Tomorrow: What does the future of Mobility Look Like? The impact of emerging and disruptive technologies

Scenario Planning: A Process to Explore Potential Futures; Identify Investment Needs; and Commit to Action Items

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CDM Smith

How Transportation Technologies Will Change Everything

Intelligent Transportation System poised to transform transportation into a connected, dynamic component of the city-as-a-system (1)

- **Connected and Autonomous Vehicles**
  - Optimizing roadway/system utilization
  - Safer and more secure travel
  - More informed travel decisions
- **Access to Vehicle Data**
  - Better systems for collecting, analyzing data
  - Better decision making

How Transportation Technologies Will Change Everything

Intelligent Transportation System poised to transform transportation into a connected, dynamic component of the city-as-a-system (2)

- **Electrification**
  - Economic development
  - Environment issues
- **Smart Cities/Regions**
  - The case for a connected, integrated transportation system
  - Investments in communications technology vs. infrastructure capacity (highway, rail, etc..)

Technology Moving at a Fast Pace

Current Technologies vs. Recent Technologies

- Recent
  - The telephone, the automobile, television and jet air travel accelerated for a while, transforming society along the way, but then settled into a manageable rate of change.
- Current
  - Computer based technologies don't work that way. They are self-accelerating; that is, the products of their own processes enable them to develop ever more rapidly
  - Technologies with this property of perpetual self-accelerated development--sometimes termed "autocatalysis"--create conditions that are unstable, unpredictable and unreliable.

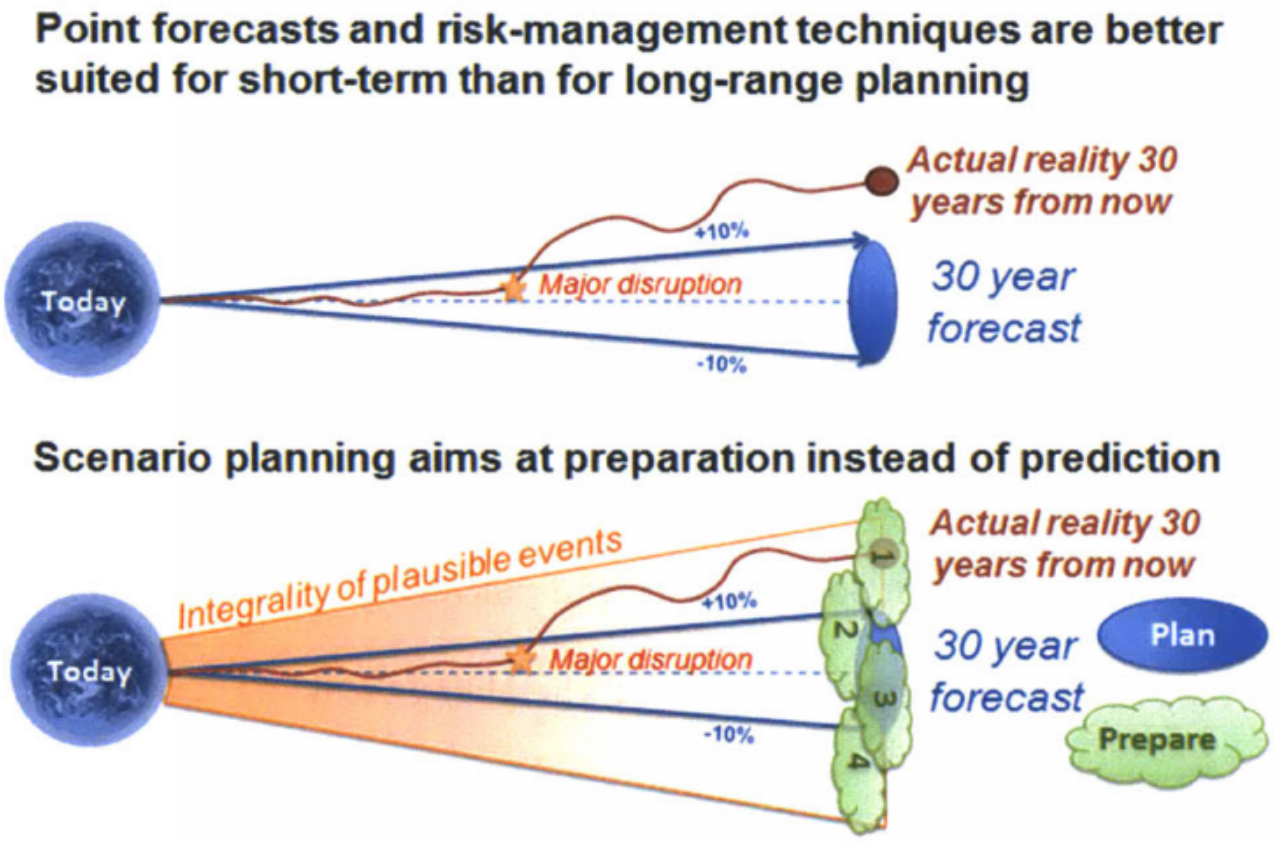
How should agencies plan for the future under these conditions?

Scenario Planning

Because there is no such a thing as a crystal ball

- Based in reality
- Build a shared vision for the future
- Explore possible futures rather than predict futures before committing to a course of action
- Enables better informed decisions for investments
- Considers broad set of driving forces, uncertainties, and trends
- Analyses impacts to mobility, transportation, housing, land use, quality of life, the environment, the economy, safety, security, etc.…

Scenario Planning Vs. Traditional Planning



Why Scenario Planning?

- ✓ Designed to deal with major, uncertain shifts affecting infrastructure network. e.g., emerging technologies
- ✓ Support long-term technology-based transportation planning
- ✓ Captures broader range of possibilities in rich detail/Helps account for uncertainties in planning
- ✓ Reduces risk by better understanding the risks and their possible consequences

Focus on Exploratory Scenario Planning

Normative

- Interaction of land use and transportation
- Tries to achieve desired end state
- Mostly qualitative

Currently used in Transportation Planning

Exploratory

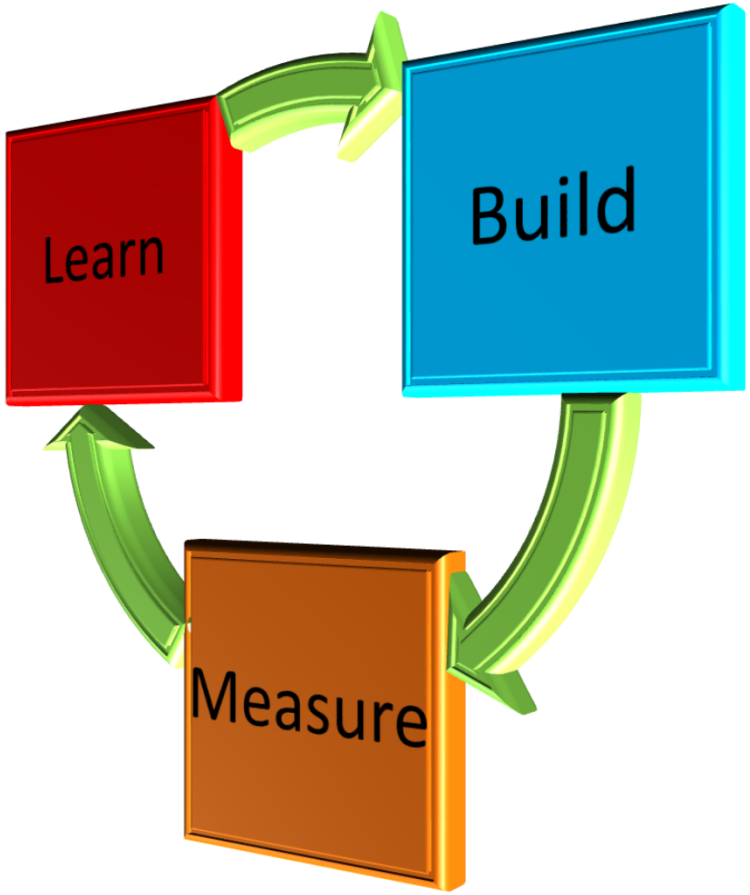
- Considers broader driving forces
- Not a specific solution, but process of testing for impacts of driving forces
- Quantitative

Proposed for use in Transportation Planning

CDM Smith Scenario Planning Process (1)

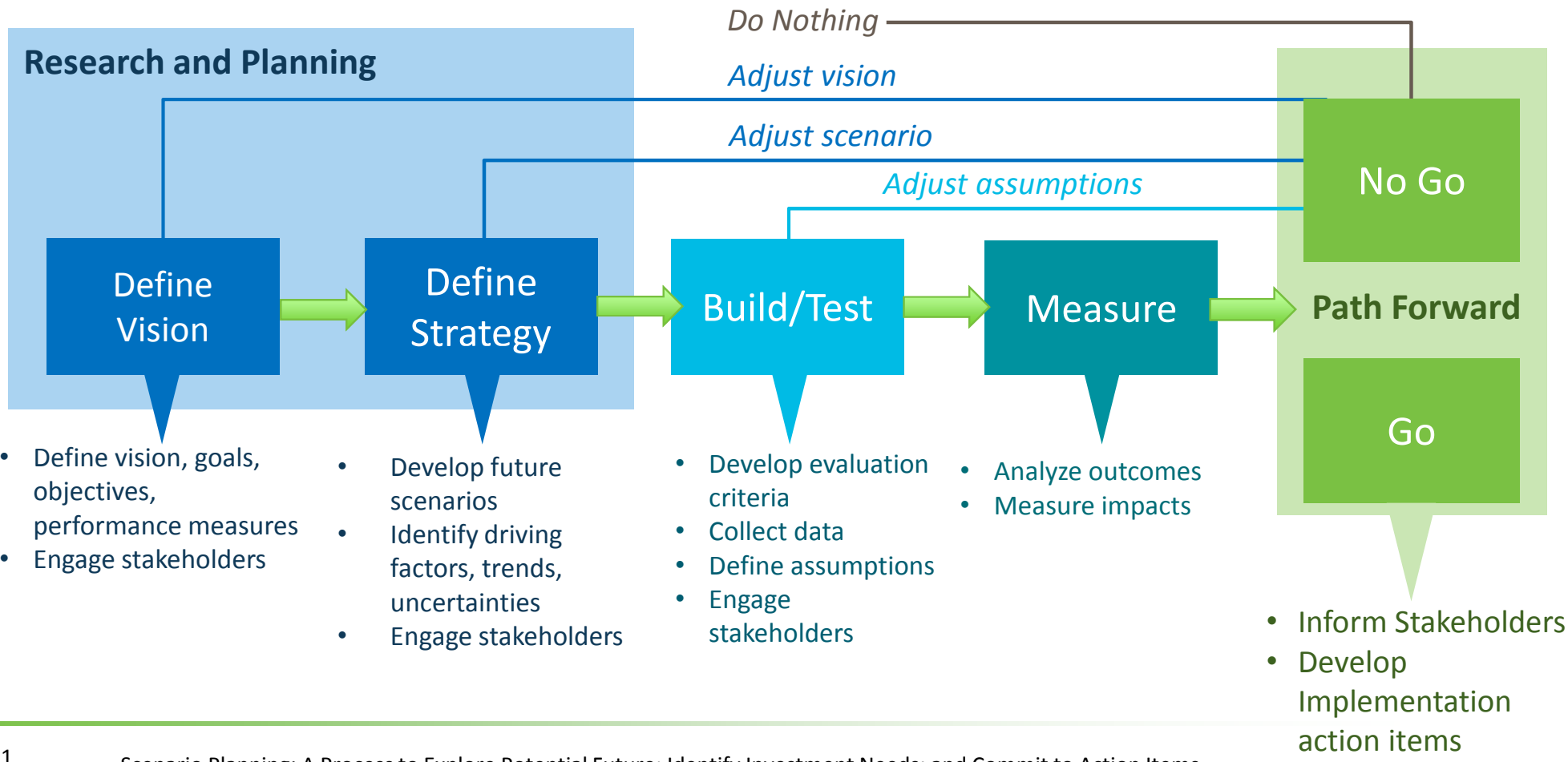
- Overarching vision rarely changes
- Strategies or Pivots are adjusted to address data, penetration rates, technology availability and realities
- Path Forward evolves over time as the process is optimized

CDM Scenario Planning Process (2)



- Iterative process
- End result: identify optimal scenario

CDM Scenario Planning Process (3)



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Application of Scenario Planning to ITS Technologies Selection

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Determining Best Technology

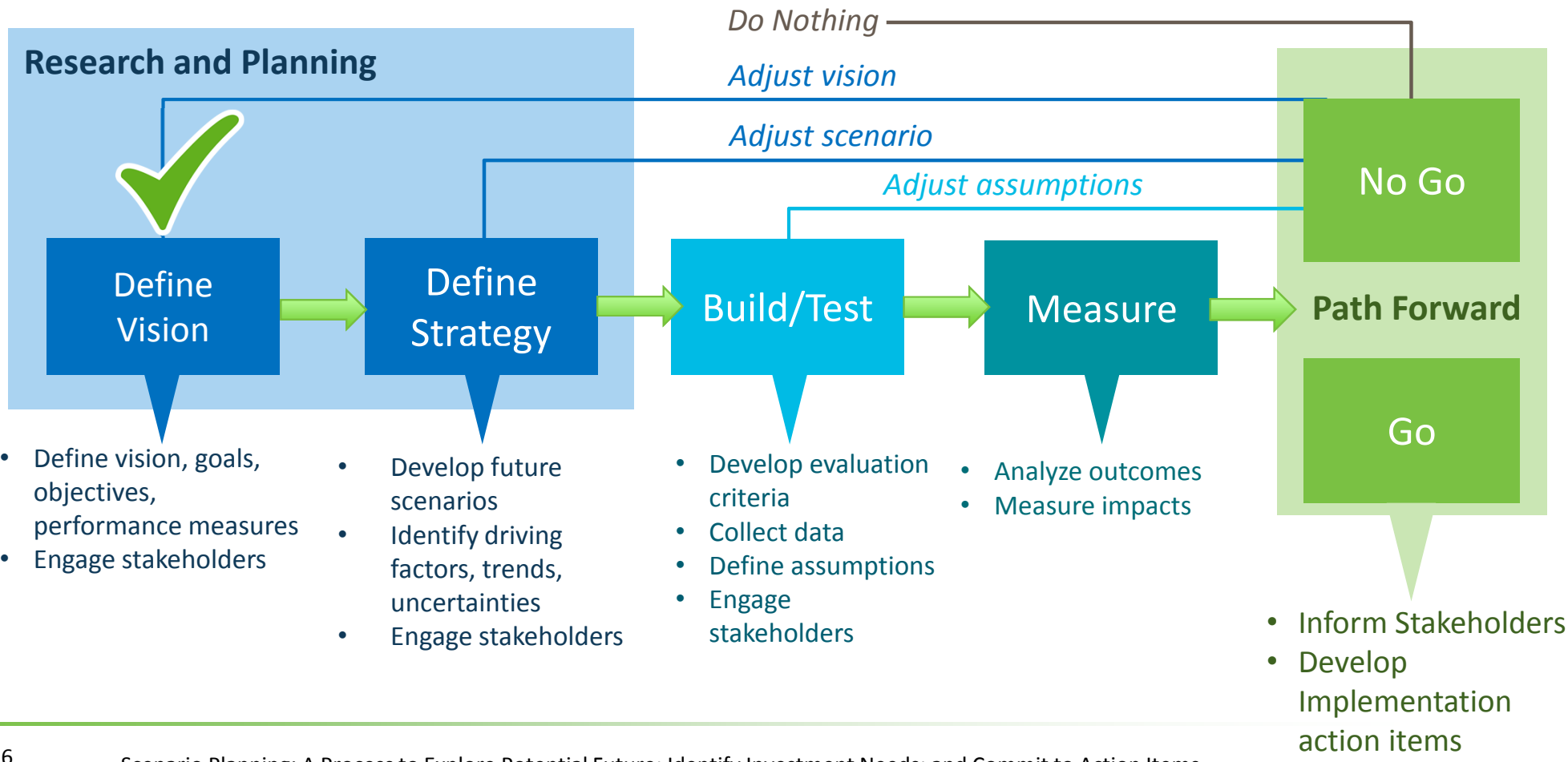
Four Emerging Freight Technologies in CDM Smith Portfolio		
Project	Category	Example
Corridor Management	CV	I-81
Truck Platooning	CV/AV	Columbus
Freight Advanced Traveler Information System (FRATIS)+P	CV/AV	I-81 and LA
Freight Signal Priority	CV	Columbus

Example of Application of Scenario Planning for I-81 Corridor Management

I 81 Notable Facts

- Portions of I-81 in PA, WV, and VA are part of the Primary Freight Network.
  - 40% of traffic volume is trucks
  - 35% of fatal accidents involve trucks
  - Approximately 35% of I-81 crashes with fatalities involve a truck.
  - Congestion bottlenecks along corridor (e.g. 75 Distribution Centers within 150 radius)
  - Heavy trucks account for about 40% of the traffic volume – the road was designed to carry 15% trucks.
- In the last 20 years, traffic has more than doubled, and in urban areas, tripled.
- Truck traffic on the corridor outpaces the national average.
- A recent survey showed that 74% of truck drivers believe that additional truck parking is needed.
- Hours-of-Service regulations and new requirements for electronic on-board recorders (EOBR)
- Importance of the I-81 corridor to the economy.

CDM Scenario Planning Process (3)



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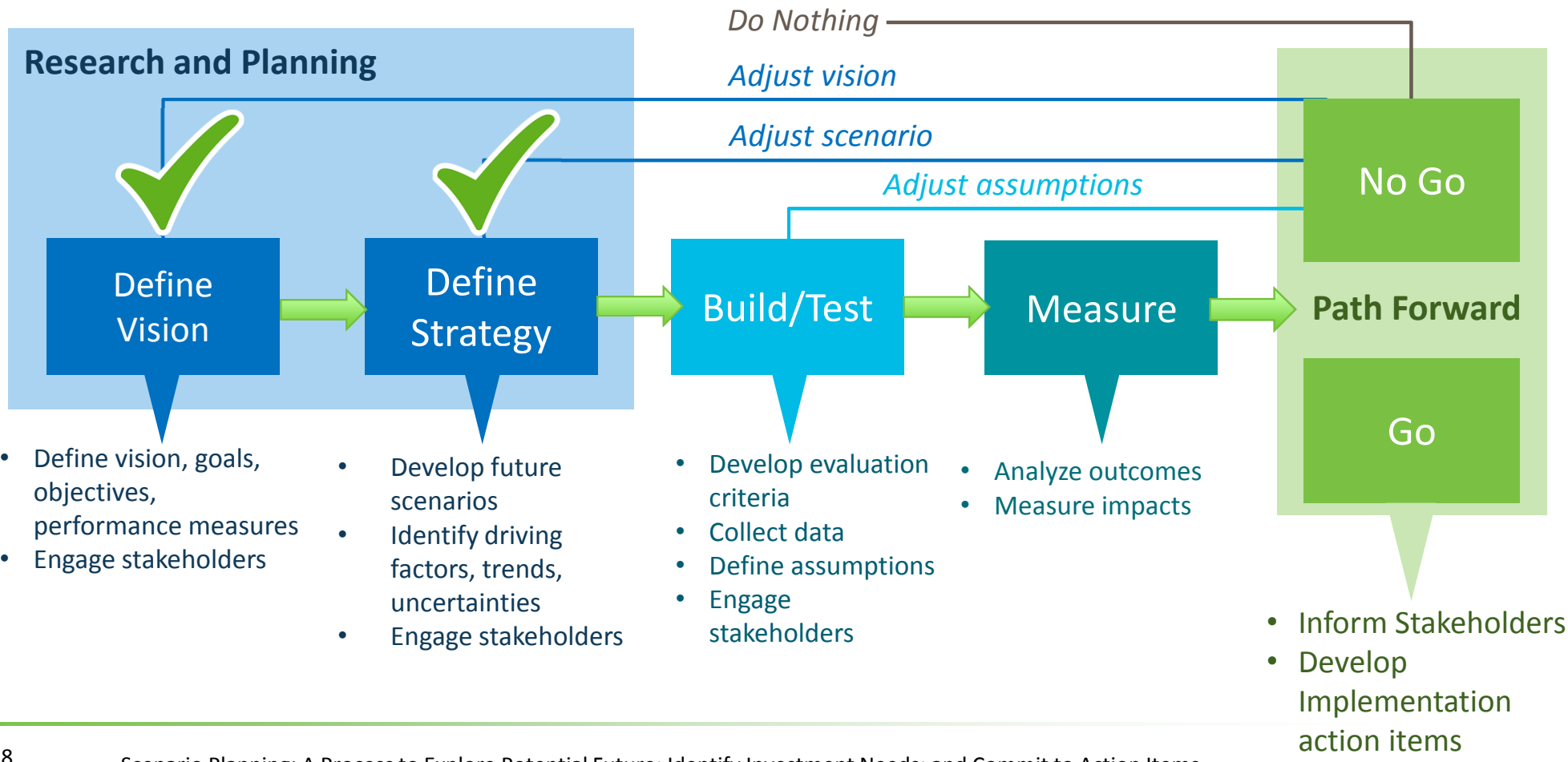
Define the Vision

CDM Scenario Planning Process (3)



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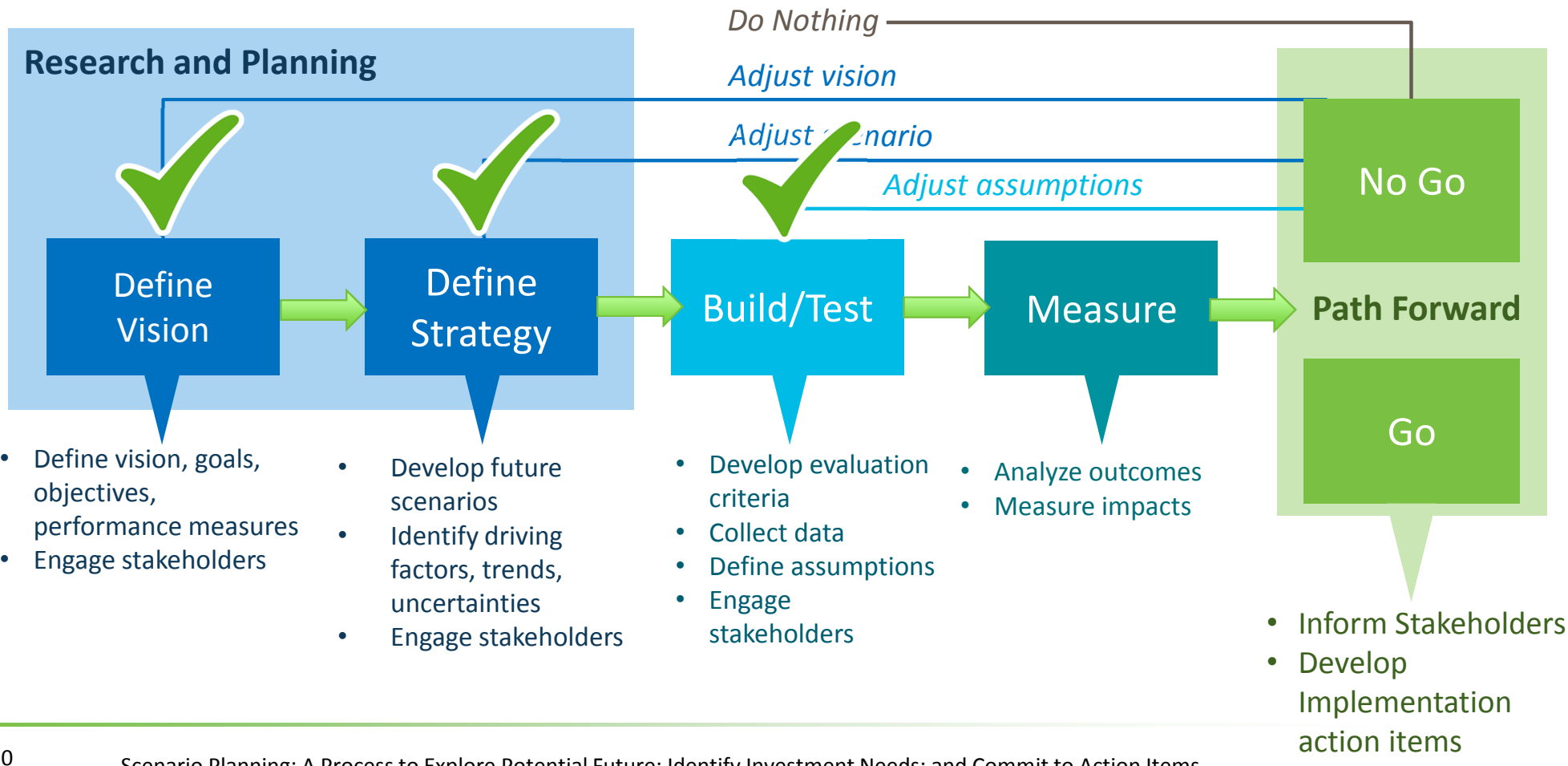
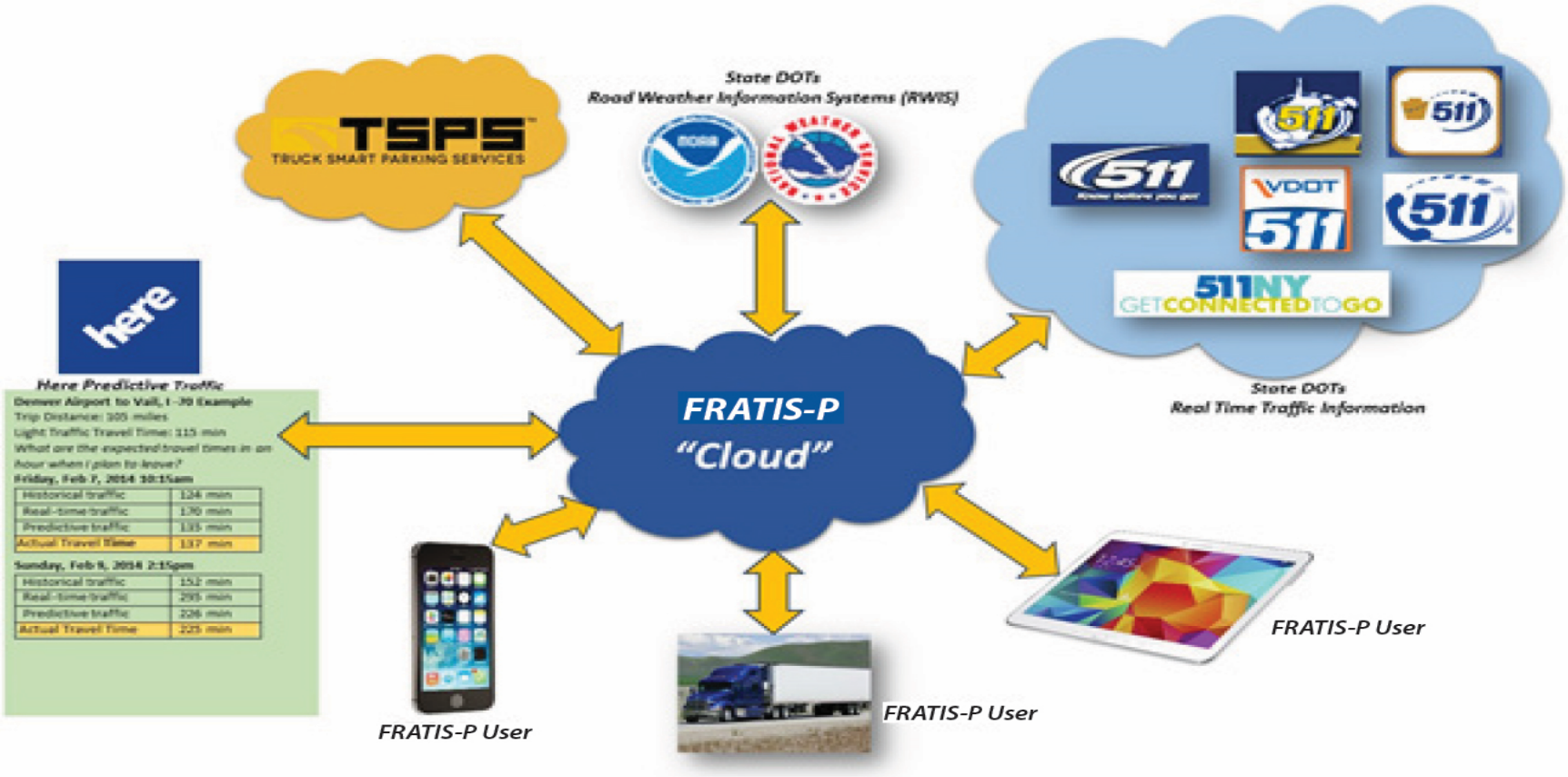
Define the Strategy

- **Leverage existing data streams between existing public and private sector systems**
  - Create a collaborative systems environment
  - Minimize the need to build a system from the ground up
  - Keeps costs low and provide for a higher rate of return on the investment
- **Deliver FRATIS-P on multiple types of devices**
  - Cell Phone, Tablets, Telematic Devices
  - Incentivize the adoption and use of the system
- **Integrate the planned technologies with public sector ITS and sensor information systems**
  - Available in current highway system
  - Lower costs and increase ROI on investment

CDM Scenario Planning Process (3)



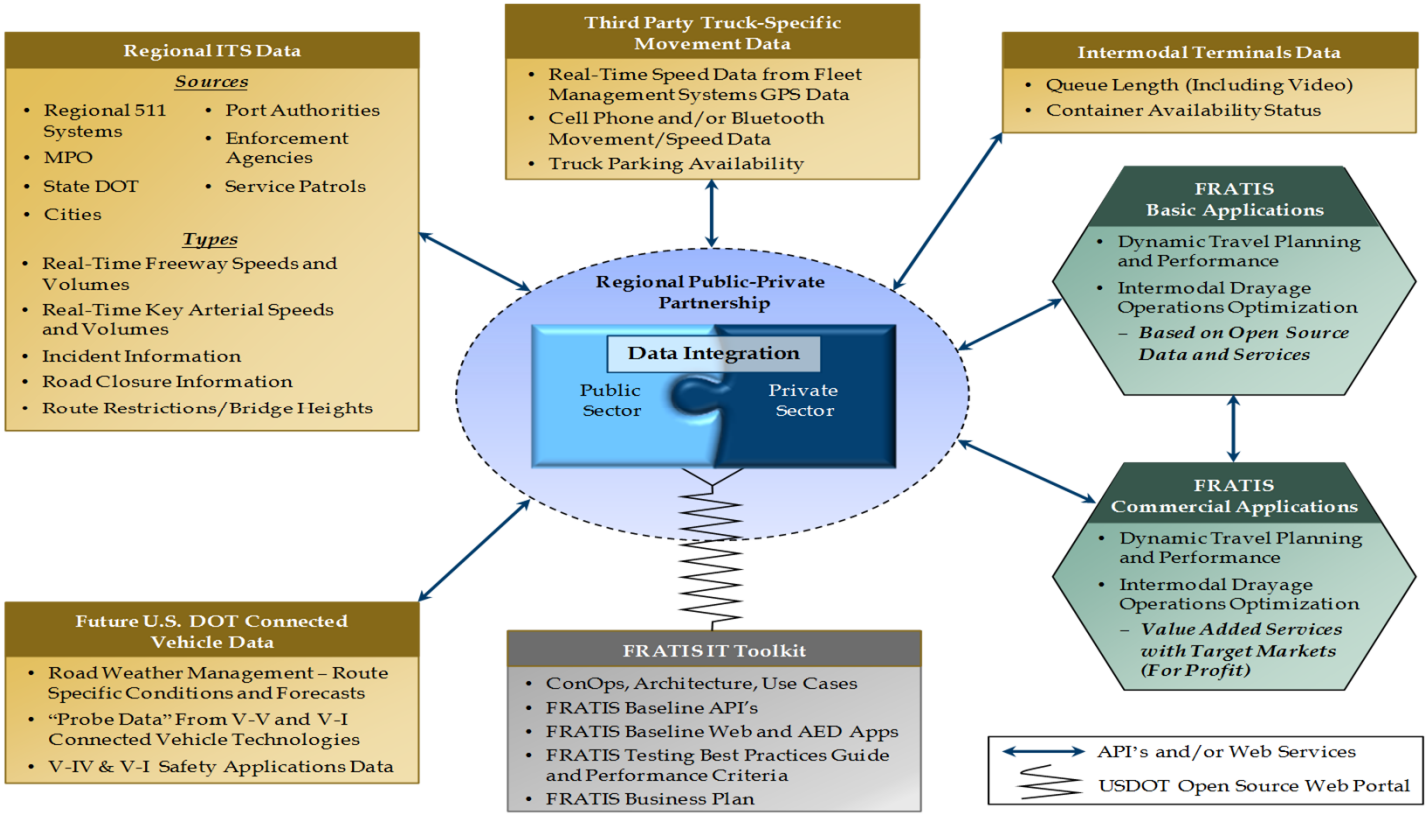
Build and Test



I-81 Corridor – Evaluation Criteria

Factors to be Considered	Evaluation Factors
Congestion bottlenecks along corridor (e.g. 150 Logistics Centers)	Efficiency
Shortage of Truck Parking -- Hours-of-Service regulations -- 35% of fatal accidents involve trucks	Safety
In the last 20 years, traffic has more than doubled, and in urban areas, tripled. 40% of traffic volume is trucks	Capacity
Importance of the I-81 corridor to the economy.	Regional Economic Growth

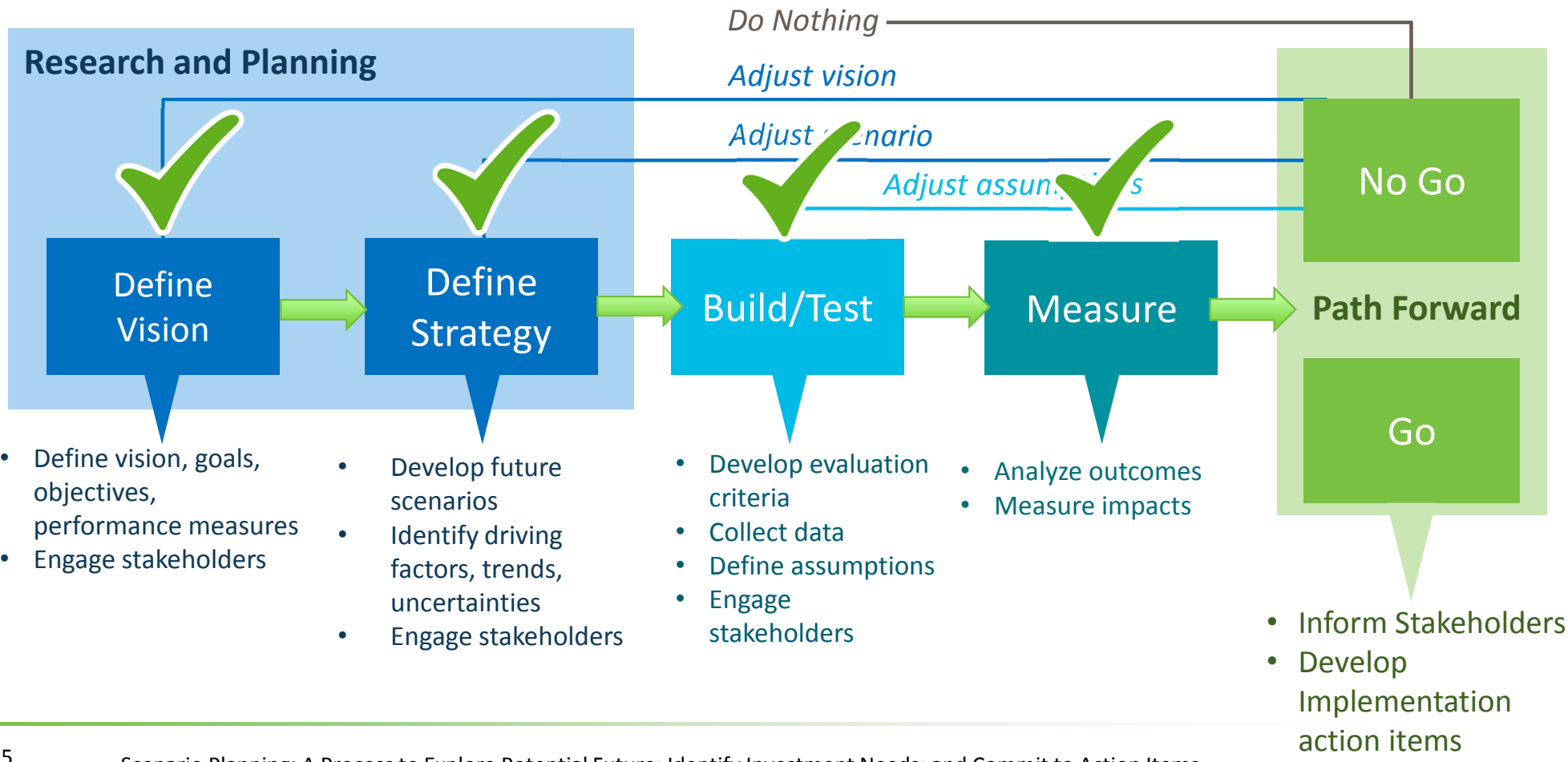
Collect the Data



Stakeholder Engagement

- Ask the following questions……
  - Does the system improve **productivity, efficiency, and safe operation** of the fleet
  - Does the system empower drivers with real-time information for **faster and better decisions** that address safety and efficiency?
  - Does the system generate near optimal truck **planned work itinerary** taking into consideration travel times with traffic, waiting times at the terminal, weather conditions, etc…
  - Will drivers be able to **navigate to their destinations** and be rerouted in case of heavy traffic, incidents and congestion in their current route

CDM Scenario Planning Process (3)



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Questions?

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