



William Parks

Chief Engineer and Special Asst
Department of Business,
Economic Development & Tourism

A Hydrogen Vision for Hawaii

September 2007

The Case for Hydrogen

Hawaii relies on imported petroleum for nearly 90% of its primary energy needs

Dependence on oil has a price:

- Economic issues
- Environmental issues
- Security issues

Hydrogen can provide an answer:

- Potentially limitless supply of energy
- Can be produced in Hawaii from renewable sources
- Clean; environmentally-friendly

The Vision

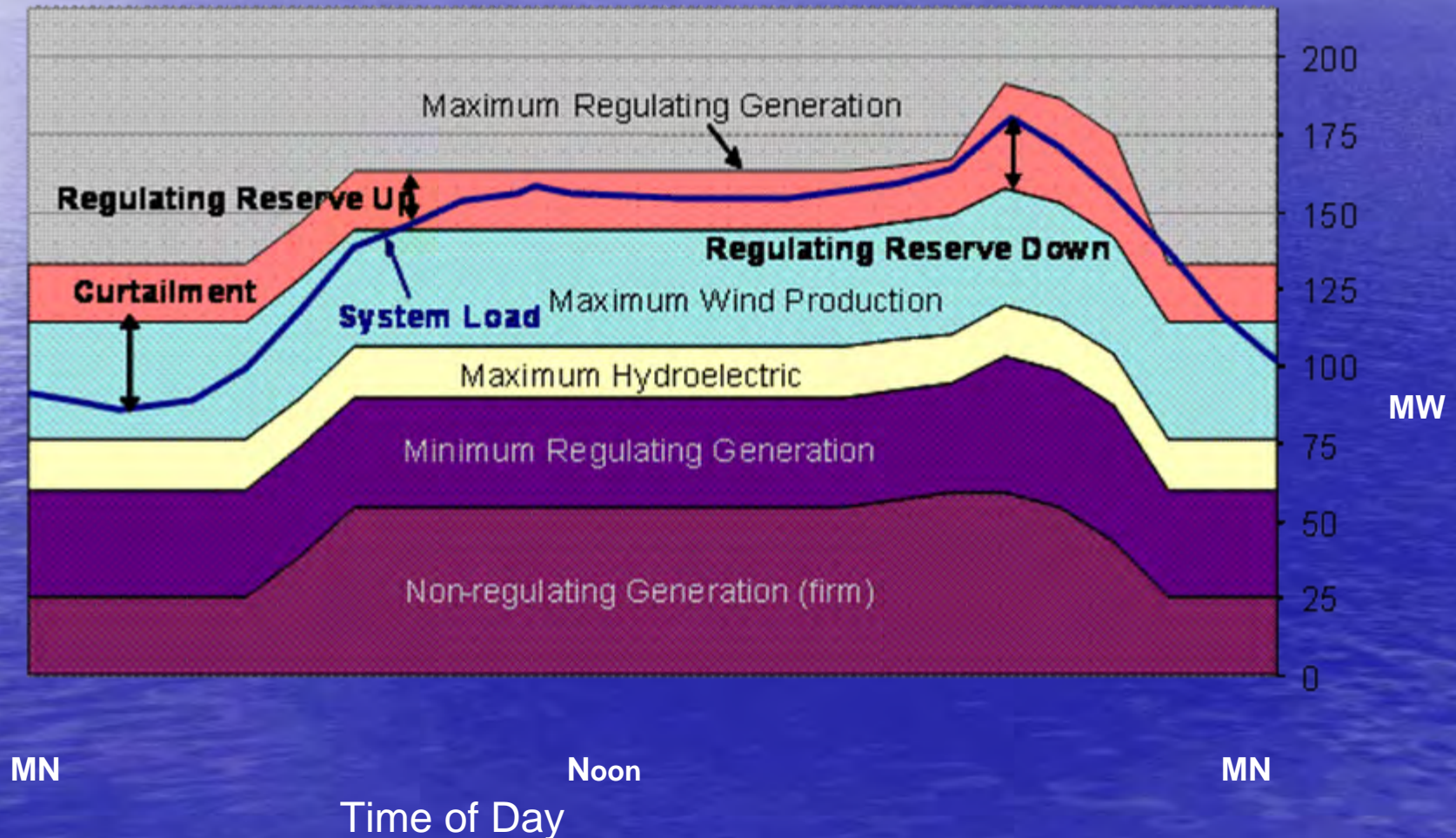
- Hawaii achieves energy self-sufficiency by generating hydrogen from renewable energy and using hydrogen as energy carrier
- Hydrogen used as transportation fuel
- Excess hydrogen is exported to other markets
- Hawaii is the U.S. leader in renewable hydrogen (as Iceland is for Europe)

Hawaii's Strengths

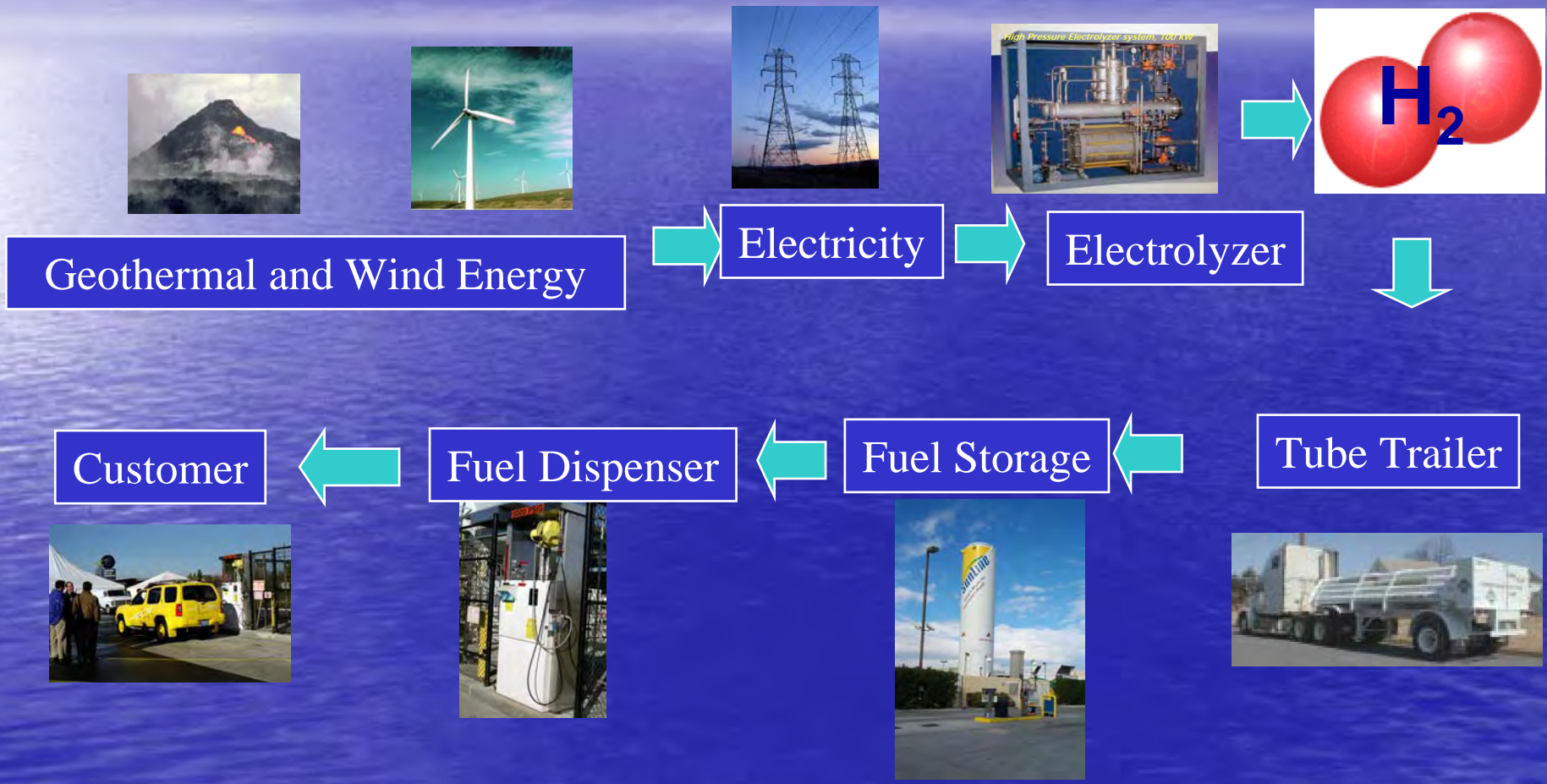
- Hawaii's natural competitive advantages: renewable energy assets
- Established research excellence at the UH: Hawaii Natural Energy Institute (HNEI)
- Major investments in R&D by federal and private sources underway
 - Hawaii Fuel Cell Test Facility (HFCTF)
 - Hydrogen Power Park
 - NELHA Gateway Center
- Significant local project and partnering possibilities, especially on Hawaii Island

Big Island has Excess Renewable Energy for Hydrogen Development

Typical HELCO Load Curve
Generation Characteristics for Future Wind Production
(Assumes Three Steam Units can Maintain Frequency)



Integrated Hydrogen System Vision - Big Island of Hawaii



Gov. Lingle's Energy for Tomorrow Hydrogen/Technology Provisions (Act 240)

- Established the Hawaii renewable hydrogen program managed by DBEDT
- Established the hydrogen investment capital special fund and appropriated \$10,000,000 for the fund
- Appropriated funds for a hydrogen system program manager

Hydrogen Fund Objectives

- Develop world-class renewable hydrogen program
- Realize Hawaii's potential as a global R&D hub for renewable energy
- Grow successful Hawaii-based energy companies
- Leverage additional sources of capital

Renewable Hydrogen Program

- Strategic partnerships for research, development, testing and deployment of renewable hydrogen technologies
- Engineering and economic evaluations of Hawaii potential for hydrogen use
- Electric grid reliability and integration
- Hydrogen Demonstration Projects
- Statewide Hydrogen economy public education program
- Promotion of Hawaii's renewable hydrogen resources to potential partners and investors

Hydrogen Plans

- 2007-2010 on Hawaii
 - Expanded installation of hydrogen production facilities
 - Develop integrated energy systems
 - Construction of additional hydrogen refueling stations
 - Promotion of building design and construct that promotes clean energy assets

Hydrogen Plans (cont'd)

- 2010-2020 plan to transition Hawaii to a hydrogen fueled economy and extend state-wide
 - Evaluation of policies to:
 - Encourage the adoption of hydrogen vehicles
 - Continually fund investment capital special fund
 - Support investment in hydrogen infrastructure

Near Term Tasks

- Assess technology and infrastructure gaps
- Identify targeted technologies to fill gaps
- Benchmark national/global hydrogen activities
- Identify market needs and policies to move hydrogen forward
- Identify companies to target for fund investment
- Mentor and advise companies

Hydrogen Investment Capital Special Fund

- \$10 million investment by legislature
- All contributions by public or private partners
- All interest earned accrued to the special fund
- Any moneys from other sources
- Moneys provide seed and venture capital investments for research, development, testing and implementation

Implementation Issues

- Finalize Management Team
- Develop portfolio for funding and investments
- Seek and Establish Partnerships for Projects