BEFORE THE

UNITED STATES SENATE

COMMITTEE ON ENERGY & NATURAL RESOURCES

HEARING ON

ADVANCES IN CLEAN COAL TECHNOLOGY

INCLUDING

PROSPECTS FOR NEAR-TERM COMMERCIAL DEPLOYMENT

TESTIMONY OF ANDREW PERLMAN

PRESIDENT & CHIEF EXECUTIVE OFFICER

GREAT POINT ENERGY

(www.greatpointenergy.com)

Washington, D.C.

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MR. CHAIRMAN and Members of the Committee, my name is Andrew Perlman. I am the Chief Executive Officer of Great Point Energy, and one of its co-founders. Thank you for your invitation to testify today regarding recent advances in clean coal technology, including prospects for deploying this technology at commercial scale in the near future. Great Point is a advanced gasification technology company. Our technology allows us to convert coal directly into pipeline quality methane natural gas. As my testimony will explain, Great Point does represent a significant advance in clean coal technology, and we are on track to deploy our plants at commercial scale in the near future.

Introducing Great Point

Great Point does not fit the image of a start-up energy technology company. For one thing, we were able to get a running start. Our advanced gasification technology draws on – and includes many patented and significant improvements over – many years of synfuels research and development that the United States promoted and began to carry out as an urgent matter of national policy during the Energy Crisis of the 1970s. This is

one key reason why Great Point's technology will soon be ready for commercial deployment, even though our company is relatively new. We stand on the shoulders of giants, and are now reaching the heights they had hoped to reach until that 1970s version of the Energy Crisis passed, oil and gas prices fell, and coal gasification technology development languished. The founders of Great Point Energy launched our company in a sincere desire to make a major contribution toward solving the current energy and global environmental crisis, which this time seems unlikely to pass away quickly.

Our company is based in Cambridge, Massachusetts. Because of our gasification technology – and, we like to think, the top management team we've attracted – we are fortunate to have gained the confidence, support, and funding of some of the greatest names in American venture capital, especially within the clean energy technologies sector: Advanced Technology Ventures, Draper Fisher Jurvetson, Kleiner Perkins, and Vinod Khosla. Our bench-scale tests, and our much larger sub-commercial demonstration test facility, have operated successfully and on a sustained basis. We have met or exceeded all our performance goals for this stage of our technology development.

We currently have thirty-five employees, nearly all of whom are highly experienced in developing, scaling, and deploying gasifiers, oil refineries, and power plants. We are ramping up rapidly now, raising significant amounts of additional funding for our large pre-commercial project, hiring additional employees and service providers, and selecting sites in the U.S. and Canada for our full-sized commercial projects, the first of which we expect will begin operating in 2011/2012.

Our Technology & Its Benefits

Most coal gasification efforts in North America have in common certain things: the recognition that our continent's coal reserves are vast; that coal is a key to our energy security and independence; that coal represents a relatively inexpensive source of energy; but that the traditional method of using coal – burning it – is inherently limited, dirty, and makes controlling carbon dioxide emissions extremely difficult and expensive, if not altogether impossible.

Until now, the best-known coal gasification technologies have been pursued primarily for one particular application, namely direct production of electric power in what's called "integrated gasification combined cycle" or IGCC power plants.

These technologies almost all operate at extremely high temperature; about 1400 degrees Celcius. At this temperature, the ash in the coal actually melts and forms something called slag. The slag constantly eats away at the reactor walls of the gasifier and leads to high maintenance costs and low reliability. In fact, a spare gasifier is typically required in order to achieve over 90% online availability of the plant so that one gasifier can be fixed while the other one is operating.

In order to generate the heat in the system, conventional gasifiers require pure oxygen. This oxygen is generated in a plant which freezes air down to near absolute zero in order to separate the nitrogen from the oxygen. These air separation plants are extremely expensive – 20% to 25% of the capital cost and result in a huge efficency hit because they utilize so much energy and operate at vastly different temperatures from the

high temperature gasifier. Finally conventional gasification processes yield synthesis gas, or "syngas," which consists primarily of carbon monoxide and hydrogen gas instead of natural gas which consists entirely of methane.

Chemically as well as commercially, the syngas from conventional gasifiers is very different from natural gas. For one thing, few if any pipelines exist to transport syngas, whereas a highly integrated nationwide network exists to transport natural gas. This means that conventional gasification plants must be located next to power production facilities and near major population centers. As a result solid coal must continue to be transported across the country to these facilities at high cost. The combination of conventional gasification technology with power plants designed to burn the hydrogen and carbon monoxide they produce is called IGCC or Integrated Gasification Combined Cycle. The plants are highly complex and very expensive.

The syngas from conventional gasification cannot be converted to pipeline quality natural gas without the addition of multiple complex chemical plants and processes.

Further, with conventional gasification technologies, unless additional steps are taken essentially all of the carbon that started out in the coal will end up in the atmosphere as CO2. In order to remove CO_2 for capture and eventual storage or sequestration, conventional gasification technologies require – in addition to the capital and operating expense of the oxygen plant – the further capital and operating expense of a so-called "shift reactor." The shift reactor is a separate facility in which the proportion of carbon to hydrogen in the syngas mixture is "shifted" to a hydrogen-rich blend by injecting steam which converts some of the carbon monoxide in the syngas to carbon

dioxide. The carbon dioxide is then available as a separate stream for potential capture and storage or sequestration.

Many, if not most population centers in the U.S. are located in areas where carbon dioxide cannot easily be sequestered, but these are the locations that IGCC plants need to be built to provide electricity. Therefore it is going to be very difficult to actually sequester carbon dioxide from these plants, even if they are built with technology to capture a portion of the CO2.

Great Point's technology is different – much simpler, more efficient, lower temperature, and less costly. With the help of a catalyst, we use a single reactor vessel to carry out three different chemical reactions, as a result of which we are able to convert coal directly into pipeline quality natural gas in our gasifier instead of syngas. Roughly 50% of the carbon in the coal is removed and captured as a pure pressurized stream of CO2. In addition to our offering a less expensive way to turn coal's energy into gas, our product – pipeline quality natural gas – is more useful than syngas. It can be transported anywhere through the existing natural gas pipeline system. Its use is not confined to the immediate vicinity of our gasifiers, unlike syngas produced by conventional gasifiers, which must be co-located with power generation facilities. Thus we can build our plants in locations where we can easily sequester carbon dioxide, and in areas with depleted oil wells actually get paid for doing so, and then ship our gas anywhere in the country through the nations robust pipeline system. And the gas we produce, which chemically is the same as natural gas, can be used in exactly the same manner as natural gas, and for all

of the same purposes: not just power generation, but also heating, industrial uses, and chemicals production.

Our process is less costly and more efficient than conventional gasification. Ours does not require a large and expensive air separation system, a separate shift reactor, or a methanator – the costly facilities and equipment that conventional gasification technologies require as "add-ons" in order to produce syngas, or isolate CO_2 for capture, or convert syngas into SNG. The energy conversion efficiency of our process – that is, our efficiency at capturing the coal's energy in our gas – is higher than for conventional gasification, too. This higher efficiency has several benefits: (1) We don't need to integrate our gasification reaction with other major facilities and equipment, such as an ASU, shift reactor, or methanator; (2) we don't operate at the high temperatures of conventional gasifiers; and (3) because we operate at lower temperatures, we also don't produce slag, which absorbs a great deal of non-recoverable energy in the form of heat (in addition to fouling equipment and adding to maintenance expense).

Our potential for cost-effective and sensible CO_2 management is much greater than for conventional gasification technologies as well. In Great Point's process, CO2 in a separate and pure stream is simply a by-product of our producing pipeline quality SNG. Of course, the CO2 still needs to be compressed for shipment via pipeline to locations where it can be used for enhanced oil recovery ("EOR") or otherwise stored or sequestered. That is true of any gasification technology – or, for that matter, any other technology that may allow CO2 to be captured, including proposed oxy-combustion and other post-combustion capture technologies, if they can be made to work. The difference

is that Great Point's process does not require the capital investment or operating expense of any extra facilities or equipment to produce CO2 as a separate, capture-ready stream. That makes it different from conventional gasification technologies and hoped-for post-combustion CO_2 capture technologies alike.

Finally, of course, like other gasification technologies, Great Point's technology offers the prospect of truly clean coal in a traditional sense. We will produce almost none of the sulfur, oxides of nitrogen, or mercury emissions of power plants that burn coal. Our emissions profile for these and similar pollutants should be as good as, if not better than, the emissions of a natural gas-fired power plant in almost all respects.

Clean coal really is possible. Moreover, as I will discuss next, it is also imminent.

Commercial Deployment

I recognize that what I've said here about Great Point's technology would be of purely academic interest to the Committee if our technology could not soon be deployed at full commercial scale. Timing, not just technology, is among your key concerns. I'm happy to be able to offer good news and encouragement on that front, too.

As I mentioned at the outset, Great Point's technology has already been demonstrated successfully both at bench scale and at the much larger scale of our test facility which we operated over the past year at the Gas Technology Institute's test facility outside Chicago.

We will next build a permanent demonstration facility which will be our final step before full commercialization. Our first commercial project operating on pet coke will be

constructed in cooperation with a major Fortune 50 chemical company at a site we have already identified and which we are already designing and engineering.

We have done a great deal of work for these commercial projects already, in addition to inventing, patenting, testing, and proving the gasification technology that they will rely on. For example, we have screened literally scores of potential sites for the location of our initial commercial projects, and have narrowed down our finalists for the first such project to about six sites. In addition to a siting strategy, we have developed and are now in the process of implementing both a partnering strategy and a project design and execution strategy, so that we may rely on investment-grade industrial partners and largely standardized project designs to help us achieve and sustain an early, efficient, and rapidly expanding commercial "launch."

Our business model is focused on building, owning, and operating these commercial projects ourselves, in conjunction paid construction contractors and in partnership with our strategic industrial allies. As I mentioned at the outset, we expect our first project to begin producing revenue in the 2011/2012 time frame. By 2017 – ten years from now – we plan to have at least ten revenue-producing projects in operation and sales revenues of over $3 billion as a company. Almost all will be at full commercial scale. Within a decade our goal as a company is to a material contribution of the North American natural gas requirements from coal and petroleum coke, and from biomass feedstocks as well.

Great Point in Perspective

I hope my testimony, the information available on our website (www.greatpointenergy.com), and whatever answers or additional information that I can provide in response to questions or further inquiries from Committee will reassure you that (1) our company, for one, does have a clean coal technology that represents a significant advance, and (2) commercial deployment of this technology is relatively imminent, not some far-fetched dream for the distant future.

At the same time, I want to acknowledge three points. First, our company could not be where it is without the great technological innovations and inventions of the scientists and engineers who came before us. Those far-sighted predecessors of ours were encouraged and largely funded by far-sighted predecessors of yours, the men and women who served here in Congress and elsewhere in the U.S. government during the Energy Crisis of the 1970s. This goes to show that government can help. I know that the Chairman has drafted legislation under which the government would again contribute in a substantial way to basic research and development for climate-friendly new energy technologies that may help the global environment while also helping North America become more secure and energy independent. From what I understand of your effort, Mr. Chairman, I applaud it, and hope our company may serve as a useful example of the long-term public benefits and private sector "leverage" that government-sponsored energy sector basic research may one day yield.

Second, the advanced coal gasification sector is large, and the potential market, both domestically and globally, is huge. There is ample room for several useful and

successful technologies in this field, and for many companies developing them. At GreatPoint, we simply intend to do an excellent job, and to do it as rapidly and on as large a commercial scale as may be reasonably possible.

Finally, in this spirit, there are additional things that I believe Congress and the Administration could do that would be useful to us and other companies focused on clean uses of coal that would speed the development of clean coal technologies. These include a $0.50/Gasoline Gallon Equivalent production tax credit for the generation of natural gas from North American coal, petcoke, and biomass much along the lines of the credits available for ethanol production; as well as loan guarantees and grants for coal conversion to clean natural gas. In short, we believe the conversion of coal to natural gas is at least as compelling, if not significantly more compelling, than traditional coal gasification and also as important to the nations energy independence as ethanol. We simply ask that it be treated equally with these other technologies when government support is available. In addition, we believe that setting a price floor for natural gas produced from highly efficient gasification of domestic feedstocks below which government guarantees would kick-in, would provide the assurances to enable large-scale, multi-billion dollar facilities to be rapidly deployed in the market without any substantial direct government incentives, unlike many other areas of the clean energy industry. My associates and I at Great Point would welcome the opportunity to discuss our technology and recommendations further with you and your staff.

Thank you again for this opportunity to appear before you.