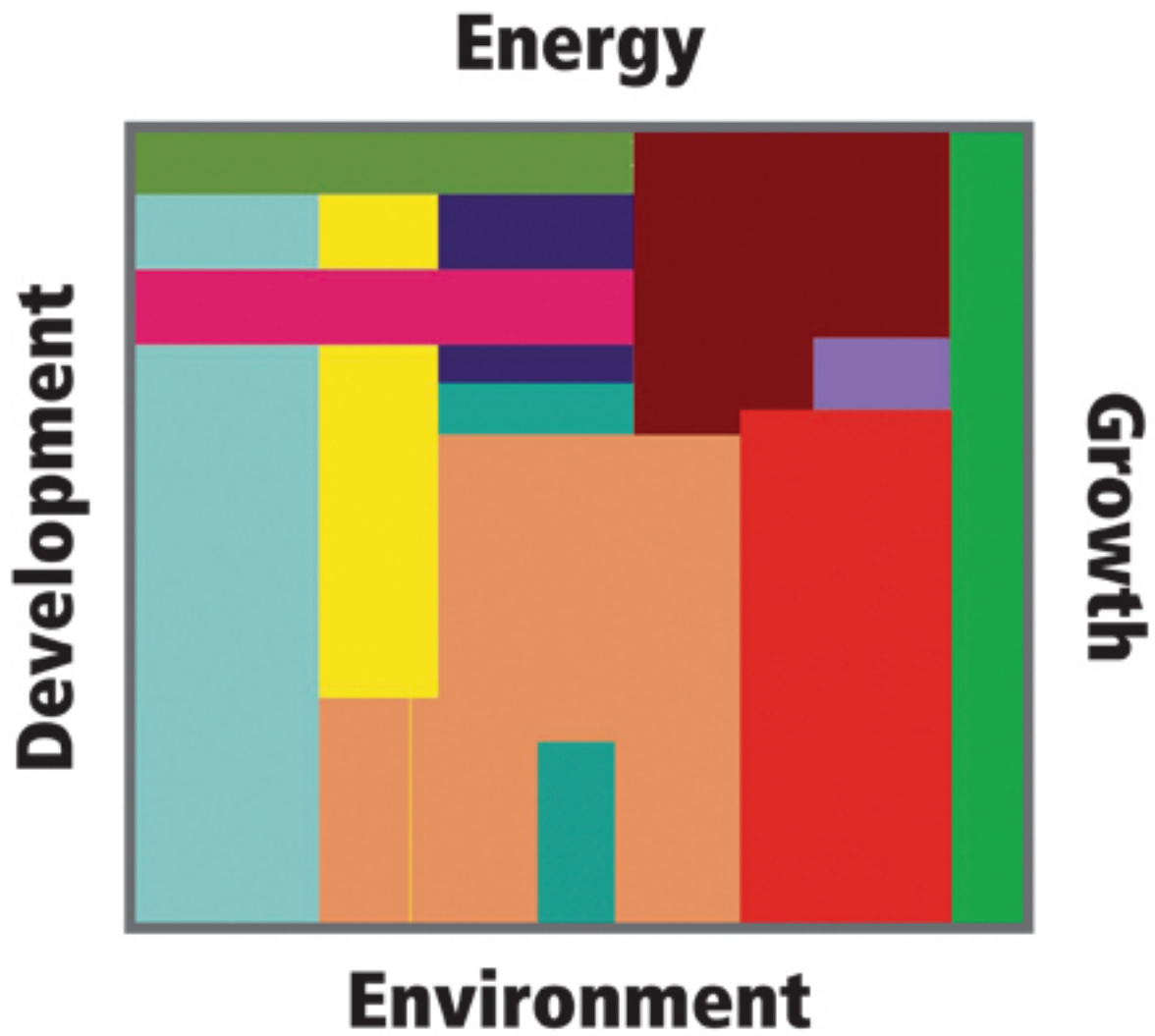


2010

Africa Energy Yearbook



Content

Acknowledgment	1
Energy for All	
Energy for All	1
Kandeh Yumkella, Director-General, United Nations Industrial Development Organization (UNIDO)	
Morgan Bazilian, Special Advisor to the Director-General, United Nations Industrial Development Organization (UNIDO)	
Tackling energy poverty in sub-Saharan Africa	5
Nobuo Tanaka, Executive Director, International Energy Agency (IEA)	
Africa's energy resources – a key to development, poverty reduction and mutual energy security	9
Stefano Manservigi, Director General for Development, European Commission	
Resource mobilization strategy for energy in the African continent	13
Mohamed Abdel-Rahman, Energy Advisor, NEPAD	
Rwanda's energy future	19
Vincent Karega, Minister of Infrastructure, Ministry of Infrastructure, Rwanda	
The value of power in Africa's circles of power	23
Bright Simons, Director, IMANI Centre for Policy and Education	
Meeting Africa's growing energy needs in a timely and sustainable manner	27
Latsoucabé Fall, Manager – Africa Region, World Energy Council	
How <<LION>> can help to achieve Africa's Energy Sustainability	32
Latsoucabé Fall, Manager – Africa Region, World Energy Council	
Packing a Punch	
Low carbon energy technologies and poverty alleviation – overcoming barriers and unlocking potentials	37
John Christensen, Director, UNEP Risoe Centre	
Gordon Mackenzie, Clean Energy Development Coordinator, UNEP Risoe Centre	
Empowering the world with renewable energies	43
Hélène Pelosse, Interim Director-General, International Renewable Energy Agency (IRENA)	
Off-grid microhydro to serve rural areas in Africa	47
Wim Jonker Klunne, Senior Researcher, Council for Scientific and Industrial Research	
Energy [R]evolution: A sustainable pathway to a clean energy future for South Africa	51
Sven Teske, Director of Renewable Energy Campaign, Greenpeace International	
Melita Steele, Climate Campaigner, Greenpeace Africa	
Nkopane Maphiri, Climate Campaigner, Greenpeace Africa	
Renewable power to the people! A case for small scale localised power generation in South Africa	57
Leigh Sax, Director, Elemental Africa	
Biofuels in Africa: Growing complexities	61
Thomas Molony, Senior Research Fellow, Centre of African Studies, University of Edinburgh	
James Smith, Professor of African and Development Studies, University of Edinburgh	
Perspectives for biofuels in Africa from the Brazilian experience	65
Suani Teixeira Coelho, Coordinator, Brazilian Reference Center on Biomass (CENBIO)	
Renata P. Soares Grisoli, Researcher, Brazilian Reference Center on Biomass (CENBIO)	
Developing energy systems in the context of sustainable development in Africa	69
Stanford Mwakasonda, Corporate Climate Change Specialist, Engen Petroleum Limited	
Financial Fixers	
What private equity investors require to invest in a country's power sector	73
Alasdair Maclay, Director, Infrastructure, Actis LLP	
Integrated gas-to-power projects: the importance of risk allocation	77
Andrew Gray, Partner, Gowlings (UK) LLP	
Out of Africa: external factors have never made it more imperative that all stakeholders take a realistic approach to development and financing	81
Neil Upton, Head of Energy, Greenberg Traurig Maher	
Energy solutions in Africa: affordable, sustainable, available?	87
Bernhard van Meeteren, Energy Sector Specialist, FMO	
Application of Concentrated Solar Power	91
Youssef Arfaoui, Investment Officer and Renewable Energy Expert, African Development Bank	
Has the time come for large-scale solar power in Africa?	97
Jérôme Bertrand-Hardy, Head of Infrastructure, PROPARCO	
Hydropower for a low carbon, high growth trajectory	99
Shantayanan Devarajan, Chief Economist, World Bank, Africa Region	
Policies for the diffusion of Renewable Energy Technologies in Africa	101
Amanda Luxande, Regional Manager for Southern Africa, REEEP	

Contents

Corporate Contribution

Energizing development in a changing climate Filippo Veglio, Deputy Director, Development Focus Area, World Business Council for Sustainable Development	103
A powered-up continent – more electricity for Africa's growth Wolfgang Dehen, CEO Energy Sector and Member Managing Board, Siemens AG	105
Managing the relationship between national oil companies and foreign operators; a win-win investment Yasser Tousson, Managing Director - Finance, Apache Egypt	111
How can a national oil company make a positive contribution to economic development: the case of PETROCI in Côte d'Ivoire Remy Gouahoury, Chief Information Technology and Statistics Officer, PETROCI Holdings	115

Africa Files

Trick or Treat: Rethinking Black Economic Empowerment Extract of chapter 11: Beyond BEE Jenny Cargill, Director, Businessmap Investment Strategy Advisers	119
Artists Biographies	121

Directories

Conventional Thermal Generators	123
Temporary Power	127
Hydropower	131
Wind	132

African Power Projects	133
-------------------------------	-----

African Power Investors	155
--------------------------------	-----

Index of Advertisers

ABSA Capital	22
African Development Bank	90
African Energy	42
Aggreko Energy Rental South Africa (Pty) Ltd	126
Andritz Hydro GbmH	Outside back cover
APR Energy	128
Argentil Capital Partners	98
Burmeister & Wain Scandinavian Contractors AS	6
Caterpillar SARL	122
Fields of Play—District 6 Museum	56
Fieldstone Africa	76
Globeleq	72
Greenberg Traurig Maher	80
Gowlings (UK) LLP	79
Group Jeune Afrique	96
Haefely Test AG	18
London & Bamako—A Contemporary Art Exhibition	114
Marchés Tropicaux & Méditerranéens	68
Next Energy	59
OMICRON electronics GmbH	4
Rolls-Royce	25
Sarens South Africa (Pty) Ltd	49
Semco Maritime	41
Siemens	106
Trick or Treat	118
Vergnet SA	46
Vestas	26

Index of images

'Walking in the desert' - Meek Gichugu	50
'Finger' - Meek Gichugu	60
'Etranges fant mes' - Meek Gichugu	71
'Le Fumoir' - Meek Gichugu	86
'My Radio' - Meek Gichugu	102
'Bangalore - mixed media' - Leaky Kaburu	104

Energy for All

Kandeh Yumkella Director-General, United Nations Industrial Development Organization



Mr. Kandeh K. Yumkella is Director-General of the United Nations Industrial Development Organization (UNIDO). As a leader in international development cooperation for over 20 years, he has actively promoted important initiatives and international partnerships for the cause of sustainable development. Mr. Yumkella serves as Chairman of UN-Energy, the United Nations system coordination body on energy-related issues. He also serves as the Chairman of the UN Secretary General's Advisory Group on Energy and Climate Change (AGECC).

Morgan Bazilian Special Advisor to the Director-General, United Nations Industrial Development Organization



Morgan Bazilian is the Special Advisor to the Director-General of UNIDO on international energy and climate issues. Prior to this, he held a political appointment as Senior Advisor on Energy and Climate Change to the Minister for Energy in Ireland. Morgan was the lead climate change negotiator for the EU on low-carbon technology, and a member of the UNFCCC's Expert Group on Technology Transfer (EGTT).

Large parts of humanity - billions of people - live without access to modern energy services. These are fundamental services that most of us take for granted, like light, fuel for heating and cooking, and mechanical power. Despite the efforts of many committed people, working on excellent programmes, about 1.5 billion people still don't have access to electricity, and around 2.5 billion people rely on traditional biomass as their primary source of energy – a clearly unacceptable position. This lack of access to affordable, reliable, energy services is a fundamental hindrance to human, social, and economic development – and is thus a major impediment to achieving the Millennium Development Goals (MDGs). The issue is also a stark illustration of the deep inequity that exists between the rich and poor – roughly, the poorer three-quarters of the world's population use only 10% of the world's energy. The rich countries aim for a secure, environmentally acceptable, and affordable energy supply – but what about the billions without access?

A few success stories do exist - countries such as China have improved the access for their citizens substantially in the last decades – but in many parts of sub-Saharan Africa, and in parts of Asia, people are living without basic energy services. The demand for energy in these regions is expected to grow dramatically, with increases in population and improvements in living standards adding to the scale of the challenges. It is stunning to realize that, if 'business as usual' conditions are maintained, over the next decades the total number of people without access to modern energy services will not decrease (IEA, 2009). Current efforts are clearly insufficient in scale and scope, and attempting to address the issue in the same way we have in the past is not remotely adequate.

Energy for development

Energy services have an impact on productivity, health, education, security, safe water, and communication services. Therefore, it is no surprise that access to energy has a strong correlation to social and economic development indices (e.g. Human Development Index, life expectancy at birth,

Low carbon energy technologies and poverty alleviation – overcoming barriers and unlocking potentials

John Christensen
Director,
UNEP Risoe Centre



Dr. John Christensen is the Director of the UNEP Risoe Centre, and has been working for the UN Environment Programme for almost 20 years in different capacities. He holds both a M.Sc. and a PhD from the Technical University of Denmark. John has worked extensively on energy and development issues at the global level as part of the UN Energy collaboration and at the national level he has been involved in a number of developing countries in Africa, Asia and Latin America providing policy support and capacity building. John has been a member of the Bureau of the Intergovernmental Panel on Climate Change (IPCC) and participated as lead author in a number of the IPCC global assessments and special reports, currently a lead author on a new special IPCC report on Renewable Energy Sources.

Gordon Mackenzie
Clean Energy
Development Coordinator,
UNEP Risoe Centre



Gordon Mackenzie (BSc, PhD Physics, University of Edinburgh) has worked on energy issues in Africa for more than 25 years. He was Energy Advisor/Deputy Director in the Zambian Department of Energy from 1984-7. In 1990 he co-founded the UNEP Risoe Centre (URC), Denmark (www.uneprisoe.org). From 1999 to 2002 he was Energy Advisor in a Danish support programme to Lesotho's Department of Energy.

Since 2002, Gordon has been coordinator of the Cleaner Energy Development theme at URC, now part of the Technical University of Denmark (DTU). His main professional interest is the link between energy and development, how access to clean and affordable energy can contribute to climate change mitigation, increase people's climate change resilience, and contribute to general development and poverty alleviation.

1. Development Context

Energy access: the current situation

In the developed world, energy is almost universally available and accessible: light at the flick of a switch, heat for cooking or comfort at the turn of a knob. In many parts of the developing world the picture is very different. Present estimates put the number of people still relying on biomass for most of their energy needs at 2.4 billion, some 1.6 billion people are still without access to electricity and many have only limited or no access to cleaner and more modern fuels such as kerosene, liquefied petroleum gas (LPG) or natural gas.

In real terms, that means millions of people – mainly women – spending much of their time in the arduous business of collecting firewood, animal dung or crop residues with which to cook or to heat their homes. Once they get their 'energy source' home, the smoke produced from its combustion in traditional fires and stoves will expose them to pollutants that cause chronic respiratory and eye diseases. Again, this affects mainly the women who do the cooking, and young children who spend much of their time indoors with their mothers. Over one and a half million annual deaths in developing countries are associated with the inhalation of smoke from solid fuels.

Considerable efforts have been made, and access to electricity and other modern forms of energy have been successfully extended to over a billion people in the past 25 years. Nevertheless, a glaring energy gap – both between North and South and the rich and poor people – persists and may even be widening, in spite of the fact that governments and international organisations everywhere recognise that the multiplier effect of access to modern energy services is vital in underpinning efforts to improve health, education, clean water and sanitation services.

The Millennium Development Goals - providing a new impetus

The Millennium Development Goals (MDGs) represent the international community's commitment to halving poverty in the

What private equity investors require to invest in a country's power sector

Alasdair Maclay
Director, Infrastructure,
Actis LLP



Alasdair Maclay has ten years of private equity investment experience and joined Actis in 2003. Actis is a leading emerging markets private equity investor with \$4.8bn funds under management and teams in 9 offices across Africa, Asia and Latin America.

Mr. Maclay focuses on infrastructure acquisitions and new project financings in the power and energy infrastructure sector in Africa. He managed the portfolio and co-led the exits of the Actis investments in Globeleq and CBPF.

Prior to Actis, Mr. Maclay worked in the UK MBO market for Sovereign Capital and was a strategy consultant at Bain & Company. Alasdair has a BA from Oxford University and an MBA from INSEAD.

Stable predictable cash flows, or if they cannot be stable, then predictable cash flows. That is all we want.

Clearly it is more complex than this but it is not revolutionary and does not need to be elusive. There are nine characteristics that we look for when identifying the 'enabling environment' that catalyses predictable cash flows from power businesses. I will risk making sweeping statements and naming countries in examples that will necessarily be oversimplified in order to illustrate where these characteristics are best evidenced or missing.

Projects and companies should succeed and attract private equity investment if the system that they operate in has or allows these attributes:

- **Government that welcomes private sector participation**
- **Predictable credit-worthy stable revenue streams**
- **Corruption-free open transparent processes**
- **Balanced regulatory environment in place**
- **Competitive and liquid debt markets**
- **Appropriate allocation of all risks**
- **Clear plan from Government**
- **Cost-reflective tariffs**
- **Acceptable returns**

These characteristics occur neither instantly nor naturally; they are commonly associated with the conventional free market reform ideology of the IMF and World Bank. Some countries have managed to adopt them and others are attempting to with varying degrees of success. Much comes from the approach and planning competence of the individual government. The clarity and sense behind each of India's 5 year plans would be welcome in many countries across Africa, as would China's ability to implement sector-wide reform

through strong command and control leadership. South Africa's much vaunted 'Integrated Resource Plan' has spent many years in the design phase and the leaked versions do not provide confidence that South Africa will be able to score highly against any of the nine criteria. Nigeria's government welcomes the private sector but is struggling to put in place the remaining eight criteria. Kenya started earlier than other African countries and has spent more time addressing its structural issues. Kenya now boasts a power sector that is among the best in Africa with an established regulator, sustainable unbundled sector entities, and a track record of projects with appropriate returns and risk allocation.

Balanced and stable existing regulatory environments are catalysts for sector success

The 2008 World Bank Africa Infrastructure Country Diagnostic (AICD) looked at the impact of regulation and private sector involvement in the power sectors of 24 Sub-Saharan Africa countries. The results suggest strongly that an established balanced regulatory environment is a key determinant of sector success. It is just one ingredient of the overall mix but it is a feature that the private sector looks for as it usually leads to predictability, transparency, clear plans, cost-reflective tariffs and the acceptable returns that the private equity investor is looking for.

Nigeria would greatly benefit from a stable regulatory environment but it has been unable to achieve this so far; its regulator left his post on legal charges to be replaced by an interim regulator while the regulatory body, NERC, operates in an uncertain political leadership environment where the rules for the sector are in constant flux.

The survey data indicates that the regulated sectors perform better. Markets with regulators have less reliance on emergency power due to better planning; higher levels of operational capacity and commercial efficiency driven by better use of the private sector and higher levels of urban connections. It is important to note that those markets with

A powered-up continent – more electricity for Africa's growth

Wolfgang Dehen
CEO Energy Sector and
Member Managing Board,
Siemens AG



Wolfgang Dehen (56) is Chief Executive Officer of the Siemens Energy Sector and Member of the Managing Board of Siemens AG, a position he has held since January 2008. With posted revenues of EUR 25.4 billion in 2009, the Energy Sector is the world's leading supplier of power technologies along the entire energy conversion chain. Before, Dehen was CEO of Siemens VDO Automotive AG in Germany. He holds a degree in business administration and started his professional career in the automotive industry at VALEO, ITT-Automotive and Alfred Teves GmbH.

Colourful flags and pennants, thousands of blaring vuvuzela horns and thunderous cheering for South Africa's Bafana Bafana greet the players as they parade onto the field. This June 11, 2010 is an afternoon like no other for host South Africa and the Mexican team in Johannesburg's Soccer City Stadium. Around 94,700 spectators in the sold-out stadium and a television audience of well over one billion fans worldwide are eagerly anticipating the opening game of the 19th Soccer World Cup. And to ensure that this spectacular mega-event fulfils the highest hopes and expectations, everything depends on a modern and efficient infrastructure. The Games can finally begin – thanks in part to Siemens technology.

Long before the World Cup, Siemens took part in the biddings on key infrastructure projects for power supplies and transport, logistics and healthcare solutions – and won contracts worth around one billion euros. Siemens is providing, for example, integrated passenger information and station management systems to help transport the millions of fans who will attend matches throughout the country. The company is also supplying healthcare IT software to 37 hospitals and 300 clinics, many near World Cup

venues. And through OSRAM, we are providing the stadium lighting in eight of the ten World Cup stadiums.

The most important role, however, will be played by reliable power supplies, and the biggest share of the contracts was earmarked for further developing and expanding South Africa's energy infrastructure. The Siemens Energy Sector built, for example, highly efficient power stations in Cape Town and Mossel Bay to help meet power needs and peak demand during the World Cup, which takes place during the high-demand South African winter season. And since the generated electricity has to reach the final consumers, Siemens Energy was not only involved in power generation projects, but with solutions for providing efficient power transmission and distribution in the South African grid.

The World Cup 2010 in South Africa effectively demonstrates what is so typical for Siemens' performance throughout the African continent: secure energy supplies, efficiency, cost-effectiveness, environmental protection and conservation of resources. And not only for the moment, but sustainably over many decades.

A joint study by Siemens and Roland Berger, among reports by other experts, has



Figure 1: Durban stadium

Conventional Thermal Power

Company: Barloworld Power

Head office location: Boksburg, South Africa

Generator type:

Fuel: Diesel/Gas

Size: 4kW - 16MW

Top 5 African countries of operation: South Africa, Angola, Namibia, Mozambique, Botswana, Zambia, Malawi

Contact: Nicola Morgan-Evens

Position: Key Account Manager

T: +27 11 323 2413

E: nevens@barloworldpower.com

W: www.barloworldpower.com



Caterpillar Electric Power

Illinois, USA

Any

Diesel, Gas, HFO

Any

Across Africa

Robert Rankin

Territory Manager AME, Electric Power Projects

+41 22 849 4758

+41 78 883 4758

cat_power@cat.com

www.cat-electricpower.com

Whatever the economic conditions Caterpillar can offer you the correct combination of rental, used and new equipment to power your business

Caterpillar Power Generation Systems

Texas, USA

Medium speed diesel engines and equipment, turnkey diesel power plants up to 150MW

Heavy fuel oil, diesel oil, liquid bio fuels, natural gas

Diesel engines - 2 to 14MW

Gas Engines - up to 6.5MW

Cape Verde, Guinea Conakry, Mali,

Mauritania, Sierra Leone

Mikko Bergqvist

Sales Manager

+41 22 849 4607

Bergqvist_Mikko@cat.com

www.catpowerplants.com

Deutz Dieselpower

Johannesburg, South Africa

3 phase

Diesel

30 - 1000kVA

South Africa

Howard Little

Sales Support

+27 21 552 1062

howard@deutz.co.za

www.deutz.co.za

Dresser Inc., Dresser Waukesha

Waukesha/Wisconsin, USA

Reciprocating, Spark Ignited Gas Engine

Generator

Various Gaseous Fuels

250kW to 3.2MW per unit

Egypt, Nigeria, Angola, Algeria, Tunisia

Thomas Hechenbichler

Regional Manager - Africa, Middle East,

Subcontinent

+43 676 918 6540

tom.hechenbichler@dresser.com

www.dresserwaukesha.com

Geopower Africa

Lanseria, South Africa

Coelmo

Diesel

up to 3MVA

South Africa, Mozambique, Zambia,

Botswana, Zimbabwe

Howard Ramsden

Director

+27 73 672 2502

howard.ramsden@terrapower.co.za

www.geopowerafrica.co.za

GE Transportation

Erie, PA, USA

Reciprocating Engine

Diesel

1Mw - 5Mw

South Africa, Algeria, Nigeria, Angola, Egypt

David Zimmerman

Global Sales Manager

+1 859 360 3759

dave.zimmerman@ge.com

Greenheart Energy (Pty) Ltd

London, United Kingdom

Any

Diesel, Biodiesel, HFO, Gas

+1 MVA

South Africa, Kenya, Namibia, Angola

Mike Eyre

Director

+44 780 243 7389

mike@greenheart.co.uk

www.greenheartenergy.co.za

Guascor Power

Zumaia, Spain

High Speed Reciprocating internal combustion engines

Natural Gas, biogas, Diesel

250 - 1200 eKW

Nigeria, Egypt, South Africa, Mozambique, Marroco

Marcos Garcia de la Torre

Africa - Area Manager

+34 94 386 5200

mdelatorre@guascor.com

www.guascorpower.com

Iberdrola Ingenieria y Construccion

Madrid, Spain

CCGT

Gas

larger than 100Mw

Northern Africa, Central Africa, Southern Africa

Ali Qureshi

Business Development

+34 91 713 3377

maqureshi@iberdrola.es

www.iberdrolaingenieria.com

MAN Diesel SE

Augsburg, Germany

High speed and medium speed reciprocating engines

Diesel, HFO, Natural Gas, BioFuels

1 - 20 MW

Morocco, Mauritania, Algeria, Sudan,

Nigeria

Max Schubert

Senior Sales Manager Africa

+49 15 114 739 967

max.schubert@man.eu

www.mandiesel.com

Mantrac Egypt

Cairo, Egypt

High speed and medium speed reciprocating engines

Diesel, Gas, HFO

5-12,000kVA

Egypt

Magdy Sawiris

Sales Manger

+20 2300 4049

msawiris@mantrac.com.eg

www.mantracpowersystems.com

PROJECT DETAILS	PROJECT DESCRIPTION	DEVELOPMENT	FINANCE AND LEGAL
ALGERIA			
Arzew / Skikda gas fired plant	2000 MW combined (1200 for export) - tenders for both projects issued at same time. [Technical bids submitted, commercial bids delayed, power export feasibility study awaiting further Algerian/Spanish negotiations]	Algerian Energy Company (90%) - 10% still available. Endesa [Spain], Enelpower [Italy], SNC Lavalin [Canada] AES [US], EDF submitted technical bids. Contract: CESI - Enel subsidiary [Italy] (power export feasibility study).	
Arzew IWPP [Independent Water/Power plant]	300MW gas-fired power plant with 86.714 cm/d desalination plant; \$200-250m; [delayed as equity structure finalised by developer, completed 2005].	Kahrama SPA owned by Black & Veatch International Energy [South Africa] & Algerian Energy Co (jointly owned by Sonatrach and Sonelgaz) [Equity split: 20% parastatals / 80% Black & Veatch]. Contracts: IHI [Ishikawajima-Harima Heavy Industries Co] + Itochu [both Japan] (turnkey).	COFACE, Opic + Japan Bank for International Cooperation. ABN/Amro (lead arranger for debt finance). Fuji Bank [London & Japanese branch] (advisers). Export credit expected with Black & Veatch SA. Sonatrach and Sonelgaz to provide payment guarantees.
Berrouaghia	500MW gas turbines (ability to run on fuel oil) [Completed]	Sonelgaz. Contract: Siemens (planning, two gas turbines, two generators, associated electrical, instrumentation & controls systems) Siemens (operation & maintenance over 7 years)	
EI Hamma	2x220MW gas turbines + 220kV substation; \$150m; [completed 6/2002].	Sonelgaz. Contracts: Ansaldo Energia [Italy] (turnkey including turbines), Fichtner [Germany] (consultant).	\$200m project. Saudi Fund for Development [\$22m 10-yr loan], Islamic Development Bank [\$20.2m] & Arab Fund for Economic & Social Development [\$17.5m loan].
F'kirina Ain Beida Power Plant	300 MW turnkey, gas; 123m Euros [construction due to start Q4 03, completed in 2004]	Sponsor: Sonelgaz. Contract: Alstom (civil work and supply of gas turbines--two GT13E2--), generators, high-voltage substation and other equipment).	
Hadjret IPP	1,227MW gas-fired power plant [1st 600MW delayed in 2003, completed in 2009].	Sonatrach. Contract: EdF (pre-feasibility study); Sargent & Lundy [US] (feasibility study) Mubadala has a co-controlling stake (co-developer) GE Energy (turbines)	US Trade & Development agency grant for feasibility study (\$561,000).
Hassi Berkine	3x1.10MW gas turbines; \$120m; [three units completed].	Anadarko Petroleum, Sonelgaz. Contracts: GE Nuovo Pignone [Italy] (construction), ABB Adda [Italy], ABB High Voltage Technologies [Switzerland] (sub-contracted by GE).	Arranger: Société Générale; Export credit agencies: SACE, ERG (\$34m); Syndicated Finance: Natexis, Arab Banking Corporation, Bayerische Landesbank, ABB Export Bank, UBAF.
Hassi Massaoud	125MW [completed]	Sonelgaz	
Hassi R'mel hybrid power plant project	160MW (2x40MW gas and 1x80MW steam) and a 25MW solar field [tender launched 1st Sept 2004, construction started in 2007, completion due 2010]	New Energy Algeria Ltd (NEAL). Contract: Abener [Spain] interested companies were: General Electric, CME International [USA], Cobra ACS Group [Spain], Siemens, Solar Millennium [Germany], SNC Lavalin [Canada], Black & Veatch, Mitsui, Alstom, Brown & Root Condor	Equity: Successful bidder (51%), NEAL and Banque Extérieure d'Algerie (BEA) (34% European Investment Bank (15%); KfW 40-50 million Euro loan, BEA, EIB
Koudiat Draouch	2x600MW gas CC; US\$900 million [completion due 2011].	Contracts: General Electric, Iberdrola, Alstom-Orascom (construction)	
Skikda Power Plant	880MW ; \$562m, combined cycle [completed in 2006]	Skikda Power Company specially set up by Algerian Energy Company (AEC) (20%), Sonelgaz (50%), Sonatrach (30%). Contract: SNC-Lavalin [Canada] -11% of Skikda's Power Company's share - Sonelgaz and Sonatrach to reduce holding to accommodate - (EPC & O & M contract for 12 years with possible 12 year extension), General Electric and Alstom (turbines and generator for first 31.4MW).	EIB, Ex-Im Bank of USA \$192m long term loan
Terga	2x600MW combined cycle plant; [completion due 2011]	Sonelgaz. Contract: Alstom (engineering, procurement, construction and maintenance) Orascom Construction Industries (civil works & construction)	
ANGOLA			
Angola-Namibian interconnection	Linking of national grids [Phase 1: operational, phase 2: power from Namibia to Caluque due 6.02 with new substation] Phase 3: includes line form Ruacana to Cahama/Xangonogo + new substations for each town.	Empresa Nacional de Electricidade (ENE) + NamPower	
Baynes Hydroelectric scheme	450MW; \$550m; [techno-economic feasibility study and environmental impact assessment due 2010].	Namang consortium (1998 feasibility study) [Namibian/Swedish/Norwegian/Angolan consultants] and Cunene Consortium (2010 feasibility study) (Elektrobras, Furnas, Engevix and Odebrecht)	
Cambambe Hydro Rehabilitation	180MW after rehab on dam in Kwanza Norte Province.	Contract: Gamek project company, Odebrecht and Furnas [Brazil] (civil works); Technopromexport (TPE) [Russia] (technical supervision and equipment, including, hydroelectric turbines); Furnas and Angolan state	Government of Spain: pledged \$30m (2001-02)
Capanda Dam	130MW (potential rise to 520MW with two more turbines); (work started in 80's but suspended during civil war); \$1.9bn to date (total cost est. \$2.1bn) [1st phase 130MW with two turbines in operation June 04]		

Power Investors

African Power Investors

Company	Country	Project	Stake	Start up date/ purchase date
ABB Equity Ventures	Ivory Coast	Azito: 300MW thermal	33%	2000
AES	Cameroon	AES Sonel: 930MW hydro/diesel/HFO & additional 85MW to Limbe HFO plant. Distribution: 23,679km	56%	Jul-01
AES	Cameroon	AES Sonel: investment plan for rehabilitation/expansion of production, transmission and distribution system	56%	2006
AES	Nigeria	Ebute: 306MW gas-fired barge-mounted	100%	Dec-01
Agip	Nigeria	320MW increasing to 800MW	20%	Feb-05
Agip	Nigeria	Afam: 980MW	5%	Unspecified startup date
Aldwych International	Kenya	Rabai: 90MW heavy fuel		2009
Aldwych International	South Africa	Kelvin: 600MW coal previous owners: City of Johannesburg, AES, Globeleq		2007**
Aldwych International	Zambia	Copperbelt Energy Corp: owns minority stake through shareholding in Zambia Energy		2006
AMCK	DRC	Lubumbashi distribution network: Anvil & Mining Company of Katanga joint venture to construct 27 km 120kV transmission line between the mine site and Lubumbashi & 300 MVA station		2009
Artumas	Tanzania	Mtwara: 300MW gas	80%	
Aviva Corporation	Botswana	Mmamantswe: 1000MW coal	100%	
Black & Veatch	Algeria	Arzew: 300MW gas	5%	Nov-05
BTU Ventures	Tunisia	Carthage Power Company Rades II: 471MW gas	60%	2002-04** May-
Candax Energy	Tunisia	SEEB: 27MW gas combined turbines bought Centurion Oil stake in Jan-05	50%	May-03
Caterpillar Power Ventures	Tunisia	SEEB: 27MW gas combined turbines	50%	May-03

Africa Energy Yearbook 2010

Order Form

	Cost per copy (inc. £3 postage & packing)	Quantity	Total Cost
Africa Energy Yearbook 2010	£78	<input type="text"/>	<input type="text"/>
additional copies	£28	<input type="text"/>	<input type="text"/>

Full Name: _____

Position: _____

Company/Organization: _____

Address: _____

Tel: _____

Fax: _____

Email: _____

Signature: _____ Date: _____

Please debit my credit card: Visa/Master/Euro Diners

Credit Card No. _____

The card is in the name of: _____

Security No. (Usually on the signature strip) _____

Date of issue _____

Expiry Date: _____

Credit card billing address: _____

Payment by Bank Transfer (attach copy or supply full details of transfer). Payment should be made through the **Royal Bank of Scotland plc**,

(1) Account Holder: **EnergyNet Ltd**

(2) Account number: **00281973**

(3) Sort code: **16-0109**

(4) Swift(BIC) code: **RBOS GB 2L**

(5) IBAN: **GB 22 RBOS 1601 0900 2819 73**

(6) Noting: name, company, and Africa Energy Yearbook.

All transfer costs to be paid by sender

Payment by **Cheque** drawn on a **UK Bank**, payable to **EnergyNet Ltd**.

Please return your completed form to:

Evelyne Cargill • EnergyNet Limited • 110 Elm Road • Kingston upon Thames • Surrey KT2 6HU • United Kingdom • Tel +44 (0)20-85 47 06 98 • Fax +44 (0)20-85 41 32 44 • evelyne@energynet.co.uk • www.energynet.co.uk

Your contact details may on occasion be made available to carefully selected third parties for marketing purposes. If you do not wish your details to be passed to a third party, please tick here.