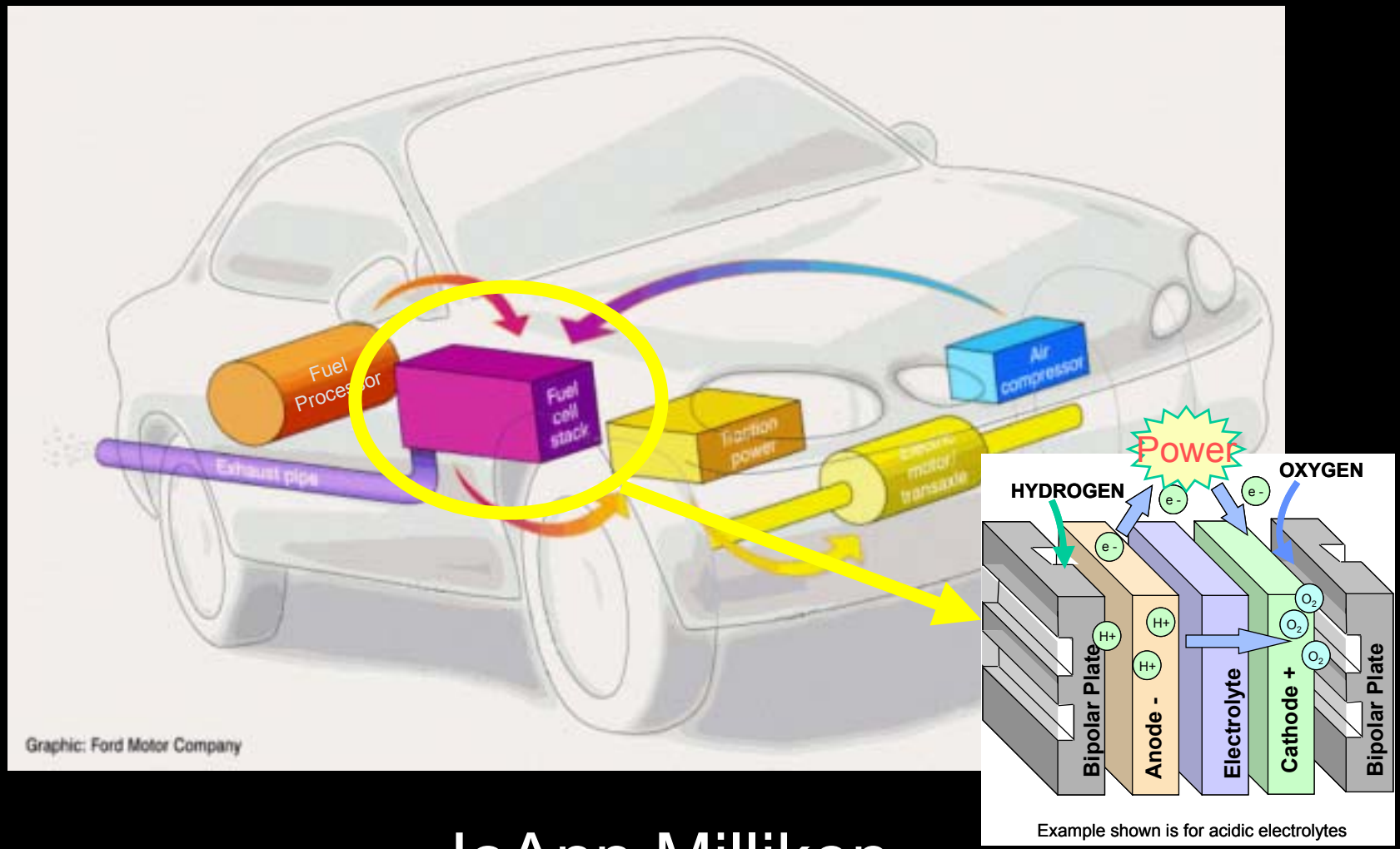
Fuel Cell Stack Components



JoAnn Milliken

Fuel Cell MEA Targets

Component	Characteristics	Units	Target
MEA			
	Performance on H_2	mA/cm^2	400 @ 0.8 V
	Perf. on Reformate	mA/cm^2	500 @ 0.75 V
	Cost	$/kW	10
	Pt loading	gkW	0.2
	Durability	hours	5000
	H_2 Crossover	mA/cm^2	<1
	O_2 Crossover	mA/cm^2	<3

TARGETS: Fuel Cells for Portable Power (Consumer Electronics: subWatt – 20/50W)

		2005	2010
Consumer Electronics (subWatt - 20/50W)	Specific Power (W/kg)	30W/kg	100W/kg
	Power Density (W/L)	30W/L	100W/L
	Energy Density (Wh/L)	500Wh/L	1,000Wh/L
	Cost ($/W)	$5/W	$3/W
	Lifetime (hrs)	1,000 hrs	5,000 hrs

DRAFT – Subject to change

Membrane-Electrode Assemblies Hurdles/Objectives

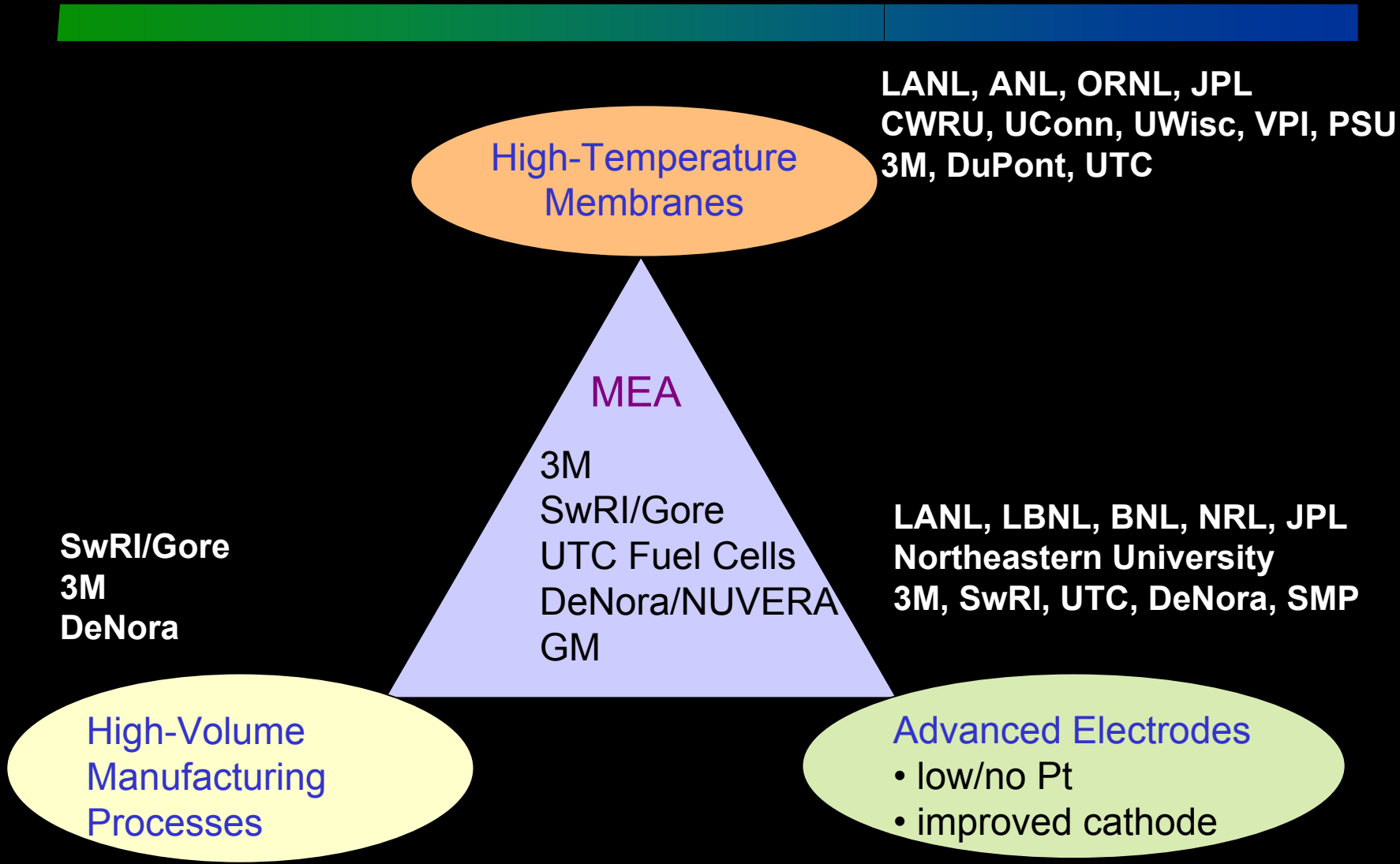
Hurdles

- Cost
- Cathode Performance
- Thermal management
- Durability

OBJECTIVES

- Reduce the cost AND improve the performance of MEAs
- Develop low-cost, high-volume MEA fabrication processes

MEA R&D Projects



Industry Interactions / Technology Transfer

- LANL developed MEA test standards with industry.
- LANL has had interactions with DuPont, PlugPower, DeNora/E-TEK, 3M.
- ORNL has worked with W.L. Gore.
- BNL provides analytical support to 3M.
- LBNL has provided technical support to GM, 3M, DeNora/E-TEK.

Discussion Points

High Temperature Membranes

- Elevated temperatures will affect catalyst, GDL, and bipolar plate performance and durability.
- What single cell performance targets should be achieved before scaling up to a short stack?

Electrodes

- Performance and durability are issues for low-Pt electrodes
- Pt cost and availability are critical issues
- Are non-precious metal fuel cell catalysts possible?