



Energize the Poor

Business opportunities
for *Nordic companies*

INTRODUCTION

The need

Globally, 1.6 billion people do not have access to electricity. For billions more, electricity is often scarce, unreliable, and disproportionately expensive. These people live at the base of the global economic pyramid or in short - at the BOP. This term refers to the four billion people that live for less than USD 3,000 a year in developing countries across the world.

For people living at the BOP, energy is not just about cooking dinner. Combined with productive appliances for households, schools, hospitals, agriculture, and enterprises, access to energy can help reduce poverty and scale the development impact. Companies that offer innovative and green energy solutions and appliances can contribute to this process and reach new markets at the same time.

Opportunities for Nordic companies

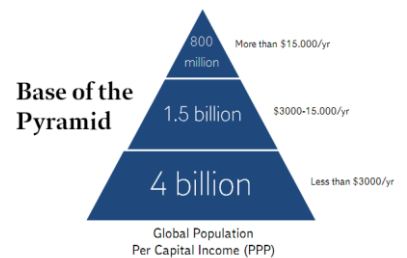
Nordic companies offer a unique array of sustainable energy products and relevant appliances for example related to water, cooling, and agribusiness. If these products are adapted appropriately, Nordic companies have the potential to enter the estimated USD 433 billion BOP energy market. The BOP energy market is characterized by aggregate volume rather than individual purchasing power, and stimulated by a significant increase in investments from local governments and international institutions.

The Danish BOP Learning Lab

The Danish BOP Learning Lab supports companies that wish to investigate the market possibilities at the base of the pyramid and develop products and business models targeted at low-income consumers. Energy is an important focus sector for the Lab, due to the strong link between needs and Nordic competencies. The purpose of this paper is to present a brief overview of the needs, the market, and the business opportunities – Encouraging Nordic companies to seize the opportunity and put their technologies to use in BOP markets.

"The BOP-energy market is complex and challenging, but with the right knowledge and willingness to innovate there are significant opportunities waiting to be explored to the benefit of companies as well as end-users."

Hans Skov Christensen, Director General and CEO, Confederation of Danish Industry



The BOP Learning Lab is hosted by Confederation of Danish Industry in partnership with DANIDA – the Danish Development Agency. The Learning Lab is part of a global network of BOP-Learning Labs.

ENERGY CHALLENGES AT THE BOP

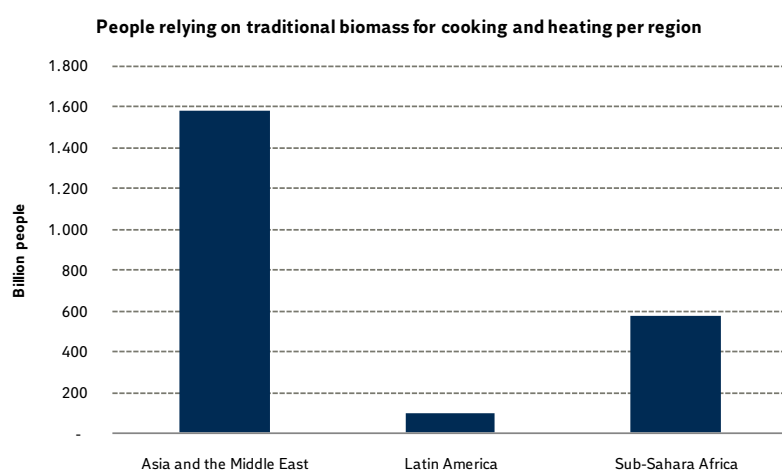
Access to energy

From the highlands of South America, across the deserts in Africa, to the pulsing megacities of Asia - the conditions people live under at the BOP vary tremendously. However, what a large share of these people have in common is electricity that is either unreliable and expensive or not available at all.

In total, only 36 percent of the BOP segment has access to electricity. At the one end of the spectrum, people living at the BOP in Eastern Europe have almost 100 percent access to electricity, while in many African countries it is less than 30 percent.¹ Urban areas in Latin America and Asia have very good coverage rates, but often problems with efficiency and reliability. Rural coverage is generally lower, but varies a lot between countries.

Use of energy

Despite large geographical and cultural variations, energy production and usage at the BOP has certain common characteristics around the world. Many people living at the BOP rely on firewood and charcoal for their daily cooking, especially in Asia and Sub-Saharan Africa. They use different types of simple and often inefficient stoves and cooking devices, and spend much time collecting firewood. Cooking is therefore often a time-consuming task that leaves little time for income generating activities.



Indoor pollution and related health issues are major problems related to this type of cooking. In addition the local environment is often deteriorated, which causes environmental and climate problems as well as depletion of resources that are often essential for generating an income.

¹ World Resources Institut (WRI)

Beside energy for cooking and water heating, light during the dark hours is usually the only other energy-consuming activity in many BOP households. If kerosene is locally available, this is frequently used in homemade inefficient lanterns. Kerosene and other petroleum products are sometimes used for cooking and lighting in electrified areas, as a result of unreliable and expensive connections. Small businesses often use diesel generators for energy purposes if they can afford it.

The link between energy and development

Access to electricity can mean the difference between being able to study after dark, storing medicine, generating an income - or not having these possibilities. In other words, access to energy is often a prerequisite for creating development impact in other areas. Access to water and electricity is for example usually closely linked. Water for drinking, bathing and cooking often has to be transported over land because electricity is not available for drilling wells and pumping water.

"Electricity for lighting can increase quality of life, and for example help children study at night - which is fine. But if we really want to reduce poverty we also have to provide better access to energy for generating new income through production. In rural areas this usually means increasing agricultural productivity, for example through irrigation, processing and preservation of products to reduce post-harvest losses."

Gordon A. Mackenzie, Senior Energy Planner, UNEP Riso

Food security and access to energy is another area of great importance from a development perspective. A large share of the BOP population lives as subsistence farmers or small-scale farmers. Access to energy enables farmers to increase yields, process their crops locally, and store their crops for a longer time.



MEET THE BOP

Mr. Mohammed, Mr. Gonzales and Mr. Gunjan each represents a large segment of energy consumers living at the BOP.

Rural areas - Mr. Mohammed, Tanzania

Mr. Mohammed lives in the rural village Bunduki in Tanzania. He is a self-sufficient farmer with a small side job guarding a near-by mobile antenna. His wife and children also work at the family's two acres of land located half an hour walk from the village. Food is prepared in an outside three-stone stove using gathered or bought firewood from the surrounding forest as fuel. During the dark hours the family uses kerosene for lighting, or candles depending on the household budget. Mr. Mohammed owns a mobile-phone which is charged at a local shop where he also buys charcoal and kerosene.

Rural towns - Mr. Gonzales, Guatemala

Mr. Gonzales lives in a mid-sized rural town in Guatemala. As many other similar towns, his town is not grid-connected and therefore relies on expensive and inefficient diesel-generators. Mr. Gonzales sells corn from his relatives' farm outside the town. The corn is grilled on an inefficient stove and sold at the town market. A relatively large share of his income is spent on energy purposes. Mr. Gonzales would like to start a grinding business, but is unable to pay upfront for the generator he needs and no cheap alternative energy technology is locally available or payable.

Urban slum - Mr. Gunjan, India

Mr. Gunjan lives in a suburb to Bangalore where he shares a shed with two friends. The three of them are rickshaw drivers. The shed is connected to an unstable and unsafe electrical grid. The connection is controlled by illegal intermediaries, from whom Mr. Gunjan buys a small amount of expensive electricity every month for lighting, mobile charging etc. Almost all of Mr. Gunjan's income is used for the most basic needs such as food and energy. Mr. Gunjan uses an inefficient charcoal stove to prepare his food and must often rely on candles due to power cuts.



THE ENERGY MARKET

The BOP market

Traditionally, poor areas have not been regarded as potential markets for Nordic and international companies. A number of companies are however redefining their understanding of this vast group of people. People living at the BOP are seen as consumers, producers, and entrepreneurs in their own right. What they may lack in individual buying power, they make up in sheer volume as a group.

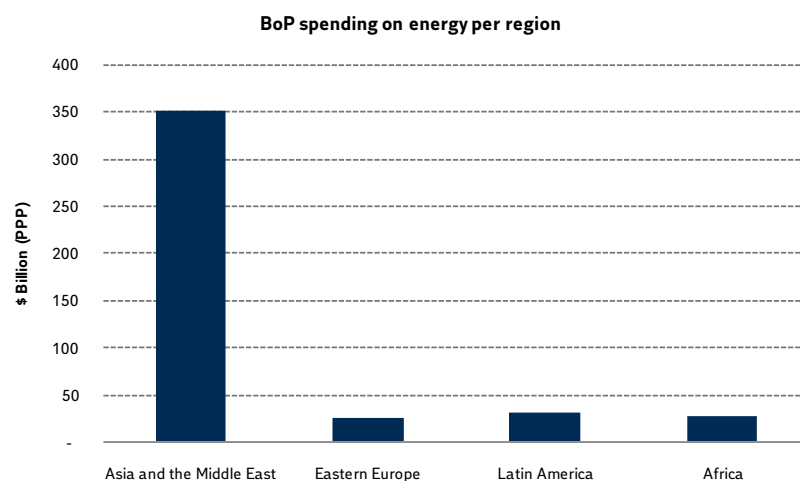
The BOP energy market is however complex and in some places needs to be built from scratch. Therefore, patience and willingness to innovate are important prerequisites for success. If energy solutions and business models are designed to meet the special requirements of these markets, the potential is significant.

“I think developing markets is the right place to look for Danish and Nordic companies in the energy field. We have the technologies. We just have to figure out how to coordinate and implement them in the local environments.”

Lasse Rosendahl, Professor Aalborg University

Current market size

The total BOP energy market is estimated at around USD 433 billion world-wide, with large regional variations. A typical person at the BOP spends on average around seven percent of his total household budget on energy. In Asia and the Middle East, the average annual spending on energy per BOP habitant is USD 123, in Eastern Europe it is USD 100, in Latin America USD 85, and in Africa USD 55.² Besides money spent directly on energy by end-users, the market is made up by substantial public investments and funding from international donors.



² World Resources Institute (WRI)



Framework is improving

Although there are still serious challenges, the regulatory and political conditions for engaging in energy projects in developing countries are improving in a number of countries. Across the world there is a growing recognition that better access to energy is of paramount importance for creating growth and development. Private actors are increasingly encouraged to help ensure this objective.

Future scenarios

In some countries attention is on expanding the existing electrical grids and slowly improving their efficiency, while other countries have given up on the idea of comprehensive grids and instead focus on developing independent grids to serve especially rural areas. There are however areas where rural electrification is not realistic in the foreseeable future. Here, improved cooking stoves and alternative energy sources will be relevant products for many years.

‘The green leap’

BOP markets often feel very far away from Nordic companies’ home markets. However, there can be an unexpected link between the markets. Some experts argue that future renewable solutions for the developed world may very well be born as a result of off grid experimentation in developing countries.³ In matured markets, new energy solutions need to fit into the well-defined structures already in place, which give little room for radical innovation. In BOP markets companies are instead forced to experiment, learn and think differently which can lead to unexpected inventions and new ideas that can be brought home. This means that engaging in BOP ventures could be an important innovation driver.

³ See for example *Stuart Hart* Converging on Green, BizEd July/August 2009

DANISH AND NORDIC STRONGHOLDS

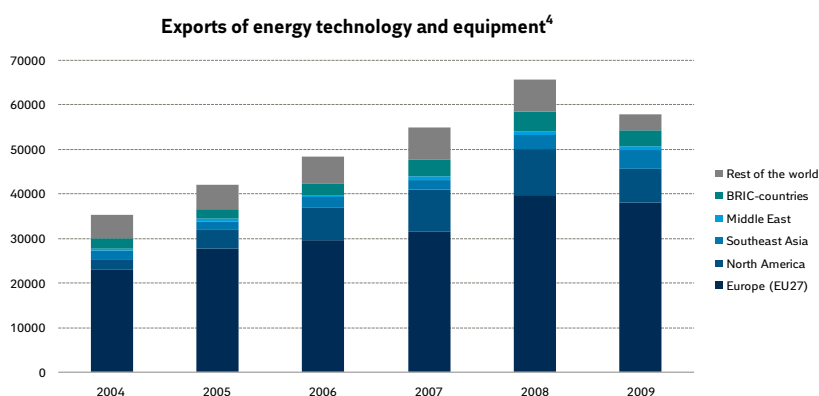
Focus on renewable energy

Renewable energy and energy efficiency has traditionally been of high importance for both the public and private sectors in Denmark. This focus has resulted in a range of premium clean-tech energy solutions.

“Danish companies can compete with the best on renewable energy solutions. Beside wind-technology as the most well-know Danish technological stronghold we also have very strong competencies within biomass technology, biogas, energy efficiency, decentralized energy systems, waste utilization, low energy water supply, bridging technologies, and climate adaptation.”

Anders Stouge, Director, Danish Energy Industries Federation

Unfortunately, the majority of these products and initiatives are only focused on sustainable technologies for developed markets. Little attention is being paid to commercialization strategies or distribution models targeting low-income markets. In a time where many companies' normal home-markets are weighed down by the financial crisis, the BOP market represents a new opportunity.



An opportunity for Nordic partnerships

Denmark's neighboring countries in Scandinavia have developed important technologies and products that can supplement Danish competencies. Examples include hydro technologies, efficient use of wood material, and decentralized isolated energy systems due to dispersed populations. By joining forces Nordic countries can deliver a full range of energy solutions.

⁴ Danish Energy Industries Federation



The need for integrated solutions

Electricity is never a means in itself. Electrification only becomes valuable if linked with good appliances that are demanded by the end-users. It therefore often makes sense to create integrated business models that link energy with relevant usages. Nordic competences can also have a role to play here. Mobile technology, water systems, agri-business input, improved cooking stoves, and cooling systems are just a few examples of appliances that are relevant to link with energy systems. Often collaboration between different types of energy providers and complementary appliance providers can create innovative business models that bring down costs and enhance the value for the end-user.

The right mindset

Besides technological capabilities, Nordic companies have another advantage. Many of them prioritize sustainability and are increasingly linking these efforts to their core business. Awareness about community impact and willingness to engage often makes companies better at understanding the BOP markets and creating successful business models. In addition, these companies experience that while financial return on investment might take time, successful BOP projects have reputational benefits that can be leveraged on the short run.

EXAMPLES OF BUSINESS OPPORTUNITIES

The energy market offers different business opportunities that are relevant for Nordic companies. Examples include:

Improved cooking stoves and biofuel

Development and distribution of more efficient stoves and bio-fuels has a significant potential. The cooking device must be cheap but of good quality, easy to operate and repair, and be culturally acceptable. Development of more efficient bio-fuels for cooking is also an opportunity. Residues from local agro-business and manure are often an untapped resource that can be used for the purpose, reducing the immense deforestation rate caused by the use of firewood.

Household systems for light and other purposes

Developing tailored household systems that meet BOP needs is another market opportunity. Besides providing light after dark for studying or business purposes, a household system could also address other low-voltage needs, for example radio, mobile charging, and other appliances.

“A successful example is the Solar Energy Foundation (SEF) initiative in Ethiopia. The initiative includes the sale of two different sized systems, 50 franchised solar centres providing technicians for installation and service, a microfinance services, and collaboration with good local institutions and local communities. The target group included schools, water pumping utilities and households.”

Cases from [Access to Energy for the Base of the Pyramid: Hystra, 2009](#)

Stand-alone grid with integrated energy sources

In villages or small towns in rural areas, grid extensions and connections are often too expensive and too big a task to undertake by the authorities and local companies. Consequently, those who can afford it use inefficient diesel generators. A suitable alternative could be a small independent grid with multiple energy sources, e.g. hydro, wind, and biomass generators using bridging technologies.



Grid extension or grid-connections in urban areas

Urban areas are often partially grid-connected – with the lowest connection rate in slum and suburban areas. In slum areas, users often pay a large premium to use illegal and hazardous transmissions. There is a need for safe, reliable, and inexpensive energy through efficient grid-extensions and grid connections. Electrical appliances targeting low-income urban consumers are also in demand.

Restructuring of grid connections in urban areas

Experience shows that improving an existing energy distribution model can have a great impact on the inhabitants' energy situation by increasing stability, legality, and the numbers of connected users. Intelligent metering systems and optimization of existing grid connections are therefore also business opportunities.

An example is the CONLOG pre-pay metering project in Sudan. The project encompassed the installation of over one million prepayment meters in Khartoum to illegal and legal existing customers, as well as new customers. It benefitted both the electrical consumers who now have regular, safe, and reliable electrical service, and the utility company eliminated its debt of USD 70 million from previous unpaid bills.

Cases from Access to Energy for the Base of the Pyramid: Hystra, 2009



HOW DO WE GET STARTED?

Developing successful business models

There is much to learn in order to stand on the shoulders of the best and avoid the most common pitfalls. Developing and implementing energy solutions in BOP markets involves a number of challenges, but if the right models are developed, the scale and impact can be huge. The Danish BOP Learning Lab disseminates best practice and encourages companies and other stakeholders to cooperate and build innovative business models. The following briefly summarizes a few important points to consider when doing business in BOP markets. If you want to know more, please contact us to learn how your company can investigate the business potential and get started.

Leadership commitment

BOP projects often take time to develop fully. Therefore top-level commitment and internal understanding of the dynamics of BOP business ventures is often crucial for success.

“At Grundfos, we are in a quite privileged position, because we have strong internal support. We have been willing to invest time and money – and learn a lot along the way. It is these hard-earned experiences that are crucial for the result we can deliver today - delivering sustainable and transparent solar powered automatic water systems to low-income consumers. “

Peter Todbjerg Hansen – Managing Director , Grundfos LIFELINK

Applied R&D – get out there

To increase the chance of success, sterile labs needs to be combined with input from the end-users ensuring that local knowledge, practice, and preferences are taken into account. Keywords are affordability, simplicity, design, and durability.

“The energy solutions need to be perceived as modern and smart by the users – also in the least developed areas. This means that companies need to remember design and quality – if they want their products to be accepted and bought.

To be successful, companies need to convince the men, but design for the women who will be using the product.”

Rolf Hernø, Programme Coordinator, Care Danmark

Integrated solutions

To develop effective energy solutions that create maximum value for the end-users, companies often benefit from entering into innovative business partnerships to pool resources and technologies, and bring down the costs of the business model.

Multi-stakeholder partnerships

BOP-business models are not business as usual. Product development, production, distribution, sales, and services need to be adapted to the special needs of low-income consumers. Often multi-stakeholder partnerships across sectors are key to leveraging the necessary networks and competences.

Think big, start small

Scalability is crucial for creating a viable business model in BOP markets. However, finding the right model to scale may take a few tries and require a willingness to adapt and learn along the way.

Co-financing possibilities

BOP projects have the potential to create a substantial development impact. To encourage and support the development of sustainable business models, there are different financing schemes that can help companies get started and reduce financial risks. An example is DANIDA's Innovative Partnerships for Development, which is a grant scheme for Danish companies that engage in BOP projects.

"Rural women often spend more than two hours a day collecting wood. However, what we see as wasted time might have an important social function. It is always important to think about the opportunity costs when designing for the BOP."

Gordon A. Mackenzie, Senior Energy Planner, UNEP Risø



ABOUT THE BOP LEARNING LAB

The BOP Learning Lab

DIBD hosts the Danish BOP Learning Lab in partnership with DANIDA, the Danish Development Agency. The Learning Lab was founded in 2007 and is part of a global network where companies and other stakeholders working in BOP markets can exchange ideas and experiences.

The Learning Lab organizes workshops, projects, study trips, and other activities focusing on the development and implementation of BOP Strategies.

Examples of previous target areas are:

- ⊖ BOP innovation processes
- ⊖ Market studies at the BOP
- ⊖ BOP financing
- ⊖ The BOP food market
- ⊖ The BOP in South Africa
- ⊖ The BOP in Egypt

To learn more about the BOP Learning Lab please visit:

boplearninglab.dk



Confederation of Danish Industry (DI)

Confederation of Danish Industry is a business membership organisation. Currently 10.000 companies have chosen to join forces within DI. The companies work within manufacturing and services covering a range of sub-sectors.
di.dk

DI International Business Development (DIBD)

DI International Business Development is a part of DI. DIBD assists members that seek international growth by developing their businesses in challenging markets in Asia, Eastern Europe, USA, Africa, and Latin America. DIBD has experience assisting Danish companies on the BOP markets.

dibd.dk · boplearninglab.dk

Danish Energy Industries Federation

Danish Energy Industries Federation is a part of DI and organizes companies that work with extraction, production and distribution of energy resources and development of technologies and services. The scope of the Federation of Danish Energy Industries is to obtain the best possible growth and development conditions for its members on national and international markets.
energi.di.dk

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