



International Partnership *for the* Hydrogen Economy



Fuel Cell Systems for Transportation: Current Costs and Near-Term Challenges



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IPHE Joint ILC/SC Meeting

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Washington, DC



Action Item from 8th ILC Meeting

- Presentations given in Korea on the theme: “Fuel Cell Systems for Transportation: Current Costs and Near-Term Challenges”
- Action Item: Prepare a short IPHE paper summarizing the results of the thematic presentations.
- Objectives:
 - To identify the challenges associated with the cost of fuel cell systems for transportation
 - To summarize the current status of fuel cell cost
 - To help identify key areas potentially requiring further R&D
 - To inform the ILC and Steering Committee, as well as the general public.



Status

- Draft presented to ILC at Essen, February 2008.
 - Input received from U.S., Korea, Japan, and EU
- Additional input received from China in 2008
- Conducted analysis of current status of fuel cell system cost (including stack and balance-of-plant) for high volume production



DRAFT Fuel Cell Cost Target Data

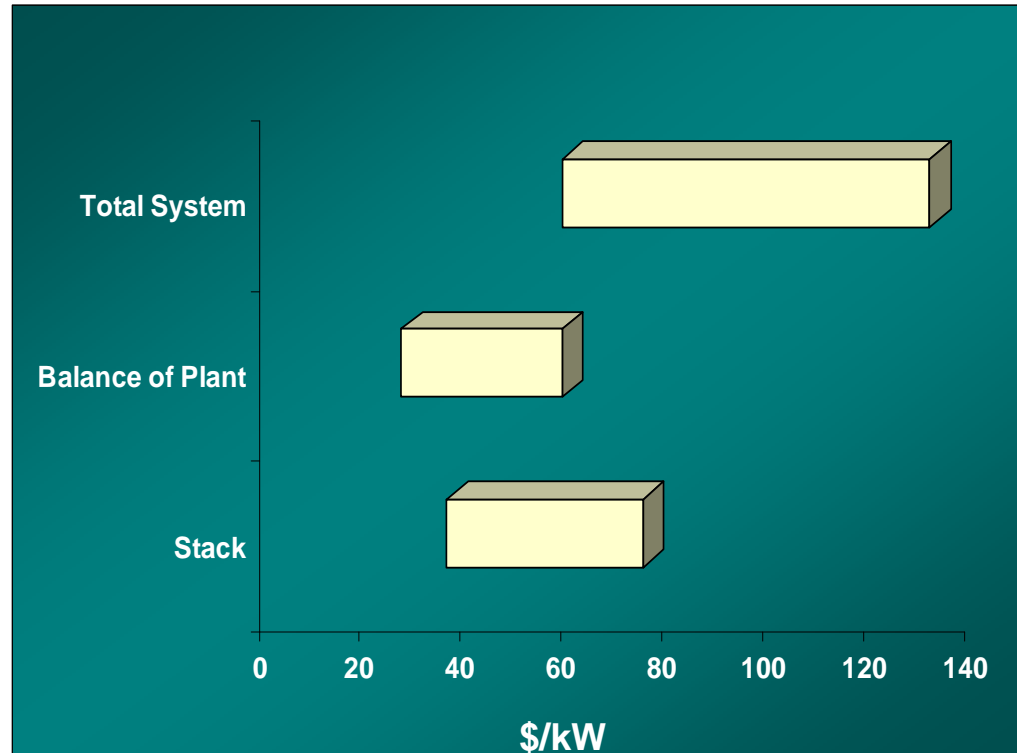
	Korea*	United States	Japan	EU
Thousands of units per year	500	500	1000	Not specified
Fuel Cell System Cost	\$57/kW	\$30/kW	\$110/kW	€100/kW
Stack Cost	\$38.00	\$15.00		
Balance of Plant (BOP) cost	\$19.00	\$15.00		
Membrane Electrode Assembly (MEA) Cost	\$20.00	\$5.00		
Membrane Cost (\$/m ²) ¹		\$20.00		
Catalyst Cost (including application)		\$3.00		
Gas Diffusion Layer (GDL)				
Bipolar Plate Cost	\$10.00	\$3.00		
Balance of Stack	\$8.00			
Total Stack Cost	\$38.00			
Air Management Cost	\$7.00			
Water + Thermal Management Cost	\$7.00			
Fuel Management Cost	\$5.00			
Balance of Plant Total Cost	\$19.00			

For light duty vehicle fuel cells

* To be finalized



Cost Status Summary

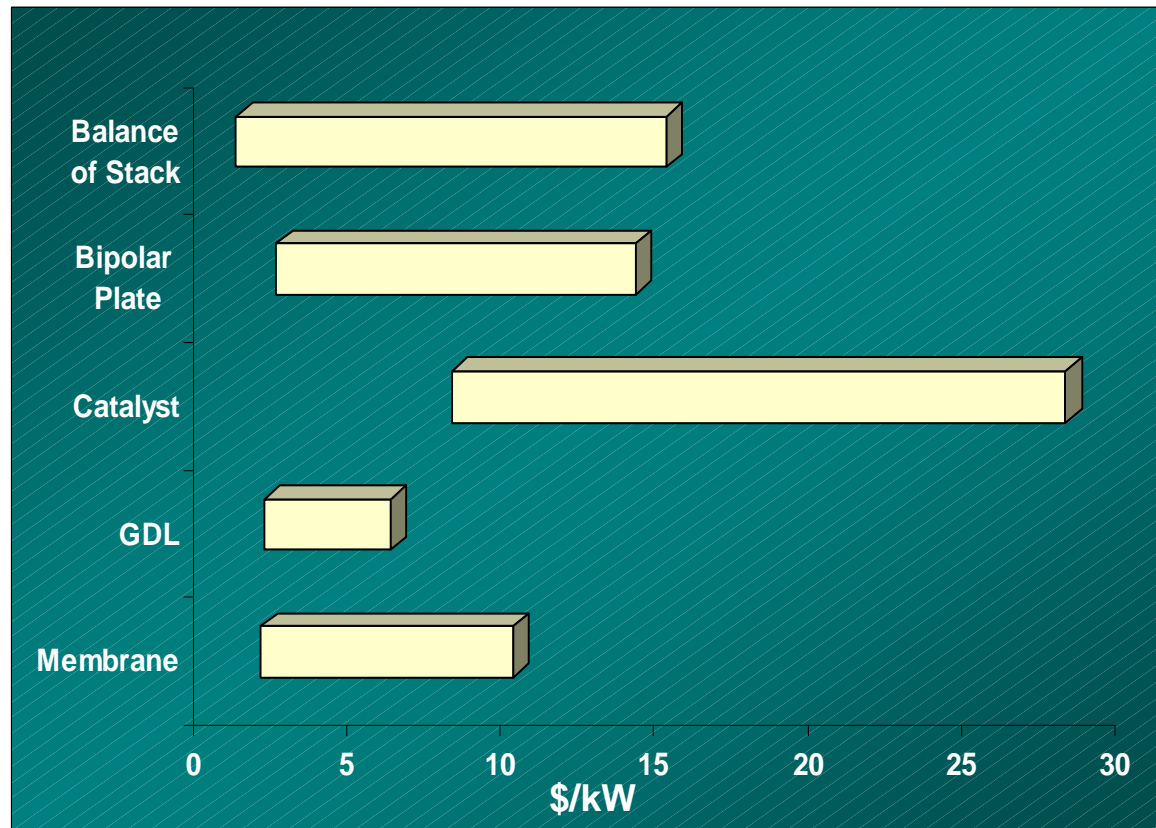


Cost range for 500,000 units/year: system status

Balance of Plant and Stack cost contributions are comparable even with wide variation in total system cost estimates



Cost Status Summary



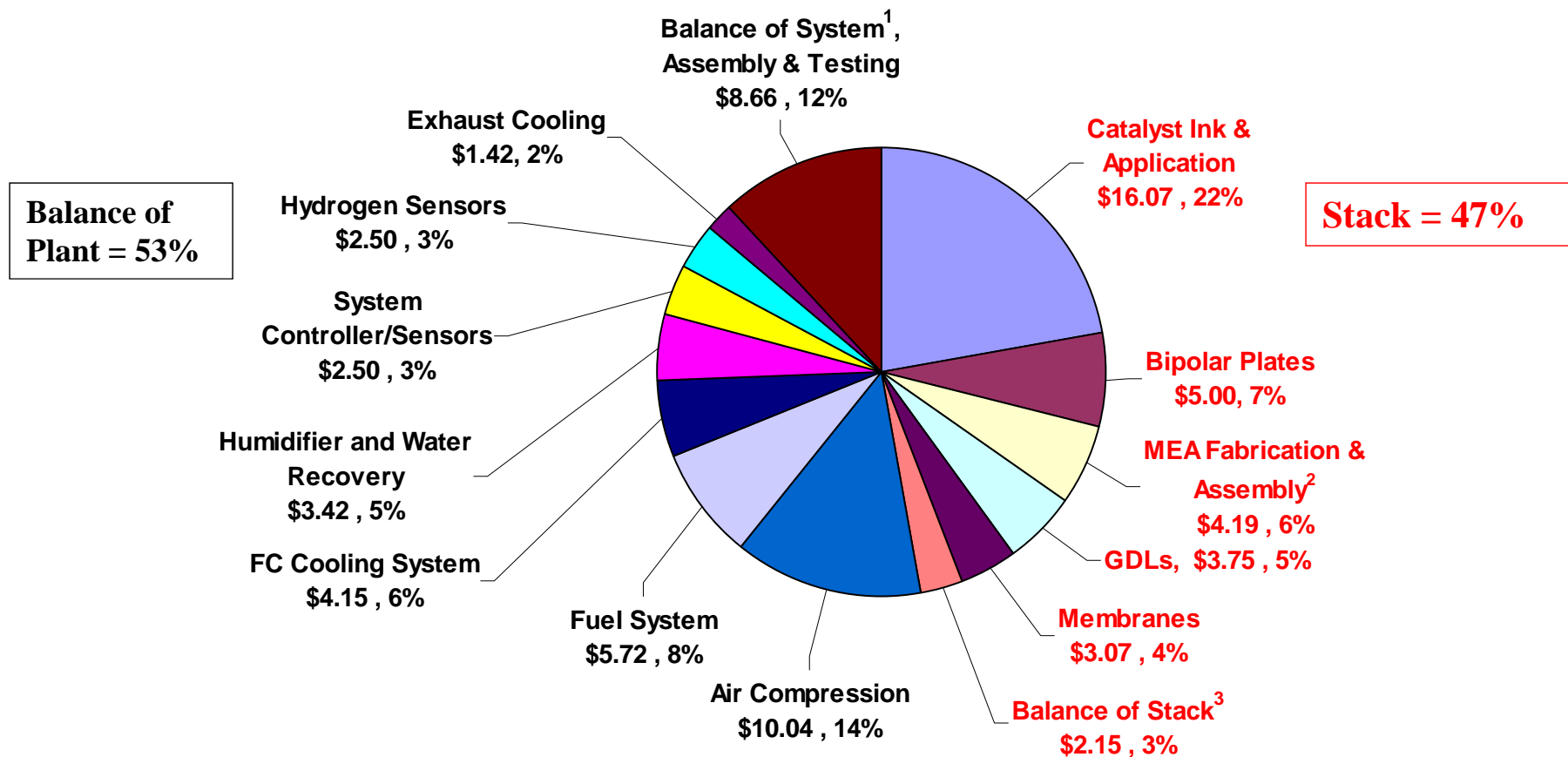
Cost range for 500,000 units/year: stack component status

- Range of cost estimates varies widely for some components
- Catalyst cost reduction is clearly required



Fuel Cell Cost Breakdowns

U.S. – High-volume cost (500,000 units/year), based on 2008 technology - \$73/kW



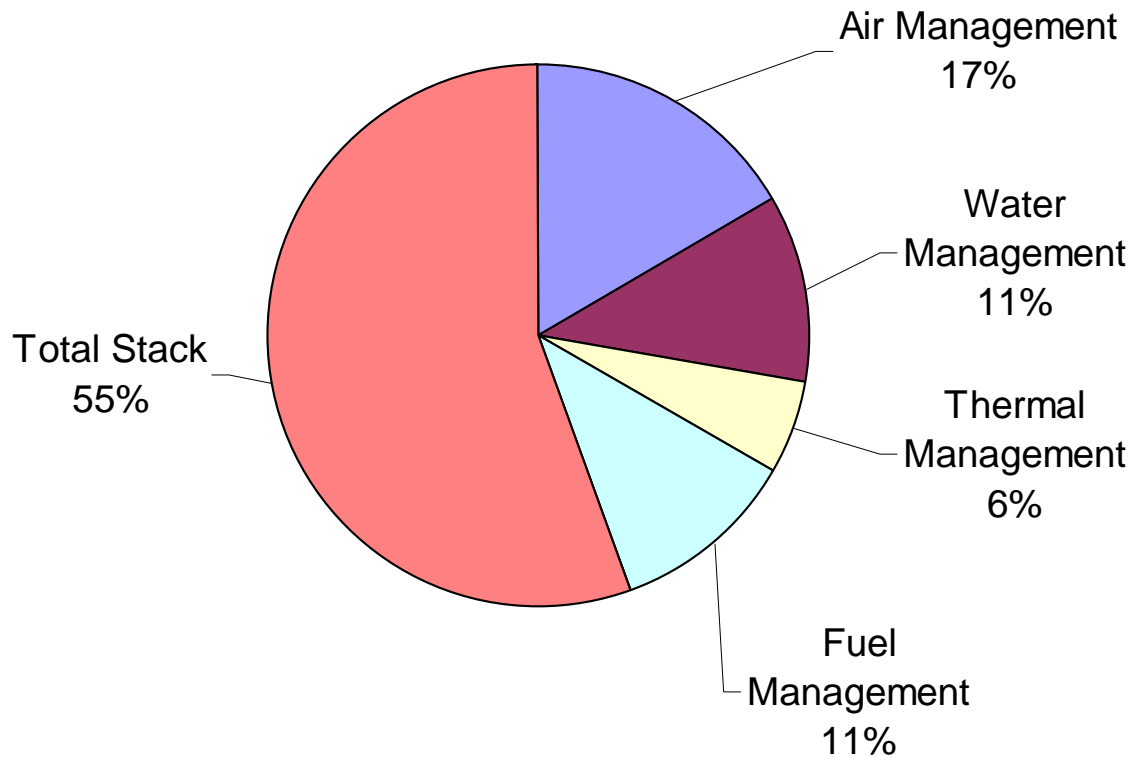
1 – Balance of System includes: Mounting Frames; System Controllers / Sensors; Wiring, Ducting, Etc; and System Assembly & Testing
 2 –MEA includes: Hot Pressing; Cutting & Slitting; and Frame / Gaskets

3 – Balance of Stack includes: Gaskets; Endplates; Current Collectors; Compression Bands; and Stack Conditioning & Testing



Fuel Cell Cost Breakdowns

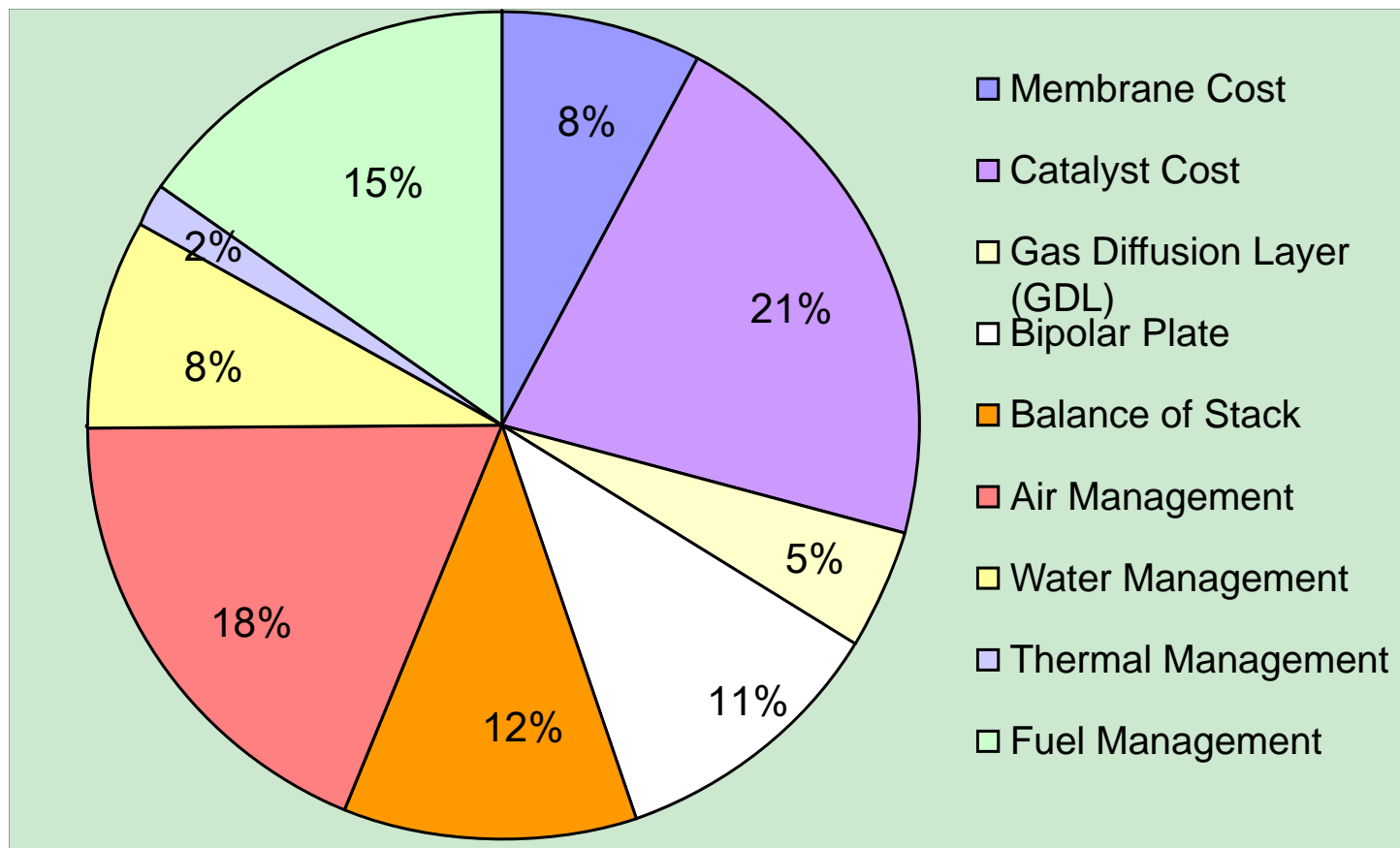
Korea – High-volume cost estimate
(500,000 units/year), 2007 data





Fuel Cell Cost Breakdowns

China – High-volume cost estimate (500,000 units/year), 2008 data





Outline of Written Report

- Introduction
- Analysis Summary
 - Overview of analysis and targets developed to date
- Analysis Details (One section per country)
 - Assumptions
 - Preliminary results
 - Key challenges & focus areas for future R&D



Comments

- Action from ILC meeting in Essen: include an analysis of costs for stationary and portable fuel cells.
 - We suggest that IPHE members with significant efforts in stationary/portable fuel cells in their countries (e.g. Japan or EC) take the lead on this topic and we will support this effort.



Next Steps

- Report to be submitted to ILC for final comment
- Please comment by January 29, 2010
- Consider follow-on activity for stationary fuel cell cost (e.g. working group task)
- Submissions: **secretariat@iphe.net** or **stephanie.byham@ee.doe.gov**