FINANCING HYDROGEN TECHNOLOGIES IN A TURBULENT MARKET

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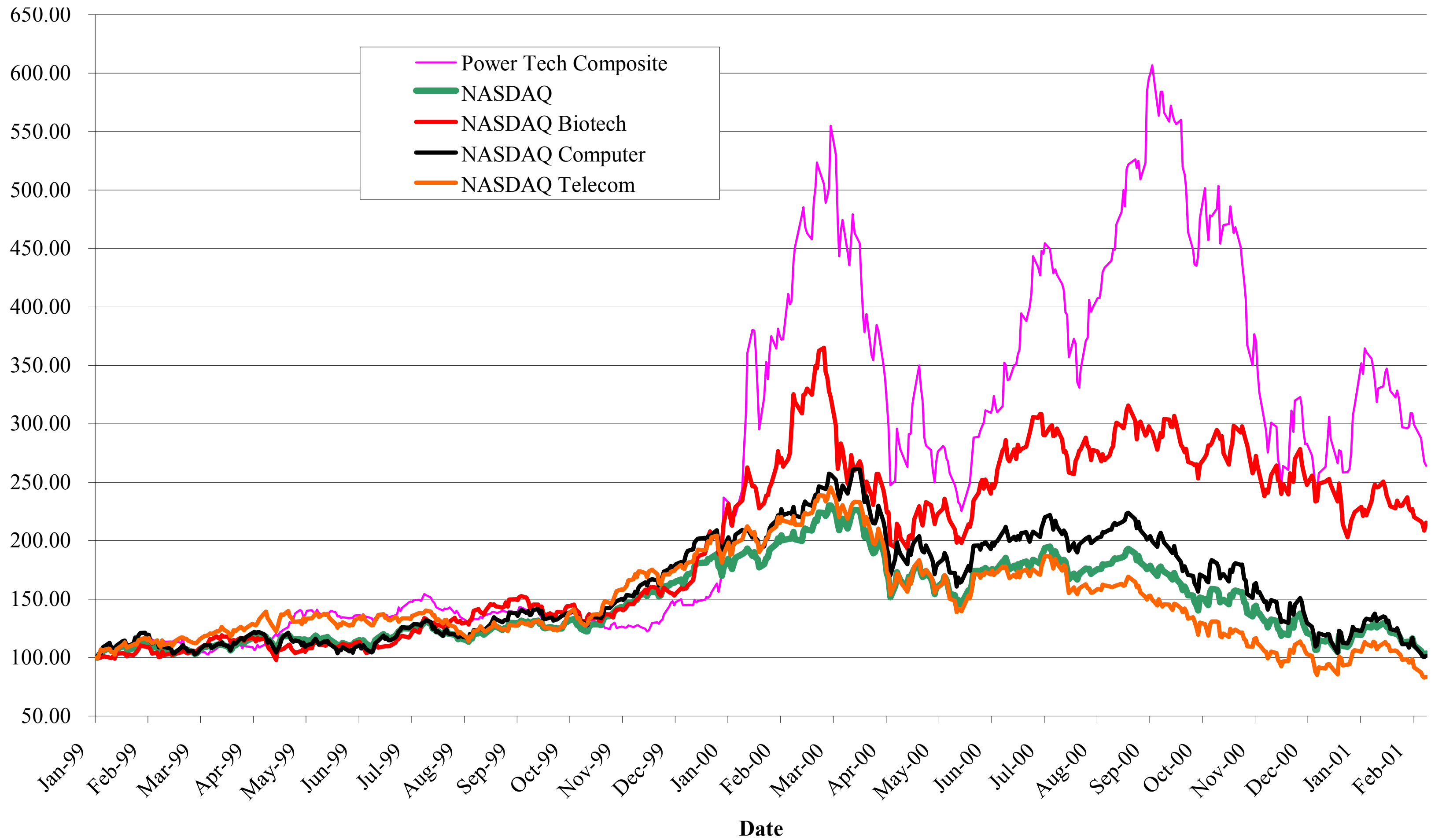
THE ENERGY TECHNOLOGY SECTOR IS "HOT"

- THE LAST YEAR HAS BEEN ONE OF DRAMATIC CHANGE
  - » WIDESPREAD MARKET RECOGNITION OF THE POWER TECHNOLOGY SPACE
  - » PROLIFERATION OF PUBLIC COMPANIES
    - – MANY INVOLVING HYDROGEN TECHNOLOGY
    - – MOST STILL VERY EARLY STAGE
- THE POWER TECHNOLOGY INDEX
  - » HAS FLUCTUATED WILDLY
  - » BUT HAS STILL OUTPERFORMED THE MARKET OVERALL
  - » AND NOW SEEMS TO BE STRENGTHENING

POWER TECHNOLOGY STOCKS ARE VOLATILE



Sources: FactSet, StockVal and CIBC World Markets.

CIBC World Markets

INVESTING IN HYDROGEN TECHNOLOGIES

SUCCESSFUL INVESTING IN THESE TURBULENT TIMES REQUIRES DISCIPLINE --

- DEFINE YOUR INVESTMENT SPACE PRECISELY
- UNDERSTAND THE DYNAMICS OF THE MARKETS
- PICK WINNERS BY FOCUSING ON THE BASICS
- BUILD A DIVERSE PORTFOLIO
- COMMIT TO THE LONG HAUL

HYDROGEN SYSTEM TECHNOLOGIES -- A CORNERSTONE OF THE MICRO-GENERATION REVOLUTION

FOSSIL FUEL MICRO-GENERATION
- TURBINES
- I.C. ENGINES
- FUEL CELLS
- STIRLING ENGINES
- ALTERNATE CYCLES
- THERMAL PV

MICRO-STORAGE / POWER QUALITY
- MICRO - SMES
- FLYWHEELS
- BATTERIES
- ULTRA-CAPACITORS

SYSTEM INTEGRATION, IMPLEMENTATION, & CONTROL

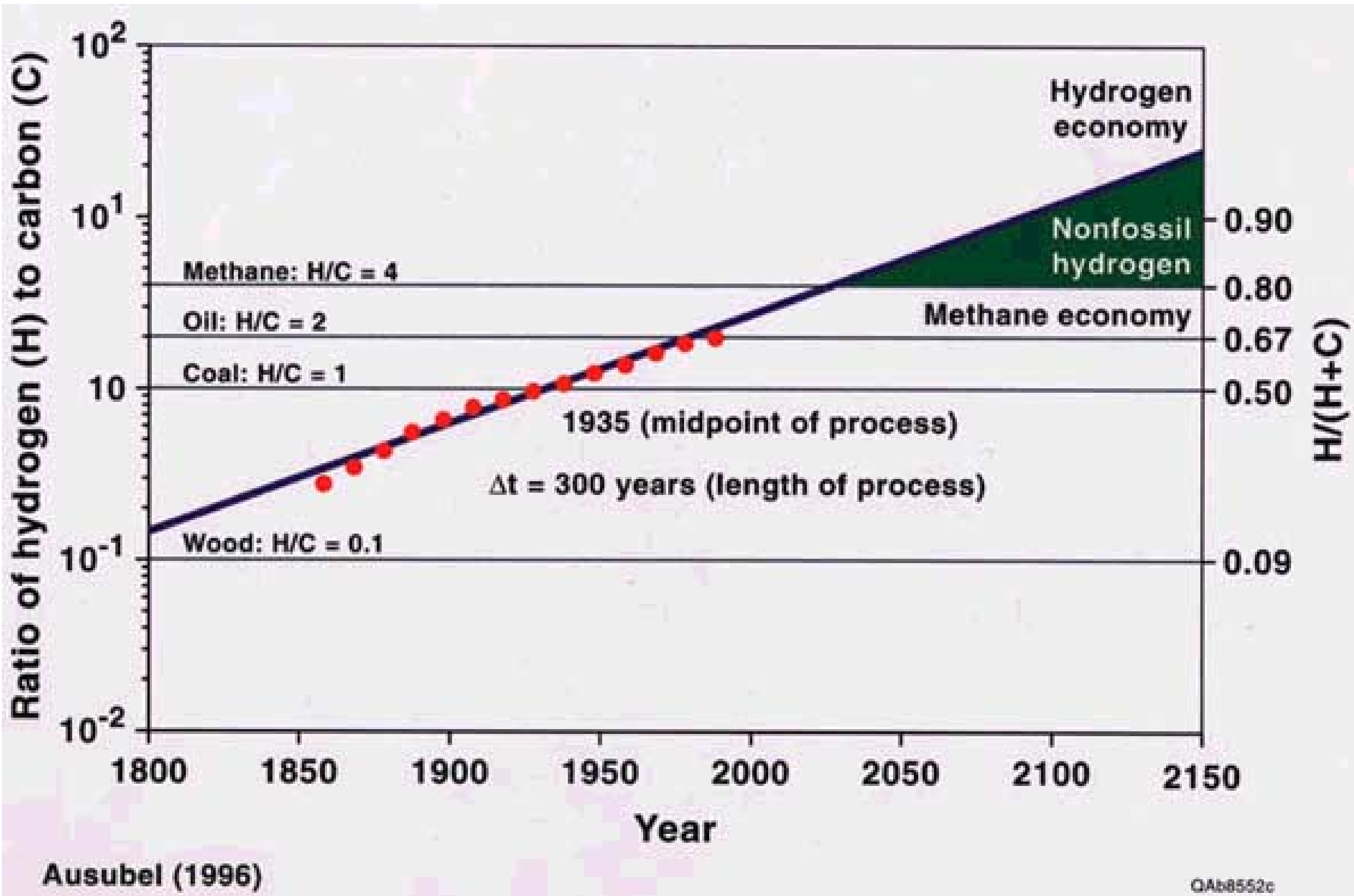
HYDROGEN SYSTEM TECHNOLOGY
- FUEL CELLS
- ELECTROLYZERS
- STORAGE
- REFORMERS

RENEWABLES / MICRO-GENERATION
- WIND
- PHOTOVOLTAICS
- BIO - GENERATION
- EMERGING TECHNOLOGY

THREE DRIVERS OF THE ENERGY TECHNOLOGY MARKET

- BASIC SHIFT IN ENERGY MARKETS TO GASEOUS FUELS -- WITH HYDROGEN THE LONG TERM WINNER
- POWER QUALITY AND RELIABILITY REQUIREMENTS OF THE NEW ECONOMY
- MASS - PRODUCED ENERGY APPLIANCES RESTRUCTURING THE ELECTRIC UTILITY INDUSTRY

THE ENERGY ECONOMY IS SHIFTING TO GASEOUS FUELS



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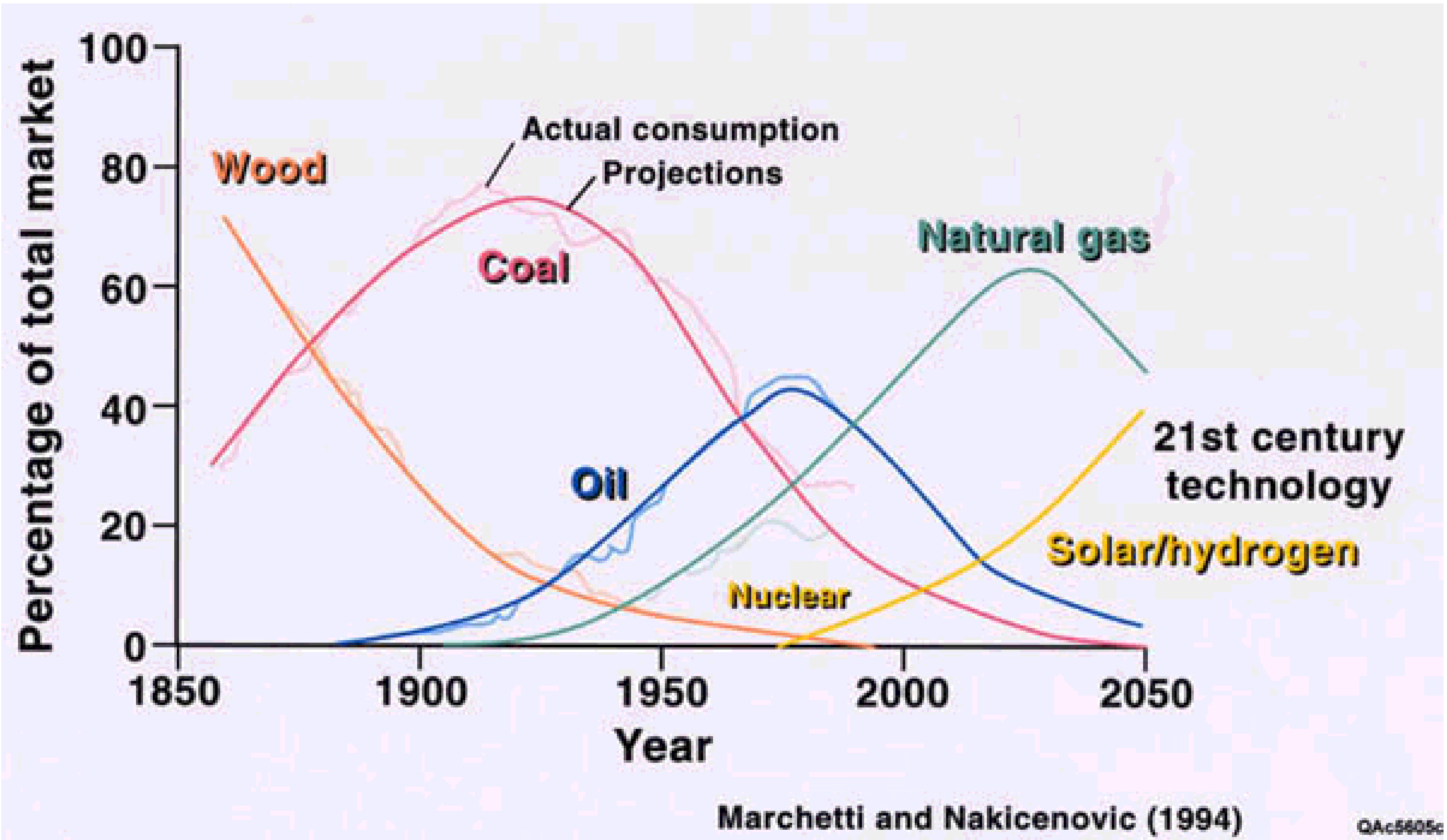

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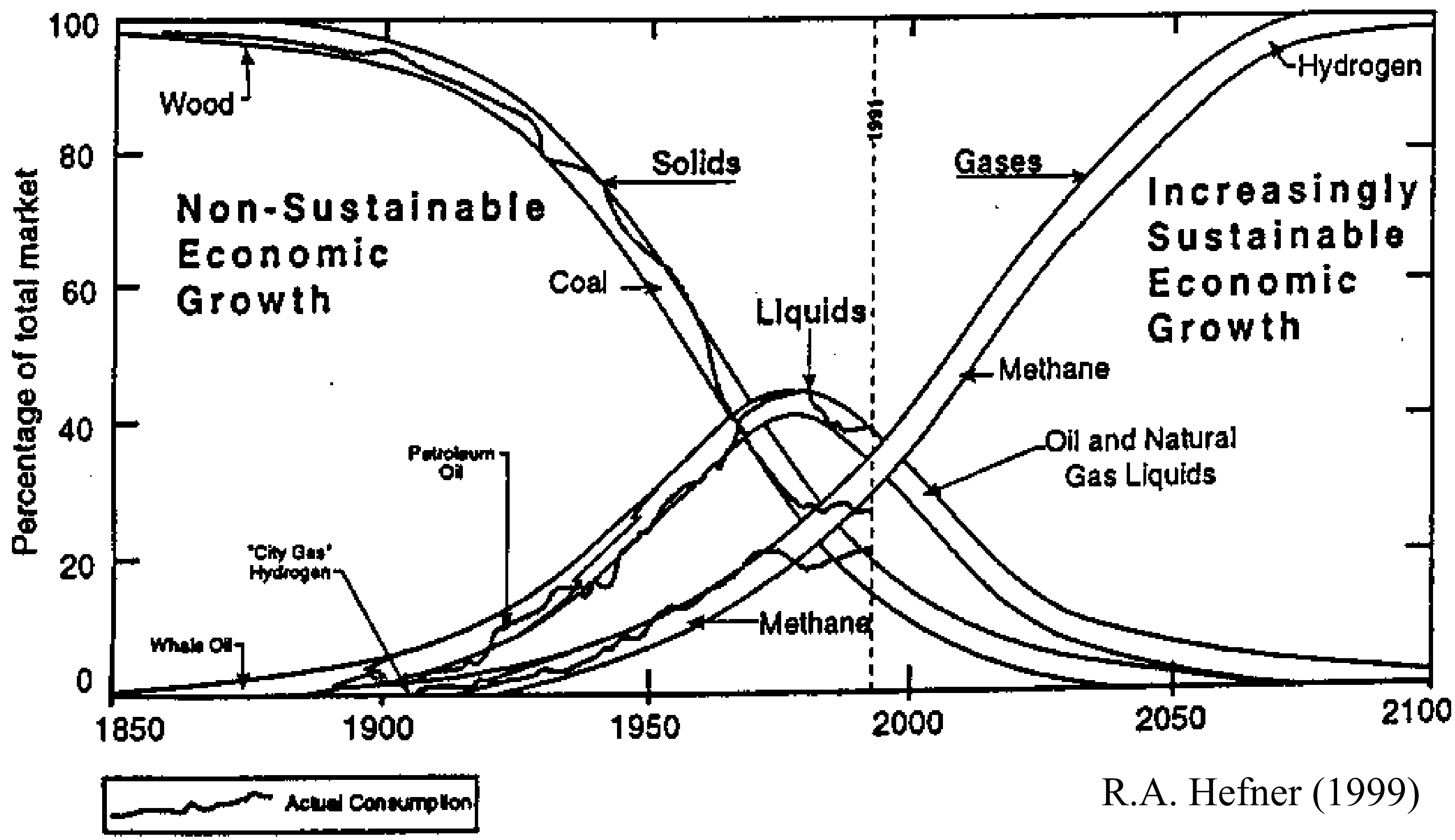


R.A. Hefner (1999)

WHY ALL THE EXCITEMENT ABOUT ENERGY TECHNOLOGIES ?

- DISTRIBUTED GENERATION AT THE 250 KW TO 5 MW SCALE HAS BEEN AVAILABLE FOR YEARS
  - » GAS ENGINES AND DIESEL GENSETS
  - » AIRCRAFT DERIVATIVE TURBINES
- THESE UNITS HAVE PROVIDED
  - » PEAKING POWER
  - » GRID STRENGTHENING
  - » BACK - UP POWER
- VERY SMALL SCALE (5 KW) GENSETS ARE ALSO AVAILABLE COMMERCIALLY
  - » INEFFICIENT
  - » SHORT OPERATING LIFE
  - » EMERGENCY POWER ONLY

WHY ALL THE EXCITEMENT ?

- TECHNOLOGY DEVELOPMENT EFFORTS UNDERWAY FOR DECADES ARE NOW GIVING BIRTH TO COMMERCIAL PRODUCTS
  - » FUEL CELLS
  - » MICRO - TURBINES
  - » PHOTOVOLTAICS
  - » STIRLING ENGINES
  - » HYDROGEN SYSTEMS
- “NEW” MICRO - GENERATION TECHNOLOGIES PROMISE
  - » HIGH PERFORMANCE / RELIABILITY -- AND MODULARITY
  - » LOW COST -- WITH MASS PRODUCTION
  - » MINIMAL ENVIRONMENTAL FOOTPRINT
  - » CUSTOMER CONTROL

WHY ALL THE EXCITEMENT ?

- SIMULTANEOUSLY, THE NEW ECONOMY IS MAKING UNPRECEDENTED DEMANDS ON THE AGING UTILITY INFRASTRUCTURE
  - » EXTRAORDINARY DEMANDS FOR RELIABILITY: 6 - 9's / 24 X 7
  - » EXCEPTIONAL REQUIREMENTS FOR POWER QUALITY / VOLTAGE STABILITY
- THE CONVERGENCE OF THIS MARKET NEED AND THE AVAILABILITY OF MICRO - GENERATION TECHNOLOGIES -- INCLUDING HYDROGEN - BASED TECHNOLOGIES -- THAT CAN ADDRESS IT HAS LED TO A RUSH OF INTEREST IN THE FINANCIAL WORLD

MICRO - GENERATION WILL RESTRUCTURE THE UTILITY INDUSTRY

- THE EXISTING UTILITY INFRASTRUCTURE
  - » IS VULNERABLE TO WEATHER RELATED OUTAGES
  - » IS EXPERIENCING DISRUPTIVE SYSTEM FAULTS
  - » IS AGING AND REQUIRES UPGRADE
  - » HAS A SERIOUS ENVIRONMENTAL FOOTPRINT

- WITH OPENING OF UTILITY MARKETS TO COMPETITION
  - » NEW PLAYERS OFFERING MICRO - GENERATION SOLUTIONS WILL ENTER -- FIRST IN NICHES, THEN IN MAINSTREAM
  - » “MICRO-GRIDS” WILL BE SET UP TO ENHANCE LOCAL RELIABILITY AND CAPTURE LOAD DIVERSITY
  - » IN TIME, “WIRELESS” MICRO - GENERATION SYSTEMS AT CUSTOMER SITES WILL “STRAND” THE EXISTING T&D SYSTEM

THE PACE OF CHANGE COULD BE FAST

- THE IMPACT OF DISTRIBUTED GENERATION COULD BE FELT MORE RAPIDLY THAN MANY BELIEVE
  - » 15,000,000 AUTOMOBILES / YEAR IN THE U.S., WITH
  - » 50 KW EQUIVALENT POWER PLANT / VEHICLE, MEANS
  - » 750,000 MW OF GENERATING CAPACITY IS PRODUCED BY THE AUTOMOBILE INDUSTRY EACH YEAR
  - » INSTALLED UTILITY CAPACITY IN THE U.S. = ~ 750,000 MW
- DISTRIBUTED GENERATORS ALREADY EQUAL A SUBSTANTIAL FRACTION OF INSTALLED CAPACITY
- "STRUCTURAL CHANGE CAN OCCUR WITH SURPRISING SPEED WHEN PEOPLE STOP TAKING THE DOMINANT PARADIGM FOR GRANTED"

-- DUNN, WORLDWATCH INSTITUTE

INSTALLED DIESEL GENERATOR CAPACITY

UNITED STATES, 1996

Size	*Installed Units*	*Average Kilowatts*	*Installed Capacity*
2.2 - 4.5 kW	6,235	4.2	26.4
4.5 - 8.2 kW	34,543	6.2	212.9
8.2 - 11.9 kW	40,262	10.4	417.5
11.9 - 29.8 kW	104,448	19.3	1,898.2
29.8 - 74.6 kW	153,705	53.6	8,104.9
74.6 - 130.6 kW	108,415	100.7	10,918.5
130.6 - 223.8 kW	72,434	183.5	13,292.8
223.8 - 447.6 kW	49,690	320.0	15,902.5
447.6 - 746 kW	38,318	560.2	21,467.4
Over 746 kW	24,674	1,208.5	29,819.5
Total	**626,489**	**166 kW**	**102,061 MW**

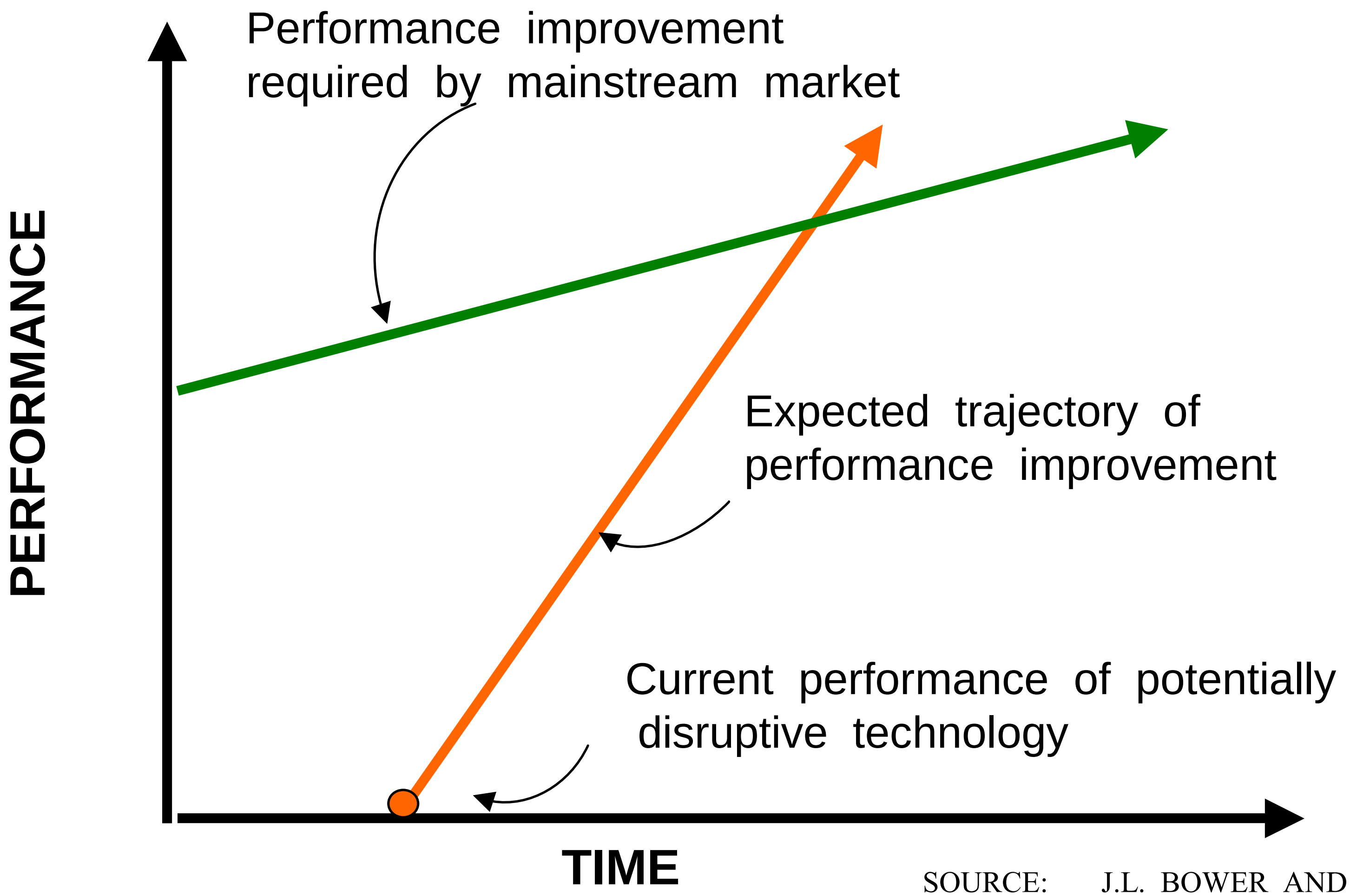
Note: Totals do not match due to rounding

Source: Singh, REPP Research Report No. 12, Winter 2001

MICRO-GENERATORS HAVE TWO IMPORTANT ADVANTAGES

- CLASSIC "DISRUPTIVE TECHNOLOGIES"
  - » ATTACK NICHES FIRST
  - » BUILD VOLUME TO DRIVE COSTS DOWN
- SMALL- SCALE UNITS OF PRODUCTION
  - » EASILY MASS - PRODUCIBLE APPLIANCES
  - » BENEFIT FROM "EXPERIENCE CURVE"

DISRUPTIVE TECHNOLOGIES

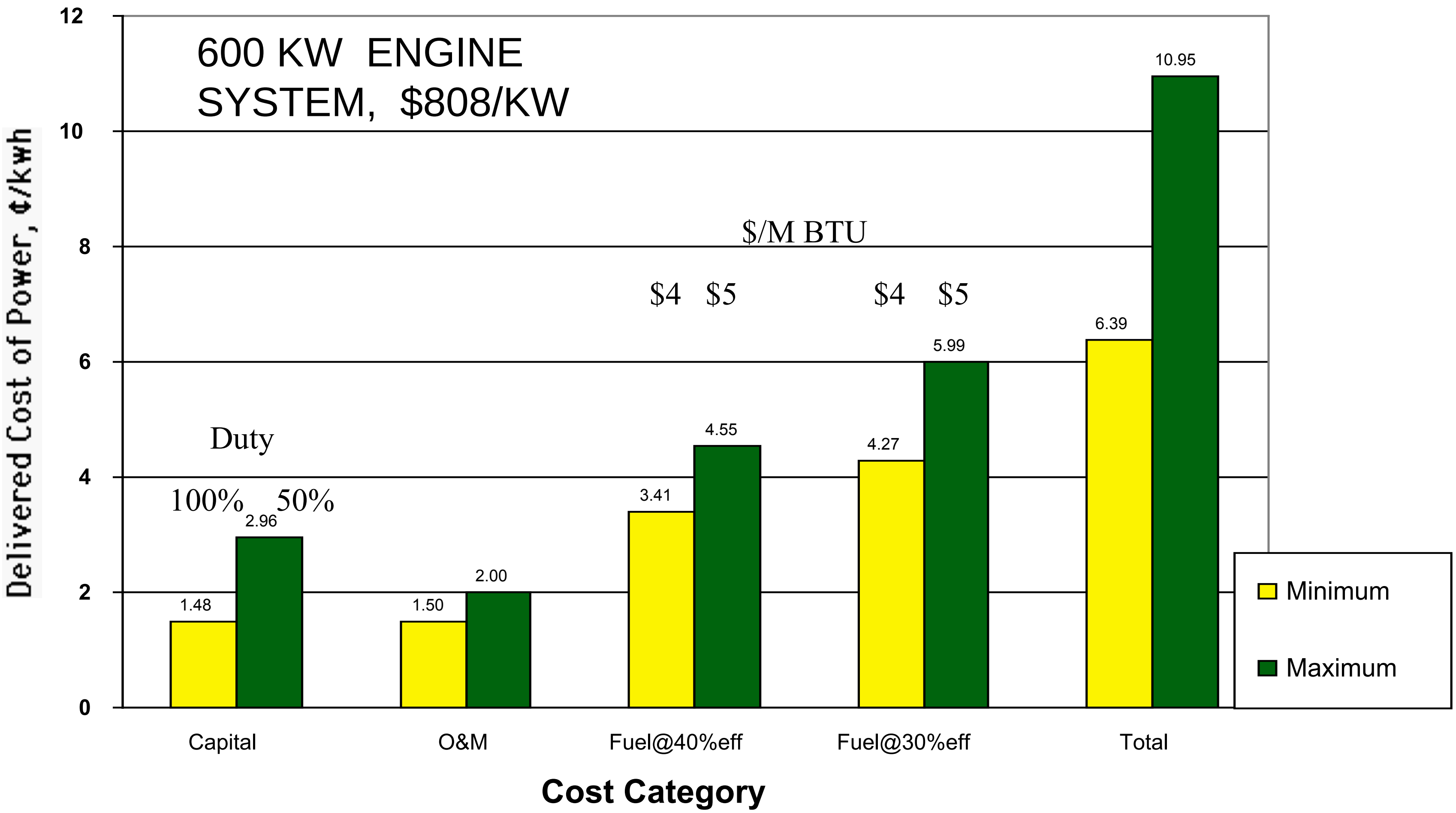


SOURCE: J.L. BOWER AND C.M. CHRISTENSEN
HARVARD BUSINESS REVIEW
JANUARY - FEBRUARY, 1995

HOW CRITICAL IS COST ?

- MICRO - GEN SYSTEMS COMPETE WITH THE DELIVERED COST / KWH -- INCLUDING T & D CHARGES
- IN EARLY COMMERCIAL MARKETS, COST / KWH MAY BE FAR LESS CRITICAL THAN 6 - 9's RELIABILITY
  - » BANK DATA CENTERS
  - » CYBER SUPER SITES
  - » TELECOM NETWORKS
- MANY RESIDENTIAL AND COMMERCIAL CUSTOMERS WILL PAY A PREMIUM TO AVOID WEATHER RELATED OUTAGES

EFFICIENCY DRIVES DELIVERED POWER COSTS



PICKING WINNERS

- SOLID, PROPRIETARY TECHNOLOGY BASE
- ACCESS TO LARGE, DIVERSE MARKETS
- SUPERB MANAGEMENT TEAM

ARETÊ FUNDS: INVESTING IN HYDROGEN TECHNOLOGIES FOR MICRO-GENERATION

1.	**BALLARD POWER SYSTEMS, INC.***	**P.E.M. FUEL CELLS**
2.	Astropower, Inc.*	Photovoltaics
3.	American Superconductor, Inc.*	HTSC wire
4.	Superconductivity, Inc.	Micro-SMES (now ASC)
5.	Evergreen Solar, Inc.*	Photovoltaics
6.	Statpower Technologies Corp	Inverters (now Xantrex)
7.	Northern Power Systems, Inc.	System Integrator
8.	**PROTON ENERGY SYSTEMS, INC.***	**P.E.M. ELECTROLYZERS / URFC**
9.	Capstone Turbine Corp*	Microturbines
10.	Metallic Power, Inc.	Zn - Air fuel cell
11.	Encorp, Inc.	Controls and Integration
12.	BurstPower Technologies	Ultracapacitors (now CellTech)
13.	Beacon Power Corp*	Flywheel UPS /PQ systems
14.	**HYDROGENICS CORPORATION***	**P.E.M. TEST STATIONS**
15.	Bowman Power Systems, Ltd	Microturbine CHP
16.	Powerzyme	Organic Battery
17.	CellTech Power, Inc.	Solid Oxide Fuel Cell
18.	**H2 GEN INNOVATIONS, INC.**	**STEAM METHANE REFORMER**
19.	Solo Energy	Microturbines
20.	STM Power, Inc.	Stirling Engine Gensets

HYDROGEN TECHNOLOGIES

*** PUBLIC COMPANY**

COMMIT TO THE LONG HAUL

- SIX YEARS AGO WE FIRST BEGAN TO FLAG THE PARADIGM SHIFT THAT DG IS CREATING IN THE UTILITY INDUSTRY
- NOW MOST PEOPLE GET IT -- EVEN THE U.S. GOVERNMENT IS NOW PROJECTING 20 - 30% OF POWER WILL COME FROM DG IN THE NEXT 30 YEARS
- BUT WE ARE STILL AT THE VERY BEGINNING OF THIS SEA CHANGE. INVESTORS SHOULD --
  - » SELECT A PORTFOLIO OF LIKELY WINNERS
  - » AND STICK WITH THEM THROUGH TURBULENT TIMES
- PATIENCE IS PARTICULARLY CRITICAL FOR HYDROGEN TECHNOLOGIES