Test Site Sweden

20010 DOE Hydrogen Program and Vehicle Technologies Annual Merit Review

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Argonne National Laboratory

Sponsored by Lee Slezak

Project ID #VSS032

U.S. Department of Energy

Energy Efficiency and Renewable Energy

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

Project Overview

Timeline

- Start – 10/08
- Finish – TBD
- NA (ongoing in support of DOE policy directives)

Budget

- Total project funding 700K (450K DOE)
- 250K in FY 2009 (EERE)
- 250K in FY 2009 (SEA)
- 200K in FY 2010 (VT)

Barriers/Goals Addressed

- Data acquisition and smart charge control
- Consumer behavior/preferences
- Interactive consumer interface
- Outreach and education
- Global codes & standards for vehicle testing and vehicle-grid interface

Partners

- Test Site Sweden and Swedish Hybrid Vehicle Center (includes Saab, Volvo Car, Volvo Group, Scania, BAE, etc.)

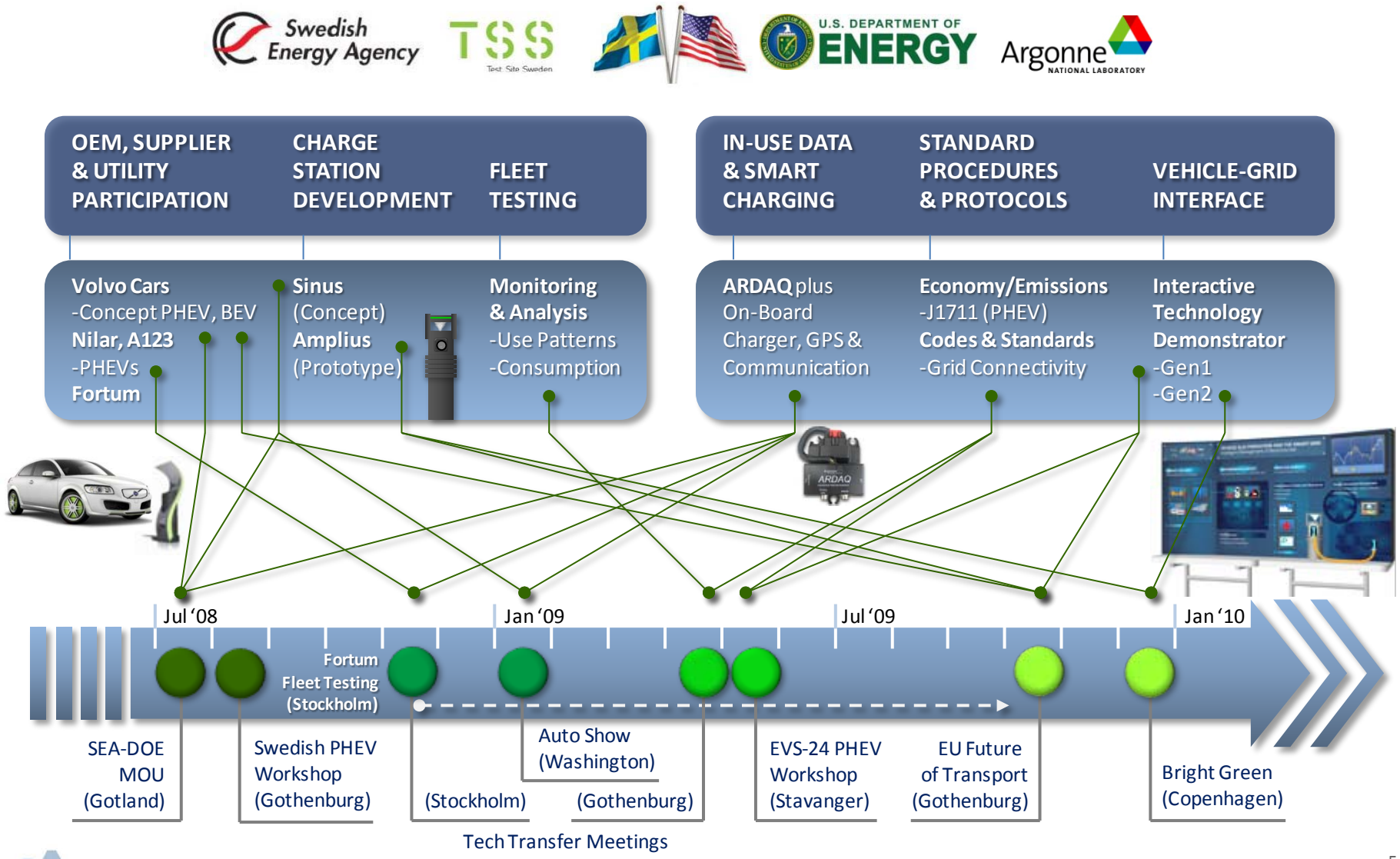
Overview

- Initiated in FY 2009 to directly support DOE programmatic initiative; cooperative program between the DOE and the Swedish Energy Agency
- DOE budget through FY2010 = 450K
  - $250K (FY 2009) from EERE crosscut to support policy initiative
  - Matching budget in Sweden
- Goals
  - Proof of concepts to support PHEV development and introduction, e.g., vehicle instrumentation and smart charging
  - Customer behavior in field operational testing
  - Convenient and ‘open’ charging station systems
  - Quantification of national and customer benefits
- Partners
  - Argonne, Test Site Sweden, Swedish Hybrid Vehicle Centre (includes Swedish light- and heavy-duty OEMs)

Objectives

- Support DOE policy directive to promote international cooperation on plug-in vehicles
  - Proof of concepts to support PHEV development and introduction
    - Data acquisition and smart charge control system proof-of-concept
    - Trial in utility service fleet
  - Customer behavior in field operational testing
    - Interactive charger kiosk concept
  - Convenient and ‘open’ charging station systems
    - Prototype smart charge station
  - Government-industry tech transfer meetings
    - Stockholm Nov08
    - Gothenburg Apr09
  - PHEV Workshops/technology demonstrations
    - EVS-24 (Stavanger May09)
    - EU Future of Transport Meeting (Gothenburg Oct09)
    - Bright Green Conference (Copenhagen Dec09)

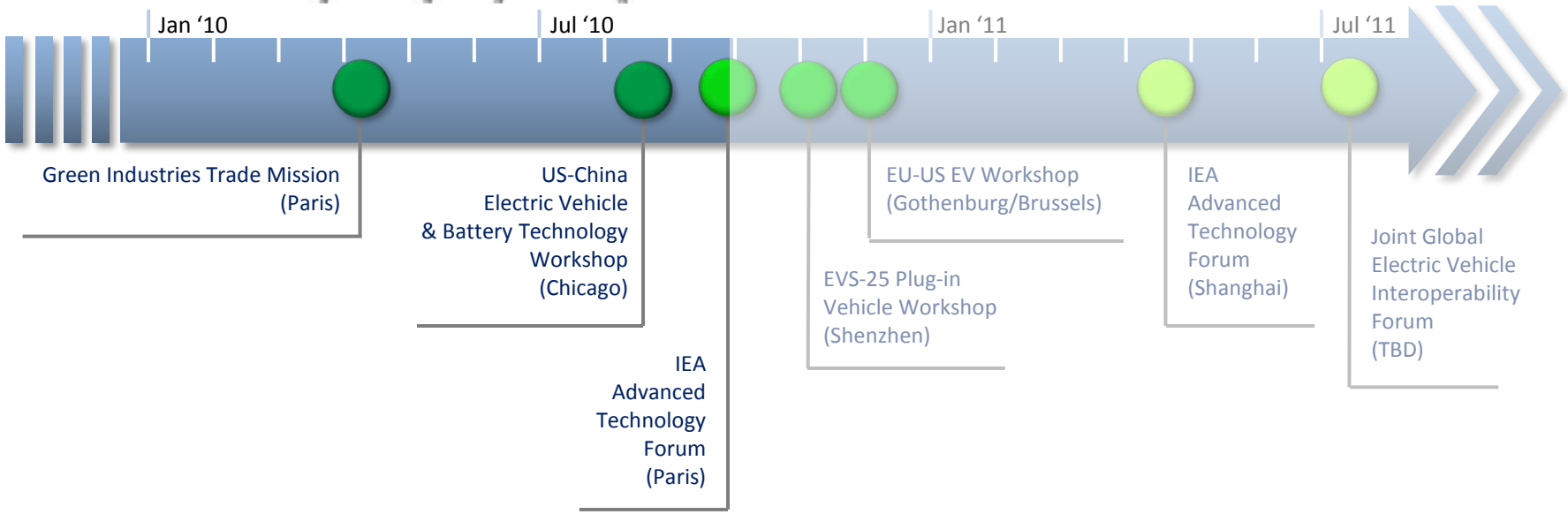
Cooperative Activities & Milestones



FY 2010 Transition to EU-US & US-China Cooperation

Promote Global Vehicle-Grid Interoperability

- Electric Vehicle Supply Equipment (EVSE)
- Communication standards
- Security standards



Approach/Strategy

- Develop and demonstrate hardware/software concepts to characterize technical options and illustrate potential benefits offered by standard connectivity and communication
  - Leverage the technology development projects of the Grid Interaction Tech Team (e.g., compact and low-cost metering, universal communication technology, vehicle-grid-home area network compatibility)
- Conduct joint international meetings to share development methods, tools and procedures as well as promote collaboration
  - Conduct joint activities with members of the EU-US Energy Council and the US-China EV Initiative
  - Leverage the international venues (e.g., EVS) and contribute to key forums organized by partner agencies (e.g., DOC, IEA)
  - Utilize working hardware in technology displays to demonstrate capability and commitment
- Share non-sensitive data globally for the benefit of developers, OEMs and policymakers (e.g., travel patterns, consumer behavior, grid impacts)
  - Leverage the ongoing/planned plug-in vehicle demonstration programs in the US, Europe and China

Technical Accomplishments and Progress

- Proof of concept to support PHEV development and introduction
  - Data acquisition and smart charge control system proof-of-concept
  - Trial in utility service fleet in Stockholm (Fortum)
    - Included design and fabrication of specific battery management system interface

Technical Accomplishments and Progress

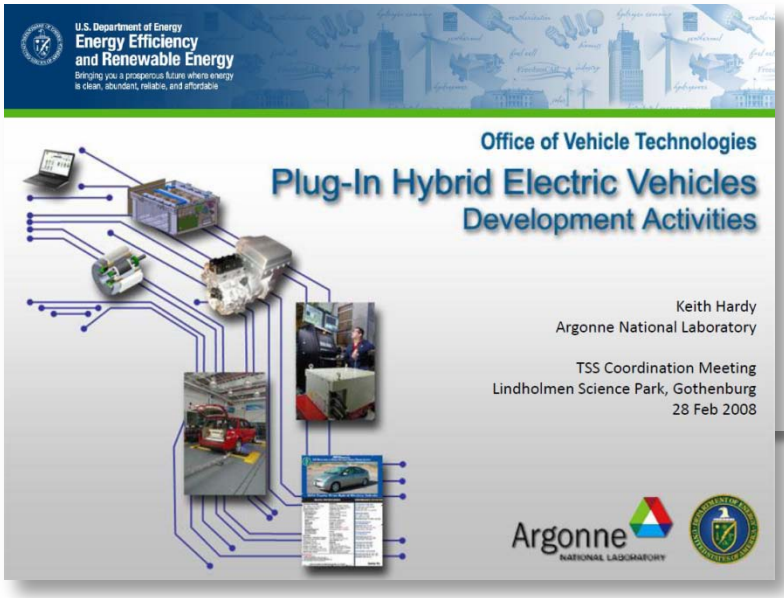
- Customer behavior/feedback
  - Interactive charger kiosk (concept)
  - Preferences/feedback obtained in public events

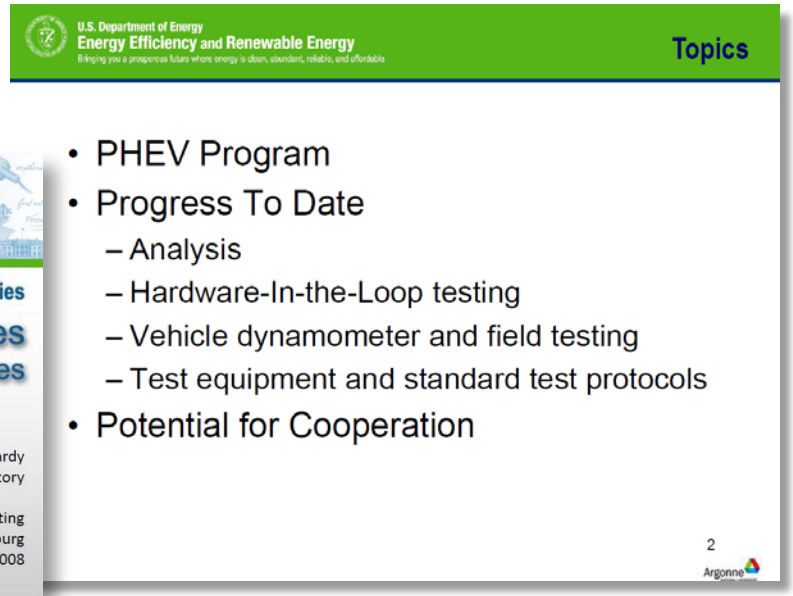
Technical Accomplishments and Progress

- Prototype smart charge station

Technical Accomplishments and Progress

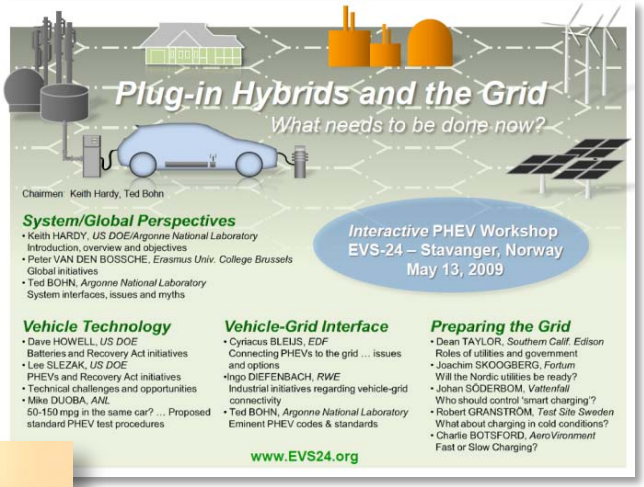
- Government-industry tech transfer meetings
  - Stockholm Nov08
  - Gothenburg Apr09





Technical Accomplishments and Progress

- Workshops/technology demonstrations
  - EVS-24 (Stavanger May09)
  - EU Future of Transport Meeting (Gothenburg Oct09)
  - Bright Green Conference (Copenhagen Dec09)



Collaboration

- DOE
  - FreedomCAR Grid Interaction Tech Team (VT)
  - Office of Electricity Delivery and Reliability (OE); issues related to smart grid (SG) implementation and interface
  - Policy & International Affairs; policy guidance and coordination through the EU-US Energy Policy Working Group (WG) and SG EV WG
- DOC
  - NIST; issues related to vehicle interface and smart grid task force
  - US Mission to the EU; Coordination with Commerce activities in Europe and Embassy staff interface
- External
  - Swedish Energy Agency and Ministry of Industry and Enterprise; coordination on schedule and resources for activities under MOU, US-SE events, transition to EU-level coordination and EU-US workshop
  - Test Site Sweden; technical coordination and integration of US and SE contributions
  - Swedish Hybrid Vehicle Center; Coordination of US-SE events involving Lindholmen Science Park and EU-US workshop
  - EC DG TREN/MOVE; opportunities for technical cooperation in EC procurement actions and programmatic coordination through the SG EV WG

Future Work - Transition from SE-US focus to Cooperation with EU & Asia

Promote Global Vehicle-Grid Interoperability

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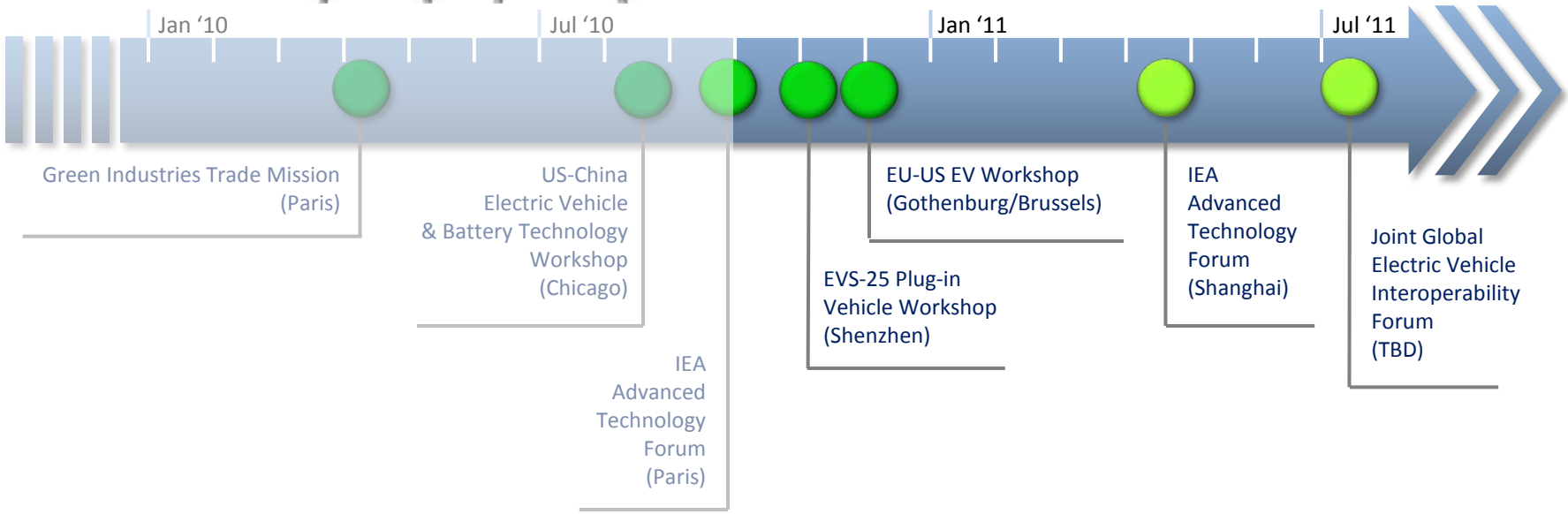
- Security standards



Technical Direction

- Leverage technology development in the grid connectivity project to promote global evaluation of proposed codes & standards
  - Prototype EVSE, communication, network compatibility methods
  - Limited field evaluation of (common) prototype EVSE and communication software in parallel activities in Europe and China
  - Propose joint (global) plug-in vehicle interoperability forum to assess global vehicle interface standards, compare vehicle use patterns and grid impacts
- Support key events in Europe and Asia consistent with the EU-US Energy Policy activities and the US-China EV Initiative

Summary

- The Test Site Sweden project has successfully supported DOE policy directives and demonstrated the benefits of international cooperation – technically and programmatically
  - Leveraged resources effectively; resulting in substantial technical accomplishments and programmatic benefits
  - Formed working relationships between US technical, programmatic and diplomatic efforts to leverage the benefits of a small program
  - Formed the basis for EU-level cooperation on the key issues regarding programmatic coordination, vehicle-grid interface and data sharing
- Transition from a Sweden focus to the EU and China supports DOE policy directives and is an effective means to pursue global vehicle-grid interoperability
- Key international technical, programmatic and diplomatic interfaces have been established
- Key events have been identified and responsibility established for organization/participation