Rural electrification in Benin by grid extension

I: Presentation of project
II: Socio-economic impacts

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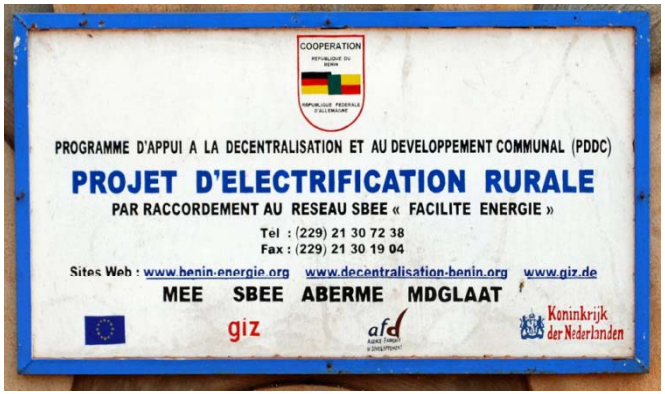
I: Presentation of project

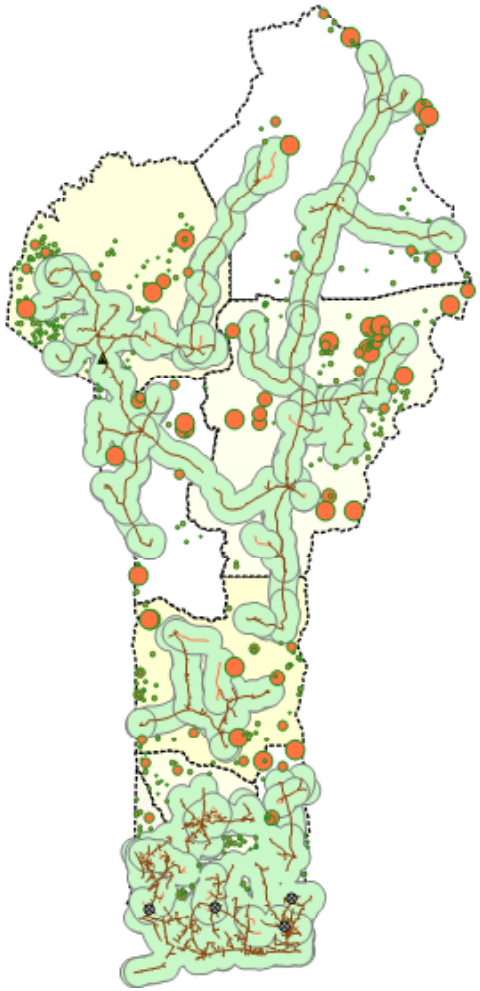


Challenges regarding rural electrif. in Benin (1)

- Main production of electrical energy by neighbor countries and strong dependence upon petrol products
- Limited financial resources for required investments
- Supply and demand
  - Strong annual increase of energy demand;
  - Frequent blackouts (30 days/year)
  - Severe loss of electrical energy as a result of informal connections (up to 60%)
- Unsufficient technical service on all levels
  (organization, equipment, competences)
- Low access-rates
  Urban population (30%): 54% / Rural Pop. (70%): 3,5%
- Migration of (young) rural population to urban areas

Challenges regarding rural electrif. in Benin (2)

Localization of demand by spatial analysis (GeoSim / IED)



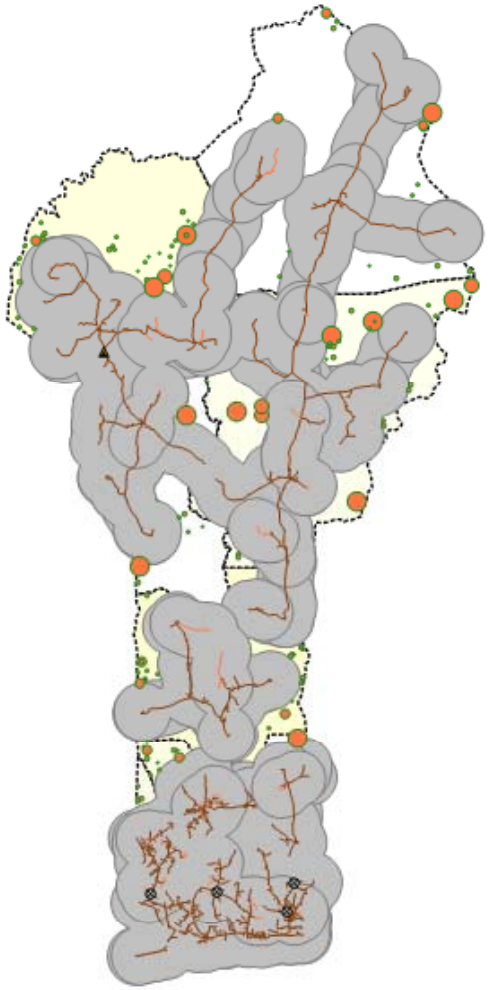
3,758 communities in Benin (2009),
2,384 (= 63%) are not electrified

1,979 non electrified villages within <10 km of MT

⇒Potential for electrification with low investment

Challenges regarding rural electrif. in Benin (3)

Localisation of demand by spatial analysis (GeoSim / IED)

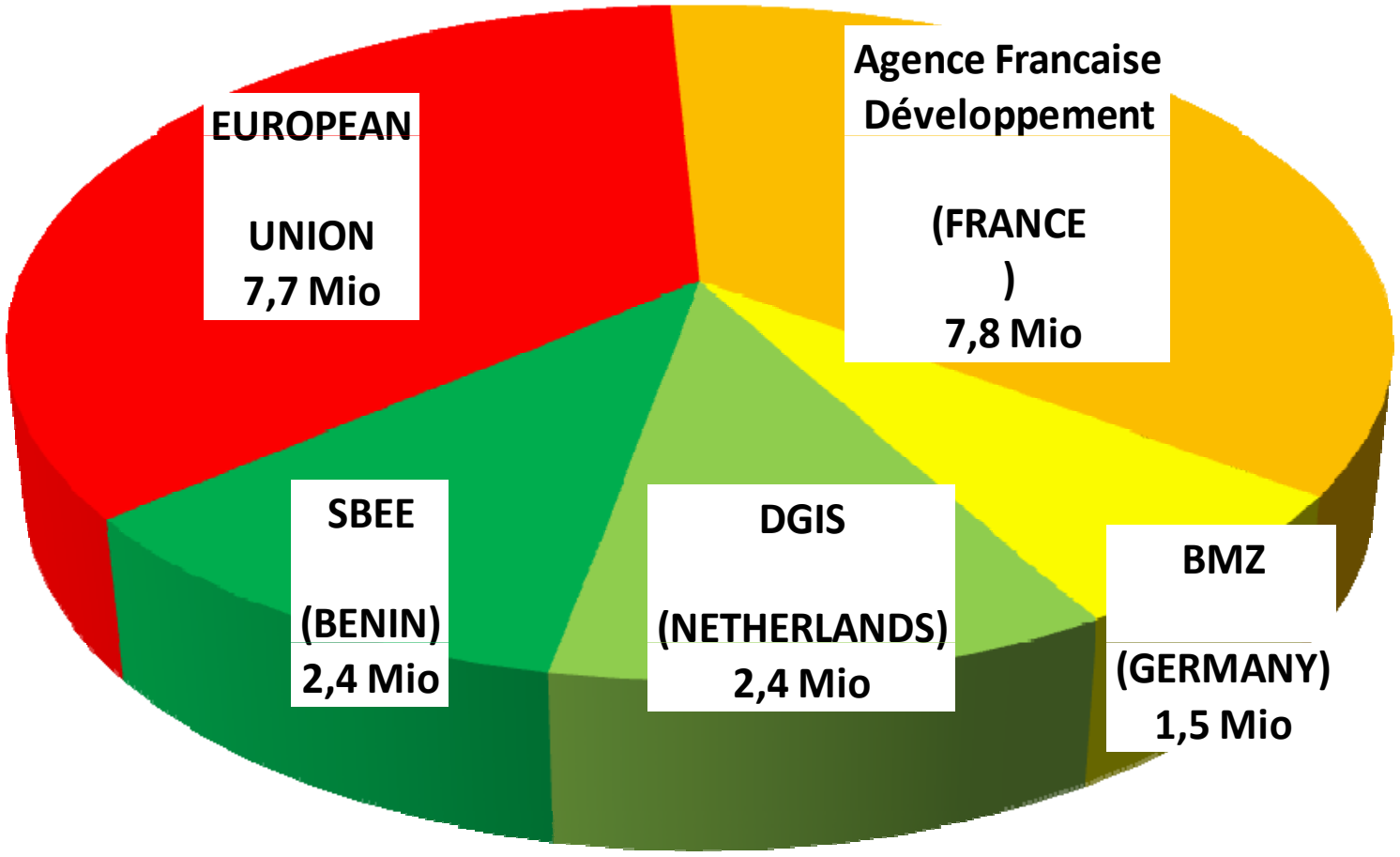


3,758 villages in Benin (2009),
2,384 (= 63%) are not electrified

125 non electrified villages at >20 km from existing grid

=> Potential for renewable energy

Project budget: 21,8 Mio €



Summary of rural electrification project (1)

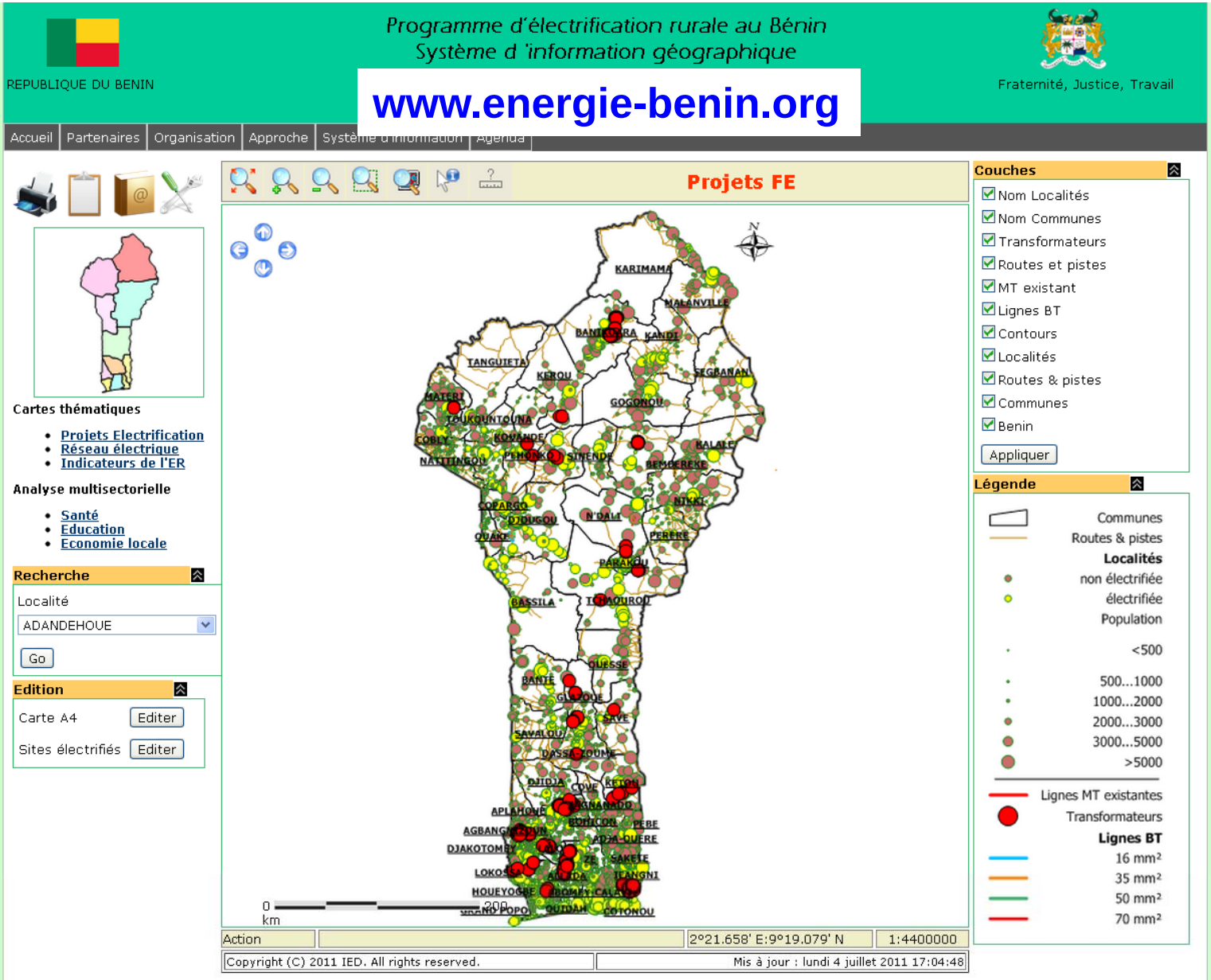
- Overall Objectives
  - Improve living conditions of rural population by implementation of national policy regarding rural electrification
  - Improve economic, social and environmental sustainability of the sector
- Specific Objectives
  - Increase sustainable access of rural village population to electrical energy (105 villages) including economic sector and social institutions
  - Strengthen organisational structures and specific competences of SBEE and ABERME

Summary of rural electrification project (2)

- Partners
  - Société Béninoise d'Energie Electrique (SBEE)
  - Agence Béninoise d'Electrification rural et de Maitrise d'Energie (ABERME)
  - Association Nationale des Communes du Bénin (ANCB)
- Target group
  - Approx. 220.000 people until 2017 (primary connections)
  - Social institutions (schools, health care centres), local business and handicraft business
- Timeframe: 01/2009 – 06/2013

Summary of rural electrification project (3)

- The grid extension
  - Number of villages: 105
  - Medium Voltage (15/20/33 kV): 320 km
  - Low Voltage (230/400 V): 500 km
  - Transformers: 185
  - Electric meters: 16.000
  - Public street lightning: 2.500
  - Power poles (concrete): 5,250
  - Power poles (wood): 8,600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Programme d'électrification rurale au Bénin
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ADANDEHOUE
Go
Edition
Carte A4
Editer
Sites électrifiés
Editer
Couches
Nom Localités
Nom Communes
Transformateurs
Routes et pistes
MT existant
Lignes BT
Contours
Localités
Routes & pistes
Communes
Benin
Appliquer
Légende
Communes
Routes & pistes
Localités
non électrifiée
électrifiée
Population
<500
500...1000
1000...2000
2000...3000
3000...5000
>5000
Lignes MT existantes
Transformateurs
Lignes BT
16 mm²
35 mm²
50 mm²
70 mm²
KARIMAMA
MALANVILLE
BANIKOARA
KANDI
TANGUIETA
KEROU
SEGBANAN
MATERI
GOGONOU
TOUKOUNTOUNA
KOUANDE
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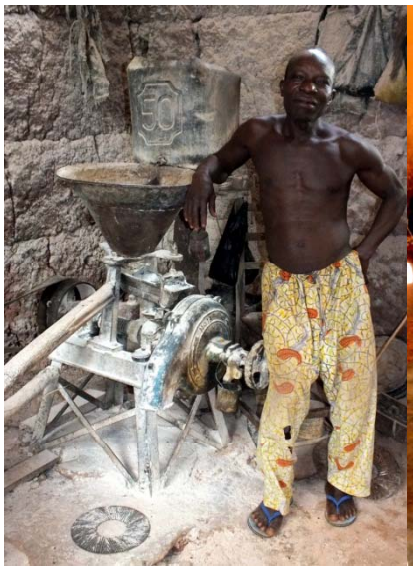
Key results

- Significant increase of access to electrical energy
  - Introduction of more efficient planning methods (105 villages au lieu de 59)
  - Improved living conditions of rural population / social-economic conditions for social institutions, local craftsmen and traders
- Introduction of efficient technical planning tools, leading to a significant reduction of investment costs (optimisation of electrical and mechanic design of grid)
- Introduction of new standards in construction of power lines (Choice of materials; construction standards)
- Improved planning competences of local partners
- Detailed expertise on potential of renewable energy

II Socio-economic impacts




Non-electrified households

- Size of households:
  12 people with 7 children between 0-18 years
- Type of housing:

Traditional houses

Modern buildings

Lighting (1)

- 100% households use petrol lanterns
- Around 5 lanterns per household
- Burning 11h (19:00 – 06:00) each night
- 8 l petrol consumed per month
- Costs: 4.000F CFA /month (= 6,20 €)

Light sources (2)

- LED-lantern, type « Yayi Boni » with 3 ou 4 mono-cells (from chinese production)
- 4 lanterns per household
- 4 h per night
- 32 piles/ month*household
- 3,200 F CFA /month*household (4,90 €)

Other costs for electrical and other equipment

- Mobiles: charged 12 times /month: 1,800 F CFA (2,80 €)
- Radio: 12-16 piles/month:1,200/1.600 F CFA (1,8/2,5 €)
- Electrical generators (e.g. local festivities, weddings, initiations, political events)
- Diesel driven engines for generation of electrical energy (par ex. for electrical welding, bars, woodcraft)

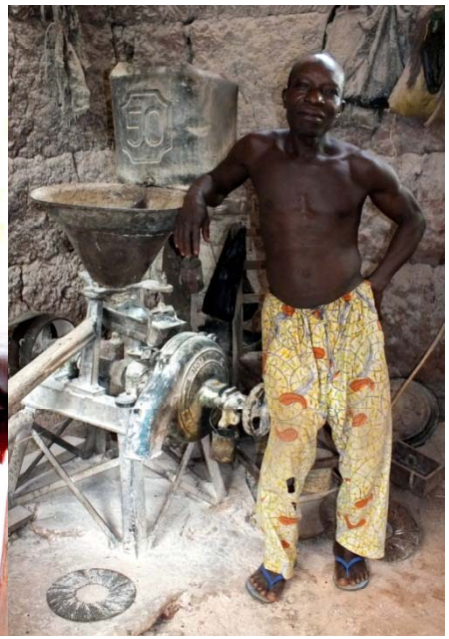
- Corn-mills (run on diesel)
- Air-compressors (for inflating tires)

Economic infrastructure in non electrified villages:

Carpenter

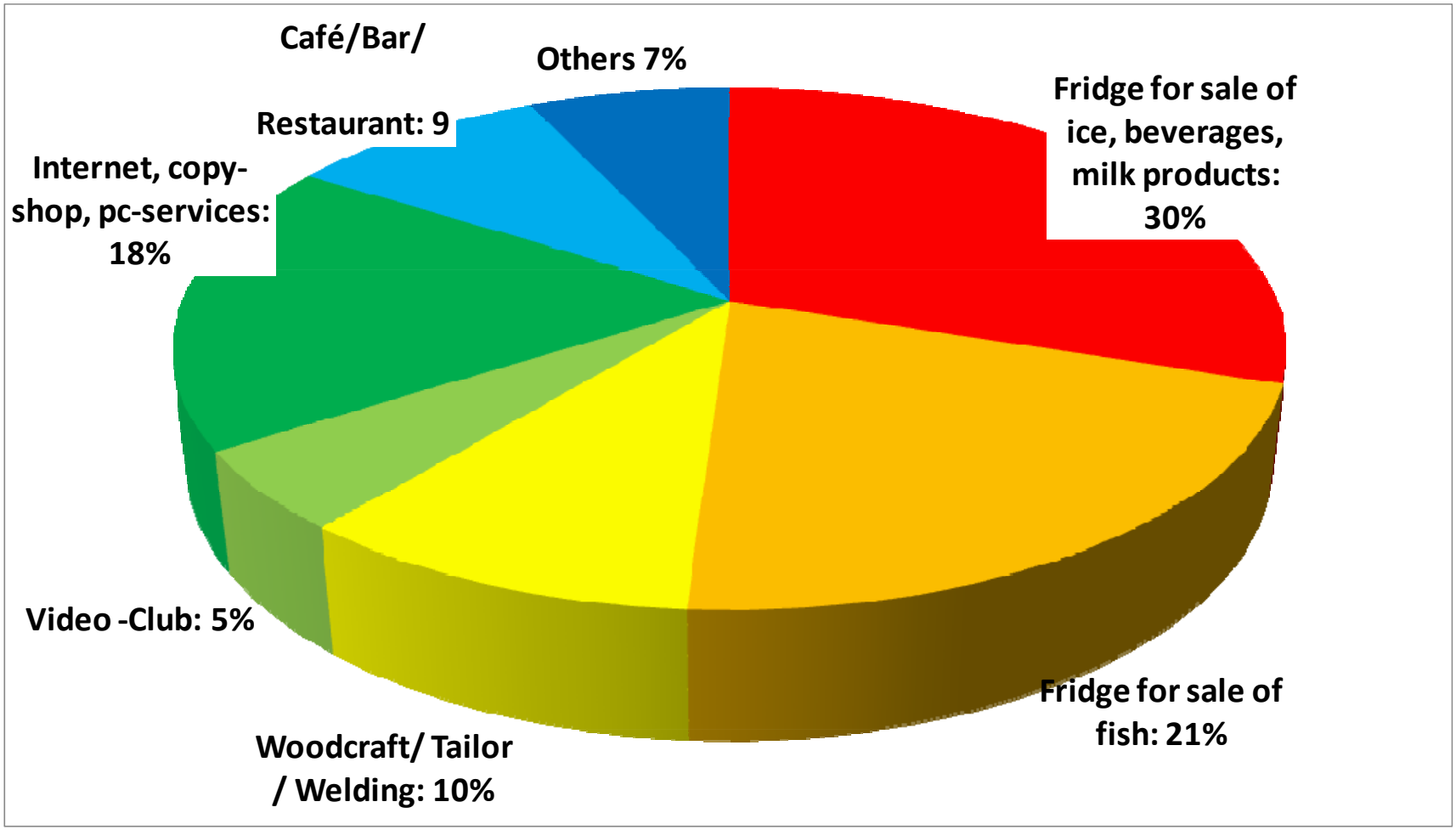
Tailor

Miller



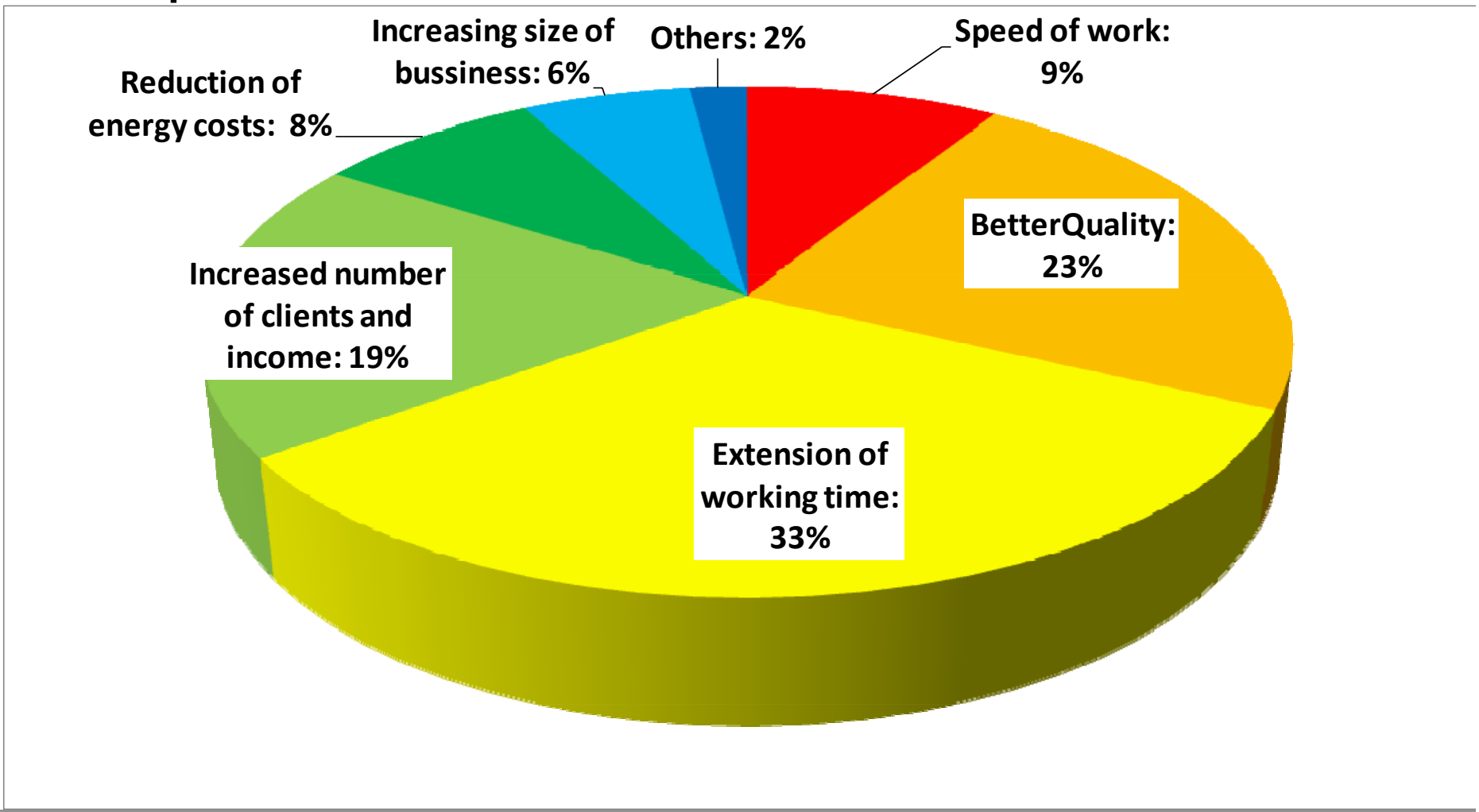
New projects planned by households

24,5 % of interviewed households declared that the plan to open a new bussiness

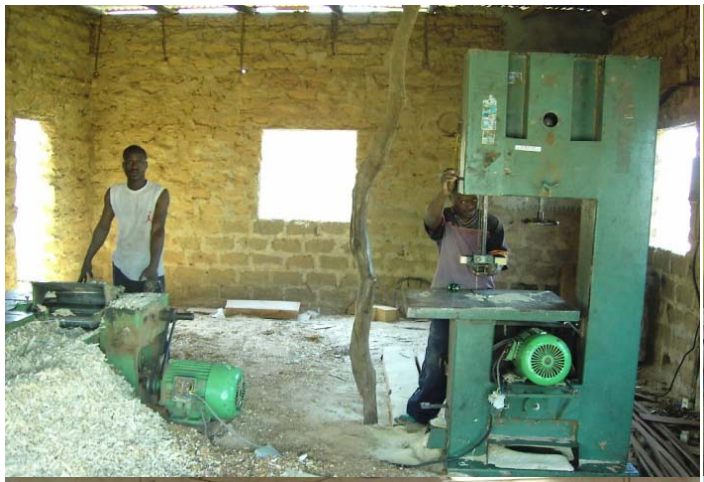


Reasons for access to modern energy

79 % of the already existing businesses plan an expansion of their enterprise



In fact, local workshops, already existing before electrification, seldom make intense use of electricity (apart from bars); however access to electricity especially leads to creation of new enterprises



3 Lessons learnt

- We must identify the individual drivers of socio-economic development for each village before electrification (important choice –criteria?). Specific strategies and tools must be available and implemented to support and push those drivers.
- We must not ignore the existence of informal secondary connections, created by villagers shortly after completion of the project. Secondary connection multiply in some cases the access rates by factor **5 to 8**!
- Sustainability of rural electrification demands for a better service quality to be provided by the electricity supplier. Adequate measures must be part of the log-frame.

Challenging and controversal questions

- Which is are the decisive forces for the social-economic development of villages after their electrification?
- Which is an appropriate set of SMART-criteria to be used for a balanced choice of villages?
- What is an equal balance between „poverty reduction“ and „economic devellopment of villages“? (measurable?)
- Do all (100%) social-institutions have to be connected to the grid or do we need other solutions?
- Which is the minimum technical standard, that would make secondary connection acceptable ?
- How could the service attitude of electricty provider be improved during the project?

Thank you for your attention !
and don‘t forget: