This is vital to understand & & &	
P= VRMS IRMS COZ O,	
True = Apparent Power Power Power Factor $P = AP \cdot PF$	
Power Power Factor	
6 PF ≤ 1	
$P = AP \cdot PF$	
This is important because we pay for energy not	
power, and energy is W= SPdt as long now as T Time average power a long time, like seconds or minutes or hours, or	 13
O Time allegae dallar	
a long time, like seconds or minutes or hours, or	^
물물보이 그는 그렇게 모르겠다. 이 사람이 나는 그들은 사람이 모든 사람이 하는 그리고 있다고 살았다. 나를 나타고	
even longer. This French is what the Electric Mete	r
on a house or building records, in units of Wa	#
마다 마다 마다 마다 마다 마다 그들은 그들은 사람들이 되었다. 그는 사람들은 사람들이 되었다. 그는 사람들이 되었다고 있는 것이다. 그는 사람들이 되었다고 있다. 1982년 - 1982년 1988년 1988년 1988년 - 1988년 1982년 1982년 1988년 1988년 1988년 1988년 1988년 1988년 1988년 1988년 1988년 1988	
hours, or Wh. (Wis is Joules, but they are too small	
and require too many conversions)	940044-00004000-0-0-0-0-0-0-0-0-0-0-0-0-
	ghille ghill al William an ann an
In 2012 the average US residential utility custo	mer
	optivision to the factor of the supply of th
Consumed 903 kWh/month	process the freeding construction of the const
	Not or the second se
La-highest - 15,046 kWh Me-lowest = 6,367 kWh	Automotives of the second second
Me-lowest = 6,367 kWh	ikininteeteistä koinnin oli kaikaa kiraa
	PARTAMENTAL PROPERTY AND

0	In 2012, the total US consumption of electricity
	Was 3,694,650 MWh?
	or 3.69465 TWh
	37% Went to residential
	36% commercial
	26% industrial
	270 transportation
	Aprile The world consumed (in ~2012)
0	19,320,360,620 MWh/yr ·(365.25)(24)
	= 16,936,228,120,000 MWh
	$\Lambda \Lambda \Lambda \Lambda \Lambda Millions$
	Trillion Billions Quadrillion
	Quintillion => 17 Quintillion Wh & &
WWW.ideaconicide-baselikatobisk-area (assocyclydriolis-cold manifolisis in inicide inicid	17 X10 15 Wh X 3600 In
destination for recognishments and size-recognished by the destination of the first of the destination recognishment and size-recognishment and size-recognishme	
aranda del tratamente cuivis de chranquezza una despoka da la nivera como despokación con superior consecuencies.	$= 61,200 \times 10^{15} \text{ J}$
	$= 61,200 \times 10^{15} \text{ J}$ $= 61.2 \times 10^{18} \text{ J}$
	Per Capita Consumption:
egezegtőűnhelekkölüleplejűlőspojagogogogogogogogogogogogogogogogogogog	Afghanistan, Chad, Sierra Leone -> ~ 8,700 Wh US (6th) -> 14.75 X106 Wh
	US (6th) -> 14.75 X106 Wh
以对于这个	Iceland (1st) -> 51.17 x106 Wh

Go back to:

In our power system, we keep VRMs constant, and

each house, office, factory, etc. takes whatever I

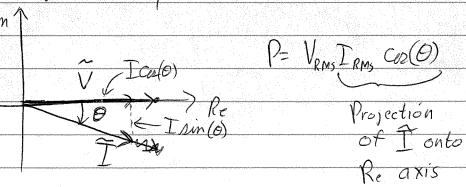
it needs to get the power it requires, so

$$PT_{RMS} = \frac{P}{V_{RMS} cos(\theta)}$$

If the Power factor is less than 1, then I pms must

be larger to provide the same Pltime Average Power)

Think of it this way:



To get the same Pas Ol increases IRMS Must

i norease.

0	But this is real current that the power company
	must provide and which leads to increased
V	RW RZ Cause
¥	1 3) lag (0)
	Most commercial and industrial loads, and
	increasingly most residential loads, are inductive
	(motors) Which cause I to lay V (ELI)
	So If you need a power Pin the load,
	$T = \frac{\forall \rho}{\forall cor(b)}$
	$P_{W} = R_{W} I = \frac{R_{W} P}{V cor(0)}$
a Commence and the second and the se	As \$000 cor(0) V, Pw1 (loss in wires that
	Power Company cannot
	Charge For.)

Power Companies therefore measure the PF ata companies connections to the grid, and charge extra if the PF < 0.85 or about that. This corresponds to 0= cos 1(0.85)=32° The quantity Papp sin(0) is called the "Reactive Power" and corresponds to the amount of energy Having to supply this Reactive Power is What costs extrag for the power company, It can have real effects besides price: extera power Ctation dissipated ncrease reactive IN WI'res loads, TI, 10 Acrease Already a not day, more power dissipated, Wires heat -> get longer -> Sag.