

August 3, 1959

ANNUAL POWER COST ESTIMATES

Proposed Two Mile Linear Electron Accelerator

M-148 FILE COPY
PROJECT M

Load	Connected Load (KVA)		Billing Demand (KVA)		Load Factor		Average Load (KVA)	
	Stage I	Stage II	Stage I	Stage II	Stage I	Stage II	Stage I	Stage II
Klystron power supplies	23,200	92,800	8,000 ⁽²⁾	32,000 ⁽²⁾	0.488	0.488	3,900 ⁽¹⁾	15,600 ⁽¹⁾
Klystron auxiliaries	600	2,400	300	1,200	0.9	0.9	270	1,080
Klystron focusing ⁽³⁾	0	0	0	0	---	---	0	0
Deflection system	800	800	40	40	1.0	1.0	40	40
Booster pumps	200	200	200	200	1.0	1.0	200	200
Controls	400	1,600	350	1,400	0.9	0.9	315	1,260
Vacuum gauges	400	400	400	400	1.0	1.0	400	400
High vacuum pumps	400	400	400	400	1.0	1.0	400	400
Klystron tunnel lights	1,000	1,000	500	500	1.0	1.0	500	500
3 Auxiliary power	400	400	200	200	0.2	0.2	40	40
Klystron heaters ⁽⁴⁾	120	480	75	300	1.0	1.0	75	300
Water pumps	400	800	300	600	0.9	0.9	270	540
Accel. water heater	600	600	300	300	0.9	0.9	270	270
Roughing pumps	600	600	6	6	1.0	1.0	6	6
Monorail	200	200	10	10	1.0	1.0	10	10
Accel. Tunnel	480	480	120	120	.01	.01	1	1
TOTAL TUNNEL REQUIREMENTS	29,800	103,160	11,201	37,676			6,697	20,647

Load	Connected Load (KVA)		Billing Demand (KVA)		Load Factor		Average Load (KVA)	
	Stage I	Stage II	Stage I	Stage II	Stage I	Stage II	Stage I	Stage II
Beam switchyard	3,650	14,600	1,800	7,200	1.0	1.0	1,800	7,200
End Station	3,900	3,900	3,300	3,300	0.6	0.6	1,980	1,980
Prototyps	2,250	---	2,250	---	0.6	---	1,350	---
Adm. - shops, etc.	2,270 ⁽⁵⁾	2,270	2,270	2,270	0.5	0.5	1,135	1,135
Air conditioning	1,000	1,000	1,000	1,000	0.6	0.6	600	600
Pumps and fans	3,690	3,690	2,750	2,750	0.6	0.6	1,650	1,650
Compressors and Refrig.	<u>4,120</u>	<u>4,120</u>	<u>4,120</u>	<u>4,120</u>	<u>0.6</u>	<u>0.6</u>	<u>2,472</u>	<u>2,472</u>
	20,880	29,580	17,490	20,640			10,987	15,037

TOTAL POWER REQUIREMENTS (KVA) 50,680 132,740 28,691 58,316 .616 .612 17,684 35,684

TOTAL POWER REQUIREMENTS (Kw)⁽⁶⁾ 45,612 119,466 25,822 52,484 15,916 32,116

Calculated rate: (From schedule A-13, Pacific Gas & Electric Co., San Francisco, Calif.) 9.294 $\frac{\text{mills}}{\text{kv hr.}}$

Total Annual Cost: 15,916 x 8760 x .009294 = \$1,295,808 Stage I

32,116 x 8760 x .009294 = \$2,614,738 Stage II

- (1) Based upon operation on the average at 11 Bev (Stage I) and 22 Bev (Stage II) -- half maximum energy -- and 240 pulses per second average repetition rate.
- (2) Klystron power supplies will be limited to this level except during off-peak hours (i.e., higher demand will be permitted from 10:30 p.m. to 6:30 a.m. and holidays).
- (3) It is assumed that permanent magnet focusing is used.
- (4) Klystron heaters require 400 watts maximum, 250 watts expected.
- (5) Reduced 900 KVA to allow for elimination of klystron factory.
- (6) A power factor of 0.9 has been used throughout.