HARTFORD FSAE

Switching Fuel Source to Natural Gas

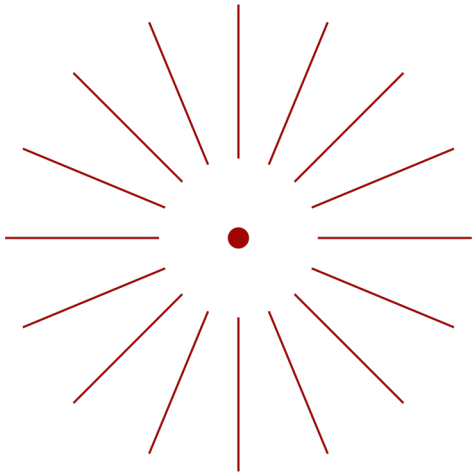
Hazel Hill

HARTFORD RACING
FORMULA SAE
UNIVERSITY OF HARTFORD

“At Hartford FSAE, we wish to honor the race car community's love for internal combustion engines while prioritizing environmental sustainability.

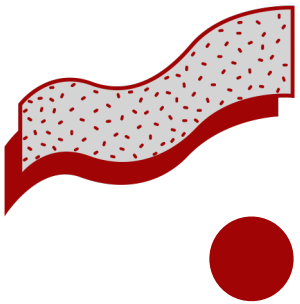
By introducing natural gas as a propulsion power source, we'll balance tradition with innovation, while minimizing our environmental impact."

Hartford FSAE Vision Statement



WHY SHOULD YOU CARE?

Stakeholder Interest



- Long term operational cost savings with better energy efficiency
- Market demand exists for internal combustion engine (ICE) despite growing trends for alternative fuels
- Market demand for environmental sustainability
- Action to customer desires = $$$

PRIORITIES

01 Be Environmentally Conscious

02 Internal Combustion Engine

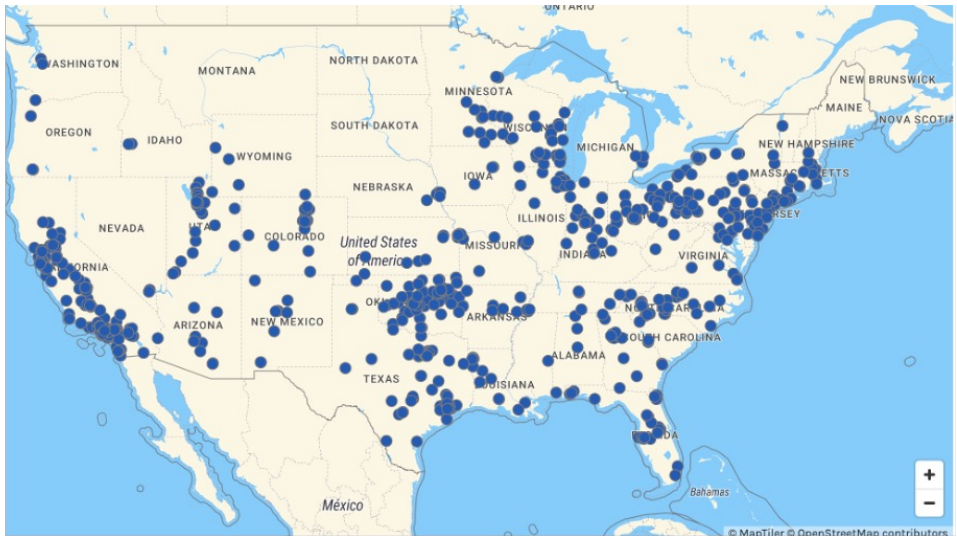
03 Integrate Efficiently & Timely

04 Consider Supply Chain Management

CHOOSING AN ALTERNATIVE FUEL SOURCE

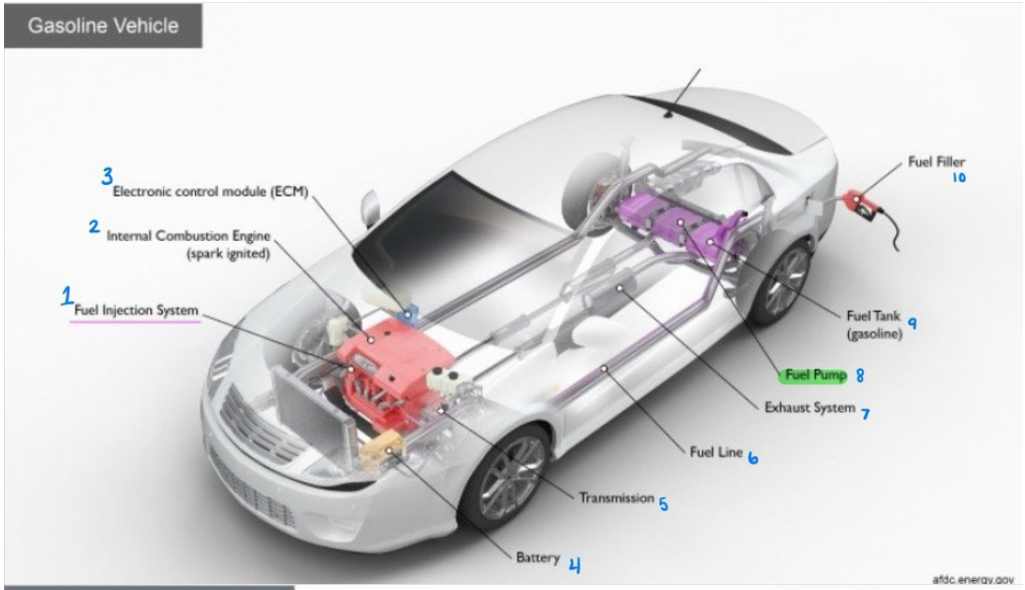
HYDROGEN

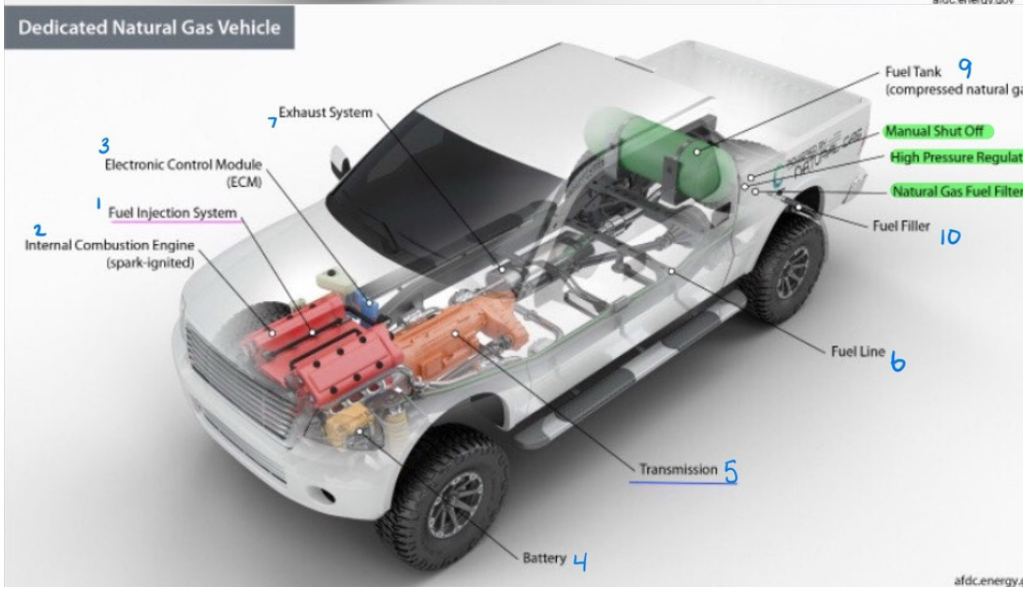
NATURAL GAS



HYDROGEN VS NATURAL GAS

- Infrastructure & supply chain constraints.
- 95% sourced from natural gas in U.S.
- Costly to transport, store, and capture.
- Lower (COP) than methane.
- 56 versus 736 fueling locations in U.S.





NATURAL GAS

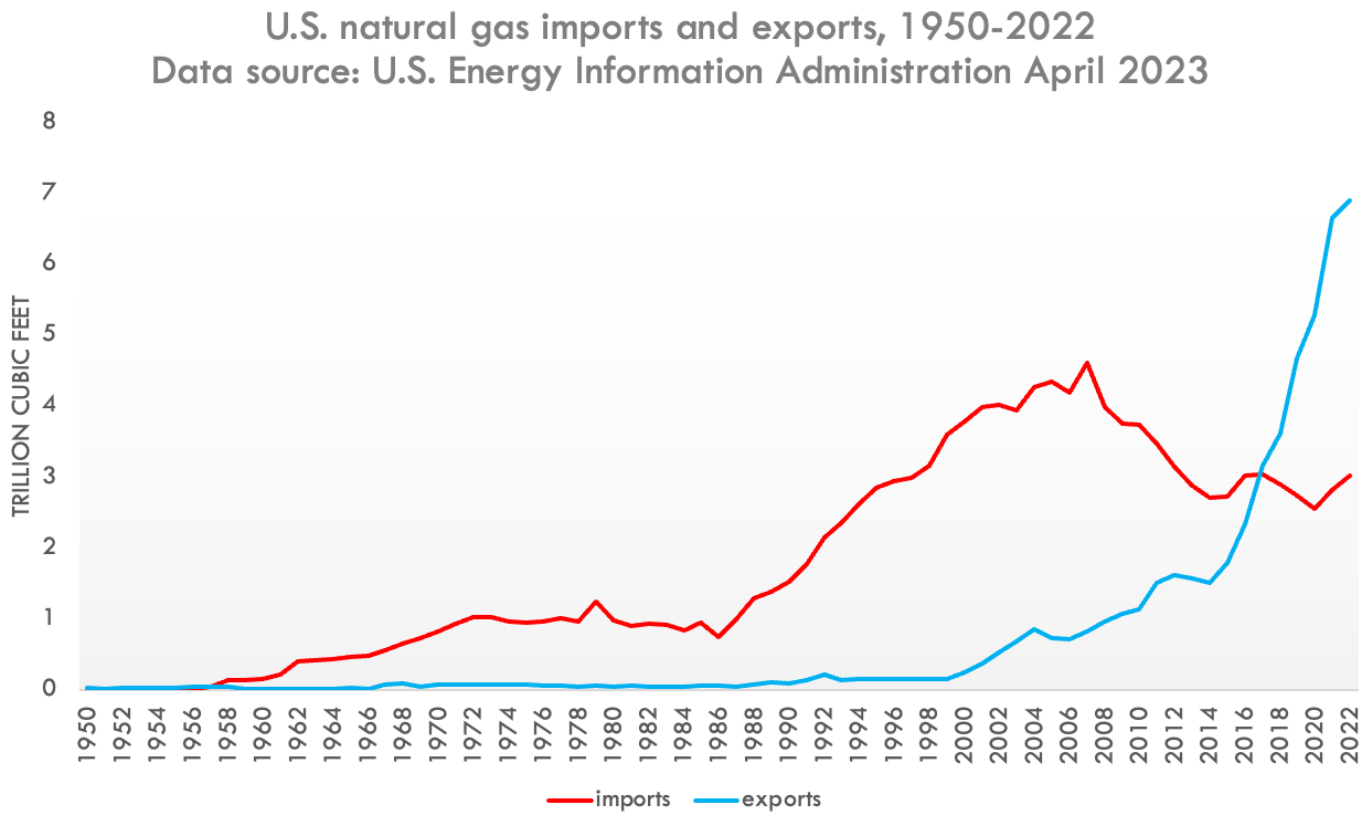
Pros

- Ease of implementation
- Internal combustion engine
- Is cleaner than gas when burned
- Infrastructure is set up in the U.S.

Cons

- Limited driving range
- Lower density requires larger fuel tank
- Still leaves environmental impact

GLOBAL SUPPLY CHAIN



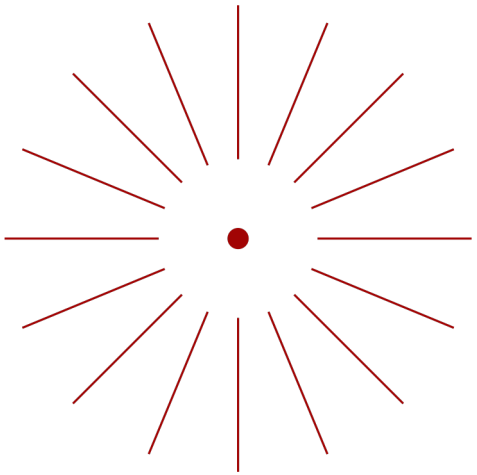
ENVIRONMENTAL IMPACT

- Air & water pollution.
- Contribution to climate change.
- Carbon dioxide emission upon combustion.
- Natural gas emissions in transport & extraction.

Mitigation Strategy

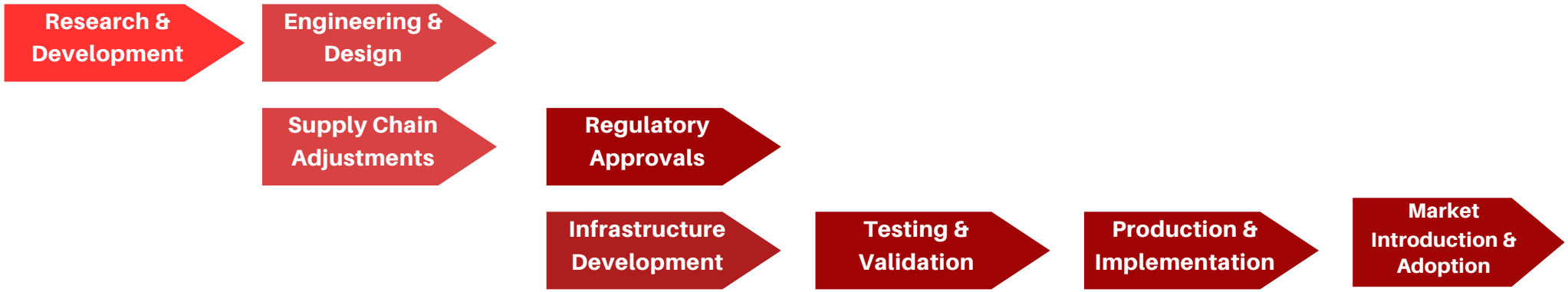
- Employ practices to minimize natural gas leaks.
- Detailed oversight during our regulatory compliance.
- Support research and development in emission control technology.

GOALS

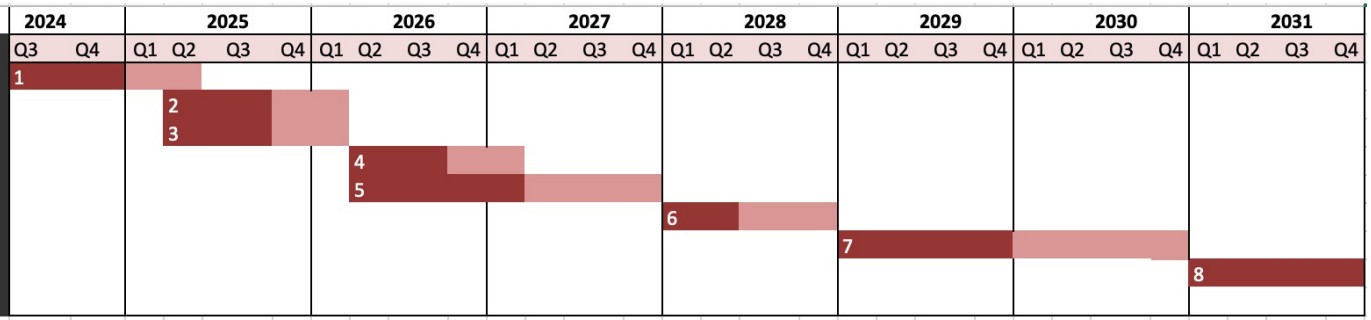


1. Develop and implement a natural gas system for our FSAE cars.
2. Complete research and development within 12 months.
3. Obtain necessary approvals for regulatory compliance.
4. Complete the development of a new natural gas-powered race car by 2031.

IMPLEMENTATION PROJECT NEEDS



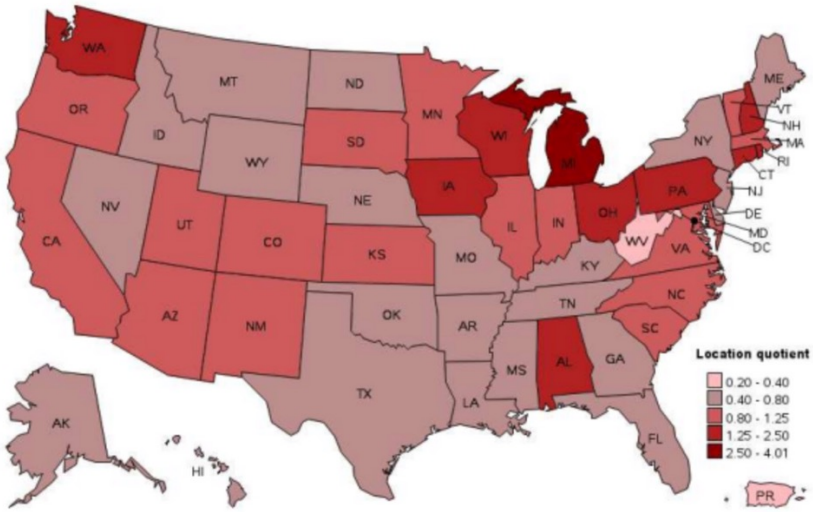
	Start	End
Status - Not Started		
1.Research and Development	26-Jun-2024	01-Jul-2025
2. Engineering and Design	27-Mar-2025	03-Apr-2026
3. Supply Chain Adjustments	27-Mar-2025	01-Apr-2026
4. Regulatory Approvals	28-Mar-2026	08-Apr-2027
5. Infrastructure Development	29-Mar-2026	31-Dec-2027
6. Testing and Validation	21-Dec-2027	01-Jan-2029
7. Production and Implementation	29-Dec-2028	05-Oct-2030
8. Market Introduction and Adoption	26-Sep-2030	04-Dec-2031



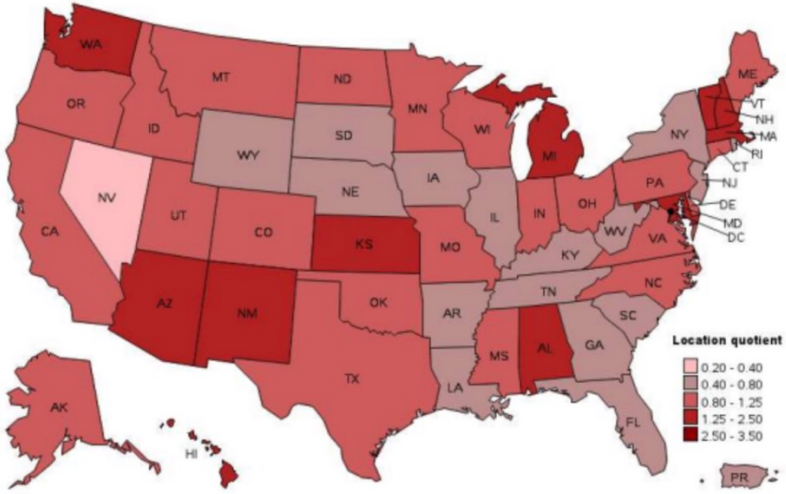
LABOR SUPPLY

ENGINEERING TALENT POOL

Location quotient of mechanical engineers, by state, May 2022

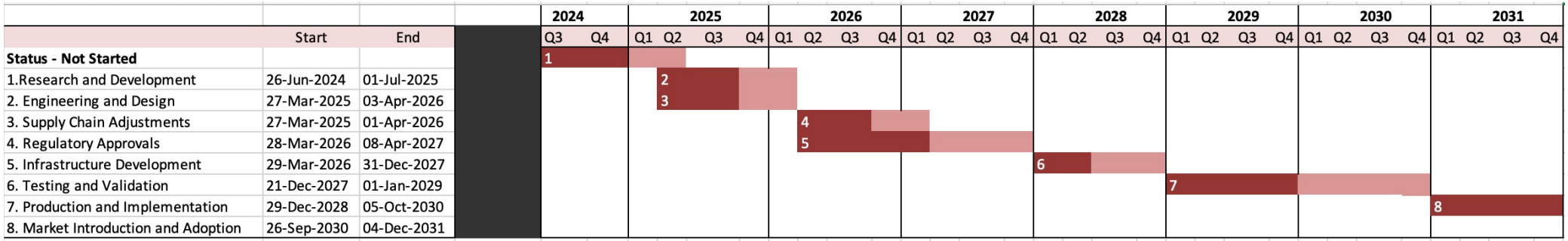


Location quotient of electrical engineers, by state, May 2020



PROJECT TIMELINE

Beginning June 26, 2024



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TOOLS SUPPORTING THIS PROJECT

TECHNOLOGY

- Generative AI in project management system
- Generative AI Assistance in engineering and design

LABOR

- We can accommodate hybrid working in areas of the project

INFRASTRUCTURE

- Existing fueling sites
- Supply within the United States
- Cost of this change is lower with pre-existing infrastructure

WE HAVE THE TOOLS TO ~~SUCCEED~~

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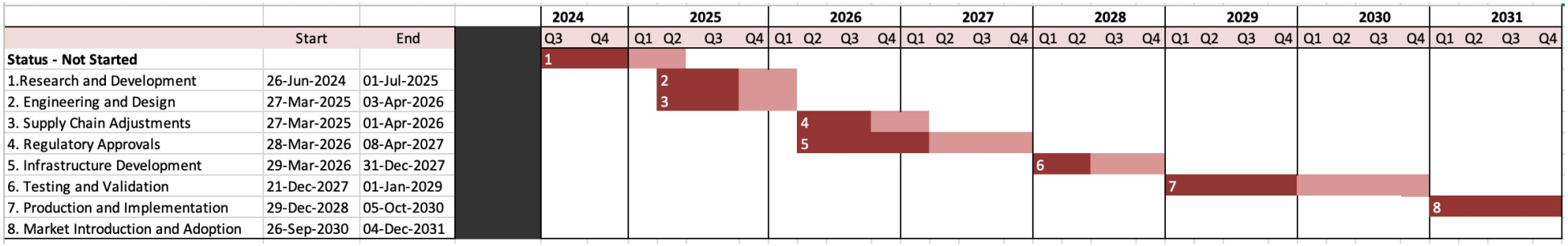

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PERHAPS EVEN SOONER

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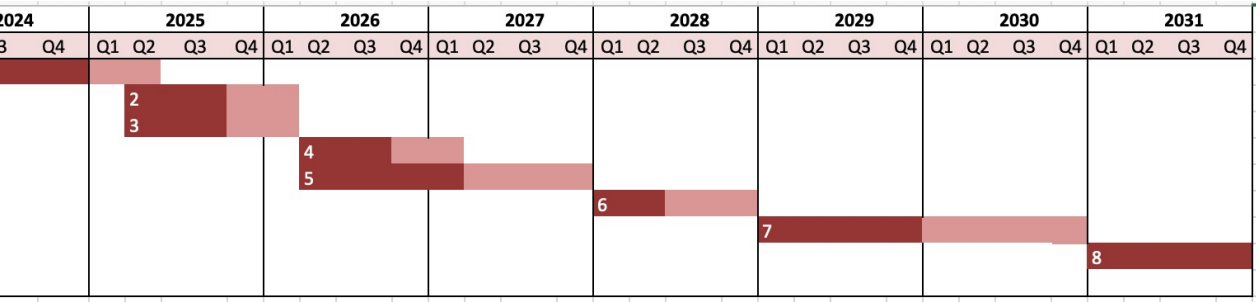

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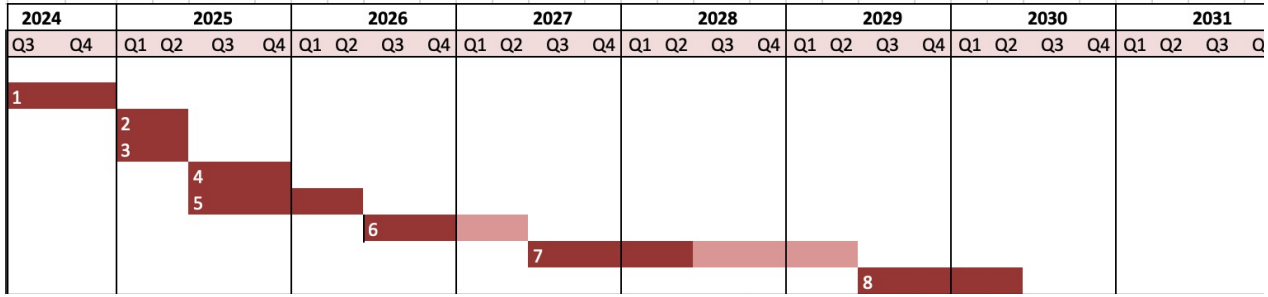

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