

MINI-HYDROELECTRIC POWER PLANT PROJECT HANDBOOK

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PREFACE

M-HEP is a project which involved multidisciplinary efforts to design, fabricate, install, test and commission a mini-hydroelectric power station along River Ndarugu in Njoro Sub-County, Nakuru County. Power generated from this project shall be used to power streetlights and any other selected loads in the University or within the community. The project shall be automated and interfaced with a wireless control for remote management and teaching purposes. This project shall be implemented with support from Geothermal Development Company personnel support as well as external support and funding from other parties.

This Project handbook is developed to guide the developing in the entire process

TEAMS

Civil & Environmental Eng'

Design

Mechatronics

Control & Automation

Electrical

IT

Quality Control & Assurance

Business & Marketing

Welfare

Literature & Technical writing

Public & Community Relations

KEY RESPONSIBILITIES FOR TEAMS

Civil & Environmental Eng' Team

- Conduct/Lead site surveys
- Obtain water parameters
- Work with Design & Mechanical Teams whenever required
- Conduct project EIA
- Ensure nature and environment are unharmed.

Design Team

- Design and simulate turbine system prior to fabrication
- Design for manufacture and maintenance
- Fully liaise with fabricators (mechanical team) for good job
- Help teams test concepts, models, installation and commission.
- Provide support to documentation team.

Mechatronics / Mechanical Eng' Team

- Work hand-in-hand with Design Team test and develop concepts.
- Assemble and integrate mechanical parts for the system.
- Help documentation team develop technical manual for the mechanical system & maintenance documentation pack.

Electrical Eng' Team

- Help design team size & select electrical systems (generation & transmission).
- Sizing, selection and installation of network loads.
- Help documentation team develop technical manual for the electrical system & maintenance documentation pack

Control & Automation Team

- Design, test and adopt a control system for the system.
- Help documentation team develop technical manual for the control and automation system & maintenance documentation pack for the system.

KEY RESULTS FOR TEAMS

Civil & Environmental Eng' Team

- Proper sizing and selection of systems.
- Proper sizing, selection and installation of loads
- Technical documentation of electrical systems.
- Development of inspection, maintenance and troubleshooting manual for the electrical systems.

Design Team

- Design completed and reviewed
- DFM and DM incorporated
- Concept simulation and testing

Mechatronics / Mechanical Eng'Team

- Concept developed and fully tested.
- Deliver good quality of fabrication and integration work
- Development of inspection, maintenance and troubleshooting manual for the mechanical systems.

Electrical Eng' Team

- Proper sizing and selection of systems.
- Proper sizing, selection and installation of loads
- Technical documentation of electrical systems.
- Development of inspection, maintenance and troubleshooting manual for the electrical systems.

Control & Automation Team

- Deliver properly designed and tested control system
- Incorporate IoT, remote monitoring, data logging capabilities in the system.
- Development of inspection, maintenance and troubleshooting manual for the automation systems.

KEY RESPONSIBILITIES FOR TEAMS

Quality Control & Assurance

- Develop and conduct Quality Control checks for various Team activities
- Develop and conduct QC checks for selected items for use in the system.
- Work with documentation team to develop Quality Control reports.
- Develop BoQs and Budgets in liaison with other teams.

Business & Marketing

- Work with the PR team to market the project.
- Drum up support for the project.
- Develop strategies and approach investors for funding.

Literature & Technical writing

- Work hand-in-hand with other teams to develop Technical Manuals, Maintenance Pack and Technical documents.
- Develop and keep updated meeting minutes.
- Lead research and review of literatures.

Welfare

- Cater for project team welfare – meals, security and security.
- Handle membership checks and provide certifications
- Take mandatory attendance/meeting lists
- Handle Guests to the project

Public & Community Relations

- Conduct public outreach and awareness
- Seek legal permissions from the government and community
- Support IT team in engaging social network campaigns

IT

- Support relevant teams and integrate IT into the project
- Develop and keep project website, Apps and social platform updated.

KEY RESULTS FOR TEAMS

Quality Control & Assurance

- Development of QC checklists
- 100% component/item QC checks
- 100% QC checks during installation and commissioning. for various Team activities
- QC reports.
- Check Budgets and BoQ

Business & Marketing

- Wide marketing of the project.
- Proper financial support for the project
- Wide project support.

Literature & Technical writing

- Work hand-in-hand with other teams to develop Technical Manuals, Maintenance Pack and Technical documents.
- Well updated meeting minutes.
- Research! Research!

Welfare

- Team never misses anything
- Well updated project membership lists
- Well updated meeting attendance lists
- Satisfied guests!

Public & Community Relations

- Zero/minimal public conflicts with project.
- Attainment of legal endorsements/support
- Support IT team in engaging social network campaigns.
- Thorough public awareness
- Thorough project visibility

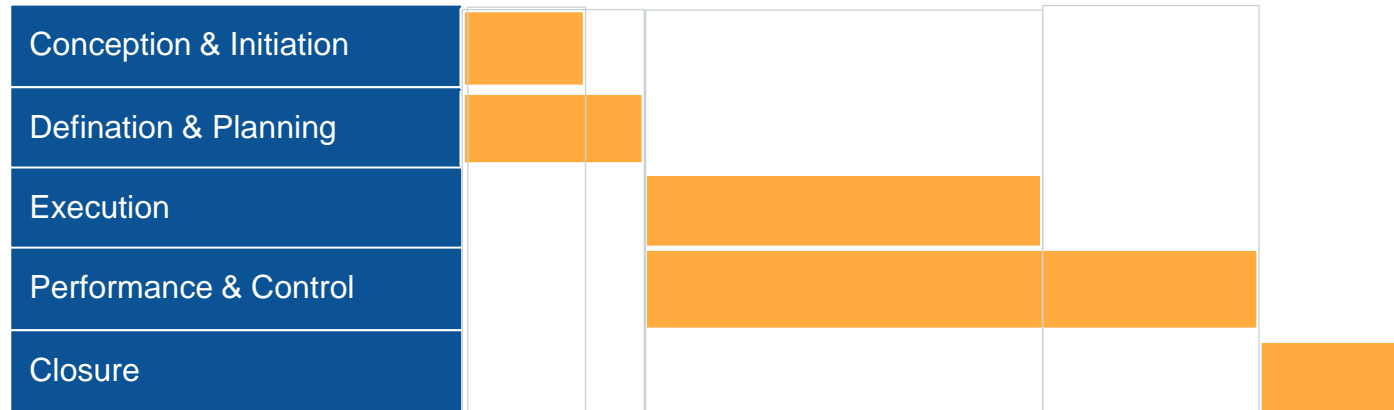
IT

- Well updated website, App or social media platform.
- Seamless IT integration into the project.

OUR PROJECT CYCLE



OUR PROJECT TIMELINES



PROJECT RISKS, TEAM STRUCTURE & COMMUNICATION

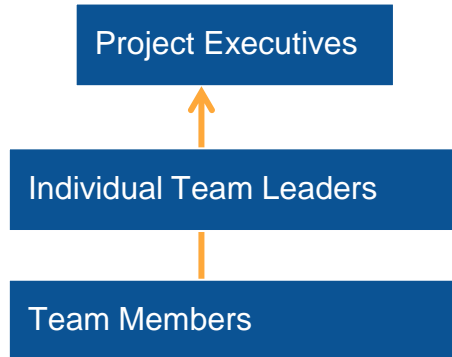
Risks

- Financing
- Scope changes
- Change management
- Quality control
- Team morale and self drive

Mitigation

- Source finances as the first step, keep budget small
- Stick to project objectives and defined milestones
- Have a change management procedure
- Have independent and strict Quality Control team
- Have weekly meetings and reports, frequently update of member's list per participation.

TEAM LEADERSHIP



How we will be communicating

1. Weekly tracking, review and communication of team performance status through meeting and Whatsapp group updates.
2. Weekly meetings / have project agenda as part of EUTEEC meetings
3. Teams allowed to meet as frequent as necessary.

PROJECT PROGRESS TRACKING

Tracking of each and every team's activities, deadlines and results shall be done using a Project Action Tracker which shall be updated on a daily basis and shared out at the end of every week
This will be useful for stakeholder communication, team motivation and identify challenge areas.

Example of the Action Tracker

	TEAM	TASK	STATUS	Responsible	Start Date	Due Date	Findings/Links
1	Design Team	Literature review & Research	Not started		11/15/2019	11/15/2019	
		Design concepts developments & simulations	Not started		11/15/2019	11/15/2019	
		Review and update concepts	Not started		11/18/2019	11/18/2019	
		Test concepts	Not started		11/20/2019	11/20/2019	
		Freeze design & start fabrication	Not started		11/20/2019	11/20/2019	
		Lab test	Not started		11/15/2019	11/15/2019	
		System handover to mechanical team	Not started		11/20/2019	11/20/2019	