Energy Harvesting, Storage and Management for Automated Environment Monitoring in the East African Region

PROGRESS REPORT – MAY

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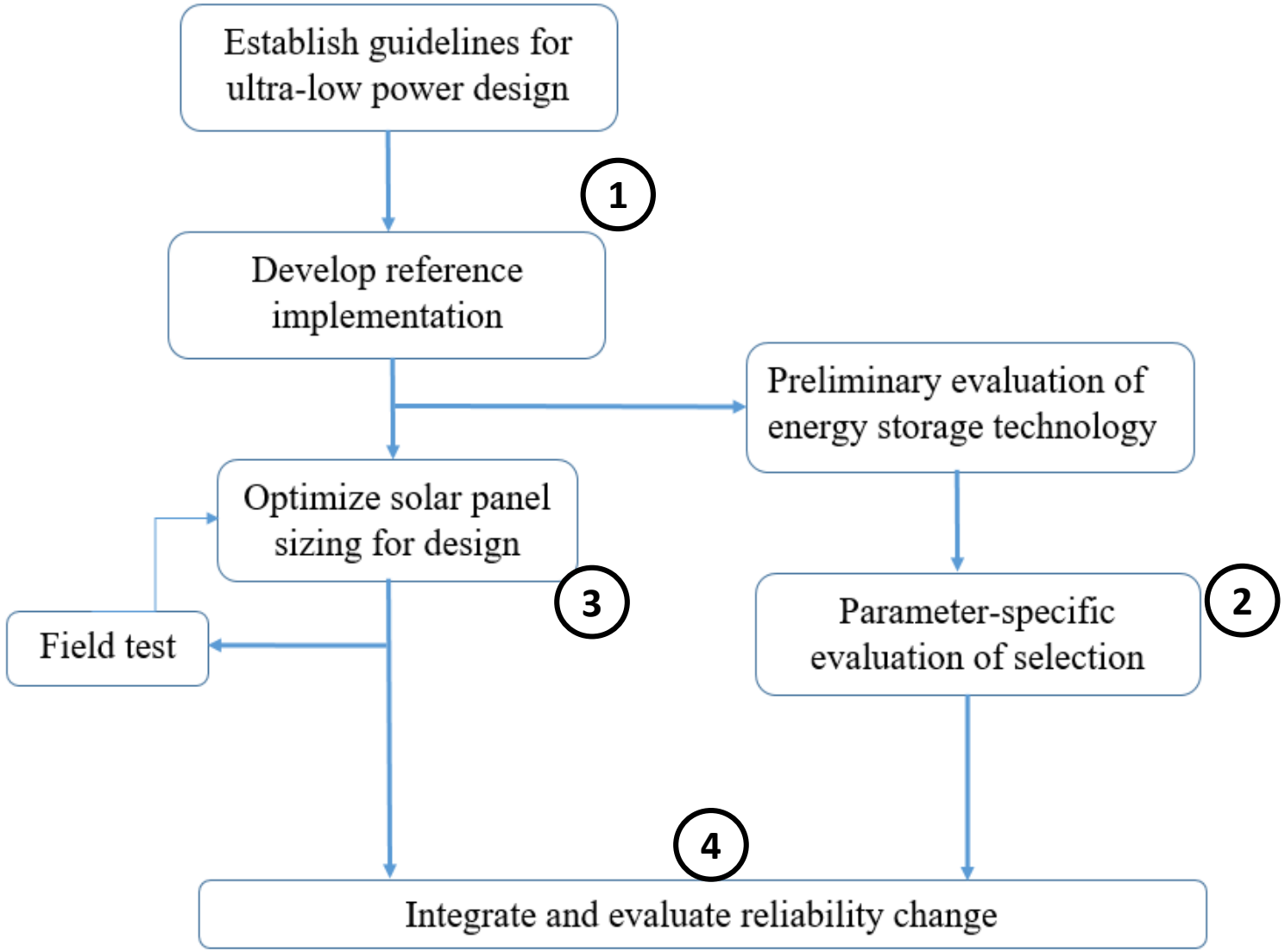
General objective

- To increase the mean time between failure of environment monitoring devices due to energy-related causes

Conceptual Framework



May Plans as per last presentation

❑Finish Paper - *Practical Design Guidelines for Ultra-low Power Gateways in Environment Monitoring Wireless Sensor Networks* **- Submitted to IEEE AFRICON 2017**	
Finish proposal and present to HDRC	
Get the RC3 student matriculated into the project	
Design uplink and get data on server	

Details on Gen 3 gateway

- Low power sink node is connected to 3G module
- Data stored on SD card. Uploads are every N minutes (programmable)
- Data sent to WIMEA server over TCP
- FTP is possible; with different design allowing file access. Higher speeds
- Reliability is a challenge:
  - Within Control: connection re-tries
  - Out of Control: Network reliability (Vodafone, Airtel, Africell)

June Plans

- Present to HDRC, secure full admission
- Pay tuition for 2016/2017
- Improve reliability of uplink
- Start Preliminary work on Objective 3 with Masters student

END

9.2 Research Hypotheses

In particular, the hypotheses to be tested are as follows:

i. In objective I, the null hypothesis is: " *An ultra-low power gateway for AWS cannot be developed and yet retain core functionality*"

ii. In objective II, the null hypothesis is: " *Emerging battery technologies do not provide more optimal performance than current technologies in use*"

iii. In objective III, the null hypothesis is: " *Current solar panel sizing techniques are sufficient for sizing for AWS loads*"

It will be the task of this research to disprove the above hypotheses.