

# Carnegie Mellon University

## Rwanda

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Challenges and opportunities for developing countries  
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# **Mera Gao Power: off-grid solar *observations from the presentation***

- Business model
  - affordable
  - no subsidies
- Relative to grid electricity
  - more expensive but more reliable
- Not sufficient for productive activities

**Conclusion: not transformational**



[www.bboxx.co.uk/](http://www.bboxx.co.uk/)

**BBOXX SMART Solar**



**200,000th Home Connects to M-KOPA**

[www.m-kopa.com/](http://www.m-kopa.com/)

OFF-GRID  ELECTRIC



Radical Affordability



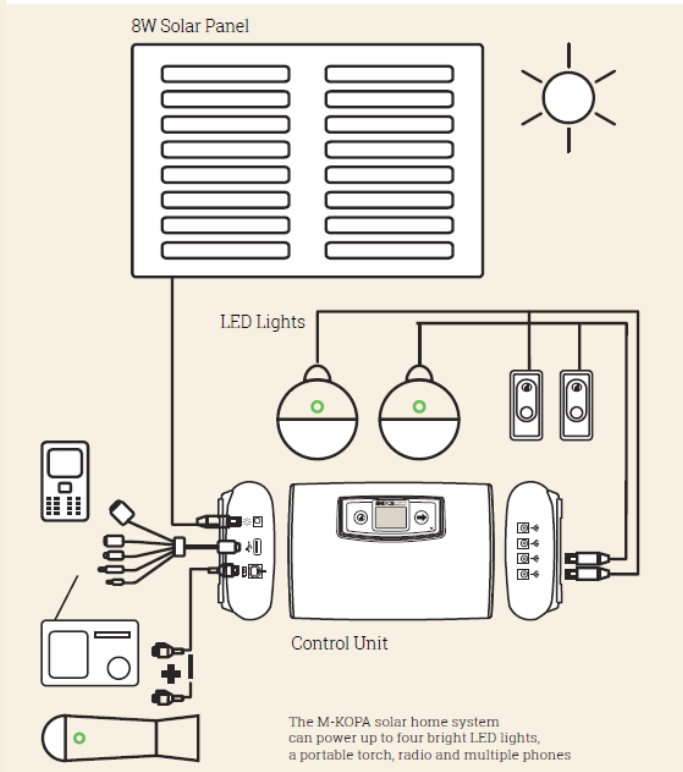
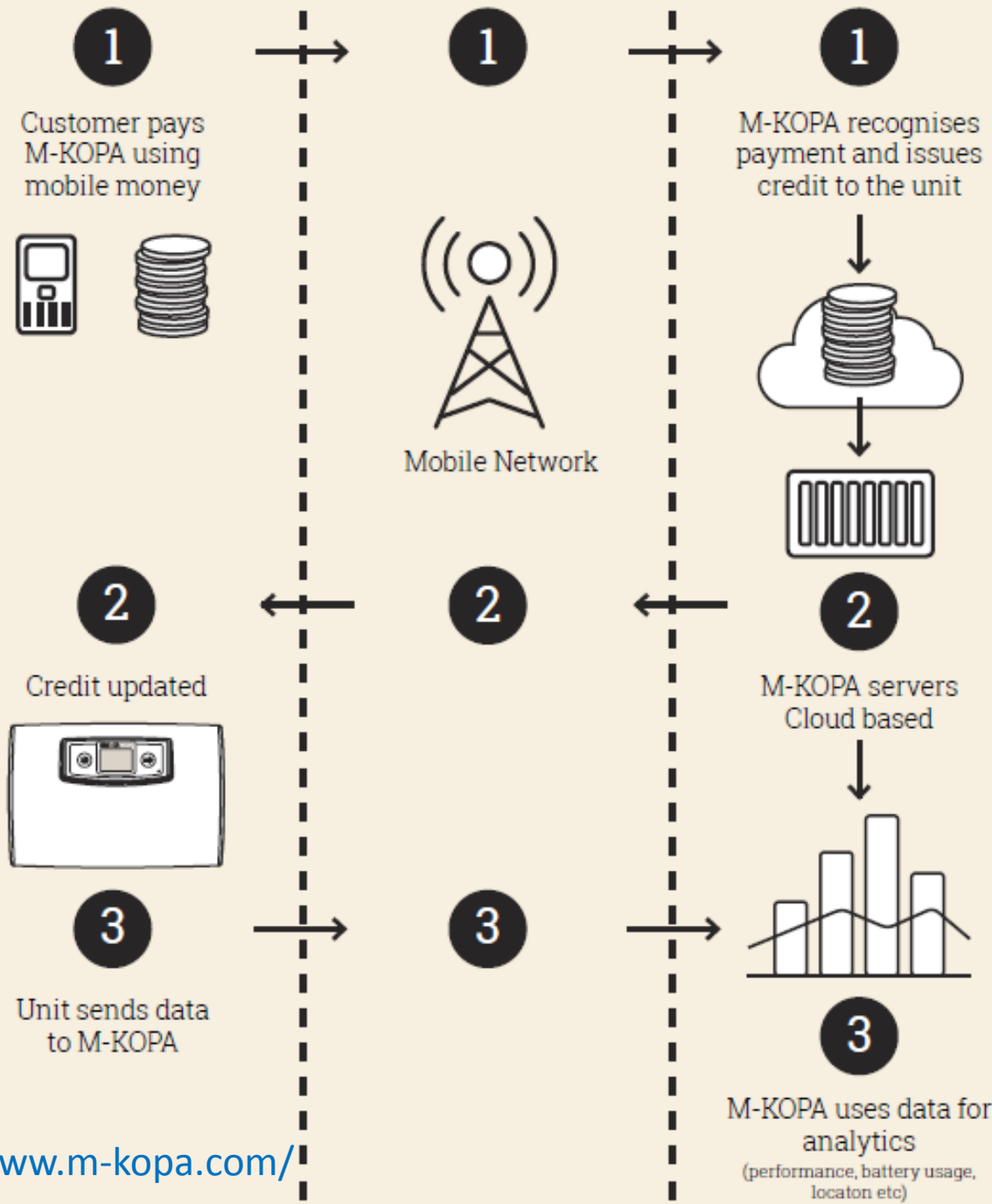
State-of-the-Art Solar



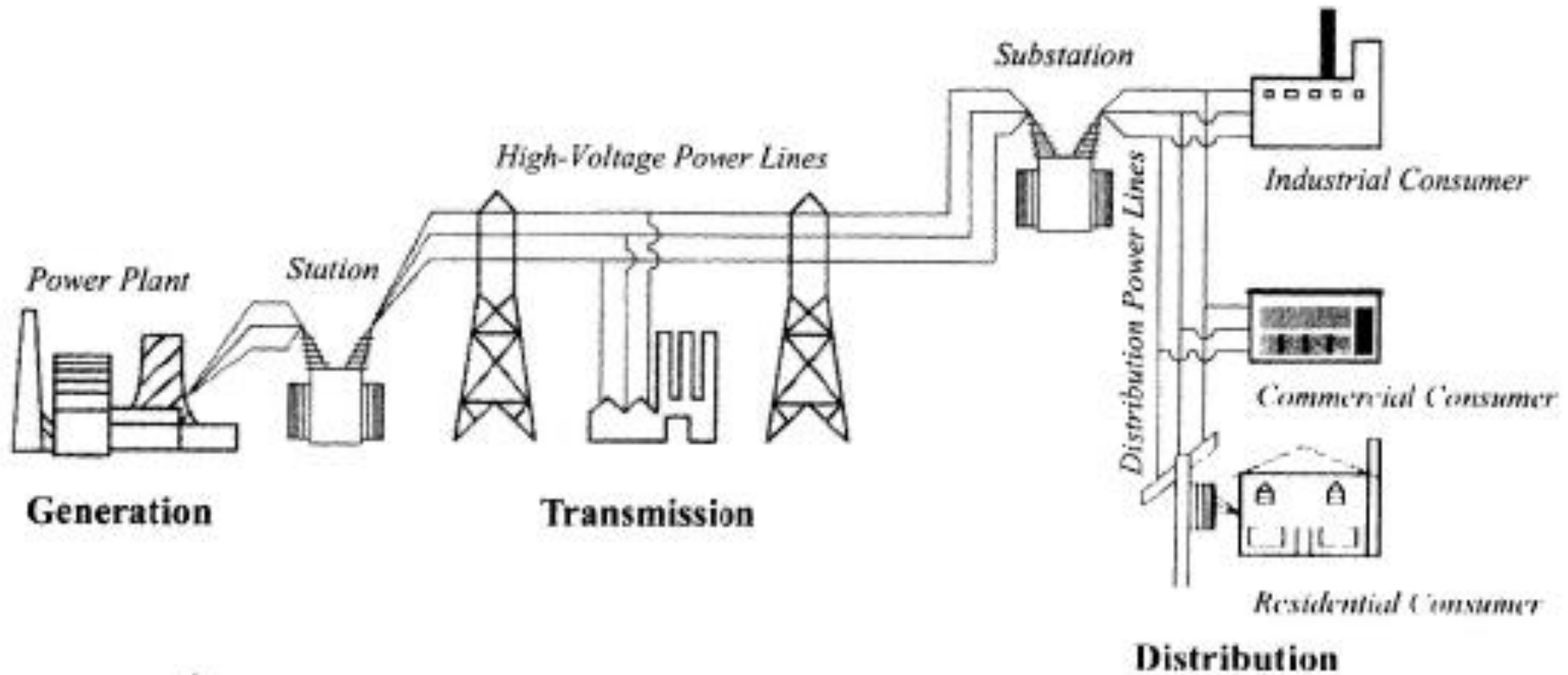
Holistic Model



[offgrid-electric.com/](http://offgrid-electric.com/)



# What would we build today if there were no legacy system?

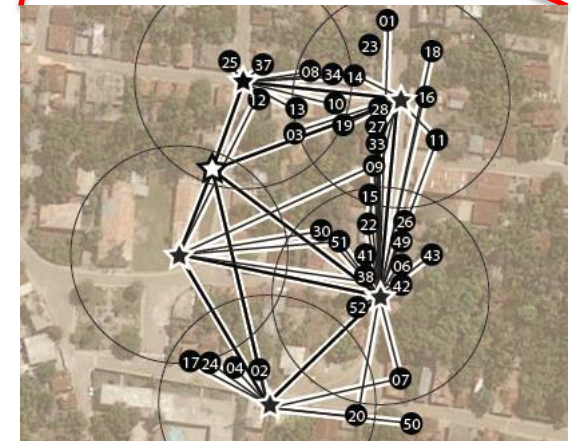


S. W. Blume, *Electric Power System Basics for the Nonelectrical Professional*, IEEE Press, 2007.

# Exploring New Business Models



<http://www.sparkmeter.io/>



M. Buevich, D. Schnitzer, T. Escalada, A. Jacquiau-Chamski, A. Rowe, "A System for Fine-Grained Remote Monitoring, Control and Pre-Paid Electrical Service in Rural Microgrids", ACM/IEEE IPSN 2014.

# Vision for Future Power

- precision delivery of personalized energy
- integration of energy sources at all scales
- fully networked equipment
- efficient use of AC & DC source to load
- resilient against all contingencies
- agility to incorporate and exploit innovation

# Rwanda Energy System Innovation Center

