than any other port complex in the world.

When combined, the two ports rank as the world's 9th busiest container port complex.



Ranked

**#1**

container port in North America 2000-2017



Moved

**9.3**

million twenty-foot equivalent units (TEUs) in 2017



Facilitated a cargo value of

**\$284**

billion (USD) in 2017



Handled

**18%**

of the nation's containerized cargo in 2017



Connected to

1 in **9**

regional jobs in 2017



## 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.

73% of west coast's market share

32% of nation's market share

## Hydrogen fuel cell electric powered ZE Class 8

Such a large Port has a large emission footprint, both in terms of CO2 emissions and air pollution

Everyday ~17,000 trucks operating in and out.

Vehicles will have to utilize zero emission technologies to meet emissions regulations

5,100 jobs at seaports for every \$1 billion invested in infrastructure



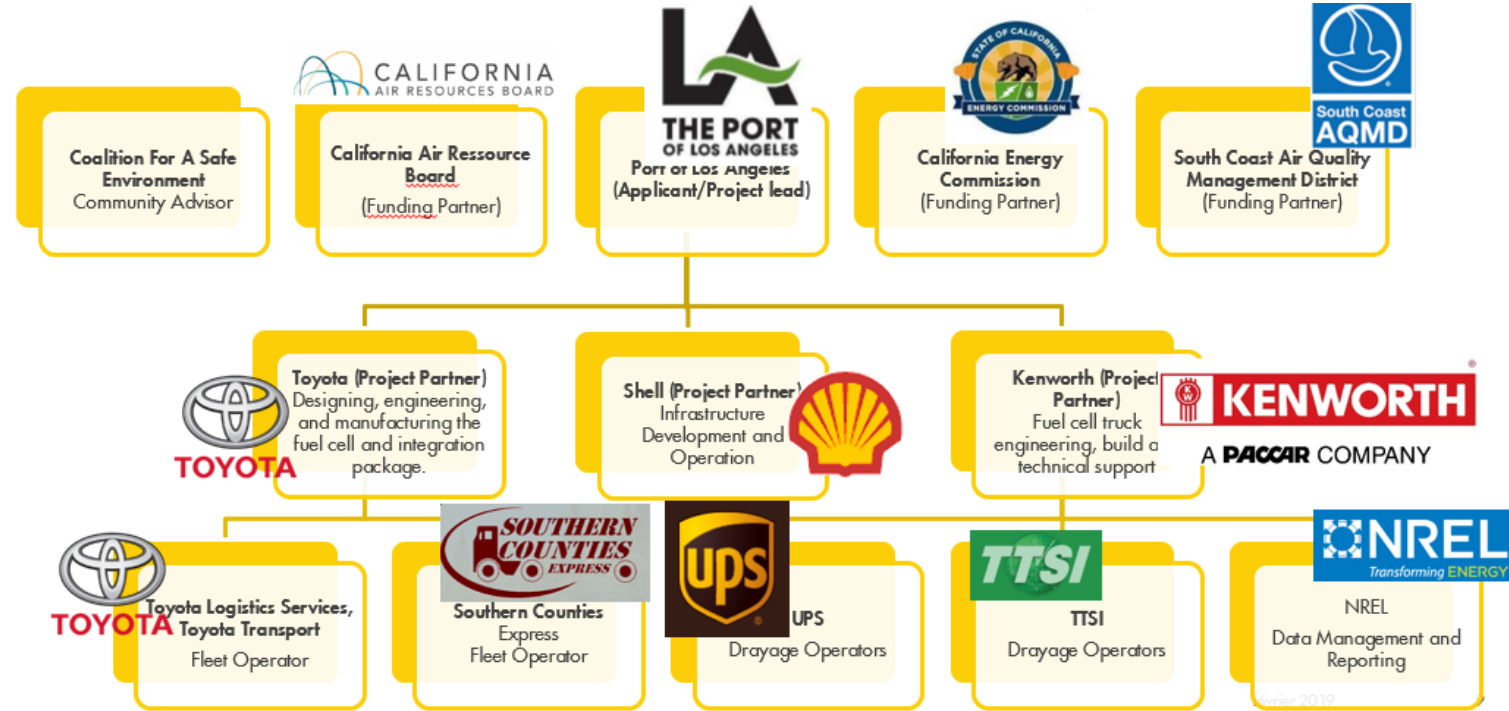
# Blue Print of a project

10 hydrogen fuel cell electric powered ZE Class 8 on-road trucks to move cargo from the L.A. basin ports and on to inland locations (Kenworth Truck Company and Toyota Motor North America)

Three new large capacity hydrogen fueling stations (Shell)

Freight operators: United Parcel Services, Toyota Logistic Services Total Transportation Services Inc., and Southern Counties Express.

Launch of a technical consortium to develop a fit for purpose refueling protocol

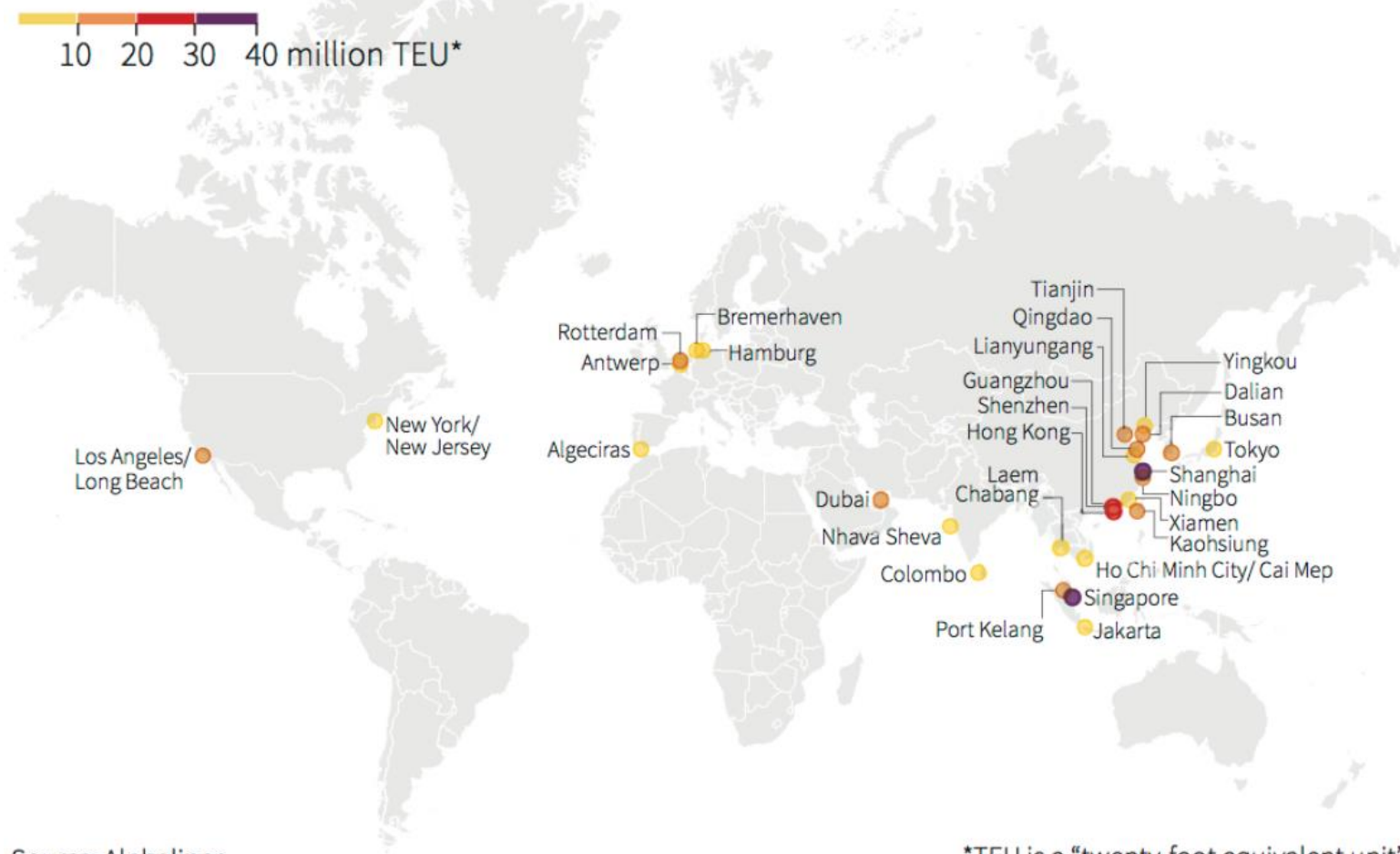


<b>Total Project Budget</b>	<b>\$82 mln</b>
<b>Supporting scheme</b>	<b>\$50 mln</b>

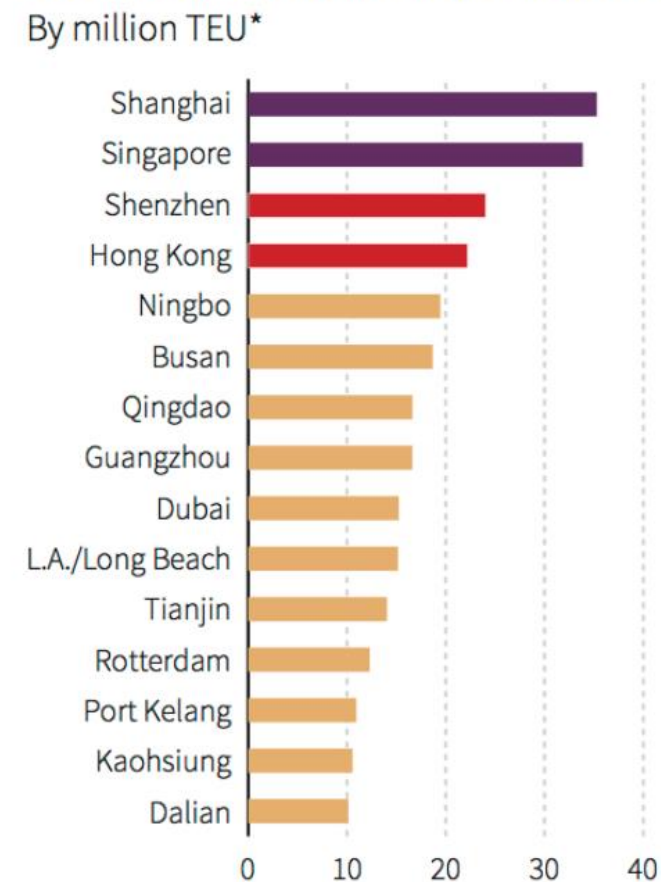


# This type of project could be replicated across the globe

**LOCATION OF THIRTY LARGEST PORTS IN 2014**



**VOLUME OF FIFTEEN LARGEST PORTS IN 2014**



Source: Alphaliner

J. Wang, 14/08/2015

\*TEU is a "twenty-foot equivalent unit" used to describe the capacity of container ships and terminals.