



Global LED Adoption  
Through Blockchain Technology



# Whitepaper

The Essentials White Paper  
(A brief outline of Terawatt's platform and vision)



## Global LED Adoption Through Blockchain Technology



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### Overview

Terawatt is a patent-pending, renewable energy blockchain startup, with a strong focus on monetization and driving global L.E.D. adoption.

Terawatt will create a DAO, and also a deflationary Ethereum-based, private (zk-SNARKS) currency for global payments.

The DAO will be funded and used by Utility Companies, L.E.D. Sellers, Businesses, token holders, and energy customers worldwide. The DAO will act like a **decentralized global insurance fund** to ensure Utilities (and businesses) always have access to funding (which constantly runs out) for subsidizing L.E.D. sales to their energy customers (or for businesses and people to overcome the upfront cost of upgrading to L.E.D.s).

### Total Supply: 100 Million Tokens

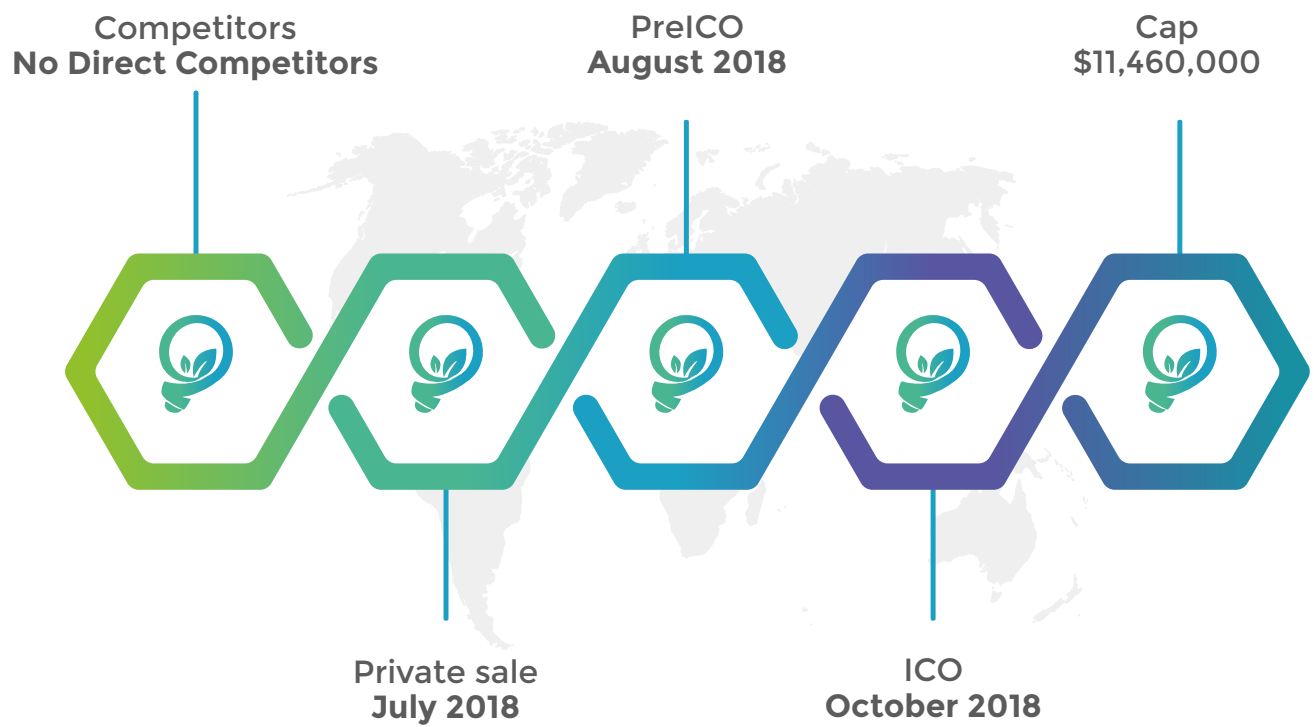
**Circulating Supply:** 65 million ( supply will decrease exponentially in an s-curve fashion to as low as 1 million tokens over time).

This is due to our continuous coin burning algorithm. Terawatt will automatically use 50-75% of company profits earned from DAO entry/exit fees, (no exit fee if LED purchase is verified), profit taking fees (like an exchange), carbon tax data storage fees, purchase record access fees (for businesses using our tokens as payment), carbon credits, and even from affiliate L.E.D. sales commissions to buyback and burn (LED) Tokens.

**This is similar to the BNB token, but they only burn every quarter,  
We Will Burn 24/7.**



Utilities and other businesses will want to accept our tokens for payments because our rate of deflation is much greater than all FIAT currencies and most, if not all, cryptocurrencies/tokens while also being more private and secure with zk-SNARKS and masternodes when available. They can also reduce accounting costs as all transaction data will be stored securely on the decentralized ethereum blockchain. Furthermore, the more tokens they have to enter into the DAO fund, the more voting power, profits, and staking rewards they can receive. This may further increase token value due to the network effect. (Metcalfe's Law)



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# Abstract

## Goal:

Leverage blockchain technology to help reduce global lighting electricity consumption 50 percent (roughly 2000 Terawatts) by 2035, while also increasing light output by 50 percent. Terawatt will also create a deflationary currency to compete with FIAT and digital alternatives like Bitcoin. Terawatt aims to tackle other renewable sectors like Solar, Wind, Electric Vehicles after proof of concept is achieved with L.E.D.s.

## Method:

### Method 1

Terawatt will create a Decentralized Autonomous Organization (DAO), and also create a highly deflationary Ethereum based currency for global payments. The DAO will be funded and used by Utility Companies, L.E.D. Sellers, Businesses, Token Holders, and Energy Customers worldwide. The DAO will act as a decentralized global mutual/insurance fund to ensure Utilities (and businesses) always have access to funding (which constantly runs out) for subsidizing L.E.D.\ sales to their energy customers (or for businesses upgrading to L.E.D.s).

This is a major benefit to utility companies as they want 100 percent of their customers to have energy efficient lights due to progressive grid overload, which forces power companies to build (and maintain) expensive (Hundreds of millions of dollars) power plants to meet demand. They are also mandated by government agencies (i.e. US Department of Energy and US Environmental Protection Agency) to increase L.E.D. adoption in their respective markets. Businesses want L.E.D.s because they reduce electricity bills, increase light output, reduce maintenance costs, and qualify them for tax incentives. The upfront cost was the issue, but Terawatt will help overcome this.

### Method 2

The Terawatt Token will also be used as a currency similar to ETH at any business or utility company that will accept it as method of payment. DAO members with businesses will want to accept Terawatt tokens as payment because they will gain increased voting/staking power in the DAO, and because it's much more deflationary than FIAT or other cryptocurrencies due to continual coin burning structure, which equals potentially increased profitability.



The power companies, and other token holders, will buy into the DAO with our tokens, we'll charge a fee for entering and exiting, and when they sell their position, we take a percentage of their profits (like a mutual fund or an exchange does). We will take 50-75% of these profits to buyback and burn our own tokens daily (per transaction depending). With Terawatt, all people and businesses can have uninterrupted access to inexpensive/free L.E.D.s which substantially decreases their purchasing costs, electricity bills, increases global lighting efficiency, and in turn reduces global greenhouse emissions.

The (LED) token will may or may not exponentially increase in value as more power companies (and buyers/energy customers/other companies) realize the advantages of using our tokens and of joining the DAO (Metcalfe's Law), thereby increasing demand while also decreasing supply.

Through DAO utilization, key partnerships ( We are actively pursuing collaborations and partnerships with utility companies globally) , deflationary supply, token incentives, and voracious marketing, Terawatt aims to help put L.E.D.s in all commercial, industrial (street lights), government and residential buildings/facilities worldwide and e fficiently increase the changeover from less efficient Incandescent, Metal Halide (MH), High Pressure Sodium (HPS), and Compact Fluorescent Lighting (CFL) to 100% L.E.D. lighting (Light Emitting Diode).

Token holders will also be able to find and utilize applicable instant tax rebates, search for tax credits, and then securely store this purchase data on the network for later use in filing their taxes. Participants can buy, sell, stake with masternodes (when available), vote, donate, or hold (LED) tokens, which will power the Terawatt Ecosystem.

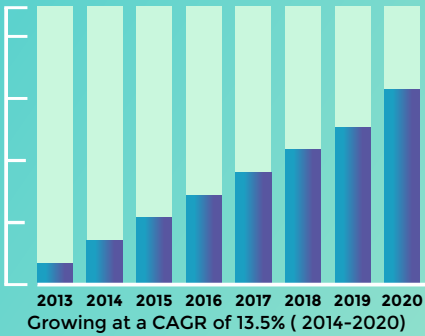


# Market Data

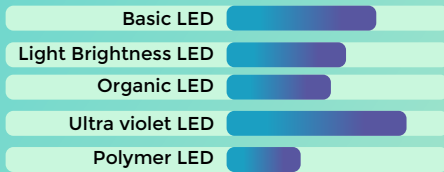
## Global Light Emitting Diodes(LED) Market Size and Forecast ( 2013-2020 )

### Global Light Emitting Diodes(LED) Market

Global Light Emitting Diodes(LED) Market is forecast reach \$42.7 billion by 2020



### Global Light Market by Technology



The comprehensive view on the % share of technologies segment (2013)

### Global Light Market by Applications



The comprehensive view on the 9% share of application segment (2013)

### Global Light Market by Geography



LAMEA, Asia Pacific, Europe

### Global Light Emitting Diodes(LED) Market Dynamics

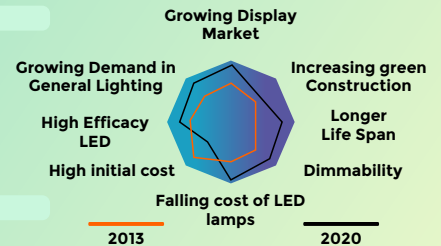
#### Drivers

- Growing display and large screen backlighting market
- Increasing green construction
- Longer Life span
- Dimmability
- Falling cost of LED lampsnad LEDs

#### Restraints

- High initial cost

### Top Impacting Factors



“The rapid adoption of LEDs in lighting marks one of the fastest 1 technology shifts in human history,” Goldman Sachs stated in a new report.

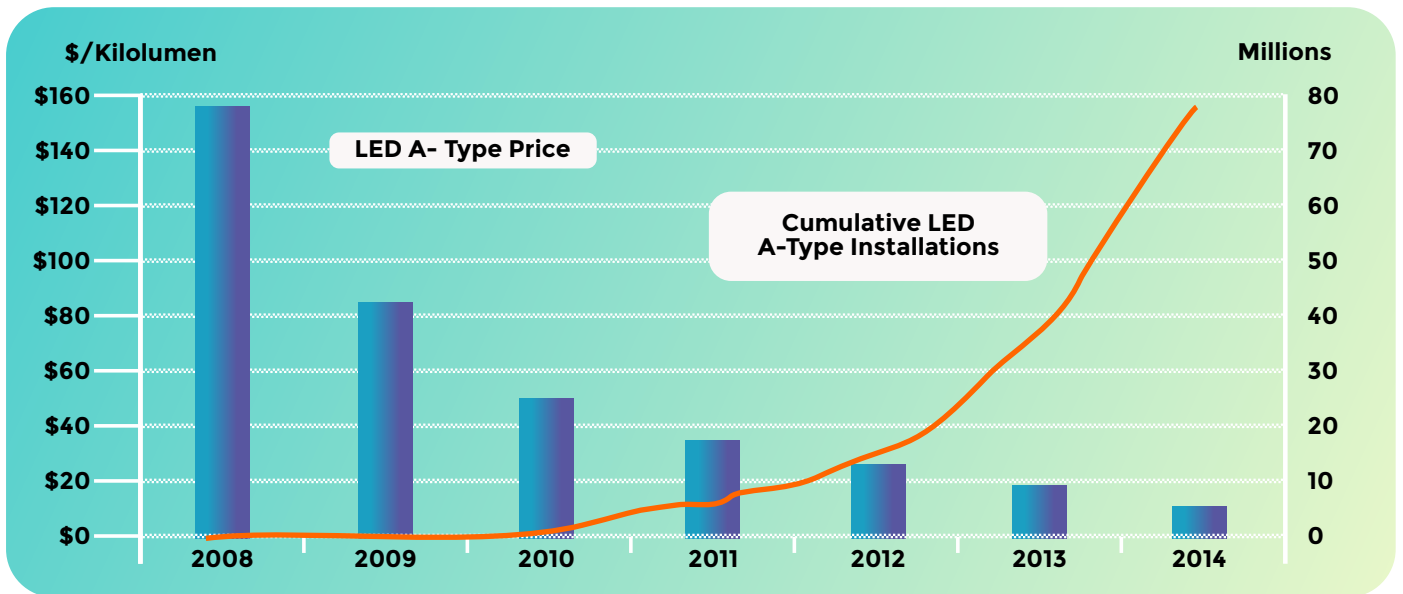
The accelerated deployment of light-emitting diode (LED) bulbs is on track to save U.S. consumers and businesses \$20 billion a year in electricity costs within a decade, which would lower U.S. CO2 emissions by some 100 million metric tons a year! The growing global effort to speed up LED adoption could ultimately cut global energy costs and carbon pollution 5 times as much.

Let’s look at some key charts and facts that illustrate the LED lighting “miracle,” which is every bit as remarkable — and every bit as unheralded by the major media — as the solar miracle , the battery miracle , and the electric vehicle miracle .

1. [www.specgradeled.com/global-led-market-hit-42-7-billion-2020/](http://www.specgradeled.com/global-led-market-hit-42-7-billion-2020/)



# LED Lighting



As recently as 2009, this country didn't have even 400,000 installations of common home LED bulbs, according to the November 2015 Department of Energy report "Revolution... Now The Future Arrives for Five Clean Energy Technologies." And yet by 2012, we had 14 million — and by 2014 we had whopping 78 million installations.

This revolution has been driven by "sharp cost reductions and performance improvements, relatively short replacement cycles for incumbent technologies, and aggressive policy support (including bans on incandescent technology in major markets such as the U.S., the E.U. and China)," as Goldman Sachs has detailed in its recent reports on "The Low Carbon Economy."

Since 2008 alone, prices for LED light bulbs have dropped a remarkable 90 percent, and you can now buy a 60-watt-equivalent LED bulb for a little more than \$3.

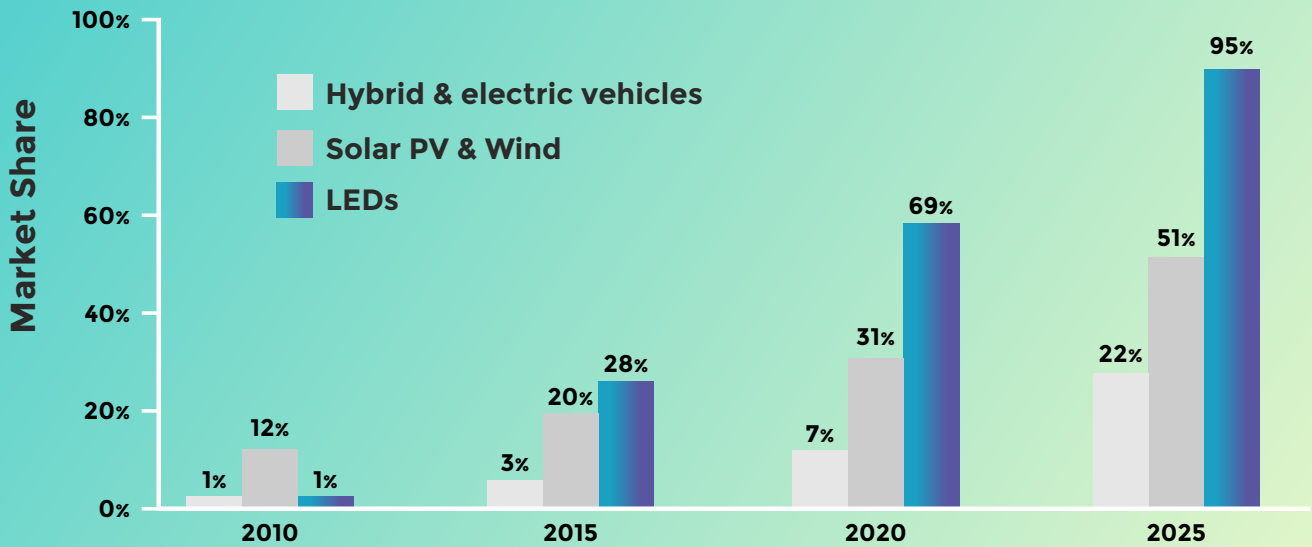
Goldman forecasts "that LEDs will account for 69 percent of light bulbs sold and over 60 percent of the installed global base by 2020." This chart of where LEDs have been and where Goldman Sachs projects they are going in the near term is from their July 20 report, "The Low Carbon Economy: Our Thesis In 60 CHARTS." It compares LED adoption with the adoption of hybrid and electric vehicles and solar PV and wind.





**Exhibit 19: The rapid adoption of LEDs in lighting marks one of the fastest technology shifts in human history.**

LEDs for general lighting were commercialized only recently, but will dominate sales by the end of this decade



Source : IHS, Company data, IEA, IRENA, BP, Goldman Sachs Global Investment Research.

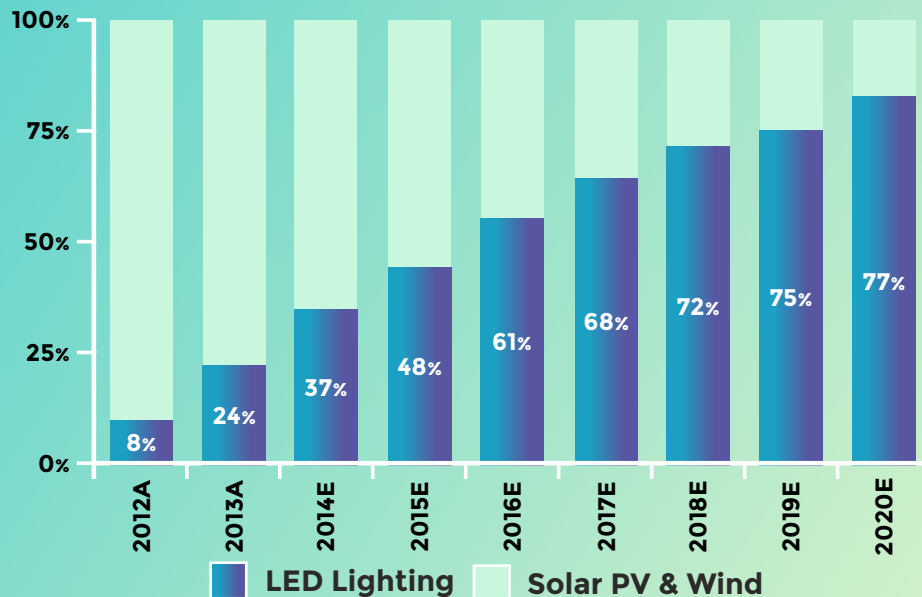
Currently the best LED bulbs cut electricity use by 85 percent compared to incandescent light bulbs and by 40 percent compared to fluorescent lights. By 2020, Goldman expects those savings to increase to over 90 percent and 50 percent respectively.

At the same time, LEDs can last for up to 5 years of nonstop use — or a few decades if used just a few hours a day. This is 50 times longer than incandescents and some 3 to 7 times longer than fluorescents. At the same time, LED bulbs provide superior light quality than compact fluorescent lights (CFLs). For all these reasons and more, GE announced earlier this year it would stop making CFLs “for the U.S. market and instead focus its consumer lighting efforts on LED lamps.”

With the initial price dropping sharply while the ultra-low lifecycle costs also keep dropping, you end up with a revolution — one that is happening even faster in the United States:



**Exhibit 53:.....and LEDs now account for over half of US lighting sales....**  
**LEDs for residential lighting are seeing over 1000 basis points in market share gain per annum.**



Source : DOE, Goldman Sachs Global Investment Research.

With such an unprecedented technology revolution, it's no wonder that, in 2014, the Nobel Committee awarded the Physics Prize to three scientists for their 1990s invention of “efficient blue light-emitting diodes [LEDs], which has enabled a bright, energy-saving white light source.”

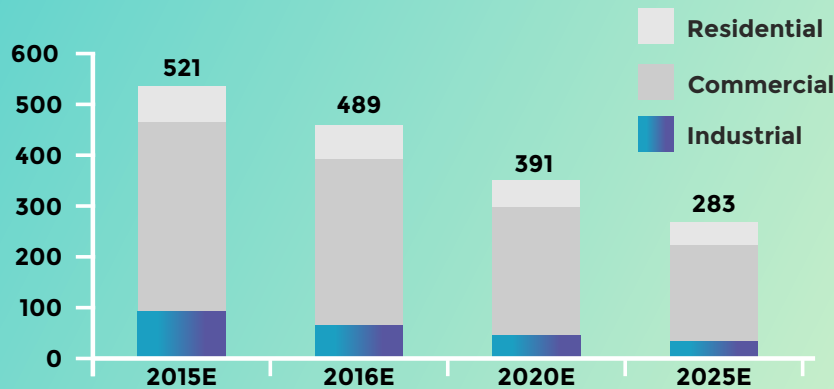
And in case you think that one small product you can hold in the palm of your hand can't be a game-changer in the arena of energy and climate solutions, think again. The nation's total electricity bill for residential and commercial customers is now more than \$320 billion . Of that about 15 percent is lighting — nearly \$50 billion a year.

Goldman Sachs projected last month that LED lights “are on track to cut power consumption for lighting... by over 40 percent.” That would provide annual savings of more than \$20 billion for consumers and businesses within a decade. And that in turn would reduce U.S. CO2 emissions by some 100 million metric tons a year.



### Exhibit 54:.....and are on track to cut power consumption for lighting (17% of total) by over 40%

As LEDs lighting rapidly penetrates the installed base, US power demand for lighting begins to drop substantially



Source : Goldman Sachs Global Investment Reserch.

I have previously noted that electricity sales in this country have been flat for nearly a decade even as the economy has kept growing. This shift has been driven federal energy efficiency standards for appliances (including lighting) and a growing embrace of policies to promote efficiency at the state level.

Clearly, the LED lighting revolution will help ensure that trend continues for at least one more decade. Indeed, the only plausible way the United States could return to an era of significant electricity demand growth is if the electric vehicle revolution takes off in the 2020s, which as we've seen is entirely possible, if not likely.

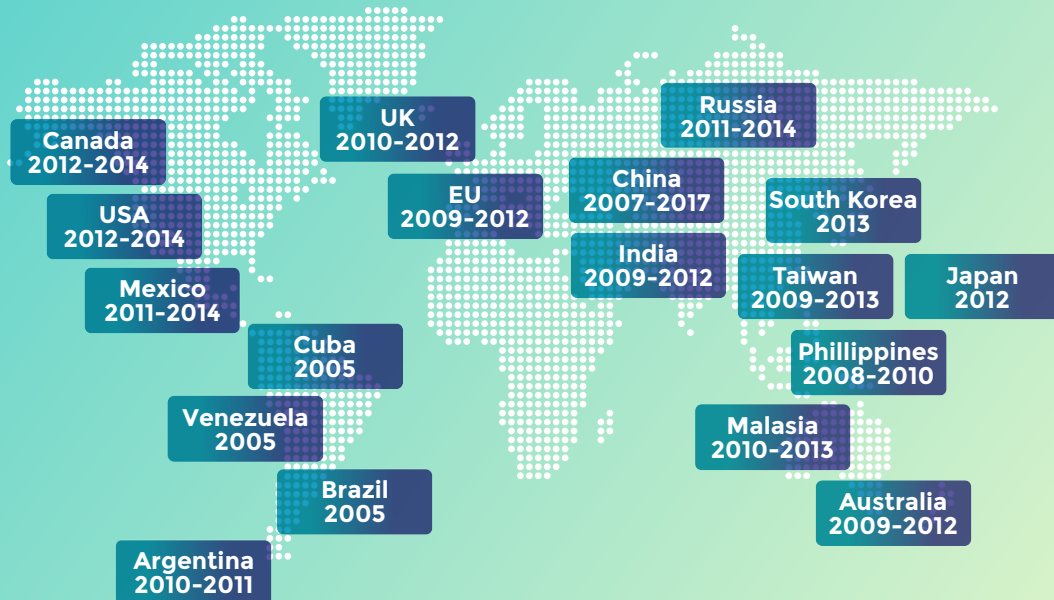
The energy and climate benefits of LEDs are so large, it's no wonder the U.S. Department of Energy has been working to advance the technology and promote their deployment for over 15 years. And it's no surprise the DOE has worked with countries like India on technical and analytic approaches to rapidly accelerate their adoption of LED lights.

Indeed, most of the major countries in the world have adopted policies that have sped up the adoption of LEDs, the most important of which have been the mandatory phaseout of inefficient incandescent lights:



## Exhibit 20: Aggressive policy support in all major jurisdiction has been a key catalyst for growth

Mandatory phase-outs of incandescent lighting in all major markets played a key role in boosting investment in LEDs



Source : Goldman Sachs Global Investment Reserch.

On top of all that, in 2015, the world's energy ministers embraced a Global Lighting Challenge , which is “a global race to accelerate phase-in of high efficiency, high-quality and affordable advanced lamps and lighting systems with a target of achieving cumulative global sales of 10 billion such units as fast as possible.” LED lighting will be a central focus.

As with solar energy, advanced batteries, and electric vehicles, the LED lighting revolution may not be televised by the major media, but it is happening at a torrid pace nonetheless — with a big boost from government deployment policies.”<sup>2</sup>



LED's have the potential to fundamentally change the future of lighting in the United States, and abroad. Residential LEDs, especially ENERGY STAR rated products, use at least 75% less energy, and last 25 times longer, than incandescent lighting.

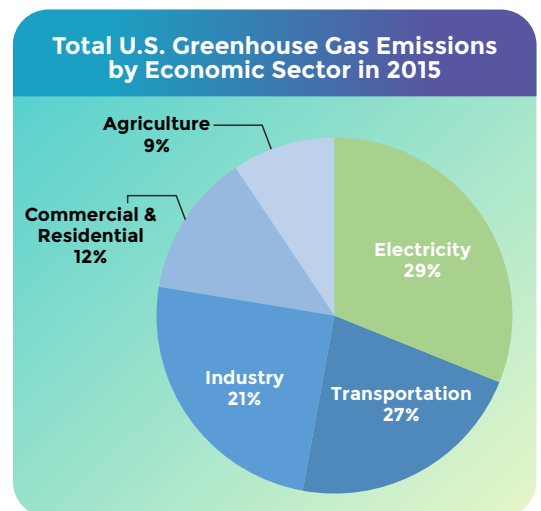
Widespread use of LED lighting has the greatest potential impact on energy savings in the United States. By 2027, widespread use of LEDs could save about **348 TWH** (compared to no LED use) of electricity: This is the equivalent annual electrical output of **44 large electric power plants** (1000 megawatts each), and a total savings of more than **\$30 billion** at today's electricity prices.<sup>3</sup>

## The Lighting Problem/Solution

Inefficient light bulbs are creating both unnecessary greenhouse gas emissions, which contribute to climate change, and unnecessarily exorbitant electricity bills for peoples and governments. Terawatt will help to fix this problem by driving LED adoption

## The Greenhouse Emissions Problem

Greenhouse gases trap heat and make the planet warmer. Human activities are responsible for almost all of the increase in greenhouse gases in the atmosphere over the last 150 years. <sup>1</sup> The largest source of greenhouse gas emissions from human activities in the United States is from burning fossil fuels for electricity, heat, and transportation. EPA tracks total U.S. emissions by publishing the Inventory of U.S. Greenhouse Gas Emissions and Sinks. This annual report estimates the total national greenhouse gas emissions and removals associated with human activities across the United States. The primary source of greenhouse gas emissions in the United States is:



Electricity production (29 percent of 2015 greenhouse gas emissions) – Electricity production generates the largest share of greenhouse gas emissions. Approximately 67 percent of our electricity comes from burning fossil fuels, mostly coal and natural gas. <sup>2</sup>

3. [www.energy.gov/energysaver/led-lighting](http://www.energy.gov/energysaver/led-lighting)

4. [www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions](http://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions)



# Electricity Sector Emissions

## Total Emissions in 2015 = 6,587 Million Metric Tons of CO2 equivalent

Land Use, Land-Use Change, and Forestry in the United States is a net sink and offsets approximately 11.8 percent of these greenhouse gas emissions, not included in total above. All emission estimates from the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2015 .

The Electricity sector involves the generation, transmission, and distribution of electricity. Carbon dioxide (CO<sub>2</sub>) makes up the vast majority of greenhouse gas emissions from the sector, but smaller amounts of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) are also emitted. These gases are released during the combustion of fossil fuels, such as coal, oil, and natural gas, to produce electricity. Less than 1 percent of greenhouse gas emissions from the sector come from sulfur hexafluoride (SF<sub>6</sub>) , an insulating chemical used in electricity transmission and distribution equipment.

## Greenhouse Gas Emissions in the Electricity Sector by Fuel Source

Coal combustion is generally more carbon intensive than burning natural gas or petroleum for electricity. Although coal accounted for about 70 percent of CO<sub>2</sub> emissions from the sector, it represented only about 34 percent of the electricity generated in the United States in 2015. Another 32 percent of electricity generated in 2015 was generated using natural gas, an increase relative to 2014. Petroleum accounted for less than 1 percent of electricity generation in 2015. The remaining generation in 2015 came from non-fossil fuel sources including nuclear (about 20 percent) and renewable sources (about 13 percent), which include hydroelectricity, biomass, wind, and solar. These other sources usually release fewer greenhouse gas emissions than fossil fuel combustion, if any emissions at all.

## Emissions and Trends

In 2015, the electricity sector was the largest source of U.S. greenhouse gas emissions, accounting for about 29 percent of the U.S. total. Greenhouse gas emissions

from electricity have increased by about 4 percent since 1990 as electricity demand has grown and fossil fuels have remained the dominant source for generation.



# The Excessive Electricity Bill Problem/ Solution : LEDS Vs Other Bulbs



Calgary under conventional streetlights back in 2013 (left), taken by astronaut Chris Hadfield compared to Calgary in 2015 (right) with LED streetlights, taken by astronaut Scott Kelly (Photo Courtesy of Chris Hadfield and Scott Kelly via Twitter)

LED lighting solutions have never been more accessible or affordable than now. With multiple rebate programs and incentives, more cities are making the switch to LED street lighting. And why wouldn't they? As we all know by now, LEDs are energy-efficient and long-lasting which means huge savings on the energy bill as well as reduced maintenance costs. But what about the other benefits? Such as reduced crime rate, safer neighborhoods, and overall perceived improvement? These are all benefits that LED street lighting can offer compared to the orangey glow of the high pressure sodium (HPS) street lighting still illuminating most of our streets and neighborhoods.

5. [www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions](http://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions)
6. [www.etrenzikled.com/big-picture-led-impact/led-lit-canadian-city-looks-fairer-now-from-space/](http://www.etrenzikled.com/big-picture-led-impact/led-lit-canadian-city-looks-fairer-now-from-space/)



## SAFER STREETS

The biggest difference between LEDs and HPS lights (other than the energy savings, of course) is the overall appearance of the light. LEDs not only feature a crisp color similar to moonlight/natural light (anywhere from 4000K to 6000K), but also a great Color Rendering Index (CRI) of at least 70. This is hugely important because the CRI is what determines the visibility and ability to see things as intended. The CRI for HPS lights, in comparison, can be as low as 20. This makes visibility “muddier” and more difficult to discern detail and color. When visibility is decreased, so is safety\ which means an increase in crime. Visibility is an obviously important factor when it comes to lighting streets and neighborhoods at night. Take a look at this chart that compares basic statistics between LED street lighting and HPS.





# COMPARISON CHART : LED VS HPS

	HPS	LED
Optics	Non-uniform, optics degradation	Uniform, much less aging of the optics
CCT*	2000K	4000-6000K
Life	3,000hrs 30%-35%	50,000hrs<5%
Power Factor	0.85	0.95
Turn on time	15-20 min	<0.1sec
Spectrum	Ultraviolet	No UV
CRI	20-30	>70
Uniformity	Bad	Good
Environment	Hg	No Harm
Smart Control	No smart control	Smart control
Flickering	High pressure and high frequency op	Constant current, no flickering
Heat	High Heat, temp >100C	Less Heat, temp <60C
Voltage	4000-7000V	110-220V

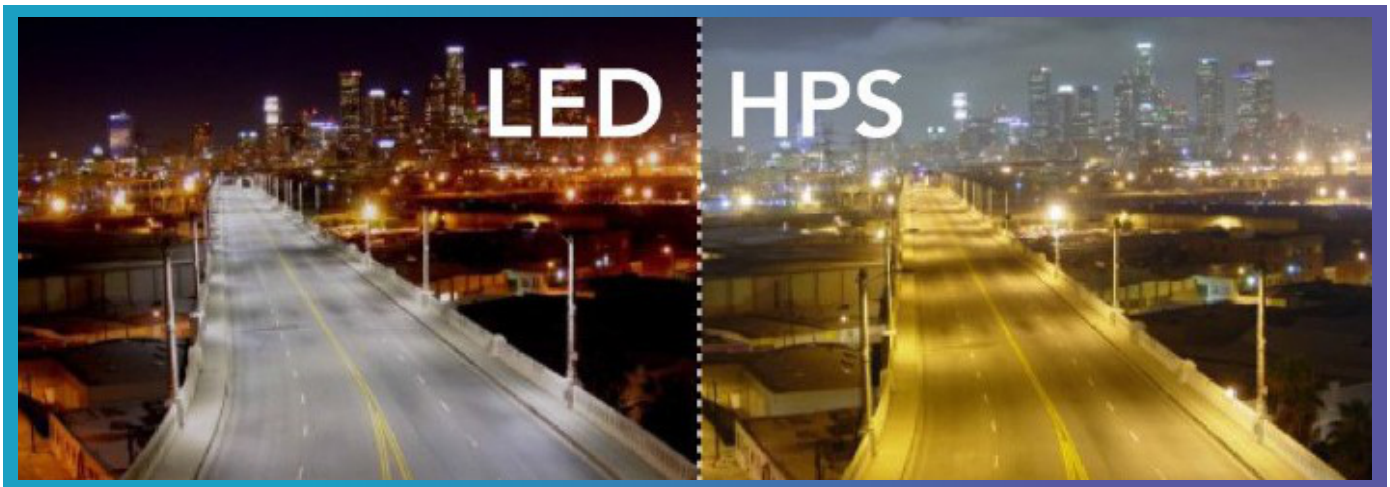
\*CCT is Correlated Color Temperature



## CASE STUDY : PORTLAND SAVING \$100K PER MONTH

Portland, Oregon recently converted 20,000 city street lights to LED in the largest efficiency upgrade the city has undergone. Savings from the program have now topped **\$100,000** per month and those monthly savings will continue to grow as more lights are converted. The money saved can be utilized to improve infrastructure (i.e. roads, water lines, and sewer lines) without the need of raising taxes. Read more here .

## CASE STUDY: LOS ANGELES REACHES ANNUAL SAVINGS OF \$8.7 MILLION



Los Angeles , California began a huge installation of 140,000 LED street lamps in 2009. Since the conversion from HPS to LEDs, the city has recorded up to 63% energy savings and cost savings of \$8.7 million this past year. The cost savings are the result of not only a savings in electricity cost, but a reduction in maintenance costs as well. As an article on Forbes reports, “In 2008, pre-LED roll-out, Los Angeles logged 70,000 street light repair and maintenance events; in FY 2012, maintenance and repair events fell to 46,300. LEDs are longer lived than the incumbent units they replace (10-15 years versus 4-6 years), which means that maintenance should steadily decline as LED units are fully deployed.” Again, savings in energy costs and maintenance equates to a minimization in tax increases and revised budgets with money allocated to much needed and often put off infrastructure repairs. Read the entire Forbes article on LA’s LED lighting project here

7. [www.luxtg.com/led-vs-hps-street-lighting/](http://www.luxtg.com/led-vs-hps-street-lighting/)



# LEDs Vs CFLs and Incandescent Bulbs

I think it's fair to say that most people and businesses understand LEDs are more efficient, can reduce their electricity bills, and are generally better for the environment. However, most LED buyers are not aware they could have utilized local city/state tax rebates to reduce the purchase price by 50-80 percent, and also that they can apply for a tax credit at the end of the year (as always, consult with your local tax professional). Take a quick look at the table below:

LED vs CFL vs Incandescent Cost	Incandescent	CFL	LED
<b>Watts used</b>	<b>60W</b>	<b>14W</b>	<b>7W</b>
<b>Average cost per bulb</b>	<b>\$1</b>	<b>\$2</b>	<b>\$4</b> (\$0-2 when using instant tax rebates!)
<b>Average lifespan</b>	<b>1,200 hours</b>	<b>8,000<sub>hours</sub></b>	<b>25,000<sub>hours</sub></b>
<b>Bulbs needed for 25,000 hours</b>	<b>21</b>	<b>3</b>	<b>1</b>
<b>Total purchase price of bulbs over 20 years</b>	<b>\$21</b>	<b>\$6</b>	<b>\$4</b> (\$0-2 when using instant tax rebates!)
<b>Cost of electricity (25,000 hours at \$0.15 per kWh)</b>	<b>\$169</b>	<b>\$52</b>	<b>\$30</b>
<b>Total estimated cost over 20 years</b>	<b>\$211</b>	<b>\$54</b>	<b>\$34</b>

While prices for LED light bulbs were astronomical just a few years ago — upwards of \$100 for one bulb — you can now pick up a cheap, 60-watt-equivalent LED light bulb for less than \$5 . They will become even less expensive as technology advances.

Incandescent light bulbs are being phased out: An almost complete ban on their sale started in 2014 and will take full effect in 2020. Simply put, they waste a lot of energy and don't last very long.

8. [www.viribright.com/lumen-output-comparing-led-vs-cfl-vs-incandescent-wattage/](http://www.viribright.com/lumen-output-comparing-led-vs-cfl-vs-incandescent-wattage/)



Even though CFL's are better than incandescents, LEDs are the superior option in every area. Modern CFLs also contain a small amount of mercury, which is very harmful to both your health and the environment. That means it's bad news to break one ( here's how to clean it up safely if you do ), and they shouldn't be disposed of in your regular household trash ( here's how to recycle them ). If these bulbs are not properly disposed the mercury could contaminate groundwater which we use as a source for drinking water. This is just some of the severity we face if CFL's are not properly disposed.

## LEDs: Light-Emitting Diodes

Light-emitting diodes, or LEDs, were for years most commonly found in small electronic displays, such as the clock on your cable box. Because the light emitted by each tiny LED is directional and fairly weak, household LED bulbs were on the fringe of mainstream technology just a few years ago.

According to the Lighting Research Center , LED light bulbs work by bringing together currents with a positive and negative charge to create energy released in the form of light. The result is a fast source of light that is reliable, instantaneous, and able to be dimmed. What sets LEDs apart from incandescent bulbs and CFLs is just how long they can last. According to Consumer Reports , LED light bulbs can last anywhere from 20,000 to 50,000 hours, or up to five times longer than any comparable bulb on the market. However, that combination of efficiency and durability has historically come at a cost. LEDs cost more money than CFLs and incandescent bulbs. The good news, however, is that their price has dropped considerably over the years, as seen in the table above.

Where once it was common to pay \$50 or even \$100 for an LED light bulb, they're now available for about \$8 a bulb on Amazon . IKEA sells its own 60W-equivalent LED light bulbs for just \$5 , and Home Depot is reportedly running a promotion in May that will discount Philips LED light bulbs to as low as \$2.50 per bulb, and that's before rebates, token incentives from Terawatt, tax credits, and tax deductions

<sup>9</sup> [www.greenisbetterinc.com/light-bulb-showdown-led-vs-cfl-vs-incandescent/](http://www.greenisbetterinc.com/light-bulb-showdown-led-vs-cfl-vs-incandescent/)

<sup>10</sup> [www.greenisbetterinc.com/light-bulb-showdown-led-vs-cfl-vs-incandescent/](http://www.greenisbetterinc.com/light-bulb-showdown-led-vs-cfl-vs-incandescent/)



## How Much Could You Save?

Now consider that those savings are from just one bulb. Think about the number of lights in your house — some fixtures, like chandeliers or ceiling fans, probably even use three bulbs or more. If you replaced 20 incandescent bulbs with LED light bulbs throughout your home, you could save up to \$3,260 over their 23-year lifespan (and that's assuming utility rates don't rise).

Now let's see what the savings will be if every house in the US converted to LEDs

## Sample Home Test Results (40 Light Bulbs, 40 LED Bulbs)

You have the same number of light fixtures as the average U.S. household.

You use **33.6 more** efficient bulbs than the average.

You are likely **saving** about **\$127.44** more than the average U.S. household each year on lighting energy, due to your choice of bulbs.

If every household in the United States took the same steps on lighting efficiency



it would save **\$14,400,695,050** in energy costs.



it would be like shutting down **20 coal power plants**.



it would be like taking **15,587,765** cars off the road.



it would reduce Co2 emissions by **79,497,604** metric tons.



it would cut emissions equivalent to **432,876** railcars of coal.







The savings are exponentially greater when you then apply this same data to business, commercial, and industrial applications. Energy efficiency, blockchain technology, and sustainability are growing trends that show no signs of slowing down.

## Other Ways to Compare CFL vs. LED Light Bulbs





Let's put cost aside for a moment and look at these lighting options based solely on quality and other important factors. Here are some pros and cons of CFLs vs. LEDs:

### CFL Light Bulbs

#### Pros:

-  Use less energy than incandescent bulbs
-  Cost less than LED light bulbs
-  Produce extremely bright light that spreads evenly
-  Available in soft, warm, and bright white hues

#### Cons:

-  Cannot be used with a dimmer switch
-  Take a few moments to heat up and reach full brightness
-  Contain mercury, a toxic heavy metal
-  Can be sensitive to cold temperatures

11. [www.environment.nationalgeographic.com/environment/energy/great-energy-challenge/light-bulb-savings-calculator/](http://www.environment.nationalgeographic.com/environment/energy/great-energy-challenge/light-bulb-savings-calculator/)



# LED Light Bulbs

## Pros:

- Light up immediately, like an incandescent bulb
- Don't heat up much at all – they stay cool to the touch even after use
- Last up to five times longer than CFLs; can literally last a lifetime
- No sensitivity to cold temperatures
- Do not contain mercury
- Some models can be used with a dimmer switch
- Available in soft, warm, and bright white hues

## Cons:

- Directional light that may not spread as evenly as other sources
- In some cases, more expensive to purchase up front, but less expensive overall

## CFL vs. LED Light Bulbs : Who Wins?

After conducting research using my own personal experience and expert sources like **Consumer Reports** and **EnergyStar.gov**, I've concluded that it's hard to beat the value offered by modern LEDs. Not only are their prices getting more affordable every day, they also lasts up to decades longer than the competition.

With soft and warm white hues that mimic the glow of traditional incandescent bulbs, the ability to use some models with a dimmer switch, and their instantaneous illumination, LEDs are simply a better option around the house than CFLs.

12. [www.greenisbetterinc.com/light-bulb-showdown-led-vs-cfl-vs-incandescent/](http://www.greenisbetterinc.com/light-bulb-showdown-led-vs-cfl-vs-incandescent/)



Personally, I have all LEDs in my home. Prices for LEDs are lower than they've ever been (and continue to get more competitive), and they are the most durable, efficient home lighting option on the market. It's hard to argue against a product that more than pays for itself in energy savings and might last for the rest of your life.

You don't have to make a huge commitment now. If you want, you can upgrade to more efficient lighting one room at a time, or as old light bulbs burn out. Or start with installing an LED light bulb in a hard-to-reach spot, like a cathedral ceiling fixture, since you won't have to replace it for many, many years.

There is no right or wrong way to make the switch. But the sooner you do, the sooner you'll start saving.

In short, It's easy to see that we can have a dramatically positive effect on our environment (and our wallets!) by simply changing our light bulbs to more efficient LED ones. The above example is a small one, however, imagine if everyone in the world made the switch! The US, China, and Asia-Pacific countries are the biggest offenders, with the bulk of the lighting being used in the Commercial and Residential sectors (businesses and homes) It's also extremely cost effective, often greatly reducing electric bills, is profitable over time, and it helps save the environment.

13. [www.greenisbetterinc.com/light-bulb-showdown-led-vs-cfl-vs-incandescent/](http://www.greenisbetterinc.com/light-bulb-showdown-led-vs-cfl-vs-incandescent/)





# Funding Problem/Solution

## Terawatt Decentralized LED DAO Project “Lighting Efficiency Decentralized”



### Problem:

Significant upfront costs to upgrade to LEDs for businesses and consumers, and also, electrical grids get overloaded as electricity consumption continues to grow with the population as well as our increased reliance on electricity. This is likely to continue to become an even greater issue as more electric vehicles hit the market. To meet this demand power/utility companies have to build expensive additional power plants (hundreds of millions of dollars). OR, what they are doing is incentivising their customers to upgrade to LED lighting, (and other energy efficient appliances, devices, building methods, etcetera) Power companies are even encouraging their customers to consider solar panels or provide their own electricity somehow. Sounds counterintuitive right? It makes sense though when you realize how expensive it is to build and maintain a new power plant versus just having your customers change their light bulbs. Also, in the US, power companies are mandated by the EPA to incentivise the changeover from CFL's to all LED because CFLs contain mercury! Most people do not recycle them either because it's easier to just throw them in the trash.

I spoke to DUKE energy, one of the largest utility companies in the USA and world, and they are even giving LED's away for FREE! Up to six bulbs and the rest are heavily discounted. This tells us they REALLY need their entire user base to adopt LEDS (and other energy star rated appliances, building materials, switch to renewable energy sources, etcetera)

The power companies are given funds by the State and Federal governments, and also use their own money (TECO is investor/privately owned for example) to subsidize the cost of the LEDs. DUKE energy for example, it's worth it for them to offer their customers 1 million dollars worth of free LED bulbs, if it helps them avoid building a 200 million dollar power plant, and also paying to maintain it.  
**Power companies are required to incentivise the changeover from Mercury containing CFL's to Clean LEDs to maintain compliance with the EPA!**



The power companies usually run these programs until they run out of funding to subsidize the cost of the LEDs. I have seen some utility providers like Century Hudson only offering the instant tax rebates (discounted prices essentially) for 3-4 months out of the year. Upon speaking with them, they of course would like to have this available for the entire year, but simply run out of funds depending on their budgets.

Power companies only usually allow their current customers to access these discounts because they are paying for it, and want to primarily reduce their electricity usage through increased lighting (electrical) efficiency. So it wouldn't make sense for them to offer this subsidized cost to other power companies' customers. Hm...a challenge!

### The Decentralized Terawatt DAO Solution:

## What is a DAO? Is this something new?

The DAO is a next-generation organisation that will change the way we create products and share profit.

“ **The DAO** is now the biggest crowdfunded project of all time. In less than a month the organisation has a market cap of \$140 million. So what is the DAO really? And why should you care? Simply put, the DAO is a self-running company. It has no directors, no managers and no employees — at least not in the conventional sense of the words. DAO stands for ‘Decentralised Autonomous Organisation’ and it’s powered by a crypto currency called **Ethereum**. To better understand how the DAO works requires a quick explanation of Ethereum. This is the future of trust..

Money is the second most important thing human beings have invented, after language. More than just a way of buying things, currency is a symbol of trust. Until now, that trust has relied on central authorities, like banks, for verification. We no longer need those monolithic entities thanks to cryptocurrencies like Bitcoin. Ethereum, like Bitcoin, is a cryptocurrency and, like other cryptocurrencies, Ethereum is built on a blockchain. What makes Ethereum different, however, is that it has been designed as a platform for ‘smart contracts’, allowing anyone to create a trust agreement without requiring middlemen.

Bitcoin was designed to be both a currency and asset. Its blockchain can also be used for other forms of transactions or contracts, but it isn’t easy to build out these applications yet. Ethereum, on the other hand, was designed for contracts from the get-go and makes it easier for developers to build applications accordingly.



# Enter the DAO

With Ethereum gaining traction, the scene was set for a new kind of organisation. The DAO uses Ethereum smart contracts to power everything from its funding to how it pays people for the work they do. Like a traditional company, the DAO is built for profit. It is seeded via the sale of 'DAO tokens' during the crowdfunding period ending 28 May 2016. The tokens empower whoever holds them to vote on what the organisation will do.

If we use familiar terms to describe the DAO, you could think of tokens as 'company equity' and token holders as 'shareholders'. While not entirely accurate in conventional business terms, substituting those words when you read the rest of this article may be useful. What the company actually does is up to the token holders. New ideas are presented to the DAO in the form of proposals. Token holders then vote on proposals and, if approved, contractors will be allowed to compete for work on the resulting projects.”

With a basic understanding of what a DAO is and how it works, we can now get into more details on how the Terawatt DAO will function. We will build a DAO, and they will come . This is a decentralized autonomous organization that is essentially a bank/pool of funding allocation for power companies, all businesses, and their customers (business and residential), which they can tap to ensure that these L.E.D discounts can be offered/available 12 months out of the year instead of 3-6 months, or not at all in some cases. **For businesses and everyday consumers, The DAO can help provide them with the funding needed to afford upgrading their existing lights to LEDs.** So, this project does not entirely rely on utility company partnerships. Terawatt will act as both a funding bank, payment currency, and as an immutable verifiable data ledger. Think of it like an insurance fund, or a merry-go-round of appreciating money, that allows utility companies, businesses, and all people worldwide to help each other afford LEDs. This helps reduce everyone's electricity bills, helps the environment, increases light output, and further advances the federal and state initiatives that are pushing for 100% LED adoption anyway.

14. [www.medium.com/simondingle/the-company-of-the-future-a-beginners-guide-to-the-dao-112b8855d9ca](http://www.medium.com/simondingle/the-company-of-the-future-a-beginners-guide-to-the-dao-112b8855d9ca)

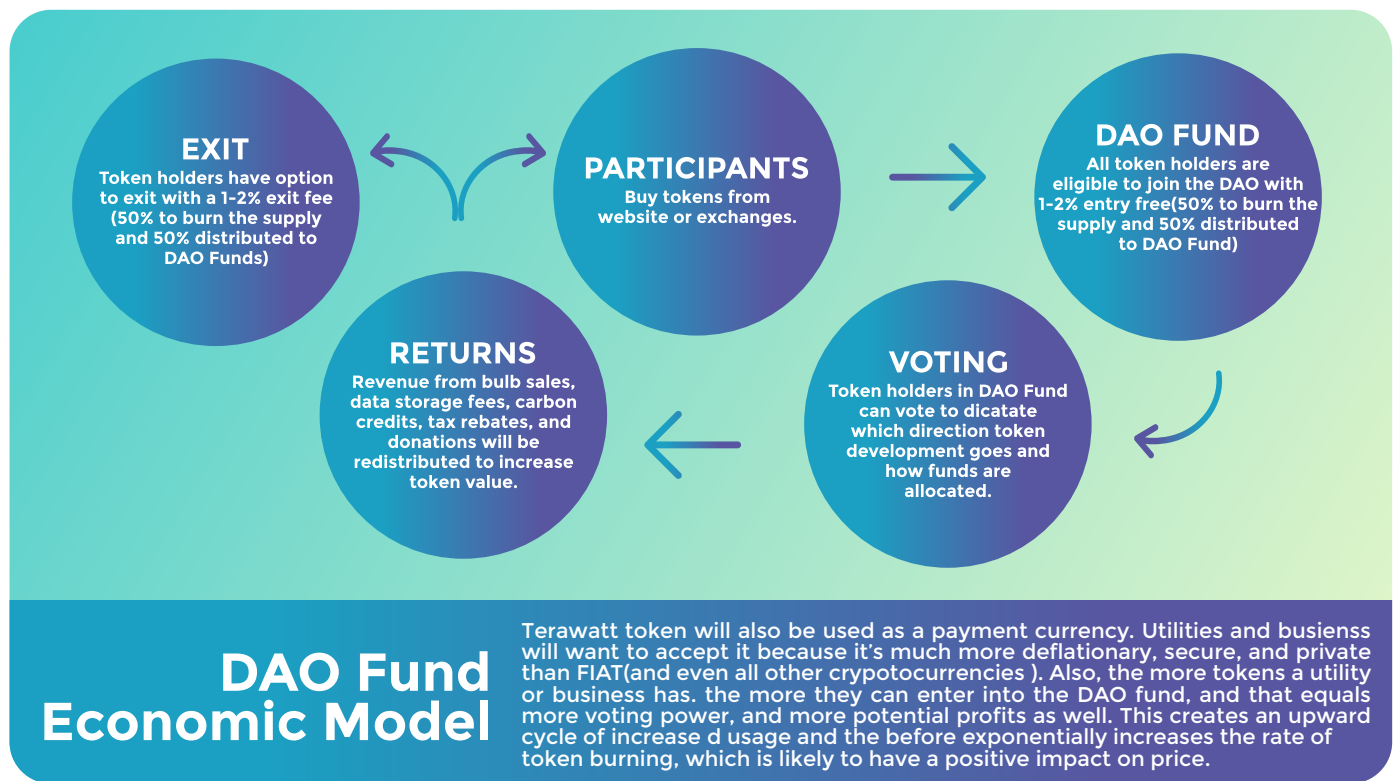


We may use a percentage of the ICO money to fund the DAO initially. We are actively pursuing partnerships with some of the largest utility companies, utility commissions, and Lighting manufacturers (such as GE and Philips) in the world, and they are open to trying out this model . Terawatt will offer them a free-trial basically, allowing the utility company to partake in the DAO and experience its benefits firsthand. This removes the risk from the utility providers, and businesses, and will help them realize the benefits of accepting the LED token as a payment currency.

## Terawatt DAO economics

### Primary Participants of the DAO

1) Utility Companies 2) L.E.D. bulb sellers 3) All businesses, consumers, and token holders



## DAO Funding

Participants will add funds to the DAO in the form of Terawatt tokens (LED ticker). All interested businesses and consumers, not just utility providers, can buy LED tokens and participate in the DAO. This will help increase the network effect (Metcalfe's Law). Now we have a growing decentralized fund as more token holders join.

**Why invest in this DAO?** High probability of making profits, to direct the funds via voting on community proposals, and to help drive global L.E.D. adoption

The Terawatt token supply will rapidly and exponentially decrease with a continuous coin burning algorithm. Terawatt will automatically use 50-75% of company profits earned from DAO entry/exit fees, profit taking fees (like an exchange), Carbon tax data storage fees, carbon credits, and also from affiliate L.E.D. sales commissions to buyback and burn (LED) Tokens. This is similar to the BNB token, but they only burn every quarter. We will burn continuously.

This may or may not mathematically cause token value to greatly increase as we are decreasing supply, while also increasing demand through marketing and growing adoption. Ex: If a Utility company invests \$10,000/month, in one year their account value has possibly increased 200% from \$120,000 to \$360,000. They could withdraw part, or all, of their account balance to provide subsidized LED's to their customers as needed, or to fund other green initiatives, like solar, wind, energy star-rated materials. products, electric vehicles, etc. Businesses and token holders can use their DAO profits to buy L.E.D. bulbs which will reduce their utility bills, qualify them for government tax credits/rebates, and reduce greenhouse emissions. We will also offer a token incentive or discount for participants who verify that they used profits for buying/selling L.E.D.s or related technologies.

Moreover, it acts like a decentralized insurance fund, with the Terawatt token that powers it also acting as a fast, private, secure monetary currency which can be accepted at businesses and utility providers globally. It will make sense for utilities and businesses to take payment in our tokens as it will allow them to add more tokens into the DAO, and potentially greatly increase their profits. With the supply being extremely more deflationary than FIAT, and even than most other cryptocurrencies, it will become highly attractive as a payment currency.



# DAO Technical Diagrams

## 1. Proposal

A Proposal can be submitted at anytime by any DAO Token Holder. The proposal defines how much ether will be paid to a Service Provider in exchange of the development of products or service. It's expected of a DAO to engage on several proposals over time.

## 2. Vote

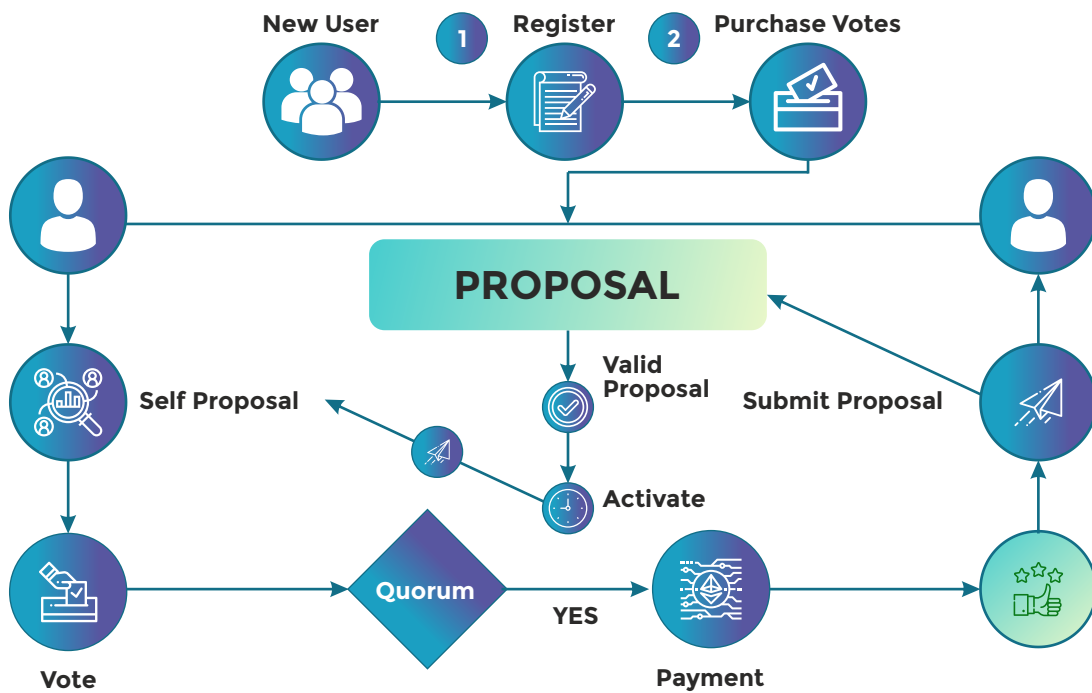
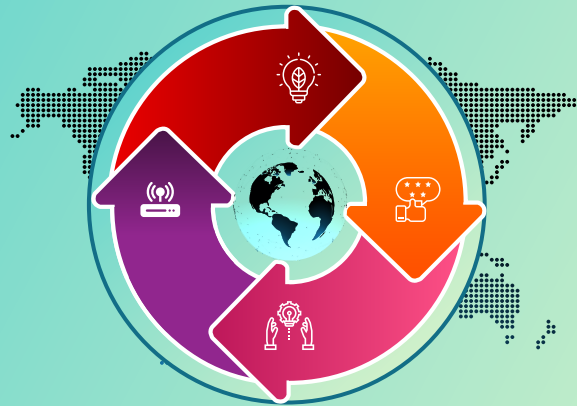
DAO token holder debate and then vote on a proposal. The DAO Token Holders stay in control of their ETH at all times. They can even elect a new Service Provider, for any reason. DAO Token Holders maintain their right to receive the rewards from the DAO even if they choose to leave the DAO.

## 4. Deployment

The DAO can charge anyone outside the DAO Token Holders for using the products or services created as part of a Proposal. This potential revenue is then sent directly to the DAO in the form of ether. The DAO then has the option to accumulate this ETH to support its growth, or redistribute it to the DAO Token Holders as a reward.

## 3. Development

If the proposal is accepted, work starts. The Service Provider is bound by irrefutable smart contract code to deliver on a series of objectives. Because the proposal is paid for an predefined installments instead of a lump sum, the Service Provider and the DAO's enjoy a mutualistic relationship.



15. [www.steemit.com/crypto-news/steempower/the-dao-an-ethereum-based-token-saleico-is-now-live-a-few-hours-old-and](http://www.steemit.com/crypto-news/steempower/the-dao-an-ethereum-based-token-saleico-is-now-live-a-few-hours-old-and)

16. [www.draglet.com/smart-contract-platform-act/smart-contract-daoact-platform-infographic/](http://www.draglet.com/smart-contract-platform-act/smart-contract-daoact-platform-infographic/)



## Who can join the DAO?

All interested businesses and consumers, not just utility providers, can buy LED tokens and participate in the DAO. This will help increase the network effect (Metcalfe's Law) Now we have a growing decentralized fund as more and more token holders join.

We also aim to do this for GAS, and SOLAR, and WIND, Electric Vehicles, Etcetera. LEDs are just the beginning of the titan Terawatt will become. LEDs will be proof of concept and then it will snowball from there into these other sectors. Once utility companies experience the innumerable benefits of joining the DAO, they will happily pay to join, and other companies that don't do this will experience F.O.M.O (fear of missing out).

## Token Description

Our project will use Ethereum to issue and create tokens mainly because it has the base foundation that our technology will implement. Terawatt will manipulate the blockchain smart contracts. Our token will be a standard ERC20 token with some specific modifications. Our algorithms will verify that the consumer has actually purchased the bulbs from a suitable seller and add the transaction to the blockchain. Smart contracts will execute and manage the entire process.



## How LED Token will be implemented?

Our token will use POS so that it will help with emissions and keep the environment clean and green. Our first implementation will be on the Ethereum Casper Network using Proof of Stake. This network is able to finalize blocks/messages in constant time  $O(1)$ . This is in contrast to the  $O(N)$  time required for Byzantine fault tolerant state machine replication. Casper uses a binary consensus protocol. Protocol messages has three parts An Estimate(0 or 1), a sender( validator name) and a justification. An Estimator then translates the messages into 0's and 1's.



CBC Casper is a method for "deriving" consensus protocols . Using this method, a family of protocols have been created that enjoy a variety of benefits over traditional consensus protocols. These benefits include:

- 💡 A (relatively) simple consensus safety proof!
- 💡 No "in-protocol" finality threshold.
- 💡 The ability to trade off latency to finality with number of validators, rather than just network overhead.
- 💡 Theoretically optimal network overhead in the certain cases.





Terawatt LED token is actually going to be part of a global distribution of how consumers interact with energy not just about lighting. We are offering tokens to consumers that use our patent-pending verification technology in order to verify that they have purchased led bulbs. Product tracking, verification, ecosystem expansions are all in future works. We believe that being transparent and open will help keep the sustainability and value of this token. We will also offer several utilities such as:







 DAO - A decentralized fund for funding sustainable lighting solutions worldwide. A percentage of funds will be locked into a pool, and the global Terawatt community will vote/decide on what projects get funded and how much funding will be provided or set on the side for these projects.

 Payment Currency - Terawatt will be accepted by utility companies and businesses around the world

 Incentives - Terawatt Token will also act as a rewards system for each L.E.D. bulb purchase that's verified by our patent-pending process. This serves as an incentive for users to purchase LEDs for home, businesses, or government use and verify them through our interface

 Data Storage - LED purchase records, and all token payment records, may be securely stored in the Terawatt ecosystem. This allows the purchasing entity to return at tax time and have all of their LED and other Energy Star Rated Purchase records readily available. The user pays a small token fee to access the records again.

 Masternodes - When Ethereum makes it available. This will help to further secure and decentralize the Terawatt ecosystem, while providing benefits like residuals and staking/voting power to token holders

## Token Specifications

**Terawatt - Decentralized, Fast, Private, Secure, Sustainable**

**Overall Supply : 100,000,000 LED Tokens Circulating Supply : 65,000,000** (This number will decrease to **1 Million** or less over time) Terawatt will be mathematically delationary as we have a continuous coin burning algorithm using 50-75% of DAO profits to buyback and burn our own tokens daily 1 LED Token Represents 10,000 Watts (10 KW) of potential L.E.D. Electricity Usage As a verified LED bulb purchaser, you may get LED Tokens for free. 3-5% of LED Tokens will be given to LED bulb purchasers over the next 20 years



The remaining LED Tokens will be used for developing strong partnerships with government agencies and initiatives like the Department of Energy, Global Lighting development, LED retailers like Amazon, Philips, and General Electric, DAO operations, marketing, legal, token participants, overhead, and to expand into other rapidly growing renewable sectors like Solar, Wind, Electric Vehicles, Etcetera.

The end goal is to help cut 2,000 Terawatts of electricity usage worldwide (~50%) and 9 trillion tons of greenhouse emissions from electricity usage over the life of the project. The beauty of LEDs is this will also increase light output by ~50 percent as well. This will have a significant global impact on the environment, especially in countries like the United States, China, India, The EU, etcetera. Then though further marketing, education, government/corporate/individual partnerships, and strong development we will continue to drive global LED adoption initiatives.

## ROI

Below is a chart showing the extreme bullish nature of the BNB token. BNB (Binance's token) has a strong focus on monetization also, and they use some of their profits from trading fees to buy back and burn their supply. However, they only burn once every quarter and with a goal of reducing supply 50% over a long time, Terawatt will be burning everyday with a goal of reducing supply 99%! We will also be marketing aggressively and growing our user base while simultaneously reducing supply, just IMAGINE what that will do to the LED token price. Still, participants should do their own research and acknowledge that we cannot guarantee any results. This example is only meant to show one of many possibilities:

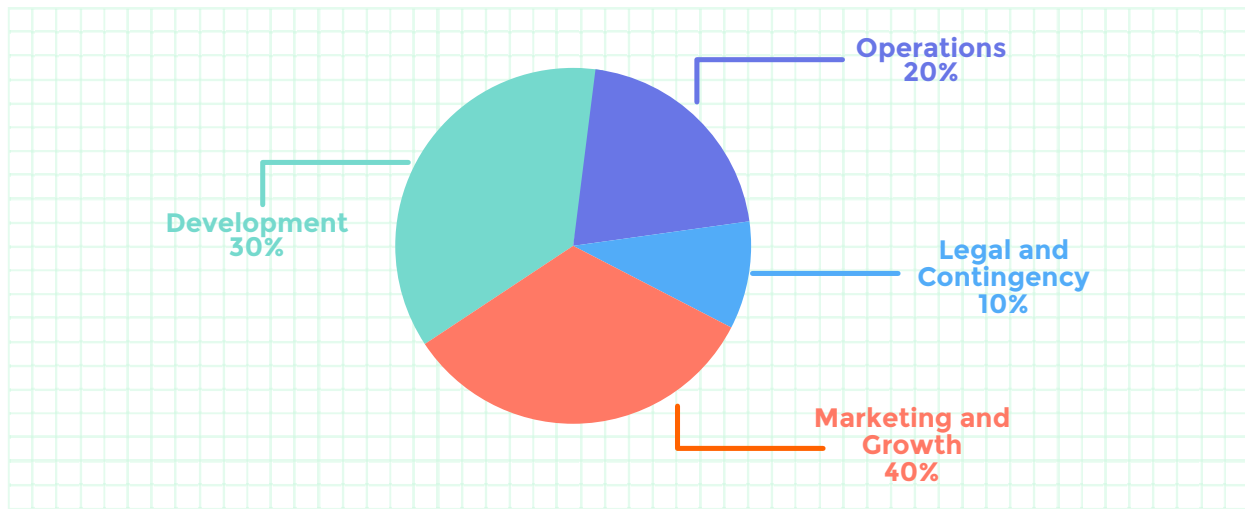


Participant funds will be cold stored in offline multisig wallets requiring 3+ confirmations to withdraw ETH, further secured with MetaMask, and with offsite keys/backups with detailed instructions left with a trusted entity in the event one of our core members dies. Participants should feel extremely safe buying our tokens.

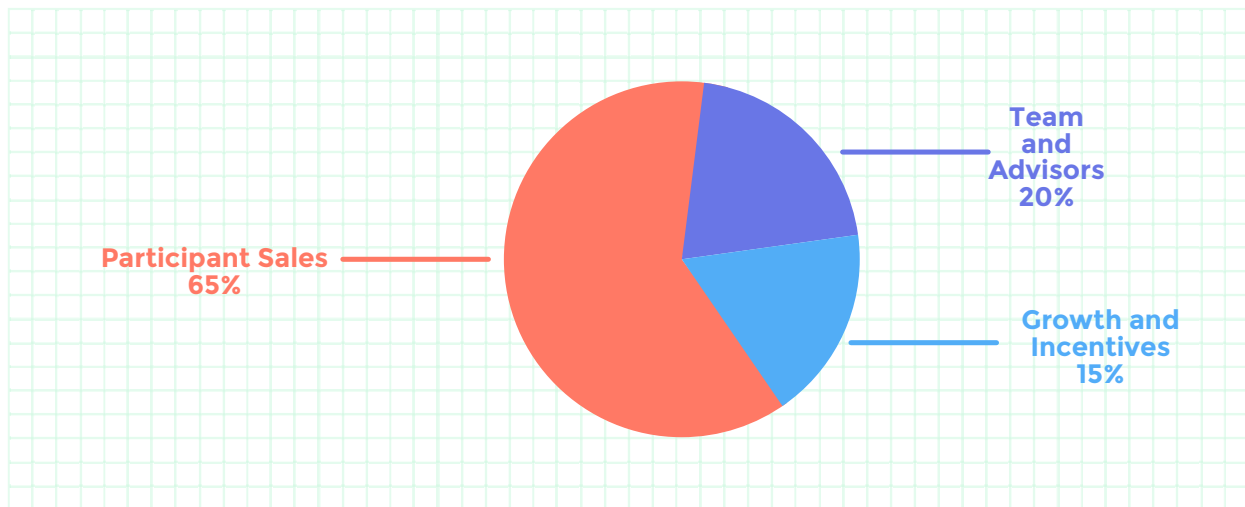
Our smart contracts were audited by Applicature's team, and we will audit the DAO vigorously, run bug bounties, and take exhaustive security measures to ensure that our DAO will be "bulletproof." As we build it we will look to add as many robust security features as possible, these may include: cold storage of DAO funds, compartmentalize the DAO so if one section is compromised it will be contained, an insurance fund, time delay on funding withdrawals, heavy encryption, and other safeguards that we will discover as we continue building the prototype and final product. Prototype is being built by the co-creator of the Ethereum DAO, Shubham Tatvamasi. We can't think of anyone better for this role than the person who helped build the largest DAO ever constructed. Prototype is expected to be completed prior to ICO in September. With a working product expected to be functioning shortly after, which will put us way ahead of schedule. It would be built already, but we need funds to finish it.



## Terawatt Contribution Allocation



## Terawatt LED Token Distribution



# Token Utility

## Why do we need blockchain?

- 💡 To create an immutable, decentralized, secure, private (zk-SNARKS) deflationary currency with utility functions
- 💡 We need complex smart contracts to power the D.A.O.
- 💡 We need Transparency, Immutability, Decentralization and verifications of all transactions performed on the platform
- 💡 Extremely precise process automation
- 💡 It becomes convenient to work with other cryptocurrencies in an increasingly digital world. Integration with other projects on blockchain (product tracking, verification, ecosystem expansions, and so on)
- 💡 Reliability and fault tolerance

## The Terawatt token will have several utility functions:

- 💡 Used as a secure, private (zk-SNARKS), fast, low cost, decentralized payment currency at Utility Companies, LED Bulb Sellers, and any other interested merchants
- 💡 Allows entry to the DAO, staking/voting abilities, powers the DAO ecosystem with Ethereum Smart Contracts
- 💡 Allows access to decentralized immutable renewable tax data records (for a small fee), used as financial incentive to verify L.E.D. bulb purchases
- 💡 Incentive - The Terawatt Token/Currency acts as a reward for each L.E.D. bulb/fixture purchase that's verified by our patent-pending process. This serves as an incentive for users to purchase LEDs for home, businesses, or government use and verify them through our interface
- 💡 Data Storage - LED purchase records may be securely stored in the Terawatt ecosystem. This allows the purchasing entity to return at tax time and have all of their LED and other Energy Star Rated Purchase records readily available. The user pays a small token fee to access the records again.
- 💡 Masternodes - When Ethereum makes it available. This will help to further secure and decentralize the Terawatt ecosystem, while providing benefits like residual rewards and DAO voting/staking power to token holders



There are no companies doing this right now, and our project will have a token ecosystem that can expand into many different renewable sectors like Wind, Solar, Electric Vehicles, and more . Terawatt i s patent-pending (further patents to be granted) and will use a community based governance model where participants can vote with their tokens on which city/application we can help convert to LED's. Terawatt will also help to educate others about the benefits of switching to LEDs.

## Monetization

We noticed that most (99 percent) crypto projects, coins, tokens, and ICO's, have no plan for monetizing their company, or its product/offering (except for accumulating participant dollars). Very few solve a “real world” problem either, have token utility, and even fewer further the global sustainability agenda that is progressing rapidly. Also, almost none are patent-pending, proprietary in any way, or have the largest contributor of the Ethereum DAO on their team. We wanted to tackle these pain points head on, and deliver a superior blockchain based product and service. This will not only differentiate this project and make it very attractive to financial participants , but also will help change the world and provide a sustainable business model going forward.

### 1. Fees from DAO usage, record storage, profit taking

Terawatt will earn profits from DAO entry/exit fees, profit taking fees (like an exchange or mutual fund does), Carbon tax data storage fees, time decay fees, carbon credits, and also from affiliate L.E.D. sales commissions to buyback and burn (LED) Tokens. This is similar to the BNB token, but they only burn every quarter causing massive “pump and dumps” and we will burn tokens continuously.

### 2. Utilizing Local, State, Federal, and Global Tax Incentives, Carbon Credits, and Rebates

“The Federal Government provides incentives for commercial and residential entities to use energy efficient lighting measures. According to the Database of State Incentives for Renewables and Efficiency, the Federal Government will offer any commercial entity **\$0.30 to \$1.80 per square foot of the building** , depending on the technology and amount of energy reduction, to allow the company to become more environmentally friendly.



The term “energy efficient lighting” includes the use of extremely energy efficient **LED light bulbs** . Generally, corporate buildings are outfitted with stronger, and therefore more expensive, light bulbs than residential buildings, and require more of them. It can become rather expensive, so, as a result, the government provides incentives for corporations to become more energy efficient. The Government also provides a Tribal Energy Program Grant for tribal governments. The amount they provide varies by solicitation. The Government will also possibly provide personal exemptions for individuals looking to install energy efficient applications. If eligible, the amount provided is 100% of the subsidy... Almost every power company will provide incentives , such as rebates , for people to take energy efficient measures and to work towards a more sustainable environment. Check with your local power or electric company to see what incentives they provide to encourage you to use efficient LED light bulbs. You can also visit the website to see various incentives provided in your area [www.dsireusa.org](http://www.dsireusa.org)

We can probably gain a percentage of these tax incentives/rebates, as well as Carbon Credits, for motivating people/entities to switch over, and this will be a huge revenue stream as we actively drive tons of traffic through our user interface via aggressive marketing strategies. Think “Shapeshift” interface. They have a token currency, but they also make millions with their website. If no rebates are available for a specific area or business, there will likely be a tax write-off, deduction, or credit available. Our software will scan for everything available to help drive LED adoption globally. We are also developing a way to decentralize the rebate process so that there is always an instant rebate available for the buyer. **We are actively contacting large energy companies like DUKE, Nextera, and PSE&G to find solutions.**

### **3. Partnerships with L.E.D. manufacturers and Governments**

It will be a no-brainer for a lighting manufacturer like General Electric, or Philips for example, to partner with us as this business model inherently drives sales of all L.E.D. products. Furthermore, since Governments are already pushing for this, they will be quick to partner with us, lead by example, and switch over local, state, and federal facilities to L.E.D.’s. The Department Of Energy (DOE) will also be a prime target for a partnership. Our COO is a Civil Engineer and will be focusing on this aspect as well. Our Advisor Jacob has also helped build hundreds of power plants in emerging nations. Furthermore, this is a good public relations move, promoting a cleaner, more sustainable future through use of L.E.D. lighting solutions. This is a cost saving measure that will help states drastically cut electricity costs over time, leaving more money in budgets for other green initiatives.

17. [www.gogreenledbulbs.com/c/150/information-on-government-incentives-for-switching-to-led](http://www.gogreenledbulbs.com/c/150/information-on-government-incentives-for-switching-to-led)



## 4. Commissions from L.E.D. bulb sales

Once a participant signs up, we can give them the option to purchase the bulbs through our websites affiliate links (ie., Home Depot, GE, Phillips, DUKE energy, etc.). This will earn revenue for both this company, the L.E.D. manufacturer, and also provides the buyer with convenience. We won't need to hold inventory or deal with shipping, customer service, etcetera as it will just be an affiliate link. (or we may go with drop shipping, or even installs and bulb recycling if it makes sense down the road)

There are many other income opportunities that will present themselves. Imagine when we start acquiring big government or corporate contracts, like all of the street lights/lamps in Shanghai, New York City, or Mumbai for example. Or if companies like Walmart, or Costco, switch over to all LEDs and partner with us to further their green energy initiatives and increase PR. From small companies to large ones, one bedroom apartments, to 80 story hotels, small eco-friendly nonprofits, to large global and governmental initiatives, the possibilities for growth are endless.

## 5. Donations

We anticipate getting a lot of support for this project as the renewable energy and sustainability initiatives continue their upward trends. We will accept donations to the project in the form of Bitcoin, Ethereum, and potentially other crypto tokens going forward. This is a “feel-good” project with a positive and altruistic mission, and everyone can contribute to helping us reduce greenhouse emissions and combat global warming. We have already received a lot of positive interest from other blockchain projects. Going green is in! We aim to have a DAO (decentralised autonomous organization) as part of our ecosystem that will contain a donated LED token pool, and community users will vote on where they want to see the tokens used to further certain initiatives. For example, option one could be to help the city of Mumbai reach 100% LED adoption, but they need 1 million dollars to reach that goal. The DAO will allocate the tokens to this project if the community chooses it over the other choices, almost like a kickstarter platform for sustainability projects.





## Legal Disclaimer

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Acquisition of cryptographic tokens does not present an exchange of cryptocurrencies for any form of ordinary shares of the Distributor, and a Holder of cryptographic token is not entitled to any guaranteed form of the dividends, Holders of our tokens are only entitled to certain rights within the TSA.

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Prospective acquirers of our tokens should carefully consider and evaluate all risks and uncertainties associated with the cryptocurrencies, Terawatt and their respective businesses and operations, and the Terawatt Initial Coin Offering. Familiarise yourself with all the information set out in this White Paper and the TSA prior to any purchase of our tokens.

Ensure that you are aware of all of them would be risks prior to obtaining our tokens. The Risk Statement details all potential risks that you should consider. We recommend that you seek out independent financial advice before engaging in any sort of business endeavour.



# Risk Statement

No regulatory authority has examined or approved any of the information set out in this White Paper. No such action has been or will be taken under the laws, regulatory requirements or rules of any jurisdiction. The publication, distribution or dissemination of this White Paper does not imply that the applicable laws, regulatory requirements, or rules have complied.

To The Maximum Extent Permitted By The Applicable Laws, Regulations And Rules, Terawatt And Its Affiliates And Their Respective Officers, Employees, Advisors Or Agents Will, In Relation To The Website And Tokens, Not Be Liable For Any Damages Of Any Kind, Including, But Not Limited To, Direct, Consequential, Incidental, Special Or Indirect Damages (including But Not Limited To Lost Profits, Loss Of Revenue Or Third Party Loss Whether Foreseeable Or Otherwise, Trading Losses Or Damages That Result From Use Or Loss Of Use Of The Website And Tokens).

For The Avoidance Of Doubt, The Distributor Expressly Disclaims Any And All Responsibility For Any Direct Or Consequential Loss Or Damage Of Any Kind Whatsoever Arising Directly Or Indirectly From: (i) Reliance On Any Information Contained In This Document, (ii) Any Error, Omission Or Inaccuracy In Any Such Information, (iii) Any Action Resulting Therefrom, Or (iv) Usage Or Acquisition Of Products, Available Through The Website.

You Acknowledge And Agree That You Are Not Purchasing Tokens For Purposes Of Investment, Speculation, As Some Type Of Arbitrage Strategy, For Immediate Resale Or Other Financial Purposes.

Some of the statements in the White Paper include forward-looking statements that reflect the Distributor's current views with respect to execution roadmap, financial performance, business strategy and future plans, both with respect to the Distributor and the sectors and industries in which the Distributor operates.

Statements which include the words "expects", "plans", "believes", "projects", "anticipates", "will", "aims", "may", "would", "could", "continue" and similar statements are of a future or forward-looking nature. All forward-looking statements address matters that involve risks and uncertainties. Accordingly, there are or will be important factors that could cause the Distributor's actual results to differ materially from those indicated in these statements.



These factors include but are not limited to those described in Articles 5 and 9 of the TSA, which should be read in conjunction with the other cautionary statements that are included in the TSA.

Any forward-looking statements in the White Paper reflect the Distributor's current views with respect to future events and are subject to these and other risks, uncertainties and assumptions relating to the Distributor's operations, results of operations and growth strategy.

These forward-looking statements speak only as of the date of the White Paper. Prospective buyers of the tokens should specifically consider the factors identified in the White Paper and TSA that could cause actual results to differ before making a purchase decision. No statement in the White Paper is intended as a profit forecast and no statement in the White Paper should be interpreted to mean that the earnings of the Distributor for the current or future years would be as may be implied in this White Paper.

## Restricted Areas

We will be using Sum and Substance for our KYC/AML Citizens, residents (tax or otherwise), or green card holders, of the United States of America are ineligible to purchase any LED tokens in the LED Initial Coin Offering, PreICO, Private Sale or any other sale offered by Terawatt. The same applies for residents of Belize, Singapore, China, Canada, Iran, North Korea, Syria, Iraq, and any other countries the US is in direct conflict with or where token sales are prohibited.

This Whitepaper, or any part thereof, as well as any copies, must not be taken or transmitted to any country where distribution or dissemination of this Whitepaper is prohibited or restricted.



# Our Team



**Evan William**  /evan-william

## Founder and Chief Executive Officer

B.S. in Business Management from The State University of New Jersey at Montclair. 12+ years of experience in operations, sales, and management. Worked at Fortune 100's Verizon Wireless and Enterprise Holdings, was Director of Business Development for TBAviation, currently a U.S. Government Contractor who engineers custom aircraft coatings for sale to the D.O.D., and is a self-made business owner, cryptocurrency trader, investor, and blockchain enthusiast



**Morris Hallowell Layton III**  /morris  
h-layton-iii-5624229/

## Chief Operations Officer

B.S. in Civil Engineering from University of Texas at Arlington. Morris has 10+ years of experience in civil engineering, business development, marketing, and event promotions. He has had the opportunity to work on software pre-launch, and promote affiliate products. He has a thorough understanding of current infrastructure needs, and economics in funding maintenance, reconstruction and new construction. He is pro-sustainability and pro-tax savings. He joined this team to build client relationships with government authorities, individuals, and businesses.



**Jerome Raymond**  /jerome-raymond-8b06278

## Chief Technical Officer

B.S. in Software Engineering from the University of Texas at Dallas. 10+ years of experience developing software and Android and IOS apps. Expert in Solidity, Angular, Javascript. Has strong knowledge of the Software Development Lifecycle and building out business infrastructures. Provides executive leadership as head of global IT. Responsible for all aspects of strategic IT planning, implementation, and support worldwide as an integral component of business plan. Managed and delivered multimillion dollar projects on time and within budget. Responsible for budgeting, design and support of all technologies.



# Our Team



**Shubham Tatvamasi**  /shubhamtatvamasi/

## DAO architect

Shubham is the largest contributor to the Ethereum DAO and has been working on Blockchain technologies since 2015. He has contributed to the Bitcoin Blockchain, Ethereum, Hyperledger Fabric, Ethos, Abyss, Microsoft Azure, Zcash, Token Market, ChronoBank, Monero, Loom, Aragon, EthLend, Origin, EOS, and many others. Shubham also has experience with Decentralized Web Applications, Corporate Blockchains, Hedera Hashgraph, Decentralized Exchange Platforms, and CryptoCurrency Mining Servers. Shubham has helped many community events/meetups for Blockchain Devs, HyperLedger Delhi/NCR, CryptoCurrencyIndia, PyDelhi, ILUGD & volunteered/spoke in conferences like Global Blockchain Conference, PyCon India.



**Hase Takujiro**  /hase-takujiro-251011167/

## Advisor/Developer

Master of Science in Distributed Computing at The University of Tokyo. Previously a Full Stack Developer at Ubisoft Tokyo, and Blockchain Developer at NashTech Japan with over 15 years of programming and blockchain development experience. Hase has recently worked on projects such as zaif.jp , bullxchange.io , psalm.io , CATS, COTN, and others.



**Savio Gomez, Capt., PhD**  /savio-gomez-capt/

## Strategic Advisor

Savio has close to three decades of international and diverse experience in the Transportation & Technology field. He is a certified Blockchain & AI professional, a Master Mariner, has an MBA in international business / trade / logistics, among other degrees leading to a PhD. He is an auditor for various systems including ISO (9001,14001, 21500), OHSAS 18001, ISPS and a Marine Quality Inspector as well. Savio continues to be active advisor to a diverse range of projects. At Terawatt Savio advises in strategic matters like partnerships, exchange listings, best practices, investor relations and helping us continue to scale globally.



# Our Team



**Roy Davey**  /roy-davey-204497135/

## Lead Engineer

Solidity, Ethereum, NEO, Blockchain expert with 8+ years of full stack web development experience including Python, Javascript, Ruby, PHP, GoLang, Django, AngularJS, Ruby on Rails, Laravel, React.JS. Deep knowledge in Cryptocurrency development (Ethereum, Smart Contracts), organization of ICOs, DAO creation, Cryptocurrency wallet and exchange development, Cryptocurrency Trading, Lending bots on Poloniex, Bitfinex, Bittrex, Solidity, Web3js, Truffle, and ERC20 tokens.



**Jacob Salvador**  /jacobohansen/

## Advisor/Marketing

Helped build dozens of solar and renewable energy power plants around the world. CFO of Bitspace, one of Norway's leading blockchain companies and EOS block producer candidate. Experienced investment professional with a track record of solid hands-on experience implementing tech projects in the financial, renewable energy and blockchain industries. His in-depth market knowledge within disruptive technologies has contributed to some of today's most promising blockchain companies where he has held advisory board positions.



**AnuDeep Reddy**  /anudeepreddy200/

## Advisor/Marketing

Anudeep is a world-class blockchain and business consultant. As an active supporter and advocate of blockchain technology, he provides consultancy and advice to selected ICOs and has worked closely with successful ICO launches who have achieved their marketing, media and PR targets. Anudeep has worked with 30+ ICOs and blockchain based companies as a Growth Hacker and Marketing Strategist.



# Our Team



**Dr. David Meszaros**  /meszaroslaw/

## Legal

Dr. Meszaros is among the leading legal experts when it comes to all matters that arise at the intersection of blockchain and law. He has been the legal advisor for over 19 ICOs and assisted Fortune 500 companies with corporate and compliance matters alike. With a doctorate in law and many years of international legal experience, Dr. Meszaros guides TeraWATT through the regulatory maze of ICOs.



## Miikka Saloseutu

### Advisor

Miikka is our strategic marketing advisor and an ICO Bench ranked advisor. He is a founder of icotokennews.com and cryptocurrencyjudge.com websites. He's an experienced marketing professional with a demonstrated history of working in the internet industry with many challenging projects relating to Search Engine Optimization (SEO), venture capital investments, angel investments, E-commerce Optimization, Sales, Initial Coin Offerings, Crypto Currencies and Pay Per Click (PPC) marketing. He has his own internet marketing company Triplex Trading OU, which specialized in highly targeted SEO based affiliate marketing in the financial space and has grown exponentially in a last few years.



# Our Team



**Roman Karimov**  /ego97516/

## Advisor

Results-oriented Business Leader with 10+ years of entrepreneurial experience in the IT and Internet Technologies. Since 2016 focused on digital assets, becoming crypto enthusiast. Blockchain technology, bitcoin, ethereum and smart contracts have become for him the embodiment of the changes in which he must participate. Invested in different ICO's and participated at several crypto projects as an advisor by joining to at various stages - from development of the project conception, tokenomics and marketing strategy to attracting investments and listing n crypto exchanges. Currently Roman is an Advisor and Private Investor in projects and startups which use blockchain technology. He is also an experienced specialist on ICO Strategy, member of the ICO TOP ADVISORS, Bitcoin Foundation and RACIB. Regularly attends the industry conferences and events as a public speaker where discussed the topics of blockchain, ICO and investing in cryptocurrencies. Advisor only if strongly believes in the project. NO compromises.



**Antoun Toubia**  /icoadviser/

## Advisor

Investor & Chairman, United Capital Investments.

Antoun is an investment services professional with years of experience in Private Equity investments, venture capital and Blockchain Technology. He is currently building a new type of Private Equity Portfolio Fund based on the Blockchain technology and has already secured several project agreements including government backed contracts. Through his extensive network, he is bringing high value projects to the ICO market. Antoun brings expertise in JV negotiations, acquisitions, ICOs and venture financing deals. His portfolio currently includes diversified projects across several markets including Fintech, Green Energy, medical technology, industrial technology and IT.





## Our Team



**Carlo Buonpane**  /carlo-buonpane-a9a44684/

Entrepreneur, Investor, Crypto enthusiast, Coach and Mentor. Carlo has gained various experiences in various digital startups, helping raise millions of dollars for various ICOs globally. Expert fundraiser with deep connections in the blockchain industry




**Alexander Pavlov**  /pavlovsasha/  
**Advisor**

Co-Founder of a media portal with 1M + active users per month.

I hold 10+ years of IT experience and 6+ years in upper echelon management. In the present I am CEO & Founder Crypto Launch, an agency of experts which helps startups and new brands to navigate in the World of blockchain, strategize accordingly and align their ideas correctly with blockchain philosophies and token economies. Also I am CEO & Founder of Web Dev Company Webinsight LLC, which is amongst TOP-10 companies in CIS Region, rated by ru-net rating agencies. Since 2017 I am COO of decentralized gaming PvP platform IQeon, which has raised more than 3.000 ETH in Token Sales to date. I have successfully taken an active part as an advisor globally, at the events, such as CryptoSpace (Moscow), Belarus Blockchain Conference (Minsk), Crypto BAZAR (Moscow), Blockchain Cruise Asia (Thailand), London Blockchain Week (London), Blockchain Economic Forum (Singapore), White Nights Conference (Prague), Decenter CryptoEvent (Minsk), Blockchain Economic Forum 2018 (San Francisco).



# Our Ratings



CoinCheckup  
TERAWATT  
ICO SCORE:  
4.38/5 ★



ICOMARKS 9.7



Foundico  
find trusted ICO

8.6



blokt  
RATING

A-  
★★★★★



Track  
Rating

5.0



Findico  
rating

4.5



ICO bliss

4.6



NEIRONIX

4.8



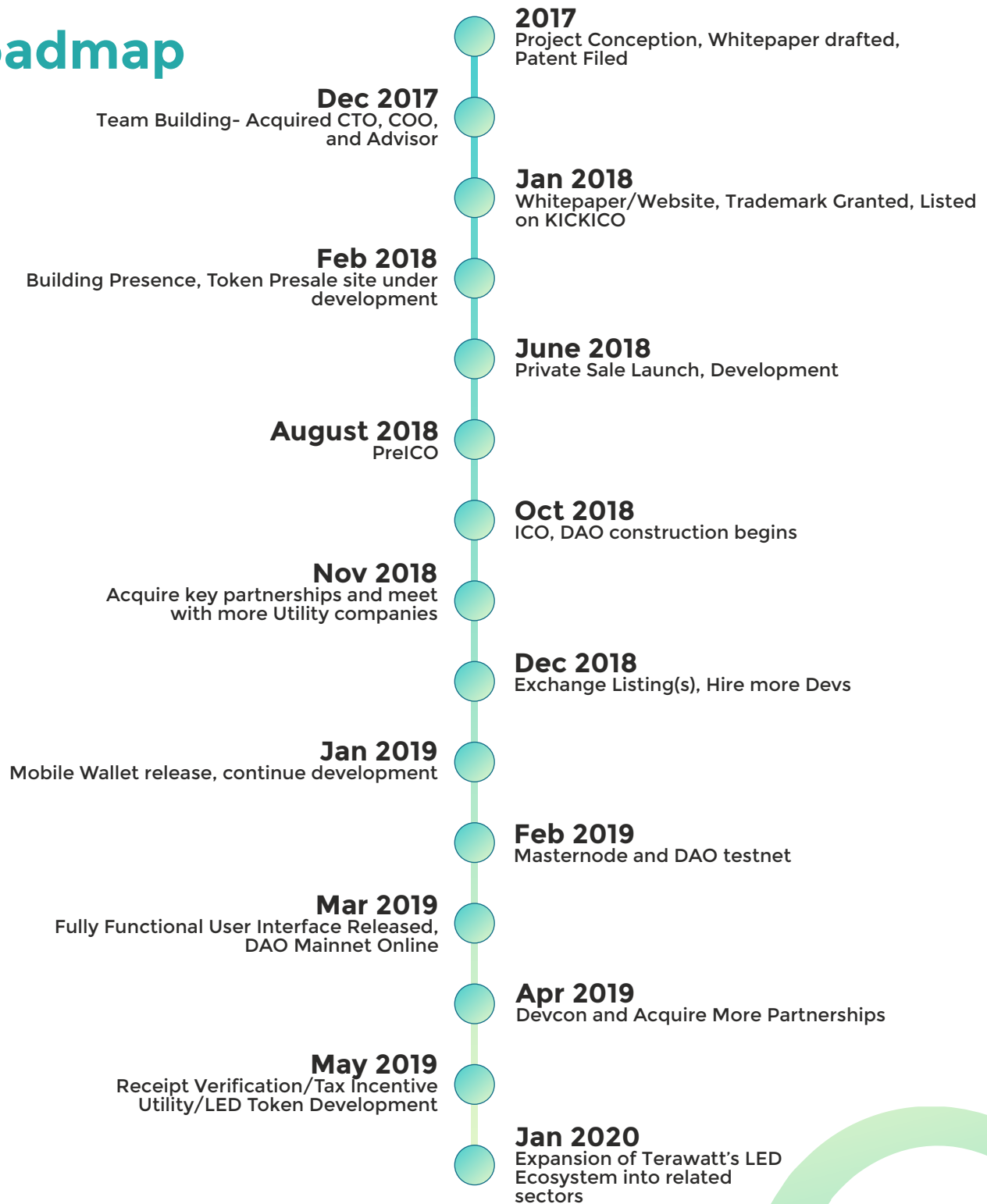
## Exchange Listings



# Partners



# Roadmap





"The Terawatt Foundation - Ground, 1st, 2nd and 3rd floor  
Joop Geesinkweg 901 - 999 Amsterdam - Duivendrecht 1114 AB  
Netherlands"

