



Transitioning Technology into Products - An Industry Perspective

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Outline

- **Introduction**
- **Research Portfolio Management**
- **Advanced Technology Deployment Process**
 - **Technology Deployment Process (old)**
 - **Big Bang Technology Process (new)**

R&A Vision

Ford Research & Advanced Engineering will propel Ford Motor Company to world leadership in safe, environmentally responsible, and consumer-focused personal mobility through innovations in science and technology.



Mission

- **ANTICIPATE** the Technical Needs of our Customers and the Company
- **INNOVATE** Solutions to Technical Challenges
- **INCORPORATE** Developed Technology into Products and Processes



Ford R&A Locations

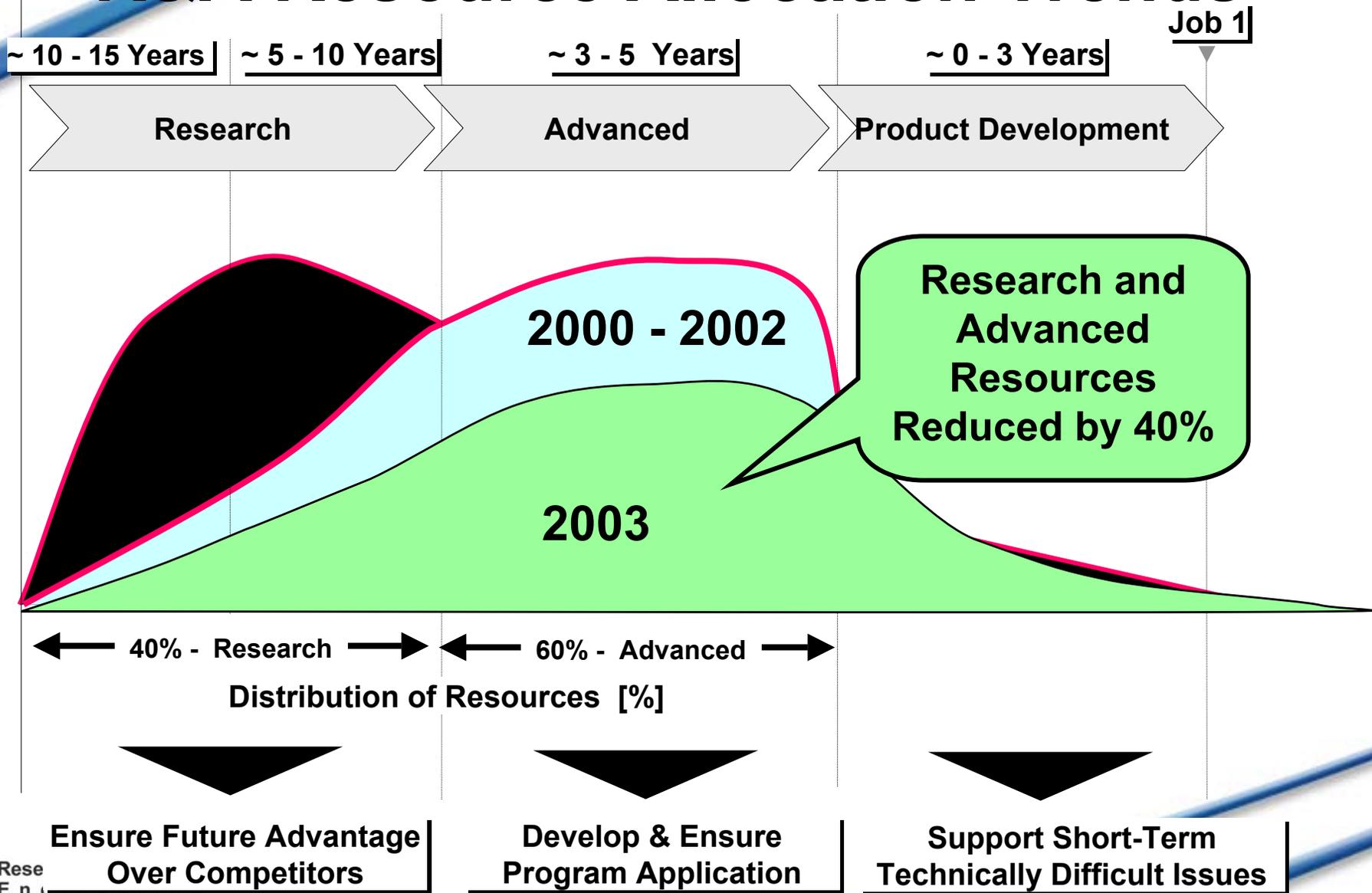


Personnel Facts and Figures

- **1,300 People**
 - ◆ 350 PhDs degrees
 - ◆ 340 MS degrees
 - ◆ 310 BS degrees
 - ◆ 300 Support/Services
- **Dearborn, USA – 1140**
- **Europe – 160**



R&A Resource Allocation Trends

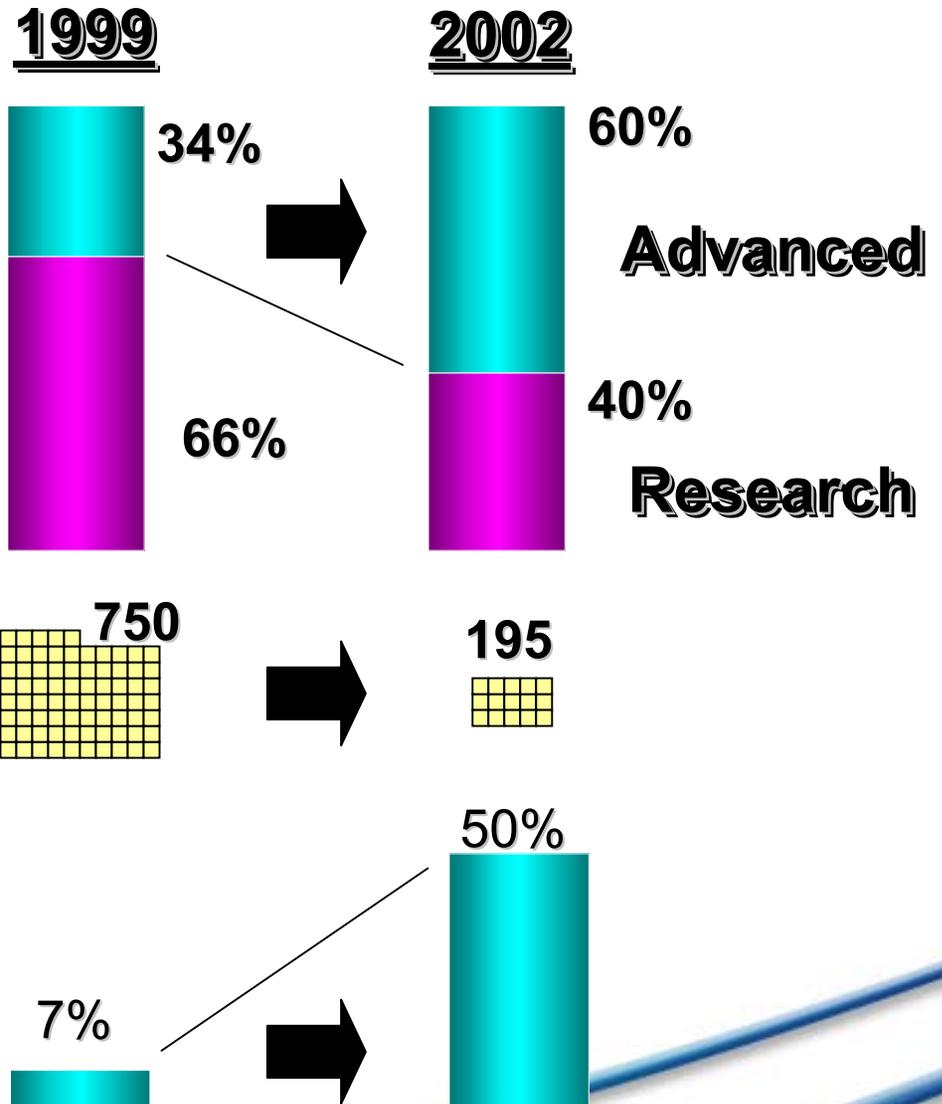


R&A Resource Allocation

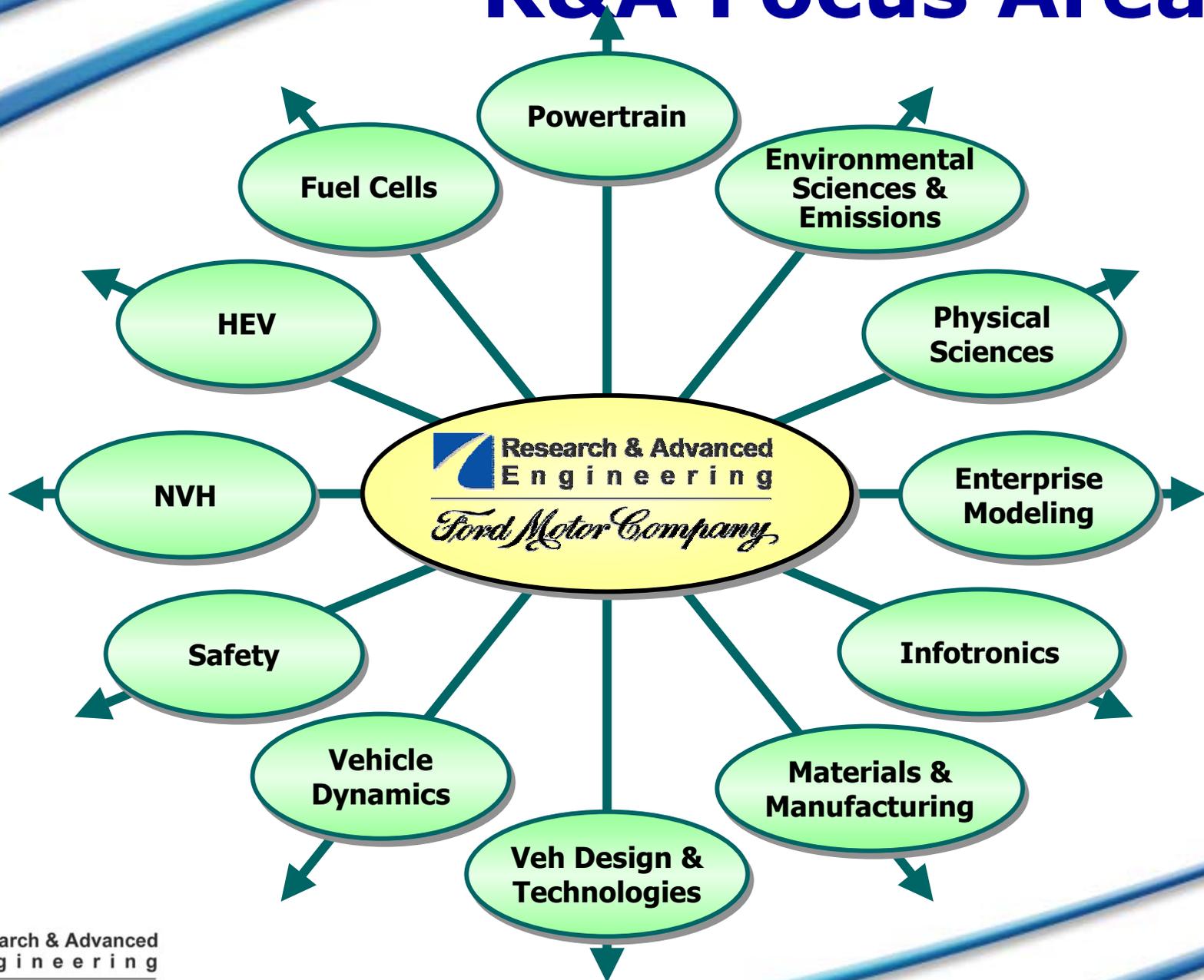
Resource distribution shifted

Number of projects decreased

Implementation rate increased



R&A Focus Areas



Research Portfolio Management Process

- **Customer Wants Process**
- **Offensive/Defensive Balance**
- **Top 5 High Priority Areas**
- **Kill x% per Year (Research Turnover)**
- **The Project Value “Silver Turkey” Chart**

The Proper Research Mix

Defense:

- **Reactive - Protect the Company from being surprised by technology. Provide some fire fighting and “smart buyer” protection.**

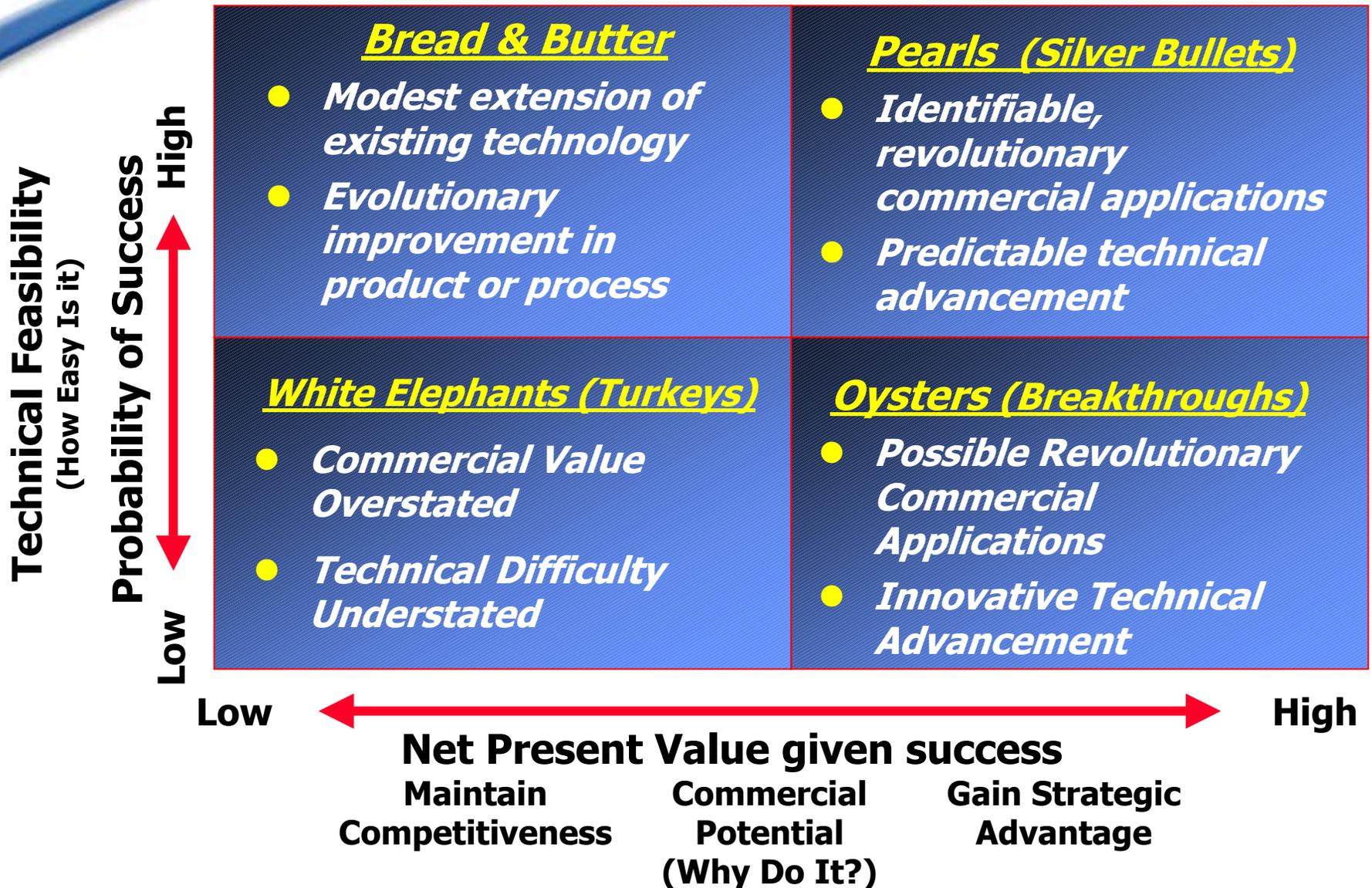
Offense:

- **Proactive - Develop new products and processes that impact cost, quality & timing which can be implemented by Ford to enable new proprietary positions and competitive advantage.**

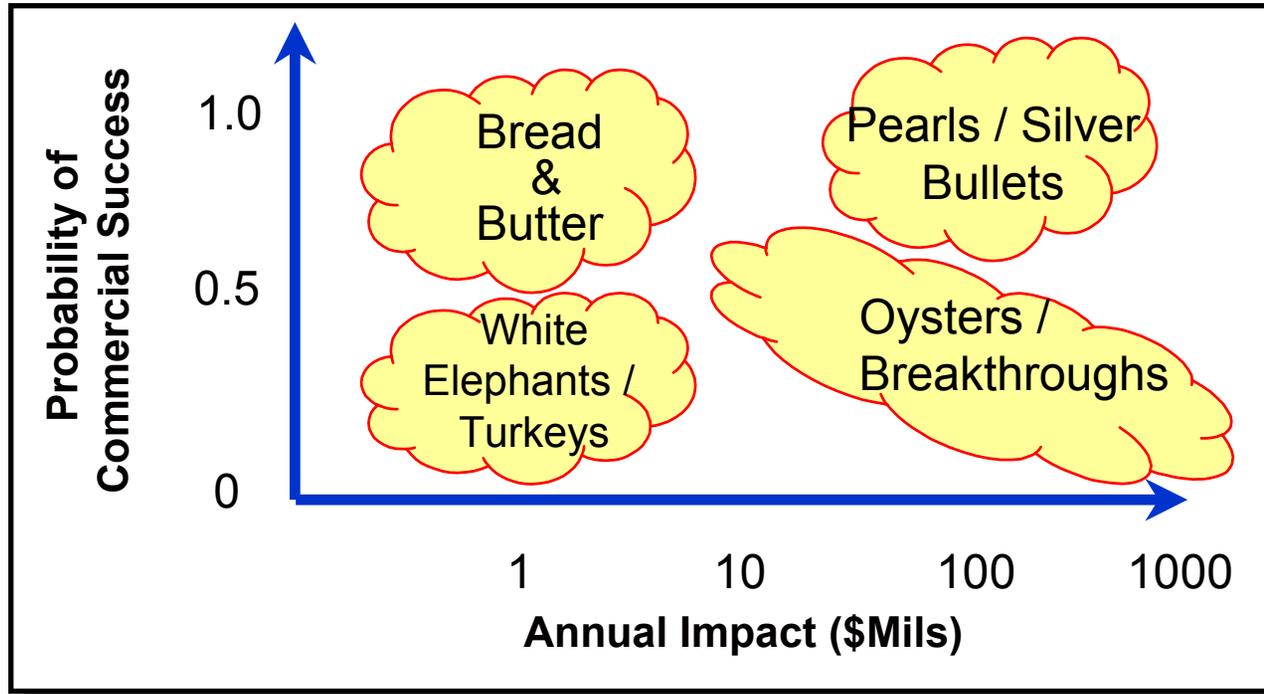
“Rule of Thumb” Research Portfolio Goals

- **80% Offense / 20% Defense**
- **80% Tangible Measures / 20% Intangible Measures**
- **Generate 2x budget in Annual “Value”**
- **30% of our projects should focus on industry first products and processes**

Project Portfolio Matrix



The "Project Value" Chart



Rough Value for Product Development

- \$?M for 1 R/1000 Reduction
- \$?M for 1 Day off the Product Development Critical Path
- \$?M per CAFÉ Mile Improvement
- \$?M per \$100/unit Priceable Option
- \$?M for On-board Emissions Reduction
- \$?M for Manufacturing Efficiency or Plant Environmental Improvement
- \$?M for Scientific/Regulatory Credibility



Advanced Technology Deployment Process

Technology Deployment Process (TDP)

Result: Implement on Vehicle (7%
Success)



"Soft" DEALS with
Programs



Prioritized Technology
Development



Governance: Cross-Functional
Engineering / Business Team

"Big Bang" Technology Process

Governance: GPDM



Prioritize "Big Bang" Technologies
(dedicate 60% of Global
Resources)

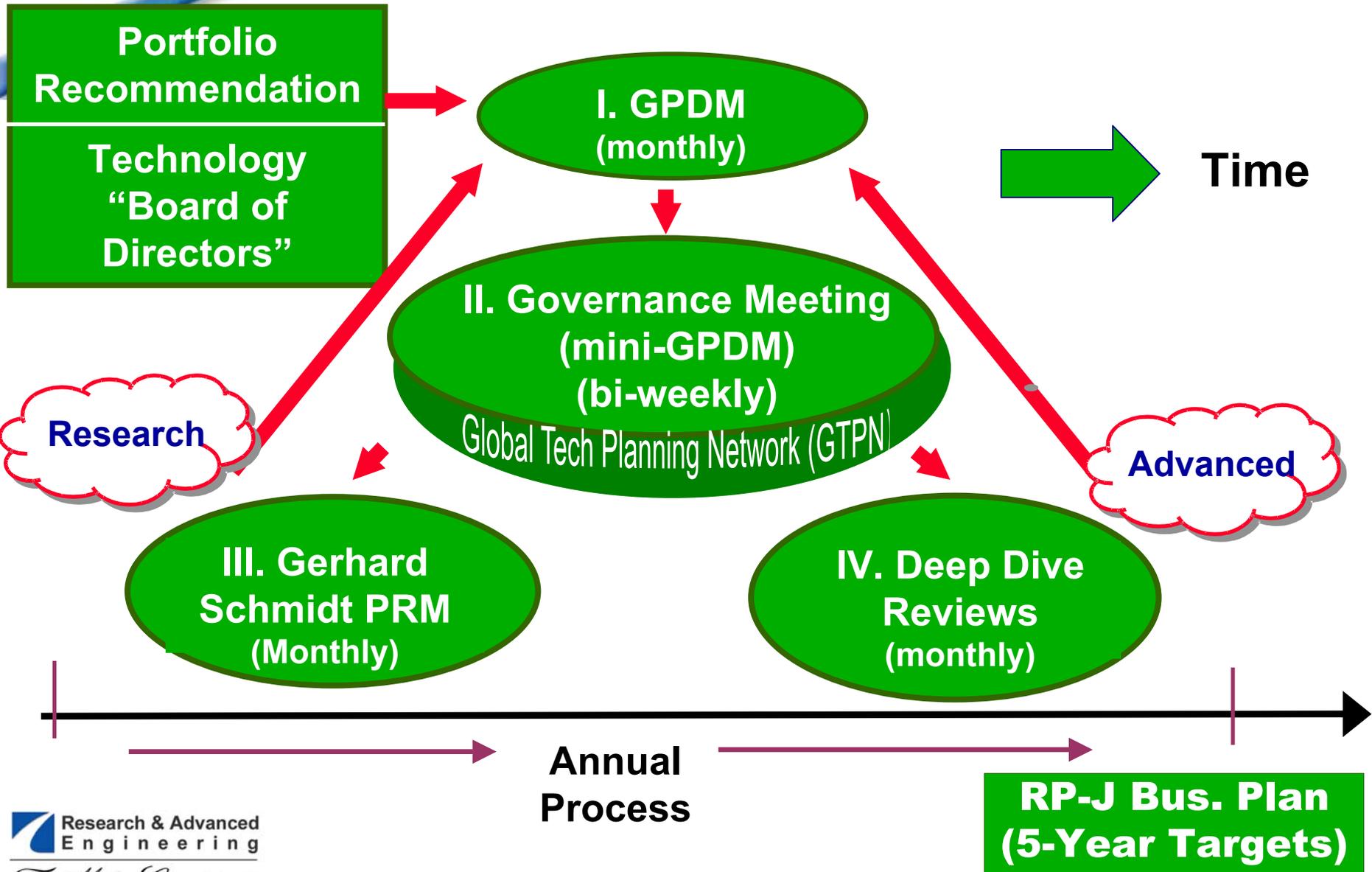


CBG V.P. Commits to
Implement on Program(s)

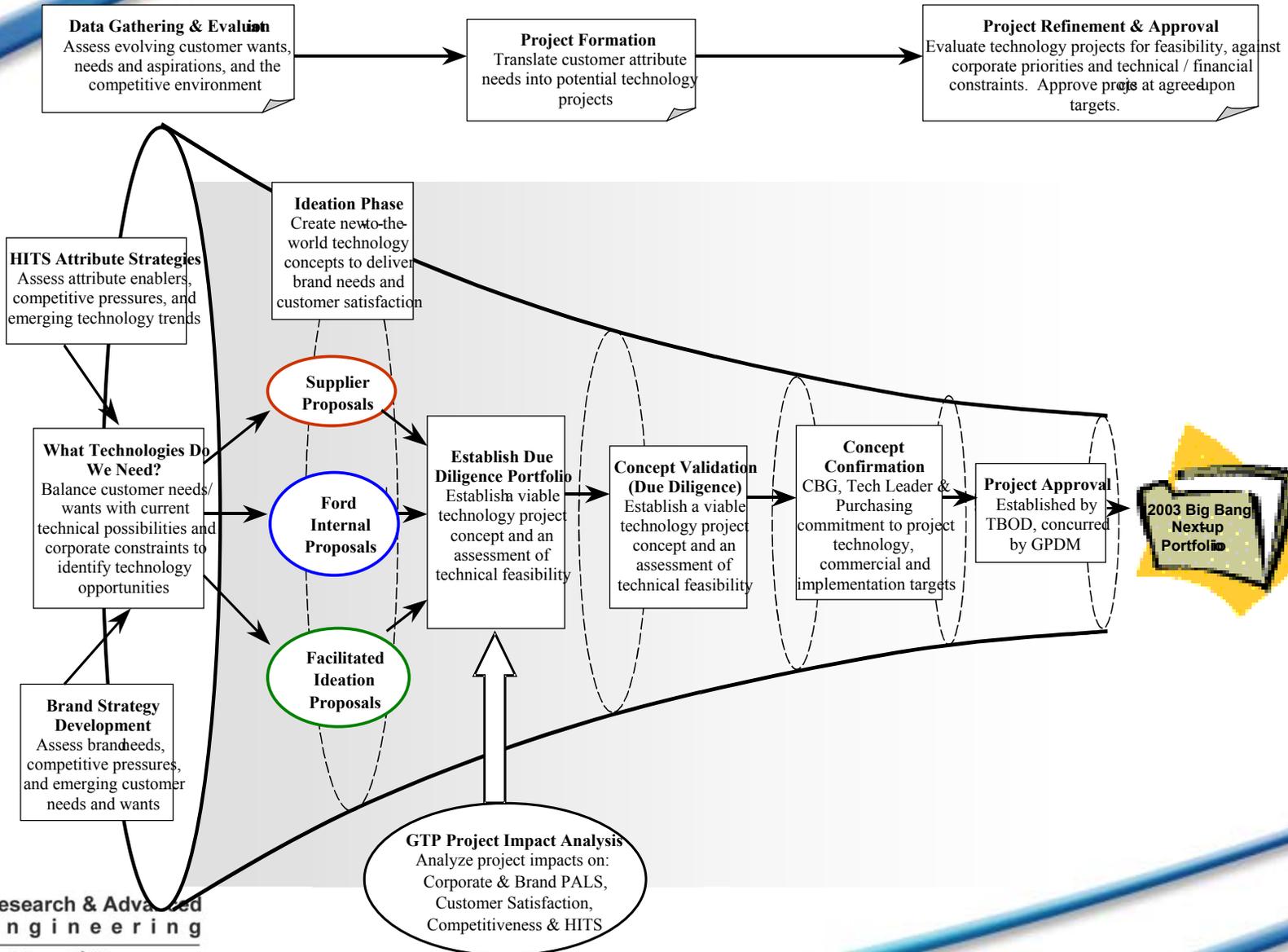


Target Result: 80% Implementation
on Vehicles

Technology Governance



Big Bang "Next Up" Technology Portfolio Development Process



Ford's "Technology Board of Directors"

Gerhard Schmidt, Champion	VP, Research
Tony Brown, Co-Champion	VP, Purchasing
Mike Richardson	Jaguar
Barry Webb	Land Rover
Hakan Lofgren	Volvo
Ron Lagola	Lincoln Mercury
Fritz Quissek	Ford of Europe
Tatsuya Kita	Mazda
Bob Himes	North American Truck
Bill Osborne	North American Truck
Burt McNeal	North American Car
Hermann Salenbauch	North American Car
Dan Kapp	Powertrain Operations
Colleen Moynihan	Advanced Manufacturing

Health Chart - Example

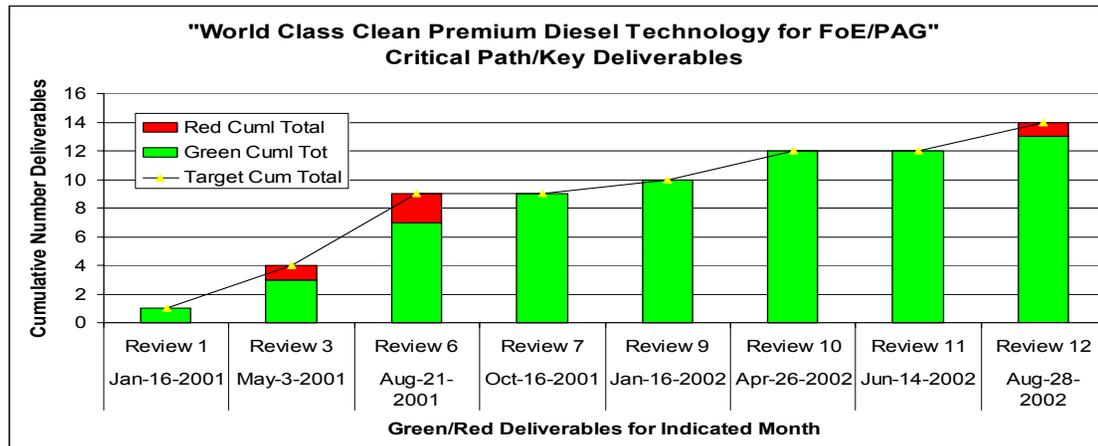
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SUMMARY - "World Class Clean Premium Diesel Technology for FoE/PAG"
as of Aug 28, 2002

Project ID #	Track. No. 01-36	TOTAL OVERALL STATUS	G/R
Project Title	Premium Diesel Technology		
Project Type	Internal		
Project Champion	Steve Ross (sross)	Co-Champion	Martin Leach (mleach5)
Project Leader	Holger Paffrath (hpaffra1) + Horst Schulte (hschult5)		
Target Vehicle	Jaguar X350 + Land Rover L319		
Target Model Year	MY 2006.5 + MY 2007		
Supplier(s) Involved	3K-Warner / Garrett, Optrand, Bosch		

CBG Lead (sross) - Business Deliverables/Targets					
Deliverables	Initial Targets	Current Approved Targets	Change to Current Approved Target This Review Date	Last Review G/R	This Review G/R
1) Program	Jaguar X400	MY 2007 X350 and L319		G	G
2) <SC> Timing	Jun-03	X350: Dec 2002		G	G
3) <Job1> Timing	Dec-05	Sep-06		G	G
4) Variable Cost Target \$	TBD	\$534		TBD	G
5) Investment \$(000)	TBD	Same as Initial		TBD	TBD
6) 1st Migration Application	FoE/Jaguar	MY 2007 X350 and L319		G	G
7) Migration Plan Start	TBD	April-4-2001		G	G
8) Migration Plan Complete	TBD	Dec 4th, 2001		G	G
9) Post <SC> CPE Lead	FoE/Jaguar	Jaguar + Land Rover		G	G
10) Public Affairs Strategy Due	TBD	Same as Initial		TBD	TBD

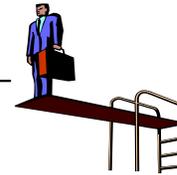
Technical Lead nschorn - Technical Deliverables/Targets					
Deliverables	Initial Targets	Current Approved Targets	Change to Current Approved Target This Review Date	Last Review G/R	This Review G/R
11) Budget \$(000)	CY2001: 6.000	Same as Initial	CY2002: 7.000	G	G
12) Budget HC	FFA 24	Same as Initial	CY2002: 31	G	G
13) Staffing Status	90% overall	Same as Initial		R	R
14) Skill Sets - Needs Met	YES	Same as Initial		G	G
15) Staff Co-location Status	FFA 80% , 20% DEC	Same as Initial		G	G
16) Sourcing Strategy Due	Sep-01	Same as Initial		G	G
17) Patent Applied For	Closed Loop Combustion	DC3, e-boost control		G	G
18) Response to Last Assignments	Completed	Same as Initial	actions ongoing	G	G
19) DFSS	N/A			G	G
20) Technical Deliverables Status				G	G



Transfer Readiness Checklist



Project Number & Title: _____



Transfer Readiness Definition:

Transfer Readiness is the formal agreement between the technology developer and the program team that the advanced technology is ready for transfer to the vehicle program. This agreement also verifies that the CBG will fund the implementation of the technology from <TR> to <J1>.

Deliverables	Responsible Activity	Status (R/G)	Comments
Health Chart Business & Technical Deliverables Accepted	CBG		
Technology added to PDL (not as "investigate")	CBG		
Affected Attribute PMT targets established and compatible	CBG		
Advance resource(s) identified (by name) to be funded by CBG at <SC>	GCE		
Benchmark Competition: are we Industry First?	GCE		
Migration Plan acceptable	CBG		
Cross-functional sourcing (has been/will be) reviewed at Global Sourcing Stakeholders Meeting	Purchasing		

COMMENTS on Red Items (Including resolution plan):

- 1
- 2
- 3

Lead Program _____

<TR> Date _____

<SC> Date _____

Job #1 Date _____

Concurrence

Tech Leader _____ Date: _____

GCE VP _____ Date: _____

CBG PD Head _____ Date: _____

CNE _____ Date: _____

NOTE:

1. Latest Health Chart and Updated One Pager must be attached to TR documentation
2. Engineering documentation will migrate with the technical leader to CBG during project transfer (TR)



**Research & Advanced
E n g i n e e r i n g**

Ford Motor Company

