2009 DOE HYDROGEN PROGRAM REVIEW

INTERNATIONAL STATIONARY FUEL CELL DEMONSTRATION

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Plug Power Inc
18 May 2009

Clean, Reliable On-site Energy

Project ID: FCP_05_Vogel

SAFE HARBOR STATEMENT

This communication contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, including but not limited to statements regarding our prospects for growth. We believe that it is important to communicate our future expectations to our investors. However, there may be events in the future that we are not able to accurately predict or control and that may cause our actual results to differ materially from the expectations we describe in our forward-looking statements, including, without limitation, the risk that the anticipated synergies of the Cellex Power Products, Inc. and General Hydrogen Corp. (now amalgamated as Plug Power Canada Inc.) acquisitions are not realized; the risk that unit orders will not ship, be installed and/or convert to revenue, in whole or in part; Plug Power's ability to develop commercially viable on-site energy products; the cost and timing of developing Plug Power's on-site energy products; market acceptance of Plug Power's on-site energy products; Plug Power's ability to manufacture on-site energy products on a large-scale commercial basis; competitive factors, such as price competition and competition from other traditional and alternative energy companies; the cost and availability of components and parts for Plug Power's on-site energy products; Plug Power's ability to establish relationships with third parties with respect to product development, manufacturing, distribution and servicing and the supply of key product components; Plug Power's ability to protect its Intellectual Property; Plug Power's ability to lower the cost of its on-site energy products and demonstrate their reliability; the cost of complying with current and future governmental regulations; the impact of deregulation and restructuring of the electric utility industry on demand for Plug Power's on-site energy products; and other risks and uncertainties discussed under "Item IA—Risk Factors" in Plug Power's annual report on Form 10-K for the fiscal year ended December 31, 2007, filed with the Securities and Exchange Commission ("SEC") on March 17, 2008, and the reports Plug Power files from time to time with the SEC. Plug Power does not intend to and undertakes no duty to update the information contained in this communication.

OVERVIEW

Timeline

- Project start – May 2007
- Project end – April 2009
- 100% Complete

Barriers

- Barriers addressed
  - Durability – 40,000 hr system
  - Cost - < $750/kW system cost
  - Performance – η_e = 35%, η_o = 85%

Budget

- Total project funding - $7.1M
  - DOE - $3.55
  - Plug Power - $3.55
- Funding in FY07 - $2.1M
- Funding in FY08 - $1.45M

Partners

- Interactions/collaborations
  - BASF Fuel Cell
- Project Lead
  - Dr. Emory DeCastro

COLLABORATIONS - DOE TOPIC 7B/EU FP6 PROGRAM

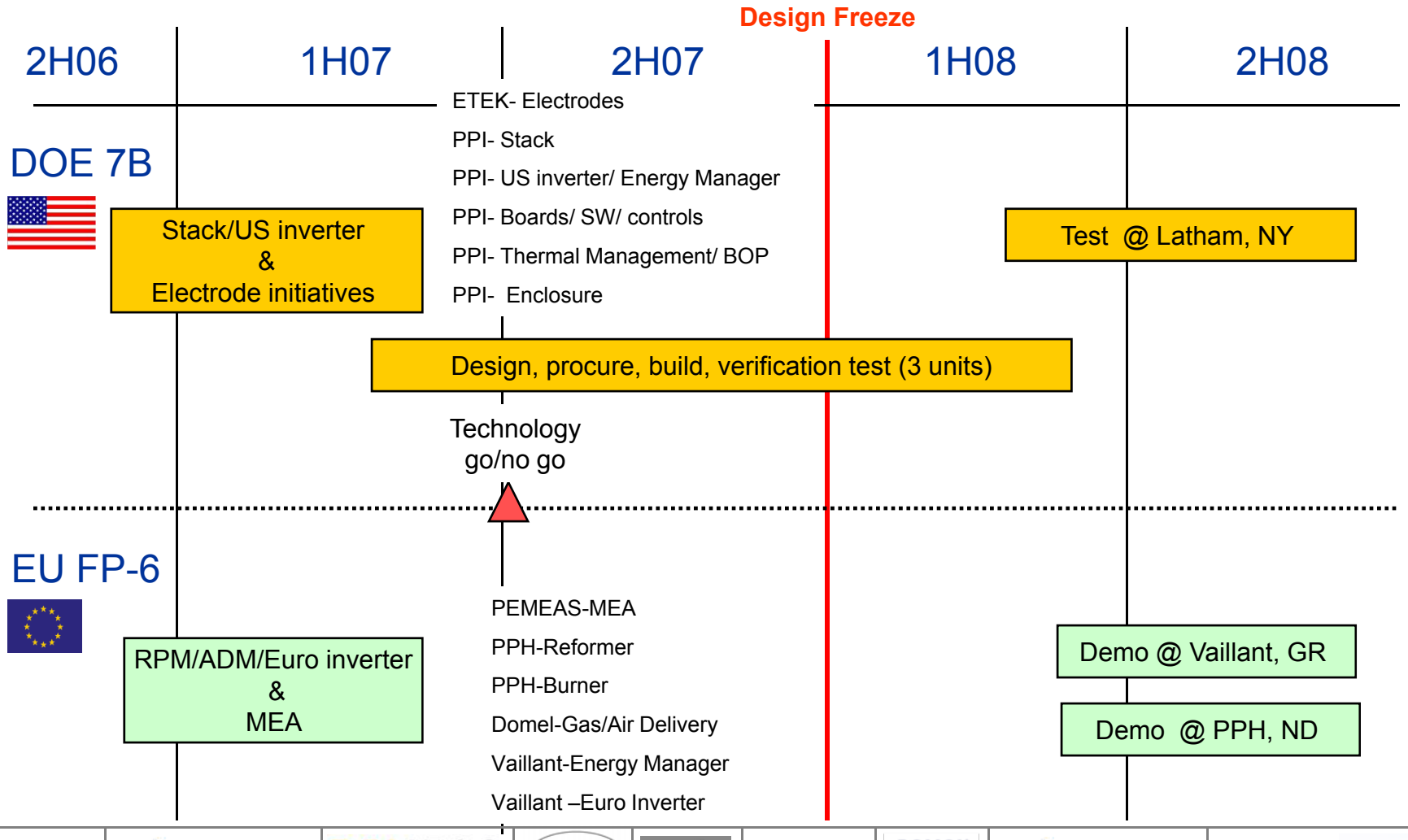
- First of it's kind collaboration between the DOE and the EU
- Goal to develop "high-temperature" (PBI-based) fuel cell heating appliances for residential use worldwide
- Executed through a US/EU consortium:
  - Plug Power (US)/Plug Power (Netherlands)
  - BASF E-TEK US/BASF (Germany)
  - Vaillant (Germany)
  - Domel (Slovenia)
  - Bulgarian Academy of Sciences (Bulgaria)
  - Gaia (Sweden)
  - Imperial College (United Kingdom)

RELEVANCE - OBJECTIVES

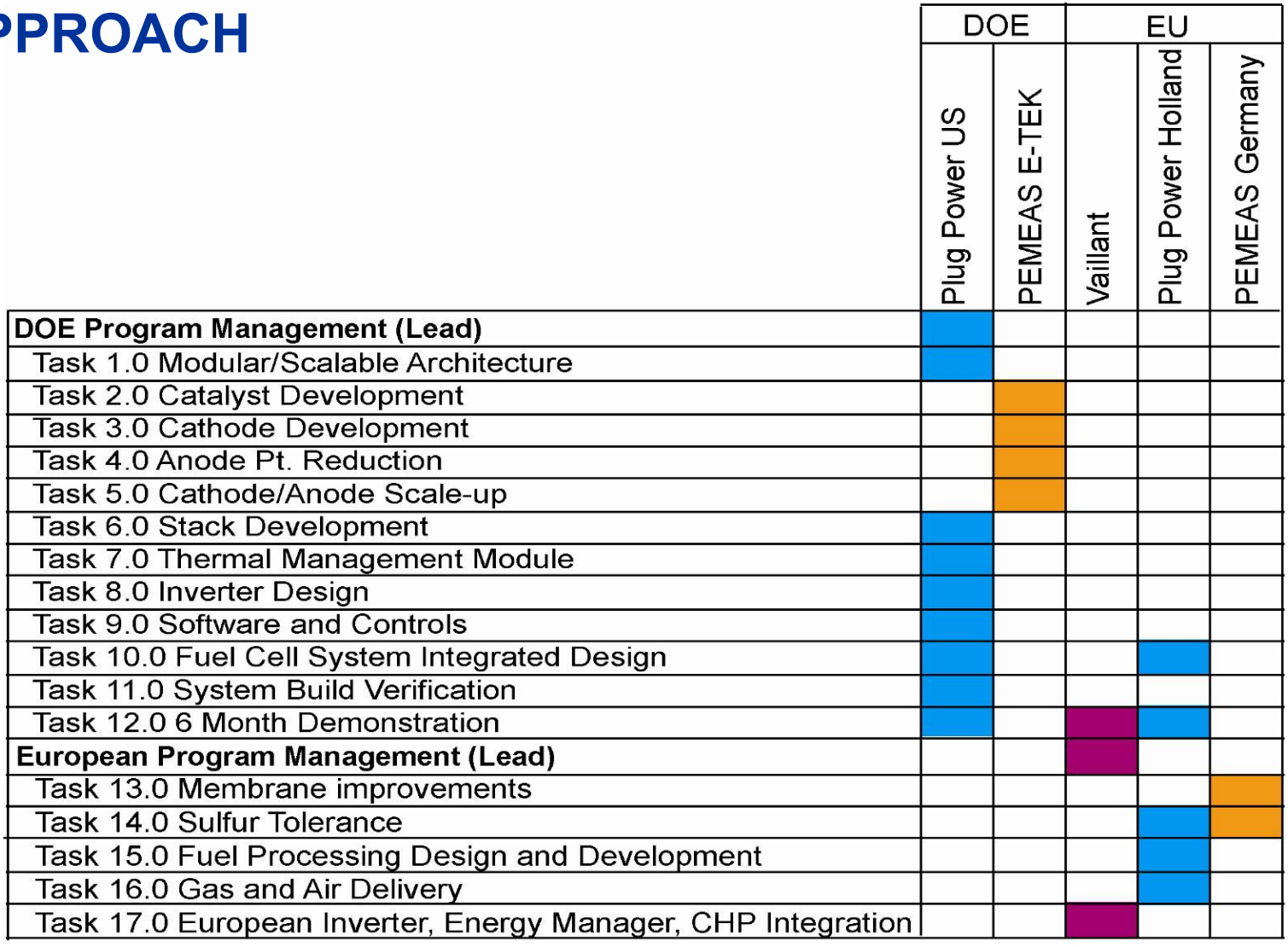
Develop, test and validate a high-temperature PEM, stationary, reformate-based, CHP, fuel cell system as the first demonstration of a modular, scalable design for a worldwide market.

- Total system cost of < $750/kW in production volumes
- $\eta_{electric}$ = 35% (line of sight to 40%); $\eta_{overall}$ = 85%
- System life = 40,000 hours
- Modular and scalable system and CHP hydraulics concepts

APPROACH - MILESTONES

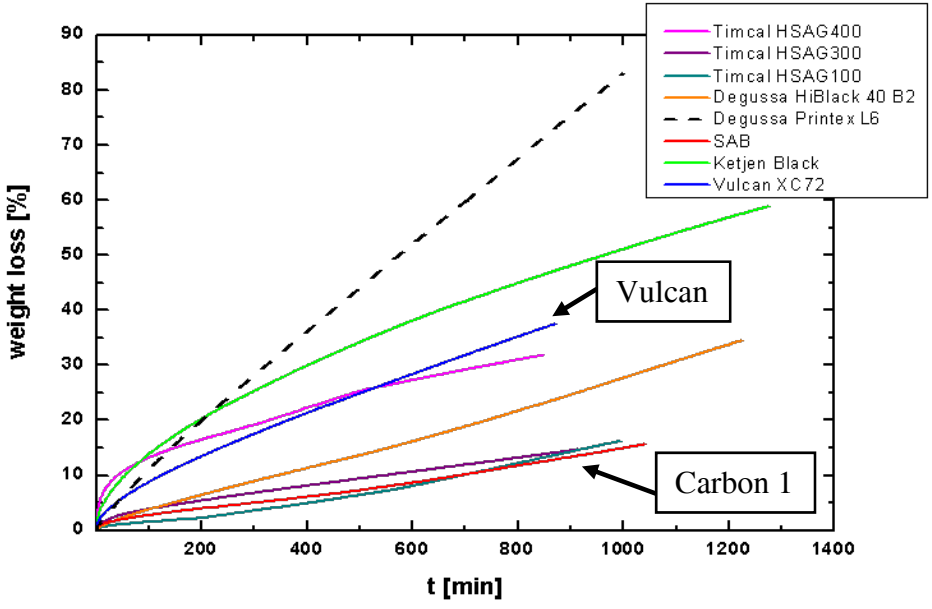


APPROACH


DOE
EU
Plug Power US
PEMEAS E-TEK
Vaillant
Plug Power Holland
PEMEAS Germany
DOE Program Management (Lead)
Task 1.0 Modular/Scalable Architecture
Task 2.0 Catalyst Development
Task 3.0 Cathode Development
Task 4.0 Anode Pt. Reduction
Task 5.0 Cathode/Anode Scale-up
Task 6.0 Stack Development
Task 7.0 Thermal Management Module
Task 8.0 Inverter Design
Task 9.0 Software and Controls
Task 10.0 Fuel Cell System Integrated Design
Task 11.0 System Build Verification
Task 12.0 6 Month Demonstration
European Program Management (Lead)
Task 13.0 Membrane improvements
Task 14.0 Sulfur Tolerance
Task 15.0 Fuel Processing Design and Development
Task 16.0 Gas and Air Delivery
Task 17.0 European Inverter, Energy Manager, CHP Integration

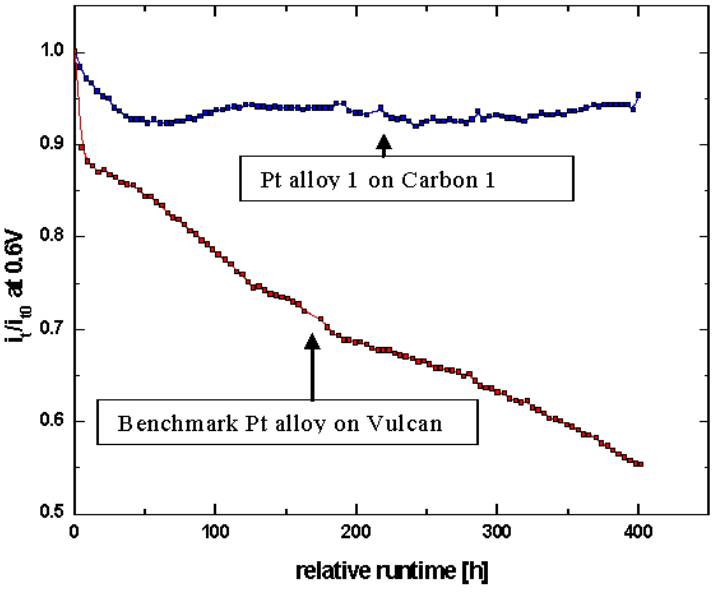
TECHNICAL ACCOMPLISHMENTS – Cathode Development

Carbon Support Selection



- Corrosion rates in Wt% at 180C, 1.0 volts
- Varying graphite content
- Two supports selected

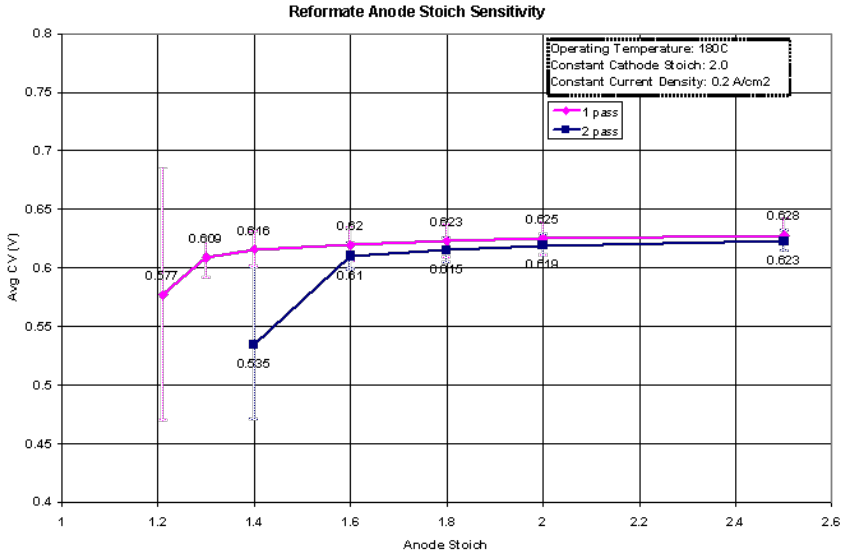
Pt Alloy Selection



- Performance under potential cycling
- Various alloys evaluated
- Scale-up tradeoffs

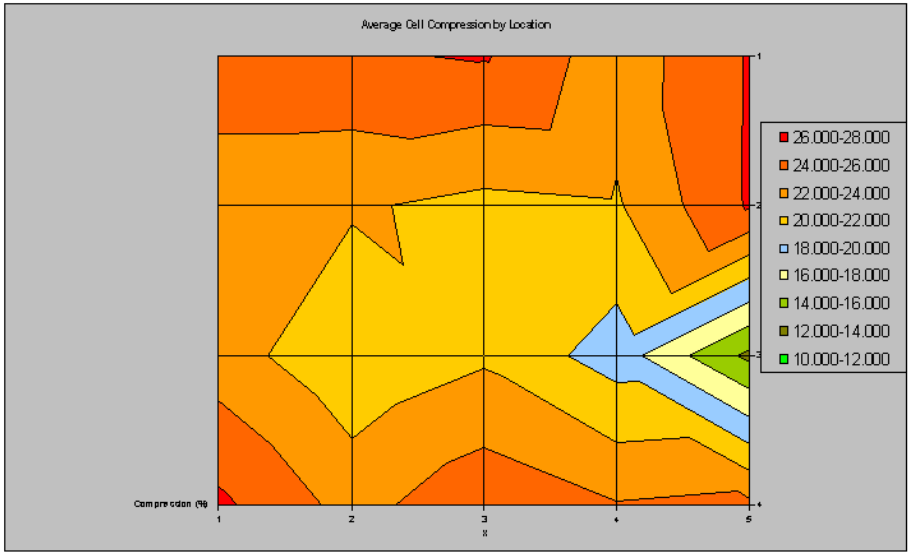
New cathode has improved resistance to corrosion and is robust to load cycling.

TECHNICAL ACCOMPLISHMENTS – Stack Development



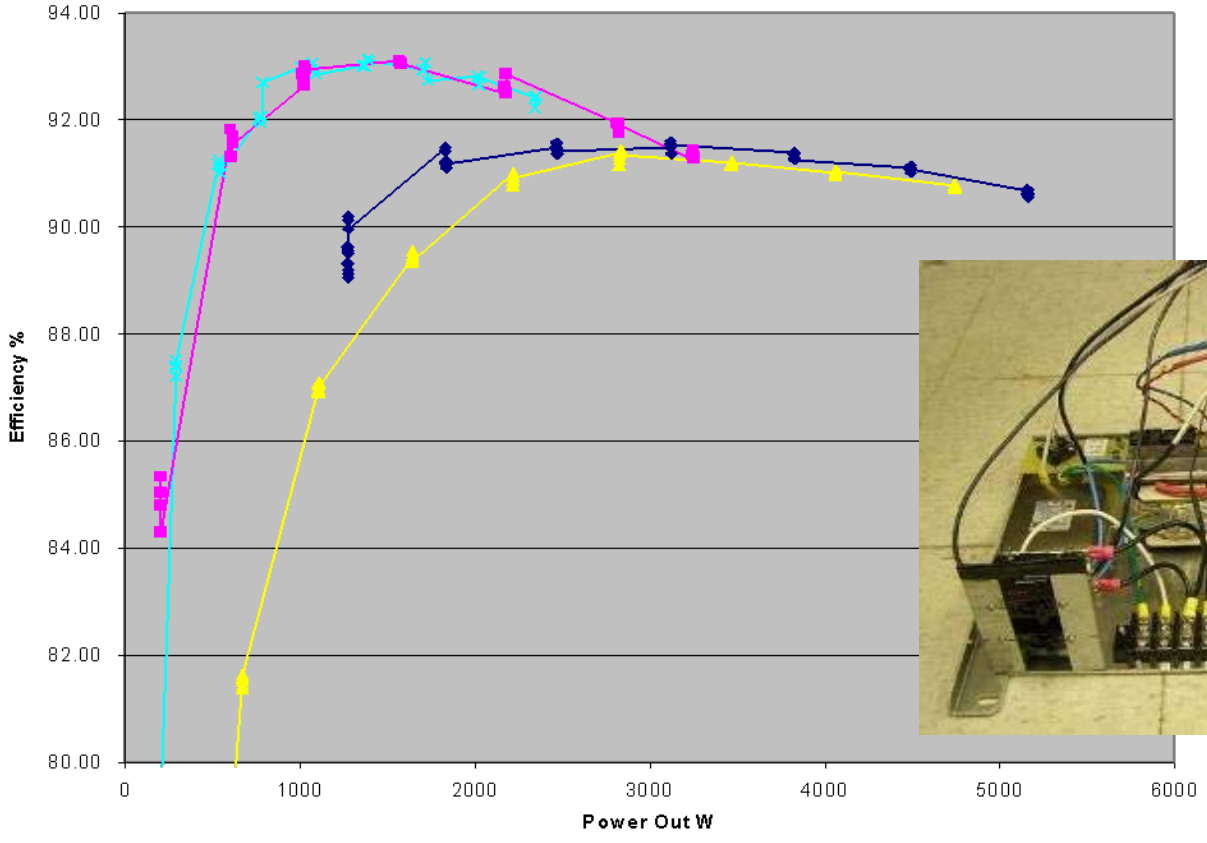
- Single vs. double pass flowfield analyzed
- Single pass design is more robust to noise

- MEA compression distribution analyzed
- Design not robust to manufacturing tolerances
- Design and manufacturing process changes



Improved stack design and component manufacture should lead to better performance and life. Testing underway.

TECHNICAL ACCOMPLISHMENTS – Inverter Development



- Prototype inverter ~93% peak efficiency

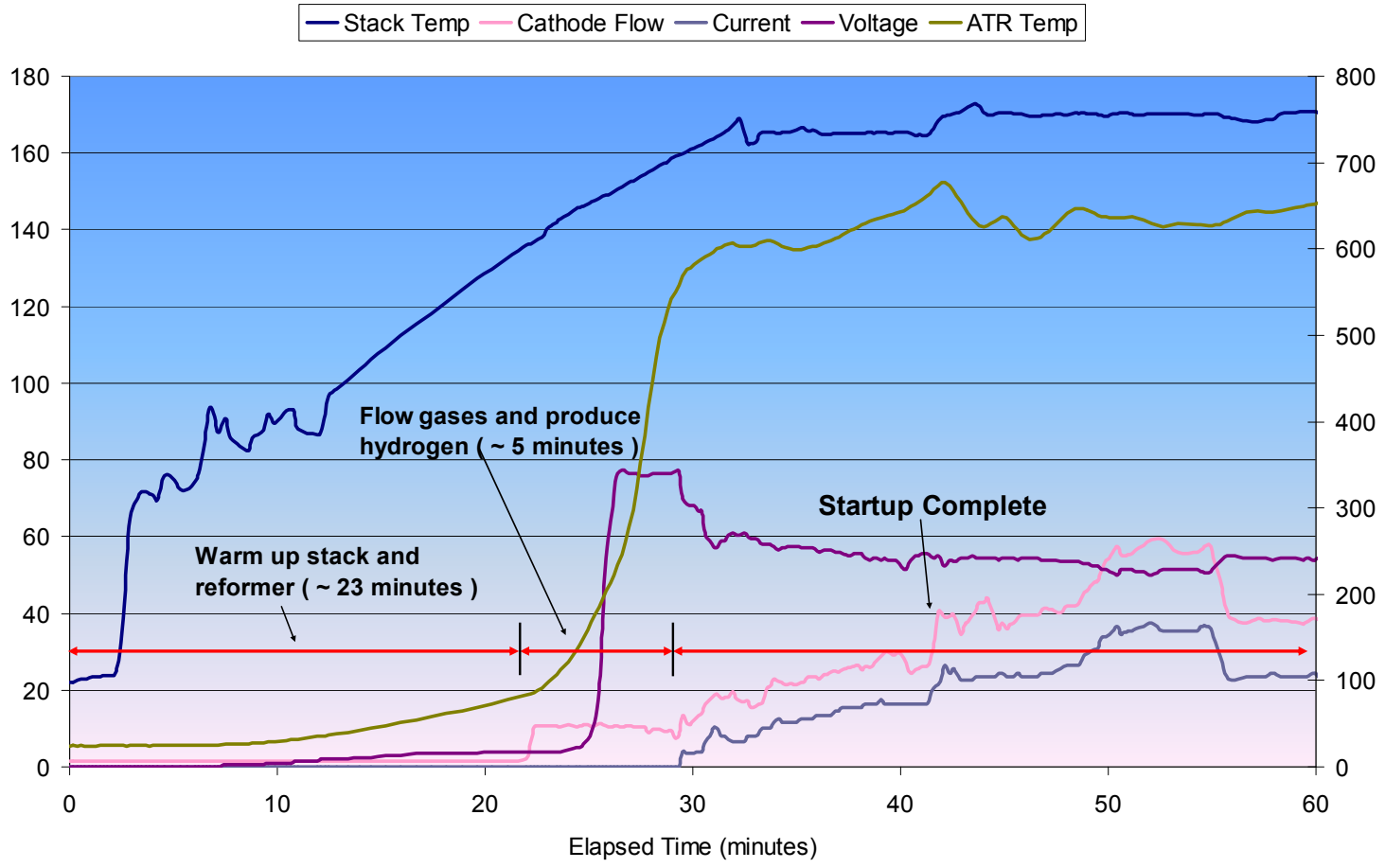
New inverter design is highly efficient, compact and low cost.

TECHNICAL ACCOMPLISHMENTS – System build

- Two systems “E1” and “E2” currently built.
- E1 in final stages of debug at PP Latham
- E2 displayed at Hannover Fair in Germany
- E3 currently being built

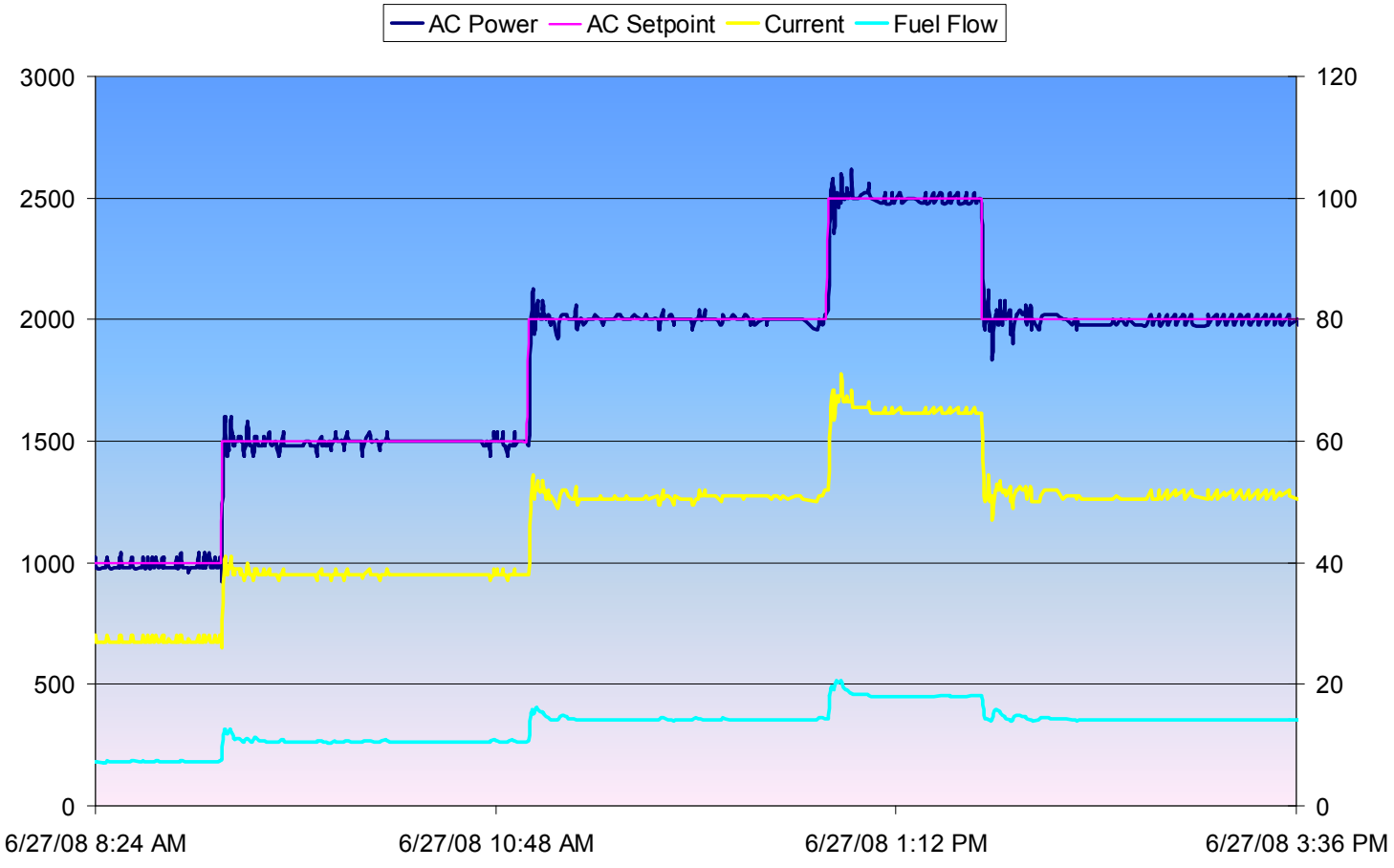
TECHNICAL ACCOMPLISHMENTS – System test

During a Conservative start up the system produces power in ~ 30 minutes



TECHNICAL ACCOMPLISHMENTS – System test

System demonstrates rudimentary load following capability.



TECHNICAL ACCOMPLISHMENTS – System test

MicroCHP system testing at Vaillant

Realized test program:

- 09/08: Installation

  1,000 operating hours

- 12/08: 1st Stack replacement

  500 operating hours

- 03/09: Improved TMM-module

  2nd Stack replacement

Experienced international installation team:

In total 1,526 operating hours in the Vaillant lab

PROPOSED FUTURE WORK

- Continue Epsilon testing in Europe – 3Q09
- Ship additional systems for external testing with strategic partners – 2Q09
- Begin installing systems in employees' homes – 2Q09
- Establish DOE sponsored reliability fleet – 3Q09
- Use learning from Epsilon, reliability fleet and employee home testing for next design iteration for commercial field trials – 1Q10

SUMMARY

- Through a very successful trans-Atlantic collaboration between the US DOE and the EU:
  - A high temperature PEM, stationary, reformate based, CHP fuel cell system has been developed based on commercial requirements
  - Enabling MEA, stack, reforming and power electronics technologies have been explored, down selected and developed
  - Progress has been made toward achieving DOE technical targets; especially performance and system durability
  - Design verification testing against commercial requirements is complete

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