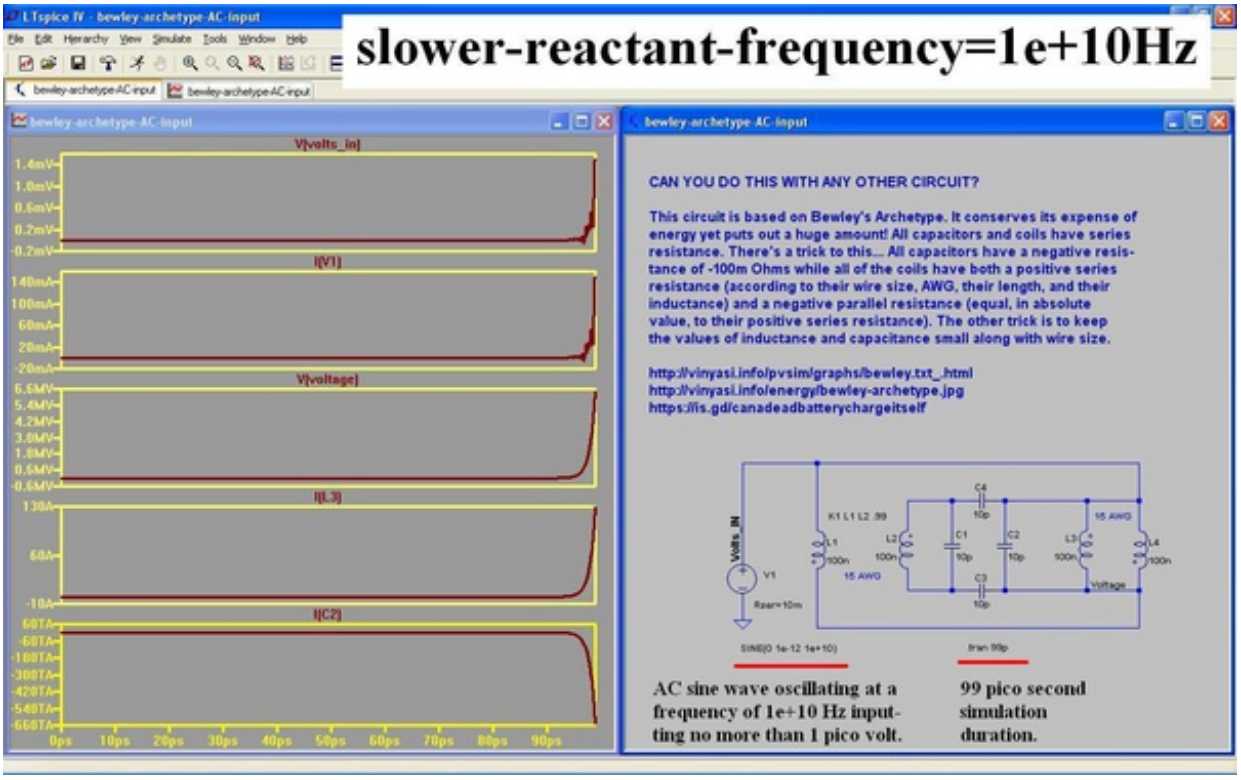
Vin Yasi

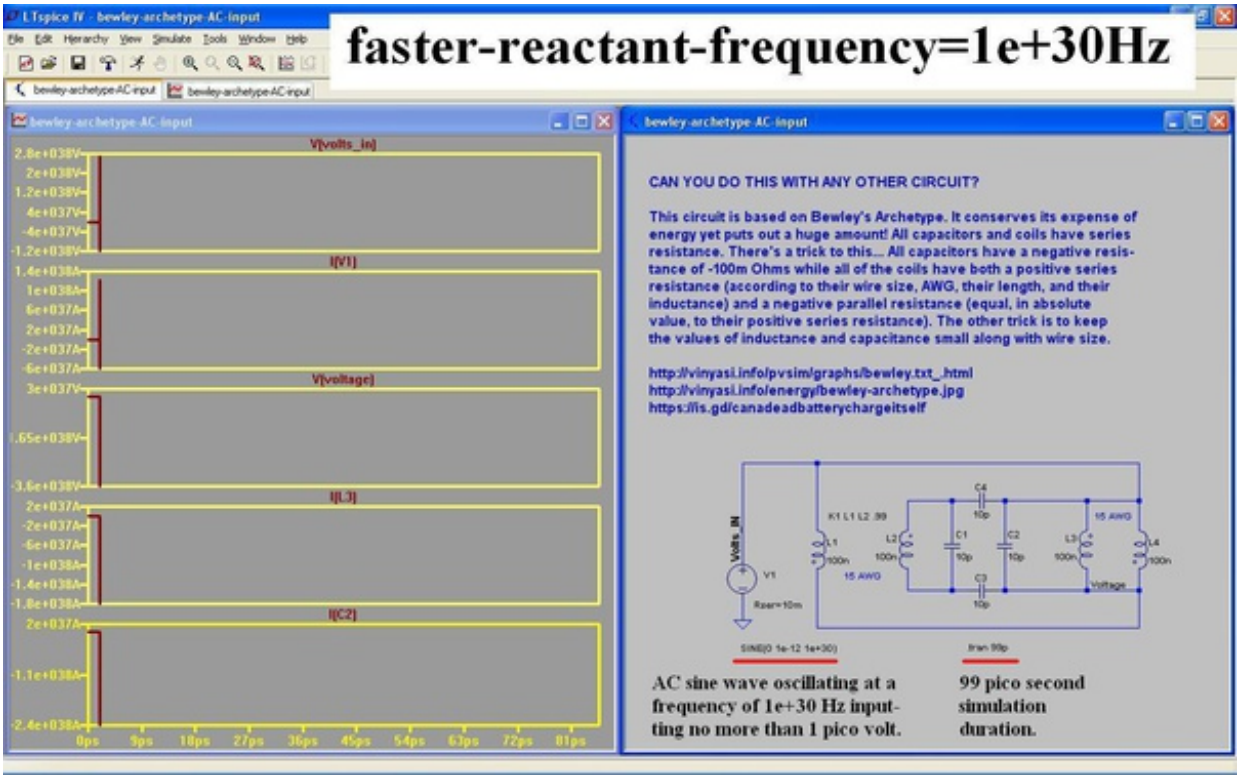
quora.com/q/electricalscience/The-Conservation-of-Electrical-Energy-does-not-apply-to-Current-nor-does-it-apply-to-Watts

Frequency is the control-point upon which rests the time dilation of each and every electronic component affecting how fast does a component alter its state-of-charge per unit of time. This potentially gives each component an independence free of meddling (from every other component) liberating the behavior of each component predicated upon its own frequency, inductance and capacitance (if that component is capable of responding to electrical reactance).

Two schematics of two LTSPICE simulations of the same circuit. The only difference is a slower input frequency, of 1e+10 Hz, in the first screenshot (below) versus a faster input frequency, of 1e+30 Hz, in the second screenshot. Otherwise, they're both the same circuit...

1. Same AC sine wave input of one pico volt (1e-12V).
2. Same duration of simulation covering 99 pico seconds.
3. Yet, the outcome is distinctly different. Both are overunity. Yet, the faster frequency has managed to accumulate so much energy (by comparison to the slower frequency during the same length of simulation) that it's spilling out into the source voltage gumming it up with tons of excessive energy the longer this circuit keeps running.
4. None of this excess energy is arising from the source voltage. It's coming from the reactance occurring within the circuit and slowly leaking backwards into the source voltage, because it can't help itself. There's just too much of it for all of it to stay in one place. So, it spreads itself around as best it can. Under the circumstances, I'd say it's doing a pretty fair job of spreading itself around, don't you think?
5. Now, mind you... This is all reactive power. Quite useless unless converted - through power factor correction - into real power. But that's the domain of electrical engineers whose job is certainly not to sneer at this, but see to it that it gets done. And by jolly they would if it didn't risk their career and reputation to "buck the system". Oh, well... I'm 20 years too late to even suggest such a notion, 'cuz I'm 20 years too old to see this thing through even if I had a fortune to spend on specialists to take care of the technicalities. But that won't stop me from continually tooting my horn over this, 'cuz my heart won't permit me to "let it go". What else have I got to amuse myself?
6. Anyway, this is merely intended to illustrate my point before I bore you to tears with soap box whining posted (written) further down, below. Happy reading if you can bear it!





Time dilation is what the physicist calls electrical reactance. In their shameful self-indulgent self-promotion, they deny that time dilation is a mere consequence of electrical reactance by not admitting to it. Consequently, time dilation gets all of the attention of the media while electrical reactance stays in the background quietly making time dilation possible.

Meanwhile, voltage can only become altered as a pandemic consequence of each and every electronic component cooperatively affecting the state-of-charge of each and every other component as a consequence of the entire interactions of all of the electronic components acting together as a unary compositional entity per unit of time.

This distinction between frequency and voltage sets these two ingredients apart, from one another, in that: frequency transcends thermodynamics while voltage cannot.

Voltage is steadfastly tied to conservation (as a consequence to voltage being limited to the collection of electronic components affecting each other's state-of-charge). Voltage-drop[1] is entirely dependent upon the entire makeup of all of the electronic components in a circuit working together (within a united context of mutual interactions) creating a topographic-voltage-gradient-oriented-fabric to their state-of-charge within a circuit.

On the other hand, frequency lies dormant (within each and every component's reactability) making it possible to turn an almost deaf ear to thermodynamics and impart an independence capable of raising each component, along with its entire host-circuit, above the limitations of thermodynamic voltage-drop putting said circuit almost (but not entirely) outside the domain of the Law of the Conservation of Energy.

Entire freedom from thermodynamics and Conservation is not possible, but nearly so! Good enough to reduce their importance and practical relevance.

Electrical load is always defined in terms of time. Time matters since consumption and production must match per unit of time (IN equals OUT).

Yet, if consumption should outstrip production, then reactance can step in as a middleman to help make up the difference.

Reactance cannot replace source. Source is always required, but made to be less relevant as a total dependency for consumption to be satisfied, if reactance is also made use of to supplement limited resources. And all because of frequency alleviating the limitations of source – via the reactability of source (along with the scope of inductance and capacitance) – helping frequency to speed things up a bit (or, a lot) should production become a little sluggish at meeting the needs of consumption, and always within the context of per unit time – without exception.

This is what I get out of studying the relevance of electrical reactance formula.

These thoughts of mine are not relevant, if we don't want them to be (by making various excuses). Everyone has their favorites: it's useless, not worth the bother, we already have renewables (solar, wind, geothermal, tidal energy, etc), so, why dwell on intangible fantasies when we already have viable options?

But, if we should choose to make electrical reactance relevant, and if we should choose to become more or less independent from exclusive domination by the sources of energy, then we will want to educate ourselves. To this end, may I present the following observations?...

In the not-so-distant future, human teachers may become scarce and artificial intelligence (AI) may become our only teachers.

Hmmm. This is already happening!

I have made it my habit to let simulators teach me electrodynamics before I would seriously listen to anyone else. Only after I get my hands-on-training from spending countless trial-and-error hours on an electronic simulator do I attempt to understand my experience from anyone who has described my experience in terms which are simple enough for me to comprehend.

It's true... Simulators have had human policies (on occasion) engineered into them. But these are easy to distinguish from the mathematical formula which rule electrodynamics making it easy to ignore these policies.

Policies are a distraction from the learning process. Policies are flimsy attempts to co-opt humans into games of social engineering superseding electrical engineering.

To give you one example...

One simulator has had an arbitrary limit of one kilo ampere placed upon all diodes and transistors with the commentary placed alongside the software code claiming that, sometimes, these two components may "act weird".

Although this is good safety policy (no different than installing fuses in an electrical wiring system), this teaches me nothing about why do diodes and transistors sometimes act weird!

If it's not a mathematical formula, then it's probably an attempt to intervene into the private affairs of thoughts and beliefs and influence human conduct.

Current can become immediately affected by reactance just as it can be affected by resistance. And voltage is directly affected by the element of time as an indirect consequence to current redistributing voltage across a circuit's topography.

Current values may be altered during runtime via electrical reactance formula utilizing frequency, inductance and capacitance, plus voltage differences placed upon the terminals of these components, and further modified by the resistances of all combined components comprising the pathways of current.

> Reactance is used to compute amplitude and phase changes of sinusoidal alternating current going through a circuit element.[2]

Voltage is the only conservable element of electricity since it cannot become altered by any single, individual electronic component. It must be altered strictly by the voltage-drop of all of the components of an entire circuit thermodynamically acting upon each other's voltage-drops.

In the meantime, current is reactive and must be exclusively inferred from moment-to-moment voltages, frequencies, inductances and capacitances. In other words, the so-called Law of the Conservation of Energy[3] must be renamed the: Conservation of Voltage-Drop, because that's the only electrical parameter which can be exclusively conserved under the aegis of thermodynamics.

Current is not entirely conservable since it is dependent upon the resistance made upon voltage and directly modifiable by reactance per unit of time.

These considerations taken together, plus the consideration of current (above), makes Ohm's Law partly oblivious to thermodynamic Conservation – not enough to be entirely subject to the jurisdiction of thermodynamic Conservation..

Since energy is oftentimes mistaken to be equivalent with power (watts), then it is no small wonder how often we misunderstand what is conserved and what is not conservable.

Yet, current is what we *want* since that represents (to us) the *dynamic* factor of electrodynamics.

And the presence of voltage makes it easier to accommodate the need for current.

Yet, the electrical reactance of frequency, inductance and capacitance plays a significant role to elevate the limitations of thermodynamics and make our circuits come to life!

Frequency is one of the three factors controlling reactance plus inductance and capacitance.

Voltage and current are the beneficiaries of whatever results from resistance and reactance acting upon the prior state of an electronic component.

It is these three factors of reactance which just happen to be equivalent terminologies applied by Eric Dollard to the Synthesis of Electricity from its three ingredients of: time (frequency), magnetism (inductance) and dielectricity (capacitance).[4]

And due to the equivalence between inductive reactance, capacitive reactance and their counterparts: inductance and capacitance, we may appreciate these equivalencies suggested by the following statements...

That, within the context of the following reactance formula…

X(L) replaces wL, and within the context of…

X(C) replaces (-1 ÷ wC), and more equivalencies are to be found here…

Inductive reactance X_L

$$X_L = \omega L = 2\pi f L$$

Capacitive reactance X_C

$$X_C = -\frac{1}{\omega C} = -\frac{1}{2\pi f C}$$

$$X = X_L + X_C = \omega L - \frac{1}{\omega C}$$

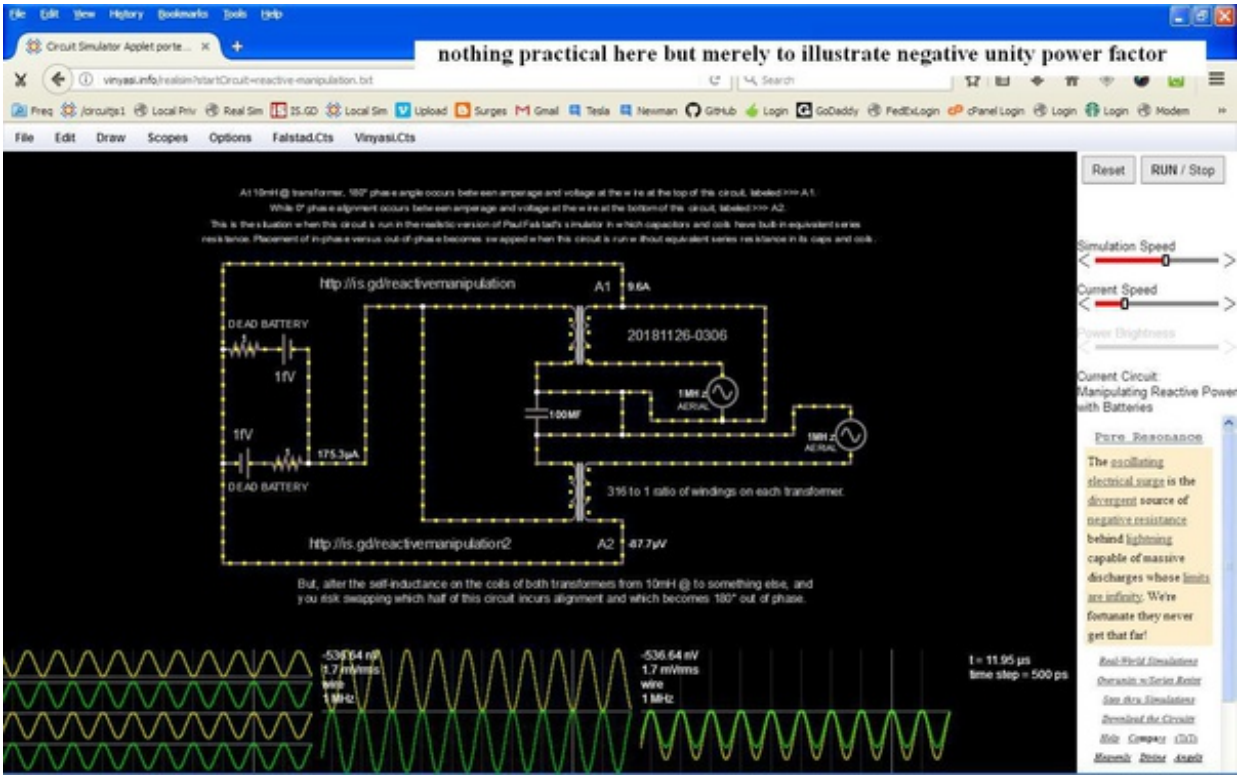
Thus, it is found to be true that reactance is a self-looping phenomenon which feeds on itself requiring no dependency upon an outside stimulus to exclusively supply it with all of its needs for energy. This benefit of electrical reactance lies outside the reach of non-reactive circuits engaging *absolutely no reactance* within themselves.

Since it would be difficult to find any circuit which does not contain at least *some* reactance, it would also be difficult to assume that all circuits are not capable of becoming more developed to make greater use of reactance as a cost-saving measure to “get more from less”.

This is what Gabriel Kron discovered: that he could take any two nodes within any circuit, and seemingly make energy appear or disappear at his discretion. Of course, he was not creating nor destroying energy! {And we never became famous, nor wealthy beyond his wildest dreams, since this discovery (of his) became the sole, proprietary possession of his employer.}

But if discovered you had secret powers equivalent to the Ant Man (in Marvel Comics), then you could shrink yourself down to such a small size that it would seem that you had disappeared. And if you could enlarge your size from that extremely small size sufficiently enough (from a size so small that no one knew that you were there in-the-flesh), it would appear that you created yourself out of thin air![5]

Notice how I did not use the oft-quoted expression, “something from nothing”? This is a very important distinction!



Footnotes

[1] Voltage drop - Wikipedia

[2] Electrical reactance - Wikipedia

[3] Conservation of energy - Wikipedia

[4] Eric Dollard - Origin of Energy Synthesis

[5] Vin Yasi's post in Electrical Science