EXECUTIVE SECRETARIAT
ROUTING SLIP

memo chrono

TO:		ACTION	INFO	DATE	INITIAL
1	DCI		X		
2	DDCI		X		
3	EXDIR		X		
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6	DDA				
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8	DDS&T				
9	Chm/NIC				
10	GC				
11	IG				
12	Compt				
13	D/OLL				
14	D/PAO				
15	D/PERS				
16	VC/NIC				
17	D/ALA/DI		X		
18	D/OGI/DI		X		
19	ES		X		
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	SUSPENSE _____ Date				

Remarks

To 5: This is to be factored in to the work you have set in motion on this subject.

STAT

Executive Secretary
28 Mar 86
Date

3637 (10-81)

CONFIDENTIAL

Executive Registry
86- 1252

27 March 1986

MEMORANDUM FOR: Deputy Director for Intelligence
Director, African and Latin American Affairs, DI
Director, Office of Global Issues, DI

FROM: Director of Central Intelligence

SUBJECT: Pyropower

In connection with Bob Gates' memorandum of 5 March on economic intelligence and the document entitled, "Proposal for a US Third World Partnership", I send you a letter from John Fitzpatrick who is in Washington working with AID and the World Bank to develop and install fluidized bed boiler plants based on a Finnish process in the Third World countries. This seems to be capable of substantially transforming the economies of less developed countries by enabling them to use a wide variety of indigenous fuels ranging from low grade coal, peat and bagasse.

C

William J. Casey

Attachment:
Letter from John Fitzpatrick
dated 30 January 1986 w/attachments

25X1

CONFIDENTIAL

JOHN P. FITZPATRICK

STAT

30 January 1986

Mr. William J. Casey

STAT

Dear Bill,

I enjoyed talking with you and Sofia last night at the Moroccan Embassy. I get very excited talking about my new business, and usually I get excitement from my audience. I was very pleased that you both understood what I was talking about, and the tremendous influence it is going to have on the less-developed countries. I am working very closely with the World Bank and AID, and they are bringing me many many projects.. Moroccoand Jordan are the first two in the "oil shale" program. There are to be 34 more in the "oil shale club". Pakistan will be the first in the "low-grade coal club". There are many others in this category. Jamaica will be the first in the "bagasse club" and there will be 44 more in that category. El Salvador will be the first in the "coffee bean hill club" and we haven't decided yet whether to lump them in with the "rice hull club" or not. There are 40 countries with one or the other or both.

The World Bank and AID have a great arrangement. AID has front end money for feasibility studies, and if the study is positive, the World Bank arranges the financing. The biggest problem at the moment is that AID is cutting the funds rather than beefing them up. Alan Jacobs, Chief of the Energy Division of AID is doing a terrific job in all these countries, but without the necessary funds, his efforts will have been in vain. The Senate Energy Committee recently concluded that AID's Energy budget should be increased to $50 million. It is now about $5 million. AID has so far ignored this recommendation. I have been lobbying all I can to get this word across to Peter McPherson, the AID Administrator. I hope we are successful, as a little bit of AID money now will place these countries in a position, where they can expand their economies and not depend on foreign aid from the U.S. There will no longer be a need to sneak across our borders to gain the means to support their families. It is also needed to arrest the movement to the left in these countries. Our boiler is the key to success for the Caribbean Basin Program, as well as the other developing countries.

Joseph Salgado, Under-Secretary of the Department of Energy, recently wrote me saying "the Department recognizes that Pyropower is a leader in the area of Circulating fluidized bed boilers". We are working very closely with DOE as we have the means to resolve the acid rain problem. We also have the means to resolve the city waste problem and toxic gases. However, the under-developed countries have the most urgent need.

If you know Mr. McPherson, or if you know someone who does, would you put in a word in favor of Alan Jacobs and AID's Energy Division. A successful program will be bound to make your Agency's task easier.

If we can be of any service to you, please do not hesitate to call on me. We would love to help. Ann joins in sending warmest best wishes to Sofia and you.

Sincerely,

Jack

John P. Fitzpatrick

Enclosures:

A package of brochures on the Pyropower Corporation and its PYROFLOW technology.

A study on the savings that will be made possible by switching from imported oils to indigenous fuels in electric power generation in the under-developed countries.

STAT

SUBSTANTIAL FOREIGN EXCHANGE SAVINGS WOULD BE MADE POSSIBLE BY SWITCHING CHEAP INDIGENOUS FUELS FOR EXPENSIVE IMPORTED FUELS IN ELECTRIC POWER PLANTS IN DEVELOPING COUNTRIES.

The great majority of developing countries are now using diesel and/or fuel oil for part of their electric power generation. If these countries would switch to a cheaper, non-petroleum product as a fuel, substantial savings could be achieved, if the country were a net importer, or substantial amounts of foreign exchange could be generated, if the country were a net exporter.

To accomplish these savings a switch or modification of the existing boilers would be required. If the boilers were switched to a new advanced technology, called PYROFLOW, these new circulating fluidized bed boilers would burn everything and anything that was burnable and practically any burnable resource can be used efficiently as a fuel, such as peat, wood, sawdust, shavings, coal, coal fines, culm, lignite, sugar cane, straw, agricultural manure, coffee beans, rice hulls, city waste and garbage, tires, tar sands, oil shales and many many more. If it is burnable it can be used efficiently as a fuel in PYROFLOW. It is highly unlikely that any developing country would not have at least one possible fuel resource, that is not being used as such at the present time.

Following is a list of all the developing countries, with the best available information on the amount of generating capacity that might be converted to an indigenous non-petroleum fuel, and it also shows the huge amounts of foreign exchange that might be saved or generated. It is based on a World Bank publication "1981 Power/Energy Data for 100 Developing Countries". It might not be up to date, but it will still serve our purpose here, and that is to demonstrate the validity of the general principle. Negotiations are already underway in varying degrees, and with World Bank help, in India, Pakistan, Dominican Republic, Ecuador, Jamaica, Mexico, El Salvador, Guatemala, Morocco and Jordan. We will try to reach all of the nations in time. If substitution programs were enacted in the 78 nations listed, the total savings and generations of foreign exchange would amount to over $10 billion annually.

COUNTRY	TOTAL MEGAWATTS	MILLION TONS OF OIL EQUIVALENT	MILLIONS OF BBLS.	$ MILLIONS THAT CAN BE SAVED
Angola	65	0.088	0.64	16
Argentina	777	2.31	16.86	421.6
Bangladesh	190	0.158	1.15	29
Barbados	37	0.087	0.64	16
Belize	21	0.021	0.146	3.65
Bolivia	46	0.047	0.343	8.6
Brazil	?	0.368	2.69	67
Burma	86	0.102	0.75	18.6
Cameroon	85	0.027	0.207	5.2

Chad	38	0.02	0.146	3.65
Chile	?	0.656	4.8	120
China	?	15.3	112	2,800
Colombia	?	1.17	8.5	213
Congo P.R.	30	0.019	0.138	3.45
Costa Rica	150	0.04	0.292	7.3
Cyprus	?	0.032	0.234	5.85
Djibouti	35	0.0275	0.2	5
Dominican Republic	?	0.8	5.9	150
Ecuador	?	0.652	4.76	120
Egypt	?	2.565	18.72	470
El Salvador	?	0.03	0.22	5.4
Ethiopia	51	0.034	0.248	6.2
Fiji	85	0.059	0.43	11
Gabon	102	0.035	0.25	6.25
Gambia	8	0.01	0.073	1.8
Ghana	84	0.014	0.102	2.5
Guatemala	140	0.331	2.4	60
Guinea	85	0.105	0.77	19.2
Guinea-Bissau	20	0.008	0.058	1.45
Guyana	100	0.113	0.825	20.6
Haiti	88	0.029	0.212	5.3
Honduras	99	0.072	0.526	13.2
India	?	0.6	4.2	105
Ivory Coast	?	0.5	3.65	91.3
Jamaica	?	(All data mixed but savings could be large)		
Jordan	?	0.35	2.56	64
Kampuchea	52	0.044	0.32	8
Kenya	162	0.084	0.61	15.5
Liberia	60	0.307	2.64	66
Madagascar	70	0.083	0.6	15
Malaysia	437	2	14.6	365
Mauritania	84	0.032	0.234	5.85
Mauritius	62	0.067	0.5	12.5
Mexico	?	10.65	78	1,950
Morocco	?	0.75	5.5	137.5
Mozambique	170	0.113	0.825	20.6
Nepal	12	0.011	0.08	2
Nicaragua	300	0.167	1.22	30.5
Niger	26	0.32	0.234	5.85
Nigeria	?	0.6	4.38	109
Pakistan	(all data mixed together, but savings could be large)			
Panama	?	0.511	3.73	93
Peru	?	0.479	3.5	87.5
Philippines	?	2.5	18.25	456
Portugal	?	2.125	15.5	400
Senegal	?	0.192	1.4	37
Sychelles	19	0.013	0.095	2.4
Sierra Leone	98	0.067	0.5	12.5
Soloman Is.	8	0.005	0.365	.91
Somalia	90	0.028	0.204	5.1
Sri Lanka	130	0.09	0.66	16.5

Sudan	150	0.109	0.8	20
Suriname	204	0.192	1.4	35
Swaziland	50	0.037	0.27	6.75
Tanzania	62	0.041	0.3	7.5
Thailand	800	2.66	19.5	487.5
Togo	48	0.021	0.153	3.8
Tunisia	900	0.75	5.5	138.8
Turkey	?	1.6	11.7	300
Uruguay	?	0.26	1.9	47.5
Vietnam	?	0.825	6	150
Yemen A.R.	?	0.525	0.38	9.5
Yemen PDR	?	0.043	0.313	8
Yugoslavia	?	1.573	11.5	288
Zaire	67	0.025	0.183	4.6
Zambia	24	0.025	0.183	4.6

The following countries were not listed as their consumption was too small to justify inclusion, or for which no information was available:

Afghanistan
Algeria
Benin
Botswana
Burundi
Cape Verde
Central African Republic
Comoros
Dominica
Equatorial Guinea
Laos
Lesotho
Malawi
Mali
Paraguay
Romania
Korea
Rwanda
Sao Tome & Principe
Syria
Uganda
Upper Volta
Zimbabwe

John P. Fitzpatrick

John P. Fitzpatrick

PYROFLOW® UNITS IN OPERATION

Customer	Start-Up	Fuels	Steam Conditions	Application
Gulf Oil Exploration Co. Bakersfield, CA, USA	1983	100% coal & limestone	2500 psig; 670°F 50,000 lb/hr 80% quality	Enhanced Oil Recovery Once thru Design
Zellstoff und Papierfabrik Frantschach AG Frantschach, Austria	1983	100% bark 100% oil 67% brown coal	1250 psig; 968°F 154,000 lb/hr	Cogeneration
Ahlstrom Varkaus, Finland	1983	100% woodwaste	885 psig; 895°F 55,000 lb/hr	Cogeneration-Retrofit
Neste Lampo Oy Mantsala, Finland	1983	100% coal-water mixture 100% coal	230 psig; 248°F hot water; 10 MM Btu/hr	Heating-Firetube Design
Oriental Chemical Co. Inchon, Korea	1984	100% petroleum coke 100% coal	1580 psig; 970°F 264,000 lb/hr	Cogeneration
Ostersunds Fjarrvarme AB Ostersund, Sweden	1985	100% peat 100% wood chips 100% coal	160 psig; 355°F hot water; 85 MM Btu/hr	District Heating
Municipal Electricity Works Kerava, Finland	1985	100% coal & limestone	145 psig; 355°F hot water; 102 MM Btu/hr	District Heating
California Portland Cement Co. Colton, CA, USA	1985	100% coal & limestone	650 psig; 825°F 190,000 lb/hr	Cogeneration
Papyrus Kopparfors AB Fors, Sweden	1985	100% bark 100% peat 100% coal	857 psig; 887°F 159,000 lb/hr	Cogeneration

PYROFLOW® UNITS IN OPERATION

Customer	Start-Up	Fuels	Steam Conditions	Application
Suomen Kuitulevy Oy Pihlava, Finland	1979	100% peat 100% woodwaste	1230 psig; 970°F 45,000 lb/hr	Cogeneration-Retrofit
Savon Voima Oy Suonenjoki, Finland	1979	100% peat 100% oil	160 psig; 250°F hot water; 22 MM Btu/hr	District Heating
Kemira Oy Oulu, Finland	1980	Zinciferous sludge	—	Sludge Incineration
Ahlstrom Kauttua, Finland	1981	100% peat 100% coal	1235 psig; 930°F 200,000 lb/hr	Cogeneration
Hyvinkaan Lampovoima Oy Hyvinkaa, Finland	1981	100% coal 80% oil 80% peat	160 psig; 355°F hot water; 85 MM Btu/hr	District Heating
Skelleftea Kraft AB Skelleftea, Sweden	1981	100% peat 100% oil	160 psig; 355°F hot water; 22 MM Btu/hr	District Heating
Ruzomberok, Czechoslovakia	1982	Sewage sludge	—	Sludge Incineration
Hylte Bruks AB Hyltebruk, Sweden	1982	100% peat 80% coal	960 psig; 840°F 143,000 lb/hr	Cogeneration
Oy Alko Ab Koskenkorva, Finland	1983	100% peat 100% oil	610 psig; 840°F 55,000 lb/hr	Process Steam
Kemira Oy Oulu, Finland	1983	100% peat 80% coal	1305 psig; 960°F 155,000 lb/hr	Cogeneration

PYROFLOW® UNITS UNDER CONSTRUCTION

Customer	Start-Up	Fuels	Steam Conditions	Application
B.F. Goodrich Henry, IL, USA	1985	100% coal & limestone	500 psig; 470°F 125,000 lb/hr	Process Steam
Metsaliiton Teollisuus Oy Aanekoski, Finland	1985	90% woodwaste 90% peat 100% coal 70% oil	1215 psig; 896°F 220,000 lb/hr	Retrofit
Central Soya Chattanooga, TN, USA	1985	100% coal & limestone	190 psig; 384°F 88,000 lb/hr	Process Steam
General Motors Pontiac, MI, USA	1986	100% coal & limestone plant wastes	1460 psig; 955°F 300,000 lb/hr	Cogeneration
Espoon Sahko Espoo, Finland	1986	100% coal	145 psig; 355°F hot water; 273 MM Btu/hr	District Heating
Colorado-Ute Electric Assoc. Nucla Station, CO, USA	1987	100% coal & limestone	1510 psig; 1005°F 925,000 lb/hr	Electric Power
Leykam Muerztaler AG Gratkorn, Austria	1987	100% coal	1755 psig; 968°F 364,000 lb/hr	Cogeneration
Kemira Oy Pori, Finland	1987	100% coal 90% peat	1218 psig; 977°F 222,000 lb/hr	Cogeneration
Chemiefaser Lenzing AG Lenzing, Austria	1987	100% brown coal 100% coal	1130 psig; 932°F 265,000 lb/hr	Cogeneration

Forbes

The Up & Comers

Ideas

With U.S. nuclear power dead for the moment and acid rain a growing concern, little Pyropower's new way of burning coal seems an intriguing answer.

Starting over

By James Cook

ERIC OAKES, a 44-year-old former nuclear physicist, went through a rough time as a director for new business development at General Atomic, an ambitious nuclear venture by Gulf Oil and Royal Dutch/Shell's Scallop nuclear subsidiary. When the nuclear reactor business collapsed in the late Seventies, Oakes began looking for other commercial applications for the company's existing technologies. (General Atomic, now known as GA Technologies Inc., recently was absorbed by Chevron Corp., along with Gulf itself.)

Oakes became the president of a GA Technologies venture to make high-tech boilers. The project, spun out in 1980 as a separate company called Pyropower Corp., in San Diego, began exploiting an energy source every bit as clean as nuclear but without its political problems.

What excited Oakes was a technology called fluidized bed combustion (FBC), a process for burning pulverized coal and limestone on a cushion of upthrusting air to make steam or generate power. The particular virtue of this process is that the pollutants produced by the combustion process—sulfur, nitrogen, you name it—are harmless. Sulfur, for example, combines with the limestone to produce calcium sulfate.

Rocky Thies

Eric Oakes of Pyropower Corp.
"Utilities don't need those big blocks of power anymore."

Various manufacturers had been dabbling in FBC for years—for steam, cogeneration or electric power production—but they had been interested mainly in a different technology. This other method, which used a so-called bubbling bed, ran into problems scaling up to commercial sizes. General Atomic, however, took note of a variant technology being developed in Europe—circulating fluidized bed combustion (CFBC).

A $700 million-a-year Finnish pulp, paper and engineering firm, A. Ahlstrom OY of Helsinki, had developed a CFBC technology and had even got its first plant into successful operation. Ahlstrom had so much of a head start that in 1980 GA and Ahlstrom decided to pool their strengths in a 50-50 CFBC venture called Pyropower Corp., which Ahlstrom finally took over entirely last year.

With U.S. nuclear power dead for the moment and acid rain a matter of rising concern, FBC now seems an intriguing and environmentally superior alternative to conventional coal plants for generating electricity. TVA is currently building a 160,000-kilowatt demonstration facility at Paducah, Ky., using the conventional bubbling FBC process. Foster Wheeler is retrofitting a 125,000-kilowatt Northern States Power plant also using FBC technology. And Pyropower is retrofitting an old coal plant for the Colorado-Ute Electric Association with a 100,000-kilowatt CFBC unit for early 1987 operation. What Oakes hopes, of course, is that the Colorado-Ute project will open the big U.S. utility market to the Pyropower process. It may already have done so. In May Diamond West Energy Corp. and Sagamore Corp. worked out a deal with Boston Edison to build an 80,000-kilowatt CFBC plant using Pyropower boilers.

There's a great deal of

high-powered competition out there: big companies like Lurgi overseas; Combustion Engineering, Babcock & Wilcox and Keeler/Dorr-Oliver in the U.S. Even so, Pyropower picked up 3 of the 15 units contracted for in the U.S. last year, and Oakes argues that Ahlstrom's experience gives it a considerable edge over its competition. Worldwide there are 17 Ahlstrom plants in operation, with 12 more under construction. Pyropower itself has already built 2 in the U.S.—a CFBC system for Gulf Oil at Bakersfield, Calif. for secondary oil recovery, and a second one, going into operation this month, for California Portland Cement, to produce both steam and electricity. It has contracts, as well, with B.F. Goodrich, Central Soya and General Motors.

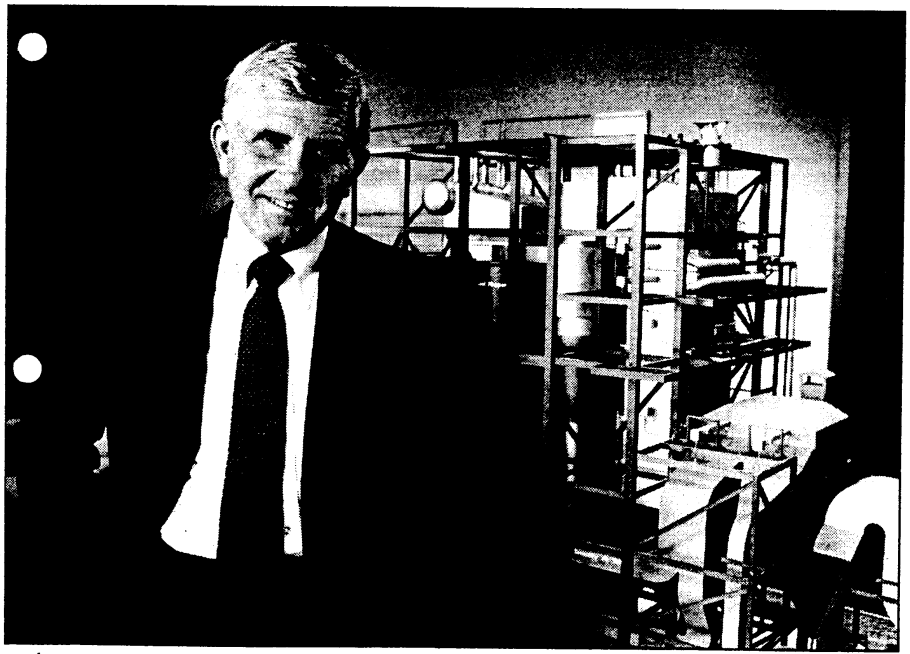
For utility applications, Pyropower units can be built in 100,000-to 200,000-kilowatt modules, for the same $1,200-to-$1,500-a-kilowatt cost a new coal-fired 600,000-kilowatt unit with pollution controls commands. These smaller Pyropower units, Oakes points out, are more adaptable to the current patterns of power consumption than the larger conventional plants. They can be added in 150,000-kilowatt modules, for example, as demand requires, and built in three years instead of the five or six years the larger units require. "The utilities don't need those big blocks of power anymore," Oakes says. "They can absorb 150 megawatts more rationally in their planning. And the cash flow is much better with four 150-megawatt units, say, than it is with one 600-megawatt unit. With the big unit, you're going to be in the hole five or six years before it starts to generate revenue. We can put a 150-megawatt unit on line in about three years." Oakes is so confident of Pyropower's ability to do the job that he's prepared to offer fixed-price contracts with guaranteed performance.

Pyropower's sales are beginning to take off: from $3 million in 1981 to $7.5 million in 1982, $22 million in 1983, $44 million last year, and $75 million in prospect for 1985 and $200 million by 1990. "Our goal is to break even this year," Oakes says. "I'm not sure we'll make it. But next year for sure. But it will be ten years before we really start to generate good earnings. It's a real challenge, trying to become a long-term supplier to the U.S. boiler business. People think that we're crazy for taking it on, but in these times of change, there's room for a newcomer with a good product and organization." ■

Los Angeles Times

Tuesday, November 19, 1985

Firm Markets Clean Coal-Power Technology



Pyropower Vice President William Compas stands next to model of

DON BARTLETTI / Los Angeles Times

By GREG JOHNSON, *Times Staff Writer*

Coal angers environmentalists, frustrates states with plenty of the cheap but dirty-burning fuel—but brings smiles to the faces of Pyropower Corp. executives.

That's because San Diego-based Pyropower, a wholly owned subsidiary of Helsinki, Finland-based A. Ahlstrom Group, is designing industrial and utility boilers that burn coal and other dirty fuels without damaging the environment.

Pyropower has six projects under way, including:

- An industrial boiler outside Chicago that is funded for $4.3 million by the State of Illinois. The state anticipates that the boiler, which began operating last month, could signal a turnaround for the state's depressed coal mining industry.

Making Illinois-mined coal environmentally safe to burn could add $500 million to the state's economy by creating as many as 4,000 new jobs, according to the state Department of Energy and Natural Resources.

- In smog-ridden and coal-poor San Bernardino County, a Pyropower coal-fired industrial boiler designed for California Portland Cement Co. fired up in June and, in the process, became Southern California's first new coal-fired boiler in 20 years.
- A 100-megawatt coal-fired unit that was designed for the Colorado-Ute Electric Assoc. has attracted cautious attention from the utility industry. The unit, scheduled to open in 1987, marks the first use by a U.S. utility of the Pyropower technology.

The Colorado-Ute unit is one of three fluidized bed projects under way, Compas said. The two others will use fluidized bed combustion systems designed by Combustion

COAL: New Technology

Continued

Engineering and Foster Wheeler.

U.S. utilities, although interested in the fluidized bed technology, have been slow to place orders, according to William Compas, vice president of Pyropower.

"These [utility] guys were burned badly by [expensive] nuclear plants," Compas said. "Although there are some mavericks who will take a chance, [most are] gun-shy about any new technology."

Pyropower, however, is not shy about its "circulating fluidized bed" combustion technology, which generated $55 million in sales during 1984. The technology cleanly burns high-sulfur coals, petroleum coke, anthracite coal wastes and waste fuels including wood, Compas said.

As fuel is fed into Pyropower-designed furnaces, a steady stream of air keeps the fuel "floating," which provides for a "cleaner" burn, company officials said. Fuel that fails to completely burn is then circulated into the furnace for complete combustion.

Crushed limestone that is blown into the furnaces creates a chemical reaction that eliminates the sulfur dioxides generally blamed for creating acid rain.

Pyropower grew out of a partnership involving Ahlstrom and La Jolla-based GA Technologies, which was considering the technology for use in nuclear-powered boiler applications. GA abandoned its part of the boiler project after the Three Mile Island radioactivity leak, the resulting regulatory explosion, and skyrocketing construction costs knocked the bottom out of the nuclear reactor industry.

When GA Technologies withdrew from the partnership, Ahlstrom created Pyropower as a wholly owned subsidiary, with former GA executive Eric Oakes as its president. Compas, another GA veteran, joined Pyropower just over a year ago. The company has taken advantage of a general industry slowdown and grabbed managers from boiler giants such as Babcox and Wilcox.

Pyropower is chasing utility and industrial customers that want both electricity and co-generated heat or steam that can be used to slash production costs, Compas said, adding that the company is also developing projects in which it acts as an owner-operator.

Last month, Pyropower and General Electric signed a marketing agreement that will "identify, screen and develop selected co-generation projects incorporating Pyropower's [technology] into GE's proven power generation systems," according to a GE executive.

GE has predicted that during the next five years, the market for solid fuel-fired co-generation plants could swell to $5 billion.