

Appendix
Budget Profiles

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Budget Profiles

This appendix contains the detailed information that underlies the quantitative aspects of our Portfolio Summary. The building blocks for this information are the Research Summary Profiles, each with a unique title. In constructing the Profiles, DOE science programs were asked to organize their research into component pieces that could be “mapped” into the twelve science challenges. The goal was to reformulate (for purposes of this analysis) the programs in a way that would reveal additional insights into the makeup of the Department’s portfolio—insights beyond those apparent through the budget structure alone. The result of this iterative effort is the 94 Research Summary Profiles for the Science Portfolio. In a number of cases, these Research Summary Profiles depict research areas at a finer level than they are presented in the President’s FY 2000 Budget Request to Congress.

Each Research Summary Profile contains the following information, distributed across the two tables in this Appendix.

Title: a short descriptive title of the science area

Resources: an estimate of the amount for FY 98 and FY 99 that can be attributed to that Research Summary. Although the apportionment is subjective, all estimates collectively meet the budget control totals for science programs and for the overall science budget. *Because of the overlapping and highly crosscutting nature of the Science Challenges, multiple counting occurs across each Challenge. Merely adding the resource estimates across science challenges will yield an estimate far in excess of the actual science budget. The tables in this Appendix display how the Research Summary Profiles contribute to multiple challenges.*

B&R Links: reference to the contributing budget element(s)

Impacts: a subjective evaluation of the degree(s) to which the particular research item support(s) one or several of the twelve major science challenges. Impact is identified as either Strong (S) or Moderate (M). A blank indicates a lower impact.

Research Performers: an estimate of the distribution of resources by different categories of research performer: national labs, universities, industry, U.S. government, international/foreign.

Table A-1. Research Summary Impacts
(M=Moderately Supportive, S=Strongly Supportive)

	RSP Title	FY 1998	FY 1999	FY 2000	New Fuels		Clean and Affordable Power		Efficient Energy Use		Sources and Fate of Energy Byproducts		Impacts on People and the Environment		Prevention and Protection		Components of Matter		Origin and Fate of the Universe		Complex Systems		Instrumentation for the Frontiers of Science		Scientific Simulation		Institutional Capacity	
					1	2	3	4	5	6	7	8	9	10	11	12												
1	Structure of Materials	\$24.455	\$25.655	\$25.390	M	S									M		S	S	S	M								
2	Engineering Behavior	\$20.211	\$21.205	\$20.985	S	S											M	S	M									
3	Mechanical Behavior and Radiation Effects	\$15.223	\$15.965	\$15.800	S	S											M	M	S									
4	Physical Behavior of Materials	\$13.562	\$14.225	\$14.078	M	S											S	M	M									
5	Neutron and X-Ray Scattering	\$18.739	\$19.700	\$19.495			M								M		S	M	M									
6	Experimental Condensed Matter Physics	\$26.147	\$27.450	\$27.165	S	M									S		S	M	M									
7	Theory & Simulations of Matter, Engineering Physics	\$19.553	\$20.555	\$22.341	M	M									S		S	S	S									
8	Materials Chemistry	\$23.547	\$24.715	\$24.458	S		M								M		S	M	M									
9	Experimental Program to Stimulate Competitive Research (EPSCoR)	\$6.815	\$6.815	\$6.815	M	M	M	M			M																	S
10	Photochemistry and Radiation Research	\$24.907	\$24.414	\$22.982	S		M	M							M		S	S										
11	Chemical Physics Research	\$38.874	\$36.860	\$39.345	M	S					M						M	S	S									
12	Atomic, Molecular, and Optical Science	\$9.926	\$10.200	\$10.213	M										S	M	S	S	M									
13	Catalysis and Chemical Transformations	\$21.883	\$23.401	\$22.854	M		S	M									S	M										
14	Separations and Analysis	\$14.248	\$13.528	\$13.406	M		M	M			S						S	M										
15	Heavy Element Chemistry	\$6.239	\$6.862	\$6.774				S			M	M					M	M										
16	Chemical Energy and Chemical Engineering	\$8.044	\$8.869	\$8.448	S	S	M										M	M										
17	Mechanical Systems, Systems Science, and Engineering Analysis	\$17.296	\$17.471	\$14.500	M	S											S		M									
18	Geosciences	\$22.855	\$22.725	\$15.275	S			S			M						S	M	S									
19	Energy Biosciences	\$26.710	\$26.652	\$25.537	S			M	M	M							S		M									
20	Neutron and Light Sources Facilities	\$275.740	\$391.858	\$480.063	M	M	M	M			M	M			M		S	S	M	S								
21	Structural Biology Research Facilities	\$17.003	\$15.375	\$15.976							M	M					S	S										
22	Understanding and Predicting Protein Structure	\$12.959	\$11.711	\$12.169							M	S					S		S									S
23	High Throughput DNA Sequencing	\$33.200	\$44.860	\$48.750													S		S									S
24	Resources and Tools for DNA Sequencing and Sequence Analysis	\$32.126	\$28.321	\$26.325													S		S	M								
25	Radiopharmaceutical Development	\$13.300	\$14.942	\$18.535							S						M											
26	Production DNA Sequencing Facility	\$12.600	\$11.411	\$11.700													M		M	S	S							

					New Fuels Clean and Affordable Power	Efficient Energy Use	Sources and Fate of Energy Byproducts	Impacts on People and the Environment	Prevention and Protection	Components of Matter	Origin and Fate of the Universe	Complex Systems	Instrumentation for the Frontiers of Science	Scientific Simulation	Institutional Capacity
	DIII-D														
56	DIII-D Facilities Operations	\$26.370	\$29.195	\$29.880	S								S		
57	Plasma Theory and Computation	\$19.773	\$22.500	\$23.000	S						S	S		S	
58	Inertial Fusion Energy Research	\$7.000	\$9.800	\$10.100	S							M			
59	Alcator C-Mod Facility Operations	\$9.689	\$9.923	\$10.100	S								S		
60	Fusion Physics Research on Alcator C-Mod	\$6.211	\$7.600	\$7.800	S							S			
61	Experimental Fusion Physics Support	\$18.557	\$17.326	\$15.598	S							M	S		
62	Experimental Plasma Research (Alternatives)	\$14.550	\$19.000	\$23.750	S							M	S		
63	Advanced Fusion Design	\$28.411	\$10.163	\$5.174	S			M							
64	Advanced Fusion Materials Research	\$7.744	\$7.000	\$7.000	S			M		M					
65	Plasma Technologies	\$23.315	\$17.897	\$10.800	S										
66	Fusion Technologies	\$6.555	\$6.931	\$4.100	S			M							
67	CP Violation - B-Meson System	\$14.335	\$14.324	\$15.357						S	S		M	M	M
68	CP Violation - K-Meson System	\$7.525	\$7.519	\$8.061						S	S		M	M	M
69	Neutrino Mass and Missing Mass	\$18.421	\$27.211	\$35.843						S	S		M	M	M
70	Search for Higgs & Supersymmetry	\$35.000	\$65.000	\$70.000						S	M		M	M	M
71	Strong Interactions, Supersymmetry & Particles	\$37.322	\$37.288	\$39.981						S	M		M	M	M
72	Electroweak Interactions	\$38.749	\$38.718	\$41.512						S	M		M	M	M
73	Hadron Spectroscopy	\$6.521	\$6.516	\$6.986						S	M		M	M	M
74	Spin Structure of Nucleons	\$0.790	\$0.790	\$0.847						S	M		M	M	M
75	Particle Astrophysics & Cosmology	\$4.636	\$4.633	\$4.967						M	S		M	M	M
76	High Energy Physics Theory	\$29.217	\$29.194	\$31.301						S	M		M	S	
77	General Technology: Detector R&D	\$16.830	\$13.835	\$14.235						S			S	M	M
78	Facility Operations: Fermilab	\$227.699	\$219.850	\$218.229						S			S	S	M
79	Facility Operations: SLAC	\$119.000	\$109.240	\$121.551						S			S	S	M
80	Facility Operations: AGS	\$49.153	\$34.326	\$5.424						S			S	S	M
81	Adv. Particle Accelerator Concepts	\$12.000	\$12.515	\$13.175						S			S	M	M
82	General Technology: Accelerator R&D	\$36.153	\$42.706	\$40.130						S		M	S	S	M
83	Quark/Gluon Substructure of Nuclei - Medium Energy Nuclear Physics	\$36.780	\$38.796	\$36.982						S	M		M		
84	Medium Energy Facility Ops. & Constr.	\$76.010	\$74.770	\$69.435						S	M		S		
85	Nuclear Structure/Dynamics ... Phase Trans. - Heavy Ion Nuclear Physics	\$52.461	\$55.515	\$50.445						S	S		M		

					New Fuels	Clean and Affordable Power	Efficient Energy Use	Sources and Fate of Energy Byproducts	Impacts on People and the Environment	Prevention and Protection	Components of Matter	Origin and Fate of the Universe	Complex Systems	Instrumentation for the Frontiers of Science	Scientific Simulation	Institutional Capacity
86	Heavy Ion Facility Ops. & Constr.	\$95.725	\$103.962	\$119.227							S	S		S		
87	Nuclear Structure & Astrophysics - Low Energy Nuclear Physics	\$23.032	\$23.785	\$24.080							S	S		M		
88	Low Energy Facility Ops. & Constr.	\$8.840	\$8.630	\$9.250							S	M		S		
89	Theoretical Nuclear Physics	\$15.330	\$15.760	\$15.830							S	M			M	
90	Science Education Support	(X)	\$4.500 (Y)	\$4.500 (Z)	M	M	M	M	M	S	M	M	M	S	S	S
91	General Purpose Plant & Equipment (GPP/GPE)	\$46.482	\$45.826	\$51.655	M	M	M	M	M	M	M	M	M	M	M	S
92	Multiprogram Energy Lab Facilities Support (MELFS)	\$21.247	\$21.260	\$21.260	M	M	M	M	M	M	M	M	M	M	M	S
93	Small Business Innovation Research (SBIR) Program	\$76.200	\$55.628	\$56.274	M	M	M	M	M	M					M	S
94	Small Business Technology Transfer (STTR) Program	\$4.600	\$3.335	\$3.379	M	M	M	M	M	M	M				M	S

X — \$4.5m of program-relevant Science Education activities were funded within the program research budgets in FY 1998.
 Y — \$4.5m of Science Education activities are being funded out of the SC Program Direction account in FY 1999.
 Z — \$4.5m of Science Education activities are being funded out of the SC Program Direction account in FY 2000, however, an additional \$10m is included in the program-relevant activities included above.

Table A-2. Research Summary Funding by Research Performer

						Percent of Funding by Research Performer				
	B&R	RSP Title	FY 1998	FY 1999	FY 2000	Lab	Univ	Ind	Gov	For
1	KC020101	Structure of Materials	\$24.455	\$25.655	\$25.390	71	29	0	0	0
2	KC020105	Engineering Behavior	\$20.211	\$21.205	\$20.985	76	24	0	0	0
3	KC020102 KC020104	Mechanical Behavior and Radiation Effects	\$15.223	\$15.965	\$15.800	75	24	1	0	0
4	KC020103	Physical Behavior of Materials	\$13.562	\$14.225	\$14.078	74	26	0	0	0
5	KC020201	Neutron and X-Ray Scattering	\$18.739	\$19.700	\$19.495	94	6	0	0	0
6	KC020202	Experimental Condensed Matter Physics	\$26.147	\$27.450	\$27.165	62	38	0	0	0
7	KC020203 KC020204 KC020205	Theory & Simulations of Matter, Engineering Physics	\$19.553	\$20.555	\$22.341	90	10	0	0	0
8	KC0203	Materials Chemistry	\$23.547	\$24.715	\$24.458	81	17	1	1	0
9	KC0205	Experimental Program to Stimulate Competitive Research (EPSCoR)	\$6.815	\$6.815	\$6.815	6	94	0	0	0
10	KC030101	Photochemistry and Radiation Research	\$24.907	\$24.414	\$22.982	57	42	0	1	0
11	KC030102	Chemical Physics Research	\$38.874	\$36.860	\$39.345	84	16	0	0	0
12	KC030103	Atomic, Molecular, and Optical Science	\$9.926	\$10.200	\$10.213	42	58	0	0	0
13	KC030201	Catalysis and Chemical Transformations	\$21.883	\$23.401	\$22.854	55	40	0	5	0
14	KC030202	Separations and Analysis	\$14.248	\$13.528	\$13.406	69	31	0	0	0
15	KC030203	Heavy Element Chemistry	\$6.239	\$6.862	\$6.774	89	11	0	0	0
16	KC030204	Chemical Energy and Chemical Engineering	\$8.044	\$8.869	\$8.448	52	48	0	0	0
17	KC0401	Mechanical Systems, Systems Science, and Engineering Analysis	\$17.296	\$17.471	\$14.500	28	66	1	5	0
18	KC0403	Geosciences	\$22.855	\$22.725	\$15.275	51	47	1	1	0
19	KC06	Energy Biosciences	\$26.710	\$26.652	\$25.537	9	89	1	1	0
20	KC020401	Neutron and Light Sources Facilities	\$275.740	\$391.858	\$480.063	100	0	0	0	0
21	KP110101	Structural Biology Research Facilities	\$17.003	\$15.375	\$15.976	90	10	0	0	0
22	KP110101 KP110401	Understanding and Predicting Protein Structure	\$12.959	\$11.711	\$12.169	76	24	0	0	0
23	KP110301	High Throughput DNA Sequencing	\$33.200	\$44.860	\$48.750	90	10	0	0	0
24	KP110301	Resources and Tools for DNA Sequencing and Sequence Analysis	\$32.126	\$28.321	\$26.325	21	79	0	0	0
25	KP140102	Radiopharmaceutical Development	\$13.300	\$14.942	\$18.535	40	60	0	0	0
26	KP110301	Production DNA Sequencing Facility	\$12.600	\$11.411	\$11.700	100	0	0	0	0
27	KP110201	Microbial Genomics	\$8.200	\$21.873	\$9.860	40	60	0	0	0
28	KP140201	Analytical Chemistry Instrumentation	\$4.766	\$5.087	\$5.849	90	10	0	0	0
29	KP110202	Health Risks from Low Dose Exposures	\$16.900	\$15.727	\$11.573	54	46	0	0	0
30	KP140102	Advanced Medical Imaging	\$10.042	\$27.660	\$11.390	50	50	0	0	0
31	KP110201 KP110301 KP110401	Understanding Gene Function	\$24.069	\$20.275	\$17.455	80	20	0	0	0
32	KP140105	Boron Neutron Capture Therapy	\$15.542	\$11.441	\$10.892	46	54	0	0	0
33	KP1301010	Natural and Accelerated Bioremediation Research Program	\$22.437	\$22.915	\$22.059	50	50	0	0	0
34	KP12040	Economics of Global Climate	\$6.853	\$6.726	\$6.699	35	65	0	0	0

						Percent of Funding by Research Performer				
35	KP1301030	Environmental and Molecular Sciences Laboratory (EMSL)	\$30.189	\$30.072	\$29.415	100	0	0	0	0
36	KP1203010 KP1203020	Ecological Processes	\$13.084	\$12.348	\$12.010	40	60	0	0	0
37	KP1201010 KP1201020	Climate Change Prediction Program	\$20.469	\$21.336	\$30.036	49	45	0	5	1
38	KP1301020	Cleanup Research	\$5.527	\$6.817	\$6.773	56	36	8	0	0
39	KC02 KC03 KC0403 KC06 KP1202020	Climate Change Technology Initiative (CCTI)	\$0.000	\$13.160	\$32.160	(W)	(W)	(W)	(W)	(W)
40	KP1202020 KP1202030	Carbon Cycle Research	\$9.837	\$13.870	\$19.237	30	65	0	5	0
41	KP12	Atmospheric Sciences	\$12.856	\$12.967	\$11.278	63	37	0	0	0
42	KP1201030 KP1201040	Atmospheric Radiation Measurement (ARM) Program Research	\$14.681	\$15.125	\$15.622	44	33	2	19	1
43	KP1201030	Atmospheric Radiation Measurement (ARM) Program Infrastructure	\$28.000	\$27.632	\$28.725	98.6	0	1.4	0	0
44	KP	Focused Health Research	\$24.692	\$16.012	\$0.000	(W)	(W)	(W)	(W)	(W)
45	KJ0101	Applied Mathematics	\$23.179	\$25.162	\$27.179	65	35	0	0	0
46	KJ0101	Computer Science to Enable Scientific Computing	\$14.000	\$14.000	\$29.602	75	25	0	0	0
47	KJ0102	High Performance Computer Networks	\$5.987	\$7.420	\$7.420	75	25	0	0	0
48	KJ0101 KJ0102	Advanced Computing Software and Collaboratory Tools	\$8.000	\$13.841	\$13.841	65	35	0	0	0
49	KJ0101 KJ0102	Scientific Computing Application Testbeds	\$8.281	\$16.169	\$18.467	60	40	0	0	0
50	KJ0102	Advanced Computing and Communications Facility Operations	\$64.182	\$58.698	\$79.580	100	0	0	0	0
51	KJ02 KJ03	Laboratory Technology Research and Advanced Energy Projects	\$22.753	\$18.148	\$13.921	100	0	0	0	0
52	AT5505 AT5501 AT5508	NSTX Facility Operations	\$18.990	\$21.377	\$28.600	100	0	0	0	0
53	AT501501	Fusion Physics Research on NSTX	\$2.446	\$9.800	\$11.300	80	15	5	0	0
54	AT5030	General Plasma Science	\$5.149	\$6.109	\$6.500	14	81	0	5	0
55	AT501020	Fusion Physics Research on DIII-D	\$21.430	\$21.905	\$22.520	34	9	56	0	1
56	AT5502	DIII-D Facilities Operations	\$26.370	\$29.195	\$29.880	9	0	91	0	0
57	AT5020	Plasma Theory and Computation	\$19.773	\$22.500	\$23.000	44	41	14	1	0
58	AT501503	Inertial Fusion Energy Research	\$7.000	\$9.800	\$10.100	86	13	0	1	0
59	AT5503	Alcator C-Mod Facility Operations	\$9.689	\$9.923	\$10.100	5	95	0	0	0
60	AT501030	Fusion Physics Research on Alcator C-Mod	\$6.211	\$7.600	\$7.800	24	76	0	0	0
61	AT5010101 AT501080 AT501070 ATGI	Experimental Fusion Physics Support	\$18.557	\$17.326	\$15.598	37	60	3	0	0
62	AT501502	Experimental Plasma Research (Alternatives)	\$14.550	\$19.000	\$23.750	35	62	1	2	0
63	AT601050	Advanced Fusion Design	\$28.411	\$10.163	\$5.174	62	30	8	0	0
64	AT6020	Advanced Fusion Materials Research	\$7.744	\$7.000	\$7.000	95	5	0	0	0

						Percent of Funding by Research Performer				
65	AT601030	Plasma Technologies	\$23.315	\$17.897	\$10.800	47	45	8	0	0
66	AT601040	Fusion Technologies	\$6.555	\$6.931	\$4.100	75	22	3	0	0
67	KA04	CP Violation - B-Meson System	\$14.335	\$14.324	\$15.357	25	75	0	0	0
68	KA04	CP Violation - K-Meson System	\$7.525	\$7.519	\$8.061	25	75	0	0	0
69	KA04	Neutrino Mass and Missing Mass	\$18.421	\$27.211	\$35.843	25	75	0	0	0
70	KA04	Search for Higgs & Supersymmetry	\$35.000	\$65.000	\$70.000	25	75	0	0	0
71	KA04	Strong Interactions, Supersymmetry & Particles	\$37.322	\$37.288	\$39.981	25	75	0	0	0
72	KA04	Electroweak Interactions	\$38.749	\$38.718	\$41.512	25	75	0	0	0
73	KA04	Hadron Spectroscopy	\$6.521	\$6.516	\$6.986	25	75	0	0	0
74	KA04	Spin Structure of Nucleons	\$0.790	\$0.790	\$0.847	25	75	0	0	0
75	KA04	Particle Astrophysics & Cosmology	\$4.636	\$4.633	\$4.967	25	75	0	0	0
76	KA04	High Energy Physics Theory	\$29.217	\$29.194	\$31.301	25	75	0	0	0
77	KA04	General Technology: Detector R&D	\$16.830	\$13.835	\$14.235	50	50	0	0	0
78	KA02	Facility Operations: Fermilab	\$227.699	\$219.850	\$218.229	100	0	0	0	0
79	KA02	Facility Operations: SLAC	\$119.000	\$109.240	\$121.551	100	0	0	0	0
80	KA02	Facility Operations: AGS	\$49.153	\$34.326	\$5.424	100	0	0	0	0
81	KA04	Adv. Particle Accelerator Concepts	\$12.000	\$12.515	\$13.175	35	22	40	3	0
82	KA04	General Technology: Accelerator R&D	\$36.153	\$42.706	\$40.130	100	0	0	0	0
83	KB0101	Quark/Gluon Substructure of Nuclei - Medium Energy Nuclear Physics	\$36.780	\$38.796	\$36.982	55	45	0	0	0
84	KB0102	Medium Energy Facility Ops. & Constr.	\$76.010	\$74.770	\$69.435	82	18	0	0	0
85	KB0201	Nuclear Structure/Dynamics ... Phase Trans. - Heavy Ion Nuclear Physics	\$52.461	\$55.515	\$50.445	67	33	0	0	0
86	KB0202	Heavy Ion Facility Ops. & Constr.	\$95.725	\$103.962	\$119.227	100	0	0	0	0
87	KB0401	Nuclear Structure & Astrophysics - Low Energy Nuclear Physics	\$23.032	\$23.785	\$24.080	58	41	0	1	0
88	KB0402	Low Energy Facility Ops. & Constr.	\$8.840	\$8.630	\$9.250	100	0	0	0	0
89	KB0301	Theoretical Nuclear Physics	\$15.330	\$15.760	\$15.830	33	67	0	0	0
90	Program Dir.	Science Education Support	(X)	\$4.500(Y)	\$4.500(Z)	70	30	0	0	0
91	Cross Cut	General Purpose Plant & Equipment (GPP/GPE)	\$46.482	\$45.826	\$51.655	100	0	0	0	0
92	KG	Multiprogram Energy Lab Facilities Support (MELFS)	\$21.247	\$21.260	\$21.260	100	0	0	0	0
93	KM0000	Small Business Innovation Research (SBIR) Program	\$76.200	\$55.628	\$56.274	5	10	85	0	0
94	KN0000	Small Business Technology Transfer (STTR) Program	\$4.600	\$3.335	\$3.379	25	15	60	0	0

W — This Research Summary includes new program elements and as such the distribution of these research funds has yet to be decided.

X — \$4.5m of program-relevant Science Education activities were funded within the program research budgets in FY 1998.

Y — \$4.5m of Science Education activities are being funded out of the SC Program Direction account in FY 1999.

Z — \$4.5m of Science Education activities are being funded out of the SC Program Direction account in FY 2000, however, an additional \$10m is included in the program-relevant activities included above.

