



PIESA CONFERENCE

**15 – 18 SEPTEMBER, THE KINGDOM
HOTEL,**

VICTORIA FALLS

SWER PROJECT MANAGEMENT:

**A Case study of Swereki Area Electrification
Project – Beitbridge District,
Matabeleland South, ZIMBABWE**

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Presentation Layout

- * **Introduction**
- * **SWER Technology**
- * **Project Management**
- * **PRINCE2 Project Management Methodology**
- * **Advantages Of PRINCE2 Method**
- * **Swereki Electrification Project**
- * **PRINCE2 Principles**
- * **PRINCE2 Themes**
- * **PRINCE2 Processes**
- * **PROJECT Environment**
- * **Recommendations And Conclusions**

The image is a conceptual graphic with a blue color palette. In the center, a large, semi-transparent globe of the Earth sits on a matching circular base. Three smaller, identical globes are positioned around it: one to the left, one above, and one to the right. The background consists of a bright blue sky with soft, white clouds and several four-pointed starburst effects. The overall aesthetic is clean and futuristic.

INTRODUCTION

Rural Electrification Fund

- * Spearheading of the RE program soon after independence in 1980.
- * Slow electrification due to the following:
 - Non availability of an institutional framework
 - Lack of adequate funding
- * REF Fund Act of 2002: to facilitate rapid and equitable electrification of rural areas
- * NEP of 2012: access to adequate, reliable, least cost and environmentally friendly and sustainable energy services
- *

SWER Technology

33kV THREE PHASE BACKBONE

**SINGLE WIRE EARTH RETURN 19.1kV
SUPPLY LINE**

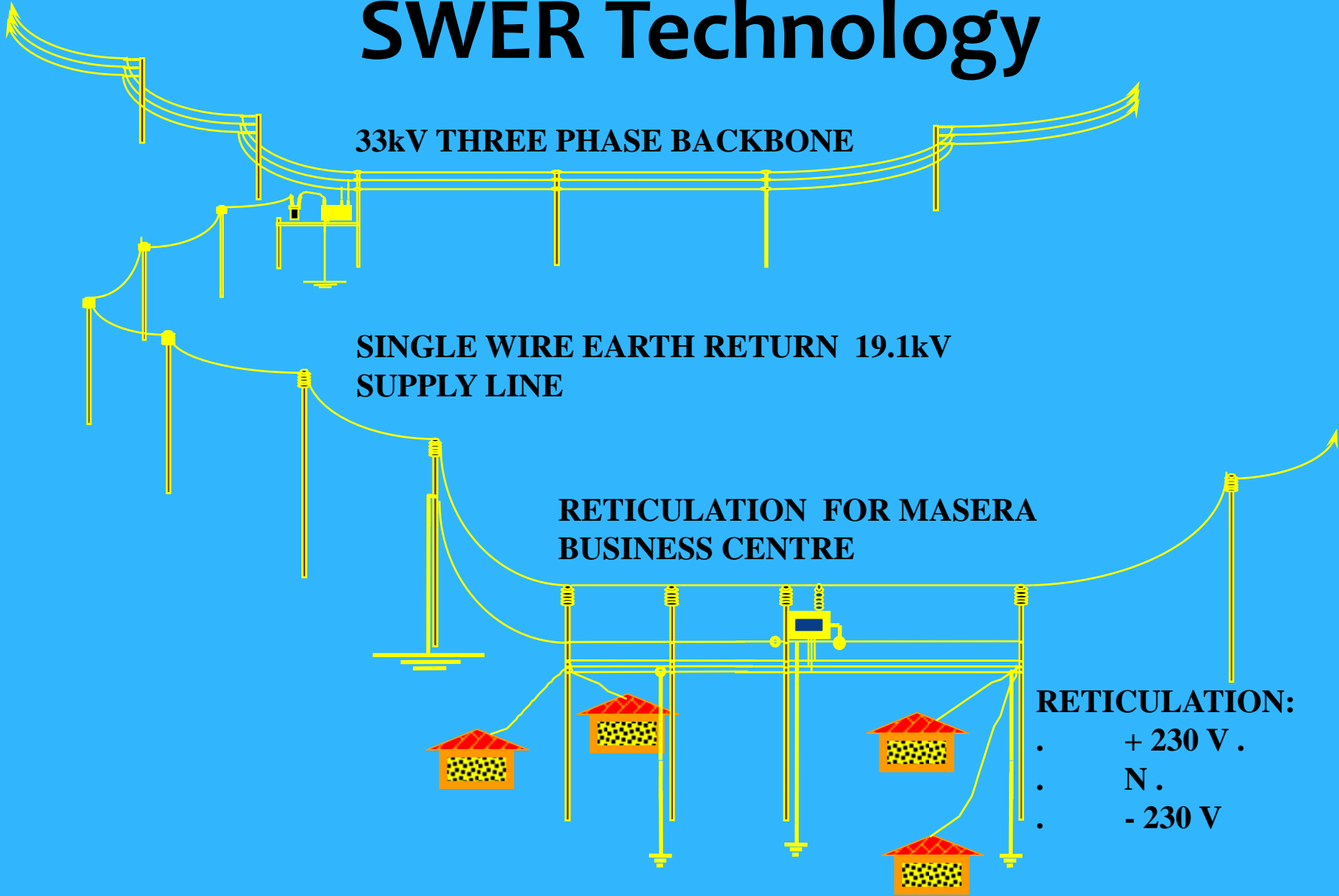
**RETICULATION FOR MASERA
BUSINESS CENTRE**

RETICULATION:

• + 230 V .

• N .

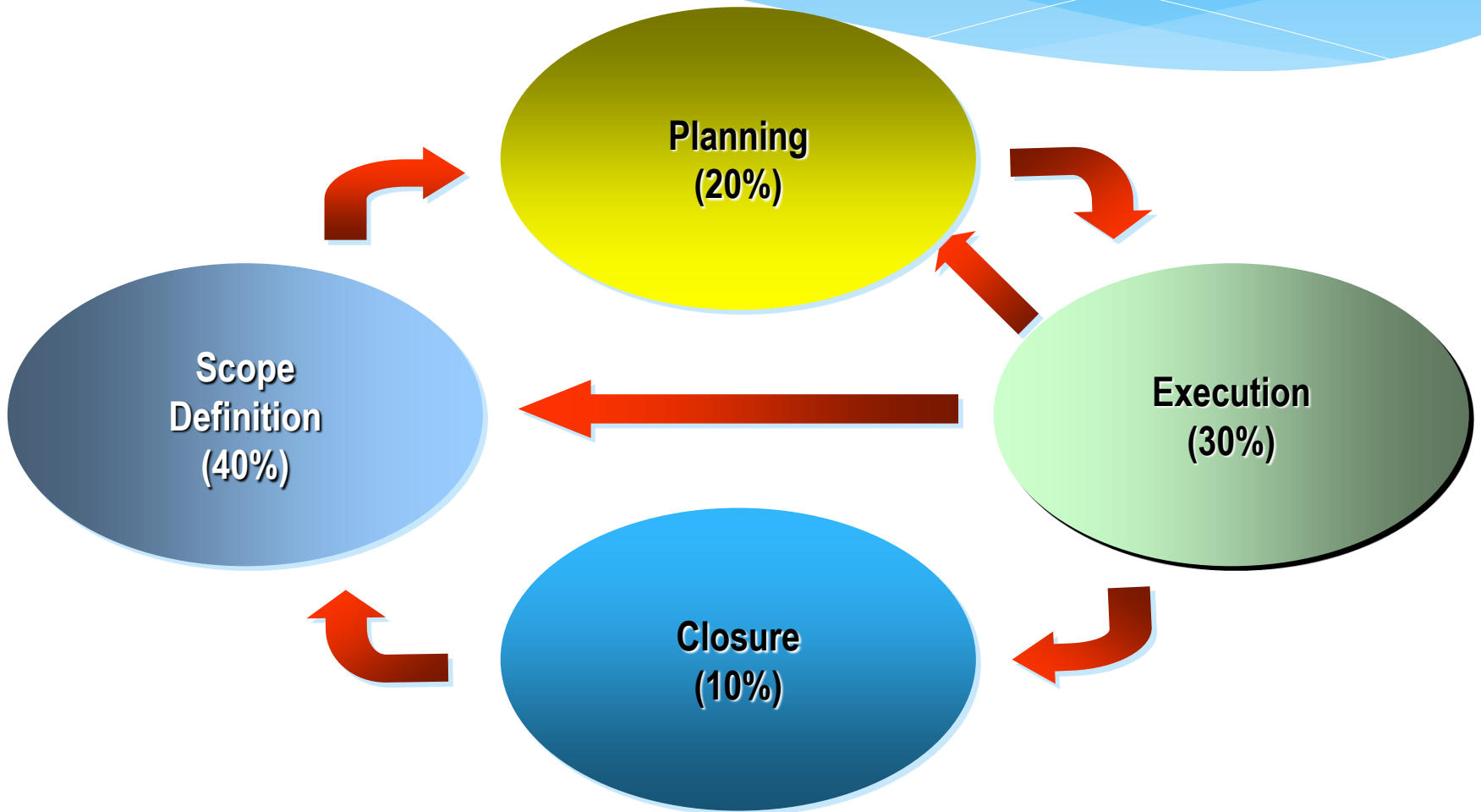
• - 230 V



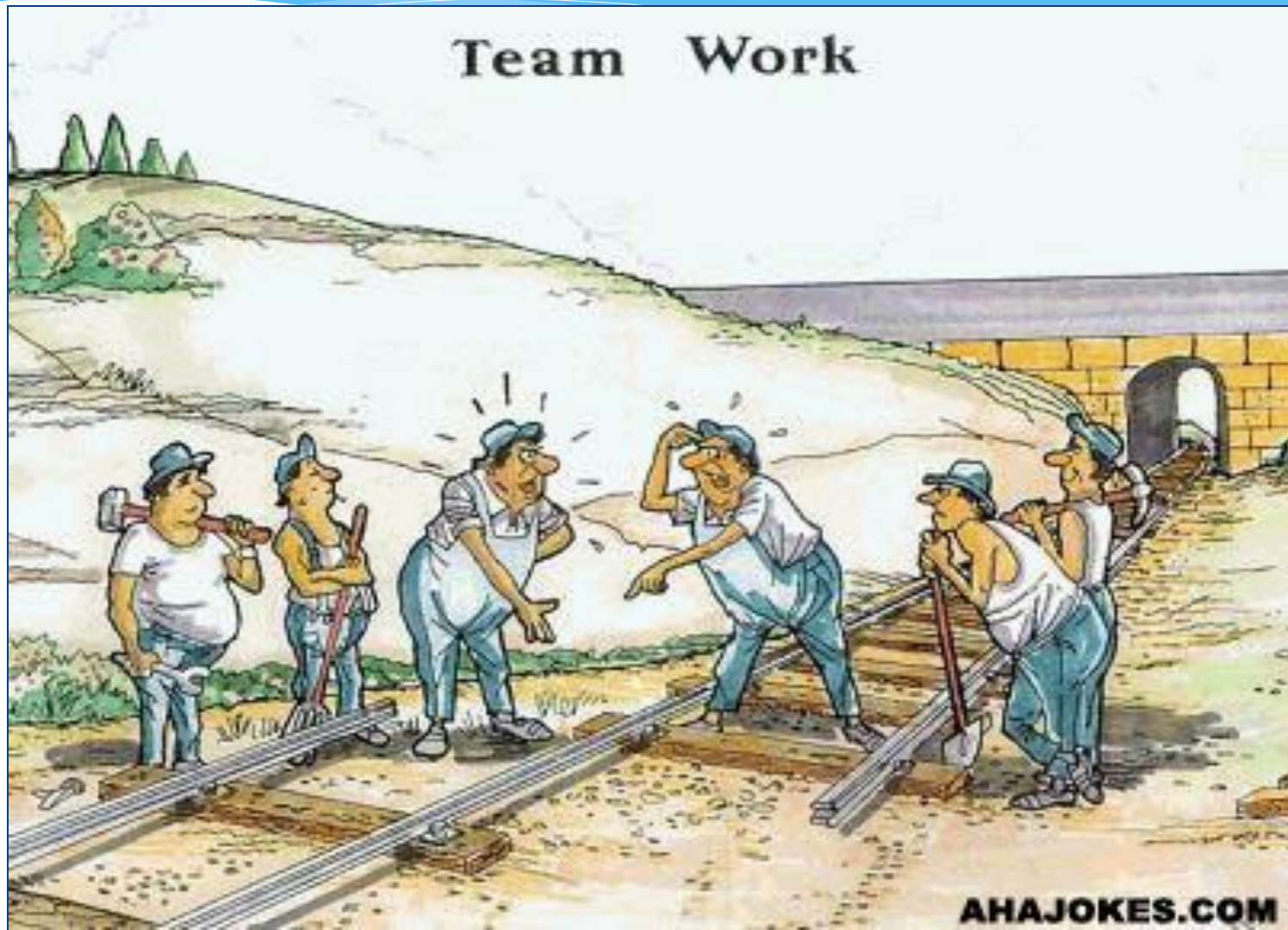
PROJECT MANAGEMENT

- * It involves applying **knowledge, skills, tools & techniques** during the course of the project to accomplish project requirements.
- * PM emphasizes that all projects must be **planned** properly to give room for easy **execution, monitoring & control** and finally **closed** properly.
- * Hear out some Managers:
 - –Why plan when you can just start building?
 - –“Planning will be a waste of valuable time”.

When Do Projects Fail?




The Starting point: Success requires continuous planning, execution based on the plan, monitoring & valuation, review & re-planning, etc



Setting the tone

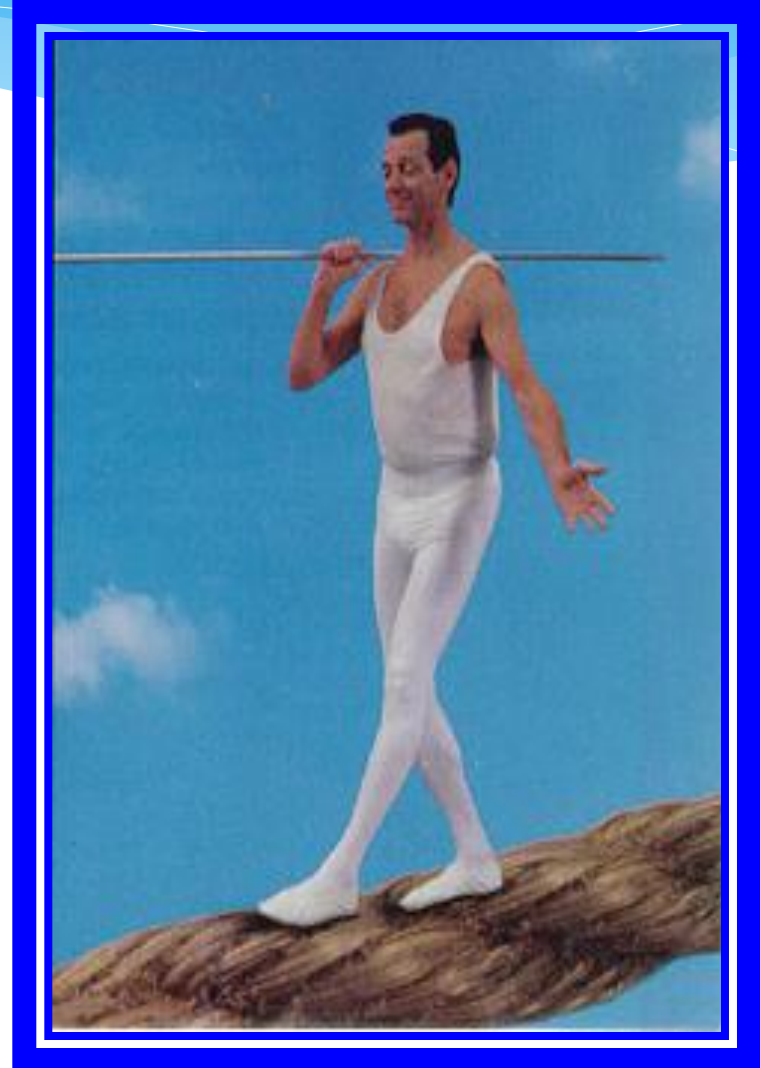
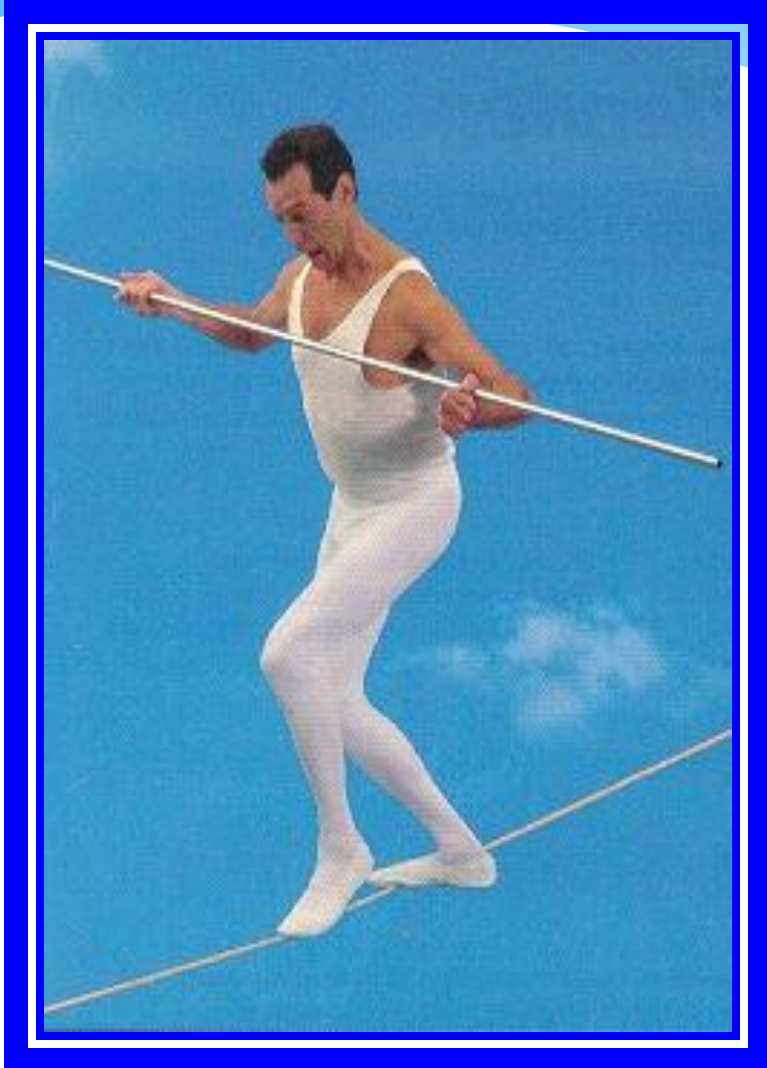
- * An adventurer just returned from a successful climb of Mount Himalayas. While there, seven other climbers died. He did not only survive, he stated that “the experience was so positive that he will want to partner with others to do it again”.
- * To him, his secret was discipline.
- * What are some of the questions that you can ask from this short case?



A key to success in mountain climbing, is to **identify the pillars** that will be practiced **with discipline**.

In project management, **pillars** refer to **the methods, approaches, techniques and skills** to achieve success – the purpose for this presentation

Mastering Project Management



PRINCE2 PM Method

- * Definition: Projects in controlled environment
- * Description: **structured** project management method based on **experience drawn** from thousands of projects.
- * **Principles**: the seven best practices.
- * **Themes**: the seven themes describe the theory of project management.
- * **Processes**: the seven describe the steps to be followed from start to finish.
- * **Project Environment**: tailor PRINCE2 to project environment.

Benefits of applying PRINCE2 Method

- * Embodies established and proven **best practices and governance**.
- * Can be applied to **any project** irrespective of scale, type, organisation, geography or culture (generic)
- * Provides for explicit **recognition of project responsibilities**
- * Emphasizes on **product focus**.
- * Defines a thorough but economic **structure of reports**.
- * **Plans** meet the needs of different levels in the project management team thereby improving communication and control.
- * Adopting PRINCE2 promotes **learning and continual improvement** in organisations,
- * PRINCE2 offers an invaluable **diagnostic tool** which facilitates assurance and assessment of project work, trouble shooting and audits.

The Swereki Area Project

Scope: 50.5km of 19.1kV SWER line, 1 x 475kVA isol. Txf, 1 x autorecloser, 3x64kVA, 3x32kVA, 2x16kVA txfs, 4.2km of LT6 lines

Institutions; Ndambe Bus. Centre, Ndambe Pry School, Maseru Clinic, Maseru Agritex, Maseru ZRP, Mtshilashokwe Pry School, Maseru Sec. School, Maseru Bus. Centre, Toporo Bus. Centre, Toporo Vert, Toporo Pry School, Swereki Clinic, Swereki Pry School, Kohomela Sec. School & Swereki Bus. Centre (15)

The 7 principles

1. Continued Business Justification
2. Learn from Experience
3. Defined Roles and Responsibilities
4. Manage by stages
5. Manage by exception
6. Focus on products
7. Tailor PRINCE2 to the project environment

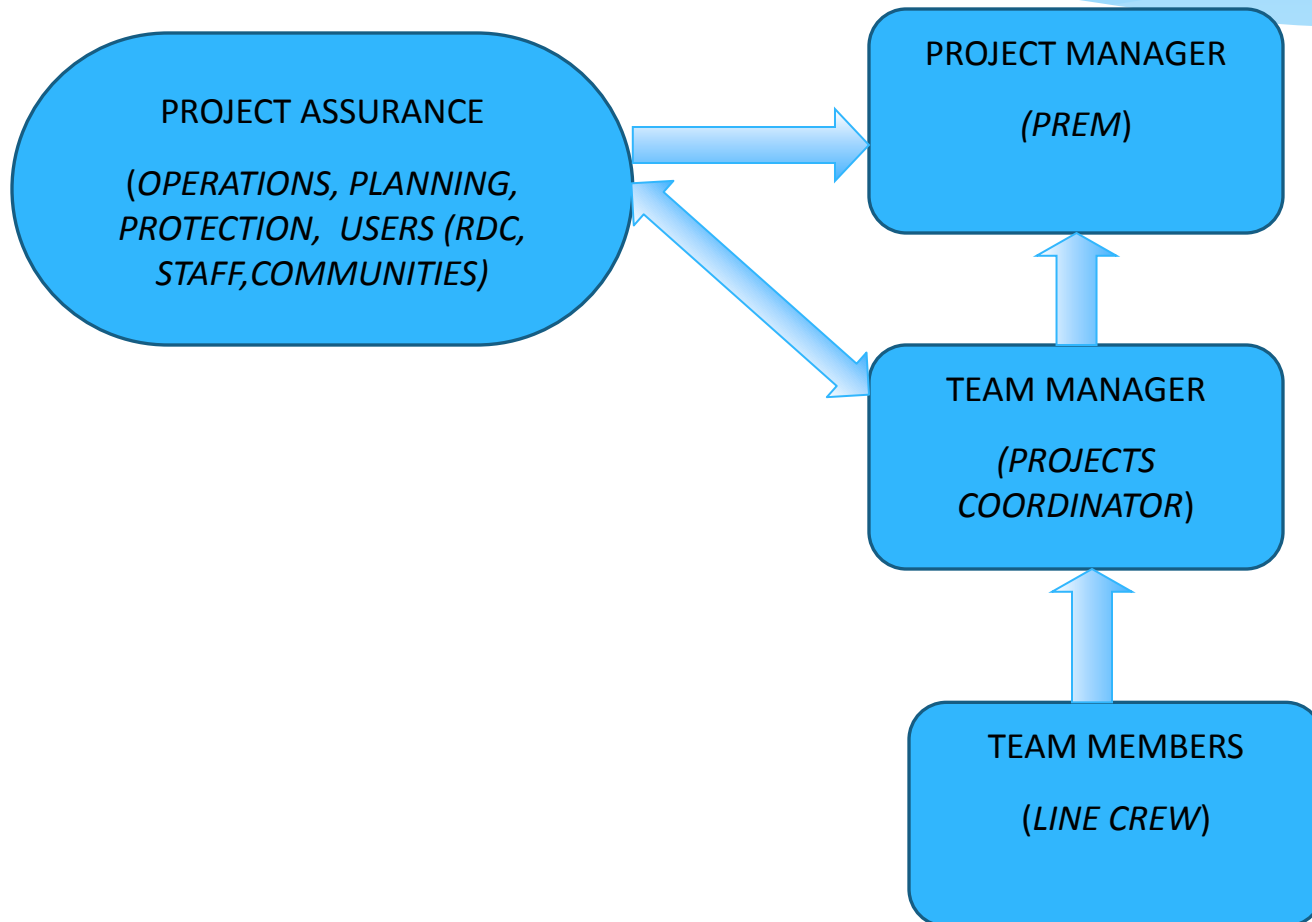
Continued Business Justification

- * The main objective of the project was to provide electricity supplies to the institutions for the following uses:
- * Domestic; pumping drinking water, heating , lighting, cooling and irrigating crops.
- * Institutions: pumping drinking water, ICT, heating lighting, refrigeration of vaccines and medicines and crop irrigation.
- * The area is dry and falls in agro-ecological Region V, characterized by very high temperatures, low and erratic rainfall. Agricultural production is adversely affected resulting in food insecure communities. The District is the largest producer of cattle in the country.
- * Before the project, the main source of energy was **firewood** for both villagers and institutional staff. Shallow wells are being used to irrigate crops as well as dry land farming.

Learn form Experience

- All practices, experiences and lessons drawn were listed, recorded and corrected - **Manual for Design and Installation of SWER Systems.**
- Lessons were also drawn as Project started, progressed until closure.
 - Participation of stakeholders was initially **poor** hence we had to engage top management in all consultations
 - The Team had to go to Mudzi twice, to **familiarise** with the project prior to implementation and even during implementation.
 - The adoption of PRINCE2 **methodology** just to try and improve on project management techniques.

Defined Roles and Responsibilities



Manage by stages

- * The project was planned, monitored and controlled on a **stage by stage** basis for ease of management.
- * *Project feasibility studies*: at this stage the project was defined, justification to do project was done and options at hand explored.
- * *Pre-implementation planning*: Resource budgets (materials, transport, manpower, stakeholder meetings, T &S allowances) were estimated.
- * *HV and LV Lines Construction*: 300m of 33kV, 50.5km of 19.1kV and 4.2km of LV lines were to be erected.
- * *Substation Construction*: 2x16, 3x32, 3x64kVA and the isolation transformers were put up.
- * *Pre-commissioning*: Lines, SWER earthing and substations were precommissioned.

Manage by exception

- * The linesman manages the line gang operations on a daily basis and sees to it that all lines' and substations 'specifications and standards as given are observed. Any **deviations** from given specifications and standards are referred to the PC.
- * The PC would plan, monitor and manage the working team in accordance to the given specifications. Any **deviations** would be discussed with the ZETDC Foreperson and further referred to the PREM.
- * The PREM would pay particular attention to the following:
 - Time: +/- 10% of time on target completion dates.
 - Cost: +/- 10% of the planned budget.
 - Quality: +/- 10% off quality target eg line spans of exactly 300m, 10% v-drop at the far end of the line.
 - Scope: +/- line length, sub capacities,
 - Risk: in accordance to the Agency Risk Management Strategy

Focus on products

- * The focus was on constructing a properly designed **SWER line** that would last for + 10 years. The line specifications had to be followed so as to avoid defect rectifications, acceptance by ZETDC on handover, operational challenges, etc.

Tailor PRINCE2 to the project environment

- *The PRINCE2 method had to be **tailored** so that it could be applied to the pilot project.

The 7 Themes

1. Business Case
2. Organisation
3. Quality
4. Plans
5. Risk
6. Change
7. Progress

Business Case

- * **Justification:** To provide electricity supplies to clinics, primary and secondary schools, government extension offices, rural service centres and homesteads for domestic and other purposes.
- * **Estimated costs:** The project costs were estimated. (Materials, Manpower, transport, administration, commissioning, etc.)
- * **Risks:** major risks were identified, assessed and control measures put in place.
- * **Expected benefits:** poverty to be alleviated through irrigated crops, large head of cattle would increase disposable income in addition to beef, healthy and learned communities.

Business Case contd.

- * **Time scales:** The project commenced beginning of May 2014 and was expected to be completed in 4 months' time
- * **Costs:** Project costs based on the estimated scope were calculated.
- * **Investment Appraisal:** Being a pilot project no proper appraisal was done. It was difficult to evaluate the project properly given that project costs were heavily underestimated. However a qualitative analysis was done and justified by the social benefits to be derived.

Organisation

- * **Directing:** The **Operations Director** was responsible for overall direction and management of the project within the constraints set out by the REA corporate strategy. He would approve all plans, authorize deviations and communicate with the stakeholders.
- * **Managing:** The **PREM** was the Project Manager and was responsible for the day to day management of the project. She ensured the line would be constructed in accordance with time, cost, quality, scope, risk and benefits.
- * **Delivering:** The **Project Coordinator**, Linesman, Drivers and line crew members were responsible for the line and substation construction works within the specified timescale and cost.
- * **Assurance:** **ZETDC, REA Project Planning and Support Department** are offering project assurance roles
- * **Communication strategies:** Weekly and monthly reports

Quality

Quality plan:

- SWER HV line inspections and the requisite standards and specifications,
- LV line inspections and the requisite standards and specifications,
- Isolation transformer, distribution substations inspections
- Earth resistivity tests and recommended values,
- Pre-commissioning activities and checklists
- Final commissioning activities and checklists.

Quality contd

Quality Control

- * Soil resistivity measurements.
- * Earth resistance measurements.
- * HV, LV line surveying and pegging, hole digging, pole dressing and erection, line stringing inspections.
- * SWER Earthing, isolation point equipment and substations construction inspections.

Quality Assurance:

- * REA Project Planning, ZETDC Operations and Protection assistance with ensuring quality planning and control was in place.

Plans

Project Plan: (PREM)

- ❖ Project scope definition
- ❖ Project activities identification
- ❖ Resources identification
- ❖ Estimates and schedules preparations
- ❖ Draft document production

Stage Plans (PC)

- ❖ Detailed work breakdown structure

Team plans (Linesman)

- ❖ Daily routine plans based on the PC's plans

Risk

- * **Team:** occupational, health and safety, and operational (timing and quality) risks.
- * **PC:** identify and assess reworks and targets risks - time, quality and scope.
- * **PREM:** risks affecting project objectives, project acceptance, reworks, and targets in terms of time, cost, quality, scope and benefits
- * No registers for the particular project were put in place. Provincial Risk Register was rather utilized and updated.
- * There was no separate risk budget for the project.

Risk contd.

Cases in point were:

- * Non- engagement of ZESA : acceptance disputes on project handing over for operating and maintenance on completion, reworks due to poor workmanship, electrocutions and shocks to communities and livestock arising from high step and touch voltages due to poor earthing as well as equipment damages due to poor operating and maintaining by ZESA .
- * Non observance of targets in terms of time, cost and scope : budgets overshooting resulting in a nonviable project despite the social benefits to be derived.
- * References were made to the REA Risk Management Policy. All provisions with respect to risk appetite, tolerances, procedures for escalation and defined roles and responsibilities were followed.

Change

- * Changes arising from project team members, ZETDC, communities were **assessed** and either **approved, rejected or deferred** by the PREM. Some changes were **escalated** to the Director for approval, rejection or deferment.

Issues:

- * All **concerns, queries, requests** for change, **suggestions** or **off specifications** raised during the project were referred to REA Project Planning and Support Department for further discussions and deliberations prior to approval, rejection or deferment by PREM and/or Operations Director.

Change contd.

Cases in point were:

- * When CAFCA failed to supply the balance of 33km of 26sqmm SNIPE conductor in time.
- * Team break for the Annual Sports Festival from 31 July to 25 August 2015. The PREM had to accept the request despite the impact on the project delivery schedules.
- * On completion of pole erection in July 2014, we only managed to string 18 km of the 19.1kV line and left the balance due to unavailability of 26sqmm conductor. Transformer LV arrestors and distribution transformers were also not available as suppliers failed to deliver in time hence requests to halt the project were raised and granted.
- * After conducting load flow studies, recommendations to upgrade conductor from 10 to 26sqmm were done. A request for the upgrade was granted by the Director and procurement was initiated.

Progress

- * The **PC** controls progress at site within the given tolerances of time, cost, quality and scope. He regularly visits site for progress assessment, quality checks and assisting the Linesman.
- * The **PREM** monitors weekly progress and whether the day to day controls are within the 10% set tolerances for time, cost, quality and scope. She is responsible for authorisations at project site as well as receiving progress update reports from site. In the case of exceptions and changes, she uses project registers and logs to review progress and identify issues and risks needing to be resolved.
- * The **Directorate** main controls included authorizations of project ACEs, fund requests, progress and project closure. He constantly reviews project progress through weekly, monthly and highlight reports.

The 7 Processes

1. Starting up a project
2. Directing a project
3. Initiating a project
4. Controlling a stage
5. Managing product delivery
6. Managing a stage boundary
7. Closing a project

Starting up a project

- * A justification to initiate the SWER project was done by the PREM. Several options were considered and evaluated and the SWEREKI Area was selected.
- * Feasibility studies of the various supply options at hand and the option to be pursued were selected.
- * Structures for implementation i.e. directorate, province, and ZETDC were already in existence.
- * Lessons drawn from the Mudzi SWER project i.e. processes and procedures, techniques, tools used, (refer to SWER Manual) were adopted.
- * A consultative workshop was initially held with the local and Mudzi Steering committees to appraise on the new technology.
- * Initiation of the project was then planned.

Directing a project

- * The Operations Director and/or Chief Executive approved project proposals and would advise, direct and guide the PREM.
- * The PREM would seek advice whenever necessary during the project.
- * The Director will authorise closure of the project at the end.

Initiating a project

- * After carrying out actual surveys, the project actual scope was compiled and load flow calculations done.
- * Project programme of works were worked out.
- * Project controls and base line were established.
- * Risks, issues and changes identification, assessment and controls were conducted.
- * Progress monitoring and controls mechanisms were devised.
- * Information needs, format and time were considered and formulated.
- * The PREM as PM prepared the project plan, setup controls, and assembled the ACE (initiation documents)

Controlling a stage

- * The PREM authorized all works to be done (STFs, manpower requests, transport requests, change requests, etc), monitored progress through weekly reports, reviewed progress status, reported highlights through weekly and monthly reports, watched for, assessed and dealt with issues and risks, took any corrective action and or escalated any such whenever there was need.

Managing product delivery

- * The PC ensured HV and LV lines and substations were constructed by the line gangs by creating team plans, ensured the line and substations were constructed in accordance with the SWER Manual and coordinated inspections with ZETDC.
- * On the absence of specific job cards in our system, issuing, execution and closure of work packages was not properly documented.

Closing a project

- * In order to de-establish camp, the PC will have the project commissioned, verify acceptance by ZETDC of the line and substations and handover the project.
- * The PREM will review the performance of the project, assess benefits realised, and ensure project costs are no longer incurred, the project would be formally closed through compilation of a vote completion and/or project appraisal report.
- * She will prepare planned closure of the project, officially hand over to ZETDC, evaluate and recommend project closure to the Directorate.

Tailoring PRINCE2 to project

- * The PREM made frantic efforts to ensure PRINCE2 was used appropriately on the project ensuring there was correct planning, control, use of processes and themes.
- * Nil particular Risk, Quality, Configuration, Communication Management Strategies for this project were formulated. Reference was made to the organisational ones in existence.
- * REA's terms and language was used in the project i.e. project proposal for business case, job description for work package, etc.

Recommendations & Conclusion

- * PRINCE2 methodology provided a systematic, structured, practical and proactive approach to the management of the Swereki SWER project.
- * The approach capitalised on customer satisfaction, continuous improvement and learning thereby guaranteeing success.
- * Challenges (lack of knowhow of the new technology) hence some tasks and activities involved in implementation were not clear upto the point of execution. A lot of research had to be done prior to and during implementation.
- * REA needs to adopt a proper project management system.
- * Organisations that aspire to achieve world class project management status should seriously consider adopting structured project management methodologies!