The '3rd Generation Renewable Fuels' Prize

PrizeCapital®

The world's addiction to oil threatens security, erodes prosperity, and jeopardizes our children's future. The *'3rd Generation Renewable Fuels' Prize* will inspire competitors from around the world to develop sustainable algal- and synthetic-based alternatives to petroleum.

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I. What is The 3rd Generation Renewable fuels Prize?

Prize Capital™ is creating a high profile, international competition to find sustainable alternatives to petroleum-based fuels.

***1st Generation**: Produced from food*

***2nd Generation**: Produced from cellulose*

***3rd Generation**: Produced synthetically or from algae*

Prize Capital, in conjunction with its non-profit partner the X PRIZE Foundation, will launch an overarching prize competition that seeks to attract a dynamic array of competitors and spur the development and deployment of ***radically advanced, resource efficient*** algal- and synthetically-based renewable fuels and systems.

The competition series will consist of two "Demonstration" competitions, one "Development" competition, one "Mega" competition, and an annual "Championship" racing prize competition.

Demonstration and Development Prizes will be determined over periods of 90 days at pre-arranged, central locations. The MegaPrize will be determined as the winner accomplishes the given task(s) (before 2016) at different locations that are pre-approved by the competition's organizers.

Demonstration Prizes

The Demonstration Prize, which unites teams in a single, centralized location, will award a total of $2 million (i.e. $1 million for each of the two prizes) to the teams that can use no more than 1/8 acre of designated land to produce:

- The ***most net-lipid biomass*** in 90 days;
- The ***most net-BTUs*** in 90 days using no more than 1 ton dry algae;

MegaPrize

Prize Capital will award $10 million to the first team to produce ***8,000 net-gallons per acre of land[1] of finished ASTM-D975 (Grade No. 2-D S15) diesel fuel***, with a minimum level of 35,000 total net-gallons produced, before December 31, 2016.

Prize Capital will also arrange Advance Market Commitments to purchase 5 million gallons of fuel for $3 per gallon for each of the top three competitors who accomplish this goal. The winners must accept this commitment and sell at the given price.

The allowable inputs for biomass and fuel production are constrained as described on Page 11.

[1] *Not* per year – this is an aggregate target

Championship Racing Prize Series

Every year, until the final prize is won, competitors will be given one day to produce as much fuel as possible on five acres of land, then race in standard, uniform, sponsor-provided, diesel fueled cars at notable, world class raceways, such as Le Mans, Qatar, and Laguna Seca. Other events may be held, as exemplified on Page 12, to align with the needs of the Series' sponsors. Each year, the competitor that travels the greatest number of laps in the least amount of time wins $1 million.

These Demonstration, Development, Mega, and Championship prize targets are designed to be *audacious but achievable.* They target breakthrough processes that are:

- **Sustainable** — transportation fuel from renewable sources
- **Suitable** — for use with today's cars, trucks and infrastructure
- **Scalable** — to make a sizeable reduction in oil consumption

Bonus Development Prize

The Development Prize will award $1 million to the team that can yield the ***most net-BTUs*** in 90 days from a production system created from scratch using a kit that:

- Weighs no more than 150 pounds;
- Can be shipped anywhere in the world;
- Contains all the necessary components (including biomass) to create renewable fuels from a virgin tract of well-lit land.

II. Why a Prize?

Inducement prizes are powerful tools for progress. They "aim innovation" where needed, motivating the world's best minds to tackle pressing problems.

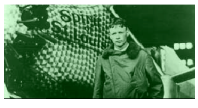
Recognition prizes (such as the Nobel Prizes) look backward, rewarding past achievements. *Inducement prizes* look forward, directing effort at a desired outcome. They cross borders, bypass bureaucracy and accelerate innovation. They offer many advantages, including:

- **More attention:** The media spotlight around a MegaPrize can bring an important problem to the attention of millions.
- **More minds:** A MegaPrize induces competitors from around the world to join the search for a solution.
- **More effort:** The competitive spirit brings out the best, in science as in sports. Watson and Crick deciphered DNA while rushing to beat rivals. Charles Lindbergh risked his life crossing the Atlantic to win a prize.
- **More approaches:** Inducement prizes attract a wider range of participants, from traditional researchers to maverick thinkers, from large public companies to serial entrepreneurs. (Compare this to the typical government grant, which finances only one competitor in one location using one approach.)
- **More return on investment:** Inducement prizes create tremendous leverage. For instance, competitors spent more than $100 million in their efforts to launch a private spacecraft and win the $10 million Ansari X PRIZE. And sponsors don't have to pay the prize until they get the result they want.

Offer a large enough prize with clear rules and you can achieve a solution to almost any problem.
Peter Diamandis, Chairman
X PRIZE Foundation

Throughout history, prizes have been used to bring forth breakthroughs. The ideal competition includes: a compelling target; a large prize; simple, stringent rules; and competitions to capture public imagination. The '*3rd Generation Renewable Fuels*' Prize will include all these elements. In addition, it will introduce innovations to increase funding and spur adoption.

The Power of Prizes

1714	1791	1927	1992	2004
				
The Longitude Act of 1714 revolutionized navigation and time.	**The French Academy Prize revolutionized chemical engineering.**	**The Orteig Prize (Charles Lindbergh) revolutionized avia-**	**The Golden Carrot Prize revolutionized energy efficiency.**	**The Ansari X PRIZE revolutionized personal space flight.**

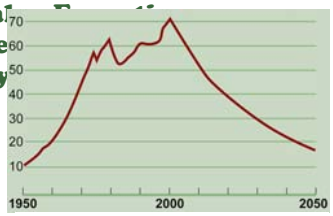
III. Why Now?

Millions of Chinese dream of driving their own automobiles.

Supply shortages. Climate change. War in the Middle East. A renewable fuels breakthrough is urgently needed to address these crises and to bring new opportunities to decentralized regions.

'en if oil demand was to re-
ain flat to 2030, 45 million
rels per day of gross capac-
:y -- roughly four times the
current capacity of Saudi
Arabia -- would need to be
lt by 2030 just to offset the
effect of oil-field decline.

lobuo Tanal
rector, Inte
rgy Agency



Some experts believe oil production may soon drop, leading to rising prices, crashing economies and oil wars.
Petroconsultants of Geneva

Our world faces a frightening array of challenges related to petroleum fuels. Yet the money devoted to finding solutions is miniscule. According to *Scientific American*, the total R&D funding from *all* the private companies in the energy sector is less than that of a ***single*** large biotech company. We must find ways to attract innovation and investment to these grave problems. Addressing these threats is the goal and purpose of The *'3rd Generation Renewable Fuels'* Prize.

The Problems Are Growing Worse

The demand for petroleum is exploding in China and developing countries, even as it continues to grow rapidly in the U.S. and Europe. Despite the economic slowdown, the Energy Information Administration (EIA) forecasts a 50 percent rise in world marketed energy consumption between 2005 and 2050. (*EIA, 2008.*)

Supply is dwindling, and what's left is becoming harder to extract. New projects coming online, such as the South American Frade project, are mediocre prospects compared with the huge pools of easy-to-get oil from the past (*Chevron, 2008*.) "The age of easy oil is gone forever," proclaimed Emirati minister Francisco Blanch. (*Wall Street Journal, 2008*.)

Global warming is nearing crisis and transportation fuels are a big part of the problem. Cars and trucks account for more than quarter of carbon emissions. *(U.S. EPA, 2008.)*

The Result Could Be Catastrophic

Global security is at stake. Petroleum is at the heart of many world conflicts. Tension will only grow as countries compete for this scarce resource.

The environment is at risk. As the developing world rapidly motorizes, the increasing demand for fuel will pose one of the biggest challenges to controlling greenhouse gases. *(Scientific American, September 2006.)*

A planet-wide depression is likely. "Without timely mitigation, oil supply/demand balance will be achieved through massive shortages and huge oil price increases, which would create a long period of economic hardship worldwide." *(U.S. Department of Energy, March 2005.)*

Current Renewable Fuel Approaches Are Not

1st Generation renewable fuels use inefficient, problematic feedstocks, such as corn.

Good Enough

In theory, renewable fuels should be nature's solution to our transportation energy needs. They would lesson our dependence on oil while living in harmony with our environment, taking in at least as much CO_2 as they emit, and providing us with significantly more energy than we expend to make them. In reality though, while the development and use of current 1st generation of renewable fuels that we utilize have played a critical role in market development, they are far from this ideal:

The growth of 1st generation renewable fuel crops helps push cattle farming to the rainforest, spurring deforestation

Energy inefficient. Most present-day processes use only a portion of the plant (for instance, only the corn kernels), wasting the energy stored in the rest of the plant, while greatly increasing the need for land, water and fertilizer. We must find new techniques that are more energy efficient.

Water inefficient. Some estimate that corn ethanol consumes 1,700 gallons of water for every gallon of fuel produced, while concurrently consuming massive amounts of fertilizer, pesticide, and energy. We must find new techniques that are less resource intensive.

Climate inefficient. Some articles and studies suggest that mainstream renewable fuels used today can cause more greenhouse gas emissions than conventional fuels if the full emissions costs of producing these fuels are taken into account. (*Science, 2008.*) Better ways of making renewable fuels would offer important climate change benefits to the entire planet.

Food vs. fuel. Most current methods convert a food crop to fuel (e.g. corn, sugar cane, soy, etc.). We must develop technologies to convert non-food crops that can be grown on marginal and arid land, as well as develop technologies to better convert bio-wastes and residues. Otherwise, renewable fuels could ultimately divert food and water from the mouths of the poor to the gas tanks of the rich.

Fuel vs. rainforests. "U.S. farmers are selling one-fifth of their corn to ethanol production, so U.S. soybean farmers are switching to corn, so Brazilian soybean farmers are expanding into cattle pastures, so Brazilian cattlemen are displaced to the Amazon." (*Time Magazine, 2007.*) We must find solutions that operate in harmony with our forests and other natural resources.

IV. Why Algae?

There is "enough waste CO_2 available in the states where nate conditions [are] suitable support 2 to 7 quads of [algal] fuel production annually."

Department of Energy Report on biodiesel from algae, July 1998

The projected amount of land required to replace 50 percent of the current U.S. petroleum consumption using corn (in yellow), soybean (in grey) and algae (in green).
Source: Chevron

Which algal species can yield the most fuel, in diverse climates, while resisting invasive species?

No known feedstock for renewable fuels has as much productive, greenhouse gas reducing, and scalable potential as algae.

In response to current renewable fuel shortcomings, '2nd generation' renewable fuel technologies have emerged. These technologies are inherently more efficient than 1st generation technologies because they use more of the plant to produce fuel. So, instead of just using the ear of the corn, 2nd generation technologies are able to break down the other components, such as the stalk, into its constituent parts, which are sugars bearing carbon and can be synthesized into more complex hydrocarbons.

While appealing from both environmental and efficiency viewpoints, undertaking this process is incredibly difficult to do without applying large amounts of heat, pressure or chemicals. Accordingly, these fuels are suitable not as an end but more as a stepping stone to fuels that have the inherent advantage of simple, productive, and scalable production. Algal and other 3rd generation renewable fuels heed that calling.

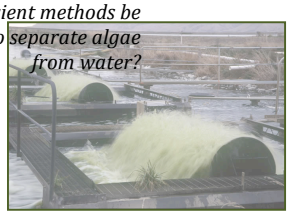
Tremendous Potential Exists…

- **Simplicity**—while 1st and 2nd generation feedstocks need to go through multiple gates in order to yield fuel – from feedstock development, to depolymerization, then to production – algae simply absorb sunlight, water, and CO_2 to produce a near finished product.
- **Productivity**—algae are 30 to 100 times more productive in producing biomass than land plants, for they don't waste energy growing physical structures such as roots, trunks, leaves and seeds. For instance, while Jatropha, a leading 1st generation feedstock, can yield 2-3 tons of biomass per hectare, algae can yield 100 tons per hectare.
- **Climate Efficiency**—not only can algal-based renewable fuels dramatically lower greenhouse gas emissions associated with fuel production and tailpipe exhaust, but the technology can also be paired with high-CO_2 emitting sources, such as coal-fired power plants, to capture and then recycle the harmful gas.
- **Livelihood**—widespread algal deployment could allow farmers to grow "fuel crops" and their associated co-products, such as animal feed, in areas not suitable for food production, including deserts. Revenue could be provided from high-CO_2 emitting sources, such as coal-fired power plants, to algae farmers who capture the gas.
- **Scalability**—The simplicity, productivity, and efficiency of algae combine with the fact that algae are capable of replicating two or three times per day to paint a clear picture of scalability. If the technology is fully developed and deployed, fuel from algae truly could meet our liquid energy needs.

Are vertical bioreactors like these the way to go, or are open pond systems superior?

Which algal species can yield the most fuel, in diverse climates, while resisting invasive species?

Is centrifugation the best way to harvest algae, or can more efficient methods be developed to separate algae from water?



...But Significant Challenges Remain

The *potential* of 3rd generation renewable fuels is immense, but only if we achieve major advances. Put simply, we need a breakthrough, something to catalyze the conquering of lingering challenges including:

- **Species optimization**—which algal species work best at producing algal oil? Where do these species work best? And how do we protect these species from contamination, such as foreign algal species?
- **Optimizing infrastructure**—which algal platforms – open ponds, closed photobioreactors, freshwater, saltwater, wastewater, etc. – are the most chemically productive and economically efficient? How do these answers change when operating in different climates, and with different algal species?
- **Maximizing energy absorption**—how can we most effectively capture and utilize the 250 watts per square meter of energy that sunlight radiates onto algal systems?
- **Managing heat**—half of the energy incident on algal systems is thermal. So how do we effectively dispose of this unusable heat?
- **Harvesting**—how do we most effectively harvest algae? Centrifugation, filtration, sedimentation, coagulation/flocculation, froth flotation, or another technique?
- **Dewatering**—once harvested, how do we remove water from the algae? Sun-drying, waste heat drying, drum-drying, freeze-drying? Or has the ideal technique yet to be invented?
- **Extracting oil**—once the water is removed, which technique – biological solvents, mechanical, electrical, supercritical fluid extraction, etc. – most effectively extracts the oil from the algae, without having to resort to harsh chemicals such as hexane?
- **Ensuring backwards compatibility**—the final product has to be usable in vehicles that are on the road today. So what is the best process for yielding this finished product? Transesterification, deoxygenation, cracking, isomerization? Or is it most efficient to genetically program the algae to bypass oil production and instead produce finished diesel fuel?
- **Delivering affordability**—current cost estimates for algal oil range between $10, $30, and even upwards of $100 per gallon. What mechanism can spur the industry to sequentially crack enough of the aforementioned barriers to yield fuel at levels that are competitive with petroleum?

V. How Will the Prize Work?

Teams from all over the world will compete to meet ambitious demonstration, overall, and in-use targets. The winners receive millions of dollars, enormous publicity, the praise of the world, and potential future revenues and royalties from commercializing the technology.

Demonstration Prizes

Demonstration prizes are created to 1) overcome specific barriers to large-scale and deployable algae-to-fuel production, and 2) be non-capital-intensive, to empower even the smallest of competitors to compete based on the merits of their technology, not the size of their wallet, and 3) facilitate team-making suitable for entry into the MegaPrize competition.

Accordingly, during a pre-MegaPrize event, at a pre-arranged, centralized TBD competition location, each Demonstration Prize competitor will be allocated a 1/8 acre plot of land upon which competitions will play out over 90 days to determine which competitor demonstrates superior:

- Algal biomass production;
- Energy yield from algal biomass;

In order to accomplish these goals, teams must prevent the release into the environment of toxic chemicals that exceed EPA regulations.

The winners of each competition will receive $1 million, for a total awarded Demonstration Prize purse of $2 million.

The specific details concerning each Demonstration Prize competition, including judging criteria and constraints, will be formulated during the prize development phase, lasting from Spring through Fall, 2009.

MegaPrize

The MegaPrize competition seeks to leverage progress made and exhibited during the Demonstration Prize phase of the competition.

Its goal is to overcome barriers to the entire algae-to-fuel production system, especially regarding how the components of the system work with each other, thereby jumpstarting an economically feasible and scalable algae-to-fuel industry.

Accordingly, the criterion of this competition are audacious yet attaina-

ble:

Prize Capital will award $10 million to the first team to produce 8,000 net-gallons of finished diesel fuel per acre of land upon which its system operates, with a 35,000 minimum net-gallon requirement. "Net-gallons" and other terminology are defined on page 14.

Prize Capital will also arrange Advance Market Commitments to purchase 5 million gallons of finished fuel for $3 per gallon for each of the top three competitors who accomplish this goal. The winners must accept this commitment and sell at the given price or forfeit the prize.

Constraints

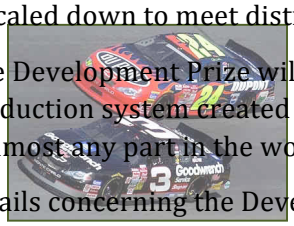
In addition to land constraints, competitors must also abide by other constraints:

- **Water quantity**— the goal must be achieved at a net-water consumption-level that doesn't exceed 150% of the pan evaporation rate for competitors' given regions.
- **Water quality (input)**— the goal must be accomplished using only generally representative municipal wastewater, seawater, or brackish water, as defined on page 14, the source of either of which must be pre-approved.
- **Water quality (output)**—water leaving the fuel production equipment, after the biomass and fuel have been produced and extracted, should be at least as clean and have a similar salinity balance as when the water entered the equipment.
- **Genetically Modified Organisms (GMOs)**— Genetically modified algae use is allowed if the algae production system in use by a given competitor is permitted through the appropriate, regional authority, demonstrating that the GMO use meets all regulatory requirements.
- **Annual demonstration**— in order to remain in contention for the MegaPrize, competitors must submit at least 25 gallons of finished diesel fuel in any given year for demonstration and competition in the Annual Road Rally Prize competition.
- **Timeframe**— the MegaPrize goal must be accomplished before December 31, 2016.

All qualifications, inputs, and results will be sampled, verified, calculated, and confidentially audited by an independent third party or parties.

Bonus Development Prize

ıe Development Prize is meant to illustrate how 3rd generation renewable fuel technologies can not only be aled up, but scaled down to meet distributed, village-level needs, particularly in developing countries.



:cordingly, the Development Prize will award $1 million to the team that can yield the most net BTUs in 90 ys from a production system created from scratch using a complete kit that can be carried by as few as o people in almost any part in the world to produce renewable fuel.

ıe specific details concerning the Development Prize competition, including judging criteria and con- raints, will be formulated in conjunction with appropriate sponsors during the prize development phase, sting from Spring through Fall, 2009.

Championship Racing Prize Series

The annual Championship Series serves an important function. It tests for the qualities needed to compete in the marketplace against petroleum-based fuels. Those qualities include performance, efficiency, durability, emissions, cost and compatibility with today's engines and infrastructure.

The criteria for winning will be straightforward: Every year, until the final prize is won, competitors will be given one day to produce as much fuel as possible on five acres of land, possibly blend this fuel at a 50/50 ratio with standard petroleum diesel fuel, then race in standard, uniform, sponsor-provided, diesel fueled vehicles at notable, world class raceways, such as Le Mans, Qatar, and Laguna Seca. Each year, the competitor that travels the greatest distance in the least amount of time wins $1 million.

The Series must also be designed for media appeal. Therefore, the organizers will possibly conform this series to demonstrate the needed qualities. We will design the specifics of these challenges with the help of partners, sponsors and scientific advisors during the prize development phase, lasting from Spring through Fall, 2009. Thus, possibilities include:

- Race sponsor-provided vehicles with celebrity drivers around racetracks.
- Race tractor trailers cross-country, refueling using bio-refineries.
- Race Indy-style cars around the Indianapolis Motor Speedway.
- Race monster trucks through a challenge course.
- Power motorcycles in a high profile race (Supercross/motocross).
- Power showroom vehicles driven by local consumers for two weeks.

The sizeable, annual cash purse along with the prestige of winning, the enormous exposure, the increased ability to attract capital, the increased valuation of their technology and their company, and plain old competitive spirit will encourage the widest possible participation.

apidly growing demand for biofuel feedstocks has con-ɔuted to higher food prices, reatening the food security oor net food buyers in both urban and rural areas.'

'ood and Agriculture Or-ganization of the United Nations, 2008

The Art and Science of Inducement Prizes

Selecting rules for an inducement prize is a balance between show business and science. The target must be:

- So challenging it attracts the best brains;
- So remarkable it attracts major publicity;
- So groundbreaking it jumpstarts a new industry.

At the same time, the target must be realistic and (just barely) achievable. If we set the bar too high, if we try to solve all the world's problems with one prize, we will fail to attract competitors and media attention.

To succeed, the competition must capture the world's imagination. The ideal rules are "binary" — that is, spectators can easily make a yes/no decision whether the competitor has succeeded without a detailed laboratory analysis or lengthy deliberations. Ideally, no lawyers, consultants or scientists are required to judge who wins the Prize.

Even though we must have rules that are simple and "media-friendly," we must also get the science right. We must avoid cheating and negative side effects. Below are a few key "proxies" the Renewable Fuels Prize will use as substitutes for more complicated goals.

Rewarding production level. By requiring competitors to produce 35,000 net-gallons of fuel, competitors are focused on developing a continuous rather than batch system of algal production, which will no doubt be essential as competitors ramp up fuel production after the competition has ended.

Energy inputs and efficiency. By focusing on net-gallons, as defined on page 14, competitors are given incentive to develop energy efficient means of producing fuel. The idea is to set a floor for 3rd generation renewable fuel net-energy ratio that is approximately equivalent to 1st generation soybean biodiesel. We calculate this by targeting 50K gallons of fuel production, then subtracting the approximately 15K gallon-equivalent of energy that would be consumed using traditional soybean biodiesel technologies (which has an energy ratio yield of 3.25:1), to yield a target of 35,000 net-gallons of fuel.

Given a targeted competition timeframe between two and five years, these numbers target a productivity level of approximately 4,000 gallons per acre per year.

Rewarding resource efficiency. By requiring competitors to consume no more than 150% of the pan-evaporation rate for competitors' given regions, competitors are encouraged to recycle inputs to the greatest extent possible while accounting for water losses due to evaporation.

Blend 50-50 with petroleum diesel. Some of our performance chal-

lenges may require blending the renewable fuel with standard petroleum diesel. Such challenges show that the new renewable fuel, which itself will be chemically equivalent to petroleum diesel (as it meets ASTM standards) can work within the existing infrastructure without damaging tanks, valves, seals and engines.

Power a showroom-ready vehicle. A primary obstacle to renewable fuels is the concern they will damage existing engines. As a result, many of the challenges may take place with either highly-tuned racecar engines or unmodified, showroom-ready vehicles provided by sponsors.

Rules and Requirements

Eligibility: The competition is open to teams from any country, as long as they are incorporated as a company and agree to the terms of the prize in the Master Participation Agreement.

Proof of concept: Before they may enter the MegaPrize competition, competitors must demonstrate the ability to meet or exceed the requirements of the competition, including the ability to bear all the costs of competition and of fulfilling the obligations of the AMCs, should the team win.

Entry fees and requirements: All competitors must sign and agree to a Master Participation Agreement which specifies the timing, the rules, the entry fees and the assignment of media and other rights.

Verifiability: Competitors must agree to submit for auditing all data relevant to judging the prize competitions, including but not limited to production inputs (to determine total energy consumption), water sources, applicable fuel and permitting records, and output fuel and water samples.

Definitions

Brackish water: Non-potable water water that has more salinity than fresh water, but not as much as seawater.

Diesel fuel: Fuel that meets the diesel fuel criteria as outlined by ASTM-D975, Grade No. 2-D S15

Heterotrophic production: Algal production method that, rather than consuming sunlight and CO2 directly, consumes autotrophic organisms, such as sugar, and uses the organic compounds in their bodies as energy sources and as raw materials to create their own biomass. Heterotrophic production methods will be permitted, but the embodied energy in the autotrophic organisms will be counted in the net-gallon calculation, as will the size of the land used to produce the organisms.

Marketed energy: An energy source that is commercially traded. Typically, this energy is sold by a producer, such as a petroleum refiner, through a transmission and distribution network (e.g., pipelines and trucks) to an end-use consumer (e.g., diesel sold at the pump).

Municipal wastewater: Generally representative of pre-treated wastewater found at U.S. municipal treatment facilities. Subject to approval by the competition organizers.

Net-gallons: The quantity of gallons yielded after per-gallon energy inputs used in fuel production (including electricity, fertilizers, and other inputs' embedded energies) are subtracted. For this purpose, diesel fuel is assumed to contain 130,000 BTUs of energy per gallon, while production input electricity is considered to contain 43,000 BTUs per gallon.

Pan-evaporation rate: Regionally-specific data, a measured by the United States National Weather Service, measured using the four-foot diameter Class A evaporation pan.

Performance challenges: These events will be designed to verify, in a tangible way, important aspects of the renewable fuel, such as its efficiency (how much of the feedstock is converted to fuel), and its compatibility with today's engines. Because these events will be designed with the help of sponsors, their design has not been finalized at this stage.

Seawater: Water with a saline content of approximately 3.2-4.0 percent, contains various trace elements, and that meets the State of California water quality discharge standard, as well as applicable provisions of the Federal Clean Water Act. Subject to approval by the competition organizers.

Showroom-ready vehicle: An automobile or truck currently offered for sale to the general public by a major manufacturer, whether designed for gasoline, gasoline-ethanol blends, flex fuel, diesel or other fuel types. Contestants may not make mechanical changes, additions or substitutions. (Tuning and other improvements may be allowed for the Championship Series.)

VI. How Will the Prize Be Financed?

The beauty of bioenergy is that production can be tailored to local environments and energy needs.
Gustavo Best, Energy Coordinator, UN Food & Agriculture Organization

The Renewable Fuels Prize will be financed by sponsorships, donations and Advance Market Commitments. In addition, Prize Capital has created an innovative mechanism to attract funding for the competitors.

MegaPrizes create enormous leverage. A relatively small amount of money can result in tens of millions worth of publicity and hundreds of millions worth of investment by the competing participants.

Despite their efficiency, MegaPrizes are, by definition, large and global. They require funding over the several years needed to develop, launch, and successfully conclude a competition. Key areas of investment include the cash award (currently contemplated at $10 million); the definition of the target and the rules; the multi-year public awareness campaign, and the administration and judging of the competition itself.

Prize Capital and its partners will use several mechanisms to finance the competition, including sponsorships, donations, Advance Market Commitments and a new form of investment vehicle.

Sponsorships and Donations

Sponsorships will be accepted from both private and public sources. (For instance, the Energy Policy Act of 2005 authorizes several U.S. agencies to fund prize competitions.) Possibilities include:

- *Title and category sponsorships* similar to major sporting events. The sponsorships will support prize operations and cash awards. (The cash purse is not paid out, however, until the prize is won.)
- *In-kind sponsorships* whereby a company becomes the official provider of things such as tools, equipment, travel, shipping, etc.
- *Event sponsorships* for the announcements, challenges, and press conferences.

Donations will be solicited from the many non-profits that fund energy and environmental causes. Because of their great leverage, prizes can be a way for those philanthropic foundations to get more bang for the buck.

Advance Market Commitments (AMCs)

AMCs are a commitment to buy a given quantity of a product or service that meets certain performance goals. They are often used by governments and foundations to stimulate development of new approaches or new technologies; and to ensure that those innovations are widely adopted.

illion in energy investments
vill be needed in the next 25
's. New players are stepping
vard. They hunger for ideas.
rtin Rosenberg, Editor-in-
hief, EnergyBiz Magazine,
March 2006

The Renewable Fuels Prize should benefit from the growing number of "compliance markets" where governments have mandated standards, such as a certain percentage of renewable fuels by a certain date. Those governments (or their private sector suppliers) may be eager to find sources that allow them to comply.

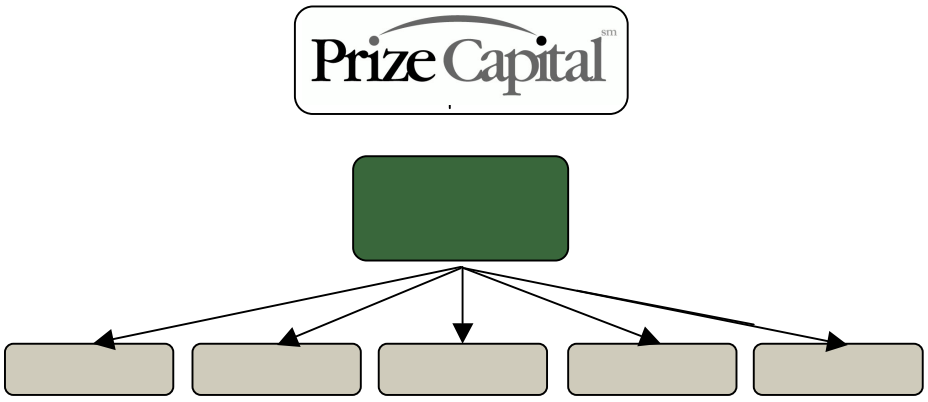
AMCs can play another important role. They can also be a mechanism to create "sub-prizes" to encourage desired outcomes. For instance, a large municipality might give an Advance Market Commitment related to treating wastewater. A chemical company might commit to buy improved breeds of algae for various uses. And a government or multi-lateral agency might use an AMC to promote renewable fuels adoption in developing countries that might otherwise be bypassed.

Investment Funds

Since only the winning competitor receives the prize—and only *after* it has done the work to reach the target—the competitors must raise the money to compete. As noted in Thomas Kalil's Brookings Institution white paper *Prizes for Technological Innovation*, "most researchers and small and medium-sized companies find it difficult to self-finance or raise external funding."

Prize Capital has stepped into this breach with an innovative investment vehicle that will channel more money to competing participants. It will also allow private sector investors to diversify their holdings and hedge their risk.

Companion investment funds. Prize Capital intends to create a series of MegaPrizes for energy and the environment. It will create a master investment fund and then a companion, sector-specific fund for each prize. The following illustration shows how money might flow from the master fund, to the renewable fuels fund, and from there as investments to many of the competitors. (Prize Capital will be a follow-along, co-investor.)



Benefits to competitors. The availability of a possible co-investor will make it easier for competitors to raise money from venture investors, friends and family or corporate parents. In this fashion, Prize Capital

will reduce one of the biggest limitations of the inducement prize mechanism. It will make it easier for competitors to raise money to tackle a complex problem.

The energy sector is woefully underinvested. Governments simply cannot afford to shoulder the burden alone. (Nor do governments have the full range of tools to bring new technologies to the market.) We must find ways to motivate the private sector to participate. The Prize Capital investment approach can eventually attract millions of dollars in new money and apply it to the grand challenge of the century—answering our energy needs while preserving the environment.

VI. Who Will Administer the Prize?

Chinese wanted to live like
ericans, we would need the
ces of four worlds to do so.
Liang Congie, Chinese environmentalist, Financial Times, May 25, 2004

To ensure impartiality, Prize Capital hands off administration of the prize to a non-profit organization and helps them raise the money to launch and operate the competition. Prize Capital retains control over the investment vehicle.

Prize Capital lives at the intersection of innovation and investment. Formed by Lee Stein, noted entrepreneur and environmentalist, it seeks to get all stakeholders—business, consumers, scientists, policy makers, advocacy groups—around the table to seek solutions to energy and environmental problems. Prize Capital, LLC accelerates innovation through prize competitions that lead to breakthrough solutions to our world's energy and environmental problems.

Through the prize mechanism, it brings additional attention to those problems, unleashing some of the world's top minds. Through its groundbreaking investment vehicle, it attracts additional money. It is this combination—more minds and more money—that gives us our best hope of finding a path forward.

Prize Capital will be assisted by an expert panel of advisors and by a Prize Team housed at non-profit organization, such as the X PRIZE Foundation. Prize Capital conceives and crafts the prize target with help from its advisors. Then it hands off the actual prize administration to this non-profit that has no financial stake in who wins or loses.

The Expert Panel of Advisors

A panel of experts will approve the prize target and define the rules. The panel will combine thought leaders from different disciplines and geographies, including national laboratories, large industrial firms, universities, high-tech startups, environmental groups, government agencies, trade associations and more. These authorities will help to identify the best prize targets; develop the final rule sets and approve the challenges to determine the winner.

ach passing day brings yet
ore evidence we are facing
planetary emergency. We
change this by inventing
manufacturing new solu-
ns to stop global warming.
mer U.S. Vice President
Al Gore

The Renewable Fuels Prize Team

Prize Capital will help to recruit a Prize Team to launch, manage, and judge the Prize. For the most part, they will reside with the non-profit partner, to ensure objectivity and to remove any concerns that information could be leaked from one competitor to another. The competitor members will be experts in their respective fields and will:

- Administer and enforce the prize rules
- Raise donations and sponsorships for the purse and the operations
- Educate the press and the public on the importance of renewable fuels
- Support and promote the competing participants
- Administer the ongoing operations over a 4-6 year period
- Judge the results through the creation of a world-class panel of judges and independent research institutions to award the prize purse

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Many experts believe the world is on the brink of serious problems. Rising oil prices could trigger economic downturns just as global warming creates famines and environmental disasters. We cannot postpone this crisis to the next generation. We must innovate our way out. Thankfully, solutions that solve these problems can be the source of new jobs and economic expansion.

With your help, we can attract imagination, ability and money to the challenge of renewable fuels and a sustainable energy future. We welcome your support, ideas, and participation.