

Institutionalizing Innovation Management: A Case Study from the Utility Industry

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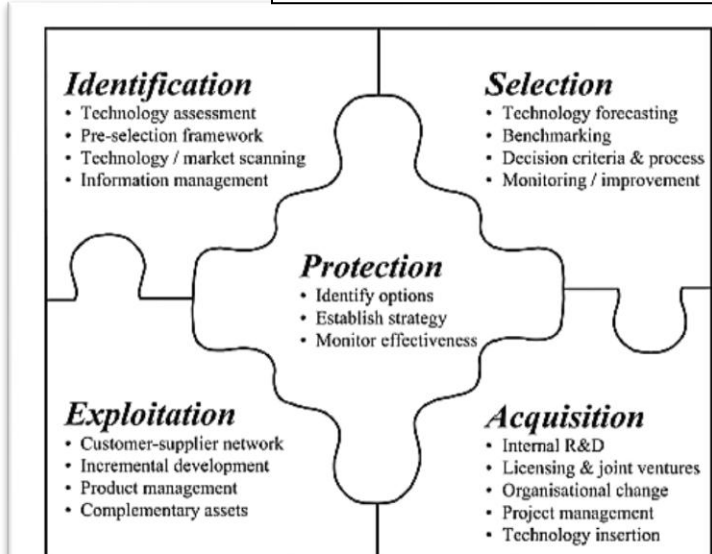
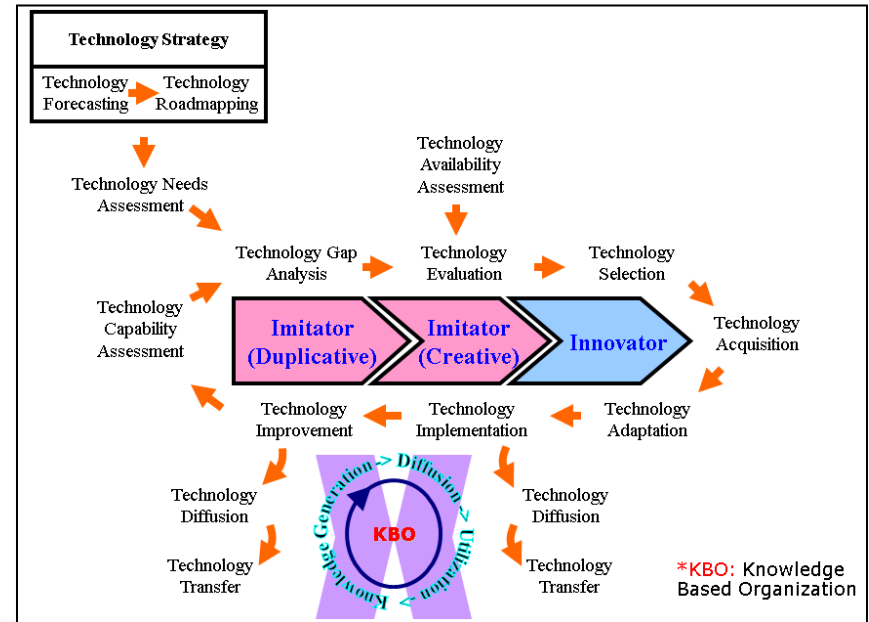


Introduction

- Technology Management Process in Literature
- Overview of the Bonneville Power Administration (BPA) transmission system
- Managing Research and Development at BPA
 - Roadmapping
 - Portfolio management
 - Project management
 - Technology transfer
- Application to others industries
- Lessons learned
- Conclusions

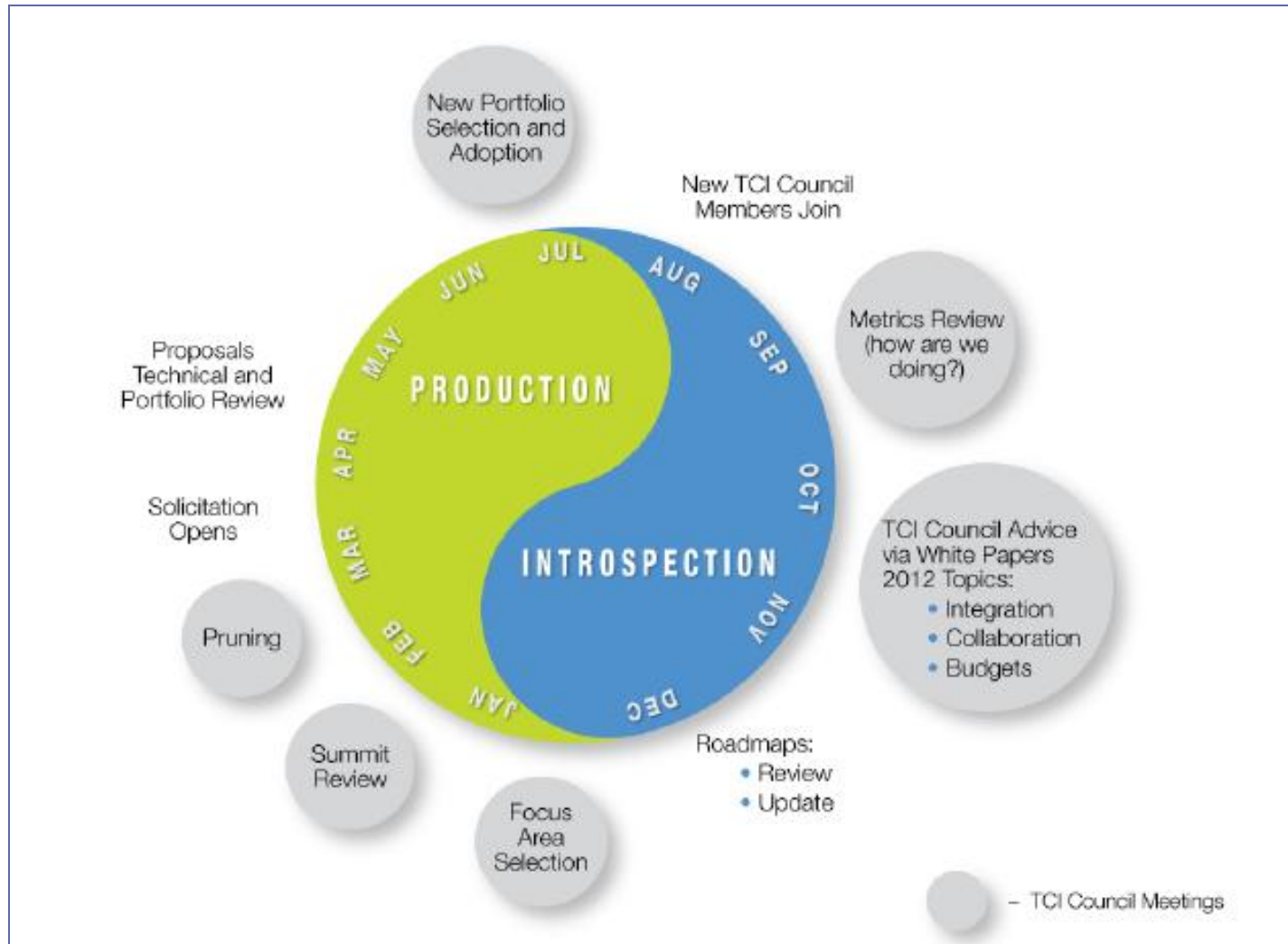
Technology Management Process in Literature

- Technology Strategy Development
- Technology Needs Assessment
- Technology Gap Analysis
- Technology Availability Assessment
- Technology Evaluation
- Technology Selection
- Technology Acquisition
- Technology Adaptation
- Technology Implementation
- Technology Improvement
- Technology Imitation
- Technology Innovation

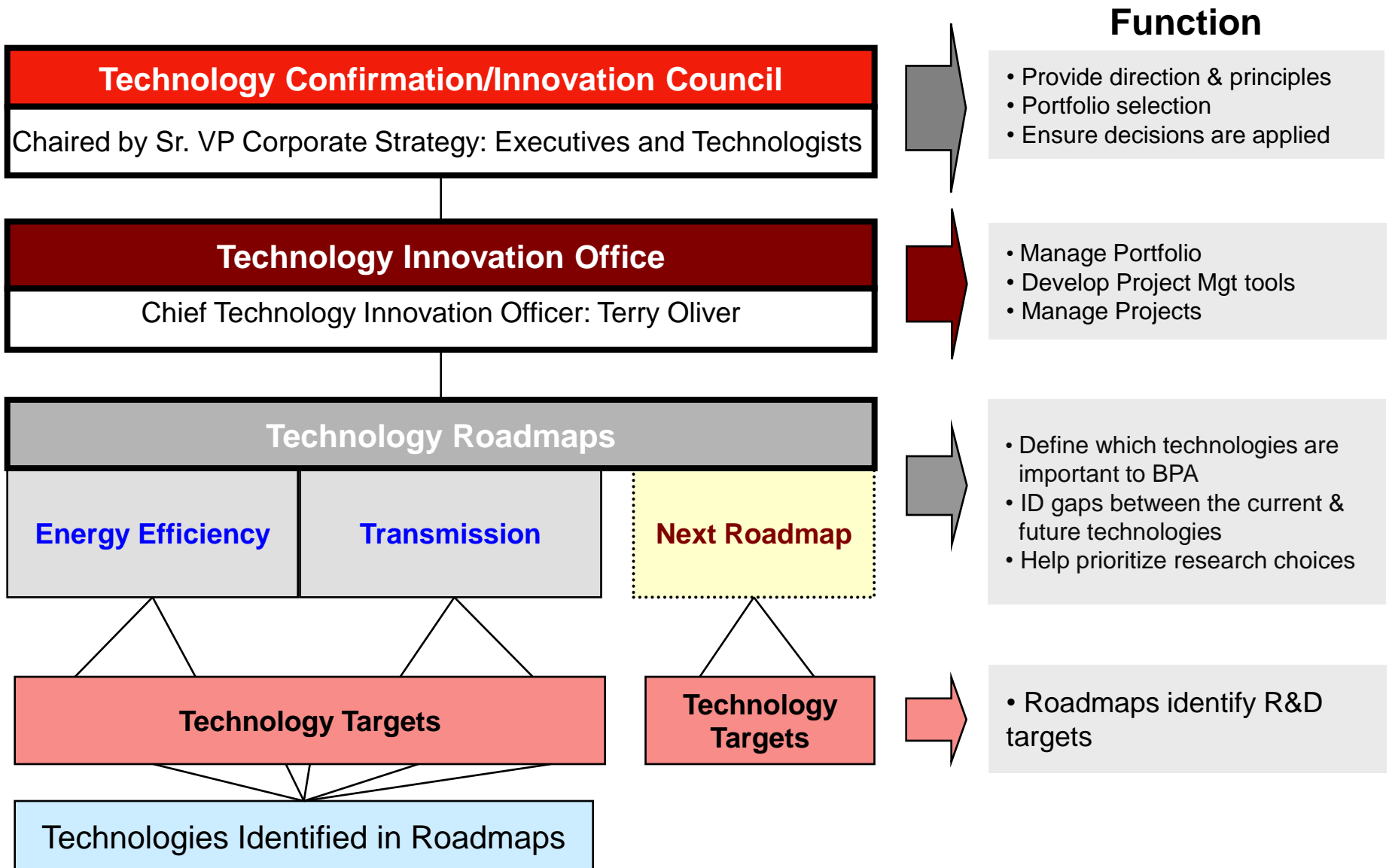


Source: Gregory (1995)

Technology Innovation: Cyclical Process



Technology Innovation Structure



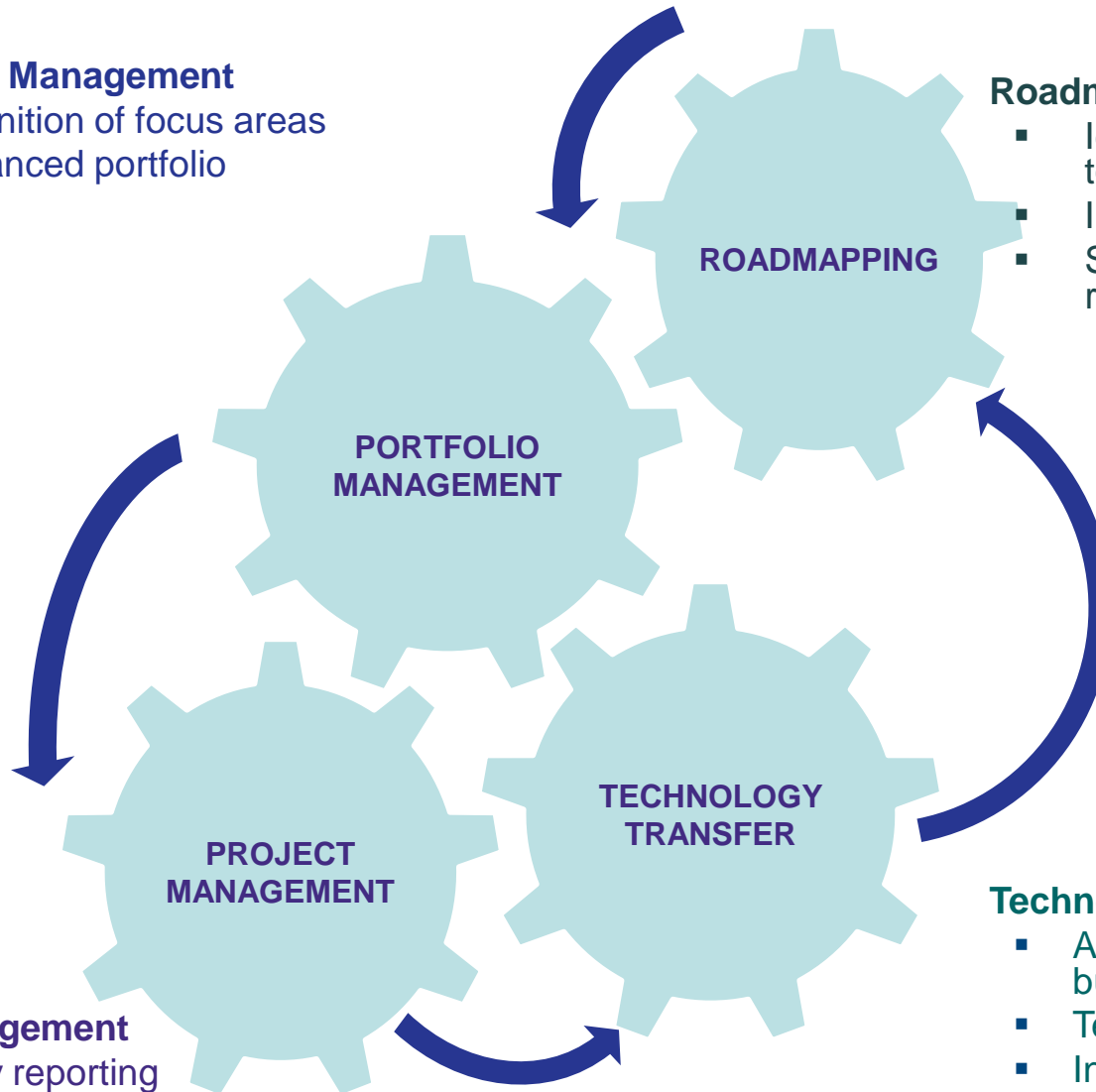
Technology Innovation Operations: Integrated Process

Portfolio Management

- Definition of focus areas
- Balanced portfolio

Roadmapping

- Identifies technologies matched to business challenges
- Integration of key agency targets
- Serves as the basis for the research portfolio



Technology Transfer

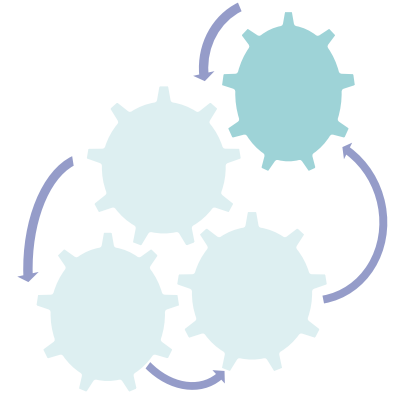
- Application of technology to meet business challenge
- Technology commercialization
- Intellectual property considerations

Project Management

- Quarterly reporting
- Stage gate management
- Triple constraint management

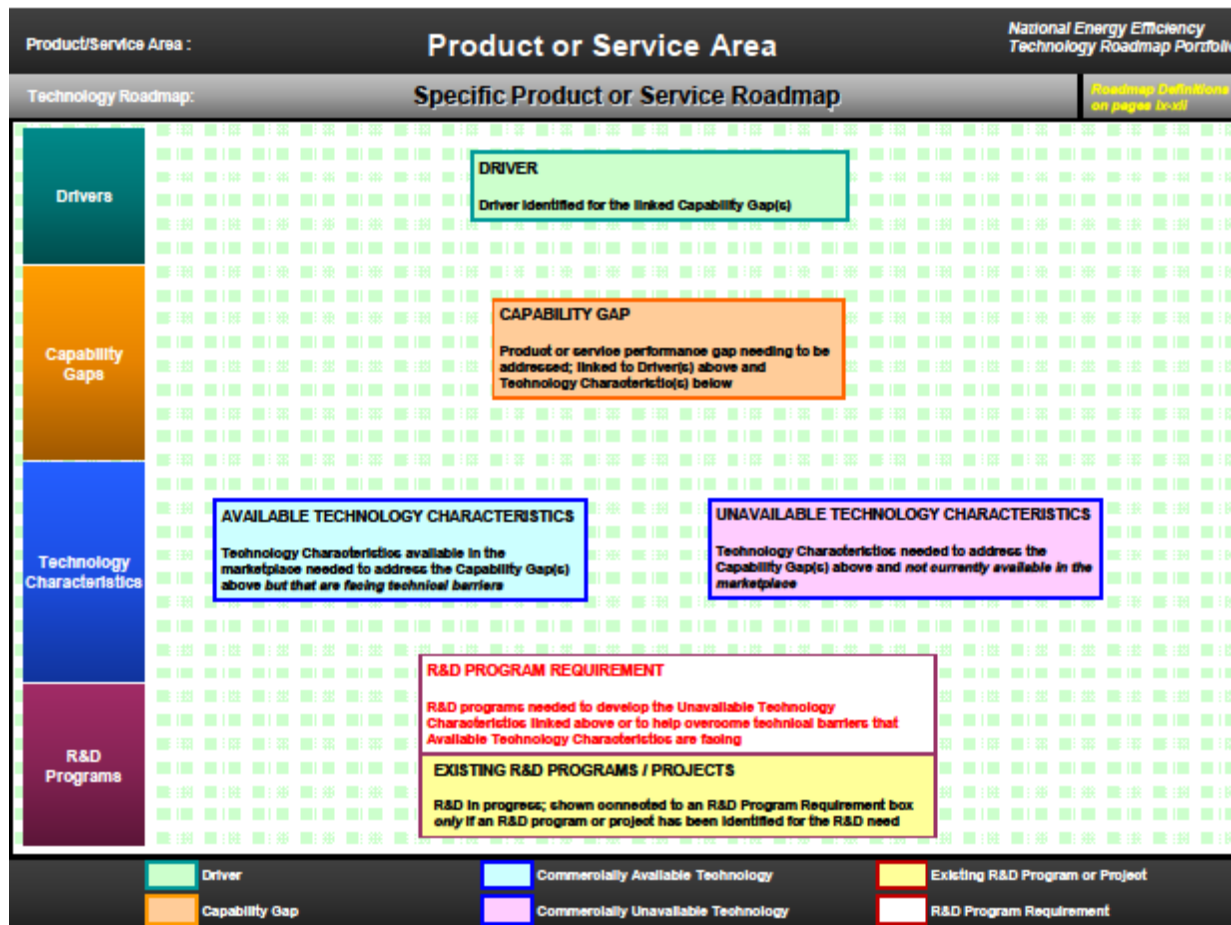
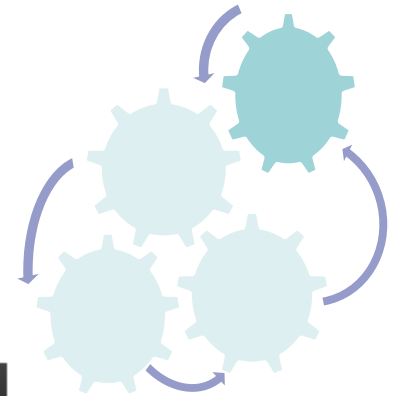
Roadmapping

- Synthesis of internal and external expert opinions
- Links business, operational and technical challenges
- Guides R&D efforts
- The roadmapping process:
 - Workshops to identify BPA challenges and drivers
 - Identify technologies that address the challenges
 - Identify technology gaps
 - Determine how technologies will be acquired or developed
 - Consider alternative solutions

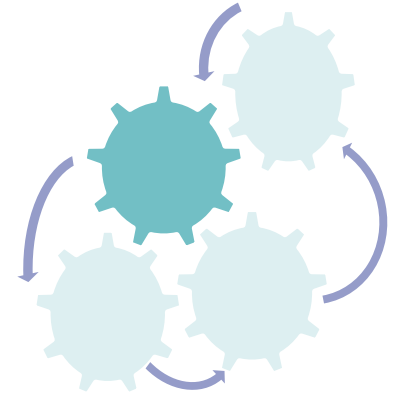


Roadmapping

- Current technology roadmaps
 - Transmission Operations and Planning
 - National Energy Efficiency
- Roadmap framework

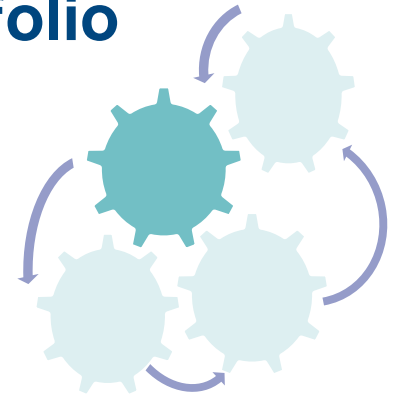


Portfolio Management



- Define focus areas
 - Alignment with key agency targets
- Balance portfolio
- Manages annual portfolio solicitation
- TI publishes annual reports on the performance of the portfolio
- Cyclical process
 - Solicitation
 - Portfolio selection
 - Summit review/prune

Portfolio Management: Balanced Portfolio



Value

Low

High

Feasibility
(Probability of Project Success)

High

Easy gain but
little benefit

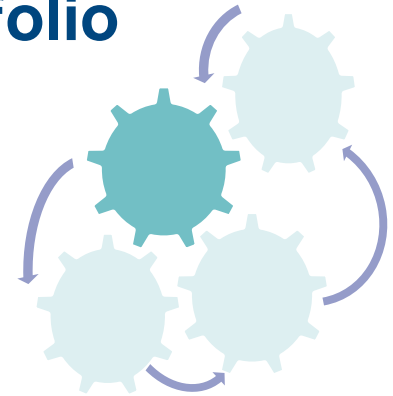
Target project

Low

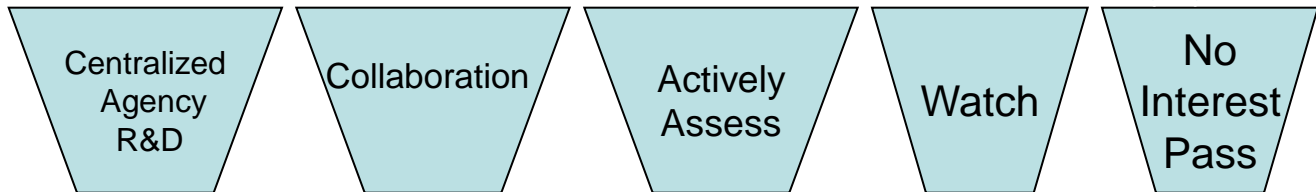
Poor investment

Good but needs
attention

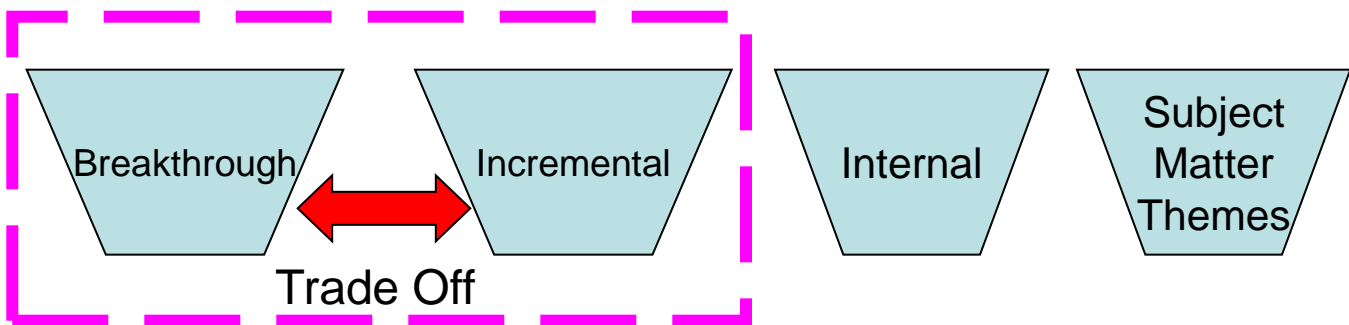
Portfolio Management: Balanced Portfolio



Assessing
BPA
Role in
Technology
Development



Balancing
of
Portfolio
Issues

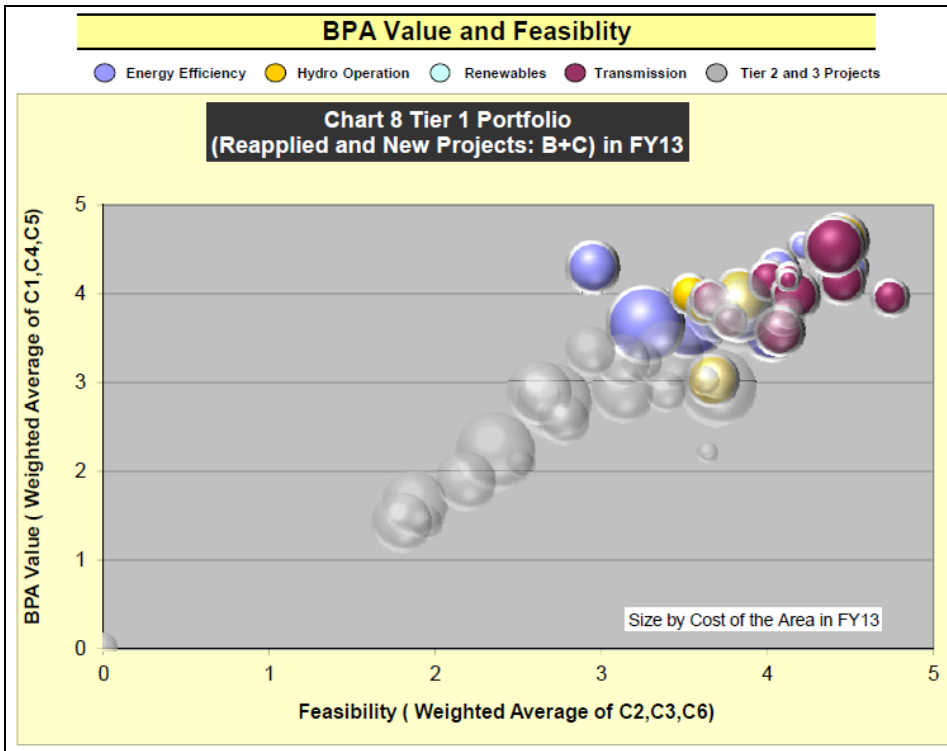
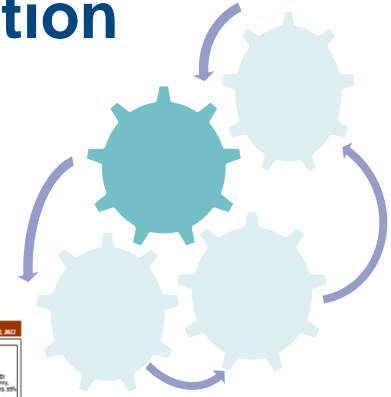


Improving
Effectiveness
of R&D
Investment



Size of Project Investment

Portfolio Management: Portfolio Selection



R&D Portfolio Summary FY13

August 11, 2012

Category	FY11	FY12	FY13	FY14
Total Available Budget	\$1,081,000	\$1,000,000	\$1,000,000	\$1,000,000
Energy Efficiency	\$470,000	\$470,000	\$470,000	\$470,000
Hydro Operation	\$100,000	\$100,000	\$100,000	\$100,000
Renewables	\$100,000	\$100,000	\$100,000	\$100,000
Transmission	\$100,000	\$100,000	\$100,000	\$100,000
Tier 2 and 3 Projects	\$211,000	\$211,000	\$211,000	\$211,000

Energy Efficiency Budget Breakdown:

Sub-Category	FY11	FY12	FY13	FY14
Energy Efficiency	\$470,000	\$470,000	\$470,000	\$470,000

Hydro Operation Budget Breakdown:

Sub-Category	FY11	FY12	FY13	FY14
Hydro Operation	\$100,000	\$100,000	\$100,000	\$100,000

Renewables Budget Breakdown:

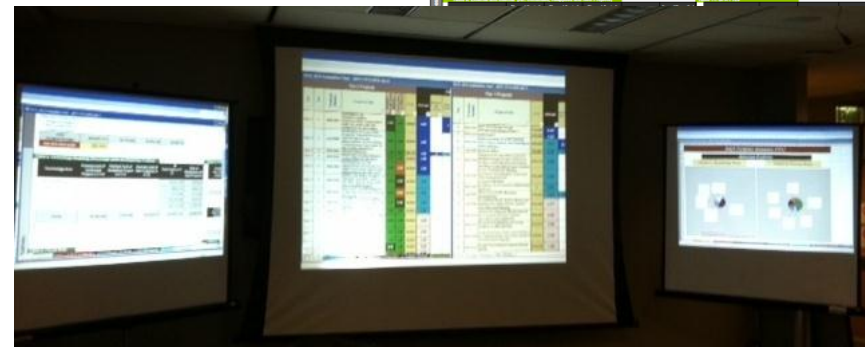
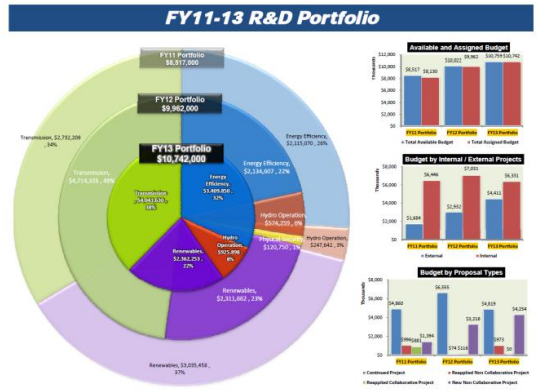
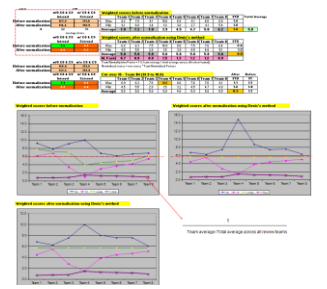
Sub-Category	FY11	FY12	FY13	FY14
Renewables	\$100,000	\$100,000	\$100,000	\$100,000

Transmission Budget Breakdown:

Sub-Category	FY11	FY12	FY13	FY14
Transmission	\$100,000	\$100,000	\$100,000	\$100,000

Tier 2 and 3 Projects Budget Breakdown:

Sub-Category	FY11	FY12	FY13	FY14
Tier 2 and 3 Projects	\$211,000	\$211,000	\$211,000	\$211,000



Tier 2 R&D Portfolio FY13

March 2012

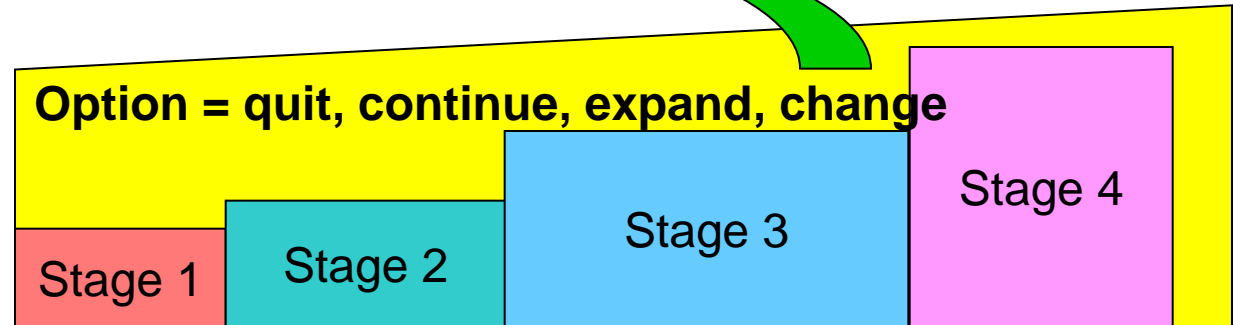
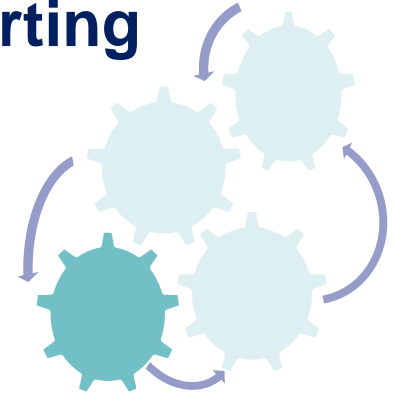
Project Name	Category	Status	Start Date	End Date	Budget	Progress
Project A	Energy Efficiency	Active	2011-01-01	2012-03-31	\$100,000	75%
Project B	Hydro Operation	Active	2011-01-01	2012-03-31	\$100,000	50%
Project C	Renewables	Active	2011-01-01	2012-03-31	\$100,000	25%
Project D	Transmission	Active	2011-01-01	2012-03-31	\$100,000	10%
Project E	Tier 2 and 3 Projects	Active	2011-01-01	2012-03-31	\$100,000	5%

Project Management

- Provide oversight and guidance
- Implement the Project Management Maturity Model (PM3) to advance R&D project management skills and practices
 - Develop and maintain comprehensive tools, templates and documentation for the TI PMs
- Establish methods to monitor, influence, and appropriately control project performance
 - Require stage gate
 - Informal monthly meetings
 - Formal quarterly reports
 - Provide PM training and development opportunities
 - Implement financial reporting tools
- Facilitate collaborative engagement



Project Management: Stage Gate Reporting



Analysis of Project Value Includes:

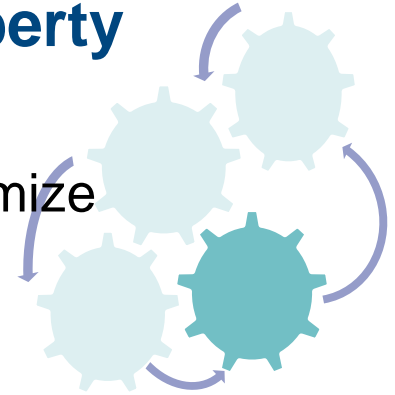
- Risk
- BPA business challenges
- Cost
- Relation to objectives
- Achievement of deliverables

Project X Restructured as a Series of Stage Gates

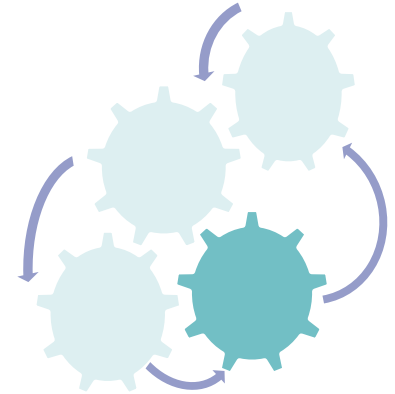


Technology Transfer: Intellectual Property

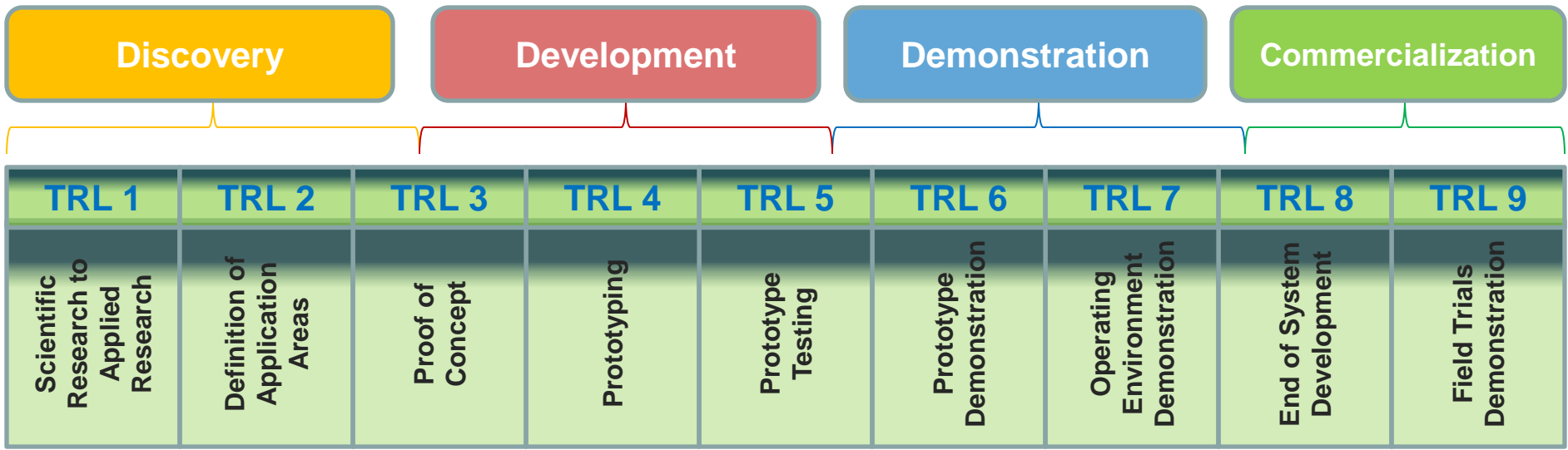
- Dissemination of knowledge and research results to maximize value of R&D investments
- Intellectual Property incentivizes technology development
- Externally - Research partners have elective rights. BPA receives licenses
- Internally-BPA can develop IP and utilize for a variety of purposes consistent with our mission
 - Defensive use
 - Leadership in sector
 - Reasonable returns on investment



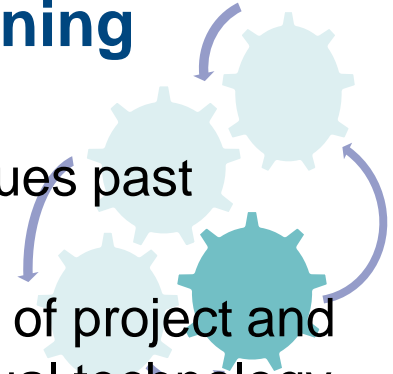
Technology Transfer: Application



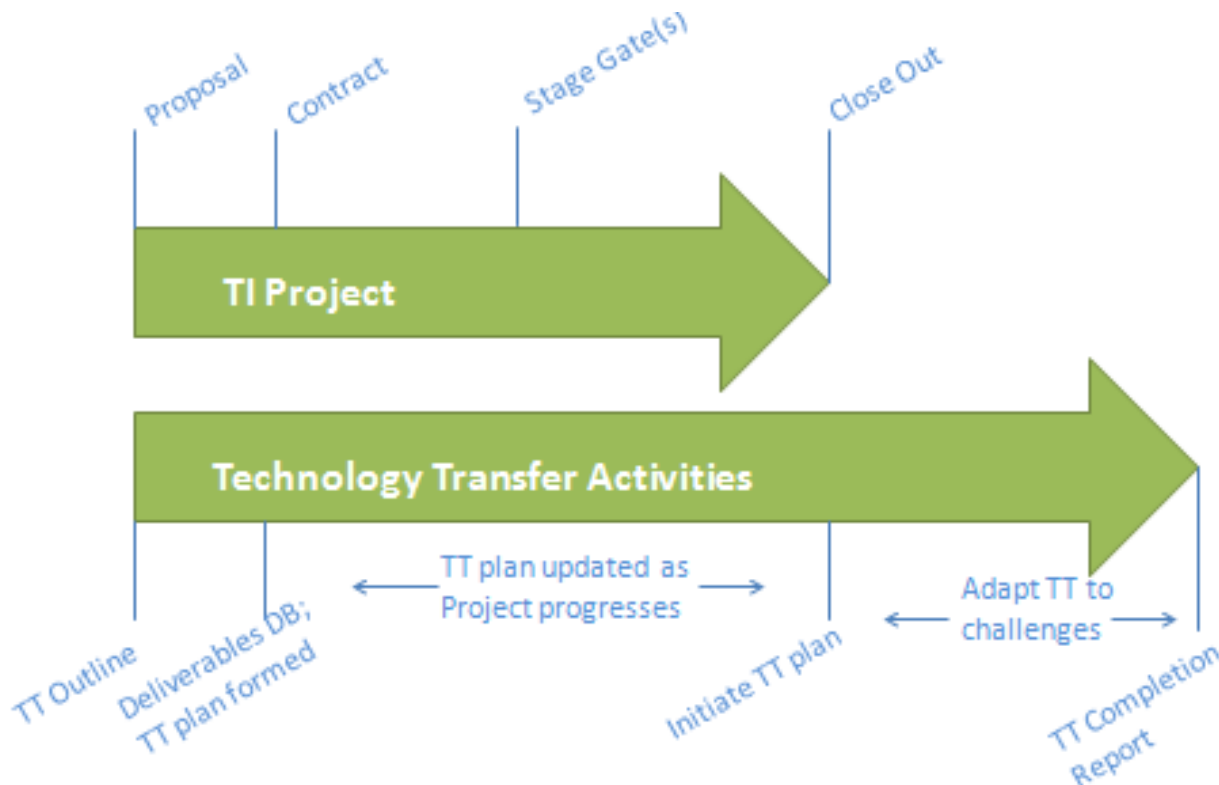
- Structured approach
- Consider implementation strategy at project *inception*
- Next steps based on Technology Readiness Level (TRL)
 - TRL < 7
 - Development continues through
 - Direct BPA investment or
 - Reference to outside institutions (National Labs or Academia)
 - TRL ≥ 7
 - Ready for implementation in real-world application!



Technology Transfer: Application Planning

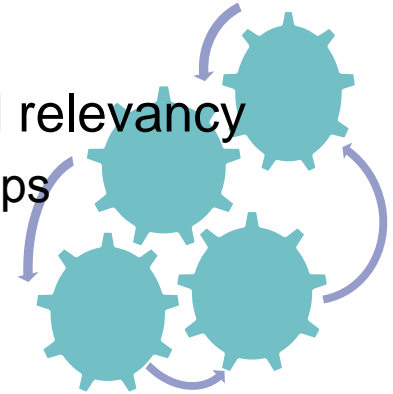


- Application planning begins at project inception, and continues past project completion.
- A Technology Transfer plan matures throughout the course of project and is to be used to pro-actively addresses challenges to eventual technology application.



General Application to Industry

- Innovation investment is a *requirement* for success and relevancy
 - Choice: Managed process or 'chaotic' funding and missteps
- Innovation is messy – most R&D fails
 - Embrace a balance
 - Fail early = fail cheap
- Structured R&D program
 - Manage the investments
 - Appropriately timed stage gates
 - Integrated to support business objectives and corporate strategy
- Road maps and technology transfer are the bookends of innovation
 - Road Maps show *innovation* can achieve the vision and mission of your business.
 - Technology transfer *starts* when the project is awarded
 - Know who will 'own' the innovation (and when they need to prepare)
 - Plan for the implementation strategy and funding
- Change is the Constant: Innovation is Essential!



Lessons Learned

- **Council of Peers**
 - The Technology Council provides a forum for executives and subject matter experts to exchange ideas
 - Ensures diverse opinions are considered.

- **Pruning is a necessity**
 - Otherwise, complacency is a risk
 - Makes funding available for more relevant projects

- **Summit review requires objective data**
 - Implement rigorous review process
 - Use quantified criteria
 - Improves the clarity of project's value

Conclusions

- Demonstrated success with R&D
 - Provides a framework for selecting and managing a portfolio >\$12M and 50 projects annually

- Framework serves as a model for other utilities
 - There are some common themes that can be applied to all industries

- Money is not enough! The process requires:
 - Clarity of purpose
 - Clarity of choice
 - Clarity of the system

Disciplined R&D = \$000 Millions in Value

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