

Disk Price
Performance Analysis

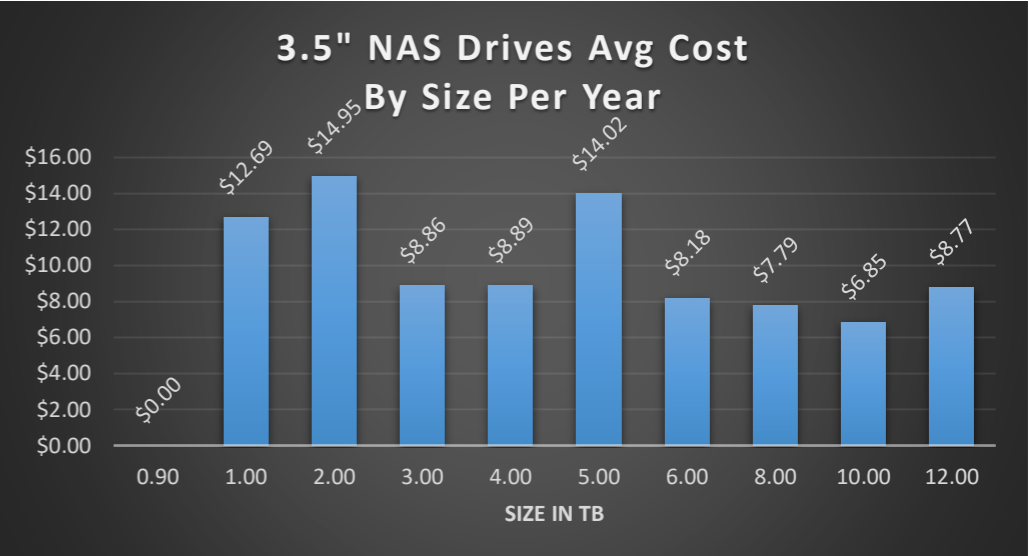
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC		
1	SPECIFICATIONS						PERFORMANCE					DURABILITY				POWER USAGE				Actual		Warranty	Normalized	Computed	TBD	Energy					
2	Date	Manu	Model	Type	ormFactc	SizTB	RPM	vgLatenc	SeekT	PerfCmp	XferRate	S	CycleCnt	WorkLoad	MTBF	RErrRate	xStartupW	Watts Active	Watts Idle	Watts Stand	Cost	\$ TB	\$+Warr	\$PerTB	\$ TB/year	Imp \$/Perf/Si	Energy\$/Year	Energy\$/Year	Energy\$/Year	Notes	
3	10/28/2017	HGST	Deskstar NAS	NAS	3.50	4.00	7,200		11.99	33%	202	3	600,000		1,000,000	1.000E+14	30.00		7.30		\$110.00	\$27.50	\$134.19	\$33.55	\$6.71					HGST drives are now owned by WD	
4	10/11/2017	HGST	Deskstar NAS	NAS	3.50	6.00	7,200		11.99	33%	227	3	600,000		1,000,000	1.000E+14	30.00		7.30		\$179.99	\$30.00	\$219.59	\$36.60	\$7.32						
5	11/2/2017	HGST	Deskstar NAS	NAS	3.50	8.00	7,200		11.99	33%	205	3	600,000		1,000,000	1.000E+14	30.00		5.10		\$229.99	\$28.75	\$280.59	\$35.07	\$7.01						
6	11/4/2017	HGST	Deskstar NAS	NAS	3.50	10.00	7,200		11.99	33%	240	3	600,000		1,000,000	1.000E+14	30.00		5.10		\$299.99	\$30.00	\$365.99	\$36.60	\$7.32						
7	9/27/2017	HGST	Travelstar 5K100		2.50	1.00	5,400	5.50	12.00	0%	99	3	600,000				4.50	1.60	0.80	0.200	\$49.99	\$49.99	\$60.99	\$60.99	\$12.20						
8	10/28/2017	HGST	Travelstar 7K100		2.50	0.10	7,200	4.20	12.00	33%	128	3	600,000				5.50	1.80	1.00	0.200	\$54.99	\$549.90	\$67.09	\$670.88	\$134.18						
9	9/6/2017	HGST	Ultrastar 7K6	NAS	3.50	2.00	7,200	4.16	8.00	33%	192	5	600,000		2,000,000	1.000E+15		9.10	7.10		\$149.34	\$74.67	\$149.34	\$74.67	\$14.93		\$8.22	\$4.11			
10	9/6/2017	HGST	Ultrastar 7K6	NAS	3.50	4.00	7,200	4.16	8.00	33%	192	5	600,000		2,000,000	1.000E+15		9.10	7.10		\$255.99	\$64.00	\$255.99	\$64.00	\$12.80		\$8.22	\$2.05			
11	9/6/2017	HGST	Ultrastar 7K6	NAS	3.50	5.00	7,200	4.16	8.00	33%	192	5	600,000		2,000,000	1.000E+15		9.10	7.10		\$381.42	\$76.28	\$381.42	\$76.28	\$15.26		\$8.22	\$1.64			
12	9/6/2017	HGST	Ultrastar 7K6	NAS	3.50	6.00	7,200	4.16	8.00	33%	216	5	600,000		2,000,000	1.000E+15		9.10	7.10		\$301.53	\$50.26	\$301.53	\$50.26	\$10.05		\$8.22	\$1.37			
13	10/25/2017	HGST	Ultrastar Archive Ha¹⁰	SMR	3.50	8.00	7,200	4.16	8.50	33%	157	5	600,000		2,000,000	1.000E+15		7.60	5.10		\$373.00	\$46.63	\$373.00	\$46.63	\$9.33		\$6.14	\$0.77	Helium filled, Shingled (SMR)		
14	10/13/2017	HGST	Ultrastar C10K1200	NAS	2.50	1.20	10,520	2.85	4.40	95%	224	5			2,000,000	1.000E+16		6.50	4.70		\$180.00	\$150.00	\$180.00	\$150.00	\$30.00		\$5.54	\$4.62			
15	10/13/2017	HGST	Ultrastar C10K1800	NAS	2.50	1.80	10,520	2.85	4.40	95%	224	5			2,000,000	1.000E+16		6.60	4.70		\$315.00	\$175.00	\$315.00	\$175.00	\$35.00		\$5.57	\$3.09			
16	10/13/2017	HGST	Ultrastar C15K600	NAS	2.50	0.60	15,030	1.99	3.10	178%	250	5			2,000,000	1.000E+17		7.50	5.80		\$259.99	\$433.32	\$259.99	\$433.32	\$86.66		\$6.73	\$11.21			
17	10/11/2017	HGST	Ultrastar He⁶	NAS	3.50	6.00	7,200	4.16	9.00	33%	195	5	600,000	550	2,500,000	1.000E+15		7.40	5.10		\$179.99	\$30.00	\$179.99	\$30.00	\$6.00		\$6.09	\$1.02	Helium filled		
18	10/11/2017	HGST	Ultrastar He⁸	NAS	3.50	8.00	7,200	4.16	8.50	33%	237	5	600,000	550	2,500,000	1.000E+15		7.40	5.10		\$285.00	\$35.63	\$285.00	\$35.63	\$7.13		\$6.09	\$0.76	Helium filled		
19	9/27/2017	HGST	Ultrastar He¹⁰	NAS	3.50	10.00	7,200	4.16	8.00	33%	237	5	600,000	550	2,500,000	1.000E+15		6.80	5.00		\$349.99	\$35.00	\$349.99	\$35.00	\$7.00		\$5.87	\$0.59	Helium filled		
20	9/27/2017	HGST	Ultrastar He¹²	NAS	3.50	12.00	7,200	4.16	8.60	33%	243	5	600,000	550	2,500,000	1.000E+15		7.20	5.30		\$619.98	\$51.67	\$619.98	\$51.67	\$10.33		\$6.22	\$0.52	Helium filled		
21	10/13/2017	HGST	Ultrastar Hs¹⁴	SMR	3.50	14.00	7,200	4.16	12.00	33%	223	5	600,000	550	2,500,000	1.000E+15		6.40	5.20			\$0.00	\$0.00	\$0.00	\$0.00			\$5.96	\$0.43	Helium filled, Shingled (SMR)	
22	9/29/2017	Seagate	BarraCuda		3.50	1.00	5,400	4.16	9.50	0%	210	2	300,000	55		1.000E+14	24.00	5.30	4.60	0.940	\$46.99	\$46.99	\$62.50	\$62.50	\$12.50		\$5.19	\$5.19			
23	10/31/2017	Seagate	BarraCuda		3.50	2.00	5,400	6.00	15.00	0%	210	2	600,000	55		1.000E+14	30.00	8.00	5.40	0.750	\$59.99	\$30.00	\$79.79	\$39.89	\$7.98		\$6.49	\$3.24			
24	10/6/2017	Seagate	BarraCuda		3.50	3.00	5,400	6.00	15.00	0%	210	2	600,000	55		1.000E+14	30.00	8.00	5.40	0.750	\$69.99	\$23.33	\$93.09	\$31.03	\$6.21		\$6.49	\$2.16			
25	11/1/2017	Seagate	BarraCuda		3.50	4.00	5,400	6.00	15.00	0%	190	2	600,000	55		1.000E+14	24.00	5.00	2.50	0.250	\$99.99	\$25.00	\$132.99	\$33.25	\$6.65		\$3.29	\$0.82			
26	10/11/2017	Seagate	BarraCuda		2.50	1.00	5,400			0%	140	2	600,000			1.000E+14	5.00	1.70	0.45		\$49.99	\$49.99	\$66.49	\$66.49	\$13.30		\$0.77	\$0.77			
27	10/11/2017	Seagate	BarraCuda		2.50	2.00	5,400			0%	140	2	600,000			1.000E+14	5.00	1.80	0.50		\$66.99	\$33.50	\$89.10	\$44.55	\$8.91		\$0.83	\$0.42			
28	10/11/2017	Seagate	BarraCuda		2.50	3.00	5,400			0%	140	2	600,000			1.000E+14	6.00	2.10	1.10		\$89.99	\$30.00	\$119.69	\$39.90	\$7.98		\$1.42	\$0.47			
29	10/11/2017	Seagate	BarraCuda		2.50	4.00	5,400			0%	140	2	600,000			1.000E+14	6.00	2.10	1.10		\$114.99	\$28.75	\$152.94	\$38.23	\$7.65		\$1.42	\$0.36			
30	7/31/2017	Seagate	BarraCuda		2.50	5.00	5,400			0%	140	2	600,000			1.000E+14	6.00	2.10	1.10		\$209.99	\$42.00	\$279.29	\$55.86	\$11.17		\$1.42	\$0.28			
31	10/11/2017	Seagate	BarraCuda Pro		3.50	2.00	7,200	4.16		33%	195	5	600,000	180		1.000E+15	24.00	7.50	4.50	0.800	\$127.99	\$64.00	\$127.99	\$64.00	\$12.80		\$5.59	\$2.79			
32	10/11/2017	Seagate	BarraCuda Pro		3.50	4.00	7,200	4.16		33%	214	5	600,000	180		1.000E+15	24.00	6.70	6.00	0.600	\$174.99	\$43.75	\$174.99	\$43.75	\$8.75		\$6.73	\$1.68			
33	5/6/2017	Seagate	BarraCuda Pro		3.50	5.00	7,200	4.16		33%	220	5	300,000	300		1.000E+15	23.28	8.37	4.42	0.800	\$214.99	\$43.00	\$214.99	\$43.00	\$8.60		\$5.71	\$1.14			
34	10/11/2017	Seagate	BarraCuda Pro		3.50	6.00	7,200	4.16		33%	180	5	300,000	300		1.000E+15	24.00	9.00	7.20	0.600	\$249.99	\$41.67	\$249.99	\$41.67	\$8.33		\$8.28	\$1.38			
35	10/11/2017	Seagate	BarraCuda Pro		3.50	8.00	7,200	4.16		33%	220	5	300,000	300		1.000E+15	24.00	6.80	4.50	0.800	\$324.99	\$40.62	\$324.99	\$40.62	\$8.12		\$5.43	\$0.68			
36	10/11/2017	Seagate	BarraCuda Pro		3.50	10.00	7,200	4.16		33%	220	5	300,000	300		1.000E+15	21.60	6.80	4.50	0.800	\$424.99	\$42.50	\$424.99	\$42.50	\$8.50		\$5.43	\$0.54			
37	11/5/2017	Seagate	BarraCuda Pro		3.50	12.00	7,200			33%	250	5	300,000	300							\$519.99	\$43.33	\$519.99	\$43.33	\$8.67						
38	10/19/2017	Seagate	Exos 10E2400	NAS	2.50	1.80	10,500	2.90		94%	270	5		550	2,000,000	1.000E+16		6.95	4.26			\$0.00	\$0.00	\$0.00	\$0.00			\$5.26	\$2.92	16GiB NAND	
39	10/19/2017	Seagate	Exos 10E2400	NAS	2.50	2.40	10,500	2.90		94%	270	5		550	2,000,000	1.000E+16		8.57	4.90		\$514.99	\$214.58	\$514.99	\$214.58	\$42.92		\$6.17	\$2.57	16GiB NAND		
40	10/19/2017	Seagate	Exos 15E900	NAS	3.50	0.90	15,000	2.00		178%	215	5		550	2,000,000	1.000E+16		7.60	5.70			\$0.00	\$0.00	\$0.00	\$0.00			\$6.66	\$7.40	8GiB NAND	
41	10/19/2017	Seagate	Exos 5E8		3.50	8.00	5,900			9%	190	3	300,000	180	800,000	1.000E+14	24.00	5.30	3.70	0.990	\$229.99	\$28.75	\$280.59	\$35.07	\$7.01		\$4.40	\$0.55	Shingled Magnetic Recording (SMR)		
42	10/19/2017	Seagate	Exos 7E2	NAS	3.50	1.00	7,200	4.16		33%	194	5		550	2,000,000	1.000E+15		7.00	4.70			\$0.00	\$0.00	\$0.00	\$0.00			\$0.00	\$0.00		
43	10/19/2017	Seagate	Exos 7E2	NAS	3.50	2.00	7,200	4.16		33%	194	5		550	2,000,000	1.000E+15		7.00	4.70		\$306.60	\$153.30	\$306.60	\$153.30	\$30.66		\$0.00	\$0.00			
44	10/29/2017	Seagate	Exos 7E2000	NAS	2.50	1.00	7,200	4.16		33%	136	5	300,000	550	2,000,000	1.000E+15		5.90	3.29	1.520	\$184.41	\$184.41	\$184.41	\$184.41	\$36.88		\$4.18	\$4.18			
45	10/19/2017	Seagate	Exos 7E2000	NAS	2.50	2.00	7,200	4.16		33%	136	5	300,000	550	2,000,000	1.000E+15		6.02	3.53	1.520	\$329.99	\$165.00	\$329.99	\$165.00	\$33.00		\$4.41	\$2.21			
46	10/19/2017	Seagate	Exos 7E8	NAS	3.50																										

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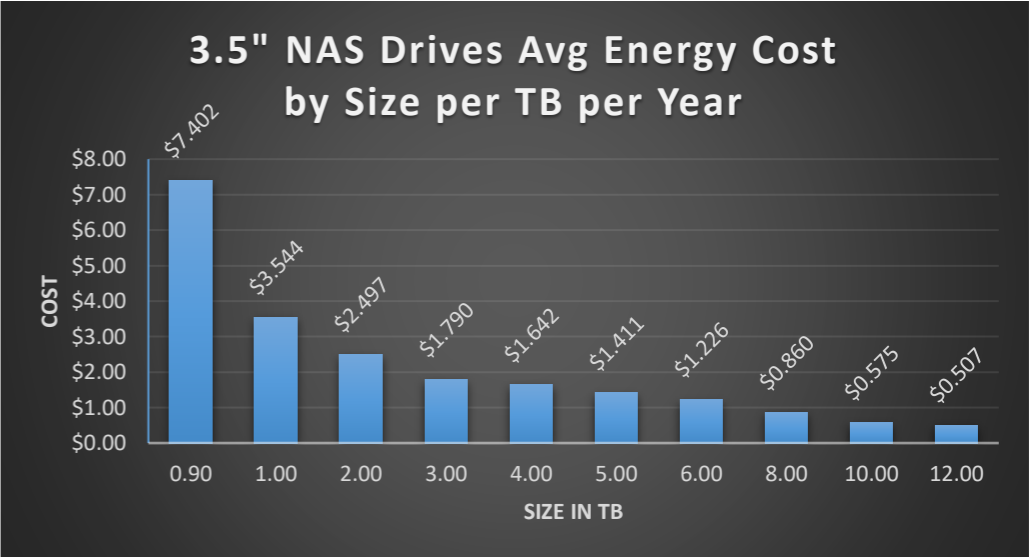
	A	B	C				D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC		
1	SPECIFICATIONS										PERFORMANCE						DURABILITY				POWER USAGE				Actual		Warranty	Normalized	Computed	TBD	Energy			
2	Date	Manu	Model	Type	ormFactc	SizTB	RPM	vgLatenc	SeekT	PerfCmp	XferRate	S	CycleCnt	WorkLoad	MTBF	RErrRate	xStartupW	Watts Activa	Watts Idle	Watts Standb	Cost	\$ TB	\$+Warr	\$PerTB	\$ TB/year	Imp \$/Perf/Si	Energy\$	Yearly	Yearly	Yearly	Notes			
79	10/11/2017	Toshiba	N300	NAS	3.50	6.00	7,200	4.17		33%	210	3		180	1,000,000	1.000E+14		10.10	6.70		\$197.97	\$33.00	\$241.52	\$40.25	\$8.05			\$8.09	\$1.35					
80	10/11/2017	Toshiba	N300	NAS	3.50	8.00	7,200	4.17		33%	240	3		180	1,000,000	1.000E+14		9.20	6.20		\$269.99	\$33.75	\$329.39	\$41.17	\$8.23			\$7.45	\$0.93					
81	10/11/2017	Toshiba	P300		3.50	1.00	7,200	4.17		33%		2									\$49.99	\$49.99	\$66.49	\$66.49	\$13.30									
82	10/7/2017	Toshiba	P300		3.50	2.00	7,200	4.17		33%		2									\$71.99	\$36.00	\$95.75	\$47.87	\$9.57									
83	11/4/2017	Toshiba	P300		3.50	3.00	7,200	4.17		33%		2									\$69.99	\$23.33	\$93.09	\$31.03	\$6.21									
84	10/11/2017	Toshiba	X300		3.50	4.00	7,200	4.17		33%		2									\$129.99	\$32.50	\$172.89	\$43.22	\$8.64									
85	10/11/2017	Toshiba	X300		3.50	5.00	7,200	4.17		33%		2									\$141.97	\$28.39	\$188.82	\$37.76	\$7.55									
86	10/29/2017	Toshiba	X300		3.50	6.00	7,200	4.17		33%		2									\$169.99	\$28.33	\$226.09	\$37.68	\$7.54									
87	10/11/2017	Toshiba	X300		3.50	8.00	7,200	4.17		33%		2									\$254.99	\$31.87	\$339.14	\$42.39	\$8.48									
88	11/7/2017	WD	Ae	SMR	3.50	6.00	5,760			7%	150	3	300,000		500,000	1.000E+14		6.50	4.80		\$159.99	\$26.67	\$195.19	\$32.53	\$6.51			\$5.63	\$0.94	SMR				
89	11/2/2017	WD	Black		2.50	1.00	7,200			33%		5	600,000			1.000E+14	5.50	1.80	0.80	0.200	\$66.99	\$66.99	\$66.99	\$66.99	\$13.40			\$1.10	\$1.10					
90	10/21/2017	WD	Black		3.50	1.00	7,200			33%	150	5	300,000			1.000E+14		6.80	6.10	0.800	\$69.99	\$69.99	\$69.99	\$69.99	\$14.00			\$6.84	\$6.84					
91	10/28/2017	WD	Black		3.50	2.00	7,200			33%	164	5	300,000			1.000E+14		9.50	8.10	1.300	\$109.99	\$55.00	\$109.99	\$55.00	\$11.00			\$9.18	\$4.59					
92	10/19/2017	WD	Black		3.50	4.00	7,200			33%	202	5	300,000			1.000E+14		9.10	5.80	1.000	\$169.99	\$42.50	\$169.99	\$42.50	\$8.50			\$7.08	\$1.77					
93	9/22/2017	WD	Black		3.50	5.00	7,200			33%	194	5	300,000			1.000E+14		10.60	7.60	1.600	\$134.99	\$27.00	\$134.99	\$27.00	\$5.40			\$8.98	\$1.80					
94	10/25/2017	WD	Black		3.50	6.00	7,200			33%	227	5	300,000			1.000E+14		9.10	7.10	1.000	\$219.99	\$36.67	\$219.99	\$36.67	\$7.33			\$8.22	\$1.37					
95	11/7/2017	WD	Blue		3.50	1.00	5,400			0%	150	2	300,000			1.000E+14					\$44.99	\$44.99	\$59.84	\$59.84	\$11.97									
96	11/4/2017	WD	Blue		3.50	2.00	5,400			0%	147	2	300,000			1.000E+14	20.76	4.10	3.00	0.400	\$59.99	\$30.00	\$79.79	\$39.89	\$7.98			\$3.53	\$1.76					
97	10/25/2017	WD	Blue		3.50	3.00	5,400			0%	147	2	300,000			1.000E+14	20.76	4.10	3.00	0.400	\$79.99	\$26.66	\$106.39	\$35.46	\$7.09			\$3.53	\$1.18					
98	10/25/2017	WD	Blue		3.50	4.00	5,400			0%	150	2	300,000			1.000E+14	21.00	5.30	3.40	0.400	\$99.99	\$25.00	\$132.99	\$33.25	\$6.65			\$4.14	\$1.04					
99	8/13/2017	WD	Blue		3.50	5.00	5,400			0%	170	2	300,000			1.000E+14	21.00	5.30	3.40	0.400	\$235.89	\$47.18	\$313.73	\$62.75	\$12.55			\$4.14	\$0.83					
100	10/11/2017	WD	Blue		3.50	6.00	5,400			0%	175	2	300,000			1.000E+14	21.00	5.30	3.40	0.400	\$196.99	\$32.83	\$262.00	\$43.67	\$8.73			\$4.14	\$0.69					
101	10/25/2017	WD	Blue		2.50	1.00	5,400			0%		2	600,000			1.000E+14	5.00	1.50	0.50	0.100	\$44.99	\$44.99	\$59.84	\$59.84	\$11.97			\$0.77	\$0.77					
102	8/13/2017	WD	Blue		2.50	2.00	5,400			0%		2	600,000			1.000E+14	5.00	1.70	0.80	0.200	\$141.99	\$71.00	\$188.85	\$94.42	\$18.88			\$1.07	\$0.54					
103	10/19/2017	WD	Gold Enterprise	NAS	3.50	1.00	7,200			33%	184	5	600,000	550	2,000,000	1.000E+15		8.10	5.90		\$74.99	\$74.99	\$74.99	\$74.99	\$15.00			\$6.95	\$6.95					
104	10/29/2017	WD	Gold Enterprise	NAS	3.50	2.00	7,200			33%	200	5	600,000	550	2,000,000	1.000E+15		8.10	5.90		\$119.99	\$60.00	\$119.99	\$60.00	\$12.00			\$6.95	\$3.47					
105	10/11/2017	WD	Gold Enterprise	NAS	3.50	4.00	7,200			33%	201	5	600,000	550	2,000,000	1.000E+15		9.00	7.00		\$164.00	\$41.00	\$164.00	\$41.00	\$8.20			\$8.11	\$2.03					
106	10/11/2017	WD	Gold Enterprise	NAS	3.50	6.00	7,200			33%	226	5	600,000	550	2,000,000	1.000E+15		9.30	7.10		\$234.99	\$39.17	\$234.99	\$39.17	\$7.83			\$8.26	\$1.38	X GIB NAND Cache				
107	11/1/2017	WD	Gold Enterprise	NAS	3.50	8.00	7,200			33%	205	5	600,000	550	2,500,000	1.000E+15		7.20	5.10		\$339.99	\$42.50	\$339.99	\$42.50	\$8.50			\$6.05	\$0.76	Helium filled				
108	11/1/2017	WD	Gold Enterprise	NAS	3.50	10.00	7,200			33%	249	5	600,000	550	2,500,000	1.000E+15		7.10	5.00		\$409.99	\$41.00	\$409.99	\$41.00	\$8.20			\$5.94	\$0.59	Helium filled				
109	10/11/2017	WD	Gold Enterprise	NAS	3.50	12.00	7,200			33%	255	5	600,000	550	2,500,000	1.000E+15		7.00	5.00</															

Disk Price
Performance Analysis

Type	NAS
FormFactor	3.50
NAS Drives Avg Cost By Size Per Year	
Row Labels	Average of \$ TB/year
0.90	\$0.00
1.00	\$12.69
2.00	\$14.95
3.00	\$8.86
4.00	\$8.89
5.00	\$14.02
6.00	\$8.18
8.00	\$7.79
10.00	\$6.85
12.00	\$8.77
Avg By Size	\$9.46

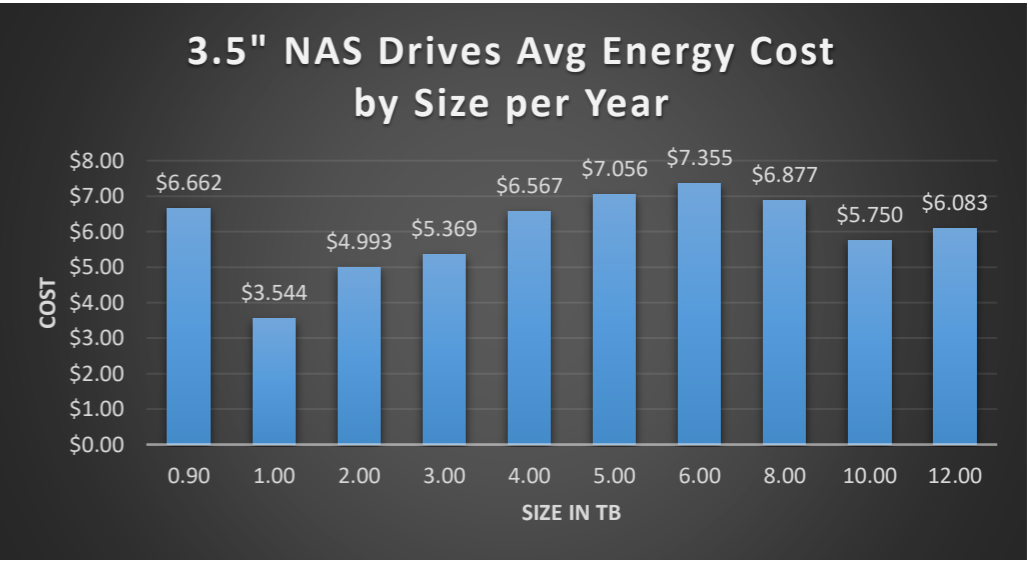


Type	NAS
FormFactor	3.50
Avg Energy Cost by Size per TB per Year	
Row Labels	Cost per TB per year
0.90	\$7.402
1.00	\$3.544
2.00	\$2.497
3.00	\$1.790
4.00	\$1.642
5.00	\$1.411
6.00	\$1.226
8.00	\$0.860
10.00	\$0.575
12.00	\$0.507
Average	\$1.571

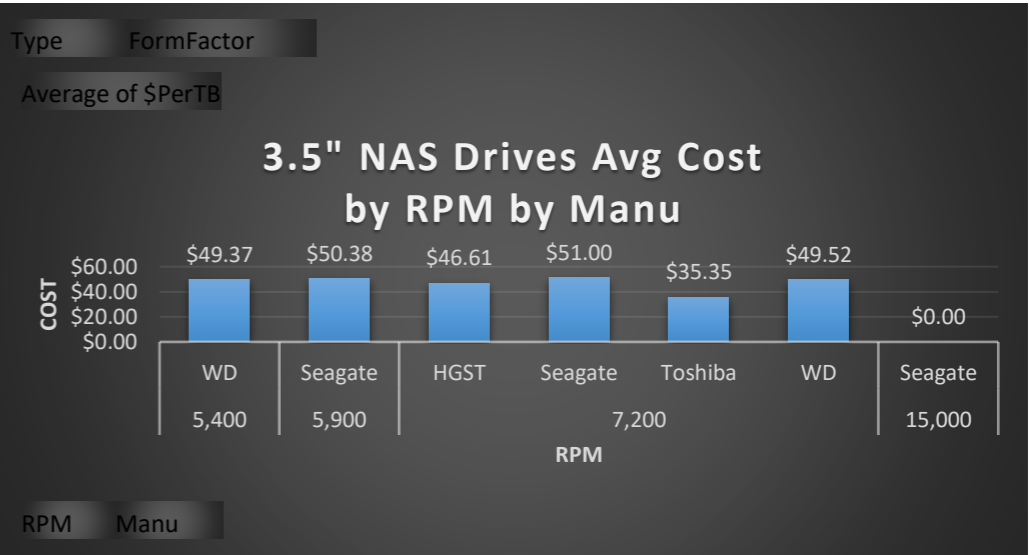


Disk Price
Performance Analysis

Type	NAS
FormFactor	3.50
Avg Energy Cost by Size per Year	
Row Labels	Average of Energy\$year
0.90	\$6.662
1.00	\$3.544
2.00	\$4.993
3.00	\$5.369
4.00	\$6.567
5.00	\$7.056
6.00	\$7.355
8.00	\$6.877
10.00	\$5.750
12.00	\$6.083
Average	\$6.113

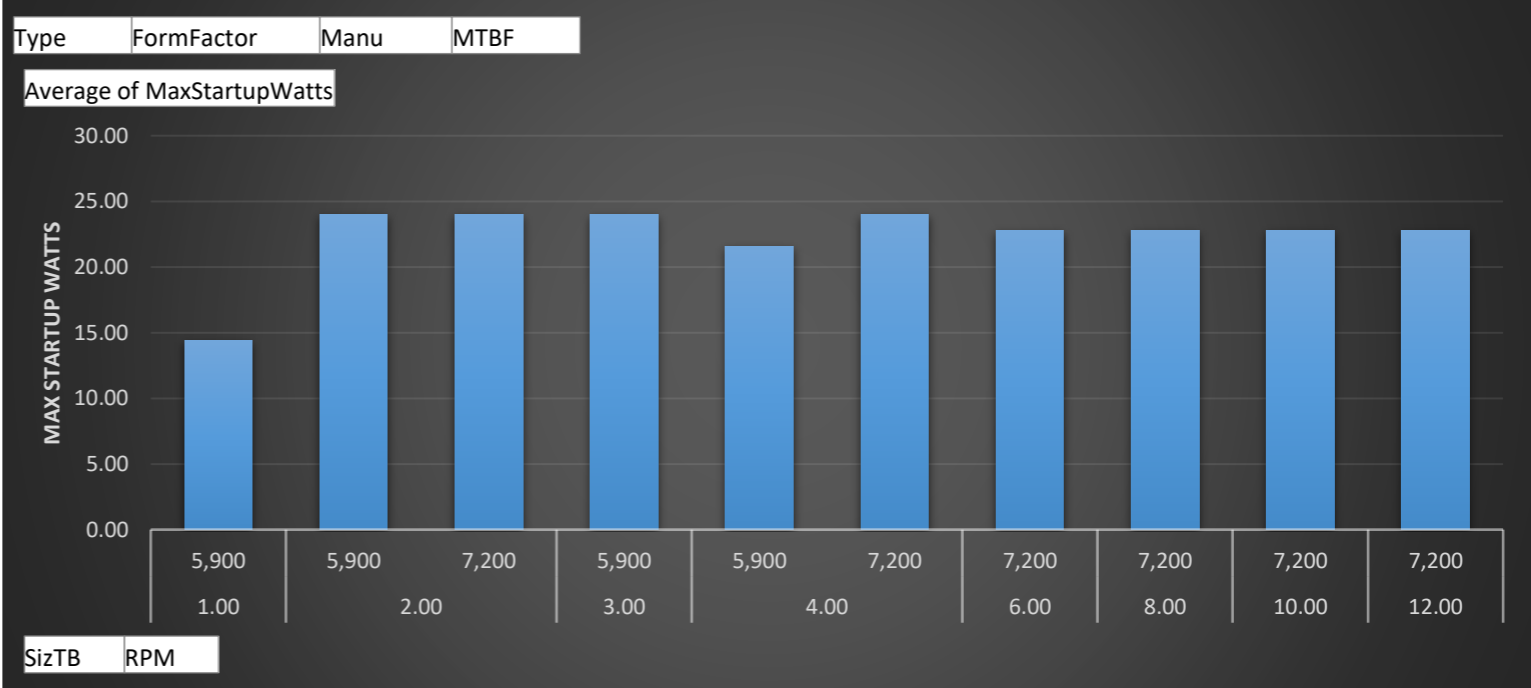


Type	NAS
FormFactor	3.50
3.5" NAS Drives Avg Cost by RPM by Manu	
Row Labels	Average of \$PerTB
5,400	\$49.37
WD	\$49.37
5,900	\$50.38
Seagate	\$50.38
7,200	\$47.78
HGST	\$46.61
Seagate	\$51.00
Toshiba	\$35.35
WD	\$49.52
15,000	\$0.00
Seagate	\$0.00

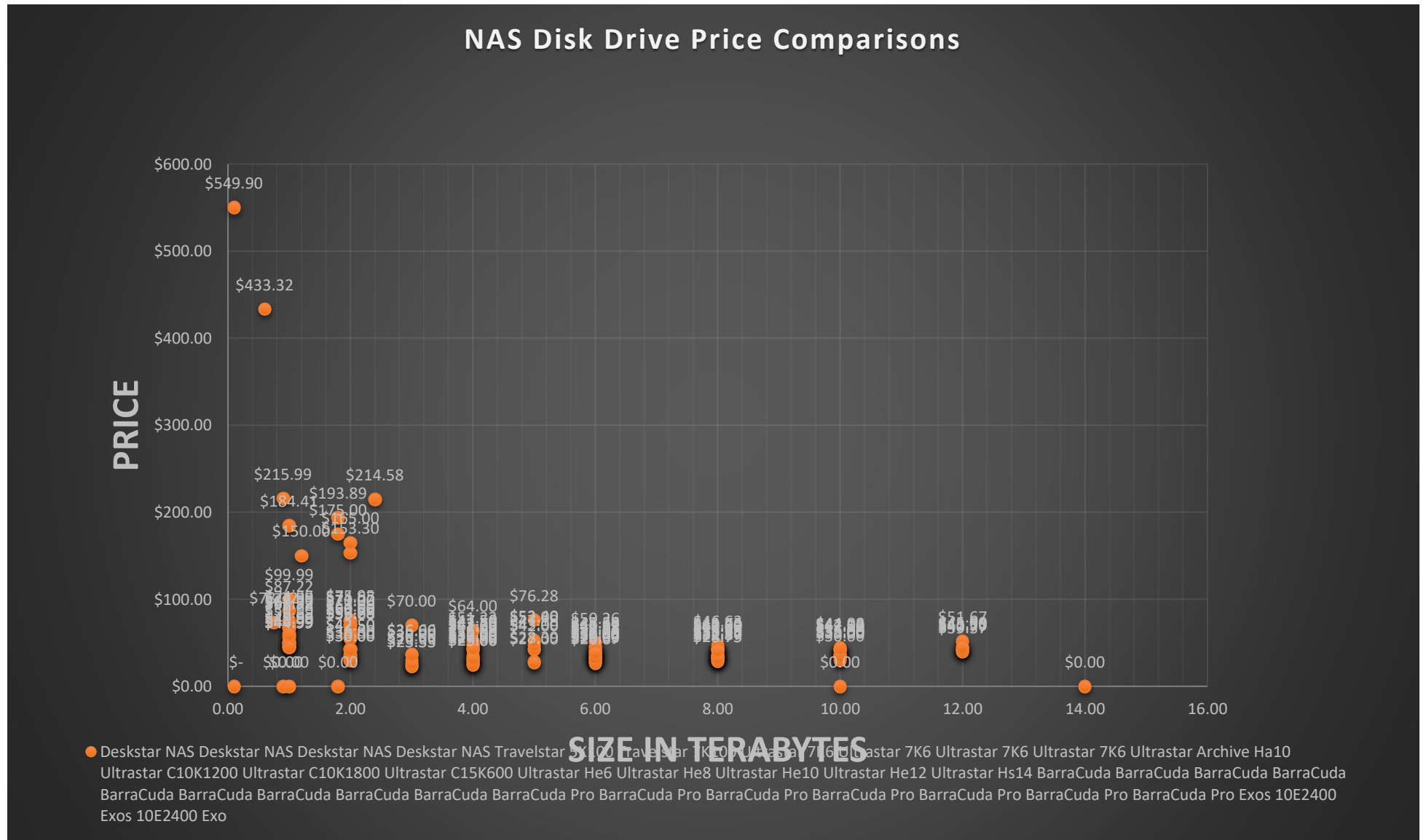


Disk Price
Performance Analysis

Grand Total		\$47.40
Type	NAS	
FormFactor	3.50	
Manu	Seagate	
MTBF	(Multiple Items)	
Row Labels		Average of MaxStartupWatts
1.00		14.40
5,900		14.40
2.00		24.00
5,900		24.00
7,200		24.00
3.00		24.00
5,900		24.00
4.00		22.80
5,900		21.60
7,200		24.00
6.00		22.80
7,200		22.80
8.00		22.80
7,200		22.80
10.00		22.80
7,200		22.80
12.00		22.80
7,200		22.80
Grand Total		22.46



These are incomplete at thi time...



Date	Manu	Model	Type	SizTB	RPM	AvgLatency	SeekT	PerfCmp	XferRate	Warnty	CycleCnt	WorkLoad	MTBF	RErrRate	kStartupW	Watts Activ	Watts Idle	attsStand	Cost	\$ TB	\$+Warr	\$PerTB	\$ TB/year	hp \$/Perf/	\$energy\$year	gy\$yearPe	Notes
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NAS

10

>100

\$2,364.02 Mean
\$370.86 Avg
\$299.99 Min
\$440.77 Max
8 Qty