



## WHAT is invVEST?      WHY SUPPORT invVEST?

invVEST is a Technology Agnostic, apolitical Nonprofit Organization with a single purpose:

**Enable Global Leadership for USA in Sustainable Energy through Massive Scaling. Our initiative will provide Clean & Economical Energy leading to a vibrant economy while protecting our planet for future generations. TOGETHER WE CAN!**

**invVEST will work collaboratively with public & private sectors organizations to enable our shared vision.**

**invVEST initiatives will enable a global paradigm shift. Imagine:**

*Twenty years from now instead of fighting over a dwindling resource like fossil based oil to generate our energy that increases our pollution levels to the point of no return for our planet, we generate more clean, sustainable energy because it actually helps protect the environment while fueling our economic growth.*

**In short, invVEST initiatives will enable Clean Energy AND Economical Energy.**

## WHAT WILL THE SUPPORT BE USED FOR?

- Call for action from State and Federal government leaders to act on our shared vision & purpose
- Get funding/grants/sponsorships for our non-profit efforts

## HOW DO I SIGN UP FOR SUPPORT?

Go to [www.invVEST.org](http://www.invVEST.org), click on SEI Community Center for Students & Citizens & sign up in SHOW YOUR SUPPORT.

*We will not provide your information to any 3rd party information or send you emails without your express consent.  
Please check out our website about our growing team and the testimonials.*

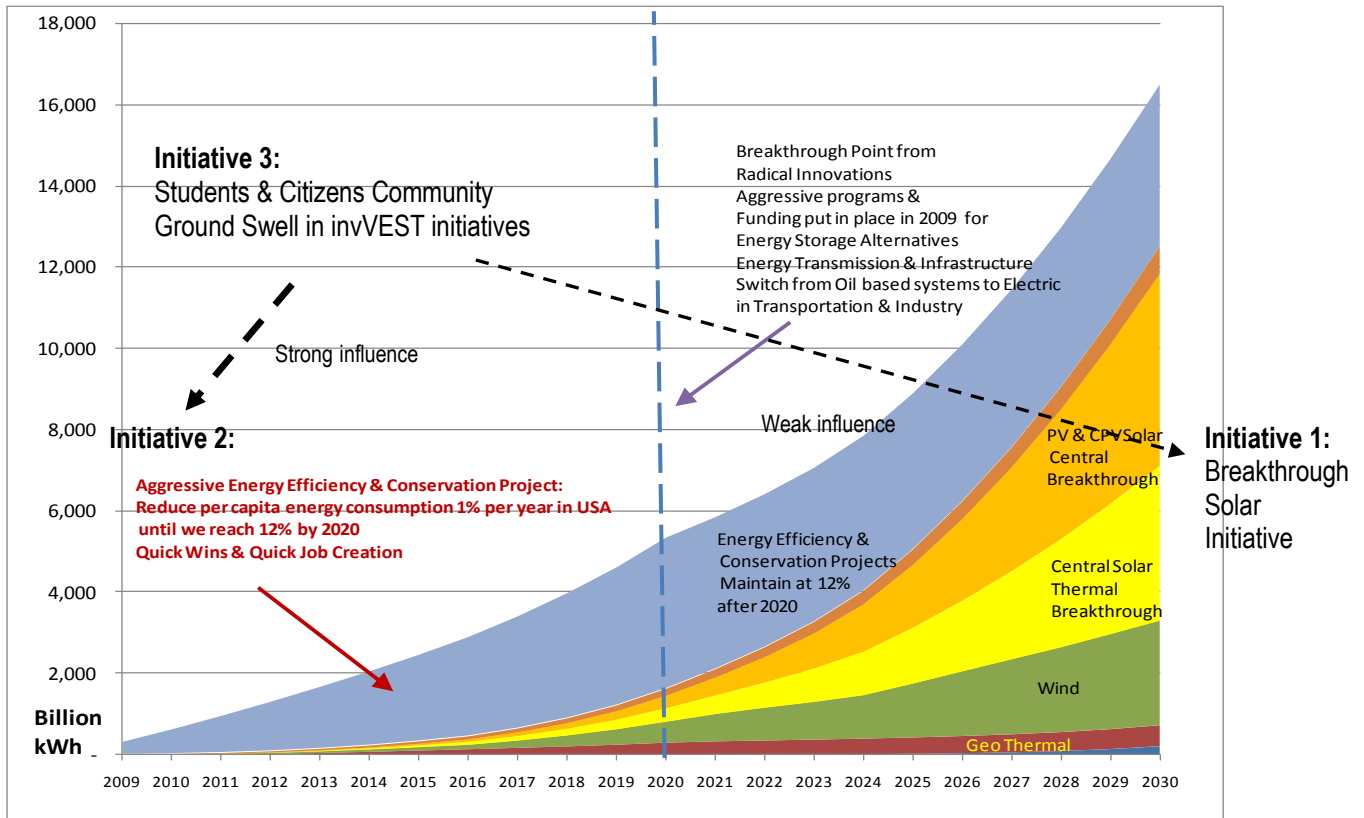
## SEI Community Center: invVEST initiatives will provide you with these immediate benefits

- You or your organization could directly benefit from mass-scaling your sustainable energy products & services by interacting with invVEST team.
- You will find numerous practical SEI ideas that have been successfully implemented and can be easily implemented in your own community.
- You will find hot practical tips for the most economical energy saving ideas that you can implement yourself or through listed companies.
- You can get prizes for your team for coming up with practical ideas that can be implemented in your community and replicated in other communities.
- You can also get prizes for successfully implementing any of the ideas in your communities.
- There will be monthly contests and the monthly prize winners can further refine their idea and implementations to compete for the annual prize.

## SEI Collaboration Center: Public & Private Sector organizations & Thought Leaders can collaborate

- You or your organization can participate to test out ideas, products and services that show promise and invite the ones that best fit your needs to provide Sustainable Energy related services to your organization or home
- You or your organization will be able to leverage lessons learned and knowledge base of the virtual team of experts for your own initiatives
- You or your organization can get relevant up to date information on many of the sustainable energy initiatives that are best practices
- Our interactive interactions and idea exchange will level playing field between individuals and large organizations, we hope to flush out the best ideas, products and services that lead to massive scaling of Sustainable Energy Initiatives
- Your participations and contributions will lead to a vibrant new energy economy
- You will help mitigate the climate issues & reduce GHG emissions for a cleaner and healthier world for our future generations

invVEST Sole Purpose is to Enable Global Leadership for USA in Sustainable Energy through Massive Scaling. Our initiative will provide Clean & Economical Energy leading to a vibrant economy and millions of jobs for our future generation. TOGETHER WE CAN!



invVEST currently has 3 specific initiatives. The impact of these three initiatives, if successfully implemented, are clearly outlined in this graph.

**Initiative 1: Successful implementation of Breakthrough Solar Initiative** will lead to Massive scaling that will drive down the price of Solar Energy below true power parity by at least 5-7 years faster. USA has the world's largest resources when it comes to SEI that no other country in the world has. We have a lot of free sun-drenched land, wind & Geo Thermal, etc. all infinite energy resources. Massively Scaling these resources will dramatically drive down prices and make them viable sources of energy. Solar energy is a perfect example: Germany, which has less sun radiance than some spots in Alaska, installed 6 times the amount of solar panels than USA last year. If we normalize it for GDP ratio (USA \$14.5 Trillion, Germany \$3.5 Trillion), USA should have installed 25 times more than what we actually installed. The irony of all this is we are the ones who invented the technology, but because Germany installs the largest amount of Solar, most of the companies around the world are setting up their factories in Germany and their top priorities are to satisfy needs for Germany before anybody else. If USA installs 7GW in 2010 (roughly 20 times more than the 340 MW installed in 2008, which would mean US is stepping up to installing 80% of Germany normalized for GDP) all the attention of the Solar Manufacturers and Installers will shift to USA and USA will be in a position to negotiate the prices down since the current demand is only 35% of World's supply. This will also lead to economies of scale and open up opportunities for new & incumbent installers who can provide efficient and low cost services. In 2010 for every incremental MW installed 20 installation related jobs, 3 Manufacturing jobs, 4 construction jobs will be created. So if USA installs 6.5GW incremental Solar installations about 180,000 more direct jobs will be created.

As the price reaches power parity and improves further, there will be a rapid growth. Despite the rapid growth, Solar power will still be only 2.7% of total energy consumption in USA by 2020 compared to about 3% of total energy generation from wind power, and the current transmission systems and infrastructure should still be able to handle the power generation from solar and wind without major investments. Beyond 2020 however, the exponential growth can be handled only if radical technologies for energy storage, energy infrastructure and energy usage patterns are commercialized.

**Initiative 2: Energy Efficiency and Conservation Initiative:** USA consumes 54% more energy compared to OECD Europe. invVEST goal is to reduce US energy consumption per capita incrementally by 1% a year for 12 years for a total 12% reduction by 2020. A 1% energy savings amounts to 290B kWh/year and equates to about \$30B/year in savings. Assuming 50% of the energy savings in the first few years are low hanging fruit that simply depends on our behavior patterns. Introducing Energy Sustainability embedded curriculum in schools and colleges can influence the reduction in consumption.

**Initiative 3: Enable massive support & Involvement from the student and citizen communities.** Involve Students, Faculty & Admin of Schools, Colleges and Universities in a grassroots movement to change our behavior and knowledge on how we use energy by introducing relevant curriculum and activities around SEI. The mass movement will also be extended to include all citizens communities for their deep involvement. Initiatives 2 & 3 are closely tied. We believe the return on investment in these initiatives will be less than three years or about \$45B/year in investments. Hence the education programs get a much needed boost to provide world class education systems while tailoring the programs for Sustainable Energy Initiatives. Assuming only 20% goes to creating new jobs, 180,000 new jobs will be created.

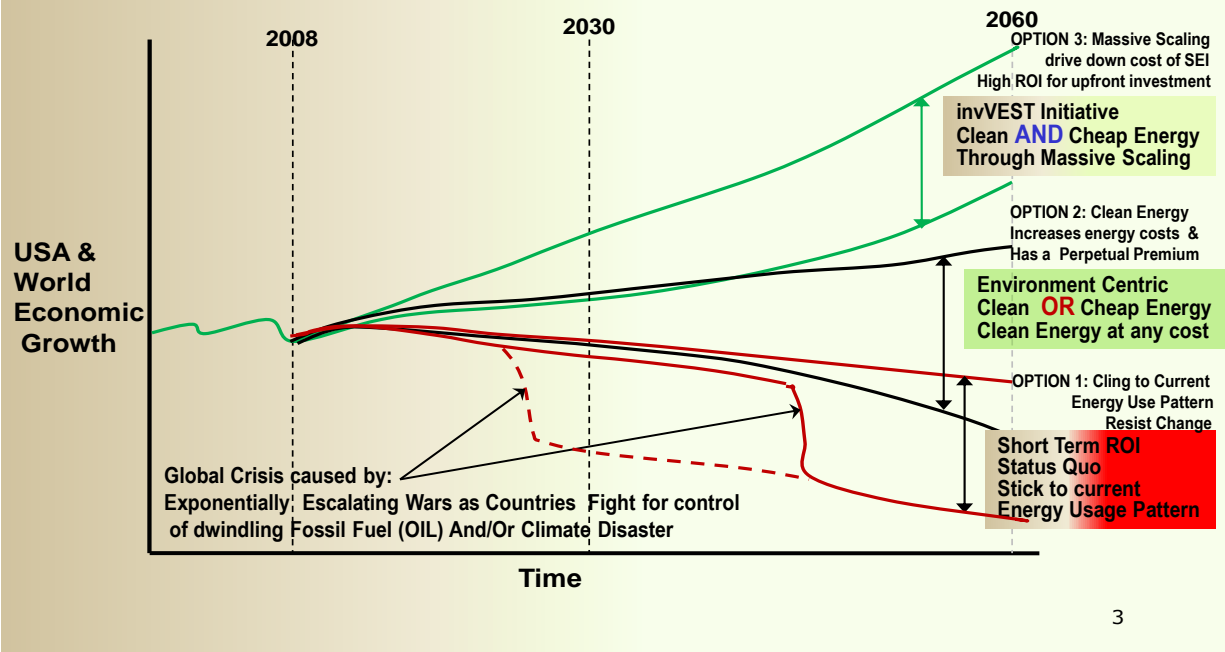
Assuming the other 50% of energy efficiency & conservation programs needs an average ROI of seven years, The average investment required is \$105B/year. Assuming 40% is labor cost, it creates an immediate \$42B labor market that may translate to 840,000 immediate jobs. So Initiatives 2 & 3 can create more than a million jobs immediately. As you can see Initiative 2 & 3 have an immediate impact on our energy consumption pattern and open up a huge opportunity for new & incumbents who can provide efficient and low cost quality services.

The success of this vision will be very much dependent on finding quality new & incumbent implementers who can ramp up quickly.

# THE PATH WE CHOOSE FOR ENERGY SOURCE WILL SHAPE OUR DESTINY FOR OUR VERY NEXT GENERATION. OUR THREE OPTIONS:

STAUS QUO (RESIST CHANGE) VS. CHANGE USING

- THE TRADITIONAL MINDSET: CLEAN ENERGY WILL BE COSTLY
- RADICAL MINDSET\* : CLEAN SUSTAINABLE ENERGY WILL BE CHEAP THROUGH MASSIVE SCALING



**Scenario Analysis of Option 1:** USA and the rest of the countries in the world cling on to the Current Energy Generation Systems. As per IEA (which stands for Energy Information Administration a part of DOE, Department of Energy), the energy requirement projections will increase in absolute quantities for USA (see Slide 4) and generation from new Sustainable Energy Sources will remain an insignificant amount and will generate a mere 2.1% of the USA energy needs compared to the current 1.7% of generation.

While the USA fossil fuel growth may not be alarming, Energy requirements from China, which will be the 800 pound gorilla, will grow exponentially from current 70% of USA fossil fuel consumption to 200%+ of USA fossil Fuel Consumption, creating a scramble to secure fossil fuels (especially Oil) sources. For a good overview the Global Energy Overview Section of the presentation under [www.invVEST.org's](http://www.invVEST.org's) Media Center, Press Release DU MBA Class Presentation at is worth reviewing if you are not familiar about the global energy dynamics.

While Fossil Fuel costs less than other alternative energies (if we do not taken into account the other related costs), that will change dramatically in the next twenty years if we continue to rely on fossil fuels. While detractors can point to the past and say that there have been several false alarms about oil prices escalating to astronomical prices, China Growth was not a factor. China's GDP was less than \$1Trillion and energy consumption was less than 1% of global energy consumption a mere 15 years ago as compared to USA which consumes 21% of global Energy while having 5% of the world population. China today consumes 70% of energy USA consumes and the energy consumption will more than double by 2030 as they grow at an average 8 -10% per year. Consider just one factor, 15 years ago China had less than 10 million cars on the road, it has crossed 150 million cars today and in Feb of 2009 more cars got sold in China compared to USA, a phenomenon unimaginable just a few years ago. Even if 50% of the population in China has cars by 2030, that adds up to a car population of 650 million. If 25% of population in India has cars (a much less likely situation, as India has not even started on building the infrastructure, unlike China) that will add 350 million cars in India. The emerging countries can potentially double the car population to 2 billion cars by 2030, creating a huge demand for oil consumption.

Given finite global production capacity at a production level of about 90 million barrels per day, and the low cost sites are dwindling, IEA (International Energy Agency) has estimated that world will need 30 Trillion US Dollars in infrastructure investment in the next twenty years just to keep the current production capacity going, let alone the cost of investing in 30 - 40 million barrels per day incremental needs by China and emerging countries. So this is a train wreck waiting to happen that can escalate into a full scale war as dominant oil consuming countries get more and more aggressive to secure by any means they can on a dwindling resource. Even if the world somehow manages to avoid a full scale war by suppressing demand by escalating the price, the stress will induce a downward spiral to the overall global economy. A \$50 rise in price per barrel of oil will cost an incremental \$380Billion to USA of which 70% is imported. A \$250 rise in price per barrel of oil will cost an incremental \$2 Trillion. Globally if the oil consumption can be repressed at 100 million barrels a day by escalating oil prices, the incremental cost for oil can exceed \$10 Trillion. invVEST research indicates the probability of this happening in the next 10 – 40 years is much higher than a global crisis caused by climate caused disaster. The climate disaster over the longer term can be much more crippling.

So the bottom-line: we are on a runaway train heading towards a chasm in the next 10 -40 years if we cling on to the current energy usage patterns. Our very next generation will be facing this calamity if we do not change the way we use our energy.

**Scenario Analysis of Option 2:** The environment centric option will attempt to tax GHG (Green House Gas Emissions) fossil fuels in hopes of restricting fossil fuel usage. This is the current path many leading nations are proposing and USA is finally turning around to agree that Climate Change is a serious issue that needs to be addressed. While this approach requires getting over the denial phase, it has several other problems :

1. The developing countries, where the exponential growth of fossil fuel based energy consumption is occurring, are not willing to switch to alternative fuels which are currently far more costly than fossil fuels. Their counter is USA consumes 6 times more energy per capita & OECD European consumes 4 times per capita more than China which is the largest energy consumer among the developing nations by far. The ratio is much larger when compared to India, the other nation with more than one Billion Population. (Refer to the Global Energy Overview Section of the presentation under [www.inVEST.org](http://www.inVEST.org) 's Media Center DU MBA Class Presentation, if you have already not done so. In the absence of emerging economies adopting alternative energy sources or reducing their energy consumptions, alternative energy sources cannot be adopted by developed countries without exacerbating the cost differential of manufacturing between developed and developing countries, leading to reduced consumption and wealth of developed countries in the optimistic case and leading to a severe global economic crisis. In a mild form the world will face more frequent economic swings as reduced demand will bring energy prices down, fueling short term economic turnaround, but the moment the economy turns around, the demand for energy will exponentially increase the price of energy and lead to another economic downturn.
2. The payment for increased cost of energy will divert the funds available for healthcare, infrastructure and reduce disposable income of consumers further fueling a vicious cycle to stunting economic growth at best and in the worst form will create a gradual but slow economic downturn as the world copes with learning to live with less and less.
3. The cost for environmental cleanup escalates with increased cost of energy. Many of the massive clean up projects being dreamed up by scientists concerned about climate disaster are in Trillions of Dollars, and will never see the daylight until the world experiences a climate related global calamity.

So the bottom-line: The mindset in this scenario is the cost of clean energy must be compared with the "true cost" of fossil fuel based energy costs that takes into account clean up of pollutants, side effect and price of energy, security and loss, death. So this is an "OR" situation, Clean Energy OR Cheap Energy. This option will just push crucial decisions out into the future as there will not be consensus between the developed countries and emerging countries. The delay in implementation globally can only increase the chances for reverting back to option 1.

**Scenario Analysis of Option 3:** If we can massively scale some of the more promising emerging Sustainable Energy Initiatives , the price of energy for these initiatives can be brought down below the fossil fuel based energy prices in the foreseeable future. The invVEST team has conducted an in-depth research and believes it is not a technology issue for the next ten years even if we scale at a disruptive level. And if the investments are made for the new technologies in energy storage and new infrastructure, and energy management control systems these technologies, many of them which are already proven at lab scale proof of concept level will be available for commercialization in the next 10 to 12 years when it will really be needed.

The invVEST Strategy document as well as this invVEST Overview document addresses this approach and we believe if we have the right team in place from the public and private sector this initiative provides the best return on investment for the fairly substantial upfront investment needed. The invVEST Strategy document and the rest of this presentation also addresses why USA is in the best position to take on this initiative among all countries/regions in the world and gains the most in doing so.

There already are a growing number of thought leaders from the Public and Private Sectors as well as the Education community who believe the invVEST initiative provides the best option for USA and the world. Your support will help invVEST obtain Grants/Funds/Sponsorships and well as move the State and Federal Government to action that will lead to a vibrant economy AND a Clean Planet for our very next generation.