

# Integrated Bio Refinery (IBR)

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**2012 Asia Pacific Clean Energy Summit and Expo**  
**August 13-15, 2012**  
**Honolulu, Hawaii**

**Uop**  
A Honeywell Company  
**Honeywell**

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UOP 5853-1

# Honeywell International

- \$36.5 billion in revenues in 2011, 50% outside of U.S.
- Nearly 130,000 employees operating in 100 countries
- Morristown, NJ global corporate headquarters

## Aerospace



**\$10.8-11.2B\***

## Automation & Control Solutions



**\$14.7-15.1B\***

## Performance Materials & Technologies



**\$5.0-5.2B\***

## Transportation Systems



**\$4.3-4.5B\***

# UOP LLC, A Honeywell Company

- A leading international supplier and licensor of processing technology, catalysts, adsorbents, process plants, and technical services
- Largest process licensing organization in the world
- 31 out of 36 refining technologies in use today were developed by UOP

## Markets

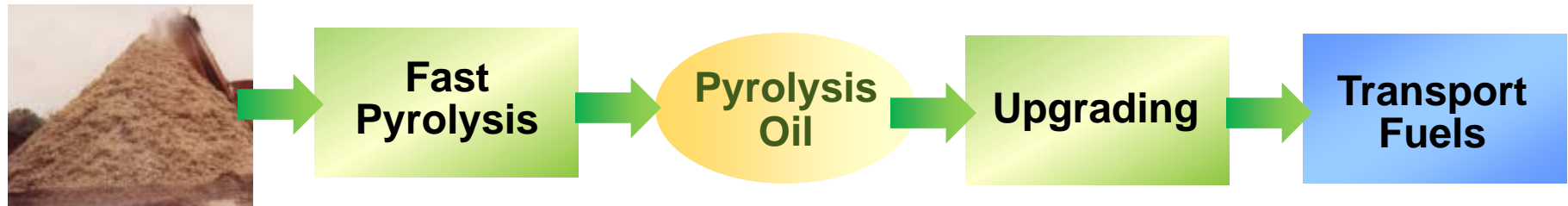


## Products/Services

- Developing and licensing of process technology
  - Equipment
  - Catalysts
  - Adsorbents
  - Molecular Sieves

***Today more than 60 percent of the world's gasoline and 85 percent of biodegradable detergents are made using UOP technology***

# Integrated Biorefinery Demonstration

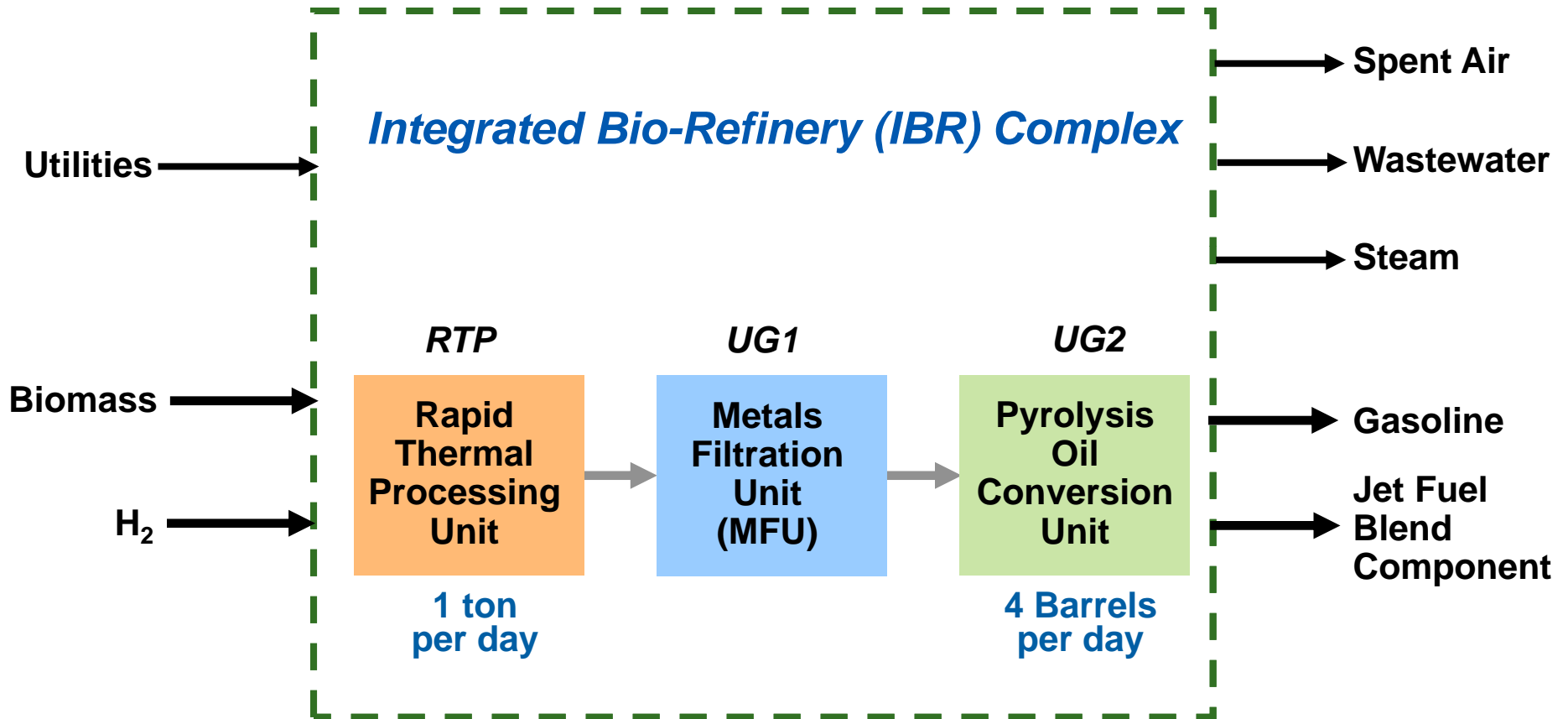


- UOP has received a \$25M grant from the US DOE ([Project # DE-EE0002879](#)) to demonstrate technology for the conversion of second generation renewable feedstocks to transport fuels
- Demonstration will be done via a Pilot Plant at the Tesoro refinery in Hawaii, USA, with cross industry commercial partners
- Objectives:
  - Demonstrate scalability of feedstock-flexible technology to produce drop-in transport fuels from lignocellulosic feedstocks
  - Demonstrate supply chain from feedstock to pyrolysis oil conversion & fuel usage
  - Pilot plant will validate that pyrolysis oils from a range of feedstocks can be processed in a common upgrading unit

***Technology that Complements Traditional Refinery Technology***

# Project Scope

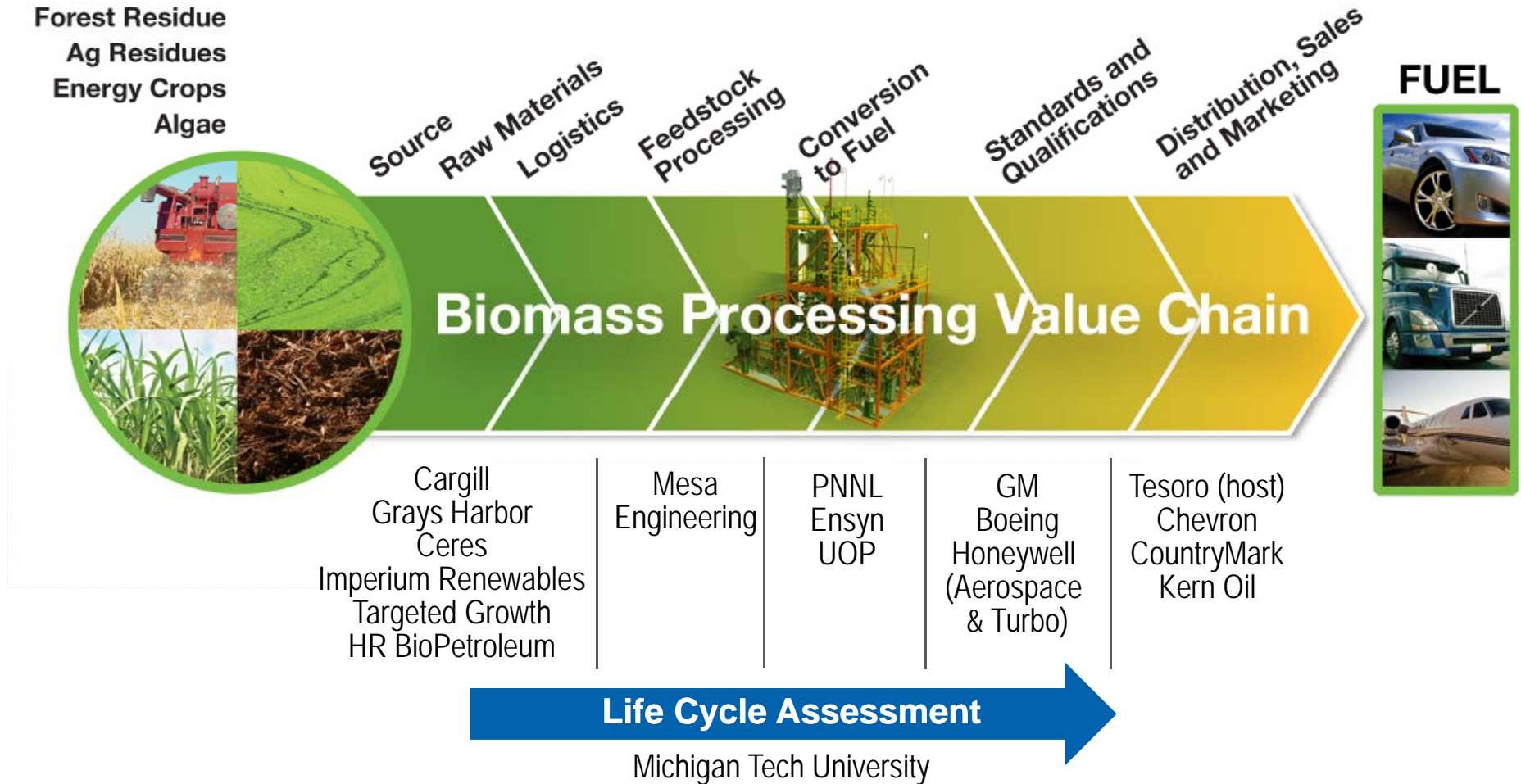
## *IBR Scope Block Flow Diagram*



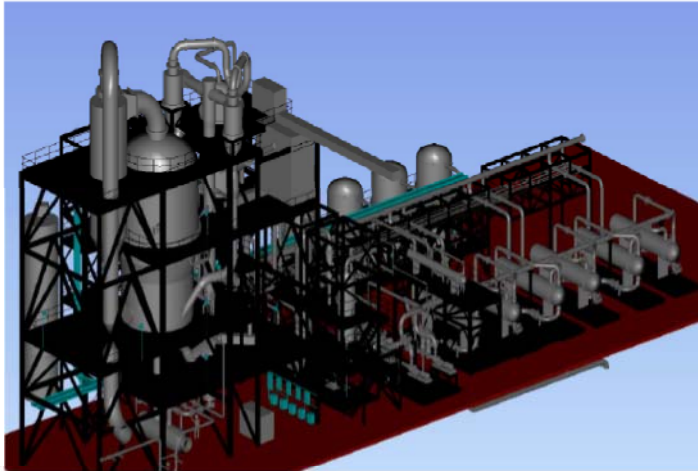
***To be Located at Tesoro Kapolei Refinery  
and Operated by UOP***

# Commercialization & Market Approval

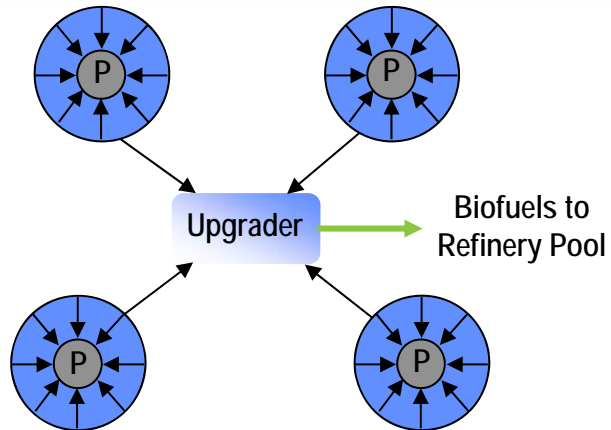
**Commercialization Strategy:  
Create Bridges Across the Biomass Supply Chain**



# Commercial Unit Configuration



*Multiple 400 T/D RTP Units*

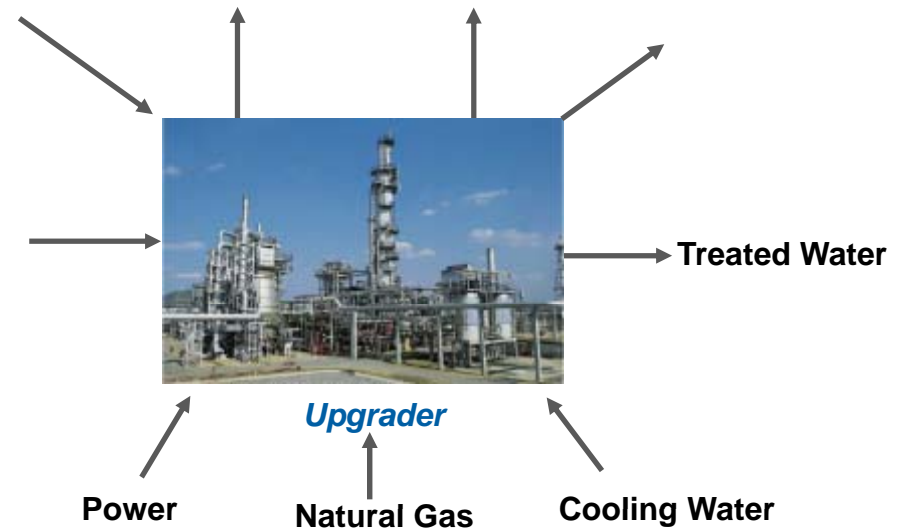


H<sub>2</sub>

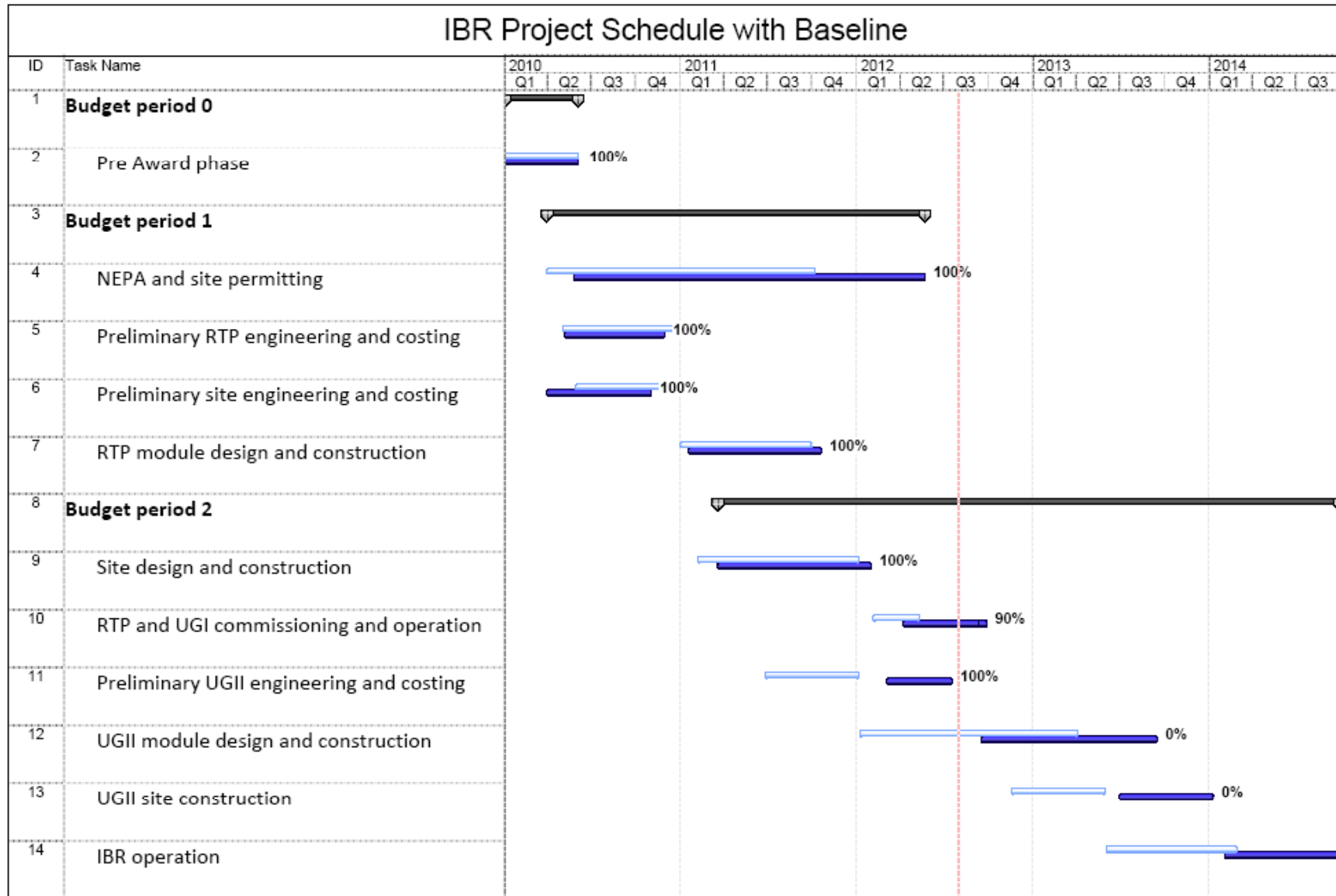
Fuel Gas/  
H<sub>2</sub> Plant Feed

Jet &  
Diesel

Gasoline



# IBR Project Schedule





# IBR Site Looking South to Tesoro Refinery



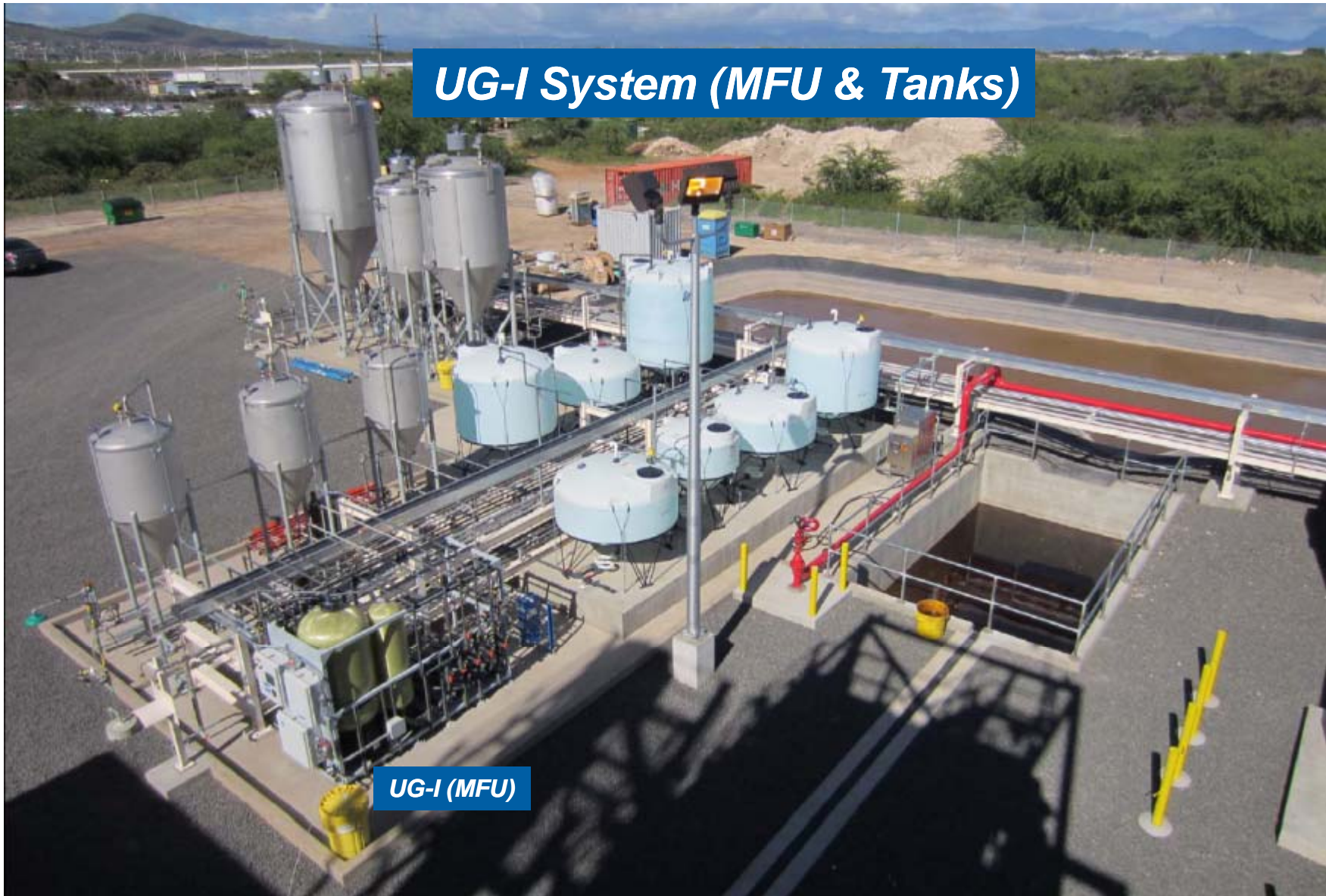
# IBR RTP Unit



# IBR Site Utilities



# IBR Site Looking North East



# IBR Site Lab



# IBR Site



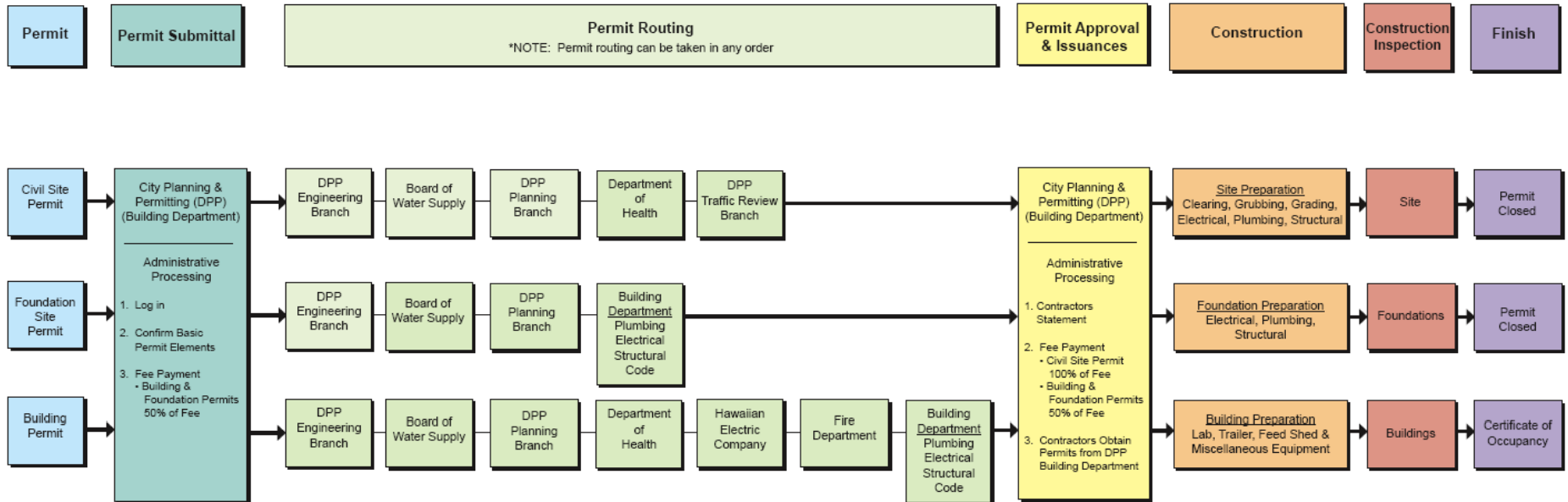
# Challenges and Opportunities

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- Agricultural Equipment to size and dry bio mass
- Infrastructure for construction of large industrial projects
- Operations staff for large industrial plants
- Permitting process for industrial projects
- Utilization of local land to grow feed stock



# City & County of Honolulu Permit Process and Construction Development



City & County of Honolulu:  
Permit Process and Construction Development



# Acknowledgements

This material is based upon work supported by the Department of Energy under Award No. DE-EE0002879

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