

Compiled by Athena Thornton, Assistant Editor

Burner bottom	
Economizer surface per boiler, 1000 sq ft	
Air heater surface per boiler, 1000 sq ft	
Air heater type	
Drive	7.0 MW
Air-flow control	
Drive	1.0 MW
Gas flow control	
Firing	
Type	100 MW
Heating value 1000 Btu per lb	
Ash softening temperature, °F	
Drive	1000 MW
Flow control	
Number	1000 MW
Capacity, each 1000 kw	
Manufacturer	
Backpressure, psia	
No bleed points	
Full load generator pressure, psia	
Surface, 1000 sq ft	1000 MW
No water passes	
Tube material	
Total boiler capacity, new units, 1000 lb per hr	
Total generator capacity, new units, 1000 kw	

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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	52
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1956 Survey of Stationary Gas Turbines in Both Central Stations and Industry

[illegible]

1956 Survey of Stationary Gas Turbines

Compiled by Althea Thornton, Assistant Editor				Builders	No. of units	Status or date of initial operation	GENERAL CHARACTERISTICS									
OWNER	LOCATION	Name plate or rated capacity	Expected or maximum capability				Turbine inlet temperature, F	Pressure ratio	Cycle	No. of shafts	Shaft speeds 1000 rpm	No. of turbine cylinders	No. of turbine shafts in series			
Huettenwerk Rheinhausen A.G.	Rheinhausen, Germany	BB	1	1956	15,000 kw		1400	5	O	1	3.0	1				
Huettenwerk Haspe	Hagen Haspe, Germany	BB	1	1957	14,000 kw		1400	5	O	1	3.06	1				
Niederheinische Huette Duisburg	Germany	BB	1	1956	5,920 kw		1400	5	O	1	4.75	1				
Dortmund Hoerder Huettenuion AG	Dortmund, Germany	BB	1	1957	100 Mcfm		1400	5	O	1	3.06	1				
Mannesmann Huettenerwerke AG	Hoerde, Germany	BB	1	1957	96 Mcfm		1400	5	O	1	3.0	1				
	Duisburg-Mueckingen, Germany	BB	1	1957	80 Mcfm		1400	5	O	1	3.0	1				
Niederösterreichische Elektrizitätswerke, AG	Vienna, Austria	BB	1	1958	13,900 kw		1200	4.6	O	1	3.0	1				
Oesterreichische Alpine Montangesellschaft Werk	Donawitz, Austria	BB	1	1957	14,300 kw		1400	5	O	1	3.0	1				
Manifactorias Metalicas Madrilenas	Villaverde, Spain	W	1	1956	5,000 kw	6,250 kw	1350	5.8	O	1	5.74	1				
Altos Hornos de Vizcaya	Baracaldo, Spain	BB	1		26.5 Mcfm				O	1		1				
Societe Romana di Electricita	Rome, Italy	BB	1	1956	25,000 kw		1200	16	O	2	4.75/3.0	2				
Societe Set Valdarno	Livorno, Italy	BB	2	1956	22,000 kw		1200	16	O	2	4.75/3.0	2				
Tifeo	Augusta, Italy	SM	2	1957	3,600 kw	4,000 kw	842	4	FP		3.0					
Azienda Generale Italiana Petroli	Cortemaggiore, Italy	RH	1	1955	900 kw	1,000 kw	1340	4	O	2	11.5/6.0	2	2			
Societa Nazionale Metanodotti	San Donato, Italy	RH	1	1955	900 kw	1,000 kw	1340	4	O	2	11.5/6.0	2	2			
Raffinerie di Napoli	Naples, Italy	BB	1	1937	10 Mcfm											
Societe Generala de Gas si de Electricitate	Bucharest, Romania	BB	1	1948	10,000 kw		1100	12.0	O	2	4.0/3.0	2	2			
Russia	Russia	EW	1	1958	10,000 kw	12,000 kw	1250	4	C	1	6.6	1				
ASIA																
Palestine Electric Corp.	Haifa, Israel	BB	2	1957	10,000 kw		1200	4.6	O	1	3.0	1				
Electricity Board of Beirut	Beirut, Lebanon	W	1	1955	5,000 kw	6,250 kw	1350	5.8	O	1	5.74	1				
Ciments Libanais	Chekkia, Lebanon	SM	2	1957	1,500 kw	1,650 kw	842	4.0	FP	1	9.0'	1				
Anglo-Iranian Oil Co., Ltd	Agha-Jari, Iran	BB	2	1949	4,700 kw		1100	4.6	O	1	3.8	1				
Basran Petroleum Co.	Basran, Iraq	RH	3	1957	1,300 hp	1,430 hp	1340	4.0	O	2	11.5/6.0	2	2			
Iraq Petroleum Co., Ltd	Dukhan, Bahrain	BB	1	1953	4,000 kw	4,700 kw	1200	4.6	O	1	3.8	1				
Government of Bahrain	Manama "B" PP, Bahrain	BB	2	1958	6,100 kw		1200	4.6	O	1		1				
Bahrain Petroleum Co., Ltd	Bahrain Island	GE	1	1956	7,000 hp	8,750 hp	1450	6.0	O	1	6.9	1				
Saudi-Nation et National Co for El Pwr	Jeddah, Arabia	BB	2	1955	5,750 kw		1200	4.6	O	1	3.6	1				
Arabian American Oil Co.	Arabia	CB	5	1958	8,500 hp		1350	4.25	O	2	5.0/5.2	1	2			
		BB	1	1958	6,200 kw		1350	4.25	O	2	5.0/3.6	1	2			
Ministry of Finance, Riyadh Pwr Plt	Saudi-Arabia	BB	4	1957	5,000 kw		1200	4.6	O	1	3.6	1				
		BB	4	1957	6,000 kw		1200	4.6	O	1	3.6	1				
Kuwait Oil Co., Ltd	Kuwait	RH	1	1953	820 hp	900 hp	1340	4.0	O	2	11.4/6.0'	2	2			
Pakistan Industrial Development Corp.	Karachi, Pakistan	RH	1	1955	900 kw	1,000 kw	1340	4.0	O	2	11.5/6.0	2	2			
Singapore Paris Panjang Power Plant	Singapore	P	1	1-56	1,950 kw		1230	3.69	O	2	6.28/3.0	2	2			
Asiatic Petroleum Co.	Borneo	W	1	1957	5,000 kw	6,250 kw	1350	5.3	O	1	5.74	1				
Shell Petroleum Co., Ltd	Borneo	WV	1	C	4,500 kw	5,600 kw	1292	5.25	O	1	4.3	1				
Standard Vacuum Oil Co	Wakayama, Japan	W	2	1957	3,000 hp	3,750 hp	1350	4.8	O	1	8.5	1				
Hokkaido Denryoku KK	Hokkaido Tanko, Japan	EW	1	C	2,000 hp		1220	3.2	C	1	13.0	1				
Maruzen Oil Co., Ltd	Wakayama, Japan	TS	1	1956	2,000 kw		1250	4.5	O	2	5.5/4.5	2	2			
Standard Vacuum Oil Co	Palembang, Sumatra	W	2	1957	3,000 hp	3,750 hp	1350	4.8	O	1	8.5	1				
Avimana Construction Co	Australia	RH	2	1956	900 kw	1,000 kw	1340	4.0	O	2	11.5/6.0	2	2			
UNELCO	Noumea, New Caledonia	SM	1	1956	1,530 kw	1,650 kw	842	4.0	FP	1	9.0'	1				
Le Nickel	Noumea, New Caledonia	SM	1	1956	1,500 kw	1,650 kw	842	4.0	FP	1	9.0'	1				
AFRICA																
Gatsa, Tunisia	Gatsa, Tunisia	SM	1	1952	600 kw		865	3.8	FP	1	11.7	1				
Compagnie des Phosphates	Redeyef, Tunisia	SM	1	1956	1,400 kw	1,650 kw	842	4.0	FP	1	9.0'	1				
	Metlaoui, Tunisia	SM	1	1953	600 kw	660 kw	842	4.0	FP	1	11.5'	1				
		SM	1	1955	600 kw	660 kw	842	4.0	FP	1	11.5'	1				
Ciments Portland	Touran, Egypt	SM	1	1957	3,750 kw	4,000 kw	842	4.0	FP	1	3.0	1				
Raymond Arcane & Co	Alexandria, Egypt	BB	1	1949	1,200 kw		1100	3.0	O	1	6.65'	1				
UNELCO	Lome, French Togo	SM	1	1956	1,500 kw	1,650 kw	842	4.0	FP	1	9.0'	1				
Compagnie Electricite et Gas d'Algerie	Bone, Algeria	O	1	1952	730 kw		1110	3.45	O	1	5.25	1				
Williamson Diamond Mines	Shinyanga, Tanganyika	RH	1	1955	900 kw	1,000 kw	1340	4.0	O	2	11.5/6.0	2	2			
East African Power & Lighting Co., Ltd	Nairobi, Kenya	BT	2	9-54 1-56	2,500 kw		1200	4.6	O	1	3.5	1				

BUILDER

AC - Allis-Chalmers Mfg Co, USA
 AI - W H Allen Sons & Co, Ltd, England
 AR - AirResearch Mfg Co, USA
 B - Boeing Airplane Co, USA
 BB - Brown, Boveri & Co, Ltd, Switzerland
 BE - Brush Electrical Engrg Co, Ltd, England
 BT - British Thomson-Houston Co, Ltd, England
 CA - Continental Aviation and Engineering Corp, USA
 CB - Clark Brothers, USA
 DB - David Brown Limited, England
 EE - English Electric Co, Ltd, England
 EI - Elsinore Ironvold & Engrg Co, Ltd, Den
 EM - Cie Electro-Mecanique, France
 EW - Escher Wyss Ltd, Switzerland

FC - Societe des Forges et Ateliers du Creusot - Usines Schneider, France
 GE - Gasturbine Maatschappij, Holland
 G - General Electric Co, USA
 HW - Harland & Wolff, Ltd, Ireland
 JB - John Brown & Co, Ltd, Scotland
 M - Ernest Mercier (design), France
 MN - Mitsubishi-Nippon Heavy Industries, Ltd, Japan
 WV - Metropolitan-Vickers Elec Co, England
 O - Maschinenfabrik Oerlikon, Switzerland
 P - C A Parsons & Co, Ltd, England
 PR - Panhard & Parsons and Marine Engrg Turbine Research and Development Association, England

R - Societe Rateau, France
 RG - Rover Gas Turbines Ltd, England
 RH - Ruston & Hornsby, Ltd, England
 S - Sulzer Brothers, Ltd, Switzerland
 SM - SEME (Societe d'Etudes Mecaniques et Energetiques), SIGMA (Societe Indust. Generale de Mecanique Appliquee), Franco
 ST - Svenska Turbinfabrik Aktiebolaget Ljungstrom, Sweden
 So - Solar Aircraft Co, USA
 St - Stabilimento Ernesto Breda, Italy
 T - Societe Turbomeca, France
 TS - Tokyo Shibaura Electric Co, Japan
 W - Westinghouse Electric Corp, USA

GENERAL FOOTNOTES

- Thermal effy based on higher heating value of fuel unless otherwise noted
- Turbines and compressors listed in order of descending pressure for each unit
- Power shaft geared to 3600 rpm
- Based on lower heating value of fuel
- Starting combustor, catalyst case is the operating combustor
- Power shaft geared to 3000 rpm
- 120 lb per sec gas at 25 psia, 1050 F

in Both Central Stations and Industry

						PERFORMANCE		TURBINES			COMPRESSORS				REMARKS			
No. of compressors Cylinders	No. of intercoolers	No. heating stages	Combustor type	Regenerator effectiveness, %	Type of fuel	Thermal efficiency, % ^a	Work ratio	Type ^b	No. of stages	Engine efficiency, %	Cooling	Type ^b	No. of stages	Discharge pressure, psia		Compression ratio	Compression efficiency, %	
1	0	1	S	75	BG	27		A			D.S	A				5	Blast furnace air and electric generation	
1	0	1	S	75	BG	27		A			D.S	A				5	Blast furnace air and electric generation	
1	0	1	S	75	BG	26.5		A			D.S	A				5	Blast furnace gas and electric generation	
1	0	1	S	75	BG	27		A			D.S	A				5	Blast furnace gas and electric generation	
1	0	1	S	75	BG	26.5		A			D.S	A				5	Blast furnace gas and electric generation	
1	0	1	S	75	BG	26.5		A			D.S	A				5	Blast furnace gas and electric generation	
1	0	1	S	75	BG	26.5		A			D.S	A				5	Blast furnace gas and electric generation	
1	0	1	S	None	G	19.5		A			D.S	A				4.6	Electric generation	
1	0	1	S	75	BG	27		A			D.S	A				5	Blast furnace gas and electric generation	
1	0	1	M	None	GO	15.0	0.33	A	5		None	A	16	86.0		6	Electric generation	
1	0	1	S		RG			A				A					Air to Bessemer converter	
2	1	2	S	None	BO	24		A			D.S	A				16	Electric generation	
2	1	2	S	None	BO	24		A			D.S	A				16	Electric generation	
					BO	34			8			FP					Auxiliary for steam power station, output turbine by Alsthom, 5 FP engines by SIGMA for each unit	
1	0	1	S	None	G	15.9'	0.33	A	2.2	87"	D.S	A	13	61.8		4.2	83	Combined with exhaust heat boiler with optional after burning
1	0	1	S	None	G.L.O	15.9'	0.33	A	2.2	87"	D.S	A	13	61.8		4.2	83	Combined with hot water heater
																	Houdry unit	
2		2	S	None	G	21.4		A			None	A						Refinery unit
1	1	1	Ex		PC	25.5		A				A				433		Precooler and intercooler arranged for water heating
1	0	1	S	None	BO	19.5		A			D.S	A				4.6		Electric generation
1	0	1	M	None	DO	19.0	0.33	A	5			A	16	86.0		6		Power source for cement mill
2	G	1	FP	None	BO	34		A	4			FP						Fuel gas expanded through separate turbine
1	0	1	S	None	G	16.4		A			None	A	24			4.6		Drives crude oil pumps
1	0	1	S	None	G	15.9'	0.33	A	2.2	87	D.S	A	13	61.6		4.2	83	
1	0	1	S	None	G	16.4		A			None	A	24			4.6		Fuel gas expanded through separate turbine
1	0	1	S	None	G	19.0		A			D.S	A				4.6		Petroleum refinery
1	0	1	M		RG	20.0'		A	2		D	A	15	85				
1	G	1	S	None	BO	19.0		A			D.S	A				4.6		Centrifugal compressor drives
1	0	1	S	None	DO.G			A	2.1			A	13					Electric generation
1	0	1	S	None	DO.G			A	2.2			A	13					For oil field operation
1	0	1	S	None	G	17.0		A			None	A						
1	0	1	S	None	BO	19.0		A			D.S	A				4.6		
1	0	1	S	75	G			A	2.2			A	13					Crude oil pumping plant
1	0	1	S	None	C.L.O	15.9'	0.33	A	2.2	67	D.S	A	13	61.8		4.2	83	
1	0	1	75		BO.LO	21		A	2.2	85	D	A	12	54.0		3.69	84	Derated standard 2500-kw unit, at 85 F
1	0	1	M	None	G	18.6	0.33	A	5			A	16	86.0		6.0		Electric generation
1	0	1	M		G	16.5	0.354	A	5	90		A	16	76.1		5.25	85.5	
1	0	1	M	None	RG	18.0	0.33	A	4			A	14	70.0		4.9		Air and gas compressor drive for refinery
1	1	1	Ex		LO	26.0		A	5			C	5	400				
2	0	1	S	65	BO	20.0		A	3.3		None	A	10.9	66		4.5		Standby unit
1	G	1	M	None	RC	18.0	0.33	A	4			A	14	70		4.9		Air and gas compressor drive for refinery
1	0	1	S	None	LO	15.9'	0.33	A	2.2	87	D.S	A	13	61.8		4.5	83	Combined with exhaust-heat boiler
2			FP	None	GO	34.0		A	4			FP						
2			FP	None	GO	34.0		A	4			FP						
			FP		BO	35		A	4		None	FP						Output turbine built by Pennoet
			FP		FL1	34		A	4			FP						2 FP generators supplying 1 turbine
			FP		FL1	32		A	3			FP						Electric generation Pennoet turbine
			FP		FL	34		A	6			FP						5 FP generators supplying 1 turbine
1	0	1			BO	21.6		A			None	A	15			3.0		
			FP		CO	34		A	4			FP						2 FP generators supplying 1 turbine
1	0	1	S	None	BO	15.9		A	5		B.D	C	3			3.45		Waste heat recovery included
1	G	1	S	None	LO	15.9'	0.33	A	2.2	67	D.S	A	13	61.8		4.2	83	
1	0	1	R	65	BO	21.2		A	5			C	4			55.0	4.6	

- o - Power shaft geared to 1800 rpm
- p - Turbine efficiency
- q - Turbine coupling efficiency
- r - Power shaft geared to 1500 rpm
- s - Velox boiler turbine acts as combustor
- t - Model in quantity production
- u - Or 125 air hp
- w - Gas hp
- x - 20 lb per sec air at 4 atmospheres
- y - Air hp
- z - 30 delivered, 70 on order
- 1 - 10 delivered, 90 on order
- 2 - Injection rotative
- 3 - Output speed 1100 rpm, 2-stage reducer
- 4 - Escher Wyss and Fuji Denki
- 5 - Turbine and compressor in common casing

- 6 - Two compressors in series and 3 turbines in series all in common shell
 - 7 - Ambient temperature 41 F
 - 8 - Double-flow low-pressure turbine and double-flow low-pressure compressor
 - 9 - Emergency operation with fuel oil
 - 10 - Output shaft geared to 6000 rpm
 - 11 - Lb per second
 - 12 - Maximum
- STATUS**
- C - Under construction
 - D - Under development
 - O - In operation
 - Or - Overrated
 - T - Under test
- COMPRESSOR**
- A - Axial
 - AC - Combined axial and centrifugal
 - C - Centrifugal
 - FP - Free piston

- COMBUSTOR TYPE**
- A - Annular
 - CP - Chemical process
 - D - Double (2 combustors in parallel)
 - M - Multiple (usually 6 or more combustors in parallel)
 - F - Furnace
 - Ex - External heating
 - R - Refractory lined
 - S - Single
- COOLING TYPE**
- B - Blade
 - D - Disk
 - S - Stator casing
- TURBINE**
- A - Axial
 - Ra - Radial

- CYCLE TYPE**
- C - Closed cycle
 - EP - Equipressure cycle
 - FP - Free-piston cycle
 - O - Open cycle
 - S - Semiclosed cycle
- FUEL TYPE**
- BG - Blast-furnace gas
 - BO - Bunker C or boiler oil
 - CT - Coal tar
 - CS - Coal slurry
 - DO - Distillate oil
 - FD - Domestic fuel oil
 - FL - Heavy oil, varied kinds
 - GO - Gas oil
 - K - Kerosene
 - LO - Light oil
 - O - Oil, unspecified
 - P - Peat
 - PC - Pulverized coal
 - PQ - Producer gas
 - PR - Process reaction
 - RG - Refinery gas
 - RO - Residual oil
 - S - Sol. fuels
 - SG - Sewage gas
 - WH - Waste heat

in Both Central Stations and Industry

					PERFORMANCE			TURBINES			COMPRESSORS				REMARKS		
No. of cylinders	No. of intercoolers	No. heating stages	Compressor type	Regenerator effectiveness, %	Type of fuel	Thermal efficiency, %	Work ratio	Type ^a	No. of stages	Engine efficiency, %	Cooling	Type ^b	No. of stages	Discharge pressure, psia		Compression ratio	Compression efficiency, %
1	0	1	S	70	O	22		A	2.1			A	13	4.25	86		Development tests for British Navy
1	0	1	S	75	BO	22.5	0.33	A	2.2		D.S	A	13	61.8	4.2		
1	0	1	S	None	LO	15.9	0.33	A	2.2	87 ^p	D.S	A	13	61.8	4.2	83	
1	0	0	S	None	CT	15.9	0.33	A	2.2	87 ^p	D.S	A	13	61.8	4.2	83	
1	0	0	S	None	CT	15.9	0.33	A	2.2	87 ^p	D.S	A	13	61.8	4.2	83	
1	0	1	S	None	CT	16.0	0.33	A	2.2		D.S	A	13	61.8	4.2		Combined with waste heat boiler
1	0	1	S	75	LO	22.5	0.33	A	2.2		D.S	A	13	61.8	4.2		Combined with exhaust heat boiler
1	0	1	S	75	CT	22.5	0.33	A	2.2		D.S	A	13	61.8	4.2		Combined with exhaust heat boiler and spray heater
2	1	1		86	WH	25.0		A	8		None	A	10				Air transportable power plants
2	1	1		86	WH		0.27	A	8		None	A	10	161	4.4		Combined with waste heat boiler
1	0	1	S		SG BO	20.6	0.33	A	2.2	87 ^p	D.S	A	13	61.8	4.2	83	Input from heat exchange in waste flue of group of continuous vertical retorts in gas works
1	0	1	S	75	BG	24		A			D.S	A			4.6		Blast furnace air and electric generation
2	1	2	S	78	SG	26	0.37	A	3.4		D	C	2.1	69	3.2, 1.55		Unit used in large sewage disposal works. Final output 25,000 cfm, free air compressed to 7.5 psig
1				None	O	10.0		A	2			C	1		2.7	75	
1				None	O	10.0		Ra	1			C	1		2.5		
1	0	1	S		LO			A	6		None	A	14				Provides compressed air for test purposes
3	2	2	M			40						FP	3	56.0	4.0		Last two compressor stages centrifugal and in same casing
4	3	2	S	90	BO	32.0	0.43	A				A.C					Electric generation
1	0	1	S	None	LO	19		A			D.S	A				4.6	Standby and peak load, 8 FP engines built by SIGMA
1	0	1	M	None	LO	17		A	2.2		S	A	14				Standby unit, peak load
2	0	1	S	None	FD	17	0.37	A	2.2		D	A.C	6.1		2.5, 1.8		
1	0	1	S		LO	30		A	6			FP					Standby and peak load, 6 FP engines built by SIGMA, combustion chamber between generators and turbine
1	0	1	S	60	BO						None	A				3.5	Electric generation; output turbine built by Alsthom; 2 FP engines built by SIGMA for each unit
					FLI	34			4			FP					Starting synchronous compressor. Output turbine built by Alsthom; 2 FP engines built by SIGMA for this unit
					FLI	34			4			FP					Output turbine built by Alsthom
					BO	36		A	3		None	FP					
1	0	1	S	None	BO	19.5		A			D.S	A			4.6		Electric generation
1	0	1	S	75	BG	27		A			D.S	A			5.0		Blast furnace air and electric generation
1	0	1	S	80	BG	26		A	8		None	A	20				Electric generation and air supply
1	0	1	S	80	BG	26		A				A					Drives turbo-blower for blast furnace
1	0	1	S	75	BG	27		A			D.S	A			5		Electric generation and air supply
1	0	1	S	80	BG	24.8	0.31	A	6	89		A	15		4.3	87	Blast furnace air and electric generation
1	0	1	S	80	BG	24.8	0.31	A	6	89		A	15		4.3	87	Drives alternator and blast furnace blower
1	0	1	S	75	BG	26.5		A			D.S	A			5		Electric generation and air supply
					FG	32			3			FP					Blast furnace air and electric generation
																	Pumping unit, output turbine built by Penncoet under Rateau license hourly unit
1	1	1			BO	26.9		A				A					Electric generation
2	1	2	S	None	BO	24		A			D.S	A			16		Electric generation
4	0	1	M		BO	25		A	1.2, 3		None	A	10, 10	154	10.5		Electric generation
4	2	2	S	80	BO	32.4		A			None	A					Hydro standby, double flow i-p turbine, compressor
3	2	2	S	80	BO	28.7		A			None	A					Hydro standby
4	2	2	S		BO	32.0		A			None	A					Winter hydro backup
1	0	1	S	None	BO	16.5		A		86	None	A	23	61.9	4.4	84.6	Emergency standby
2	1	1	S	77	BG	22.7	0.26	A	6	86.5		A	21		7.0	87.0	Drives alternator and blast furnace blower
2	1	1	S		BO	22.7	0.28	A	6	86.5		A	21		7.0	87.0	Drives alternator and blast furnace blower
1	0	1	S	80	BG	24.8	0.31	A	6	89		A	15		4.3	87	Drives alternator and blast furnace blower
1	0	1	S	75	BG	26.5		A			D.S	A			5		Blast furnace air and electric generation
1	0	1	S	80	BG	27.5		A			None	A	19				

- Q - Power shaft geared to 1800 rpm
- P - Turbine efficiency
- R - Turbine coupling efficiency
- S - Power shaft geared to 1500 rpm
- T - Velox boiler furnace acts as combustor
- U - Model in quantity production
- V - Or 115 awh
- W - Gas hp
- X - 20 lb per sec air at 4 atmospheres
- Y - Air hp
- Z - 30 delivered, 70 on order
- 1 - 10 delivered, 90 on order
- 2 - Injection rotative
- 3 - Output speed 1130 rpm, 2-stage reducer
- 4 - Escher Wyss and Fuji Denki
- 5 - Turbine and compressor in common casing

- 6 - Two compressors in series and 3 turbines in series all in common shell
- 7 - Ambient temperature 41 F
- 8 - Double-flow low-pressure turbine and double-flow low-pressure compressor
- 9 - Emergency operation with fuel oil
- 10 - Output shaft geared to 6000 rpm
- 11 - Lb per second
- 12 - Maximum

- STATUS**
- C - Under construction
 - D - Under development
 - O - In operation
 - Dr - Crocker
 - T - Under test
- COMPRESSOR**
- A - Axial
 - AC - Combined axial and centrifugal
 - C - Centrifugal
 - FP - Free piston

- COMBUSTOR TYPE**
- A - Annular
 - CP - Chemical process
 - D - Double (2 combustors in parallel)
 - M - Multiple (usually 6 or more combustors in parallel)
 - F - Furnace
 - Ex - External heating
 - R - Refractory lined
 - S - Simple

- COOLING TYPE**
- B - Blade
 - D - Disk
 - S - Stator casing
- TURBINE**
- A - Axial
 - Ra - Radial

- CYCLE TYPE**
- C - Closed cycle
 - EP - Equipressure cycle
 - FP - Free-piston cycle
 - O - Open cycle
 - S - Semiclosed cycle

- FUEL TYPE**
- BG - Blast-furnace gas
 - BO - Bunker C or boiler oil
 - CT - Coal tar
 - CS - Coal slurry
 - DC - Distillate oil
 - FD - Domestic fuel oil
 - FL - Heavy oil, varied kinds

- FL1 - Heavy oil 1
- FL2 - Heavy oil 2
- G - Natural gas
- GO - Gas oil
- K - Kerosene
- LO - Light oil
- O - Oil, unspecified
- P - Peat
- PC - Pulverized coal
- PG - Producer gas
- PR - Process reaction
- RG - Refinery gas
- RO - Residual oil
- S - Solid fuels
- SG - Sewage gas
- WH - Waste heat

Compiled by Althea Thornton, Assistant Editor					GENERAL CHARACTERISTICS																
OWNER	LOCATION	Builder	No. of units	Status or date of initial operation	Name plate or rated capacity	Expected or maximum capability	Turbine inlet temperature, F	Pressure ratio	Cycle	No. of shafts	Shaft speeds 1000 rpm	No. of turbine cylinders	No. of turbine shafts in unit								
Admiralty	England	AI	1	1950	1,000 kw	1,250 kw	1200	4.0	O	2	3.0/8.0	2	—								
Ministry of Supply	Prestock, England	RH	1	1953	750 kw	—	1340	4.0	O	2	11.4/6.0	2	2								
Northman Manufacturing Co.	England	RH	1	1956	900 kw	1,000 kw	1340	4.0	O	2	11.5/6.0	2	2								
Michael Nairn & Co. Ltd.	Cherford, England	RH	2	1956	900 kw	1,000 kw	1340	4.0	O	2	11.5/6.0	2	2								
Crittall Manufacturing Co.	Kircaldy, Scotland	RH	1	1957	900 kw	1,000 kw	1340	4.0	O	2	11.5/6.0	2	2								
	England	RH	1	—	830 kw	1,000 kw	1340	4.0	O	2	11.4/6.0	2	2								
Air Ministry	England	RH	3	{ 52 53 }	750 kw	1,000 kw	1340	4.0	O	2	11.4/6.0	2	2								
Bank of England	Deboen, England	RH	1	—	725 kw	970 kw	1340	4.0	O	2	11.4/6.0	2	2								
West Midlands Gas Board	Coventry, England	JB	1	1952	700 kw	—	1112	4.4	C	1	9.5	1	—								
		JB	1	1955	700 kw	—	1112	4.0	C	1	9.5	1	—								
London County Council	London, England	RH	8	1957	620 kw	750 kw	1200	4.0	O	2	11.5/6.0	2	2								
Miscellaneous and Process Units																					
Sheilton Iron, Steel & Coal Co. Ltd.	Stoke-on-Trent, England	BB	1	1956	2,500 kw	—	1200	4.6	O	1	5.35	1	—								
Middlesex County Council	Isleworth, England	HW	1	T	330 hp	—	1300	2.1	O	2	14.0/5.0	2	2								
Alfred Holt & Co. Ltd.	Shoosdore	AI	5	1-56	350 kw	350 kw	1380	—	O	1	15.0	1	—								
Anglo-Saxon Petroleum Co. Ltd.	Shoosdore	AI	1	—	125 kw	125 kw	1310	—	O	1	23.0	1	—								
National Gas Turbine Establishment	Prestock, England	P	1	—	20*	—	1125	4	O	1	4.6	1	—								
FRANCE																					
Stationary Generating Units																					
Electricite de France	Paris, France	M	1	1949	15,000 kw	—	1112	4.0	EP	—	—	—	—								
	St. Denis, France	EW	1	1949	12,500 kw	—	1250	11.6	C	2	8.0/7.3.0	2	2								
	St. Dizier, France	BB	1	1956	6,080 kw	—	1200	4.6	O	1	4.75	1	—								
	Cherbourg, France	EM	1	1955	6,000 kw	6,500 kw	825	4.30	FP	1	3.0	—	—								
	Angers, France	R	1	1956	6,000 kw	—	1210	4.0	O	2	4.8/3.0	1	2								
	Garcigny, France	FC	1	C	6,000 kw	—	1292	4.5	O	2	5.2/3.0	2	2								
	Tours, France	EW	1	1956	5,500 kw	5,800 kw	1200	4.3	FP	1	7.5	—	—								
	Paris, France	R	1	—	2,000 kw	2,500 kw	1300	3.5	O	1	3.0	1	—								
	Ajaccio, France	SM	2	{ 1955 1956 }	1,500 kw	1,650 kw	842	4.0	FP	—	9.0	—	—								
	Reims, France	SM	1	1951	1,500 kw	1,700 kw	842	4.0	FP	—	9.0	—	—								
Electricite et Gaz d'Algerie	Reims, France	SM	1	1950	1,250 kw	1,400 kw	865	3.9	FP	1	9.0	1	—								
	Santa Cruz, France	BB	2	1956	11,000 kw	12,000 kw	1200	4.6	O	1	3.0	1	—								
Miscellaneous and Process Units																					
Societe Metallurgique de Knutange	Knutange, France	BB	1	1957	14,000 kw	—	1400	5.0	O	1	3.0	1	—								
		EM	1	C	14,000 kw	—	1360	5.5	O	1	3.0	1	—								
		R	1	1958	6,000 ¹ shp	—	1380	4.0	O	1	3.5	1	—								
USINOR	Denain, France	EM	1	C	14,000 kw	—	1360	5.5	O	1	3.0	1	—								
USINOR for Escandin P.P.	France	BB	1	1957	12,000 kw	—	1400	5.0	O	1	3.0	1	—								
Societe des Fonderies de Pont-a-Mousson	Pont-a-Mousson, France	S	1	1958	7,500 kw	—	1256	4.0	O	1	3.85	1	—								
Societe des Hauts-Fourneaux de la Chiers	Longwy, France	EM	1	C	7,400 kw	—	1360	5.5	O	1	4.23	1	—								
		BB	1	1957	7,300 kw	—	1400	5.0	O	1	5.4	1	—								
Cie des Eaux de la Banlieue de Paris	Suresnes, France	SM	1	1955	900 ghp	1,000 ghp	842	4.0	FP	—	11.5 ³	—	—								
Raffinerie de Berre	Berre, France	BB	1	1945	16 Mcfm	—	—	—	—	—	—	—	—								
EUROPE (Excluding France and Great Britain)																					
Swedish Power Board	Vasterik, Sweden	ST	1	1959	40,000 kw ²	—	—	—	O	—	—	—	—								
Gustafson Munitors Kraft AB Oerebro	Sweden	BB	1	1957	25,000 kw	27,500 kw	1200	16	O	2	4.75/3.0	2	—								
Osterbacken Power Plant	Varberg, Sweden	ST	1	T	10,000 kw ²	—	1292	—	O	3	7.0/5.5/3.0	3	3								
North East Power Co.	Bezau, Switzerland	BB	1	1949	27,000 kw ²	—	1112	8.0	O	2	3.0/3.0	3	—								
	Bezau, Switzerland	BB	1	1948	13,000 kw ²	—	1112	8.0	O	2	4.75/3.0	2	2								
	Wetzikon, Switzerland	S	1	1950	20,000 kw	—	1200	20.0	S	3	5.0/3.0	3	3								
Municipal Electric Supply	Neuchatel, Switzerland	BB	1	1939	4,000 kw	—	1020	4.0	O	1	3.0	1	—								
Societe Hainaut-Sambre SA	Couillet, Belgium	S	1	10-55	7,500 kw	—	1256	6.6	O	1	4.25	1	—								
Societe Anonyme Cockerill-Ougree	Seraing, Belgium	S	1	4-56	7,500 kw	—	1256	6.6	O	1	4.25	1	—								
		S	1	1957	7,500 kw	—	1256	4.0	O	1	3.35	1	—								
Miniere et Metallurgique de Rodange	Rodange, Luxembourg	BB	1	1957	7,300 kw	—	1400	5.0	O	1	5.4	1	—								
Arbed Steel Works	Dudelange, Luxembourg	BB	1	—	5,400 kw	—	1112	3.6	O	1	—	1	—								
BUILDER																					
AC — Allis-Chalmers Mfg Co, USA	FC — Societe des Forges et Ateliers du Creusot — Usines Schneider, France	R — Societe Rateau, France	GENERAL FOOTNOTES																		
AI — W. H. Allen Sons & Co., Ltd., England	RG — Rover Gas Turbines Ltd., England																				
AR — A. Research Mfg Co, USA	G — Gasturbine Maatschappij, Holland	RH — Ruston & Hornsby, Ltd., England																			
B — Boeing Airplane Co, USA	GE — General Electric Co, USA	S — Sulzer Brothers, Ltd., Switzerland																			
BB — Brown, Boveri & Co., Ltd., Switzerland	HW — Harland & Wolff, Ltd., Ireland	SM — SEME (Societe d'Etudes Mecaniques et Energetiques), SIGMA (Societe Indust. Generale de Mecanique Appliquee), France																			
BE — Brush Electrical Engrg Co, Ltd., England	JB — John Brown & Co., Ltd., Scotland	ST — Svenska Turbinfabrik Aktiebolaget																			
BT — British Thomson-Houston Co, Ltd., England	M — Ernest Mercier (design), France	Lyngstrom, Sweden																			
CA — Continental Aviation and Engineering Corp, USA	MN — Mitsubishi-Nippon Heavy Industries, Ltd., Japan	So — Solar Aircraft Co, USA																			
CB — Clark Brothers, USA	MW — Metropolitan-Vickers Elec Co, England	St — Stabilimento Ernesto Breda, Italy																			
DB — David Brown Limited, England	O — Maschinenfabrik Oerlikon, Switzerland	T — Societe Turbomeca, France																			
EE — English Electric Co, Ltd., England	P — C. A. Parsons & Co., Ltd., England	TS — Tokyo Shibaura Electric Co, Japan																			
EI — Eismore Shipping & Engrg Co, Ltd., Den	Pt — Pametrada (Parsons and Marine Engrg Turbine Research and Development Association), England	W — Westinghouse Electric Corp, USA																			
EM — Cie Electro-Mecanique, France																					
EW — Escher Wyss Ltd, Switzerland																					
a — Thermal effy based on higher heating value of fuel unless otherwise noted																					
b — Turbines and compressors listed in order of descending pressure for each unit																					
c — Power shaft geared to 3600 rpm																					
d — With reduction in ambient temperature																					
e — L-p and h-p turbines in one casing																					
f — Double flow																					
g — One Rutland unit has 85% effectiveness																					
h — Water-cooled pads facing disks																					
i — Based on lower heating value of fuel																					
k — Starting combustor, catalyst case is the operating combustor																					
m — Power shaft geared to 3000 rpm																					
n — 120 lb per sec gas at 25 psia, 1050 F																					

IN BOTH CENTRAL STATIONS AND INDUSTRY

						PERFORMANCE		TURBINES			COMPRESSORS				REMARKS		
No of compressor cylinders	No of intercooling	No heating stages	Combustion type	Regenerator effectiveness, %	Type of fuel	Thermal efficiency, %	Wsg ratio	Type ^b	No of stages	Engine efficiency, %	Cooling	Type ^b	No of stages	Discharge pressure, psia		Compression ratio	Compression efficiency, %
1	0	0	S	None	G	24		A			D.S	A			16		Electric generation
1	0	0	S	None	G	24		A			D.S	A			16		Electric generation
1	0	0	S	None	G	24		A			D.S	A			16		Electric generation
1	0	0	W	None	BO	21.1		A	2		D	A	15	85			Hydro backup and emergency standby
1	0	0	W	LC	BO	27.0		A	2		D	A	15	85			Hydro backup and emergency standby
1	0	0	S	None	G	19.0		A			D.S	A			4.6		Electric generation
1	0	0	S	None	G	19.0		A			D.S	A			4.6		Electric generation
1	0	0	S	None	G	16.6		A			None	A					
1	0	0	S	None	G	19.0		A			D.S	A			4.6		Electric generation
1	0	0	S	None	G	19.0		A			D.S	A			4.6		Electric generation
1	0	0	S	None	G	15		A			D.S	A			4.6		Electric generation
1	0	0	W	None	BO	16.0	0.33	A	4			A	14	70	4.9		Air-compressor drive for refinery
1	0	0	W	None	FL	20.0		A	3								Pennoet turbine, Bureau license, electric generation
1	0	0	W		G	20.6		A	2		D	A	15	85	6.18		Electric generation
1	0	0	W		G.DG	20.8 ^a		A	5			A	16	85	6.0		Electric generation
1	0	0	W		G.DG	19.0		A	2		D	A	16	85			Electric generation
1	0	0	W	None	BO	15.6	0.33	A	8			A	23	68	4.7		Gas-compressor drive for refinery
1	0	0	W		RO G	19.0		A	2		D	A	16	85			Electric generation
1	0	0	W		G	17.1		A	2		D	A	15	85			Electric generation
1	0	0	S	80	BO	26.2					None	A					Base load unit
1	0	0	S	None	G	16.3		A		88	None	A			4.6	89	Standby unit
1	0	0	S	None	G	15.9	0.33	A	2.2	87	D.S	A	13	61.8	4.2	83	Electric generation
1	0	0	W		G.DG	15.0		A	2		D	A	15	85			Electric generation
1	0	0	S	None	G	24		A			D.S	A			16		Electric generation at El Convento power plant
1	0	0	S		G.DG	20.2			7.6			A	12.15	206	5.6	4.4	Electric generation
1	0	0	S	None	G	24		A			D.S	A			16		Electric generation
1	0	0	S	75	G	24		A			D.S	A			4.0		Electric generation
1	0	0	S	None	G	16.4		A			None	A					
1	0	0	S	None	BO	20.7		A			None	A	16				
1	0	0	W		G	16.6	0.33	A	5			A	16	86.0	6.0		Electric generation
1	0	0			G												Electric generation
1	0	0		None	G	17		A				A		81	5.5		
1	0	0	W	None	G	15.0	0.34	A	4			A	15	75.0	5.2		
1	0	0	W		G	15.2	0.263	A	5	89 ^a		A	14	72	4.9	84.5	
1	0	0	S	None	G	15.9	0.33	A	2.2		D.S	A	13	61.8	4.2	83	
1	0	0	W	None	G	18.6	0.33	A	5			A	16	86	6.0		Gas compressor drive, pressure maintenance platform
1	0	0	W	None	G	15.5	0.33	A	1.1		D.S	A	14	78	5.5		Repressurizing drive, 2 single-stage turbines, variable inlet nozzles in 2nd stage
1	0	0	W		G.DG	20.6		A	2		D	A	15	85			Power generation, barge mounted
3	0	0		75	LC	27.9		A	7.5, 5			A	13, 10, 8 ^b	117.6	{ 2.0, 2.03 } { 2.07 }		Two 1/2 turbines in parallel, one driving 1/2 compressor, other 1/2
3	0	0		75.5	DO	24.3	0.355	A	2.6			A	15, 14	148	3.25, 3.25	85.8	
4	0	0		88	BO	30.9	0.38	A				A					Built under Escher Wyss license
1	0	0		87	F		0.30	A	5	86	None	C	3	44.2	2.9	81	
2	0	0	W	75	LC	25.0 ^a		A	6		None	A	24				Regenerator exhaust provides space heating
1	0	0	W	None	GC	16.5	0.25	A	2.2		D.S	A	14	60	4.15		For standby service
1	0	0	W		DO	17.2	0.342	A	5	85.5 ^a		A	14	71	4.9	84.5	
1	0	0	G	None	O	16.0 ^a		A	4		D.S	A, C	6.1	70.5	4.8		For standby service
1	0	0	S	87	CS		0.21	A	5	86	None	C	3	44.2	3.9	81	

- o - Power shaft geared to 1800 rpm
- p - Turbine efficiency
- q - Turbine coupling efficiency
- r - Power shaft geared to 1500 rpm
- s - Vortex boiler furnace acts as combustor
- t - Model in quantity production
- u - Oil 115 ani no
- w - Gas no
- x - 20 to psi sec air at 4 atmospheres
- y - Air no
- z - 30 delivered, 70 on order
- 1 - 10 delivered, 90 on order:
- 2 - Injection relative
- 3 - Output speed 1100 rpm, 2-stage reducer
- 4 - Escher Wyss and Fuji Denki.
- 5 - Turbine and compressor in common casing

- | | |
|----|--|
| 6 | - Two compressors in series and 3 turbines in series all in common shell |
| 7 | - Ambient temperature 41 F |
| 8 | - Double-flow low-pressure turbine and double-flow low-pressure compressor |
| 9 | - Emergency operation on with fuel oil |
| 10 | - Output shaft geared to 5000 rpm |
| 11 | - Lb per second |
| 12 | - Maximum |
-
- | | |
|------------------------|-------------------------------------|
| STATUS | COMPRESSOR |
| C - Under construction | A - Axial |
| D - Under development | AC - Combined axial and centrifugal |
| O - in operation | |
| Or - Orifice | CF - Centrifugal |
| T - Under test | FP - Free piston |

COMBUSTOR TYPE

- A - Annular
- CP - Chemical process
- D - Double (2 combustors in parallel)
- M - Multiple (usually 6 or more combustors in parallel)
- F - Furnace
- Ex - External heating
- R - Refractory lined
- S - Simple

COOLING TYPE

- | | |
|-------------------|----------------|
| B - Blade | TURBINE |
| D - Disk | A - Axial |
| S - Stator casing | Ra - Radial |

CYCLE TYPE

- C - Closed cycle
EP - Equipressure cycle
FP - Free-piston cycle
O - Open cycle
S - Semiclosed cycle

FUEL TYPE

- BG - Blast-furnace gas
 BO - Bunker C or boiler oil
 CT - Coal tar
 CS - Coal slurry
 DO - Distillate oil
 FO - Domestic fuel oil
 FL - heavy oil, varied kinds

FL1-Heavy oil 1

- FL2 - Heavy oil 2
G - Natural gas
GO - Gas oil
K - Kerosene
LO - Light oil
O - Oil, unspecified
P - Peat
PC - Pulverized coal
PG - Producer gas
PR - Process reaction
RG - Refinery gas
RO - Residual oil
S - Solid fuels
SG - Sewage gas
WH - Waste heat

1956 Survey of Stationary Gas Turbines

Compiled by Althea Thornton, Assistant Editor		Builder	No. of units	Status or date of initial operation	GENERAL CHARACTERISTICS									
OWNER	LOCATION				Name plate or rated capacity	Expected or maximum capability	Turbine inlet temperature, F	Pressure ratio	Cycle	No. of shafts	Shaft speeds 1000 rpm	No. of turbine cylinders	No. of turbine wheels in series	

CANADA

British Columbia Electric Company	Vancouver, Canada	BB	4	1958	23,000 kw	27,000 kw	1200	16	O	2	4.75/3.0	2	
City of Edmonton	Edmonton, Canada	BB	2	1957	20,000 kw	30,000 kw	1200	16	O	2	4.75/3.0	2	
Calgary Power	Canada	BB	1	1957	20,000 kw	30,000 kw	1200	16	O	2	4.75/3.0	2	
British Columbia Power Commission	Vancouver Island, Canada	GE	2	C	16,300 kw	20,650 kw	1450	6.0	O	1	3.6	1	
			2		15,200 kw	20,650 kw	1450	6.0	O	1	3.6	1	
Canadian Utilities Limited	Sturgeon Lake, Canada	BB	1	1957	6,200 kw	9,000 kw	1200	4.6	O	1	3.6	1	
	Edmonton, Canada	BB	1	1958	5,000 kw	10,000 kw	1200	4.6	O	1	3.6	1	
	Vermilion, Canada	BB	1	1954	5,900 kw	7,400 kw	1200	4.6	O	1	3.6	1	
	Regina, Canada	BB	2	1958	6,200 kw	9,000 kw	1200	4.6	O	1	3.6	1	
Saskatchewan Power Corp.	Lethbridge, Canada	BB	1	1958	6,200 kw	9,000 kw	1200	4.6	O	1	3.6	1	
City of Lethbridge	Lethbridge, Canada	BB	1	1958	6,200 kw	9,000 kw	1200	4.6	O	1	3.6	1	
Western Chemicals	Elk Point, Canada	BB	1	1957	6,200 kw	9,000 kw	1200	4.6	O	1	3.6	1	

LATIN AMERICA

Stationary Generating Units

Esso Standard Oil Company	Belof, Cuba	W	1	1957	3,000 hp	3,750 hp	1350	4.8	O	1	8.5	1	
Carvezena Modelo	Havana, Cuba	SM	1	1953	500 kw	560 kw	342	4.0	FP	1	11.5 ^d	1	
Planta Elctrica de Grupo Industrial	Monterrey, Mexico	GE	2	C	16,000 kw	20,650 kw ^e	1450	6.0	O	1	3.6	1	
Altos Hornos de Mexico	Coahu, Mexico	GE	1	C	8,100 kw	...	...	...	O	1	5.74 ^e	1	
			2		7,500 kw	9,375 kw	...	6.0	O	1	4.63 ^e	1	
Lago Oil & Transport Co.	Aruba, B.W.I.	W	1	1957	1,800 hp	2,250 hp	1350	4.6	O	1	8.75	1	
Industria Colombiana de Fertilizantes	Bermeja, Colombia	GE	2	C	7,500 kw	9,375 kw	...	6.0	O	1	4.63 ^e	1	
Empresa Colombiana de Petroleos	El Centro, Colombia	GE	2	1957	5,000 kw	6,250 kw	1450	6.0	O	1	6.9 ^e	1	
Lima Light, Power & Tramway Co.	Lima, Peru	BB	1	1949	10,000 kw	...	1100	8.0	O	2	4.75 ^m /3.0	2	2
Corpo Peruano del Santo	Carmote, Peru	BB	1	1949	4,000 kw	4,225 kw	1100	4.6	O	1	3.6	1	
Anglo Ecuadorian Oilfields	Ancon, Ecuador	RH	1	1956	800 kw	1,000 kw	1340	4.0	O	2	11.5/6.0	2	2
Electricidad de Caracas	Caracas, Venezuela	GE	1	C	21,800 kw	...	1450	6.0	O	1	3.29 ^m	1	
		BB	1	1957	20,000 kw	...	1200	16	O	2	4.75/3.0	2	
		BB	4	12-56	20,000 kw	...	1200	...	O	2	4.75/3.0	2	1
Shell Caribbean Petroleum Co.	Las Morochas, Venezuela	BB	1	1958	20,000 kw	...	1200	16	O	2	4.75/3.0	2	
CA Venezolana de Cementos	Portigalete, Venezuela	BB	2	1954	5,000 kw	...	1200	4.0	O	1	3.6	1	
		BB	1	1954	5,000 kw	...	1200	4.6	O	1	3.6	1	
		BB	2	1949	1,550 kw	...	1100	3.0	O	1	5.23 ^o	1	
Vene Grande Oil Co.	San Tome, Venezuela	W	2	1955	5,000 kw	6,250 kw	1350	5.8	O	1	5.74	1	
			1	1957	...	...	...	...	O	...	...	...	
WV De Bataafsch Petroleum Maatschappij	Venezuela	G		Or	2,000 kw	...	...	...	O	...	...	...	
Shell Oil Co.	Maracaibo, Venezuela	G	1		2,000 kw	...	1112	5.5	O	1	5.0	1	
Shell Petroleum Co., Ltd.	Maracaibo, Venezuela	WV	1	T	1,750 kw	2,000 kw	1185	5.2	O	1	7.0	1	
Shell Petroleum Co., Ltd.	Venezuela	WV	1	1955	1,750 kw	1,750 kw	1182	4.9	O	1	7.0	1	
CA Cemento Carabobo	Valencia, Venezuela	RH	4	1956	300 kw	1,000 kw	1340	4.0	O	2	11.5/6.0	2	2

Miscellaneous and Process Units

Oreole Petroleum Corp.	Lake Maracaibo, Venezuela	W	12	1956	8,000 hp	8,750 hp	1350	5.8	O	1	6.0	1	
		GE	10	1953	5,300 hp	...	1450	5.5	O	2	6.3/5.0	1*	2
		GE	1	1957	16,500 kw	20,650 kw	1450	6.0	O	1	3.6	1	

GREAT BRITAIN

Stationary Generating Units

Central Electricity Authority	Dunston, England	P	1	1955	15,300 kw	...	1200	8.0	O	3	3.0/2.9/2.9	3	2
Central Electricity Authority	Manchester, England	WV	1	1952	15,300 kw	15,000 kw	1200	10.1	O	2	5.5/3.0	2	2
North of Scotland Hydro-Electric Board	Dundee, Scotland	JB	1	1953	12,500 kw	...	1250	10.0	C	2	8.5/3.0	2	2
	Altnabreac, Scotland	JB	1	1957	2,300 kw	...	1220	3.6	C	1	12.75	1	
National Gas Turbine Establishment	Prestock, England	P	1		10,000 kw	...	1200	5.5	O	2	2.3/3.0	2	
Metropolitan Water Board	Asnford, England	BE	1	T	2,500 kw	...	1340	4.0	O	2	6.4/3.0	2	2
		WV	1	1955	2,500 kw	2,500 kw	1292	4.9	O	1	7.0	1	
		EE	1	T	1,375 kw	2,250 kw	1400	4.8	O	2	8.25/7.0 ^m	1	2
National Coal Board	Rhodes, Scotland	JB	1	1958	2,000 kw	...	1220	3.6	C	1	12.75	1	

BUILDER

AC - Allis-Chalmers Mfg Co, USA
 AL - W. H. Allen Sons & Co, Ltd, England
 AR - Air-Ranch Mfg Co, USA
 B - Boeing Airplane Co, USA
 BB - Brown, Boveri & Co, Ltd, Switzerland
 BE - Brush Electrical Engng Co, Ltd, England
 BT - British Thomson-Houston Co, Ltd, England
 CA - Continental Aviation and Engineering Corp, USA
 CB - Clark Brothers, USA
 CB - David Brown Ltd, Eng and
 EE - English Electric Co, Ltd, England
 EI - E. I. du Pont de Nemours & Engng Co, Ltd, Den
 EW - E. W. French-Mechanical, France
 EA - Escherich, Swiss, Ltd, Switzerland

FD - Societe des Forges et Ateliers du Creusot - Usines Schneider, France
 G - Gasturbine Maatschappij, Holland
 GE - General Electric Co, USA
 HW - Harland & Wolff, Ltd, Ireland
 JB - John Brown & Co, Ltd, Scotland
 M - Ernest Mercier (design), France
 MN - Mitsubishi-Nippon Heavy Industries, Ltd, Japan
 WV - Metropolitan-Vickers Elec Co, England
 O - Maschinenfabrik Oerlikon, Switzerland
 P - C. A. Parsons & Co, Ltd, England
 PH - Palmira, Parsons and Marine Engng Turbine Research and Development Association, England

R - Societe Rateau, France
 RG - Rover Gas Turbines Ltd, England
 RH - Ruston & Hornsby, Ltd, England
 S - Sulzer Brothers, Ltd, Switzerland
 SM - SEME (Societe d'Etudes Mecaniques et Energetiques), SIGMA (Societe Indust. Generale de Mecanique Appliquee), France
 ST - Svenska Turbinfabrik Aktiebolaget Ljungstrom, Sweden
 So - Solar Aircraft Co, USA
 St - Stabilimento Ernesto Breda, Italy
 T - Societe Turbomeca, France
 TS - Tokyo Shibaura Electric Co, Japan
 W - Westinghouse Electric Corp, USA

GENERAL FOOTNOTES

a - Thermal effy based on higher heating value of fuel unless otherwise noted
 b - Turbines and compressors listed in order of descending pressure for each unit
 c - Power shaft geared to 3600 rpm
 d - With reduction in ambient temperature
 e - Lfp and Hfp turbines in one casing
 f - Double flow
 g - One Rutland unit has 85% effectiveness
 h - Water-cooled gas facing disks
 j - Based on lower heating value of fuel
 k - Starting combustor, catalyst case is the operating combustor
 m - Power shaft geared to 3000 rpm
 n - 120 lb per sec gas at 25 psia, 1050 F

Small Auxiliary and Experimental Units

					PERFORMANCE			TURBINES			COMPRESSORS				REMARKS		
No. cylinders	No. of intercoolers	No. heating stages	Combustor type	Regenerator effectiveness, %	Type of fuel	Thermal efficiency, %	Work ratio	Type ^a	No. of stages	Engine efficiency, %	Cooling	Type ^b	No. of stages	Discharge pressure, psia		Compression ratio	Compression efficiency, %
2	1	1	M	75	G.O.	27.0	0.33	A	7			A	29	113.5	8.0		Electric generation
1	0	1	D	53	PC	19.5	0.30	A	6	87.5	D	A	20	75.1	5.2	84	For coal burning operation
1	0	1	S		DO	15.9 ^c	0.33	A	2.2	67	D.S	A	13	61.8	4.2	83	Demonstration unit
2	1	1		75	LO	28		A	5.3			A	11,13	80.8	2.2/2.6		H-p turbine drives load and h-p compressor
1	0	1			LO			A	6	86	None	A	14	59.5	4.05	83	Supplies variable air conditions for experimental rigs
1	0	1		75	LO BO	24.5		A	2.2	85.2	D	A	12	55.8	3.8	84.2	Prototype standard set
1	0	1		75	O PC	15.6		A	8			A	25		4.0	81	Used for oil and pulverized coal tests
1	0	1	D	60	O.G	22.9 ^c		A	4		D.S	A,C	6.1	70.5	4.8		Shop test engine
1	0	1	D	56	O	20.5	0.34	A	1.4	86	D.B	A	11	46.6	3.2	86	Shop power supply
1	0	1		60	PC			A	4		D.S	A,C	6.1	70.5	4.8		For coal and gas burning tests
1	0	1	S	None	PC			A	5	89		A	14	76.2	5.3	85	For coal burning tests
1	0	1		None		17.0	0.26	A	2	85	D.S	A	16	71.2	4.9	82	Stator cooling on both turbines
2	1	2	S		LO BO	29*	0.38	A ^d	13.8	86		A	{ 17 11	{ 76.7 29.9	{ 2.63 2.05	{ 87 84	Prototype marine propulsion unit under shop test
1	0	2	S	70	LO	19.8		A	2.1	85	D	A	13	60	4.25	86	Separate boost turbine drives blower for combustion tests
1	1	1	S	90	DO	43	0.285	A	5	88	None	C	3	230	3.5	81	Long-life generator set for British Navy
1	0	1	S	75	P	22.0	0.33	A	2.2		D.S	A	13	61.8	4.2		Efficiency based on gas hp output
1	0	1	D	75	BO	23.4	0.33	A	2.2		D.S	A	13	61.8	4.2		Shop unit for testing solid fuels
1	0	1	S	75	O	22.5											Exhaust heat dries incoming wet peat
1	0	1	S	None	DO	8.75		Ra	1			C	1		2.4		Both generate part of factory power supply
1	0	1	S*	None	BO			A	5			A	10		4		Emergency generator set for British Navy
3	2	1	S	92	BO	31.5	0.39	A	6	90.3		A	13.9		1.6		Shop test unit for Velox boiler
1	2	2	Ex		PC	26		A	5			C	3	400			Precooler and intercooler used for water heating
2	1	1	S	76	BO	22.6	0.32	A	5.5	84	None	C	3	4.0	4.0	88	Shop test unit
			FP		FD	34		A	4								Efficiency based on kw/hr generator output
			FP		FL2	43											Efficiency based on gas output
2	1	1			BO	29		A				A					For plant power generation
1	0	1	S		O	15.0		A	3			A	16				Test unit in Vitzly steam station
					K			2	86	None							Turbine only, supplied by compressed air
2	1	2	S	90	LO	31	0.37	A	8	86	None	A	24	71	5.0	83	Experimental marine unit
1	0	1	M	50	LO	21		A	5			A	14		3.9	90	Shop test unit
																	Experimental unit
2	1	2	S	None	BO	13		A	4			A	20				For Railway Technical Research Institute
1	0	1	S	75	BO	31	0.325	A	4	86	D	A,AC	11,5.1	142	3.2,3.1	92,88	Experimental unit
					K	13	0.31	A	1.1	87	D	C	1	54.1	3.75	80	Expected to be completed summer 1956
	0	1	S		DO			Ra	1			None					Airborne unit depends on pressurized hot air source
	0	1	S		DO			Ra	1			C	2				Airborne auxiliary power unit
	0	1	S		DO	9.8		Ra	1			C	2		3.4		Airborne auxiliary and ground support source of bleed-air power
	0	1	S		DO	9.9		Ra	1			C	2		3.5		Airborne and ground support unit to provide bleed-air power
	0	1	S		DO	9.7		Ra	1			C	2		3.5		Air transportable source of bleed air for ground support
	0	1	S		DO	7.9		Ra	1			C	2		3.4		Airborne auxiliary power unit, shaft hp or bleed air
1	0	1	D		LO	14	0.345	A	1.1	82.5		C	1	60.0	4.1	75	Shaft power, supersedes 175 hp unit
1	0	1	D		LO	14	0.345	A	1.1	82.5		C	1	62.0	4.1	75	Output turbine drives 1-stage compressor supersedes 140 hp unit
1	0	1	D		LO	11	0.345	A	1.1	80.5		C	1	45.5	3.1	73	Out of production-superseded by 240 hp unit
1	0	1	D		LO	11	0.349	A	1.1	80.5		C	1	45.5	3.1	73	Out of Production-superseded by 205 hp unit
1	0	1	A		DO	9.5		Ra	1			C	1				Portable pumping, generating, process heat applications
			A		DO			A	2			C	1		3.85		Portable air compressor drive for aircraft ground support
			A		DO			A	2			C	1				Portable air compressor drive for aircraft ground support
1	0	1	S	None	DO,G	10.4	0.35	A	1	83.7	D.S	C	1	44.8	3.09	77.4	Drives water pumps, electric generators
1	0	1	S		DO	7		Ra	1			C	1	34.6	2.35		Electric generation
1	0	1	S		GO	15		A	3			A	10	61	4.15		Compressed air and shaft power
1	0	1	S		DO,K	7		Ra	1			C	1	37.6	2.56		Pumping or air bleed
1	0	1	S		DO,K	15		A	3			A	10	67.6	4.6		Shipboard generator set
1	0	1	S		DO,K	15		A	2.1			A	10	67.6	4.6		Boat propulsion unit suited for stationary applications
1	0	1	A	None	LO			A	2			C	1				Helicopter ground auxiliary drive
1	0	1	A	None	LO			A	3			C	1				Helicopter ground auxiliary drive
1	0	1		None	LO			A	2			C	1				Helicopter compressed air supply
1	0	1		None	LO			A	1.1			C	1				For starting equipment
1	0	1			K			A	2			C	1				Air conditioning aircraft cabins on ground, warming up engines
1	0	1	FP		FL2	32		A	3			FP	1				

Plants in the United States and Canada

Date of initial operation	Initial capacity, hp	Added capacity, no. of units	Date of added capacity	Ultimate capacity, hp	No. of units installed	Waterwheel capacity, hp	Waterwheel type	Speed, rpm	Static head, ft	Design head, ft	Waterwheel manufacturer	Governor manufacturer	Scroll case, concrete or steel	Penstock valve, type	Generator capacity, kw	Synchronizing, manual or automatic	Thrust-bearing location	Design power factor	Kilowatts	Generator manufacturer
1956	6,000			6,000	2	3,000	Propeller	120	20	20	JL	W	Concrete	Head gate	2,500	Automatic	BG	0.80	2.4	WE
1956	4,500			4,500	3	1,500	Francis	257	40	40	MS	L	Plate steel	Head gate	1,000	Manual	HS	0.80	0.48	WE
1956	7,175	1	1956	10,100	4	2,525	Propeller	120	20-8	20	MS	L	Concrete	Head gate	2,000	Semi-auto	AG	0.80	4.15	GE
1956	780			780	1	780	Impulse	831	672	822	MS		Cast steel							
1956	220,000			220,000	4	55,000	Francis	128.6	159-119	150	MS	W	Plate steel	Head gate	39,000	Manual	BG	0.90	13.8	WE
1956	2,400			2,400	1	2,400	Francis	400	55-52	57	JL	W	Concrete	Head gate	2,000	Manual	AG	0.80	4.16	GE
1956	200			200	1	200	Francis	360	30	30	MS									
1956	600			600	1	600	Francis	200	28	28	JL		Concrete	Head gate	500	Manual	AG	0.80	0.6	WE
1956	370			370	1	370	Francis	180	18	18	JL		Concrete	Head gate	312	Manual	AG	0.80	0.6	WE
1955	57,000			57,000	1	57,000	Kaplan	138.5	99-72	96	AC	W	Plate steel	Head gate	43,750	Auto or man.	AG	0.80	11.5	AC
1958	1,200,000			1,200,000	6	75,000	Propeller	94.73	86-79	81	AC	AC	Concrete	Head gate	60,000	Auto or man.	BG	0.90	13.8	GE
1955	30,600			30,600	1	30,600	Francis	120	104	101	MS	W	Plate steel	Head gate	25,000	Automatic	BG	0.90	11.5	GE
1955	30,600			30,600	1	30,600	Francis	120	102	101	MS	W	Plate steel	Head gate	25,000	Automatic	BG	0.90	11.5	GE
1956	18,650			18,650	1	18,650	Francis	112.5	69	67	MS	W	Plate steel	Head gate	15,000	Automatic	BG	0.90	6.9	AC
1957	32,000			32,000	1	32,000	Francis	120	105	104	MS	W	Plate steel	Head gate	25,000	Automatic	BG	0.90	11.5	GE
1957	686			686	1	686	Francis	900	115	115	JL	W	Concrete	Butterfly	6,750	Semi-auto.	AG	0.80	0.44	EC
1956	6,200	1	1956	20,800	1	6,200	Francis	514	258-258	236	JL	W	Welded pl st	Gate valve	6,750	Semi-auto.	AG	0.80	6.9	EC
1955	1,067			1,067	2	511	Francis	181	25	25	JL		Concrete	Head gate		Drives mill machinery				
1956	440			440	1	440	Impulse	600	435	435	MS		Cast steel							EC
1956	7,500			3,750	2	3,750	Kaplan	180	30	30	MS		Concrete	Head gate	3,000	Manual	AG	0.80	4.16	EM
1955	11,690	1	1955	11,690	1	2,800	Francis	240	63	63	MS		Concrete	Head gate	Connects to existing GE generator					
1955	650			650	1	650		225							500	Manual	HS	0.80	0.48	WE
1955	143			143	1	143	Francis	82	5	8	JL		Open flume	Head gate		Drives mill machinery				
1956	294			294	1	294	Francis	218	22	22	JL		Concrete	Head gate		Drives mill machinery				
1955	264,000	1	1956	440,000	3	88,000	Francis	90	187-100	150	BL	W	Plate steel	Head gate	84,210	Manual	BG	0.95	13.8	GE
1956	170,000			425,000	2	85,000	Francis	94.7	210-130	170	BL	W	Plate steel	Head gate	65,000	Manual	BG	0.95	12.8	GE
1954	450,000	3	1955	450,000	8	57,500	Francis	85.7	145-75	112	AC	W	Plate steel	Head gate	42,105	Manual	BG	0.95	13.8	WE
1956	162,000	2	1957	162,000	3	54,000	Kaplan	75	66-40	46	BL	W	Concrete	Head gate	35,100	Manual	BG	0.95	13.8	GE
1955	340			340	1	340	Francis	300	26	26	JL		Concrete	Head gate		Connects to existing Westinghouse generator				
1955	400			400	1	400	Propeller	277	20	20	JL		Concrete	Head gate	375	Manual	AG	0.80	0.48	GE
1955	140,000			140,000	4	35,000	Kaplan	128.6	82-36	74.5	NN	W	Concrete	Head gate	27,800	Automatic	BG	0.90	14.4	GE
1955	12,570			12,570	1	12,570	Francis	600	520-458	502	MS	W	Plate steel	Butterfly	12,000	Auto or man.	AG	0.90	4.16	GE
1957	70,000			70,000	3	23,333	Kaplan	128.6	64-50	56.5	NN	W	Concrete	Head gate	19,610	Auto or man.	BG	0.85	6.9	WE
1955	250			650	1	650	Francis	164	15	15	JL		Concrete	Head gate		Connects to existing Electric Machinery generator				
1956	118,400			118,400	2	55,000	Francis	100	170-104	136	NN	PB	Plate steel	Head gate	44,444	Manual	BG	0.90	13.8	WE
					1	8,500	Francis	277	170-104	136	JL	PB	Plate	Head gate	5,567	Manual	AG	0.90	13.8	WE
					2	3,600	Francis	100	33-10	30	NN	W	Concrete	Head gate	2,750	Manual	AG	0.80	2.3	GE
1956	7,200		1930	18,200	1	6,000	Propeller	128.5	33-10	30	NN	W	Concrete	Head gate	5,000	Manual	AG	0.80	2.3	GE
			1942		1	5,000	Kaplan	128.5	33-10	30	NN	W	Concrete	Head gate	4,500	Manual	AG	0.80	2.3	GE
			1955		1	7,000	Kaplan	200	65-59	60	JL	W	Plate steel	Head gate	6,250	Manual	HS	0.80	4.16	AC
1955	25,600	2	1955	39,600	2	14,000	Terry	75	32-14	26	NN	W	Concrete	Head gate	11,111	Manual	BG	0.90	13.8	WE
1955	42,000			42,000	3	14,000	Terry	75	32-14	26	NN	W	Concrete	Head gate	11,111	Manual	BG	0.90	13.8	WE
1955	21,000			21,000	1	21,000	Francis	180	166-76	124	JL	W	Plate steel	Head gate	16,667	Automatic	BG	0.90	13.8	WE
1940	80,000		1955	160,000	1	80,000	Francis	120	195	190	NN	W	Plate steel	Head gate	64,000	Manual	BG	0.90	13.8	WE
as a 102,000-hp, 3,900-cfs, 205-ft head pump						80,000	Francis	105.9	195	190	AC	AC	Plate steel	Head gate	70,000	Manual	BG	0.90	13.8	AC
1952	180,000			180,000	4	45,000	Kaplan	75	60-25	45	BL	W	Concrete	Head gate	31,250	Manual	BG	0.80	13.8	GE
1952	60,000			60,000	3	20,000	Kaplan	60	32	32	NN	W	Concrete	Head gate	13,333	Manual	BG	0.90	13.8	WE
1958	138,000			272,000	2	68,000	Francis	128.6	228-134	190	EE		Plate steel	Head gate	52,623	Manual	BG	0.95	13.8	WE
					1	1,000	Francis	600	226-134	190	JL		Plate steel	Head gate	875	Manual	AG	0.80	0.46	WE
1955	550,000			550,000	4	137,500	Francis	100	154-162	152	AC	AC	Plate steel	Head gate	101,660	Manual	BG	0.95	14.4	GE
1955	52,000			52,000	2	26,500	Francis	163.6	165-143	155	NN	W	Plate steel	Butterfly	18,950	Manual	AG	0.95	6.9	EC
1961	33,500			33,500	2	16,750	Francis	181	133-67	107	MS	W	Plate steel	Butterfly	15,333	Manual	AG	0.90	6.9	AC
1957	158,000			158,000	4	39,500	Francis	163.6	245-114	190	MS	W	Welded pl st	Butterfly	30,000	Manual	AG	0.95	11.5	PO
1955	58,800			58,800	3	19,600	Kaplan	54.5	33-8	22	BL	W	Concrete	Head gate	15,778	Manual	BG	0.90	13.8	GE
1956	780			780	1	780	Francis	150	22	22	JL		Concrete	Head gate		Connects to existing GE generator				
1955	477			477	1	477	Francis	720	61.5	81.5	MS		Plate steel	Head gate	500	Manual	HS	0.80	2.4	WE
1955	565			565	1	565	Impulse	600	745	732	PB	W	Cast steel		625	Manual	HS	0.80	2.4	WE
1957	7,900			7,900	2	3,500	Francis	350	140-78	120	JL	W	Steel	Head gate	2,750	Manual	AG	0.90	2.4	EC
1956	4,266			4,266	3	1,422	Impulse	1,200	1,525				Cast steel	Head gate	1,110	Manual	HS	0.90	2.4	
1955	1,200			1,200	2	600	Propeller	300	25	26	PB	PB	Concrete	Head gate	500	Manual	AG	0.80	2.4	GE
1955	1,607,000	4	1955	2,707,000	10	100,000	Francis	100	175-148	165	NN	AC	Plate steel	Head gate	67,386	Manual	BG	0.95	15.8	WE
		4	1956		6	100,000	Francis	100	175-148	165	MS	W	Plate steel	Head gate	67,386	Manual	BG	0.95	13.8	WE
		4	1956		2	3,500	Francis	514	174-146	165	PS	PB	Plate steel	Head gate	3,000	Manual	AG	0.80	4.16	EC
1953	1,525,700	10	53-55	2,233,000	14	111,300	Kaplan	85.7	92-42	80	MS	AC	Concrete	Head gate	73,684	Manual	BG	0.95	12.6	EE
					2	3,500	Francis	277	92-42	80	PB	W	Concrete	Head gate	3,750	Manual	AG	0.80	4.16	EM
1955	98,000			122,500	4	24,500	Kaplan	106	46-20	41	AC	W	Concrete	Head gate	16,667	Manual	BG	0.90	13.8	GE
1957	560,000	1	1956	560,000	4	140,000	Francis	150	385	385	3 BL, 1 NN	W	Welded pl st	Butterfly	100,000	Auto or man.	AG	0.80	13.8	WE
1956	912,000			1,624,000	6	114,000	Kaplan	85.7	84-49	76			Concrete	Head gate	23,000			0.95	13.8	
1957	84,000			1,728,000	8	108,000	Kaplan	62.7	86-52	75			Concrete	Head gate	75,000			0.95	13.8	
1960	220,000			222,000	4	55,000	Francis	136.5	168-135	132	MS	PB	Plate steel	Head gate	45,000	Manual	BG	0.90	13.8	GE
1955	54,000	1	1955	131,000	1	77,000	Francis	163.6	233-200	227	MS	A	Plate steel	Butterfly	61,000	Manual	BG	0.90	12.6	GE
1956	120,000			120,000	2	60,000	Francis	200	268-248	275	BL	PB	Plate steel	Head gate	47,200	Automatic	BG	0.90	13.8	GE
1957	10,000	1	1957	35,000	1	28,000	Francis	300	280	272	MS	W	Plate steel	Head gate	22,500	Automatic	AG	0.95	6.9	GE
1955	17,000			17,000	2	8,500	Francis	240	125-107	116	JL	PB	Plate steel	Head gate	6,215	Manual	AG	0.55	4.16	EM
1955	5,260			5,260	2	2,630	Francis	240	125-107	116	JL		Plate steel	Head gate		Drives Worthington pumps				
1955	18,000			18,000	1	18,000	Francis	225	167-140	156	PB		Plate steel	Head gate	11,842	Manual	AG			

1956 Design Survey: Typical hydroelectric

Company or government agency	Design or consulting engineers	Project name	New or redeveloped	River	State	Project started, date	Dam type	Crest length, ft	Max height, ft	Type of installation
PACIFIC COAST STATES, cont.										
U. S. Corps of Engineers	U. S. Corps of Engineers	The Dalles	New	Columbia	Wash. & Ore.	1951	CG			I
U. S. Corps of Engineers	U. S. Corps of Engineers	The Dalles Fishway	New	Columbia	Ore.	1951				I
U. S. Corps of Engineers	U. S. Corps of Engrs; Sverdrup & Parcel	Ice Harbor	New	Snake	Wash.	1956	CG	2,190	100	I
Portland General Electric Co.	Ebasco Services Inc.	Petton	New	Deschutes	Ore.	1956	CA	150	200	O
California Oregon Power Co.	Pioneer Service & Engr Co.	Lemo No. 1	New	North Umpqua	Ore.	1953	RFCF	885	120	O
California Oregon Power Co.	Pioneer Service & Engr Co.	Lemo No. 2	New	North Umpqua	Ore.	1953	CS&B	1,195	25	O
U. S. Corps of Engineers	U. S. Corps of Engrs; Stevens & Thomson Engrs	Lookout Point	New	Middle Fork Willamette	Ore.	1949	CG&EF	4,740	253	I
U. S. Corps of Engineers	U. S. Corps of Engineers	Dexter	New	Middle Fork Willamette	Ore.	1953	EF	2,835	80	I
Idaho Power Co.	International Engr Co.; J. P. Growdon, I. C. Steele & Harold Stearns	Brownlee	New	Snake	Ore. & Idaho	1953	E&R	1,370	395	O
Idaho Power Co.	Pacific Gas & Electric Co.	Oxbow	New	Snake	Idaho	1955	E&R	1,100	200	O
Pacific Gas & Electric Co.	Pacific Gas & Electric Co.	Pit No. 4	New	Pit	Calif.	1953	CG, S&B	415	74	O
Pacific Gas & Electric Co.	Pacific Gas & Electric Co.	Poe	New	Feather	Calif.	1954	CG	430	60	S
Pacific Gas & Electric Co.	Pacific Gas & Electric Co.	Butt Valley	New	Butt Creek	Calif.	1956	HF	1,250	130	I
Pacific Gas & Electric Co.	Pacific Gas & Electric Co.	Caribou No. 2	New	Feather	Calif.	1956	Earth	1,370	30	I
Pacific Gas & Electric Co.	Pacific Gas & Electric Co.	Selden	New	Feather	Calif.	1957	CG	505	150	I
Pacific Gas & Electric Co.	Pacific Gas & Electric Co.	Kings River	New	Kings	Calif.	1959	Arch	190	183	O
Pacific Gas & Electric Co.	Pacific Gas & Electric Co.	Batch	Red.	Kings	Calif.	1956	Arch	388	148	O
Pacific Gas & Electric Co.	Pacific Gas & Electric Co.	Haas	New	Kings	Calif.	1955	RF	250 350 270	360	U
Los Angeles Dept. of Water & Power	Prof. F. J. Converse, Ralph R. Proctor, Chas. T. Leeds & Chester Mariave	Pleasant Valley	New	Owen	Calif.	1954	EF	530	116	O
Southern California Edison Co.	J. C. Edison & Sechtel Corp.	Portal	New		Calif.	1955	EF	838	55	O
Oakdale & S. San Joaquin Irr. Dist.	Tudor-Goodenough Engineers	Tri-Dam Tulloch	New	Stanislaus	Calif.	1955	CG	1,500	200	I
Oakdale & S. San Joaquin Irr. Dist.	International Engr Co. & Geo. E. Goodall Co.	Tri-Dam Donnellis	New	Stanislaus	Calif.	1955	CA	500	477	I
Imperial Irrigation District	Good & Hill Inc.	Tri-Dam Beardsley	New	Stanislaus	Calif.	1955	EF	1,000	320	I
U. S. Corps of Engineers	U. S. Corps of Engineers	Pilot Knob	New	All-American Canal	Calif.	1954				I
U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	Folsom	New	American	Calif.	1947	CG&EF	10,230	340	S
U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	Nimbus	New	American	Calif.	1952	CG	813	50	S
U. S. POSSESSIONS										
Petersburg Light & Power Co.			New		Alaska	1954				I
N. Y. Alaska Gold Dredging Corp.	Company engineers	Nyac	New	Tuluksak	Alaska	1954				S
U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	Eklutna	New	Lake Eklutna	Alaska	1951	EF			I
Metlakatla Indian Community	Hudnell & Waller Engr. Corp.	Purple Lake	New		Alaska	1954				I
Puerto Rico Water Resources Authority	Jackson & Moreland	Yauco No. 1	New	Guayo	P.R.	1953	CG	585	190	I
Panama Canal Co.		Gatun Hydro	Red.	Chagres	{ Canal Zone }	1954				I
CANADA										
Union Electric Light & Power Co. Ltd.		Trinity	New	Trinity	Province N.F.	1954				I
United Towns Electric Co. Ltd.	Power Corp. of Canada Ltd.	New Chelsea	New	Chelsea	N.F.	1955	EF			I
Novi Scotia Power Commission	N. S. Power Comm. & K. E. Whitman	Ridge	New	Bear	N.S.	1956	EF, CW	2,966	42	I
New Brunswick Electric Power Comm.	Shawinigan Engineering Co.	Beechwood	New	St. John	N.B.	1955	CG	150	100	I
Quebec Hydro-Electric Comm.	H. G. Acres & Co.; Frazer Brace Engr.	Rapids No. 2	New	Ottawa	Que.	1951	CG	1,325	119	I
Quebec Hydro-Electric Comm.	H. G. Acres & Co.	Bersimis-Lac Casse	New	Bersimis	Que.	1953	RF	2,215 1,042	200	U
Manicouagan Power Co.	H. G. Acres & Co.	McCormick Dam	New	Manicouagan	Que.	1951	CG	4,575	95	I
Eastern Smelting & Refining Corp.	Montreal Engineering Co.	Sneller Power	New	Chicoutimi	Que.	1955	CG	460	50	I
Price Brothers & Co.	Montreal Engineering Co.	Chute Wilson	New	Shuslaw	Que.	1956				I
Shawinigan Water & Power Co.	Shawinigan Engineering Co.	Trenche	New	St. Maurice	Que.	1946	CG			I
Shawinigan Water & Power Co.	Shawinigan Engineering Co.	Rapide Blanc	New	St. Maurice	Que.	1930	CG			I
Shawinigan Water & Power Co.	Shawinigan Engineering Co.	La Tuque	New	St. Maurice	Que.	1938	CG	1,325	131	I
Gatineau Power Co.		Paugan	New	Gatineau	Que.	1926	CG			I
Northern Quebec Power Co.	Power Corporation of Canada Ltd.	Quinte	New	Ottawa	Que.	1921	S&R	2,500	50	I
Hydro-Electric Power Comm. of Ontario	Hydro-Electric Power Comm. of Ontario	Sir Adam Beck-Niagara No. 2	New	Niagara	Ont.					I
Hydro-Electric Power Comm. of Ontario	Hydro-Electric Power Comm. of Ontario	Sir Adam Beck-Niagara No. 2	New	Niagara	Ont.	1952	RF	24,967	68	O
Hydro-Electric Power Comm. of Ontario	Hydro-Electric Power Comm. of Ontario	Robert H. Saunders	New	St. Lawrence	Ont.	1954	{ CG CG }	3,200 3,100	172 126	S
Hydro-Electric Power Comm. of Ontario	Hydro-Electric Power Comm. of Ontario	Manitou Falls	New	English	Ont.	1953	CG	1,663	40	I
Hydro-Electric Power Comm. of Ontario	Hydro-Electric Power Comm. of Ontario	Whitedog Falls	New	Winnipeg	Ont.	1955	CG	1,130	80	I
Great Lakes Power Co.	Harza Engineering Co.	Centre Falls	New	Montreal	Ont.	1956	CG	1,100	130	I
Great Lakes Power Co.	Harza Engineering Co.	Upper Falls	New	Montreal	Ont.	1955	CG	1,300	90	I
Bracebridge Power, Lt. & Water Comm.	H. G. Acres & Co.	Bracebridge Falls	Red.	North Muskoka	Ont.	1956				I
Manitowish Electric Light & Water Co.	H. G. Acres & Co.	Jones Falls	New	Rideau Canal	Ont.	1946				I
Ontario-Minnesota Pulp & Paper Co.	Company engineers	Fort Francis	Red.	Rainy	Ont.	1954	CG	700	50	I
Muller Bros. Ltd.		Trenton	New		Ont.	1955				I
Manitoba Hydro-Electric Board	H. G. Acres & Co.	McArthur Falls	New	Winnipeg	Man.	1952	CG&EF	31,300	30	I
Calgary Power Co.	Montreal Engineering Co.	Interlakes	New	Kananaskis	Alta.	1954	EF	420	70	I
Calgary Power Co.	Montreal Engineering Co.	Pocaterra	New	Kananaskis	Alta.	1954	REF	2,000	90	I
Calgary Power Co.	Montreal Engineering Co.	Cascade Extension	New	Cascade	Alta.	1956				I
Aluminum Company of Canada	B. C. International Engr. Co.	Kemano	New	Nechako	B.C.	1951	RF	1,550	319	U
British Columbia Electric Co.	B. C. International Engr. Co.	Seton	New	Seton & Cayoosh Creek	B.C.	1954	{ TC CG }	800 450	20 25	I
British Columbia Electric Co.	B. C. Engineering Co.	Cheakamus	New	Cheakamus	B.C.	1954	EF	2,000	90	I
British Columbia Power Comm.	Dr. Terzaghi & Dr. V. Dalmage	Puntledge	Red.	Puntledge	B.C.	1953	CG	200	15	I
British Columbia Power Comm.	B. C. Power Comm. & H. G. Acres & Co.	Ladore	New	Campbell	B.C.	1955	CG			S
British Columbia Power Comm.	H. G. Acres & Co.	Whitman	New	Whitman	B.C.	1948				I
British Columbia Power Comm.	B. C. Power Comm. & H. G. Acres & Co.	Upper Campbell Lake	New	Campbell	B.C.	1955	EF	1,700	170	S
Northern British Columbia Power Co.	Power Corp. of Canada Ltd.	Shawatinas	Red.		B.C.	1954				I
Fukun Hydro Co. Ltd.	Phelps & Scott Engineers	Porter Creek	New	Porter Creek	Yukon	1955	EF	230	25	I

The term "New" applies to a project on a site not developed before. "Redeveloped" indicates a project on a site that has been developed before and now has new turbines, settings, generators or a new plant.

CA, concrete arch; CG, concrete gravity; CG&EF, concrete gravity and earth fill; CG, S&B, concrete gravity, slab & buttress; CS&B, concrete slab and buttress; EF, earth fill; EF&RF, earth-faced rock fill; E&RF, earth and rock fill; EFCW, earth fill with concrete core wall; HF, hydraulic fill; RF, rock fill; RFCF, rock fill, concrete face; REF, rolled earth fill, SG

sector gates; S&R, sluiceways and rock fill; TC timber crib.

1, indoor; S, semi-outdoor; O, outdoor; U, underground.

AC - Allis-Chalmers Mfg Co.
AE - American Elm Corp.

BL - Baldwin-Lima-Hamilton Corp.
CAC - Canadian Allis-Chalmers Ltd.
CBS - Charles Barber & Sons
CGE - Canadian General Electric Co. Ltd.
CWL - Canadian Vickers Ltd.
CWC - Canadian Westinghouse Co. Ltd.
DEC - Dominion Engineering Co. Ltd.
EC - Elliott Co.

Plants in the United States and Canada

Year of initial operation	Initial capacity, hp	Added capacity, no. of units	Date of added capacity	Ultimate capacity, hp	Waterwheel capacity, hp	Waterwheel type	Speed, rpm	Static head, ft	Design head, ft	Waterwheel manufacturer	Governor manufacturer	Scroll case, concrete or steel	Penslock valve, type	Generator capacity, kva	Synchronizing manual or automatic	Thrust bearing location	Design power factor	Kilovolts	Generator manufacturer
1957	1,775,000			1,775,000	123,000	Kaplan	85.7	91.50	81	3L	PS	Concrete	Head gate	22,105	Manual	BS	0.95	13.8	8GE
1961	475,000			475,000	15,000	Francis	200	151-60	74	AC	PS	Concrete	Head gate	14,200	Manual	AG	0.95	13.8	WE
1957	165,000			165,000	40,000	Francis	277	91-60	81	PS	W	Service units		3,500	Manual	BS	0.80	4.16	EM
1955	40,000			40,000	53,000	Francis	138.5	105-76	96	MS	W	Concrete	Head gate	94,737	Auto. or man.	BS	0.95	13.5	GE
1956	157,500			157,500	40,000	Francis	406	156-150	150	MS	W	Plate steel	Head gate	36,006	Manual	BS	0.90	13.8	GE
1955	20,700			20,700	52,500	Francis	128.6	756-745	710	AC	W	Welded pl st	Butterfly	30,527	Automatic	AG	0.95	11.5	WE
1958	553,000			553,000	20,700	Kaplan	128.6	727-704	705	AC	W	Welded pl st	Butterfly	34,737	Automatic	AG	0.95	11.5	WE
1955	232,000			232,000	50,000	Francis	225	233-126	185	PS	W	Plate steel	Head gate	42,222	Manual	BS	0.90	13.8	GE
1956	128,400			128,400	20,700	Kaplan	128.6	58-51	55	NN	W	Concrete	Head gate	15,000	Automatic	BS	1.00	13.8	GE
1958	157,000			157,000	64,200	Francis	225	277-176	274	MS	W	Plate steel	Head gate	106,100	Manual	BS	0.90	13.8	WE
1958	157,000			157,000	76,000	Francis	225	382-367	340	NN	W	Welded pl st	Butterfly	50,000	Manual	AG	0.90	13.8	GE
1958	157,000			157,000	76,000	Francis	225	492-467	421	PS	PS	Cast & pl st	Butterfly	49,000	Automatic	AG	0.90	13.8	GE
1961	157,000			157,000	50,000	Francis	200	360-295	313			Cast & pl st	Butterfly	40,000	Automatic	AG	0.90	13.8	GE
1961	157,000			157,000	76,000	Francis	257	1,152-1,130				Butterfly	61,000	Automatic	AG	0.90	13.8	GE	
1961	157,000			157,000	76,000	Francis	257	770	685			Butterfly	65,000	Automatic	AG	0.90	13.8	GE	
1961	157,000			157,000	76,000	Francis	257	793-709	729			Butterfly	49,000	Automatic	AG	0.90	13.8	GE	
1958	46,000			46,000	67,000	Francis	400	2,389-2,350	2293			Cast steel	Spherical	54,000	Automatic	AG	0.90	13.8	AC
1958	46,000			46,000	67,000	Francis	400	2,444-2,224	2324			Cast steel	Spherical	75,000	Automatic	AG	0.90	13.8	WE
1956	4,200			4,200	14,000	Francis	300	76-52	68	JL	W	Plate steel	Butterfly	4,000	Manual	HS	0.80	4.16	EC
1956	14,000			14,000	14,000	Francis	300	230	210	MS	W	Welded pl st	Butterfly	10,000	Auto. or man.	AG	1.00	4.8	GE
1958	24,000			24,000	12,000	Francis	240	157-74	153	MS	W	Plate steel	Head gate	9,500	Manual	AG	0.90	6.9	EC
1957	14,500			14,500	74,500	Francis	240	1,461-1,295	1151	AC	AC	Cast steel	Butterfly	57,500	Auto. or man.	AG	0.80	13.6	AC
1957	14,500			14,500	14,000	Francis	300	264-122	258	AC	AC	Riveted pl st	Butterfly	11,000	Manual	AG	0.90	6.9	AC
1956	52,600			52,600	26,300	Kaplan	128.6	48	48	BL	W	Concrete	Head gate	20,000	Manual	HS	0.80	4.16	EC
1955	222,000			222,000	74,000	Francis	153.6	340-145	300	NN	W	Plate steel	Head gate	60,000	Manual	AG	0.90	13.8	WE
1955	18,800			18,800	9,400	Kaplan	150	51-20	42	MS	PS	Concrete	Head gate	7,500	Manual	AG	0.90	4.16	EC
1956	3,100			3,100	3,100	Impulse	600	1000	AC	W	W	Plate steel	Head gate	2,500	Manual	HS	0.80	4.1	AC
1955	500			500	1,230	Francis	600	71	71	JL	W	Plate steel	Head gate	350	Manual	HS	0.80	4.1	AC
1955	50,000			50,000	25,000	Francis	600	870-780	800	NV	W	Cast steel	Butterfly	16,667	Manual	AG	0.90	6.9	PO
1956	3,530			3,530	1,765	Francis	900	321-287	300	JL	W	Cast steel	Butterfly	1,250	Manual	HS	0.80	2.4	EC
1955	34,000			34,000	34,000	Impulse	257	978-793	740	PS	W	Cast steel	Spherical	25,000	Auto. or man.	AG	0.80	13.8	WE
1956	13,520			13,520	4,440	Francis	257	75	75	PS	PS	Concrete	Head gate	3,750	Auto. or man.	AG	0.80	6.9	GE
1956	13,520			13,520	6,750	Francis	189.5	75	75	PS	PS	Concrete	Head gate	5,625	Auto. or man.	AG	0.80	6.9	GE
1955	2,000			2,000	2,000	Francis	720	260	260	DEC	W	Plate steel	Butterfly	1,800	Manual	HS	0.80	6.9	CGE
1956	5,000			5,000	5,000	Francis	514	275	275	DEC	W	Plate steel	Butterfly	5,000	Auto. or man.	AG	0.80	6.9	CWC
1957	5,000			5,000	5,000	Francis	360	145-147	147	MSC	W	Plate steel	Butterfly	5,000	Automatic	AG	0.80	6.6	CGE
1958	90,000			90,000	45,000	Kaplan	105.1	61-20	57	DEC	SGE	Concrete	Head gate	40,000	Manual	BS	0.80	13.8	CGE
1954	48,000			48,000	16,000	Francis	126	69-64	68	DEC	W	Concrete	Head gate	15,000	Manual	BS	0.65	10.66	ZCWC
1956	600,000			600,000	150,000	Francis	277	880-850	785	EEC	W	Plate steel	Spherical	120,000	Automatic	AG	0.95	13.8	MVE
1952	112,400			112,400	150,000	Francis	277	880-850	785	NBP	NBP	Plate steel	Spherical	120,000	Automatic	AG	0.95	13.8	CGE
1957	42,000			42,000	56,200	Francis	112.5	126-116	124	MSC	W	Welded pl st	Head gate	37,500	Automatic	AG	0.95	13.8	CGE
1957	80,000			80,000	65,000	Francis	112.5	126-116	124	CAC	CAC	Welded pl st	Head gate	50,000	Automatic	AG	0.80	13.8	CGE
1950	325,000			325,000	42,000	Francis	257	285-277	268	MSC	W	Welded pl st	Head gate	40,000	Automatic	AG	0.80	13.8	CGE
1932	200,000			200,000	80,000	Francis	126.6	275-270	259	KMW	W	Plate steel	Butterfly	70,000	Automatic	BS	0.90	13.8	CWC
1932	200,000			200,000	65,000	Francis	126.6	160	160	DEC	W	Plate steel	Head gate	52,000	Automatic	AG	0.90	13.8	CGE
1940	178,500			178,500	40,000	Francis	105.1	117-93	108	DEC	DEC	Plate steel	Head gate	36,000	Manual	BS	0.65	11.0	CWC
1928	204,000			204,000	44,500	Francis	105.1	117-93	108	DEC	W	Plate steel	Head gate	36,000	Manual	BS	0.65	11.0	SGE
1923	50,000			50,000	44,500	Francis	105.1	114-104	114	DEC	DEC	Plate steel	Head gate	40,000	Manual	AG	0.90	11.0	CGE
1954	1,260,000			1,260,000	45,000	Francis	107	70-90	90	CAC	W	Welded pl st	Head gate	32,500	Manual	AG	0.80	11.0	CGE
1957	270,000			270,000	34,500	Francis	107	70-90	90	CAC	W	Welded pl st	Head gate	32,500	Manual	AG	0.80	11.0	CGE
1958	1,200,000			1,200,000	105,000	Francis	150	305-294	292	DEC	W	Plate steel	Head gate	80,000	Automatic	BS	0.95	13.8	CWC
1956	1,200,000			1,200,000	45,000	Kaplan	92.3	57-40	82	EEC	W	Plate steel	Head gate	31,000	Manual	BS	0.95	13.8	CWC
1956	1,200,000			1,200,000	75,000	Propeller	94.7	81	81	EEC	W	Concrete	Head gate	60,000	Automatic	BS	0.95	13.8	CWC
1957	61,000			61,000	18,500	Propeller	150	59-44	54	DEC	W	Concrete	Head gate	15,000	Automatic	AG	0.90	13.8	CGE
1956	30,500			30,500	27,000	Propeller	105.5	54-40	50	DEC	W	Concrete	Head gate	24,000	Automatic	BS	0.90	11.5	CWC
1956	25,800			25,800	30,300	Kaplan	240	116-100	112	MSC	W	Plate steel	Head gate	25,365	Manual	BS	0.90	13.8	CWC
1956	1,000			1,000	51,500	Francis	406	24-190	235	MSC	W	Plate steel	Head gate	300	Manual	HS	0.80	4.16	CGE
1956	1,000			1,000	560	Francis	406	34	34	CBS	W	Steel	Head gate	1,000	Manual	HS	0.80	2.3	CGE
1956	1,000			1,000	1,500	Francis	406	52-55	56	CBS	W	Plate steel	Head gate	2,000	Manual	AG	0.80	6.9	CGE
1955	16,000			16,000	2,000	Propeller	200	75	75	CVL	W	Concrete	Head gate	2,000	Manual	AG	0.80	6.9	CWC
1954	80,000			80,000	290	Francis	188	14	14	JL	W	Concrete	Head gate	8,500	Automatic	BS	0.90	6.9	CGE
1955	1,900			1,900	10,000	Propeller	85.7	72.5	72.5	DEC	W	Plate steel	Butterfly	5,500	Automatic	AG	0.90	4.16	CWC
1955	18,400			18,400	5,300	Francis	257	114-74	98	CAC	W	Welded pl st	Butterfly	15,000	Automatic	BS	0.90	13.8	CWC
1957	23,000			23,000	18,400	Francis	240	210-165	185	CAC	W	Plate steel	Head gate	20,000	Automatic	AG	0.85	13.8	CWC
1954	450,000			450,000	23,000	Francis	307	346-329	320	DEC	SGE	Pivot	Spherical	114,000	Manual	AG	0.80	13.8	CGE
1954	450,000			450,000	150,000	Impulse	327	2,570	2,500	DEC	W	Cast steel	Spherical	114,000	Manual	AG	0.80	13.8	EEC
1954	450,000			450,000	150,000	Impulse	327	2,570	2,500	DEC	W	Cast steel	Spherical	114,000	Manual	AG	0.80	13.8	CGE
1954	450,000			450,000	150,000	Impulse	327	2,570	2,500	CAC	W	Cast steel	Spherical	114,000	Manual	AG	0.80	13.8	CWC
1954	450,000			450,000	150,000	Impulse	327	2,570	2,500	PS&VW	PS	Cast steel	Spherical	114,000	Manual	AG	0.80	13.8	CWC
1954	450,000			450,000	150,000	Impulse	327	2,570	2,500	PS&VW	PS	Cast steel	Spherical	114,000	Manual	AG	0.80	13.8	EEC
1956	58,500			58,500	58,500	Francis	126	167-129	147	CAC	W	Plate steel	Head gate	40,000	Automatic	BS	1.00	13.8	CWC
1957	190,000			190,000	95,000	Impulse	400	1125-1065	1,070	PS&VW	PS	Cast steel	Butterfly	80,000	Automatic	AG	0.90	13.8	CWC
1955	25,000			25,000	35,000	Francis	277	350-355	346	CAC	W	Plate steel	Pivot	30,000	Automatic	AG	0.90	13.8	CWC
1956	100,000			100,000	35,000	Francis	136.5	124-75	122	DEC	W	Plate steel	Butterfly	30,000	Automatic	BS	0.90	13.8	CGE

U. S. Government Hydro Power Plants

Government agency	Project	State or Possession	River	Ultimate capacity, hp	Initial capacity, hp	Installed capacity, hp	On order or being installed, hp
U. S. Bureau of Reclamation	Eklutna	Alaska	Lake Eklutna	50,000	50,000	50,000	
	Granby Coulee	Wash.	Columbia	3,102,000	538,000	3,102,000	
	Hunley Horse	Mont.	S. Fork Flathead	420,000	420,000	420,000	
U. S. Corps of Engineers	Bonneville	Ore. & Wash.	Columbia	729,000	137,000	729,000	
	Bia Cliff	Ore.	North Santiam	26,500	26,500	26,500	
	Lookout Point	Ore.	N. Fork Willamette	157,500	157,500	157,500	
	Detroit	Ore.	North Santiam	140,000	140,000	140,000	
	Dexter	Ore.	N. Fork Willamette	20,700	20,700	20,700	
	Chief Joseph	Wash.	Columbia	2,707,000	1,607,000	207,000	1,400,000
	Dalles	Ore. & Wash.	Columbia	2,770,200	1,779,800		1,779,800
	McNary Dam	Ore. & Wash.	Columbia	2,226,000	1,565,200	1,120,000	445,200
	Ice Harbor	Wash.	Snake	958,000	429,000		429,000
	Albion Falls	Idaho	Pend Oreille	58,800	58,800	58,800	
U. S. Bureau of Reclamation	Chandler	Wash.	Yakima	17,000	17,000		17,000
	Rozz	Wash.	Yakima	18,000	18,000		18,000
	Anderson Ranch	Idaho	Boise	55,500	37,000	37,000	
	Mindoka	Idaho	Snake	26,500	9,000	19,500	
	Palisades	Idaho	Snake	158,000	158,000		158,000
	Shasta	Calif.	Sacramento	522,000	419,000	522,000	
	Nimbus	Calif.	American	18,800	18,800		18,800
	Keswick	Calif.	Sacramento	102,000	102,000	102,000	
	Folsom	Calif.	American	225,000	225,000	225,000	
	Drop No. 2	Calif.	All American Canal	15,000	15,000	15,000	
Imperial Irrigation District	Drop No. 3	Calif.	All American Canal	15,000	7,500	7,500	
	Drop No. 4	Calif.	All American Canal	28,300	13,300	28,300	
	Pilot Knob	Calif.	All American Canal	52,600	52,600		52,600
U. S. Bureau of Reclamation	Parker Dam	Ariz. & Calif.	Colorado	160,000	120,000	160,000	
	Davis Dam	Ariz. & Calif.	Colorado	311,000	311,000	311,000	
	Hoover Dam	Ariz. & Nev.	Colorado	1,857,000	522,000	1,742,000	
	Elephant Butte	N. M.	Rio Grande	34,500	34,500	34,500	
	Green Mountain	Colo.	Blue	30,000	30,000	30,000	
	Estes Park	Colo.	Colo. Big Thompson	63,000	63,000	63,000	
	Mary's Lake	Colo.	Colo. Big Thompson	11,300	11,300	11,300	
	Pole Hill	Colo.	Colo. Big Thompson	47,500	47,500	47,500	
	Flatiron	Colo.	Colo. Big Thompson	108,000	108,000	108,000	
	Kortes	Wyo.	North Platte	55,500	55,000	55,000	
	Shoshone	Wyo.	Shoshone	20,000	20,000	20,000	
	Heart Mountain	Wyo.	Shoshone	8,300	8,300	8,300	
	Boysen	Wyo.	Big Horn	21,000	21,000	21,000	
	Alcova	Wyo.	North Platte	53,000	53,000	53,000	
	Glendo	Wyo.	North Platte	33,500	33,500		33,500
	Seminole	Wyo.	North Platte	45,000	45,000	45,000	
	Provo	Utah	Provo	7,000	7,000		7,000
	Canyon Ferry	Mont.	Missouri	70,500	70,500	70,500	
	Angostura	S. D.	Cheyenne	1,675	1,675	1,675	
U. S. Corps of Engineers	Fort Peck	Mont.	Missouri	150,000	70,000	120,000	
	Fort Randall	S. D.	Missouri	460,000	460,000	460,000	
	Oahe	S. D.	Missouri	485,000	194,000		
	Garrison	N. D.	Missouri	440,000	264,000	176,000	88,000
	Gavins Point	S. D. & Neb.	Missouri	162,000	162,000		
	St. Mary's Falls	Mich.	St. Mary's	72,750	23,925	23,925	
	Norfolk	Ark.	North Fork	168,000	42,540	84,540	
	Blakely Mountain	Ark.	Ouachita	104,000	104,000	104,000	
	Bull Shoals	Ark.	White	419,000	211,000	211,000	
	Table Rock	Ark.	White	272,000	272,000		136,000
U. S. Corps of Engineers	Narrows	Ark.	Little Missouri	36,000	24,000	24,000	
	Fort Gibson	Okla.	Grand	96,000	64,000	64,000	
	Tenkiller Ferry	Okla.	Illinois	47,000	47,000	47,000	
	Dennison Dam	Okla. & Texas	Red	282,080	56,080	114,080	
International Boundary & Water Comm.	Falcon Dam	Texas & Mex.	Rio Grande	88,500	88,500	88,500	
U. S. Corps of Engineers	Whitney Dam	Texas	Brazos	41,400	41,400	41,400	
	Wolf Creek	Ky.	Cumberland	377,000	377,000	377,000	
Tennessee Valley Authority	Kentucky	Ky.	Tennessee	220,000	176,000	220,000	
	Pickwick	Tenn.	Tennessee	302,000	96,000	302,000	
	Wilson	Ala.	Tennessee	610,000	206,000	610,000	
	Wheeler	Ala.	Tennessee	360,000	90,000	360,000	
	Guntersville	Ala.	Tennessee	141,000	120,000	141,000	
	Hales Bar	Tenn.	Tennessee	140,000	72,000	140,000	
	Chickamauga	Tenn.	Tennessee	144,000	108,000	144,000	
	Watts Bar	Tenn.	Tennessee	210,000	120,000	210,000	
	Norris	Tenn.	Clinch	132,000	132,000	132,000	
	Fort Loudoun	Tenn.	Tennessee	176,000	88,000	176,000	
	Cherokee	Tenn.	Holston	166,000	83,000	166,000	
	Douglas	Tenn.	French Broad	154,000	83,000	154,000	
	South Holston	Tenn.	South Holston	49,500	49,500	49,500	
	Ft. Patrick Henry	Tenn.	S. Fork Holston	50,300	50,300	50,300	
	Boone	Tenn.	S. Fork Holston	103,500	103,500	103,500	
	Watauga	Tenn.	Watauga	69,000	69,000	69,000	
	Fontana	N. C.	Little Tennessee	274,000	183,000	274,000	
	Apalachia	Tenn.	Hiwassee	106,000	106,000	106,000	
	Hiwassee	N. C.	Hiwassee	160,000	80,000	160,000	
U. S. Corps of Engineers	Chatuge	N. C.	Hiwassee	13,800	13,800	13,800	
	Nottely	Ga.	Nottely	21,000	21,000	21,000	
	Ocoee No. 3	Tenn.	Ocoee	33,500	33,500	33,500	
	Ocoee No. 2	Tenn.	Ocoee	25,000	25,000	25,000	
	Wilbur Dam	Tenn.	Watauga	9,700	9,700	9,700	
	John H. Kerr	Va. & N. C.	Roanoke	290,000	290,000	290,000	
	Philpot	Va.	Smith	19,640	19,640	19,640	
	Central Hill	Tenn.	Carney Fork	188,750	188,750	188,750	
	Dale Hollow	Tenn.	Ohey	75,000	50,000	75,000	
	Old Hickory	Tenn.	Cumberland	180,000	180,000		180,000
U. S. Corps of Engineers	Cheatham	Tenn.	Cumberland	60,000	60,000		60,000
	Altamaha	Ga.	Etowah	152,000	102,900	102,900	
	Burton	Ga.	Chattahoochee	119,400	119,400		119,400
	Jim Woodruff	Fla.	Chattahoochee	42,000	42,000	42,000	
	Clark Hill	Ga. & S. C.	Savannah	388,600	388,600	388,600	
Total Capacity				26,920,310	19,804,130	16,380,442	4,922,500

Steam Central-Station Installations

[illegible]

11

Institutional Plants, Below 250 psi

[illegible]

Institutional Plants, 250 psi and Above

FUEL		E-2 FANS		E-3 FANS		E-4 FANS		E-5 FANS		TAPRIMS		CONDENSER		ELECTRICAL POWER											
Heating value, 1000 Btu per lb	Air-drying temperature, °F	Drive	Air-weight control	Drive	Gas-volume control	Water demand	Ash handling	Drive	Flow control	Capacity, each, 1000 lb	Material	Backpressure, psi	No. of blades or sub-rotations	Type	Surface, 1000 sq ft	No. water jackets	Tube material	Section	Generator magnetic voltage, kv	Flame distribution voltage, kv	Transformer type	Interphase relay connection	Method of protecting	Total boiler capacity, incl. unit with, 1000 lb per hr	Total generator capacity, incl. unit with, 1000 lb per hr

[illegible][illegible]

P	Perforated fuel firing	RE	Regenerative	T	Turbine drive	W ₂	Washington Gas
PE	Preheated flue gas	RS	Riser Stoker Corp	TC	Traveling grate stoker	1	Forward time delay
PF	Preheated fuel furnace	S	Space control	TO	To Turbine	3	Two units (D, 100 G)
PI	Pitch	SA	Space control	U	Unheated stoker	4	All units (D, 100 G)
PM	Preheated	SC	Secondary	V	Van control	5	100 Bhp per ft
PM ₂	Preheated	SE	Secondary	W	Water level	6	100 Bhp per ft
PM ₃	Preheated	SP	Space control	WH	Water level	7	100 Bhp per ft
PM ₄	Preheated	SS	Space control	W ₁	Water level	8	One burner has addition
PM ₅	Preheated						2011-10-10 back furnace
PM ₆	Preheated						
PM ₇	Preheated						
PM ₈	Preheated						
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