

Onsite Production & Use of Bioenergy in Uganda

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- Not-for-profit
- Membership organization
- Formed in 2011
- Has over 60 members (ICS, & Biofuels)
- Chairperson (2016 – 2019)
- Mission: to promote networking, understanding, knowledge and action





- Membership NGO
- Formed in 2014
- 4 other regional Biogas Associations
- Vision: To be a leading driver for a commercially viable biogas sector in Africa



Goodfire

- Largest producer in Uganda
- Capacity of 700 Kg /hr
- Employs 11 people
- Formed in 2012
- Mainly B2B model





- For-profit social enterprise (gasifier stoves + Biomass fuels)
- Formed in 2012
- Co-founder and CEO
- 12 employees (5 Female)
- Works with 21 Distributors
- Sold over 3,800 stoves + 20 tons of Woodchips





- Seeking investment for decentralized Pellets (at Grassroots)
- Large scale production of woodchips



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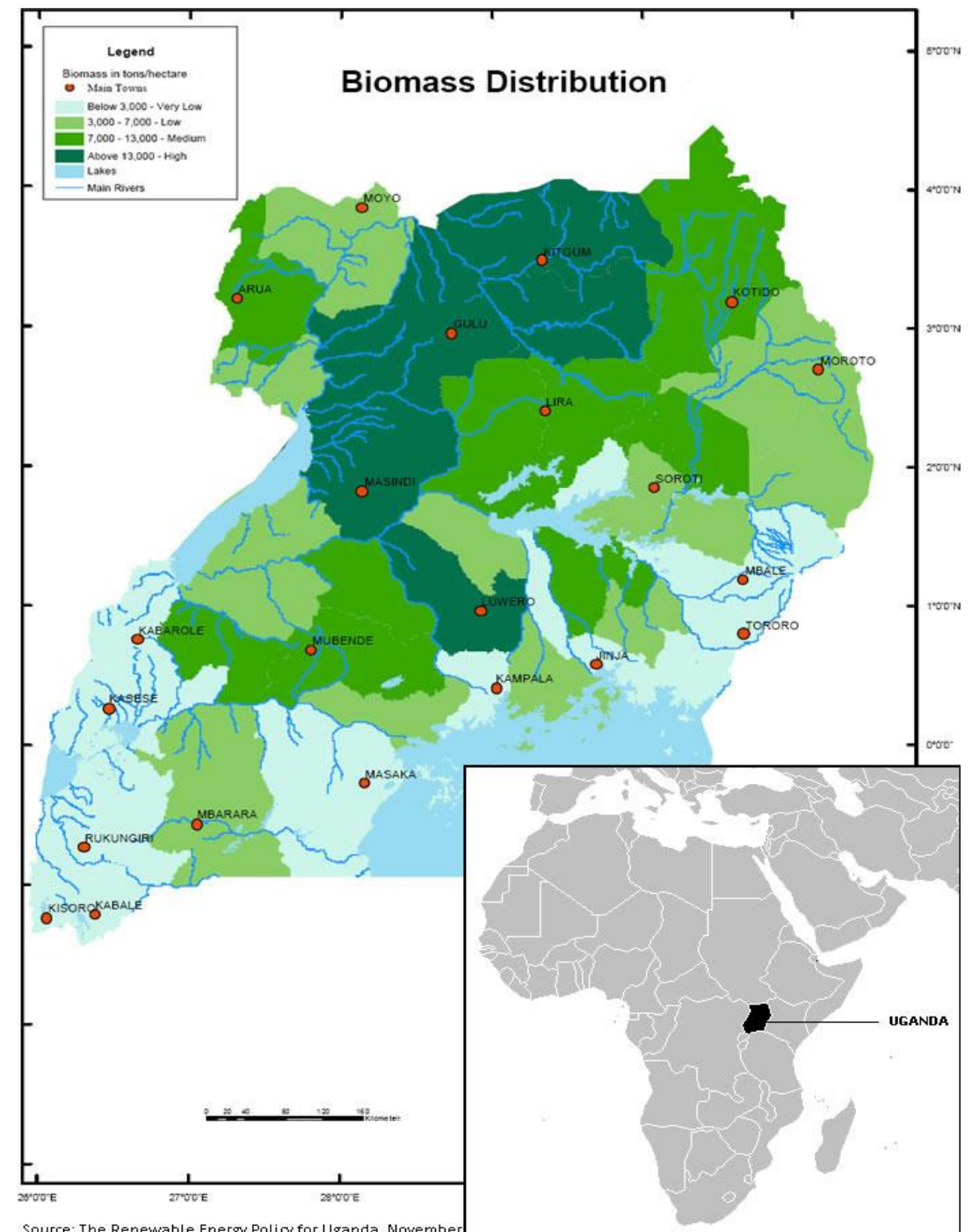
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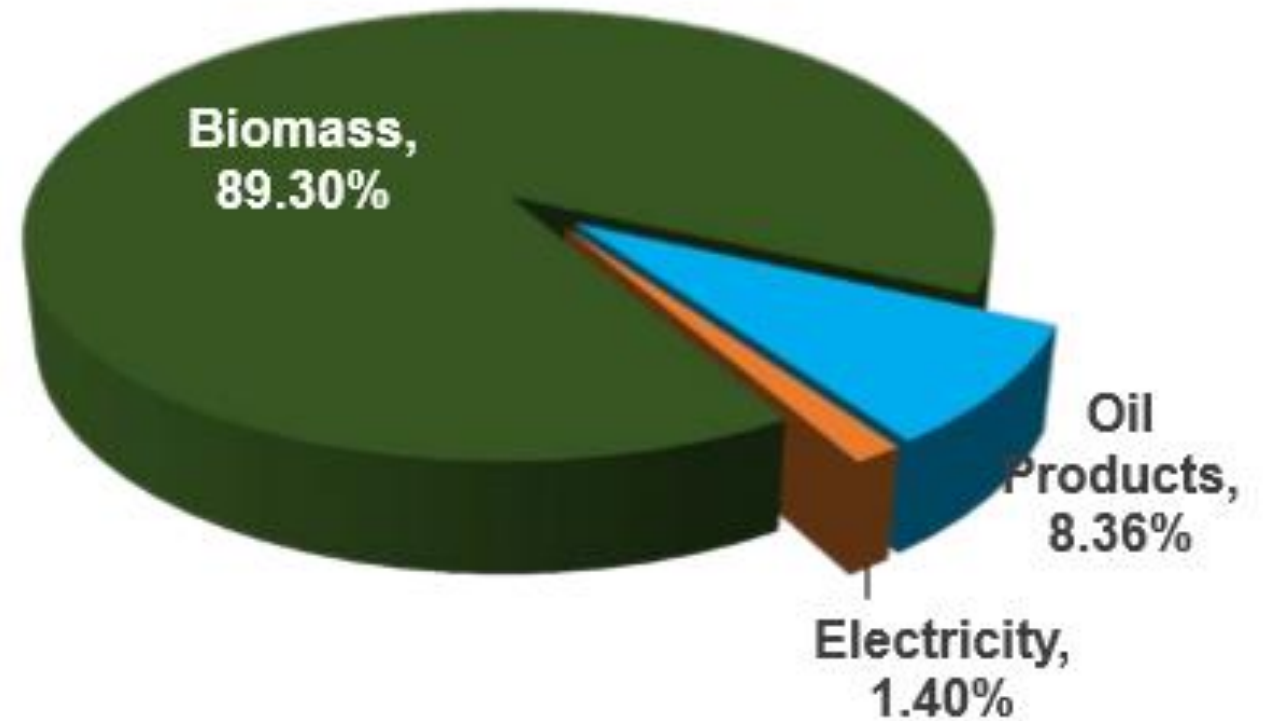
Uganda

- Area: 241,038 Km²
- Landlocked country
- Population: 34.6 Million (Census 2014)
- Currency: Uganda Shilling (UGX)
- Bordered by the **DR Congo** in the West, **South Sudan** in the North, **Kenya** in the East, **Rwanda** in the South West & **Tanzania** in the South
- Over 87% live in rural areas
- Has the lowest median age (15yrs) in the world



Energy

- Bioenergy Balance, 2015
- Biogas ~0.2 %
- Major (~75%) used in rural areas
- Very limited electricity from Biogas



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Macro Environment

Population Demographic	Uganda
Total Population (2014)	34,634,650
Population Growth Rate (CAGR)	3.0%
Rural/Urban Split (%)	79% / 21%
Rural Population (2014)	27,208,786
Average Household Size	4.7
Literacy – Total (%)	72%
Literacy – Female (%) (2002)	68%
Life Expectancy (years)	63.3
Population below poverty line (2009)	19.7%

Context

- Former British colony which gained independence in 1962
- This was followed by a long period of political unrest into Yoweri Museveni came to power in 1986.
- Languages: English (Official), Luganda, other Niger-Congo languages, Nilo-Saharan languages, Swahili, Arabic
- Roman Catholic 39.3%, Protestant 32% Muslim 11.1%, other 1.4%, none 0.2% (2014 census)

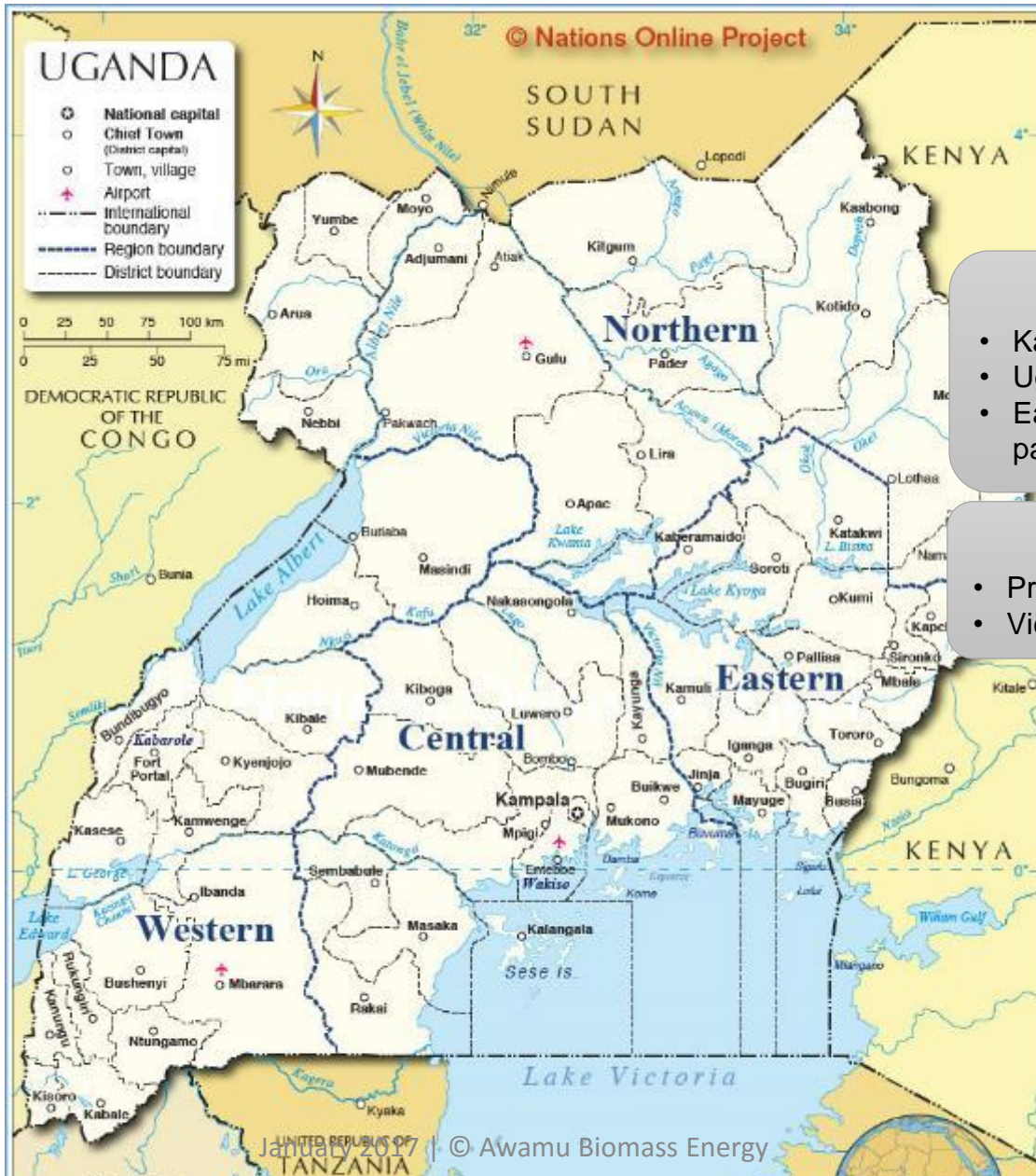
Sources: World Bank, UNBS, CIA World fact book, Census 2014

- Implications -

High population growth rates and increasing urbanisation are driving up fuel prices

Political Environment

Macro Environment



Working with the Government

- Several government policies address issues related to the bioenergy use.
- Uganda is a relatively easy place to do business by sub-Saharan Africa standards, though challenging by international norms.

Administrative Map

- Kampala is the capital city
- Uganda is divided into 112 districts across 4 administrative zones.
- Each district is further divided into sub-districts, counties, sub-counties, parishes and villages.

Current Government

- President Yoweri Kaguta Museveni has been in power since 26 January 1986.
- Vice President - Edward Ssekandi, Prime Minister – Ruhakana Rugunda.

Political Structure

- Parliamentary Democracy
- The president is both chief of state and head of government. The cabinet is appointed by the president from among elected legislators.
- The president is reelected by popular vote for a five-year term; election we held on 18 February 2016

-Implications-

Biomass energy programs should seek support from the government. Private sector involvement is encouraged

Sources:
CIA World fact book

Economic Environment

Macro Environment

Uganda has substantial natural resources. Agriculture is the most important sector of the economy, employing over 70% of the work force. The global economic downturn has hurt Uganda's exports; however, Uganda's GDP growth is still relatively strong.

Key Economic Indicators	
GDP (2013 Est)	\$22.6 Billion
GDP Per Capita (PPP) (2016)	\$2,071
GDP Growth Rate (2013)	5.6%
Inflation Rate (2016 est.)	4.6%
Youth Unemployment	62%
Household income by percentage share – Lowest 10%	2.4%
Household income by percentage share – Highest 10%	36.1

Key Economic Indicators	
Exports	\$3.156 billion (2013 est.): coffee, fish and fish products, tea, cotton, flowers, horticultural products; gold Major markets: Kenya, Rwanda & UAE
Imports	\$4.858 billion (2013 est.): capital equipment, vehicles, petroleum, medical supplies; cereals Major suppliers: Kenya, UAE, China, India,
GDP composition	Agriculture: 23.1%, Industry: 26.9% and Services: 50% (2013 est.)

Sources: World Bank, CIA World fact book

-Implications-

Rising incomes for some plus rising fuel prices mean more households are potentially in the market for improved stoves

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Bioenergy Situation

- 96% use Firewood or Charcoal for cooking
- Biogas usage <1% (mainly for cooking)
- Biogas mainly from animal waste
- Agricultural waste ~ 3%



Bioenergy Sources

- Tree biomass - 51%
- Bushes – 21%
- Farm vegetal waste – 12%
- Papyrus & Reeds – 9%
- Agro processing waste – 3%
- Grass, Forbs – 2%



Bioenergy Consumption

- Firewood - **44 million tons**
- Vegetal waste briquettes (maize cobs, coffee husks, Ground nut shells, Rice husks, Sun Flower, Palm shells) – **9 million tons**
- Municipal waste – **360,000 tons produced** annually



Bioenergy Demand

- The households utilize 74% of delivered energy
- The industrial sector utilizes 18%
- The commercial sector takes at least 5%
- Institutions utilize 3%



Biogas situation

- Biogas systems in Uganda since 1980s
- 7,000+ operating domestic biogas
- Household sizes range from 3 to 12m³
- Institutional plants range from 20 to 200m³



Common Biogas Digesters

- Camartec fixed dome design ~80%
(e.g. promoted under the UDBP)
- Floating drum system ~10%
- Horizontal tube/balloon system ~6%
- Bio-latrines ~4%



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Funding Sources

Biogas

- NGOs ~72%
- Individual ~26%
- Government ~2%

Biomass

- Individual ~84%
- NGOs ~ 12%
- Government ~4%



Key Issues

Awareness

Inadequate awareness of the availability of appropriate technologies to harness the biomass

Priority

Despite the economic importance and significance as a major fuel, bioenergy has received little recognition in terms of prioritization and funding

Funding

High upfront cost is a critical barrier to adaptation of improved biomass technologies

Budget Allocations

* Allocation in Billion Shillings

- Biomass technology is one of the least funded among the energy sector in Uganda
- In addition to limited funding, biomass project underperform mainly due to bureaucracy

Financial Year	11/12	12/13	13/14	14/15
Approved development budget	1,325	1,547	1,335	1,768
Average project Funding	76.88	67.8	68.6	75.9
Biomass technology	0.2	1	1	3.93
% of Social Sector	0.01	0.06	0.07	0.2

Source: Approved Budget Estimates FY 2011/12-14/15

MOFPED

Regulatory Framework

- Regulatory framework of the biomass sector is scattered amongst various government agencies, lacks cohesion and clear mandates
- Historically, the concern of the forestry sector was sustainable supply of timber
- Research, production, marketing, and utilisation of biomass is spread among so many institutions without a coordination mechanism
- Legislation targets specific components of a sector rather than having a multi sectoral and comprehensive approach
- Many good policies but poorly implemented

Supportive Legal & Regulatory Framework for Bioenergy

- Energy Policy (2002)
- Renewable Energy Policy (2007)
- Biofuels Bill
- National Biomass Energy Strategy (BEST), 2014
- Sector Strategic Investment Plan (2015)
- National Development Plan Phase II

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Examples

Un-Carbonized Briquettes

- 2 main companies
- Capacity of 60 Tons/ day
- Utilize Coffee & Rice husks, Sawdust, Ground nut shells, wastes from Cereals etc.



Examples

Carbonized Briquettes

- Many small (Cottage) producers
- Rely heavily on charcoal dust
- No proper documentation on production procedures



Examples

Biogas



Examples

OTHER Bioenergy efforts

- Pellets (only two known), otherwise chicken feed.
- Wood chips (mainly as research projects)



Thank you...

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