

# Generic EERE Logics and Metrics (2004-2008)

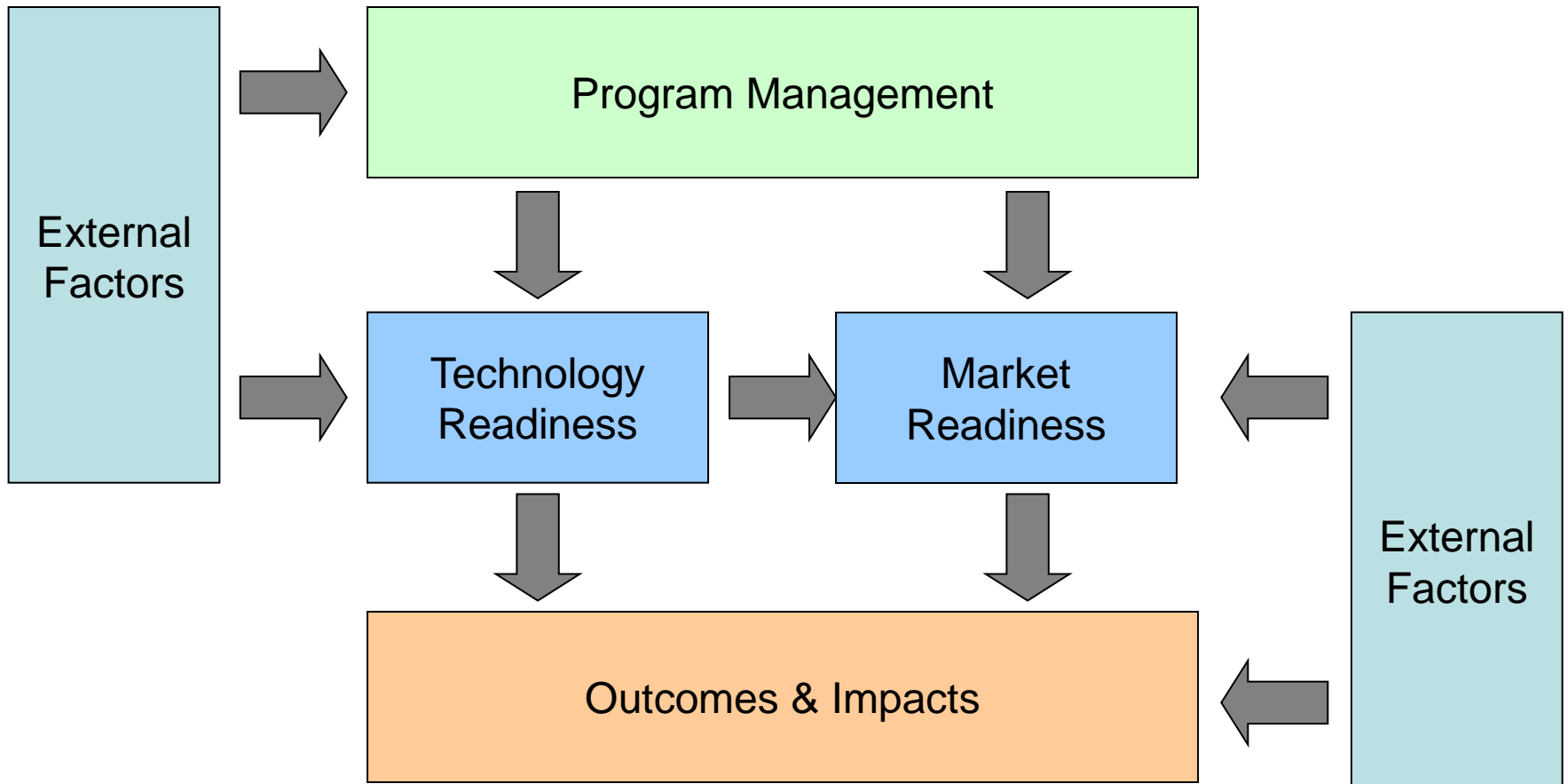
and

## High Level Logics

-for 3 R&D Programs (2007)

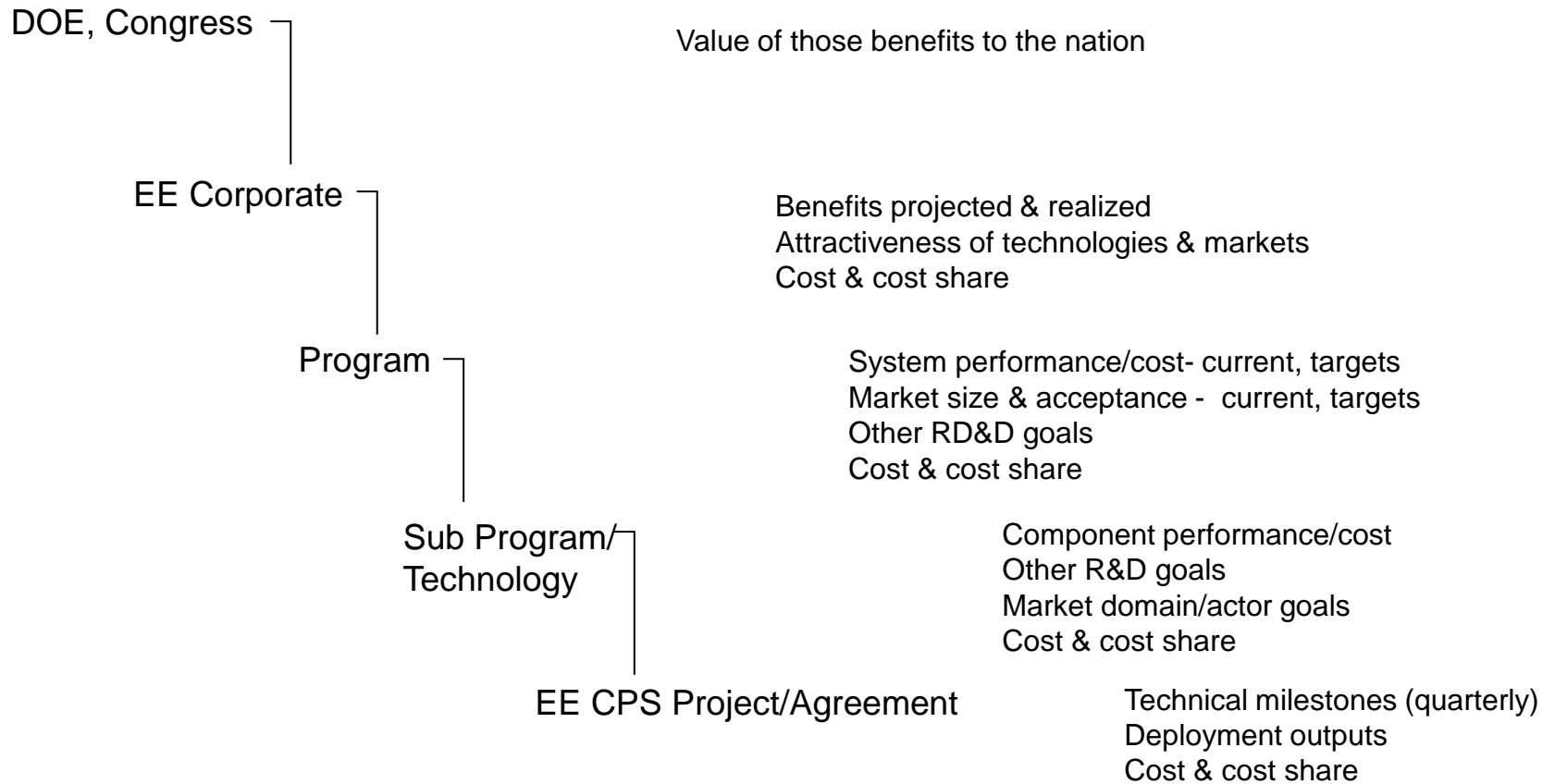
-for OWIP Programs (2004)

Measurement framework includes 5 inter-related areas that will provide useful data

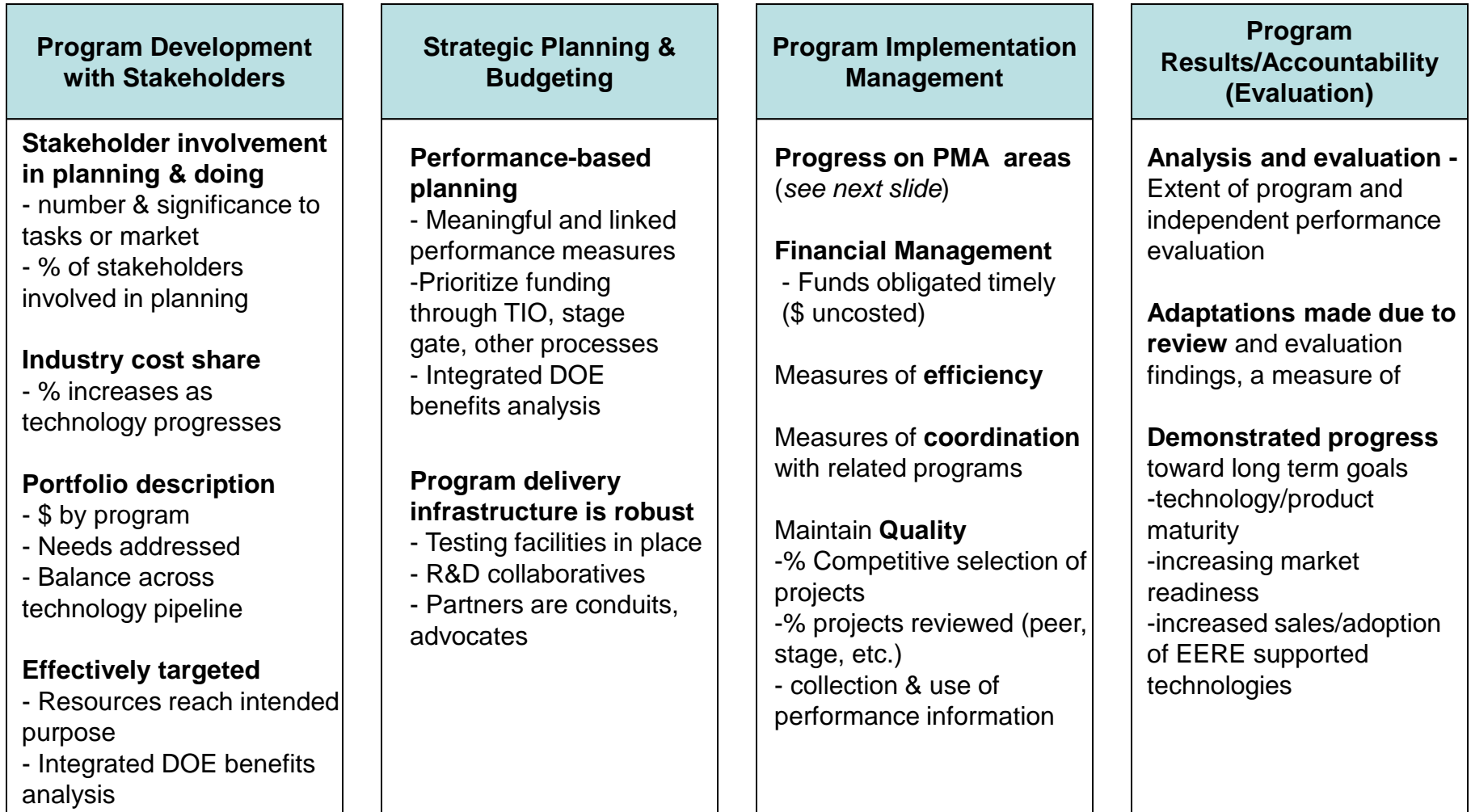


(Feedback loops not shown)

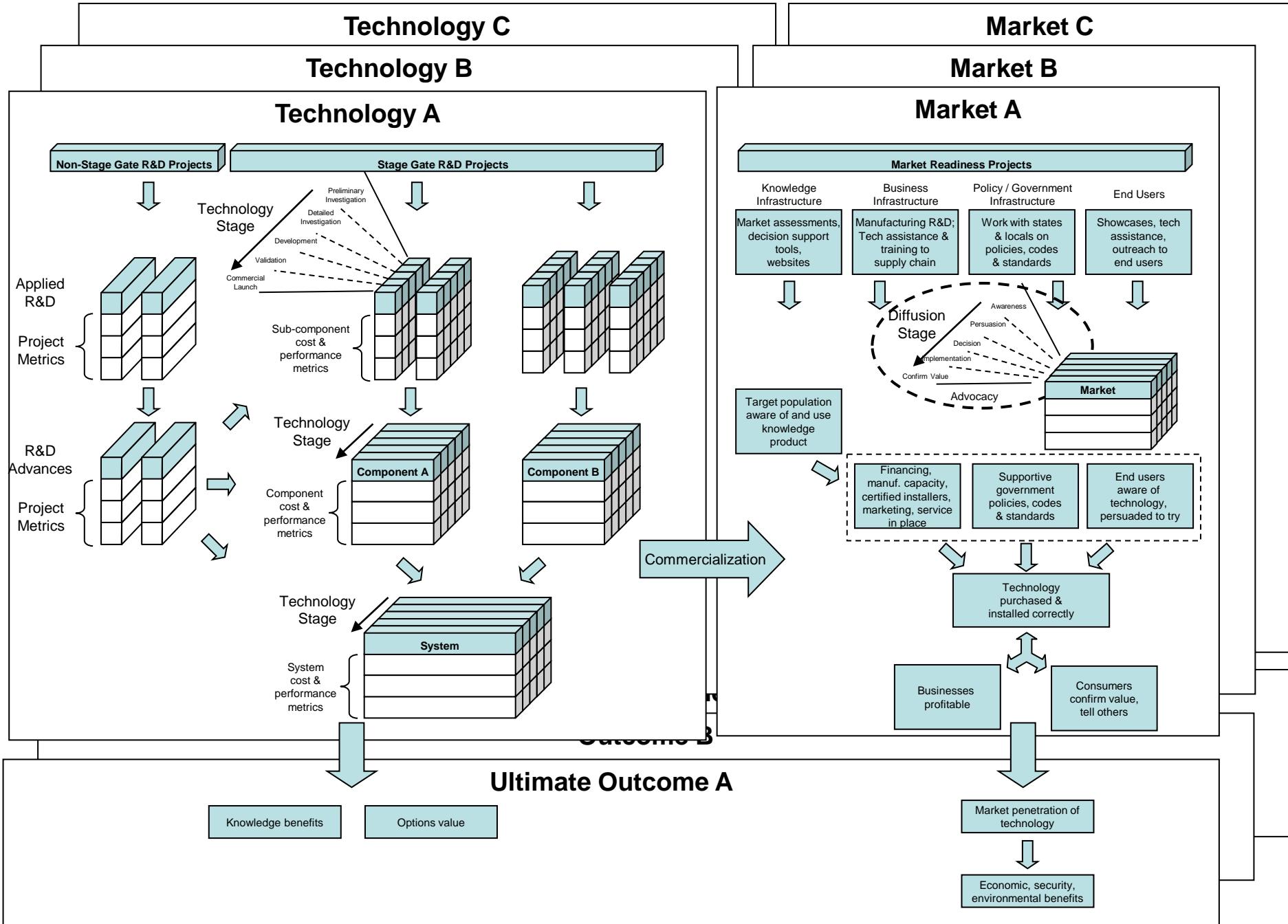
# Goals and Metrics Cascade



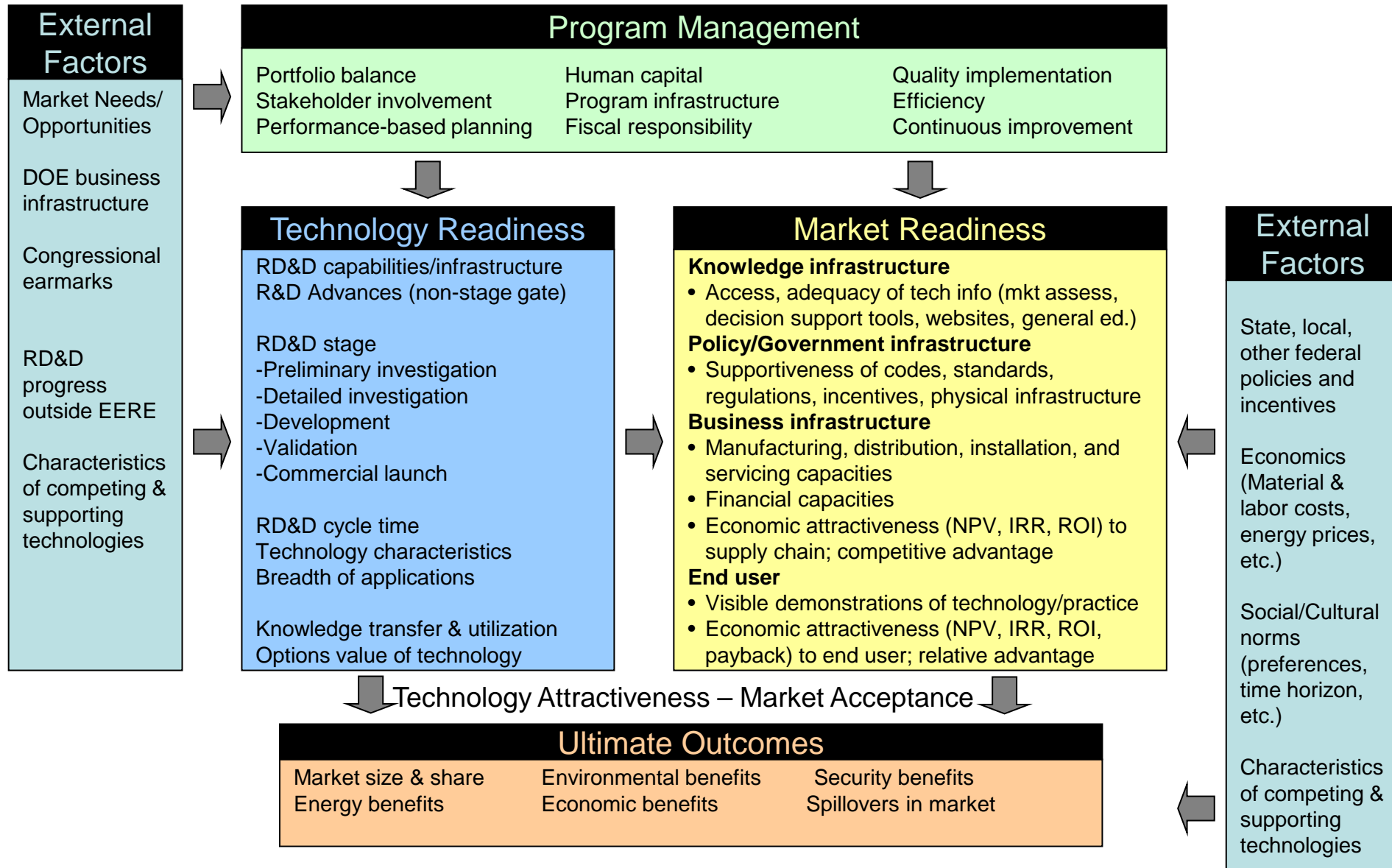
# Program Management Metrics address PART and PMA



Increased potential impact and likelihood of success  
Shortened time between bench results & introduction of new product  
and/ or volume production

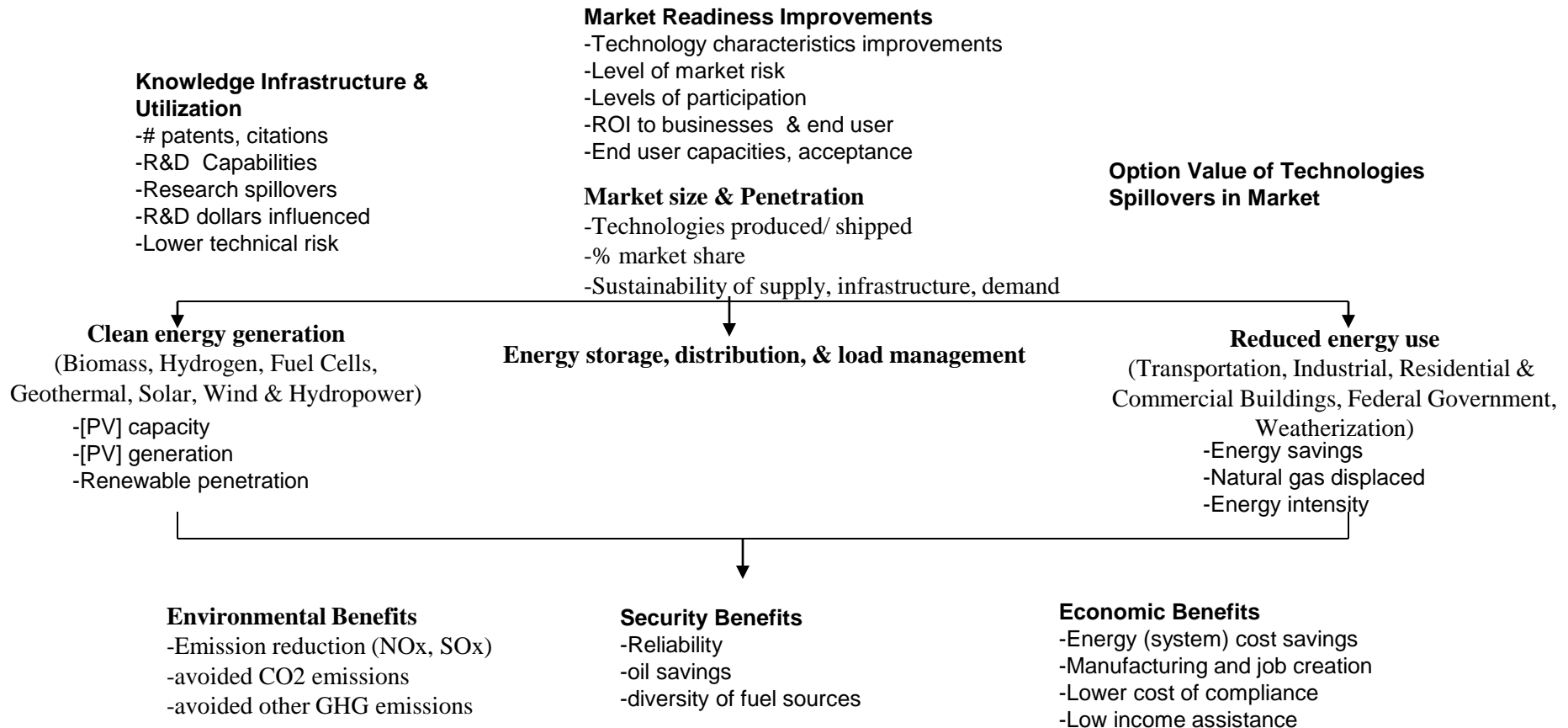


# Generic measures for EERE programs

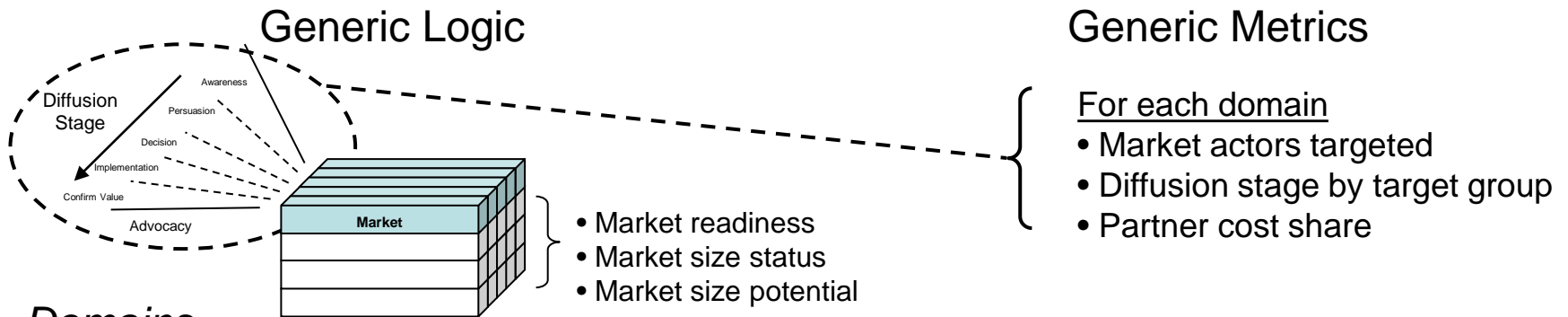


# Outcomes of EERE Programs (Estimated for GPRA and Realized)

Draft revised  
9/25/2007

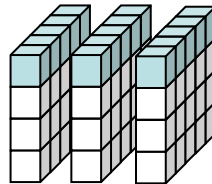


# Generic Market Readiness Metrics



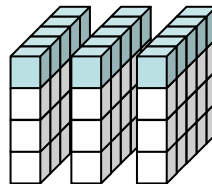
## Domains

Business Environment



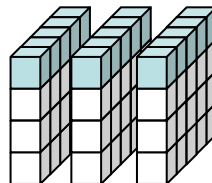
- Manufacturing volume, cost
- Total cost (installation, O&M)
- Financing availability, cost
- ROI

Knowledge Environment



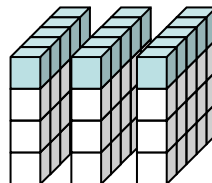
- Knowledge of technology, market
- Amount of use of decision support tools
- Influence on decisions

Policy, Government Environment



- Influence on policy, codes, gov't entities
- Amount of incentives offered
- Take up of incentives

Technology End Users



- Adopter group status (innovator, early adopter, etc.)
- Payback period
- Market characteristics (who is served)

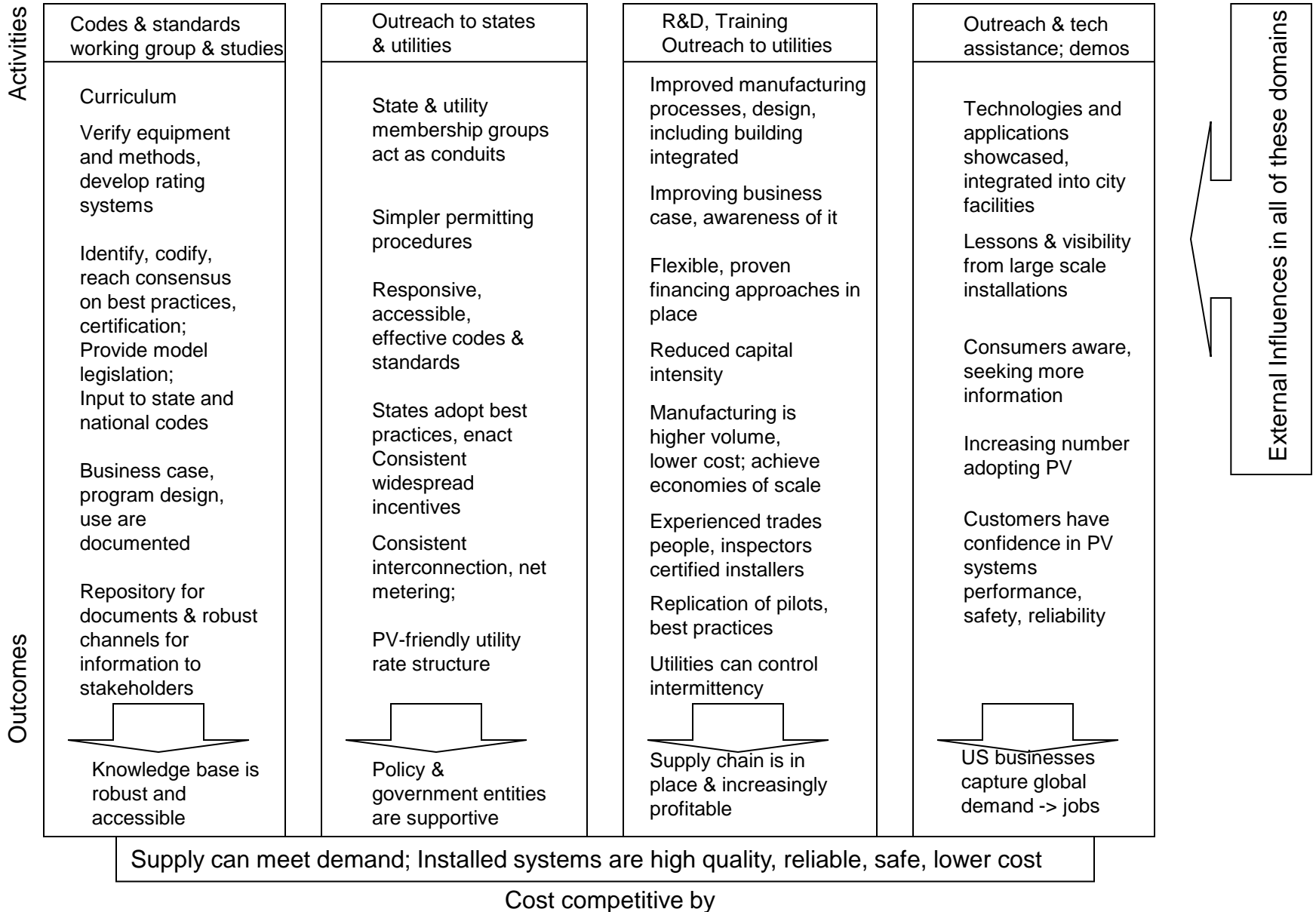


# Market readiness assessment is an aggregation of these metrics

	Knowledge Infrastructure	Policy/Government Infrastructure	Business Infrastructure	End User
Targeted Market Actors (specify from list)	<ul style="list-style-type: none"> <li>• Technical personnel in labs, industry, universities</li> </ul>	<ul style="list-style-type: none"> <li>• Government regulations all levels</li> <li>• Code officials</li> <li>• State programs</li> <li>• Local officials</li> </ul>	<ul style="list-style-type: none"> <li>• Manufacturers</li> <li>• Distributors</li> <li>• Retailers</li> <li>• Installers, Service</li> <li>• Financial institutions</li> <li>• Marketing</li> </ul>	<ul style="list-style-type: none"> <li>• Sector, group</li> <li>• Innovators, early adopters</li> <li>• Early majority</li> <li>• late majority</li> <li>• laggards</li> </ul>
Summary Metric	Robustness & accessibility of knowledge base	Supportiveness of policies & government entities	Strength & profitability of supply chain	Strength of product demand, consumer advocacy
Specific Metrics (select from list)	<ul style="list-style-type: none"> <li>• quality, credibility, coverage of knowledge that is available</li> <li>• # web hits, page views, # downloads</li> <li>• # of users of tools</li> <li>• % of target population who have accessed the knowledge product</li> <li>• News stories &amp; circulation</li> </ul>	<ul style="list-style-type: none"> <li>• % of desired standards passed</li> <li>• % of states with incentives</li> <li>• % of market represented by states with incentives</li> <li>• % of states with siting assistance</li> </ul>	<ul style="list-style-type: none"> <li>• Manf. Capacity</li> <li>• # of firms, costs, profitability along supply chain</li> <li>• availability of loans, insurance</li> <li>• Business providing purchase incentives</li> </ul>	<ul style="list-style-type: none"> <li>• # who have seen demo</li> <li>• % of end users who are aware, understand, adopt, confirm adoption of technology</li> <li>• Replication</li> </ul>
External Influences	Memory of past failures Complexity of technology	Existing state incentives Extent of technical staff Staff turn over	Cost of materials Strategic fit with existing business Competing investment opportunities	Electricity, natural gas prices Availability of alternatives GDP

# Market and Deployment Logic for EERE Solar PV

Go to highest impact markets & communication channels, engage and empower partners, accelerate stakeholder consensus



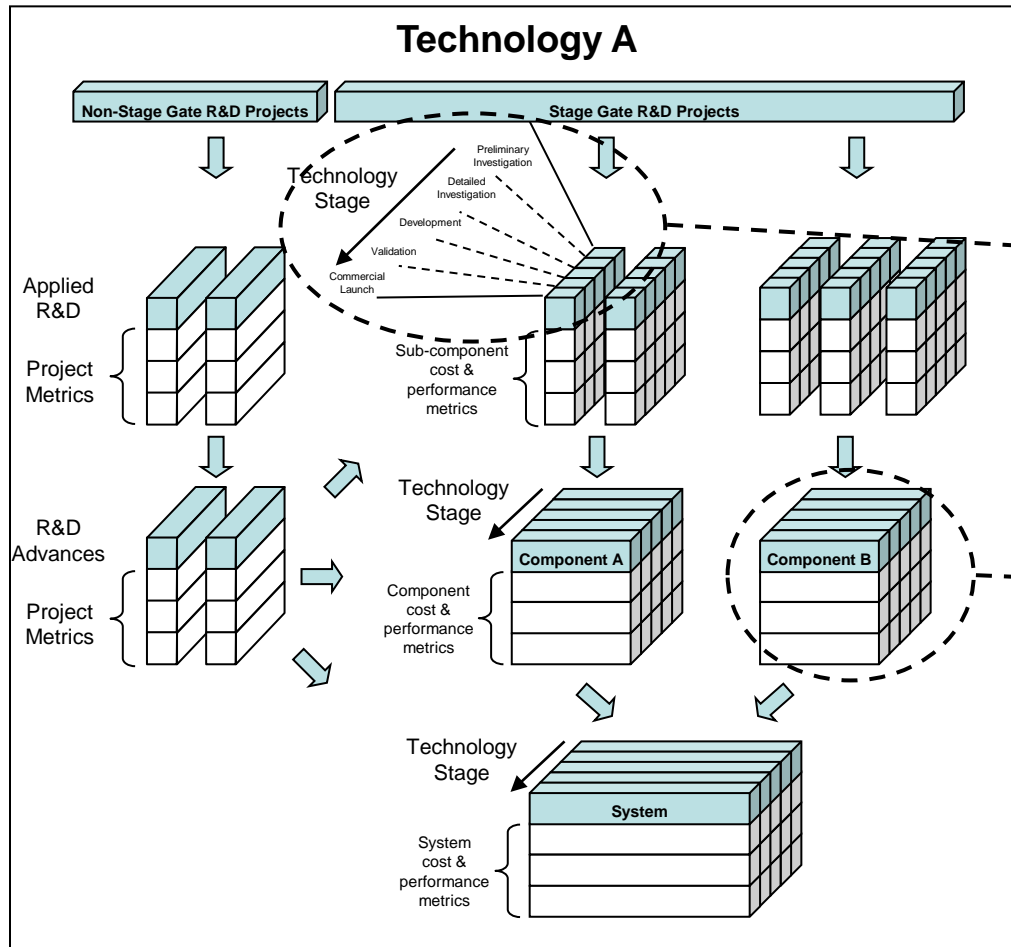
## Market Readiness Score

Total Score (1-10)	Infrastructure Domain Score With example metrics			End Users Score
	Information	Policy/ Government	Business	
<p>Scoring:            1 = none            3 = a little in place/            emerging            5 = about half in place            7 = mostly in place            10 = all in place</p> <p>Total is average of the four components.</p>	<p>Quality &amp; quantity of objective information available (e.g. on technology performance &amp; cost)</p> <p>Extent to which information is accessed (web hits)</p> <p>Extent of knowledge &amp; skills</p>	<p>% of standards adopted</p> <p>% of states with standards</p> <p>% of states with supportive programs</p>	<p>#, % firms knowledgeable, regularly providing supporting product or service with &amp; without incentives</p> <ul style="list-style-type: none"> <li>- manufacturers</li> <li>- financiers</li> <li>- wholesalers/ developers</li> <li>- retailers</li> <li>- installers</li> <li>- service/O&amp;M</li> </ul>	<p>% aware</p> <p>% market adopting</p> <p>% who recommend to others</p> <p>Attractiveness of product characteristics compared to alternatives</p>
Total Score	Score	Score	Score	Score

# Generic Technology Readiness

## Generic Logic

## Generic Metrics



- R&D Advances
- Technology stage
- RD&D cycle time
- Partner cost share by technology stage

### By Technology Stage:

- Technology performance
  - Technology capital cost
  - Technology O&M cost
  - Other technology characteristics
- Inputs to GPRA estimates

### External Influences

- Cost of inputs
- Related R&D advances elsewhere
- Characteristics of competing technologies
- Level of current demand (e.g. government purchases)

# A subset of the generic metrics are recommended for tracking in Phase 1

	Program Management	Technology Readiness	Market Readiness	Ultimate Outcomes (Retrospective)
EERE				<ul style="list-style-type: none"> <li>• Fuel diversity</li> </ul>
Program	<ul style="list-style-type: none"> <li>• <b>PART score</b></li> </ul>			
Subprogram, Technology, or Market	<ul style="list-style-type: none"> <li>• <b>% of projects competitively selected</b></li> <li>• <b>% of projects reviewed by external parties</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>System/component performance</b></li> <li>• <b>System/component cost</b></li> <li>• <b>System/component RD&amp;D stage</b></li> <li>• <b>RD&amp;D stage when handed off</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Availability of technology information and tools</b></li> <li>• <b>Manufacturing, distribution, installation and servicing capacities</b></li> <li>• <b>Supportiveness of government policies &amp; incentives</b></li> <li>• <b>Economic attractiveness of system or component to end user</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Market share of system of component</b></li> <li>• <b>Oil savings</b></li> <li>• <b>Natural gas savings</b></li> <li>• <b>Clean energy production</b></li> <li>• <b>Avoided carbon emissions</b></li> <li>• <b>Energy cost savings</b></li> </ul>
Project	<ul style="list-style-type: none"> <li>• <b>EERE cost</b></li> <li>• <b>Cost share</b></li> <li>• <b>Uncosted balance</b></li> </ul>			

Current metric

New metric

# Additional metrics derived from the Phase 1 metrics provide a more complete picture

	Program Management	Technology Readiness	Market Readiness	Ultimate Outcomes (Retrospective)
<b>EERE</b>	<ul style="list-style-type: none"> <li>EERE cost</li> <li>Cost share</li> <li>Uncosted balance</li> <li>% of projects competitively selected</li> <li>% of projects reviewed by external parties</li> <li>Average PART score for EERE programs</li> </ul>	<ul style="list-style-type: none"> <li>% of EERE technologies by RD&amp;D stage</li> <li># of EERE technologies commercialized (or imbedded in other technologies)</li> <li>Distribution of RD&amp;D stage when handed off</li> </ul>	<ul style="list-style-type: none"> <li>Availability of EERE technology information</li> <li>Average % increase in supply chain capacity</li> <li>Average % improvement in economic attractiveness of technologies to end user</li> </ul>	<ul style="list-style-type: none"> <li>Average market share of EERE technologies (%)</li> <li>Oil savings</li> <li>Natural gas savings</li> <li>Clean energy production</li> <li>Avoided carbon emissions</li> <li>Energy cost savings</li> <li><b>Fuel diversity</b></li> </ul>
<b>Program</b>	<ul style="list-style-type: none"> <li>EERE cost</li> <li>Cost share</li> <li>Uncosted balance</li> <li>% of projects competitively selected</li> <li>% of projects reviewed by external parties</li> <li><b>PART score</b></li> </ul>	<ul style="list-style-type: none"> <li>% of program technologies by RD&amp;D stage</li> <li># of program technologies commercialized (or imbedded in other technologies)</li> <li>RD&amp;D cycle time</li> <li>Distribution of RD&amp;D stage when handed off</li> </ul>	<ul style="list-style-type: none"> <li>Availability of program technology information</li> <li>Average % increase in supply chain capacity</li> <li>Average % improvement in economic attractiveness of technologies to end user</li> </ul>	<ul style="list-style-type: none"> <li>Average market share of program technologies (%)</li> <li>Oil savings</li> <li>Natural gas savings</li> <li>Clean energy production</li> <li>Avoided carbon emissions</li> <li>Energy cost savings</li> </ul>
<b>Subprogram, Technology, or Market</b>	<ul style="list-style-type: none"> <li>EERE cost</li> <li>Cost share</li> <li>Uncosted balance</li> <li><b>% of projects competitively selected</b></li> <li><b>% of projects reviewed by external parties</b></li> </ul>	<ul style="list-style-type: none"> <li><b>System/component performance</b></li> <li><b>System/component cost</b></li> <li><b>System/component RD&amp;D stage</b></li> <li><b>RD&amp;D stage when handed off</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Availability of technology information and tools</b></li> <li><b>Manufacturing, distribution, installation and servicing capacities</b></li> <li><b>Supportiveness of government policies &amp; incentives</b></li> <li><b>Economic attractiveness of system or component to end user</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Market share of system of component</b></li> <li><b>Oil savings</b></li> <li><b>Natural gas savings</b></li> <li><b>Clean energy production</b></li> <li><b>Avoided carbon emissions</b></li> <li><b>Energy cost savings</b></li> </ul>
<b>Project</b>	<ul style="list-style-type: none"> <li><b>EERE cost</b></li> <li><b>Cost share</b></li> <li><b>Uncosted balance</b></li> </ul>			

**Bold = Direct Metric**      No Bold = Derived (Aggregated) Metric

# Management Metrics to Support PMA

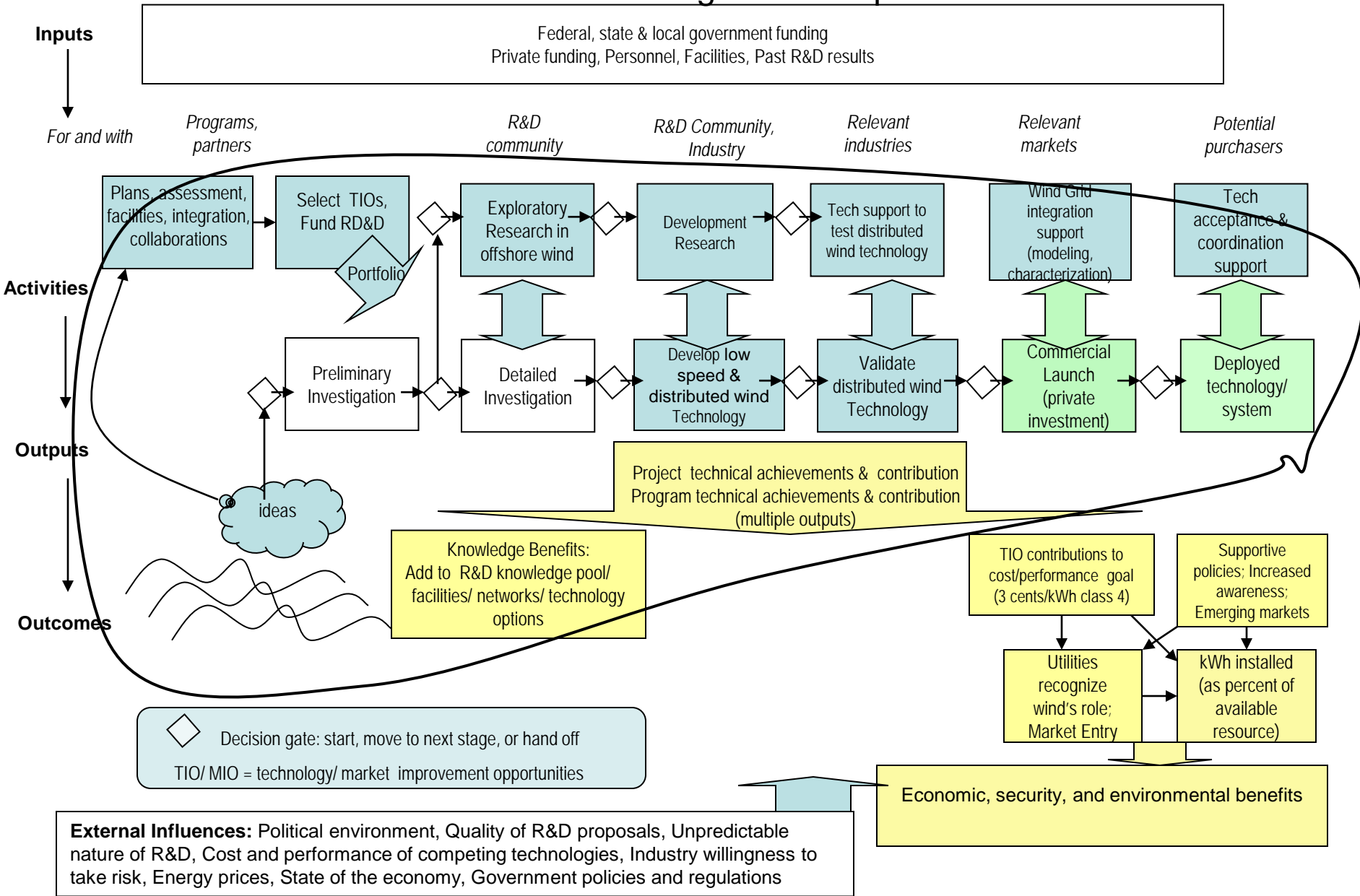
## President's Management Agenda - Scorecard Metrics

Initiative	Metric
Strategic Management of Human Capital	Portion of SES and managers subject to performance appraisal and awards (%)
Strategic Management of Human Capital	Portion of workforce subject to performance appraisal and awards (%)
Strategic Management of Human Capital	Average time to hire new employees (days)
Strategic Management of Human Capital	Portion of applicants notified within 45 days of hiring decision (%)
Strategic Management of Human Capital	Average time to hire SES (days)
Competitive Sourcing	Competitive solicitations since January 2001 (#)
Competitive Sourcing	Portion of standard competitions completed within 12 month timeframe for last four fiscal quarters (%)
Competitive Sourcing	Portion of streamlined competitions completed within 90 days for last four fiscal quarters (%)
Competitive Sourcing	Portion of standard and streamlined competitions cancelled in the past year (%)
Competitive Sourcing	Net savings from completed competitions (\$)
Improved Financial Performance	Portion of financial statement deadlines met (%)
Improved Financial Performance	Portion of systems in compliance with the Federal Financial Management Improvement Act (%)
Improved Financial Performance	Chronic or significant Anti-Deficiency Act Violations (#)
Improved Financial Performance	Repeat material auditor-reported internal control weaknesses (#)
Improved Financial Performance	Material non-compliance with laws and regulations (#)
Improved Financial Performance	Repeat material weaknesses or non-conformances reported under Sections 2 and 4 of the Federal Managers' Financial Integrity Act (#)
Expanded Electronic Government	Portion of major system investments with acceptable business cases (%)
Expanded Electronic Government	Project actual costs compared to target costs (%)
Expanded Electronic Government	Project actual schedule compared to target schedule (%)
Expanded Electronic Government	Project actual performance goals compared to target performance goals (%)
Expanded Electronic Government	Portion of IT systems properly secured (certified and accredited)
Expanded Electronic Government	Portion of applicable systems with Privacy Impact Assessment conducted and publicly posted (%)
Expanded Electronic Government	Portion of systems with personally identifiable information where a system of records has been developed and published (%)
Budget and Performance Integration	Senior agency meetings to examine integrated financial and performance reports (#)
Budget and Performance Integration	Outcome-oriented goals and objectives in DOE(?) strategic plan (#)
Budget and Performance Integration	Portion of PART measures in annual budget/performance document (%)
Budget and Performance Integration	Full cost of achieving performance goals (\$)
Budget and Performance Integration	Marginal cost of changing performance goals (\$)
Budget and Performance Integration	Portion of PARTed programs with at least one efficiency measure (%)
Budget and Performance Integration	Share of programs receiving a Results Not Demonstrated rating for two years in a row (%)
Federal Real Property Asset Management	Asset management performance measures consistent with the published requirements of the Federal Real Property Council (#)
Federal Real Property Asset Management	Time to provide information for inclusion into the government-wide real property inventory database (days)

# Earlier Generic Logics



# EERE RD&D Logic Model Reflects Stage Gate Process Wind Program Example

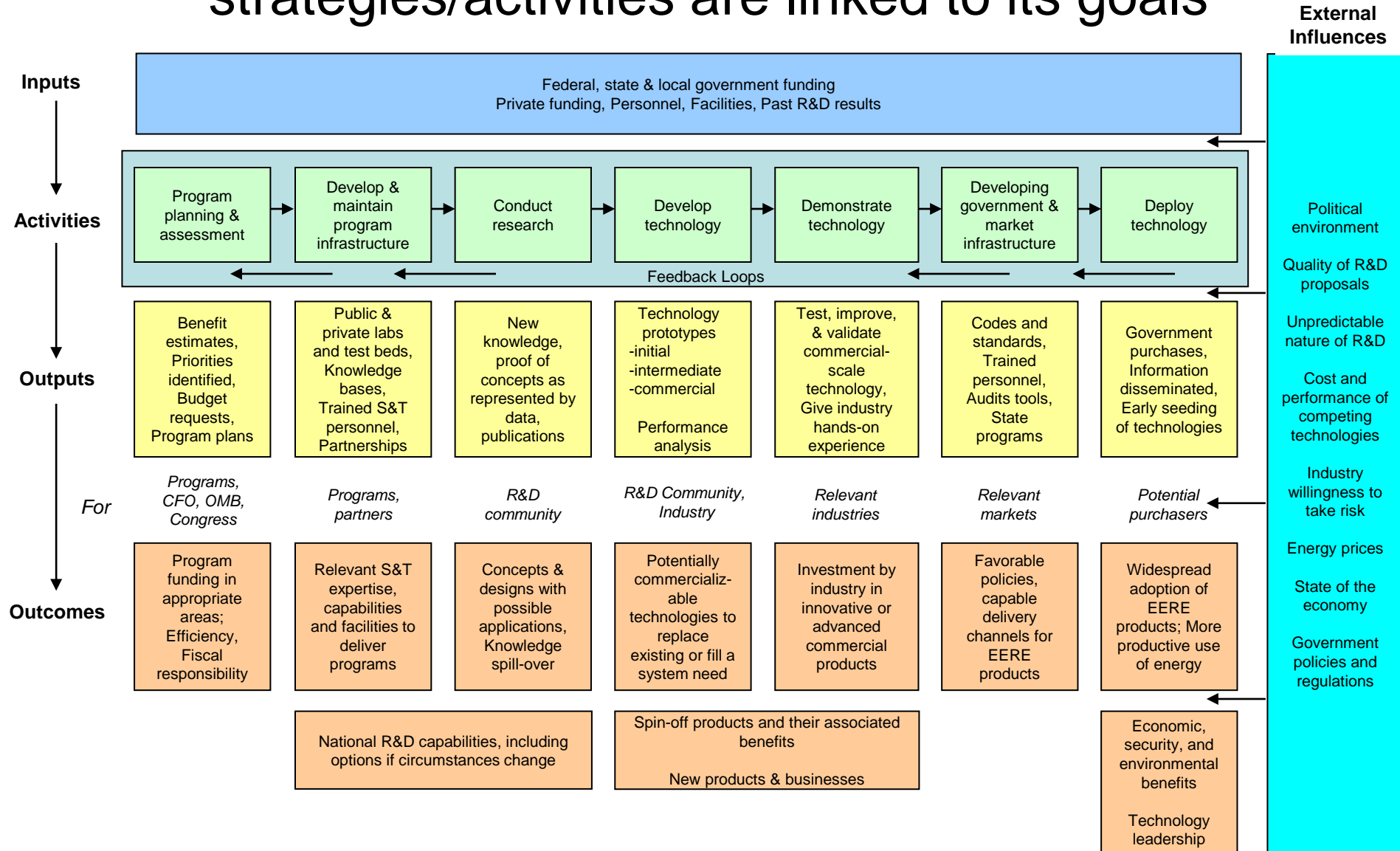


# Questions to answer to build an RD&D program logic

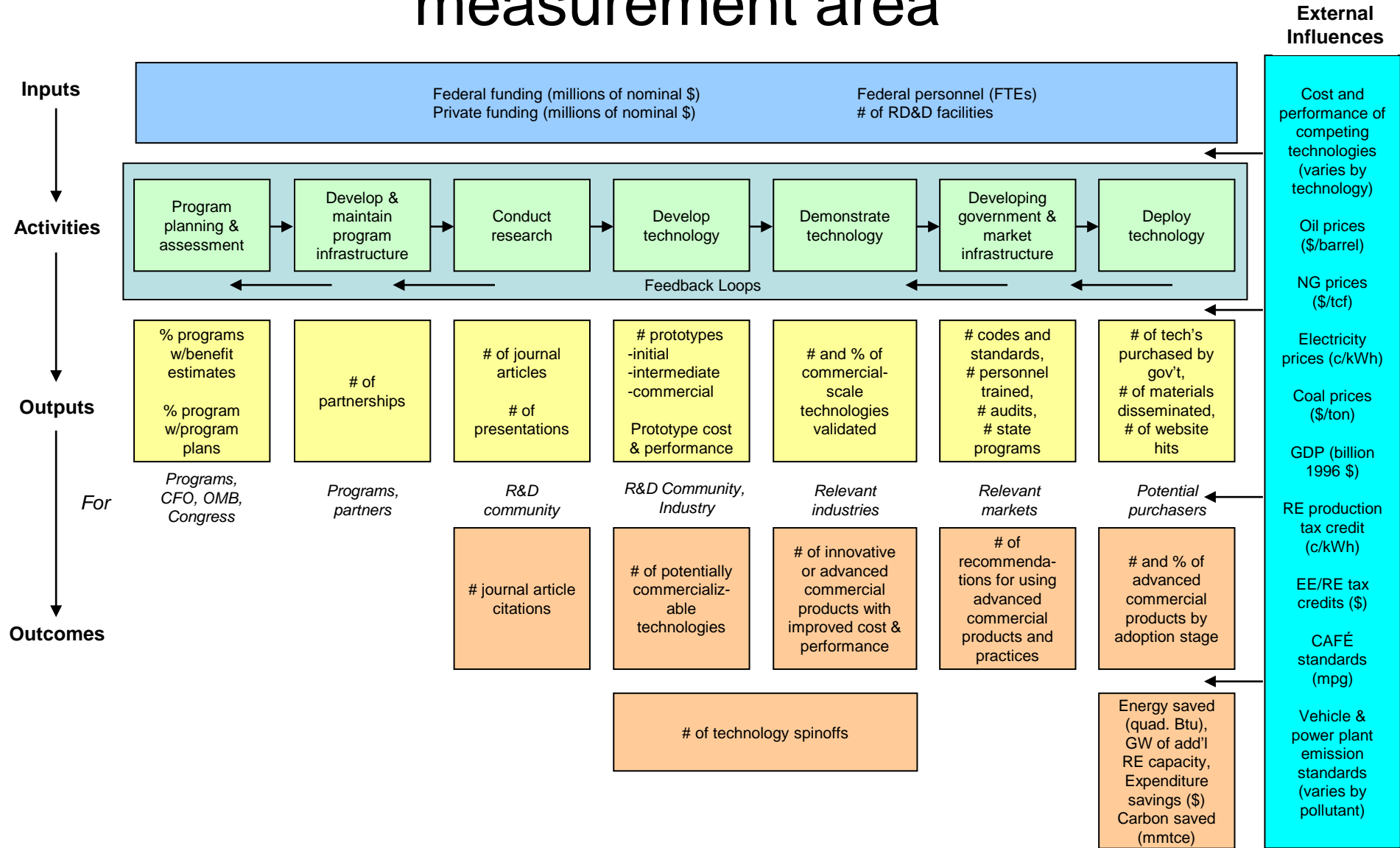
Program logic describes how the program will use its resources to achieve its strategic goals and outcomes. Thus the goals, outcomes and outputs in Section 1 will be visible in the logic.

- Given program mission and government role, what are expected program outcomes (energy savings, etc.)?
- What market areas and strategies and/or technology pathways will be pursued by program elements (e.g., low speed and distributed wind technologies, take up of wind grid integration analysis)?
- What technical and/or market developments/outputs will the program achieve so that outcome happens (e.g., technology cost and performance goals to achieve market entry)?
- In what RD&D stage is each of the program elements in currently?
- What are major or representative outputs (milestones) for each program element?

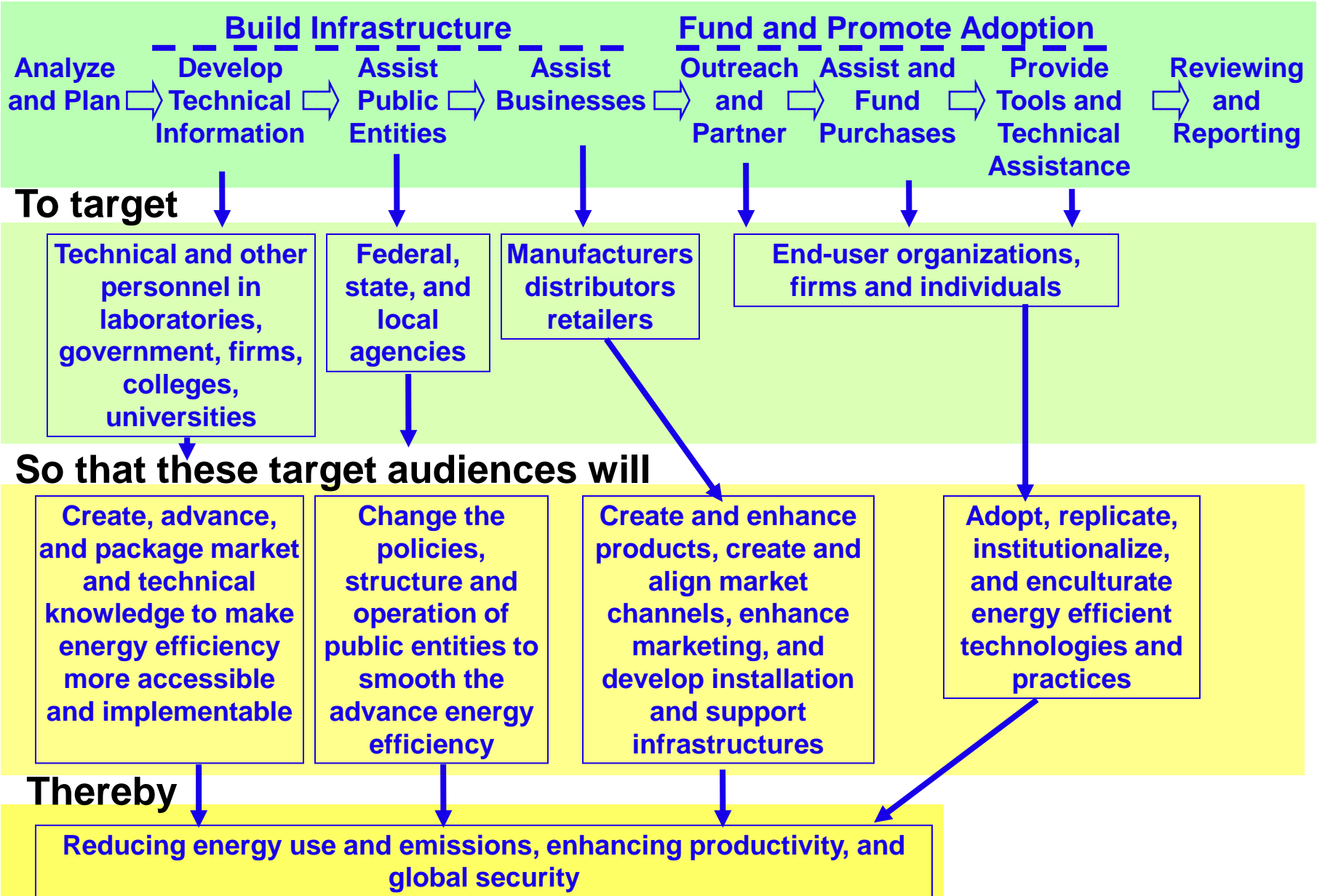
# EERE's draft logic model shows how its strategies/activities are linked to its goals



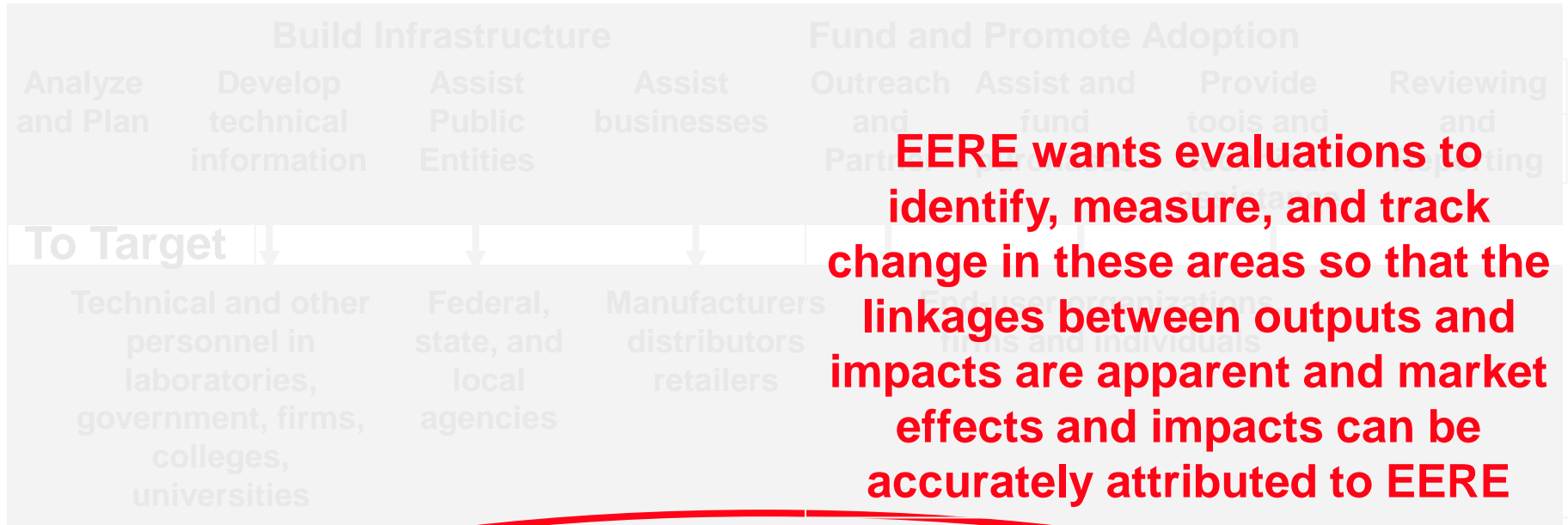
# Each box in the logic model is a potential measurement area



# The Office of Energy Efficiency and Renewable Energy of the US Department of Energy Undertakes Activities to



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## So that these target audiences will

Create, advance, and package market and technical knowledge to make energy efficiency more accessible and implementable

Change the policies, structure and operation of public entities to smooth the advance energy efficiency

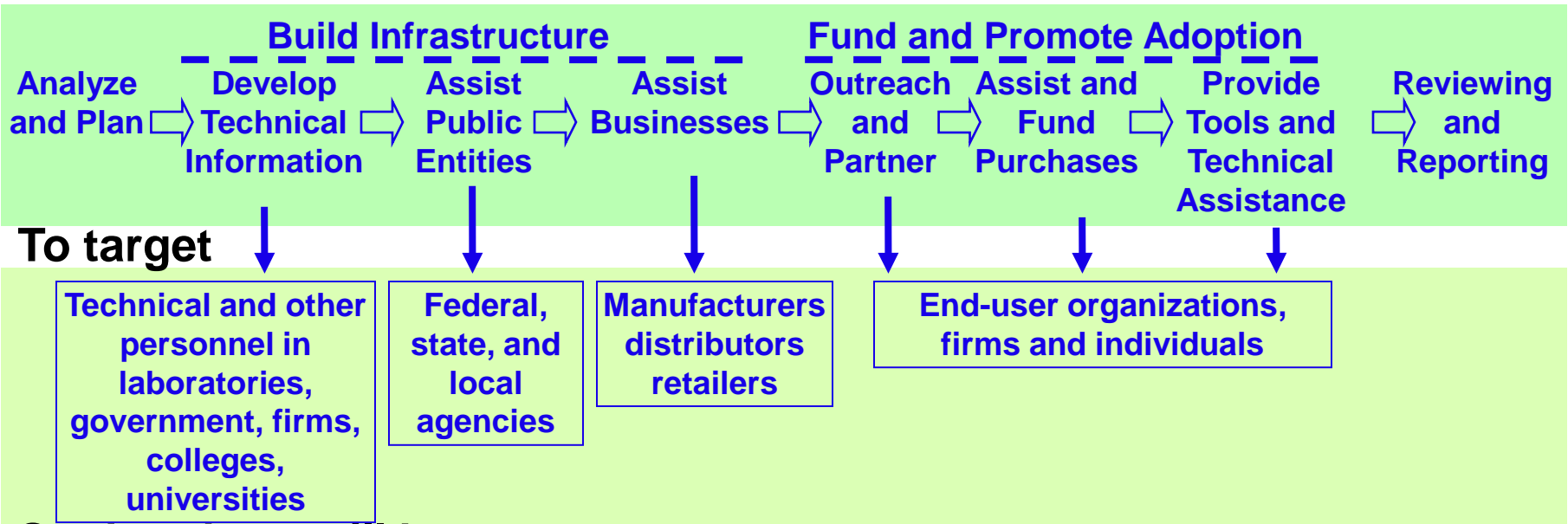
Create and enhance products, create and align market channels, enhance marketing, and develop installation and support infrastructures

Adopt, replicate, institutionalize, and enculturate energy efficient technologies and practices

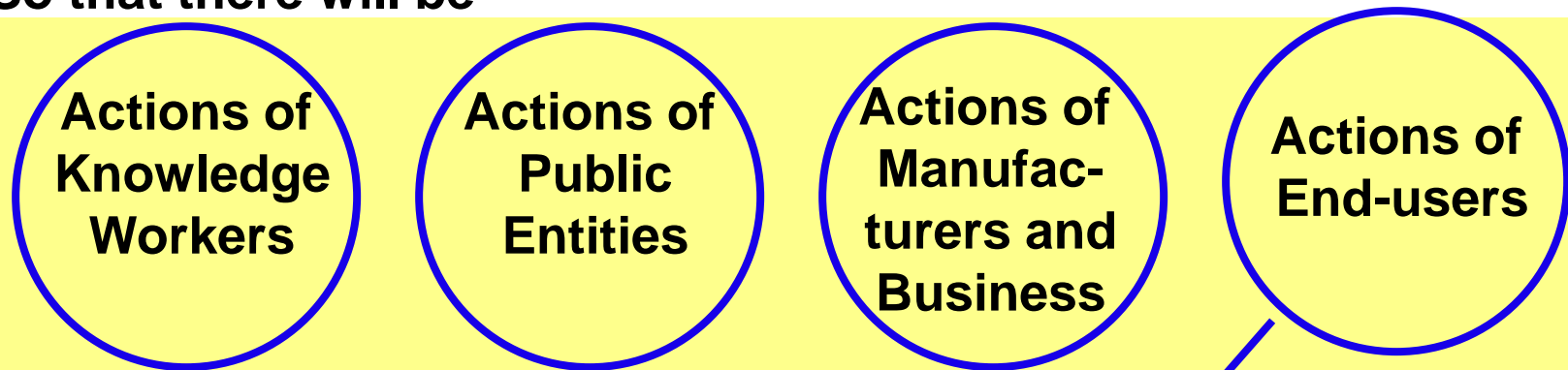
Thereby

Reducing energy use and emissions, enhancing productivity and global security, creating sustainable habitats

# The Office of Energy Efficiency and Renewable Energy of the US Department of Energy Undertakes Activities to



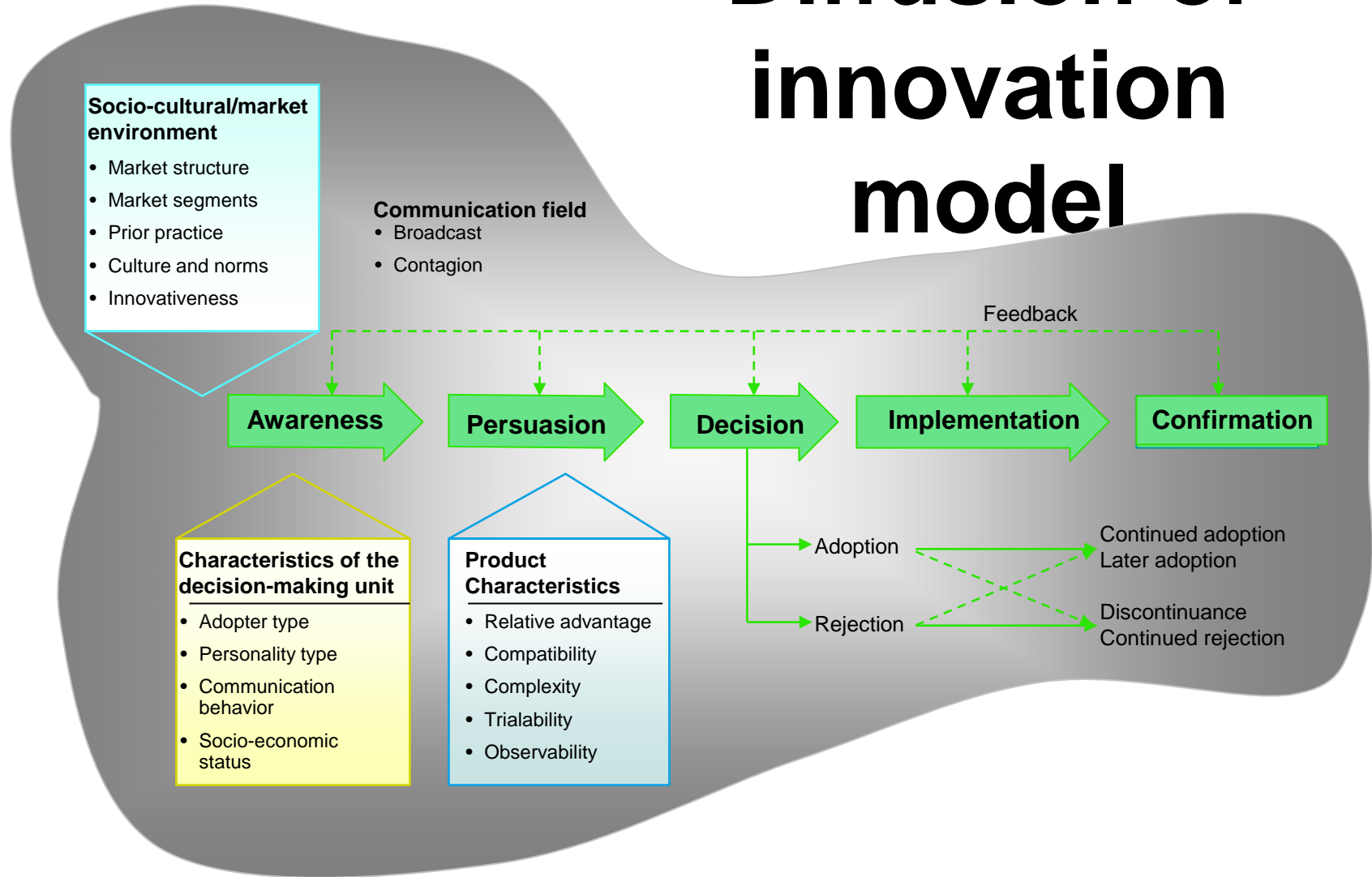
So that there will be



Thereby

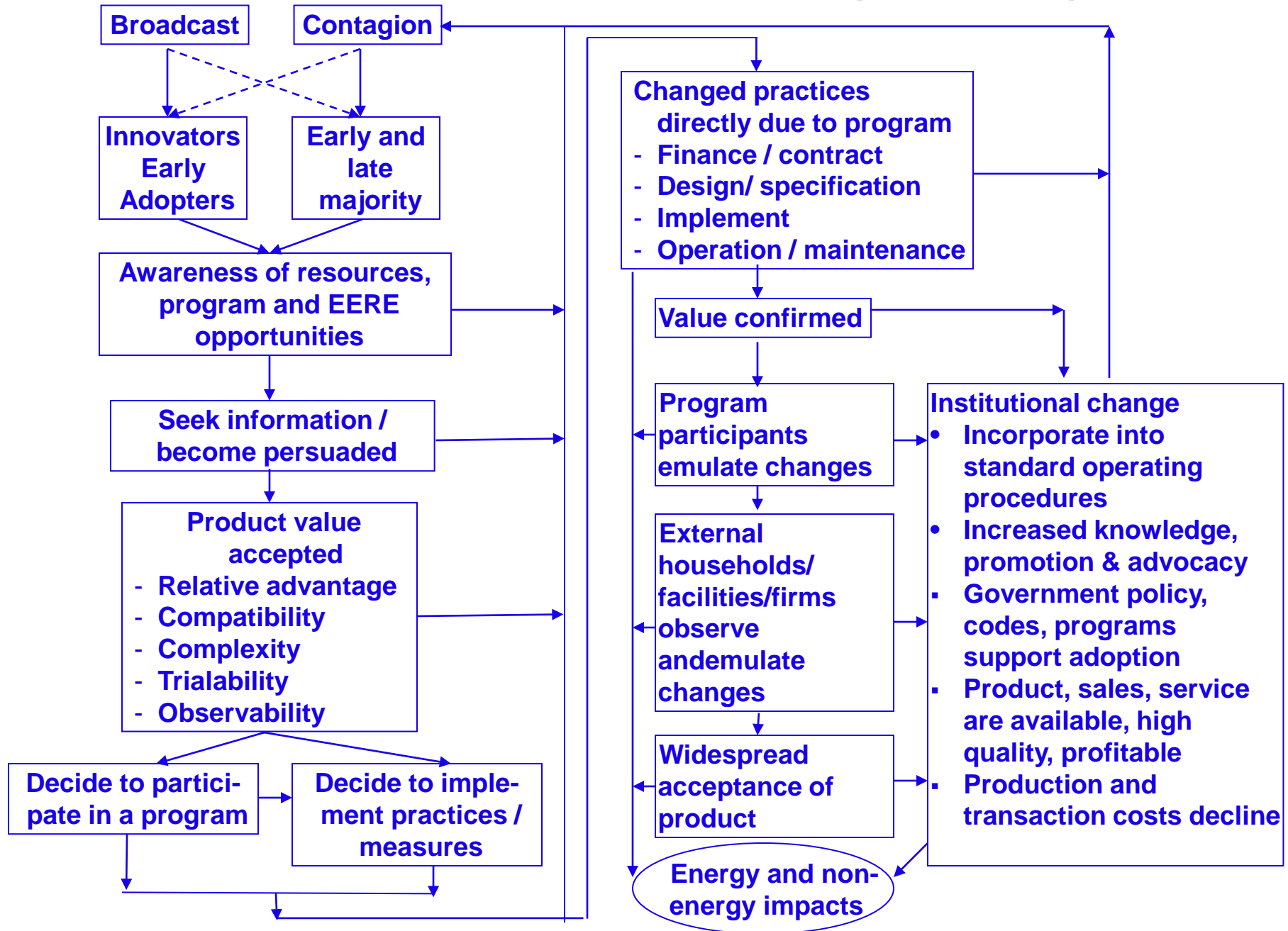
Reducing energy use and emissions, enhancing productivity, and global security

# Diffusion of innovation model

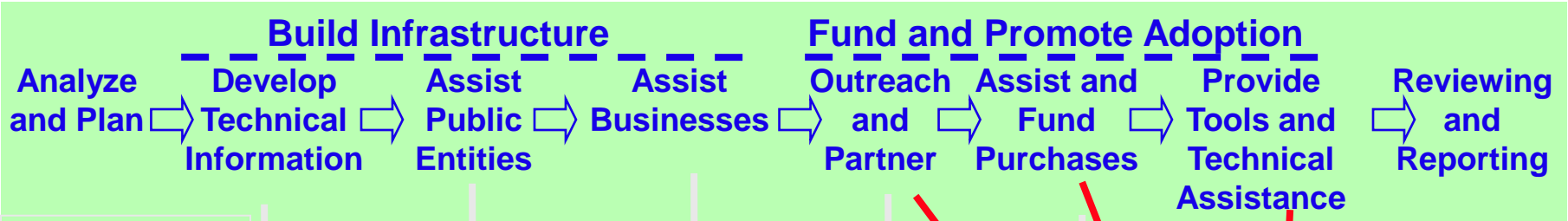




# A Version of Diffusion of Innovation to Link Outputs and Impacts



# The Office of Energy Efficiency and Renewable Energy of the US Department of Energy Undertakes Activities to



**As an example, insert the diffusion of innovations model here to help define and identify the path between outputs and long term outcomes (impacts)**

**So that these target audiences will**

Create, advance, and package market and technical knowledge to make energy efficiency more accessible and implementable

Change the policies, structure and operation of public entities to smooth the advance energy efficiency

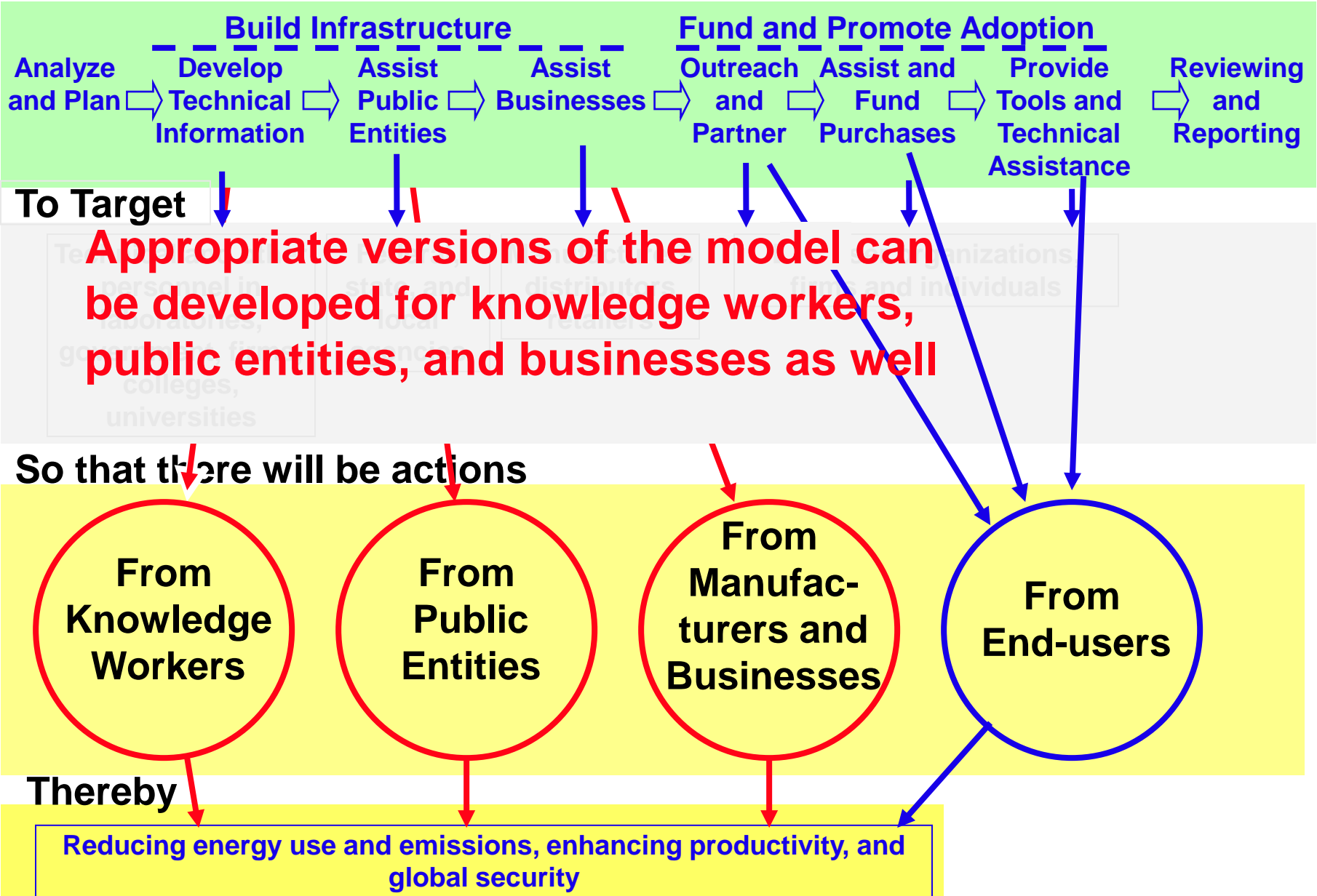
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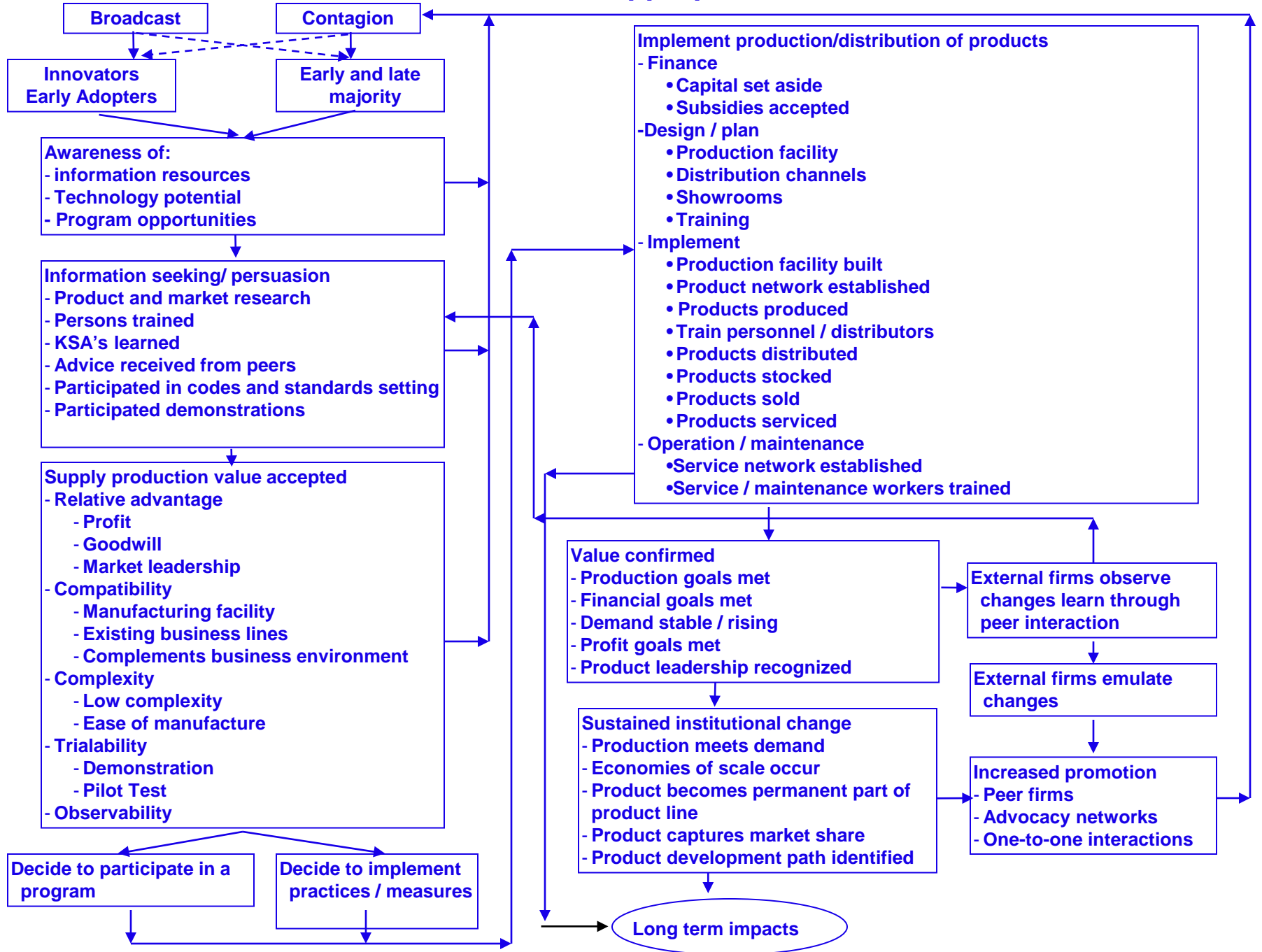
**Thereby**

Reducing energy use and emissions, enhancing productivity, and global security

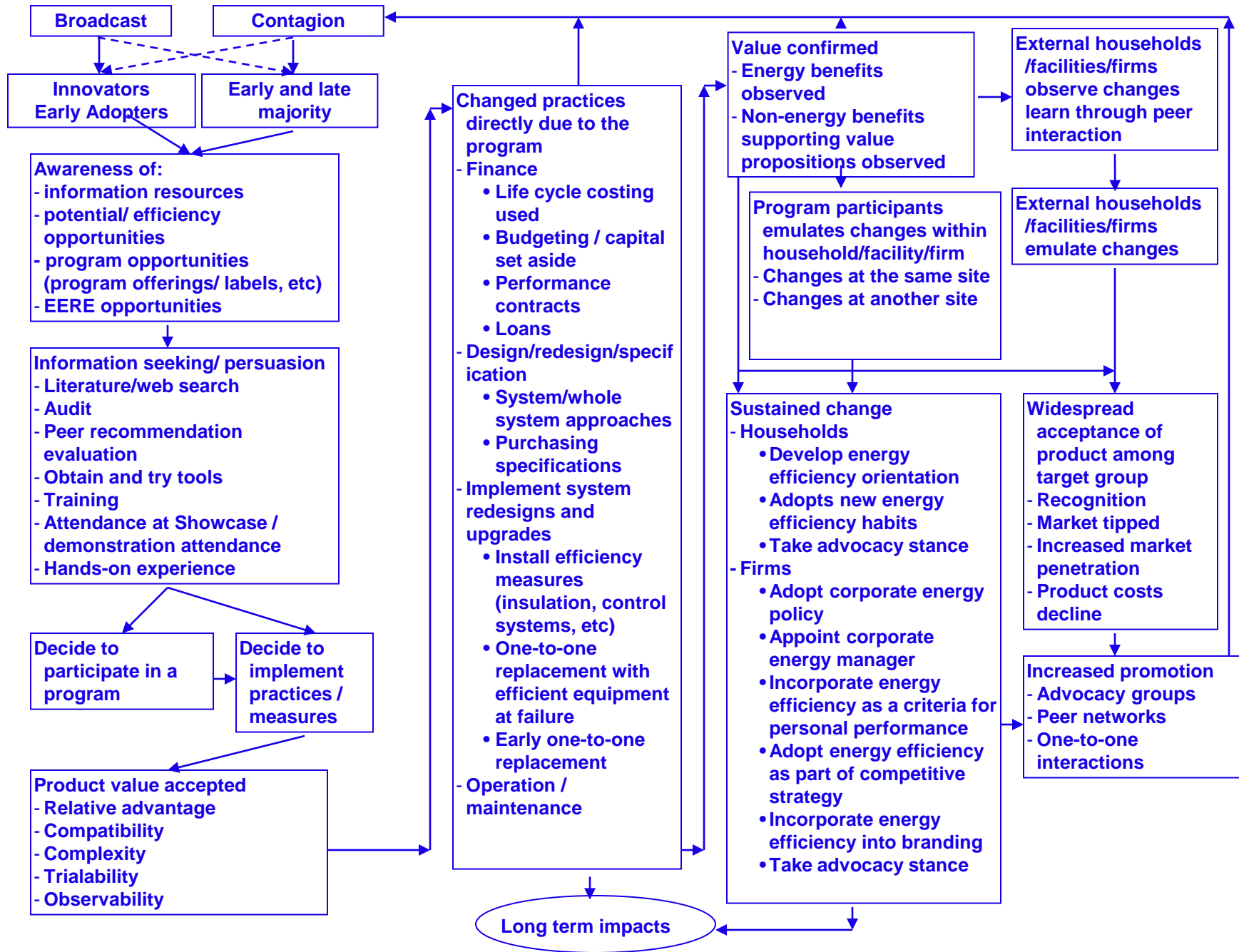
# The Office of Energy Efficiency and Renewable Energy of the US Department of Energy Undertakes Activities to



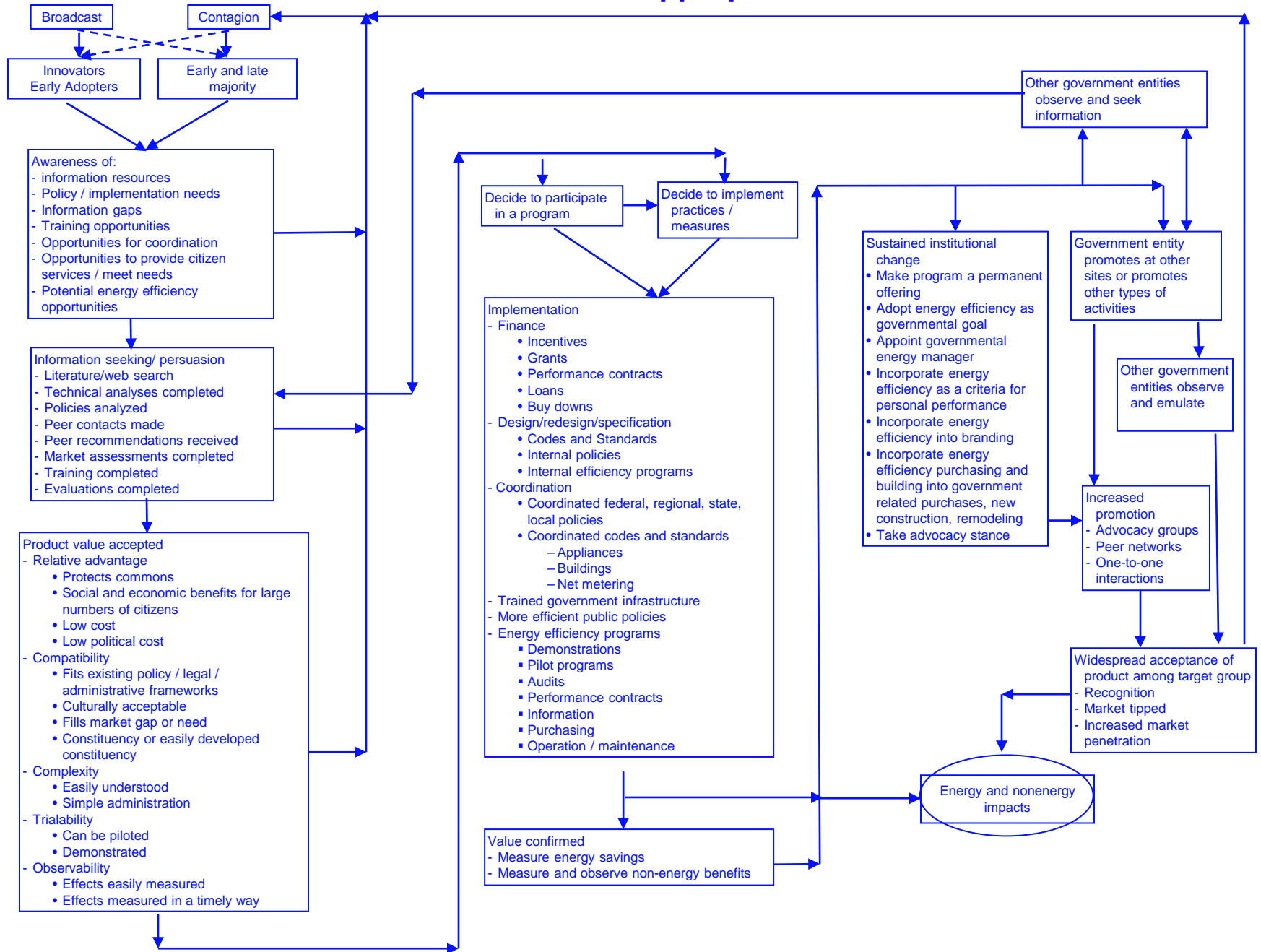
# A Generic Version of the Diffusion Model Appropriate to Manufacturers and Businesses



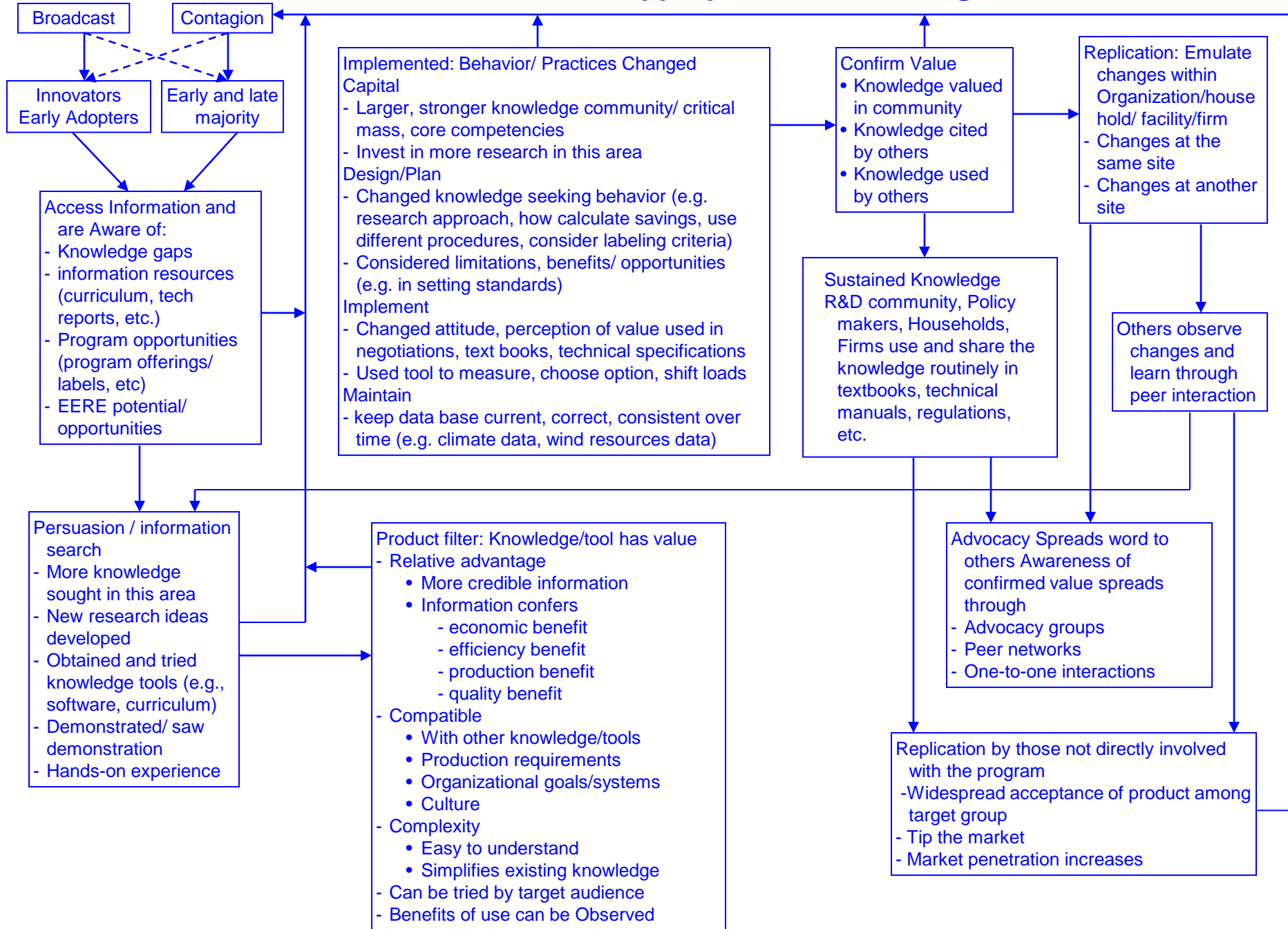
# A Generic Version of the Diffusion Model Appropriate to End-users



# A Generic Version of the Diffusion Model Appropriate to Public Entities



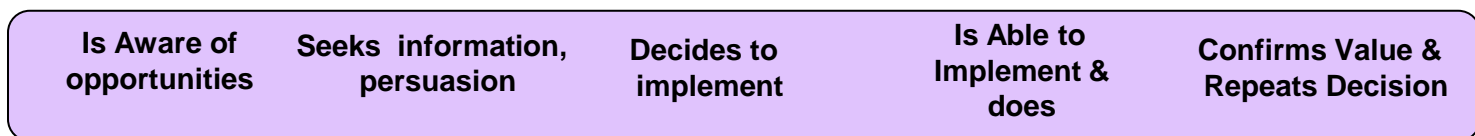
# A Generic Version of the Diffusion Model Appropriate to Knowledge Entities



# Menu of Possible Program Outcomes – What Is Not IN the program is in Context or External Influences.

Knowledge Infrastructure for Product	Know about it, <b>Develop new knowledge, knowledge tools.</b> Talk to others P1	Information, software accessible, <b>demos are credible, easy</b> P2	<b>Product has characteristics needed:</b> relative advantage, compatibility P3	Technical compatibility, <b>supporting products available</b> P4	Operational problems found & fixed; <b>Tools to verify savings available</b> P5
Government Infrastructure for Product	Know about it, trained in it, <b>use in decisions,</b> talk to others G1	<b>One stop shops</b> provide info; Audits, LCC software; T.A., <b>Demonstrations,</b> G2	<b>Codes</b> require it; Peer support & pressure; Offer incentives G3	<b>Enforce codes;</b> TA for designers, builders; <b>Help fund;</b> Easy contracting G4	<b>Assure quality if not visible;</b> Improve O&M; Track benefits G5
Business Infrastructure For Product	Know about it, <b>Have capacity to do it</b> (manu- facture,etc.) ,. Talk to others B1	Make some available; <b>Explain, do promotions</b> (e.g. store; Use green pricing B2	<b>Standards</b> make production & use feasible; More available; <b>Offer incentives</b> B3	Build/Install <b>install properly, on time;</b> Costs decrease as more is produced B4	<b>Make service available;</b> Continue to supply given <b>profits, good will</b> B5
Consumer Of Product	Open to listen. <b>Can access</b> information. <b>Read/hear</b> about it from media web, from peers, businesses C1	Can find it. Ask for more information, get <b>training,</b> skills; <b>Try it</b> to see if it is compatible. <b>Observe benefits</b> C2	Have experience; Understand & <b>have skills to prioritize, use/do it;</b> See the relative advantage & compatibility, C3	<b>Able to afford</b> or finance Have skills, incentives, <b>support to change behavior/</b> adopt C4	Technology works & has <b>benefits as promised;</b> <b>infrastructure supports continued demand;</b> Advocate to others C5

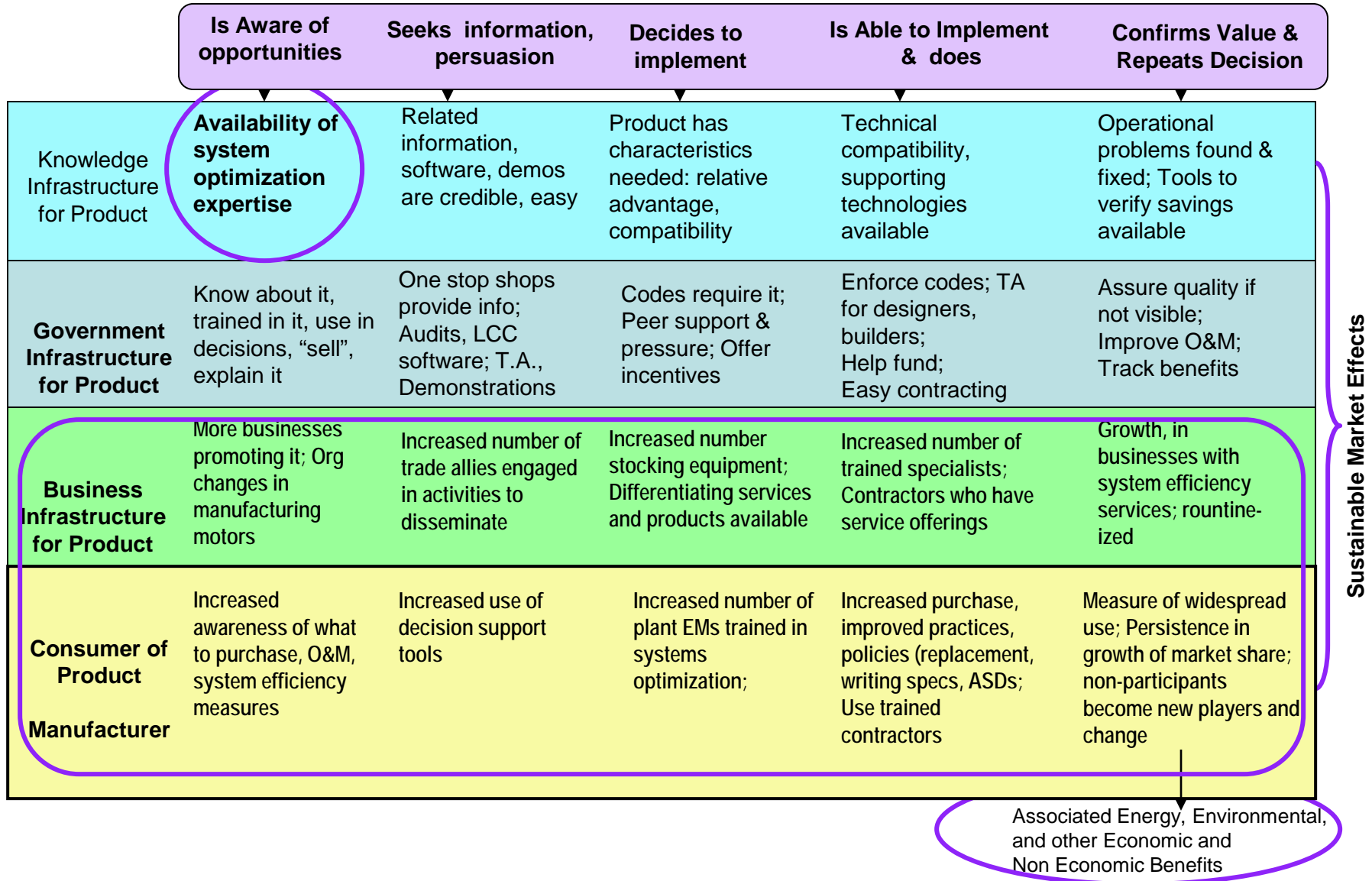
Sustainable (permanent) supply, demand, market structure changes; Serving the underserved



Energy, Environmental, and other Economic and Non Economic Benefits

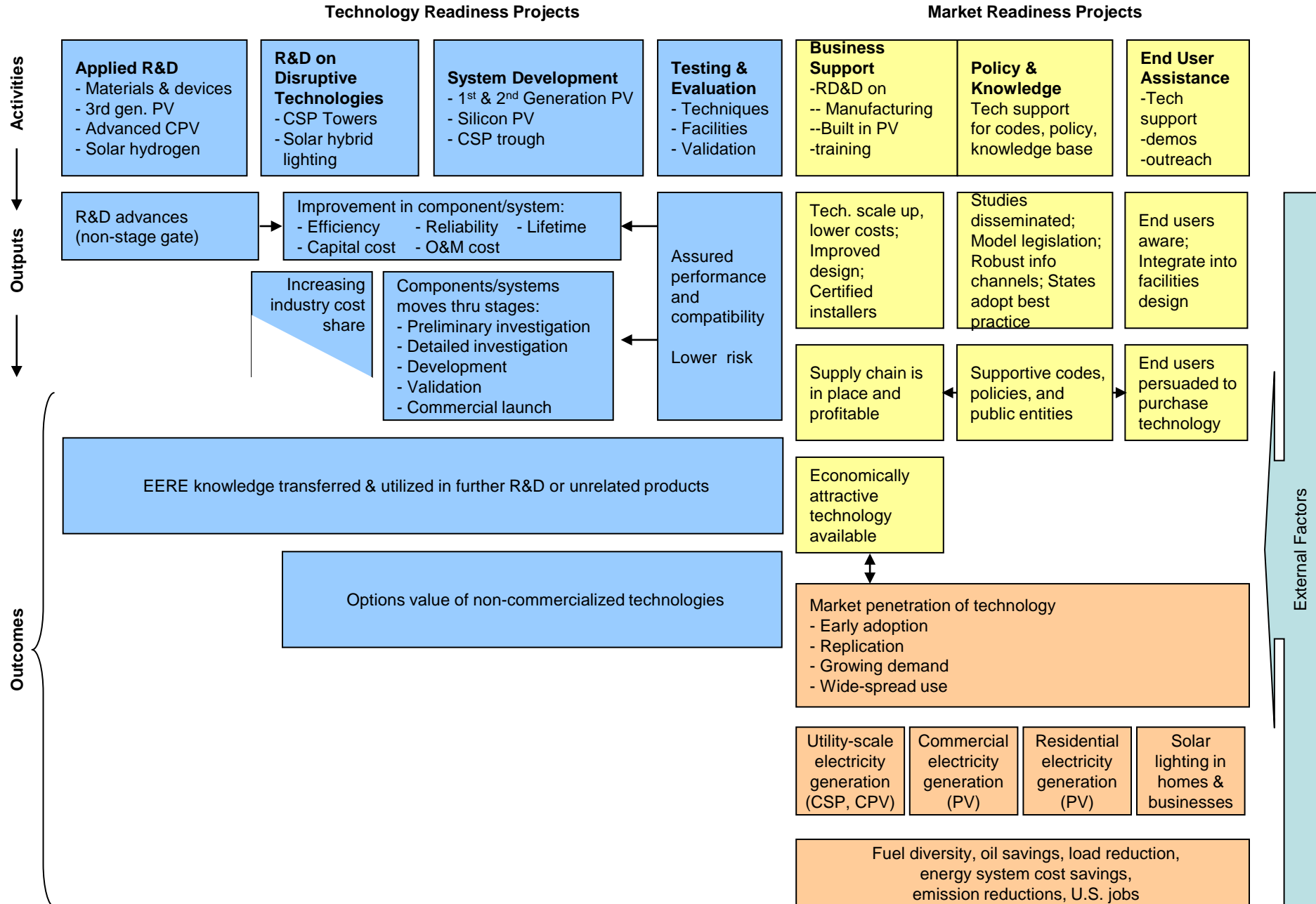


# Example – Market effects indicators where the program’s “product” is the practice of “motor systems efficiency”

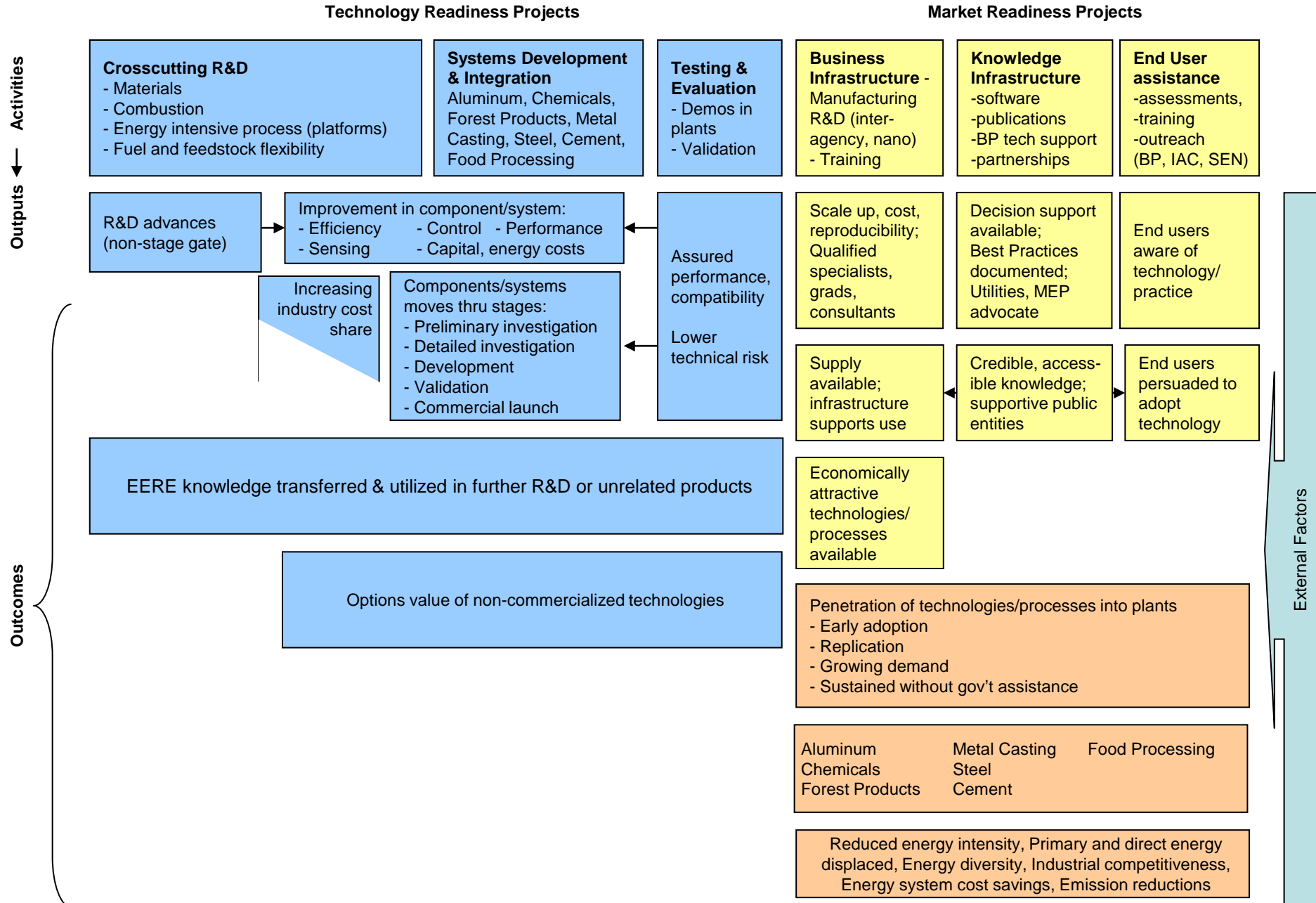


High Level Logics  
-2007 R&D  
- 2004 OWIP

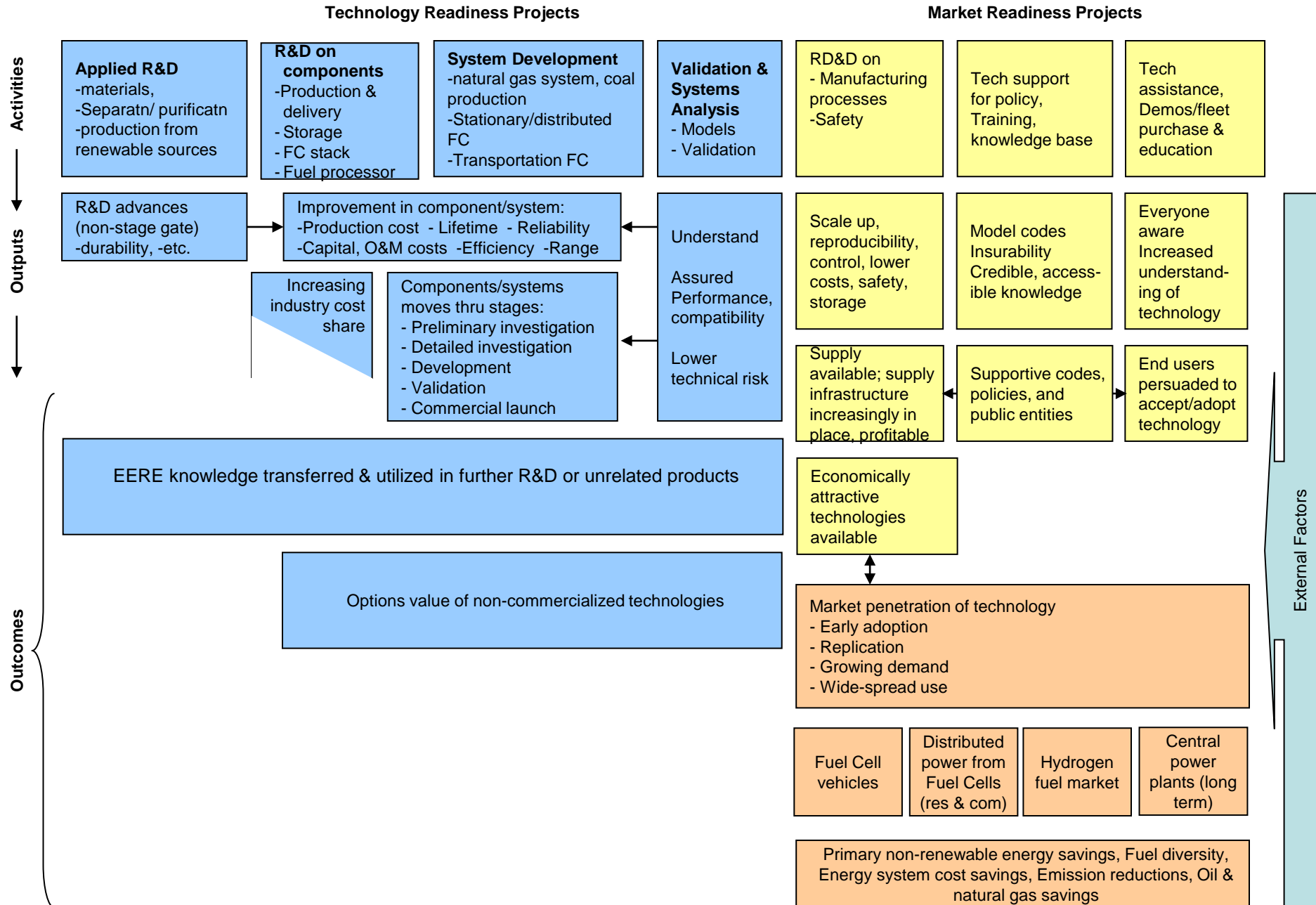
# Logic Flow of the EERE Solar Program



# Logic Flow of the EERE Industrial Technology Program



# Logic Flow of the EERE Hydrogen & Fuel Cell Technology Program



# DOE Energy Star Logic (High Level)

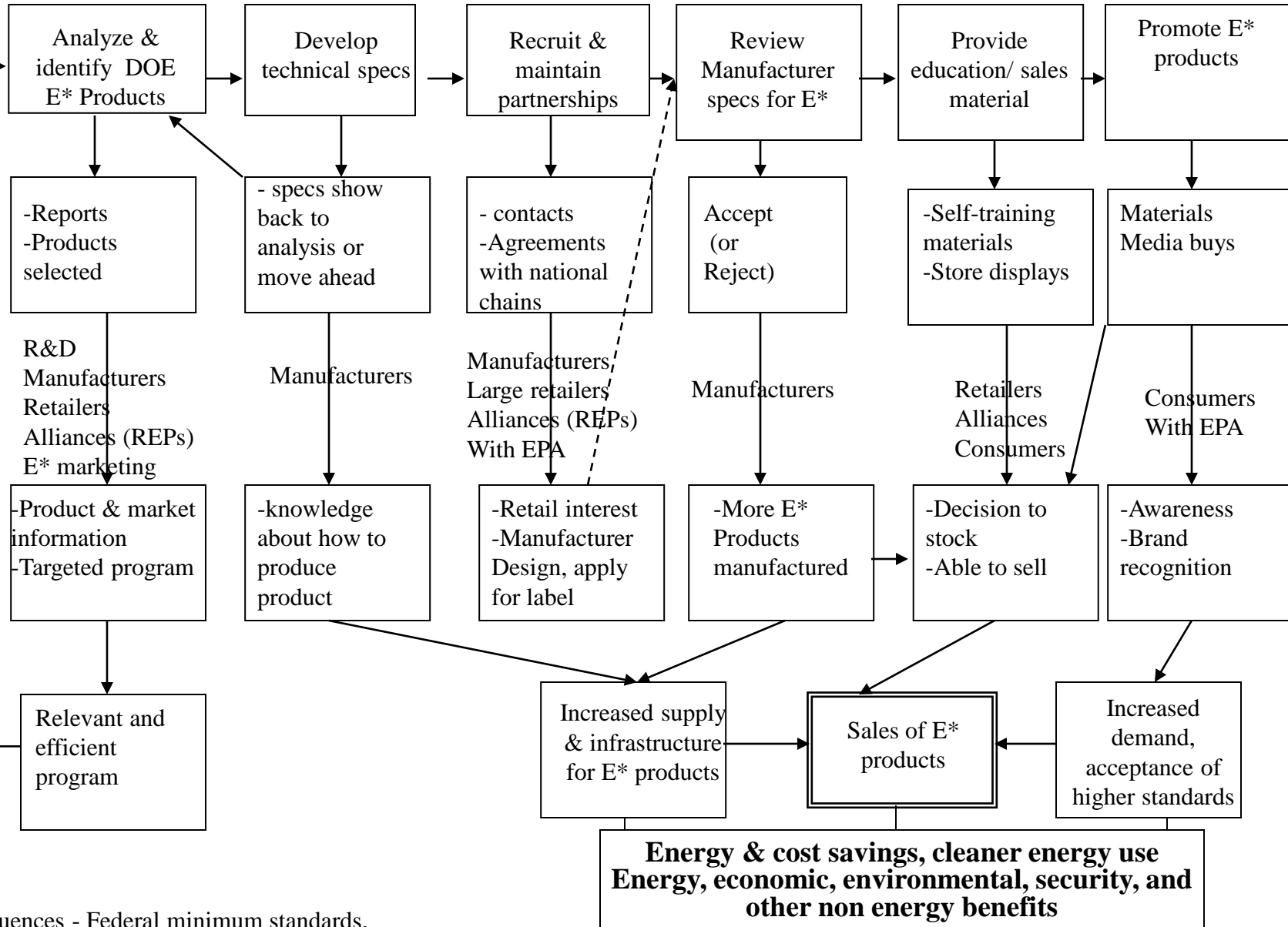
Inputs:  
\$, staff, allies  
**Activities**

**Outputs**

**For**

**Short term Outcomes**

**Ultimate Outcomes**



External Influences - Federal minimum standards, economy, energy prices

DRAFT  
2/05/04

# State Energy Program Logic (High Level)

Inputs:  
\$, staff, allies  
**Activities**

Policy/ Plan/  
target SEP  
(include EERE  
technologies)

Fund state  
programs  
SEP & TD

Provide  
technical  
assistance to  
them

Gather/ provide  
technical  
information

Monitor state  
programs &  
revise

{DOE}

Needs assessment  
Strategies  
Annual priorities

Grants to states  
Targeted  
Solicitations

Regional networks  
formed, Training  
sessions, lab support

Reports,  
Clearinghouse,  
Lessons learned

Lessons learned  
Ensure SEP  
compliance

{DOE  
Regional}

**Outputs**

## Collaborations between DOE and States

**Short term  
Outcomes**

Build prog  
infrastructure,  
State Energy  
Policy

Technology  
demonstration

Provide  
technical  
assistance &  
audits

Provide  
technical/  
promotional  
information

Develop &  
enforce codes,  
rating  
systems, rules

Government  
purchase of  
technology

Provide  
financial  
incentives  
to adopt

{States  
for End  
Users}

Planning  
Includes  
national  
priorities

Demos  
Increased  
investment  
in supply

Workshops  
Audits  
Tech  
assistance

Info inquiries  
School prgms  
Mass media

Codes  
Ratings  
HERS  
Vanpools

Procurement  
Traffic lights  
Alt fuels

Cost share  
retrofits, Loans  
Subsidies/Credits

Efficient,  
effective  
government  
programs

Increased  
availability of  
technologies

More supportive  
government & business  
infrastructure

Increased  
purchase and  
demand in all  
sectors

**Ultimate  
Outcomes**

Energy & cost savings, cleaner energy use, emergency preparedness  
Energy, economic, environmental, security, and other non energy benefits

# Clean Cities Logic (High Level)

DRAFT  
2/16/04

**Inputs:**  
\$, staff, allies

**Activities**

*{DOE}*

**Outputs**

Design/Build  
Coalitions

Develop/  
provide  
Information  
Resources

Provide Technical  
Assistance

Provide  
Financial  
Assistance

Program plan,  
implementation  
guidelines

Training, web site  
Clearinghouse,  
Lessons learned

Projects helped by  
Regional  
Tiger Teams

Funding distributed,  
tax credit &  
incentives database

*Local officials, agencies  
NGOs, trade associations  
Utilities/fuel suppliers*

Manufacturers

**Short term  
Outcomes**

Coalitions  
Formed

End-users aware,  
coalitions educated,  
engaged in building  
new/ AFV markets

Specialized  
technical  
assistance for  
large projects

Technology  
infrastructure begun  
with reduced  
cost

Technology  
purchased using  
alternate  
funding sources

*{Coalitions}*

Coalitions establish "Clean City",  
identify & undertake initiatives  
(e.g. AFV fleet purchase)

Technical &  
business  
infrastructure  
developed

Increased  
credibility,  
support for new/  
AFV  
technologies

Demonstrated  
performance;  
Increased  
demand for new/  
AFV market

**Ultimate  
Outcomes**

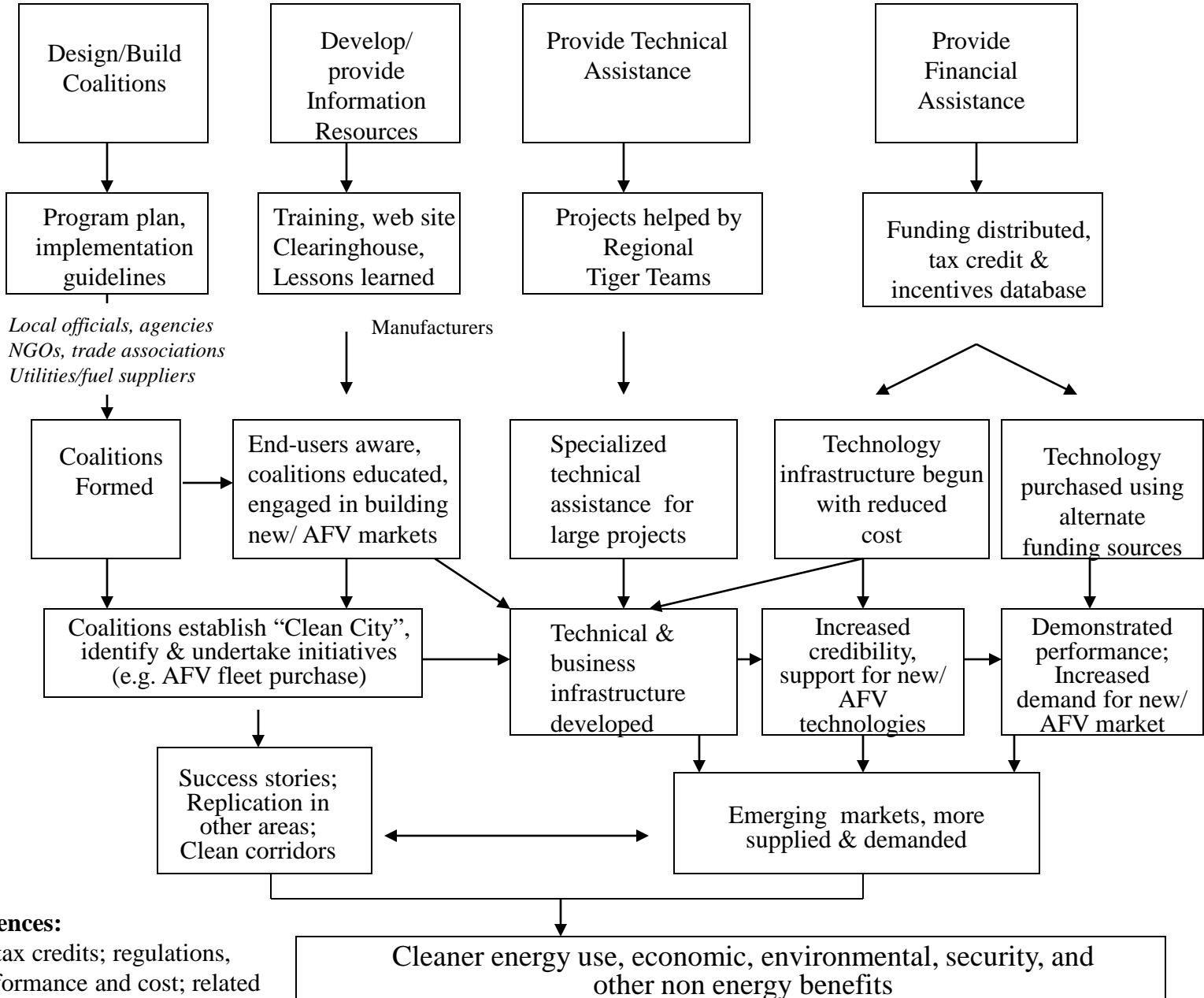
Success stories;  
Replication in  
other areas;  
Clean corridors

Emerging markets, more  
supplied & demanded

**External Influences:**

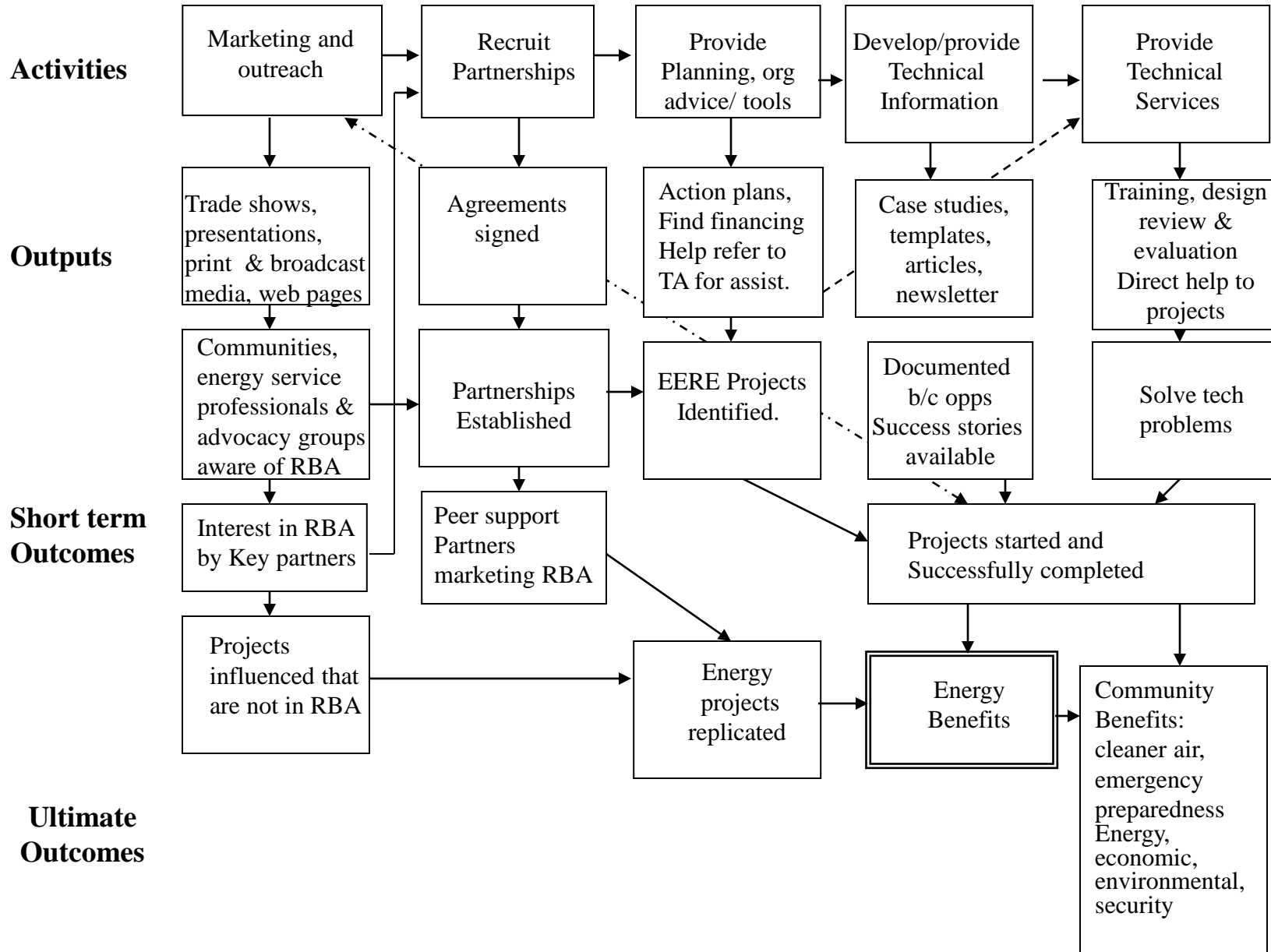
Energy prices; tax credits; regulations,  
technology performance and cost; related  
federal and state programs

Cleaner energy use, economic, environmental, security, and  
other non energy benefits

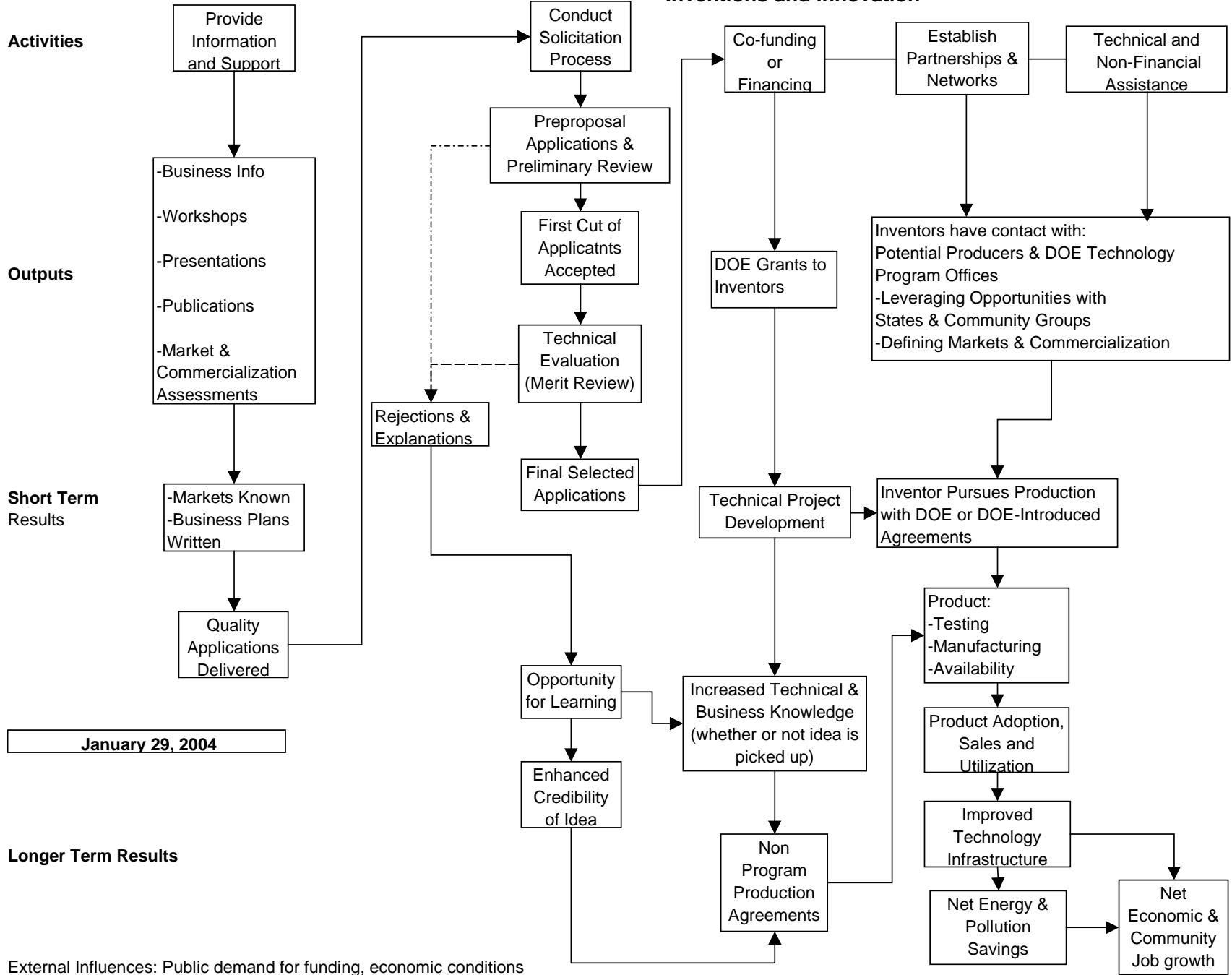




# Rebuild America Logic (High Level)



## Inventions and Innovation



# Energy Efficiency Information – Residential Pilot Program Logic

DRAFT  
3/11/04

**Inputs:**  
\$, staff, allies

**Activities**

**Outputs**

**Short term  
Outcomes**

**Ultimate  
Outcomes**

**External Influences:**

Energy prices; tax credits; regulations, technology performance and cost; related federal and state programs

