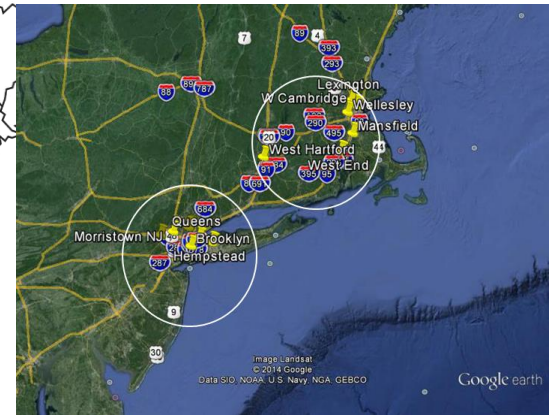
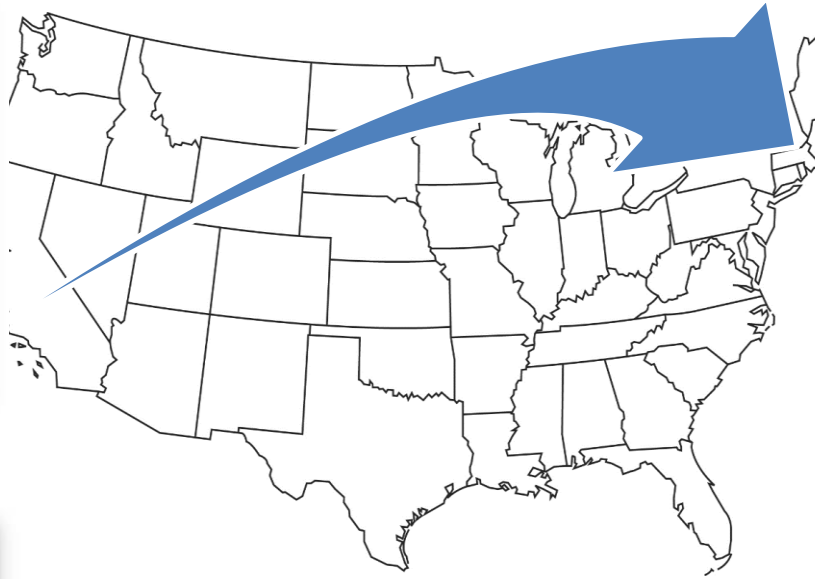


The slide features a background with a blue lower half and an orange upper half, separated by a white wavy line. The text is centered in white.

Sustainable Transportation Summit

H2USA Investment Working Group Update

Needs Expanding



What started in California to reduce transportation related emissions has become a national effort. The net result is the need for the development of clustered station networks on both coasts.

Investing

Investment

- Single station ~ \$1.5 to \$2.0 million
- Cluster: 25 stations + two distribution hubs ~ \$50 million
- Corridor: 125 stations + five hubs ~ \$250 million

Risk Mitigation

- Automaker collaboration
- Public & private fleet collaboration
 - Fleet hydrogen purchase agreements
- Enhanced utilization strategies
- Strategic site partners – National Association of Convenience Stores

Opportunities

- Hydrogen market branding
- Sustainable energy products

Analysis Resource

H2FAST

Station Inputs

| | |
|--|--------------------------------------|
| Installation time [months] | <input type="text" value="18"/> |
| Demand ramp-up [years] | <input type="text" value="3"/> |
| Station type: | Delivered Gaseous H2 |
| Long-term station utilization [%]: | <input type="text" value="70"/> |
| Vehicle refills [refills/day]: | <input type="text" value="43.75"/> |
| Hydrogen per refill [kg]: | <input type="text" value="4"/> |
| Total capacity [kg/day]: | <input type="text" value="250"/> |
| Hydrogen price [\$/kg]: | <input type="text" value="10"/> |
| Equipment capital cost [\$]: | <input type="text" value="1031846"/> |
| Total installation cost [\$]: | <input type="text" value="237325"/> |
| Planned and unplanned O&M costs [\$/yr]: | <input type="text" value="95316"/> |

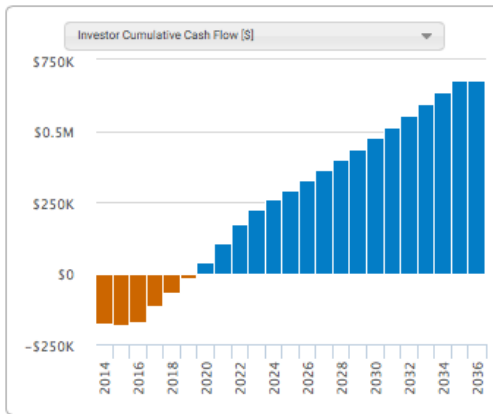
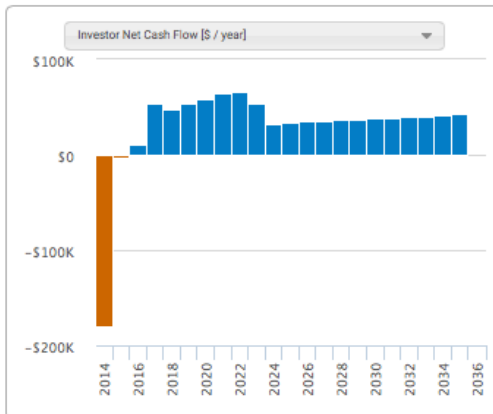
Scenario Inputs

| | |
|--|--------------------------------------|
| Capital incentive [\$/station]: | <input type="text" value="1000000"/> |
| Initial production incentive [\$/station]: | <input type="text" value="0"/> |
| Annual decrement of production incentive [\$/station]: | <input type="text" value="0"/> |
| Incidental revenue [\$/year] | <input type="text" value="0"/> |
| Cost of delivered hydrogen [\$/kg] | <input type="text" value="5.5"/> |
| Cost of electricity [\$/kWh] | <input type="text" value="0.12"/> |
| Cost of natural gas [\$/mmBTU] | <input type="text" value="8"/> |

Financing Inputs

| | |
|-------------------------------|----------------------------------|
| Debt interest rate [%]: | <input type="text" value="6"/> |
| Minimum debt to equity ratio: | <input type="text" value="0.5"/> |

Internal Rate of Return [% / year]: 19.5
Break-Even Hydrogen Price [\$ / kg H₂]: \$9.43
First Year Positive EBITD: 2019
Investor Payback Period [years]: 6
NPV: \$158696



NREL's **H2FAST** financial modeling tool can analyze a single station or cluster.

Station Inputs

- Utilization (%) or Vehicles Refills (per day)
- Hydrogen per Refill (kg)
- Hydrogen Price (\$/kg)
- Total Capacity (kg/day)
- Total Capital Cost (\$)
- Total Installation Cost (\$)
- O&M Cost (\$/yr)

Financing Inputs

- Debt Interest Rate (%)
- Min Debt/Equity Ratio

Scenario Inputs

- Capital Incentive (\$/stn)
- Initial Production Incentive (\$/stn)
- Annual Decrement of Production Incentive
- Incidental Revenue (\$/yr)
- Cost of Delivered Hydrogen (\$/kg)
- Cost of Electricity (\$/kWh)

Activities & Plans

- 🇺🇸 Provide support to station developers with tools and scenario planning
 - 🇺🇸 Creation of support materials
 - 🇺🇸 Facilitate station developer investor meetings including forums like that held at the New York Auto Show in April
 - 🇺🇸 Review station funding strategies to update models on an ongoing basis
- 🇺🇸 Fall 2016 West Coast Investor Forum to be held in the San Francisco South Bay area.
 - 🇺🇸 Meet with the automakers for an update
 - 🇺🇸 Drive Fuel Cell Electric Vehicles
 - 🇺🇸 Listen to station developers discuss opportunities
 - 🇺🇸 Tour a hydrogen fueling station
 - 🇺🇸 Explore investment opportunities

Contacts

Charles Myers

(508) 380-1759

cmyers@massh2.org