



USCAR Presentation to the Commission to Review the Effectiveness of National Energy Laboratories

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What is USCAR?

- The collaborative technology research company for:
Chrysler Group LLC
Ford Motor Company
General Motors Company
- Founded in 1992
- Located in Southfield, Mich.

USCAR by the numbers

- ✓ 3 Member companies
- ✓ 8 Technical research areas
- ✓ 40+ Teams, working groups and consortia
- ✓ 500+ Active participants
- ✓ <15 Administrative/support staff
- ✓ >20 Years of experience and success

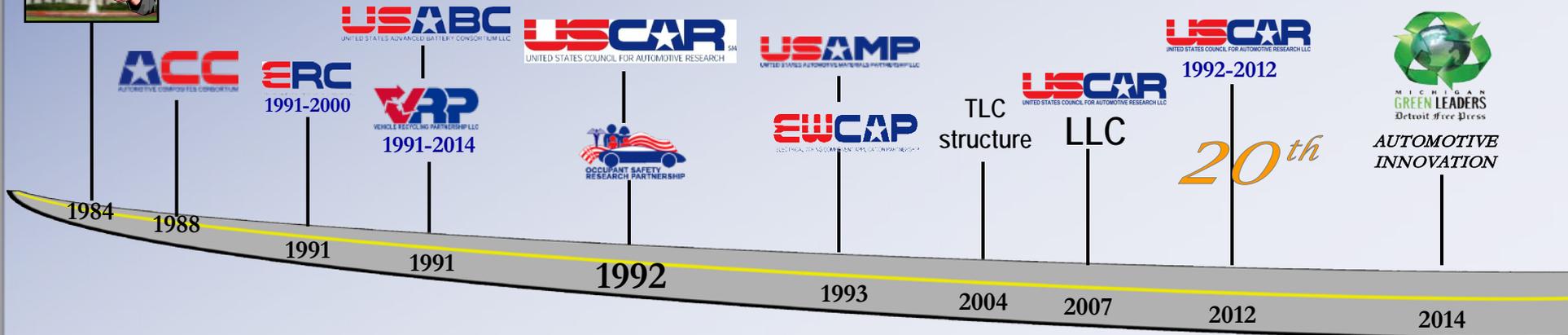
USCAR Mission

- Expand the technical knowledge and know-how of the domestic auto industry
- Encourage and support collaborative research and development of automotive technologies
- Address the needs of our environment and society, work with public and private stakeholders

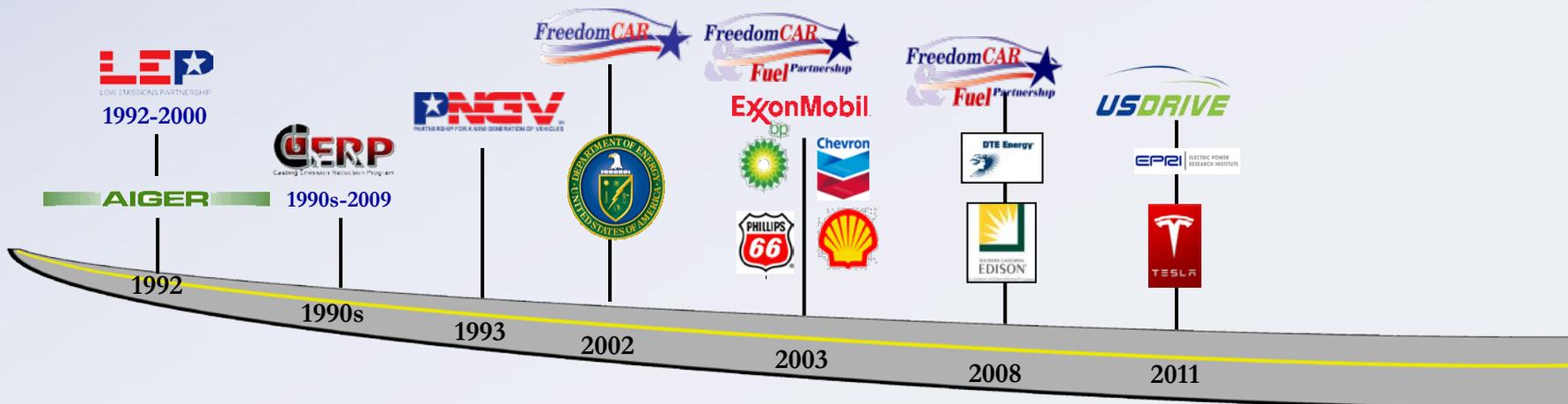
National Cooperative Research Act



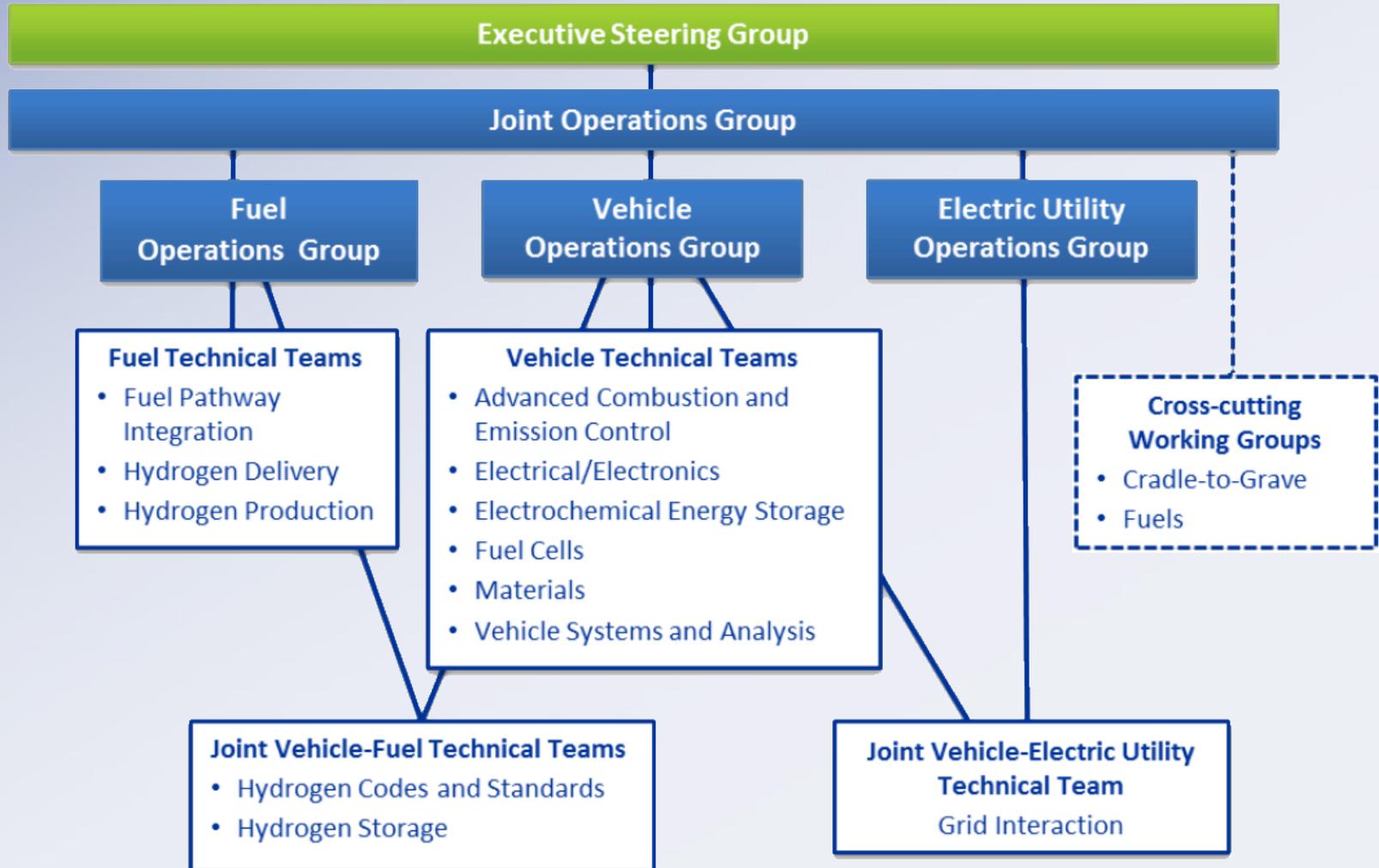
Evolution of USCAR



Key External Partnership Milestones



U.S. DRIVE Organizational Chart



UNITED STATES COUNCIL FOR AUTOMOTIVE RESEARCH LLC

Chrysler Group LLC

Ford Motor Company

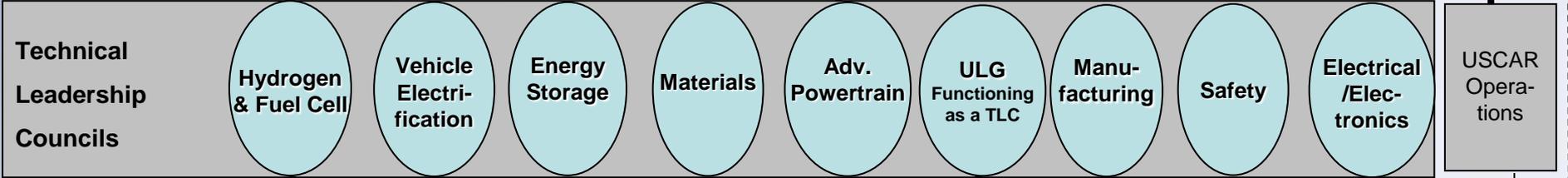
General Motors

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USCAR Council

Business
Technical
Support (BTS)

USCAR Leadership Group (ULG)



U.S. DRIVE Partnership (DOE)

- Hydrogen Storage Tech Team
- Hydrogen Codes and Standards Tech Team
- Fuel Cell Tech Team

- Grid Interaction Tech Team
- Electrical/Electronics Tech Team

- Electro-chemical Energy Storage Tech Team
- U.S. Advanced Battery Consortium LLC (USABC)
- Battery Recycling Working Group

- Materials Tech Team
- U.S. Automotive Materials Partnership LLC (USAMP)
- Decorative Trim Corrosion WG
- Substances of Concern Wkg. Gp.
- Vehicle Interior Air Quality WG
- ACC*
- AMD*
- (NDE)*

- Advanced Combustion & Emissions Control TT
- USD Fuels WG
- Engine Benchmarking Group
- Transmission Working Gp.
- Selective Catalytic Reduction (SCR) WG
- Aftertreatment Data Exchange Team
- EVAP Team
- OBD Working Group
- Automotive Lubricants Working Gp.
- USCAR Fuels WG

- Vehicle Systems Analysis Tech Team
- Cradle-to-Grave WG
- Automobile Industry/ Government Emissions Research CRADA (AIGER)
- Aerodynamics Working Group
- Vehicle Architecture Data Exchange Team (VADE)

- Manufacturing Working Group
- Ergonomics Task Force
- Plant Floor Controllers Task Force
- Digital Virtual Tools/ Simulation TF
- Plant Facilities Task Force
- Body Structures/ Stamping Task Force
- Paint TF
- Gen Assembly Task Force
- Powertrain Task Force
- Fasteners Committee
- Manufacturing Emissions Committee

- Occupant Safety Research Partnership (OSRP)
- Crash Safety Working Group (CSWG)

- Electrical Wiring Component Applications Partnership (EWCAP)
- AVB Ethernet Task Force
- Cyber/ Physical Systems (CPS) WG
- Lighting Group
- Automotive Cyber Security (ACS) Task Force
- Electric Power Systems Working Gp.

- Legal Stakeholders
- Finance Stakeholders (FiSH)
- Communications Stakeholders
- Industry Government Relations (IGR)
- Information Technology Stakeholders
- Real Estate Stakeholders

Green U.S. DRIVE Partnership Tech Team or Working Group; DOE Funding

Yellow Significant resources from gov't through a cooperative agreement, CRADA, or other government agreement

Orange USCAR members provide all or most resources; a few have significant gov't interaction and may leverage gov't resources without formal agreement (e.g., CSWG, CPSWG)

Note: Fasteners Committee assigned to Manufacturing TLC on a trial basis.

*USAMP project teams now report directly to the Steering Committee, while the three divisions remain in an advisory role.

U.S. DRIVE Tech Team Activities

USCAR works with DOE, fuel and utilities companies, and the National Labs to:

- Develop long-term technology goals
- Develop roadmaps to identify technical gaps
- Complete monthly review of existing projects
- Complete annual accomplishments reports
- Provide annual feedback on entire project portfolio
- Perform periodic assessment of lab capabilities

2013 U.S. DRIVE Technical Accomplishments



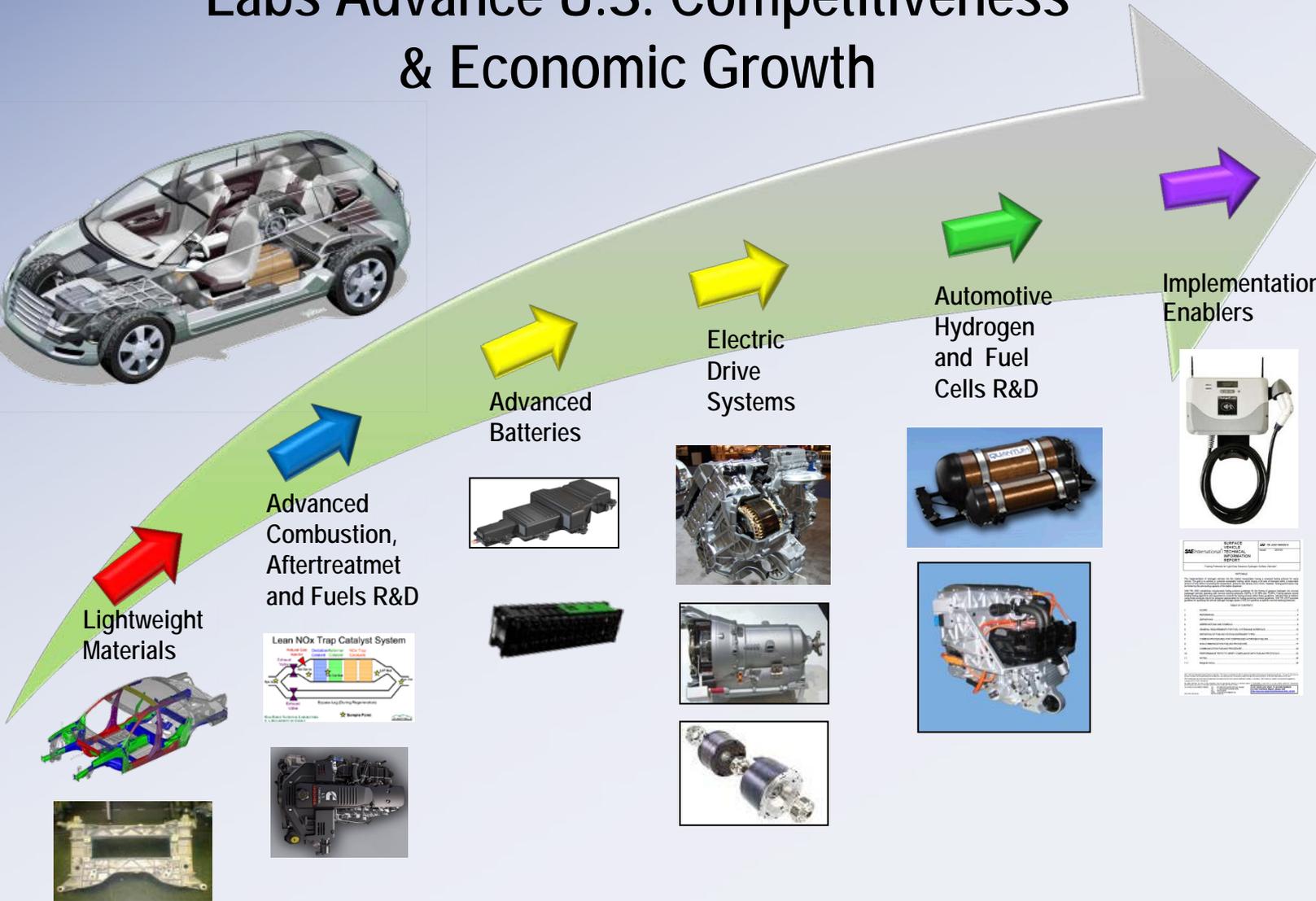
- Highlights in Vehicle, Crosscutting & Fuel Infrastructure Technologies
- 12 specific technical areas
- 57 total accomplishments
- More than 30 completed by or in partnership with a National Laboratory

Labs Contribute High-Risk, Long-Term, Basic Science Research to Commercialization Process

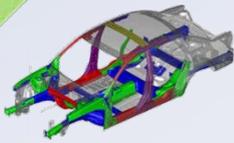


Labs Advance U.S. Competitiveness & Economic Growth

Substantial Petroleum & Emissions Reduction



Lightweight Materials



Advanced Combustion, Aftertreatment and Fuels R&D



Advanced Batteries



Electric Drive Systems



Automotive Hydrogen and Fuel Cells R&D



Implementation Enablers



National Lab Technical Capabilities Highly Valued by USCAR

Advanced Combustion and Fuels

- R&D on combustion efficiency, new combustion regimes, and low-temperature aftertreatment (ANL, ORNL, PNNL, SNL-CA)
- Work on measuring progress toward U.S. DRIVE efficiency goals (ORNL)
- Work on low carbon, high-efficiency fuels for light duty SI engines (LLNL, NREL, ORNL, SNL-CA)
- Use of Advanced Photon Source for fuel spray imaging (ANL)

Vehicle Electrification

- Fundamental battery research, especially development of new materials (ANL, LBNL)
- Battery cell, module, and pack testing (ANL, INL, LBNL)
- Characterization of battery materials (ANL, LBNL)
- Battery thermal management system benchmarking and ranking (NREL)
- More facilities to conduct battery pack-level abuse testing and increased dynamic evaluation of battery abuse models (SNL-NM)
- Traction drive, power electronics, inverters, DC-DC converters, permanent magnet motors and alternatives, wide band gap switches, (ORNL)
- Center of expertise for thermochemical reliability of bonded interfaces for power electronics and motors (NREL)
- Electric drive benchmarking (ORNL)
- Increased R&D on rare earth alternatives (Ames)

Lightweight Materials

- Fundamental research on advanced high strength steel, aluminum, magnesium, and carbon fiber and associated joining technologies for like and dissimilar materials, and (ORNL, PNNL)
- Development of ICME tools for materials and process development for improved stamping, casting, extruding, and injection molding of metals, plastics, and composites (ORNL, PNNL)

Fuel Cells

- Fundamental fuel cell inventions, including expanded novel PEM membrane and catalyst R&D (ANL, LANL)
- Large synchrotron radiation for fuel cell catalyst characterization (ANL)
- High spatial and temporal resolution soft x-ray computed tomography for in-situ water analysis in MEA (ANL, LBNL, or ORNL)
- Hydrogen Storage Engineering Center of Excellence provides valuable systems level analysis (SRNL)
- Sorbent materials development and measurement for hydrogen storage (NREL)

Cross-cutting Technology

- Vehicle and fleet information databases on real world operation (NREL, INL)
- Apply improvements in modeling and simulation calculation speeds to commercial tools (LLNL, LANL)

Possible Improvements to Lab-Industry Interface

1. Develop a more commercially competitive price structure at lab user facilities
2. Significantly reduce the response time to user requests
3. Significantly modify the publication requirements for joint-funded projects
4. Adapt licensing structure that benefits U.S. industry and economy

Thank you!