A Summary of Technology-enabled Finance for Solar Systems in the Sahel: Burkina Faso

Key Question
How does financing for energy improve access to solar lamps, solar systems and solar systems in rural Burkina Faso and refugee camps?


Consumer finance models
Consumer finance is necessary to allow poorer consumers to purchase solar energy products. The main consumer financing models and payment methods are listed below with a brief description of how each works.

**Micro-finance**
The consumer is granted a micro-credit which they pay-back in instalments. The finance might be provided via a microfinance institution (MFI) directly, or through a partnership between a MFI and an energy supplier. Micro-credit may also be used by distributors and ‘last mile’ retailers to purchase stock and cover transport costs to supply remote markets.

**Prepay**
Energy suppliers sell the energy that an appliance has generated (e.g. entrepreneurs buy solar-powered charging stations and offer charging to consumers to charge phones and tablets). Prepay models include ‘Fee-For-Service’ (FFS), Pay-As-You-Go (PAYG) and leasing. Each of these models is discussed below.

**Fee-For-Service (FFS)**
The consumer makes an initial upfront payment and covers installation costs. The consumer subsequently makes regular payments to ‘unlock’ an energy device and access the energy it generates. Unlocking may be controlled by the supplier (if device is connected to a mobile network or Internet or through access codes via scratchcards, SMS or an app.

**Pay-As-You-Go (PAYG)**
This is a rent-to-own model where a consumer makes regular payments to unlock energy for fixed periods. However, here, the appliance is unlocked permanently when the user has paid-off the value of the appliance.
**Consumer finance payment methods**

### Mobile payments

**SMS payment**
Customer issues payment instruction via an SMS or USSD message to a short code. Under this method, a premium charge is deducted from the customer’s credit or applied to their bill, mobile wallet or account. The mobile network instructs the merchant that payment has been made and the merchant then releases access to the energy device.

**Remote unlocking**
An unlocking instruction is sent directly to an energy device over the mobile network on receipt of payment. Such solutions require devices to be connected to the mobile network and mobile signal is subsequently key to the viability of the solution.

### Non-mobile payment

**Scratch card payment**
Scratch cards offer an alternative method of controlling access to energy appliances. A consumer purchases a scratch card and enters the code on the card into a keypad on the energy appliance to unlock it.

**Internet connected app**
A solar energy device is unlocked via connection to a device/software which itself connects to the Internet.

**Scratch cards and ‘Internet-connected’ solutions** for where remote device locking is non-viable, for example, because of weak or absent mobile signal. These payment methods are likely to incur lower set-up costs because they involve infrastructure that manufacturers have already developed and do not require sophisticated mobile payment solutions.

### Goudoubo

Goudoubo is located 15km north of Dori and accommodates more than 10,000 people. Dori has a population of 140,000 (2015 estimate). Demand for solar energy ranges from lighting to phone charging, cooling and processing of food, irrigation, and dairy. Solar energy suppliers, finance and Government are already in dialogue and there is an opportunity to further integrate solar energy with telecommunications providers and technology firms especially for the Sahel.
Summary of demand-side financing and their application to solar systems

Consumer financing models and payment methods are applicable to a variety of energy products. Some opportunities are shown below:

<table>
<thead>
<tr>
<th>Financing type</th>
<th>Solar Lamps</th>
<th>Solar Systems</th>
<th>Mini-grids</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFS</td>
<td>N/A</td>
<td>Consumer rents equipment; provides consumer access to electricity as a service</td>
<td>Consumer pays a fee to access electricity as a service (fee could be for a fixed period, i.e. per week/month, or based on metered usage)</td>
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<tr>
<td>PAYG</td>
<td>Consumer pays-off equipment cost with PAYG payments, accessing electricity as a service until cost is covered, when they gain ownership of equipment</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Leasing</td>
<td>N/A</td>
<td>Consumer rents equipment; provides consumer access to electricity as a service</td>
<td>An organisation (collectives, co-ops, NGO) leases equipment</td>
</tr>
</tbody>
</table>
| Microfinance  | • Consumer uses micro-loan to purchase equipment  
                • Supply-side actors such as distributors and ‘last mile’ retailers may use micro-finance to acquire stock and serve more remote rural markets | N/A |

Consumer financing players

The table below describes players within the solar energy market. The names of players in Burkina Faso will be found in the more detailed report.

Overview of solar energy prepay/micro-finance market system

<table>
<thead>
<tr>
<th>Players</th>
<th>Assets &amp; capabilities</th>
<th>Roles</th>
<th>Limitations and constraints</th>
</tr>
</thead>
</table>
| Donors        | • Financial resources  
                • Technical knowledge | • Finance for public/direct subsidies | • Limited local knowledge  
                • Potential to distort market |
| National government | • Regulatory powers (authority to prohibit, dis-incentivise and promote market behaviour) | • Implement and enforce quality standards  
                • Streamline regulatory rules and procedures in mobile  
                • Convene industry and civil society actors | • Resources  
                • Organisation (structure of state may inhibit development of particular interests and as a consequence, policies)  
                • Technical knowledge  
                • Technical capacity |
| Local government | • Knowledge of local communities | • Awareness raising at local level | • Resources |
| Mobile networks and payment service providers | • Mobile infrastructure  
• Strong brand  
• Customer trust  
• Customer service structures | • Offer payment services | • Regulatory limitations on providing financial services |
|---------------------------------------------|--------------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| Microfinance institutions (MFIs)           | • National network of branches  
• Interface with rural/poor communities | • Provide microloans | • Resources to work with clients on lowest incomes  
• Limited knowledge of SETs |
| Financial sector institutions               | • Capital, knowledge and instruments for financing | • Provide adapted finance in supply chain | • Knowledge of business opportunities  
• Market information |
| Business associations                        | • Private sector representation and influence  
• Source of industry information  
• Influence in private sector | • Promote awareness and uptake of sector initiatives  
• Facilitate communication with SMEs | • Limited capacity to influence industry norms |
| Manufacturers/importers                     | • Provision of products and technology | • Supply products and services | • Narrow interests  
• Technical knowledge |
| Local manufacturers                         | • Production/distribution of products | • Train after-sales personnel for installation, maintenance and repair | • Resources/incentives may limit participation where significant investment is required |
| Universities                                | • Technical knowledge  
• Skilled student population | • Provide technical training  
• Prompt students to engage in solar markets (start own businesses, seek employment, deploy skills, social activism) | • Technical knowledge  
• Resources (funding, facilities, teaching staff) |
| Local cooperatives & community groups       | • Embedded in rural communities  
• Rural communities’ and farmers’ trust | • Offer ‘last mile’ credit services  
• Interface between MFIs and rural communities | • Logistics |
| Community radio stations                    | • Rural communities outreach | • Rural marketing and awareness campaigns | • Logistics |
| NGOs                                        | • Knowledge, including of needs of local refugee/rural populations | • Promote awareness, quality considerations, and care and maintenance and revenue generating applications | • Resources  
• Potential to distort market  
• Ethics |
| Local retailers                             | • Ability to provide ‘last-mile’ distribution | • Provide ‘last-mile’ distribution | • Low individual power (need aggregate retailers’ interests) |
Which consumer financing models and payment methods are best suited to Goudoubo refugee camp?

### Market assessment findings

#### Sector trend
Investing in energy access will grow the sector – especially by leveraging mobile technology. Current spending on lighting by rural Burkinabés averaged FCFA 2,300 (£3) per month in 2013 and mobile users is 39.6% of the (urban) population. By enabling home-based mobile charging, improving access to lighting products and increasing opportunities to generate income, energy users could be spending much more – estimated at FCFA 3,700 (£5) per month.

#### Energy users
Total = Dori 138,218 people over 78 villages (2015 estimate) + Goudoubo refugee camp of 10,000 people + enterprises + livestock, dairy and hospitality industry + public services (schools, hospitals)

#### Finance option
Microfinance less suitable for refugees because of relatively high interest rates and the need for guarantees further complicated by issues surrounding legal status, and access to documentation. The Caisse Populaire however has lower cost finance products adapted to refugees and local women’s groups and cooperatives

#### Payment method
Refugees would be able and willing to spend US$3 to US$3.6 per month on solar energy product/service through FFS and PAYG scheme, incl. paying a one-off fee of US$10

#### Cost-effectiveness
FFS and PAYG models using non-mobile payment methods represents the lowest cost solar energy finance option to implement within Dori and Goudoubo

#### Mobile networks
Mobile network coverage in Goudoubo, Telmob networks offer a strong signal in Goudoubo, providing access to the Orange Money and Mobicash payment services

#### Technology level
Non-mobile payment methods inc. card printing and/or agent fees and billing/CRM systems are likely to require less sophisticated technology and suitable within Dori and Goudoubo. Relative simplicity of non-mobile methods mean they are quicker and less complicated to set-up than mobile equivalent

#### Subsidy
FFS/PAYG schemes might be facilitated through public subsidy to lower the initial fee

#### Future
Mobile payment methods will be viable in the near future – services already offered by Orange Money and by Telmob/Mobicash
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<th>Financing type</th>
<th>Payment method</th>
<th>Energy Access in Goudoubo and Dori</th>
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<th>Cons</th>
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<td>Non-mobile</td>
<td>• Allows pre-existing billing/CRM</td>
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<td>Relatively high interest rates (between 7.5% and 15% per annum)&lt;br&gt;• Low leverage over consumer; higher risk for provider than PAYG and less suitable for refugee populations</td>
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A full report is available
‘A Summary of Technology-enabled Finance for Solar Systems in the Sahel: Burkina Faso’ by Ivor Jones. Ivor is an expert in information and communications technologies (ICTs), markets and policy and holds a PhD in Development Studies from the London School of Economics and has extensive knowledge of fintech, renewable energy financing and digital technology.

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