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# My view of the project status

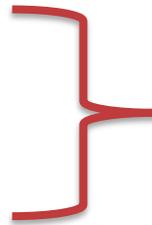
Paul Derwent

29 September 2015

# Project Scope

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- 800 MeV linac and modifications to complex to support it
    - Building & tunnels
    - SC Linac
    - Transfer line to Booster
    - Booster Injection
    - Booster 20 Hz operation
    - RR & MI RF
  - Cost:
    - full cost exercise in May for OPA Review, subtract out Collaboration contributions (\$108M before overhead & contingency)
    - 35% top down contingency: \$516M
    - -10% - +35% based on maturity of estimate: Range
      - \$465M - \$695M
- Mission Needs Statement document has \$650M as top end of range
- Total Project Cost starts accumulating at CD-0



Decision to add to project scope in June before OPA Review

# CD-0

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- Getting to CD-0
  - “A Mission Need Statement is the translation of this gap into functional requirements that cannot be met through other than material means. It should describe the general parameters of the project, how it fits within the mission of the Program, and why it is critical to the overall accomplishment of the Department mission, including the benefits to be realized. The mission need is independent of a particular solution, and should not be defined by equipment, facility, technological solution, or physical end-item. This approach allows the Program the flexibility to explore a variety of solutions and not limit potential solutions.”
- MNS is with Pat Dehmer and could be signed as early as Monday
- ESAAB will be scheduled immediately after for CD-0 approval, October 10 at earliest
  - Steve P and Ted will put together the ESAAB presentation

# Proposed Budget Profiles

	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	TOTAL
OPC	\$19.5	\$31.5	\$25.0	\$25.0	\$22.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$123.0
TEC			\$26.0	\$45.0	\$68.0	\$90.0	\$90.0	\$90.0	\$90.0	\$28.0	\$527.0
TPC	\$19.5	\$31.5	\$51.0	\$70.0	\$90.0	\$90.0	\$90.0	\$90.0	\$90.0	\$28.0	\$650.0

- Profile based on FY20-25 construction period
  - As presented at DOE June Review, w/ modification to reflect upper cost range
- Assumes \$230M international in-kind contribution
  - India + Europe (maybe)
- All amounts are \$M then-year
  - PXIE and SRF programs designed to retire technical risks in advance of the construction start
    - SRF Linac program conducted jointly with India
  - Goals for FY16 and FY17 are to keep on track for CD-1 in FY17 and retirement of all technical risks by 2019

# FY16 Commentary

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- Goals
  - Continue progress aimed at completion of the R&D phase in 2019
    - PXIE
      - RFQ, MEBT, kicker/absorber, instrumentation, cryo distribution, operation
    - SRF
      - HWR, SSRs, test stands, 650 development, cryo plant
  - Prepare for CD-1 in 2017
- Commitments to Joint IIFC R&D deliverables
  - Integration of Indian focusing and dipole corrector magnets into PXIE
  - Provide design drawings and/or FRS to India for
    - SSR2 Cavity FRS
    - SSR1,2 He vessel and tuner
    - LB,HB650 dressed cavity
    - 325 and 650 MHz RF Power
    - HTS-2 LLRF system
    - CMTS
    - Initiate Cryoplant paperwork with India
    - Initiate Nb Order paperwork with India

# FY16 Commentary

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- Goals for Project Development
  - Complete Draft CDR
  - Initiate CD-1 documentation
  - Initiate Resource Loaded Schedule
  - Manage India Collaboration
  - Develop international deliverables strategy
  - Initiate NEPA documentation
- Minimum DOE OPC Funds required
  - \$22.3M
- Impact(s) of \$19.5M funding level
  - We will not complete the full MEBT design in FY16
    - Required for FY17 installation
  - PXIE installation of HWR and SSR1 cryomodules, plus supporting cryo distribution system, delayed by one year (to Q3FY18)
  - Procurement of three HB650 cavities from US industry delayed by one year (to Q4FY17)
  - Initiate Cryoplant paperwork with India
- Opportunities with additional funds
  - Restoration of the above requires a total of \$2.8M
  - Asking for funds from Director's Reserve
  - AD supporting Booster/RR/MI in FY16, asking for \$750K (labor & M&S)

# Preliminary FY17 Budget Summary

Activity	Budget (\$M)	FTE	Goals
Project Management	\$5.1	14.6	Complete all CD-1 documentation Complete Resource Loaded Schedule Manage India Collaboration Advance NEPA documentation Initiate preparations for CD-2
PXIE	\$7.6	20.4	Complete and commission full MEFT with beam Includes choppers and absorber Complete cryogenic distribution system
Superconducting RF Linac	\$11.6	28.2	Complete assembly of HWR at ANL Initiate SSR1 cryomodule assembly for early FY18 delivery Complete design of 650 MHz cryomodule design with India Dress and test three prototype 650 MHz cavities from US vendors Complete HTS-2 installation RF, LLRF components with India Initiate Cryoplant design work with India Initiate Placement of Nb Order with India
Design Development	\$3.9	12.7	Complete conceptual design and initiate detailed design activities
Conventional Facilities	\$1.6	1.5	Complete conceptual design Initiate site characterization
Reserve	\$1.8	--	
<b>TOTAL</b>	<b>\$31.5</b>	<b>77.4</b>	

# FY17 Commentary

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- Goals for Project Development
  - Complete CD-1 documentation
  - Initiate CD-2 documentation
  - Complete Resource Loaded Schedule
  - Manage International Collaboration
  - Continue NEPA documentation
- Minimum DOE OPC Funds required
  - \$31.5M
- Impact(s) of \$19.5M funding level
  - CD-1 delayed to FY18
  - Detailed design activities delayed to FY18
  - PXIE installation of HWR and/or SSR1 cryomodules delayed by one year (to Q3FY18)
  - Procurement of three HB650 cavities from US industry delayed by one year (to Q4FY17)
  - Impact on Phase–II review by DAE
  - Initiate Cryoplant design work with India
  - Initiate Placement of Nb Order with India
  - Support for Booster/RR/MI development delayed
- Opportunities with additional funds
  - Restoration of the above requires a total of \$12.0M

## what's next in the 'project'?

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- Mission Needs Statement signature & ESAAB
  - CD-0 definition
- Formed an “Integrated Project Team”
  - Steve H, Shekhar M, Paul D representing PIP-II
  - Adam Bihary & Pepin Carolan : Federal Project Directors in Fermi Site office
  - Steve Peggs & Ted Lavine: Program Managers in OHEP
  - Meet weekly to keep things moving forward
- Start on the requirements for CD-1
  - Conceptual Design Report & Review

# CD-0 Requirements

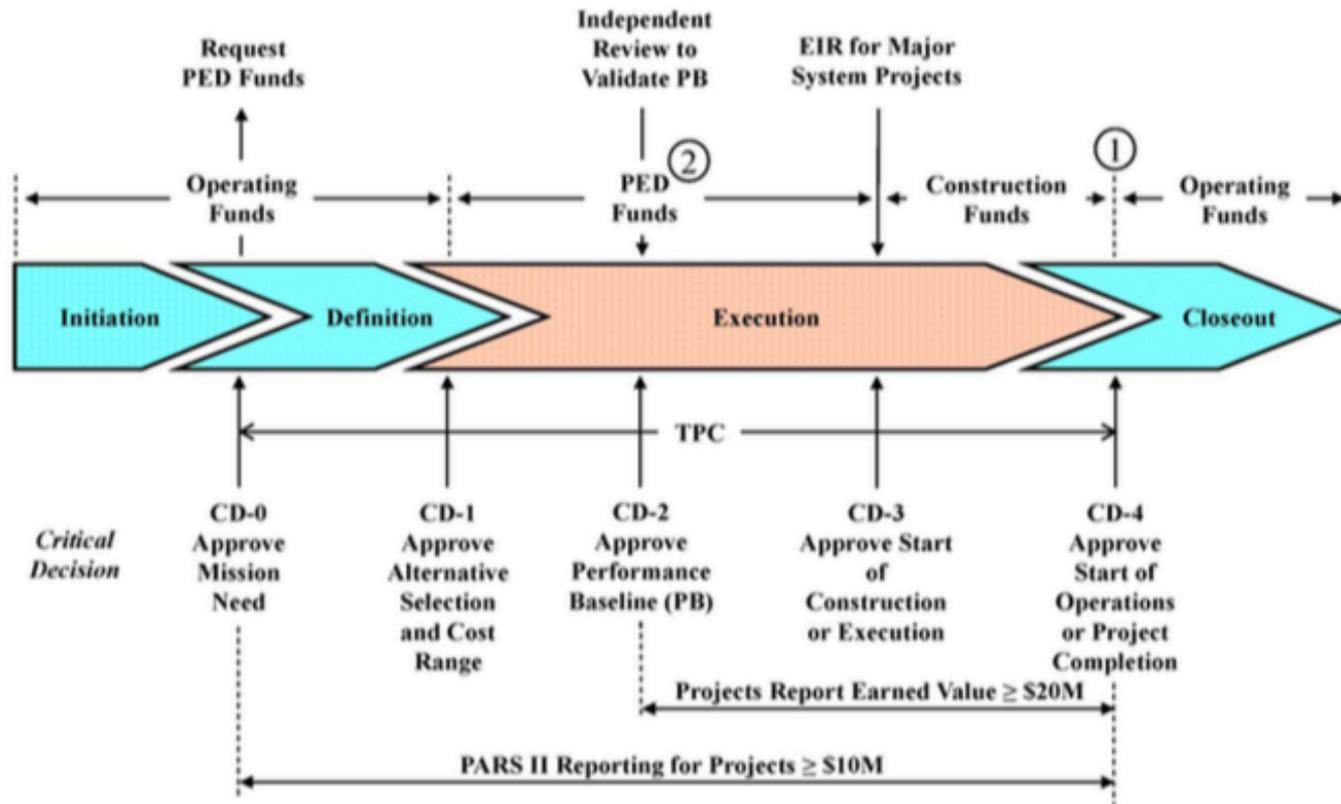
TOTAL PROJECT COST (TPC)		\$750M or more	Less than \$750M to \$400M	Less than \$400M to \$100M	Less than \$100M to \$50M*	Less than \$50M* to \$20M	Less than \$20M to \$10M**
		DECISION / REQUIREMENTS <sup>1</sup> / APPROVAL <sup>2</sup>					
<b>CD-0--APPROVE MISSION NEED</b>		S-2 (CD-1 to 4 delegated)	SC-1	SC-1	SC-AD	SC-AD	SC-AD
<b>PRIOR TO CD-0-- PRECONCEPTUAL PLANNING</b>	Perform Pre-Conceptual Planning Activities	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD
	Mission Validation Independent Review	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD
	Approve Mission Need Statement	S-2 (CD-1 to 4 delegated, see	Reviewed by SC-28 Approved by SC-1	Reviewed by SC-28 Approved by SC-AD			
	Conduct an Independent Cost Review (ICR) for Major System Project	OECM	N/A	N/A	N/A	N/A	N/A
	For NNSA--Prepare a Program Requirements Document	N/A	N/A	N/A	N/A	N/A	N/A
	<i>Incl</i> For Hazard Cat. 1, 2, 3 Nuclear Facility--Develop & approve a Preliminary Safety Design Strategy document.	Safety Basis Approval Authority (SBAA)	Safety Basis Approval Authority (SBAA)	Safety Basis Approval Authority (SBAA)	Safety Basis Approval Authority (SBAA)	Safety Basis Approval Authority (SBAA)	Safety Basis Approval Authority (SBAA)
<b>POST CD-0</b>	Submit approved CD or equivalent documents to OECM	SC-28	SC-28	SC-28	SC-28	SC-28	SC-28
	Submit request for PED funds. Prepare PDS and OMB 300s. MIE and O&E--request funding.	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD
	Proceed with Conceptual Design using Operating funds	Project	Project	Project	Project	Project	Project
	Start monthly status PARS II reporting	Prog. Mgr. & FPD No Earned Value (EV)	Prog. Mgr. & FPD No Earned Value (EV)	Prog. Mgr. & FPD No Earned Value (EV)	Prog. Mgr. & FPD No Earned Value (EV)	Prog. Mgr. & FPD No Earned Value (EV)	Prog. Mgr. & FPD No Earned Value (EV)
	Start Monthly or Quarterly Project Reporting/Meeting	SC-AD Invite SC-1 and SC-28	SC-AD Invite SC-1 and SC-28	SC-AD Invite SC-2 and SC-28	SC-AD to invite SC-28	SC-AD to invite SC-28	SC-AD to invite SC-28
AD=Associate Director; AE=Acquisition Executive; CDNS=Chief of Defense Nuclear Safety; CNS=Chief Nuclear Safety; EIR=External Independent Review Conducted by OECM; EV=Earned Value; Site Office=Field Organization (SOM, lab, etc.); FPD=Federal Project Director; ICE=Independent Cost Estimate; ICR=Independent Cost Review; IPR =Independent Project Review; OCA=Office of Cost Analysis; PARS II= Project Assessment and Reporting System; PDS= Project Data Sheet; Prog. Mgr.=HQ Program Manager; Prog. Mgr. SO= Project Management Support Office; PSO=Program Secretarial Officer; S-2=Deputy Secretary; SAE=Secretarial Acquisition Executive; SOM=Site Office Manager; US=Under Secretary							
1. Documents and reports are not intended to be stand-alone and may be combined; 2. Where no approval authorities are noted, authorities are established through other directives or the Program Offices (e.g., Functions and Requirements Assignment Matrix).							
*DOE O 413.3B does not apply for Capital Asset projects with TPC of less than \$50M only the principles of the Order applies. However, projects will submit approved CD or equivalent documents and be entered in PARS II. Project performance will be tracked for all projects with TPC of \$10M or greater.							
**For projects with TPC of less than \$10M, the Order does not apply and project is not required to be in PARS II and performance will not be tracked by OECM.							
Tailoring is necessary for efficient delivery of projects and should be applied to all projects considering size, complexity, cost, and risks.							
<div style="display: flex; justify-content: space-around;"> <span><span style="display: inline-block; width: 15px; height: 15px; background-color: #e0e0e0; border: 1px solid black; margin-right: 5px;"></span> Hazard Category 1, 2, and 3 nuclear facilities as defined in DOE STD only.</span> <span><span style="display: inline-block; width: 15px; height: 15px; background-color: #c0c0c0; border: 1px solid black; margin-right: 5px;"></span> NNSA projects only</span> </div>							

# CD-1 Requirements

Summary of Major Requirements

		TOTAL PROJECT COST (TPC)	\$750M or more	Less than \$750M to \$400M	Less than \$400M to \$100M	Less than \$100M to \$50M*	Less than \$50M* to \$20M	Less than \$20M to \$10M**
DECISION / REQUIREMENTS <sup>1</sup> / APPROVAL <sup>2</sup>								Delegation Allowed
<b>CD-1--APPROVE ALTERNATIVE SELECTION AND COST RANGE</b>			S-4	SC-1	SC-1	SC-AD	SC-AD	SC-AD
PRIOR TO CD-1--CONCEPTUAL DESIGN	Approve Acquisition Strategy		Reviewed by SC-28 Approved by SC-1	Reviewed by SC-28 Approved by SC-1	Reviewed by SC-28 Approved by SC-2	Reviewed by SC-28 Approved by SC-AD	Reviewed by SC-28 Approved by SC-AD	Reviewed by SC-28 Approved by SC-AD
	Approve Preliminary Project Execution Plan (PEP)		S-2 (CD-1 to 4 delegated, see	Reviewed by SC-28 Approved by SC-1	Reviewed by SC-28 Approved by SC-2	Reviewed by SC-28 Approved by SC-AD	Reviewed by SC-28 Approved by SC-AD	Reviewed by SC-28 Approved by SC-AD
	Appointment of the Federal Project Director (FPD)		S-4	SC-1	SC-1	SC-AD	SC-AD	SC-AD
	Approve Integrated Project Team (IPT)		S-4	SC-1	SC-2	SC-AD	SC-AD	SC-AD
	Develop a Risk Management Plan		Project	Project	Project	Project	Project	Project
	Comply with the One-for-One Building Space Replacement		Project	Project	Project	Project	Project	Project
	Complete a Conceptual Design		Project	Project	Project	Project	Project	Project
	Document High Perf. & Sustainable Bldg. & Sustainable Env. Stewardship considerations		Project	Project	Project	Project	Project	Project
	Conduct a Conceptual Design Review		Team external to project					
	Complete a Conceptual Design Report		Project	Project	Project	Project	Project	Project
	Prepare a Preliminary Hazard Analysis Report		Site Office or Lab					
	Develop and implement an Integrated Safety Management Plan		Site Office or Lab					
	Establish Preliminary Quality Assurance Program (QAP)		Site Office or Lab					
	Identify general Safeguards and Security requirements for the recommended alternative		Site Office or Lab					
	Complete National Environmental Policy Act (NEPA) Strategy by issuing a determination (i.e., EIS, EA)		Site Office or Lab					
	Conduct Independent Project Review or External Independent Review		ICE or ICR by OEMC with OPA	ICE or ICR by OEMC with OPA	ICE or ICR by OEMC with OPA	SC-28	SC-28 Tailored	SC-28 Tailored
	Update PDS, or other funding documents for MIE and OE projects, and OMB 300s, if applicable.		SC-AD	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD
	Hazard Cat. 1, 2, 3 Nuclear Facility--Update Safety Design Strategy (SDS)		SBAA & FPD, w/ CNS or CDNS concurrence, as appropriate	SBAA & FPD, w/ CNS or CDNS concurrence, as appropriate	SBAA & FPD, w/ CNS or CDNS concurrence, as appropriate	SBAA & FPD, w/ CNS or CDNS concurrence, as appropriate	SBAA & FPD, w/ CNS or CDNS concurrence, as appropriate	SBAA & FPD, w/ CNS or CDNS concurrence, as appropriate
	Hazard Category 1, 2, and 3 nuclear facilities, conduct an Independent Project Review (IPR)		PSO	PSO	PSO	PSO	PSO	PSO
	Hazard Cat. 1, 2, 3 Nuclear Facility--Prepare a Conceptual Safety Design Report (CSDR)		SBAA via the CSVr					
Hazard Cat. 1, 2, 3 Nuclear Facility--Prepare Conceptual Safety Validation Report (CSVr)		SBAA	SBAA	SBAA	SBAA	SBAA	SBAA	
Hazard Cat. 1, 2, 3 Nuclear Facility--Initiate a Code of Record		Project	Project	Project	Project	Project	Project	
POST CD-1	Submit approved CD or equivalent documents to OEMC		SC-28	SC-28	SC-28	SC-28	SC-28	SC-28
	Allow expenditure of PED, MIE OR OE funds for project design.		Project	Project	Project	Project	Project	Project
	Submit budget request for the remainder of TPC if CD-2 is approved w/ 1 year of OMB submission		SC-AD	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD
	Update PARS II with monthly status		Prog. Mgr. & FPD No Earned Value (EV)					
	Continue with Monthly or Quarterly Project Reporting/Meeting		SC-AD Invite SC-1 and SC-28	SC-AD Invite SC-1 and SC-28	SC-AD Invite SC-2 and SC-28	SC-AD to invite SC-28	SC-AD to invite SC-28	SC-AD to invite SC-28
	Develop an Acquisition Plan if applicable							
Nuc	Hazard Cat. 1, 2, 3 Nuclear Facility--Develop a Checkout, Testing & Commissioning Plan		Project	Project	Project	Project	Project	Project

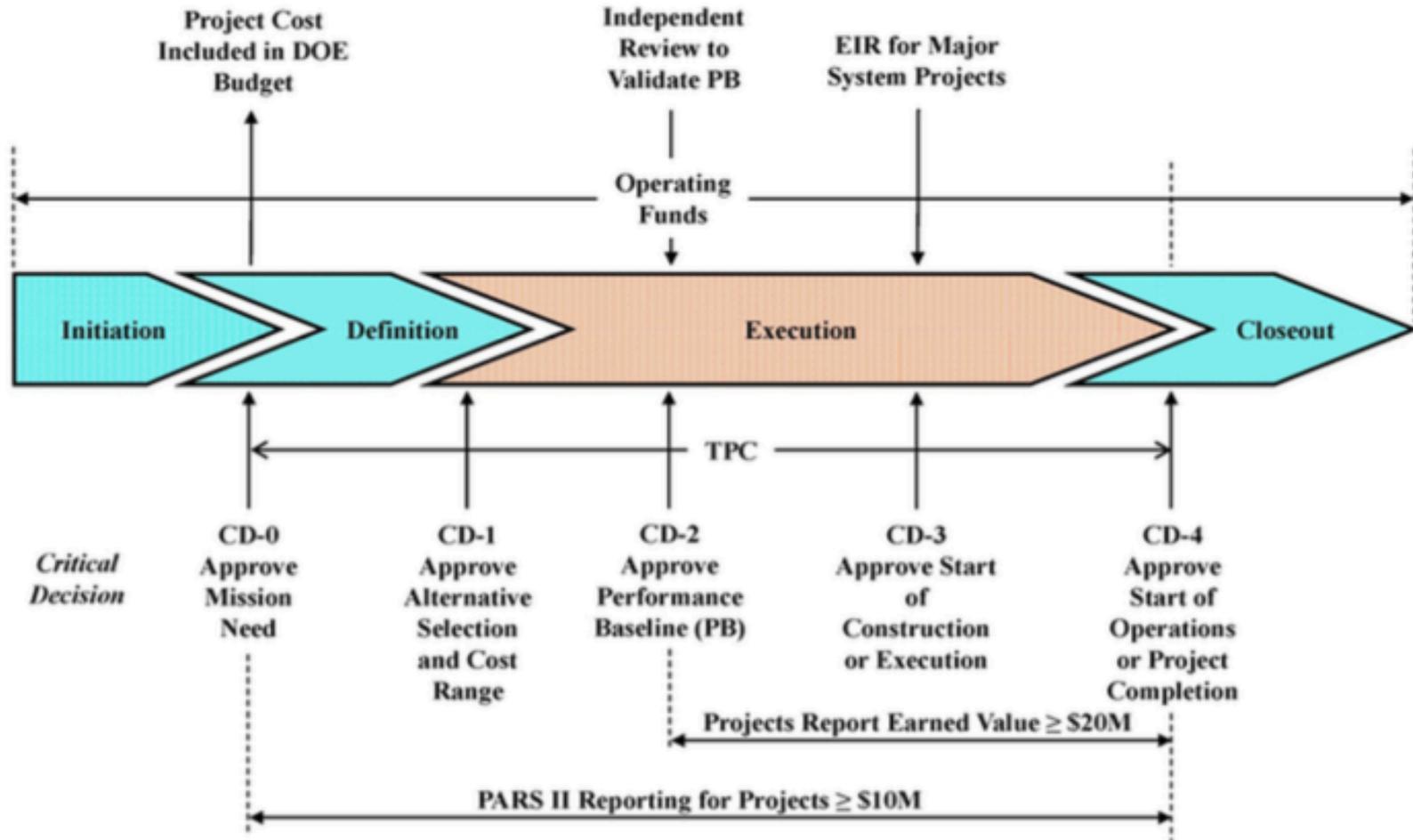
# Line Item Capital Asset Project



**NOTES:**

1. Operating Funds may be used prior to CD-4 for transition, startup, and training costs.
2. PED funds can be used after CD-3 for design.

# Major Item of Equipment



# Summary

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- Mission Needs Statement from OHEP submitted to Office of Science – CD-0 may actually be real!
- Working on setting up much of the ‘project’ infrastructure
  - Project Office
  - Reporting
  - Documentation
  - Lot for CD-1
- R&D plan:
  - PXIE + SRF
  - India Institutes Fermilab Collaboration

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- Backups

## what are the other project steps?

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- CD-1: Approve Alternative Selection and Cost Range
  - Conceptual Design
- CD-2: Approve Performance Baseline
  - Technical Design
  - Total Project Cost, Schedule, Performance Parameters are set
- CD-3: Approve Start of Construction
  - End of R&D
  - Spending construction funds
- CD-4: Approve Start of Operations or Project Completion