

## NCSX MIE Project Cost Estimate Summary

WBS		Totals w/o Contingency	Contingency	Totals
<b>1</b>	<b>Stellarator Core</b>	<b>\$27,340K</b>	<b>38.7%</b>	<b>\$10,578K</b>
11	PFCs	\$259K	27.3%	\$71K
	111 First Wall	\$214K	28.0%	\$60K
	116 PFC Local I&C	\$44K	24.0%	\$11K
12	Vacuum Vessel	\$4,395K	39.3%	\$1,728K
	121 Vacuum Vessel Assembly	\$4,045K	40.0%	\$1,618K
	122 Thermal Insulation	\$118K	32.0%	\$38K
	123 Vacuum Vessel Heating & Cooling Distrib.	\$141K	32.0%	\$45K
	124 Vacuum Vessel Supports	\$62K	30.0%	\$19K
	125 VV Local I&C	\$28K	30.0%	\$8K
13	TF Coils	\$1,523K	23.8%	\$362K
	131 TF Winding Pack	\$1,385K	24.0%	\$332K
	132 TF Leads	\$108K	22.0%	\$24K
	133 TF Local I&C	\$30K	20.0%	\$6K
14	PF Coils	\$1,804K	21.3%	\$384K
	141 PF - OH Solenoid	\$521K	24.0%	\$125K
	142 PF 3 Windings	\$285K	20.0%	\$57K
	143 PF 4 Windings	\$327K	20.0%	\$65K
	144 PF 5 Windings	\$292K	20.0%	\$58K
	145 PF 6 Windings	\$245K	20.0%	\$49K
	146 PF Leads	\$112K	22.0%	\$25K
	147 PF Local I&C	\$23K	20.0%	\$5K
15	Cryostat	\$511K	25.4%	\$130K
	151 Cryostat Shell & Structure	\$247K	28.0%	\$69K
	152 Cryostat Thermal Insulation	\$55K	28.0%	\$15K
	153 VV/Cryostat Boots	\$122K	20.0%	\$24K
	154 Temperature Control/Heaters	\$63K	24.0%	\$15K
	155 Local I&C	\$24K	24.0%	\$6K
16	Machine Structure	\$2,160K	31.8%	\$688K
	161 Base Assembly (Includes Gravity Supports)	\$438K	32.0%	\$140K
	162 TF Coil Support Assembly	\$1,693K	32.0%	\$542K
	163 Support Structure I&C	\$28K	20.0%	\$6K
17	Modular Coils	\$16,181K	39.8%	\$6,442K
	171 Windings & Coil Assembly	\$9,400K	40.0%	\$3,760K
	172 Winding Form/Structure	\$6,616K	40.0%	\$2,647K
	173 Leads	\$132K	22.0%	\$29K
	174 Local I&C	\$33K	20.0%	\$7K
18	Trim Coils	\$291K	40.0%	\$116K
	181 External Field Correction Coils	\$291K	40.0%	\$116K
	182 Internal Trim Coil Windings & Assemblies	\$0K	0.0%	\$0K
	183 Trim Coil Leads	\$0K	0.0%	\$0K
	184 Trim Coil Local I&C			
19	LN2 Distribution System Inside the Cryostat	\$216K	28.8%	\$62K
	191 Manifolds and Piping	\$130K	28.0%	\$37K
	192 Flow Control	\$72K	32.0%	\$23K
	193 Local I&C	\$14K	20.0%	\$3K
<b>2</b>	<b>Auxiliary Systems</b>	<b>\$2,298K</b>	<b>18.0%</b>	<b>\$414K</b>
21	Fueling	\$145K	18.0%	\$26K
	211 Gas Fueling Systems	\$145K	18.0%	\$26K
	212 Pellet Injection Fueling Systems	\$0K	0.0%	\$0K
22	Vacuum Pumping	\$307K	18.0%	\$55K
23	Wall Conditioning	\$105K		\$19K
	231 Glow Discharge Cleaning	\$105K	18.0%	\$19K
25	NBI	\$1,741K	18.0%	\$313K
	251 NB Systems Recommissioning	\$1,251K	18.0%	\$225K
	252 NB Installation and Systems Testing	\$490K	18.0%	\$88K

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<b>3</b>	<b>Diagnostics</b>	<b>\$2,528K</b>	<b>28.8%</b>	<b>\$728K</b>
31	Magnetic Diagnostics	\$914K	30.0%	\$274K
35	Kinetic Profile Diagnostics	\$219K	20.0%	\$44K
36	Edge & Divertor Diagnostics	\$306K	20.0%	\$61K
38	EB Mapping Diagnostics	\$538K	34.0%	\$183K
39	Diagnostics Integration	\$551K	30.0%	\$165K
<b>4</b>	<b>Power Systems</b>	<b>\$5,587K</b>	<b>17.4%</b>	<b>\$974K</b>
41	AC Power Systems	\$542K	18.0%	\$98K
411	Auxiliary AC Power Systems	\$499K	18.0%	\$90K
412	Experimental AC Power Systems	\$43K	18.0%	\$8K
42	AC/DC Converters	\$15K	18.0%	\$3K
422	D-Site AC/DC Converters	\$15K	18.0%	\$3K
43	DC Systems	\$2,395K	14.8%	\$354K
431	C-Site DC Systems	\$365K	18.0%	\$66K
432	D-to-C Site DC Systems	\$1,311K	22.0%	\$288K
433	D-Site DC Systems	\$719K	18.0%	\$129K
44	Control & Protection Systems	\$1,624K	18.5%	\$300K
441	Electrical Interlocks	\$585K	19.0%	\$111K
442	Kirk Key Interlocks	\$96K	18.0%	\$17K
443	Real Time Control	\$40K	18.0%	\$7K
444	Instrumentation	\$608K	18.0%	\$109K
445	Coil Protection	\$237K	18.0%	\$43K
446	Ground Fault Monitor	\$59K	22.0%	\$13K
45	Electrical System Design and Integration	\$1,011K	21.7%	\$219K
451	System Design	\$378K	18.0%	\$68K
452	Electrical Systems Support	\$467K	26.0%	\$121K
453	System Testing (PTPs)	\$166K	18.0%	\$30K
<b>5</b>	<b>Central I&amp;C</b>	<b>\$4,115K</b>	<b>9.8%</b>	<b>\$403K</b>
51	TCP/IP Network Infrastructure	\$716K	5.0%	\$36K
52	Central Facilities I&C	\$978K	10.0%	\$98K
53	Data Acquisition & Facility Computing	\$641K	16.0%	\$103K
54	Facility Timing & Synchronization	\$676K	14.0%	\$95K
55	Real Time Power Supply Control	\$374K	8.0%	\$30K
56	Central Safety Interlock System	\$409K	8.0%	\$33K
57	Control Room Design	\$320K	3.0%	\$10K
<b>6</b>	<b>Site and Facilities</b>	<b>\$2,628K</b>	<b>18.4%</b>	<b>\$483K</b>
61	Facility Mods and Test Cell Prep	\$781K	14.0%	\$109K
611	Facility Mod Outside Test Cell	\$302K	14.0%	\$42K
613	Seismic Mods to Test Cell Walls	\$480K	14.0%	\$67K
62	Cooling Water Systems	\$292K	20.0%	\$58K
622	NB Water	\$190K	20.0%	\$38K
623	Vacuum Water	\$27K	20.0%	\$5K
624	He Bakeout System	\$38K	20.0%	\$8K
625	Diagnostics Water	\$38K	20.0%	\$8K
63	Cryogenics	\$728K	23.0%	\$168K
631	LN2 Supply System	\$165K	23.0%	\$38K
632	Liquid He Supply System	\$252K	23.0%	\$58K
633	Stellarator Core Cryogeniucs	\$311K	23.0%	\$72K
64	Utility Systems	\$95K	20.0%	\$19K
65	VV & PFC Heating & Cooling	\$567K	10.0%	\$57K
66	Facility Systems Integration	\$165K	8.0%	\$13K

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<b>7 Machine Assembly</b>	<b>\$4,402K</b>	<b>21.4%</b>	<b>\$942K</b>
71 Planning and Oversight	\$1,626K	10.0%	\$163K
711 Planning Activities	\$265K	10.0%	\$26K
712 Construction Management	\$1,361K	10.0%	\$136K
72 On-site Pre-assembly	\$901K	32.4%	\$292K
721 Preparation of Pre-Assy Area	\$93K	10.0%	\$9K
722 Receive, Inspect & Test TF & PF Coils	\$39K	10.0%	\$4K
724 Receive, Inspect & Test VV	\$49K	10.0%	\$5K
725 Assemble Field Periods	\$721K	38.0%	\$274K
73 Test Cell and Basement Assembly Activities	\$793K	32.0%	\$254K
74 In-vessel Measurement	\$157K	24.0%	\$38K
75 Platform Design & Fab	\$187K	10.0%	\$19K
76 Tooling Design & Fab	\$737K	24.0%	\$177K
<b>8 Project Management &amp; Integration</b>	<b>\$6,037K</b>	<b>15.0%</b>	<b>\$905K</b>
81 Project Management and Control	\$3,262K	15.0%	\$489K
82 Project Engineering	\$2,243K	15.0%	\$336K
83 ES&H/QA	\$0K		\$0K
84 Project Physics	\$532K	15.0%	\$80K
<b>9 Prep for Ops</b>	<b>\$489K</b>	<b>20.0%</b>	<b>\$98K</b>
92 Integrated Systems Testing	\$489K	20.0%	\$98K
<b>Subtotals</b>	<b>\$55,425K</b>		<b>\$15,524K</b>
<b>AA PPPL Direct Allocations</b>	<b>\$913K</b>	<b>15.0%</b>	<b>\$137K</b>
<b>Total w/o Contingency</b>	<b>\$56,338K</b>		
<b>Total Contingency</b>			<b>\$15,661K</b>
<b>Total w/ Contingency</b>	<b>\$56,338K</b>	<b>27.8%</b>	<b>\$72,000K</b>