electricity & energy

Department:
Electricity and Energy
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF ELECTRICITY AND ENERGY

PCEE BRIEFING

Integrated National Electrification Programme (INEP)

DR KGOSIENTSHO RAMOKGOPA (MP)
Minister of Electricity and Energy

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PRESENTATION OUTLINE

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02 BACKGROUND & CONTEXT

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DEPARTMENTAL STRATEGIC PRIORITIES

VISION FOR ENERGY TRANSFORMATION: 2024–2029

Achieve Universal Access: Available, Affordable and Quality Energy

Attain Sovereign and Regional Energy Security

Drive Industrialisation and Lead Innovation

Qualitatively Transform Energy Demographics

Assert SA, Continental and Global Energy Leadership

INTEGRATED NATIONAL ELECTRIFICATION PROGRAMME

INEP BACKGROUND & CONTEXT

1

- Energy Security is critically important for SA's growth, development and the eradication of poverty.
- **Integrated National Electrification Programme (INEP)** entails electrification of households countrywide.
- The goal is to reach **Universal Access** by 2030!

2

- Classified in DORA under **INEP Municipality** (Schedule 5B) & **INEP ESKOM** (Schedule 6B) and disbursed through the DEE on annual basis.
- **Grid Electrification** of households and supplemented with **Non-Grid Solutions** (currently Solar Home Systems) in far flung rural areas.

3

- Connection rollout is consistently outpaced by the rising demand for new electrification.
- **Access** to electricity, **affordability** and **unplanned outages** are some of the main challenges facing the industry.

4

- According to the 2022 census data, electricity access in South Africa has shown **remarkable improvement.**
- Despite its successes to date, there are still **ca 1.6 million** households without supply of electricity according to StatSA information.
- However, if illegal connections are added, the real backlog could reach **ca 3 million** households that are without a metered supply of electricity.

"DEE continues to champion inclusive electrification and the elimination of energy poverty."

INEP BACKGROUND & CONTEXT CONT…

- With **94.7%** of households now electrified, South Africa stands as a beacon of progress in expanding energy access. However, our mission is far from over.
- DEE remains steadfast in its strategic commitment to **Achieving Universal Access** to electricity by 2030.
- To this end, **R3.9 billion** has been allocated in the current financial year through INEP to connect the remaining **1.6 million unelectrified households**.
- This includes **R247 million** specifically earmarked for the national roll-out of **Solar Home Systems**, targeting remote and underserved indigent households.

8.4 million

- ✓ Number of households connected to the grid.
- ✓ Over 200 000 households are on Non-Grid Technologies.

94.7%

Households with access to electricity increased significantly from 58.1% in 1996.

R110 Billion

Expenditure in the last 30yrs.

200

Number of participating Munics and ESKOM.

"Access to Electricity is Not a Privilege — It's the Right to Dignity, Inclusion, and Opportunity."

CURRENT INEP MODEL

ROLE OF INEP IN SUMMAY

- *Planning*
- *Administration*
- *Monitoring and Evaluation*
- *Reporting*
- *Technical Audit and Coordination*

KEY STAKEHOLDERS AND THEIR ROLES

ESKOM

- ✓ Implementing Agent.
- ✓ Gx, Dx, Tx and implementing electrification program to municipalities.

MUNICIPALITIES

- ➢ Implementing Agent.
- ➢ Municipal electrification projects and providing electricity services to communities.

NERSA

Regulator

NATIONAL TREASURY

Funding electrification programme. through DORA.

SALGA

Capacity building for municipalities to implement electrification projects.

.

CONTRACTORS

Implementation of both Gird and Non-Grid programme technologies.

CURRENT FUNDING MODEL

Funding
- Transfers from National Treasury

Fiscal

Programme
- Managed by DEE

Grid Electrification

Non-Grid Electrification

Implementation
- Implementing Agencies

Eskom
- Connections
- Infrastructure

Municipalities
- Connections
- Infrastructure

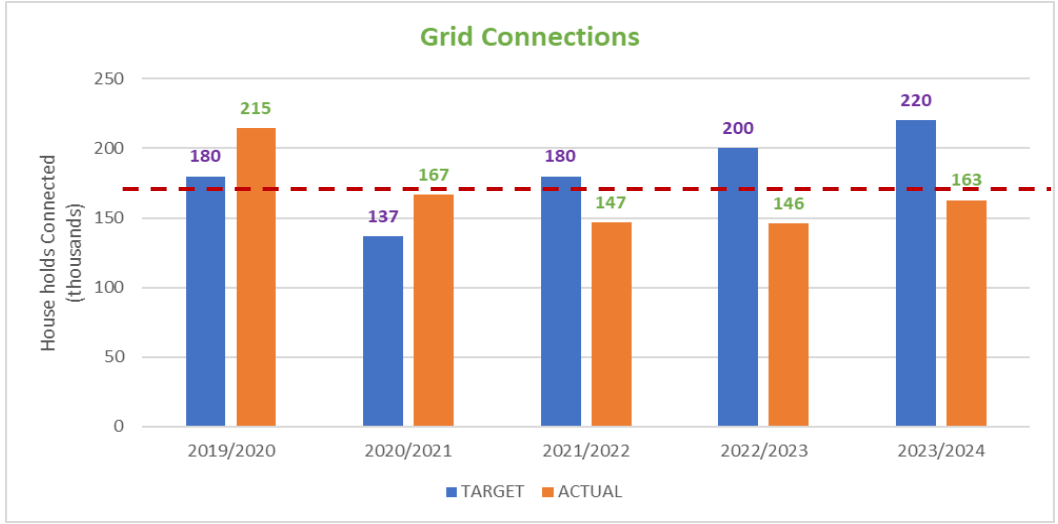
Non-Grid Service Providers
- PV Solar Home Systems

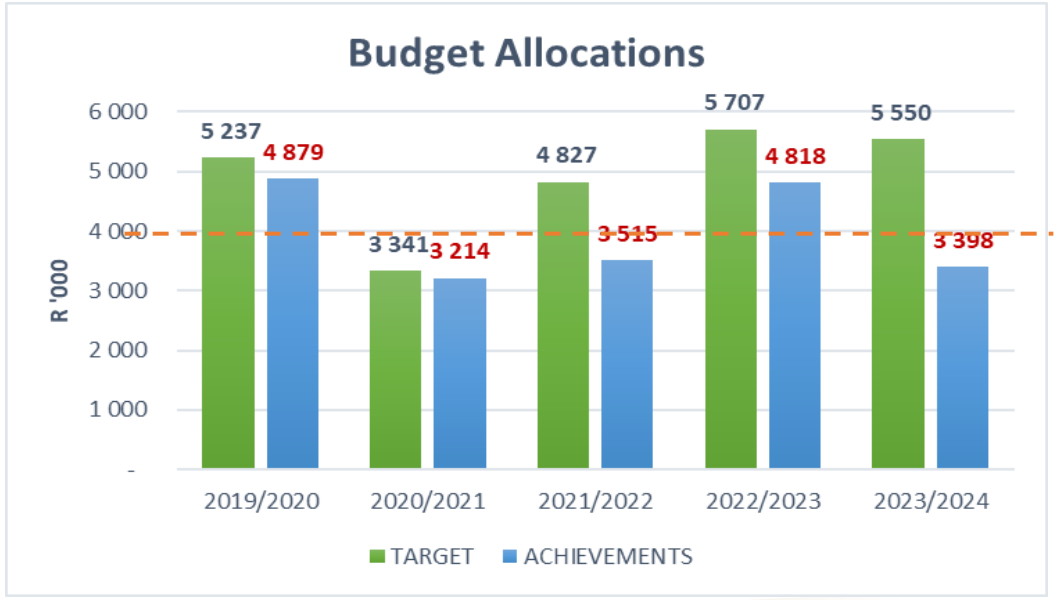
HISTORICAL PERFORMANCE

- ✓ 837k connections against a target of 917k in the last five years.
- ✓ Average of 167k annually.

- ✓ At the current pace, the race to Achieving Universal Access by 2030 is under threat.
- ✓ An annual average of over **300k** grid connections are required to eradicate the current backlog.

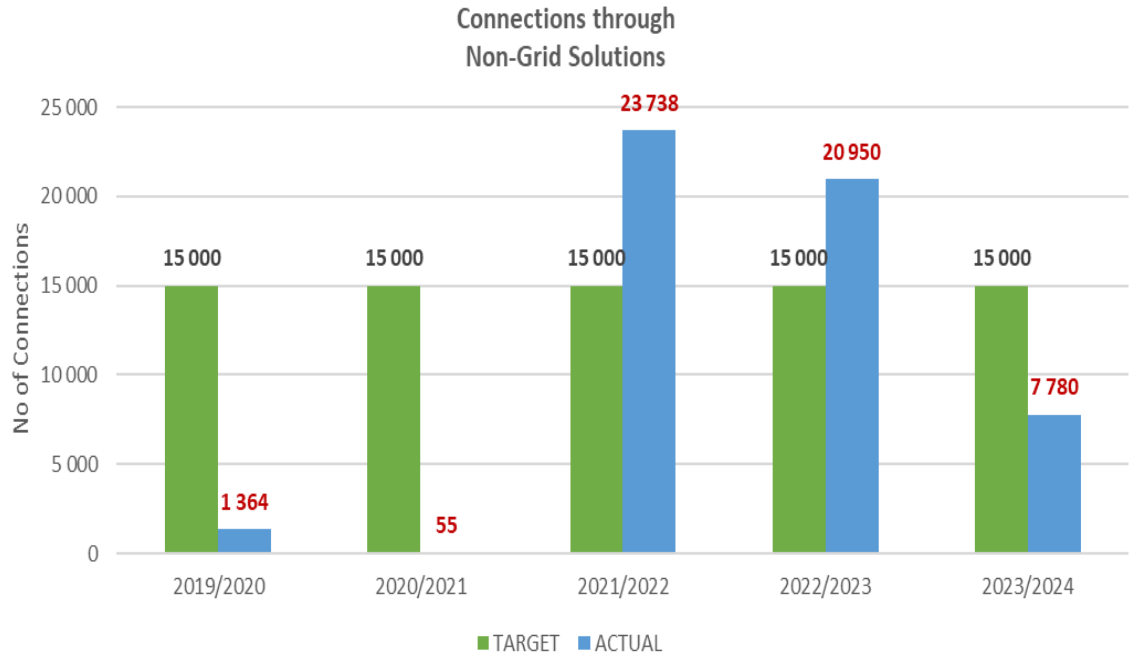
- ✓ R19.8 BN spent against a target of R24.7BN in the last five years.
- ✓ Average of R4 BN annually.
- ✓ A declining trend on expenditure in the last 3 yrs.
- ✓ Average expenditure of 82%.





NON-GRID PROGRAMME – SOLAR HOME SYSTEMS

- ✓ ca R227 million spent to date.
- ✓ All companies completed installations for 2024/25.
- ✓ 18 000 indigent households benefited in 2024/25.
- ✓ Overall performance exceeded expectations.



- ✓ SHS systems are small and meant to offer interim relieve.
- ✓ 150Wp (DC) system to power lights, radio and tv.
- ✓ Fitted with 6x LED internal lights and 2x outdoor lights.
- ✓ Solar panels and battery (Lithium iron).
- ✓ There are training opportunities for aspirant young electricians with the massive rollout of the SHS and other related Technologies in future (e.g. Micro-Grids).

CONNECTIONS – 31 MARCH 2025

	MUNICIPALITIES		ESKOM	
PROVINCE	**PLANNED CONNS**	**ACHIEVED CONNS INCLUDING ROLLOVERS**	**PLANNED CONNS**	**ACHIEVED CONNS INCLUDING ROLLOVERS**
Eastern Cape	9 090	13 570	8 278	17 882
Free State	1 539	1 460	1 436	1 910
Gauteng	1 952	1 845	1 923	2 340
Kwa Zulu Natal	7 421	8 023	9 039	23 631
Limpopo	8 256	9 397	5 479	8 548
Mpumalanga	2 741	2 383	5 965	7 758
Northern Cape	3 317	5 199	4 669	5 129
North West	2 872	3 948	8 459	9 870
Western Cape	3 149	7 129	5 123	6 004
TOTAL	**40 337**	**52 954**	**50 371**	**83 072**

"136 026 connections were achieved last year…still below required min 300 000."

CURRENT CHALLENGES

- Significant budget reduction by NT on both ESKOM and MUNIC programmes (meaning reduction in the number of connections to be achieved.
- Backlog wrt need to refurbish ageing infrastructure versus the rapid demand in new investments to catch up with rapid growth.
- Uncoordinated planning within municipalities and high reliability of consultants within municipalities.
- Capacity constrains and Project management deficiencies within participating municipalities leading to under expenditure and poor performance.
- Municipalities are not performing as required - Internal procurement processes taking too long- (i.e. appointment of service providers).
- Theft, vandalism, illegal connections, meter by-pass and ghost vending.
  Incomplete and illegal occupation of houses.
- Steep tariff hikes are making electricity unaffordable.
- Disruptions by “construction mafia” on current projects demanding 30% fee.

“These persistent challenges warranted a review of the current INEP Model.”

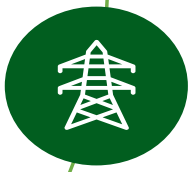
THE REPURPOSING OF INEP

KEY FOCUS

- Resolve Current Backlog
- Electrify Remaining areas
- PMO Establishment
- Costing, Affordability & Timeframe Acceleration

Electrify at least **1.6 million** households by 2030

Availability of reliable, affordable electricity services to at least **97%**



Support social and economic development

Universal access to meet basic electricity requirements of all citizens

- Urgent action needed to tackle **Energy Poverty** in rural and peri-urban areas.
- INEP review informed a new **"Action Plan"** for Universal Access.
- **Challenges**: Remote rural areas, poor infrastructure, difficult terrain, and high costs!
- Repurposed model adopts a Hybrid approach (Grid and Decentralised Systems including micro-grids).

OBJECTIVES AND SCOPE - INEP ACTION PLAN

Provision of a comprehensive and actionable roadmap to achieve 97% universal electricity access by 2030.

Analysis of Electrification Programmes: Review of provincial electrification master plans, focus on financial expenditure, number of households connected, cost per connection.

Technology and Future Plans Assessment: Analyse & evaluate future plan towards universal access, including technology options for grid expansion, off-grid and micro-grid solutions, emphasis on cost-benefit analysis and local supply chains.

Affordability and Financial Sustainability: Assess affordability of electricity for low-income households, propose subsidy/support models, ensure financial sustainability of INEP through suggesting various financing options.

Project Management and Implementation: Propose establishment of a Project Management Office (PMO) to oversee implementation of "**Action Plan**" and ensure project milestones are achieved efficiently and timeously.

DEE policy & mandate holder | **DBSA implementing partner** | **SANEDI technical advisor**

CURRENT STATUS OF ELECTRIFICATION

Households with access to electricity **increased significantly to 94,7%** from 58.1% in 1996

8.4 million households connected to grid

Over 200 000 households are on Non-Grid Technologies

Approximately **1,59* million households (Provincial Master Plans)** remain **unelectrified** across South Africa with varying numbers within each province.

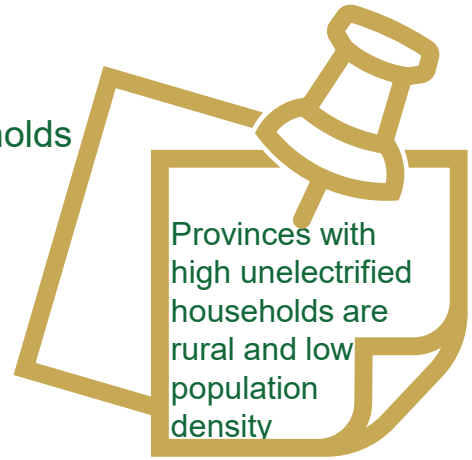
Master Plans for six provinces completed

FS, NC and WC still outstanding

All 9 provinces with extrapolation of figures for missing 3 plans

Analysis of Provincial Electrification Master Plans

Analysis focused on unelectrified households across all 9 provinces and assessed feasibility of grid expansion/alternative solutions such as microgrids.



Grid extension will be time consuming, costly and challenging

- ✓ **Gauteng** has large numbers of unelectrified households due to presence of **informal/unproclaimed settlements**
- ✓ Rural provinces viz. Limpopo, Mpumalanga, and Eastern Cape present unique challenges: geographic barriers & low population density

National grid network

- ✓ Grid network in South Africa is extensive & expansive due to gaps related to geographic factors (difficult terrain, distance from existing infrastructure, and sparse population distributions)

TECHNOLOGY FIT FOR PURPOSE

Criteria for Decision Grid Connection vs. Microgrid Deployment

1

Distance to Existing Grid Infrastructure

Prioritise grid extension areas within 10-15 km of existing infrastructure, cost per connection viable

Areas beyond 15 km, microgrid deployment more cost-effective.

2

Population Density

High population density (urban/peri-urban) focus on grid connections, extending grid more economic connecting large numbers

Low-density rural areas better suited to microgrid solutions

3

Geography and Terrain

Challenging geographic regions where grid extension prohibitively expensive prioritises microgrid solutions

Flat accessible regions more suitable for grid extension

4

Energy Demand

Higher energy demand (e.g. small business, schools, clinics) in rural areas justifies use of MG3 microgrids or grid extension

Low energy demand households, particularly indigent communities, MG1 microgrids

5

Cost per Connection

If cost per connection for grid extension exceeds a specific threshold (e.g. R70,000) microgrids should be deployed, offer more affordable alternative

CONSIDERED MICROGRID SOLUTIONS

Technology Type	Cost per Connection (70% accuracy High end est.)	Primary Use Case	Service Level	Key Components	Advantages	Limitations
Type 1: Stand-Alone Low-Cost FBE	R 35,000	Low-income to no and remote areas	Basic services: lighting, phone charging, minimal appliance use	Entry-level system with a 600W inverter, two 400W solar panels, 1 x pack of 4 x 100Ah single cell 2.3V lithium batteries (approx. 1KWh) for e.g., lights, cell phone charger, 9KG gas cylinder + cooker, alternative water heating technology.	Low cost, quick deployment, designed for minimum service needs	Limited capacity unsuitable for expanded energy demands; only basic appliances
Type 2: Medium-Cost AC Microgrid	R 55,000	Rural communities with moderate energy requirements	Mid-level services: lighting, small refrigeration, TV, additional appliances	Small system with a 1200W inverter, four 550W panels, and 2 x pack of 4 x 100Ah single cell 2.3V lithium batteries (approx. 2KWh), supporting small appliances like a fridge and laptop, 9KG gas cylinder + cooker, alternative water heating technology.	Increased service capacity meets the broader needs of rural communities	Moderate cost, capacity limits for areas with higher consumption needs
Type 3: Full Microgrid Solution	R 120,000	Higher energy demand households, small businesses	Comprehensive services: supports large appliances, small-scale economic activities	Medium system with a 3000W inverter, six 550W panels, and 3 x pack of 4 x 100Ah Single cell 2.3V lithium batteries (approx. 3KWh) for higher-demand appliances, including a microwave, 9KG gas cylinder + cooker, alternative water heating technology.	High service level, robust and resilient power supply for small business growth	High cost per connection; requires extensive resource availability and regular maintenance
Grid-Tied Electrification	Varies Per Province (R10k-R134k, ave. R57k)	Urban and peri-urban areas	Full grid services: consistent high-demand service	National grid extension, from point of common coupling (PCC) to the distribution board (DB). This is the shallow connection cost.	Long-term reliability, sustainability, ideal for economic growth and industrial activity	Infeasible for remote areas, high setup costs in low-density regions

AFFORDABILITY ANALYSIS

Socio-economic Profiling of Target Beneficiaries

- ✓ **LSM: 1 – 3:** Little to no income, energy consumption is low and limited to basic lighting, cooking and mobile phone charging.
- ✓ **LSM: 4 – 6**: This group is slightly better off but still has limited income. may have access to basic appliances like refrigerators constraints in terms of energy affordability.
- ✓ **LSM: 7 – 8:** households generally have a stable income, can afford higher energy consumption.

Free Basic Electricity (FBE) Requirements

- ✓ **FBE policy** ensures poorest households have access to minimum level of electricity at no cost.
- ✓ Households (LSM 1-3) receive a monthly allocation 50kWh, to cover basic energy needs (lighting, cooking, and powering small appliances).
- ✓ Studies indicate that households require support beyond 50kWh (e.g. 200kWh/month for households LSM 1-3).

Microgrid Affordability

- ✓ Microgrids involve significant **upfront investment** once established, **operational costs remain stable** and lower than traditional grids. Long term renewable energy sources have no fuel costs.
- ✓ Microgrid lifespan comparable to traditional grids combined with localised, **modular infrastructure.**
- ✓ Combination: **Initial direct financial support, education**, **EE appliances** make electricity affordable & sustainable.

Proposed Measures to Cushion High Tariffs

- ✓ **Tiered Tariff Models**: households consuming less electricity to pay lower rate (encourages energy conservation & ensures basic needs met)
- ✓ **Flat-rate Tariffs for Off-grid Solutions:** households pay fixed monthly fee for predefined electricity usage
- ✓ **Subsidised for Rural and Informal Areas:** Government subsidies reduce electricity cost for rural/informal areas

ESTABLISHMENT OF PROJECT MANAGEMENT OFFICE

*Placement of Project Management Office was compared between **DEE & DBSA***

Critical Success Factor

*Establishment of **dedicated PMO** is critical to ensure that electrification goals are achieved efficiently and sustainably. PMO will serve as centralised body responsible for ensuring that various components of electrification initiative are aligned, on schedule and efficiently executed*

- Supporting Project Coordination and Management
- Strengthening Stakeholder Engagement
- Enhancing Monitoring and Evaluation (M&E)
- Providing Financial Oversight
- Technical Support and Capacity Building
- Asset ownership will follow the existing distribution licence

DBSA Pros and Cons

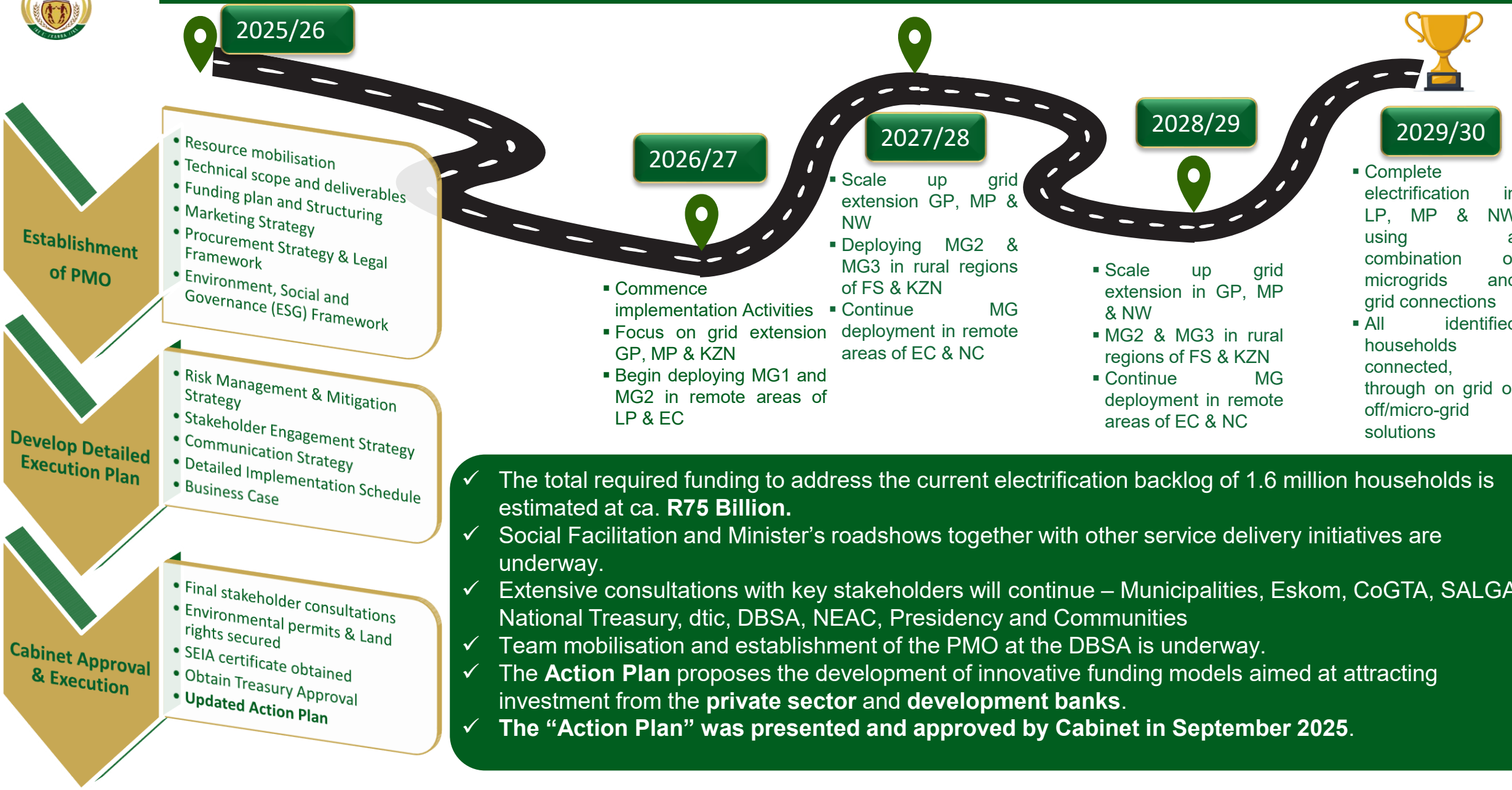
✓ Access to Financial Expertise: experience financing infrastructure projects
✓ Capacity and Technical Expertise: Infrastructure, Subject Matter Experts, Project Management, Risk, Financial Management, Legal and Compliance.
✓ Integrated Infrastructure programs: synergies with water transport & energy initiatives to enhance rural development
✓ Credibility with Donors: reputation could secure additional funding from international financial institutions
✓ Independent Decision-Making: greater autonomy allows for objective project evaluations & decision-making
✓ Governance Structures: Excellent and credible corporate structures.

Could be addressed by utilizing Institutional knowledge from current INEP Team

× Disconnection from Policy: risk of being less aligned to specific energy policies and regulations of DEE
× Communication Delays: information flow between DBSA & DEE may slowing decision-making (DEE highlights poor track record from historical engagements of this nature)
× Administrative Costs: DBSA fees for implementing agent services may increase operational costs
× Limited Energy Sector Expertise: DBSA may lack in-depth understanding of specific energy challenges
× Conflicting Priorities: DBSA's existing infrastructure projects may compete

PROPOSED ACTION PLAN

INDICATIVE TIMELINE FOR ACTION PLAN IMPLEMENTATION



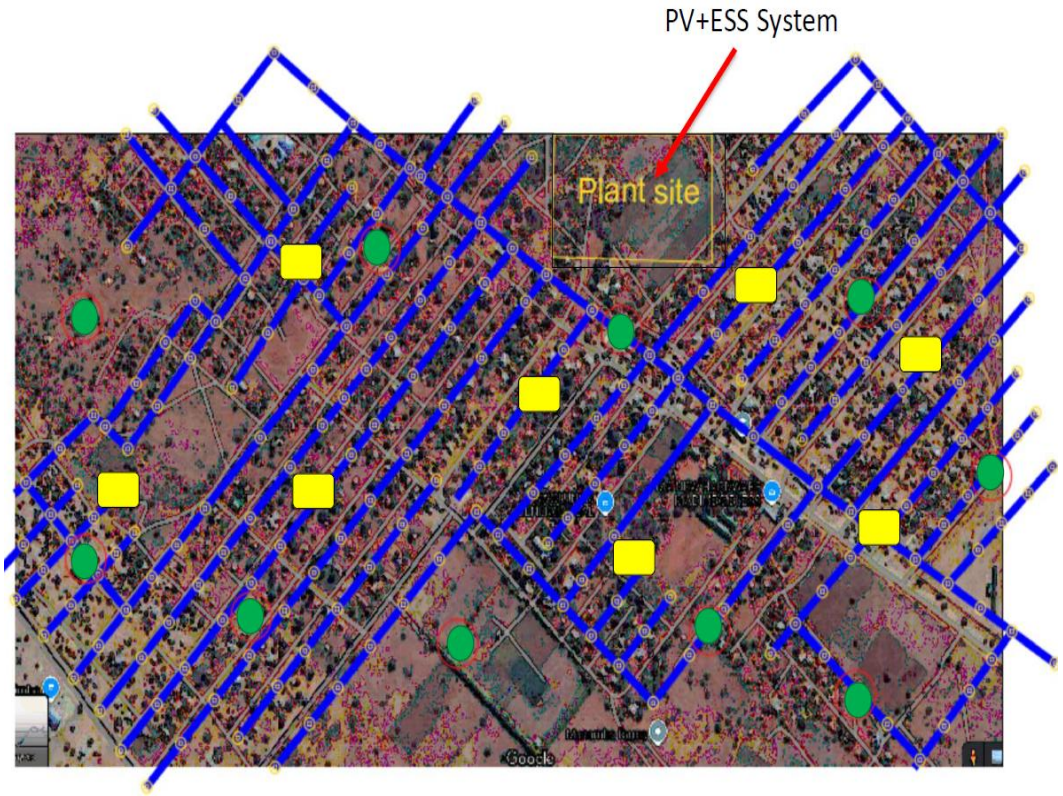
- ✓ The total required funding to address the current electrification backlog of 1.6 million households is estimated at ca. **R75 Billion.**
- ✓ Social Facilitation and Minister's roadshows together with other service delivery initiatives are underway.
- ✓ Extensive consultations with key stakeholders will continue – Municipalities, Eskom, CoGTA, SALGA, National Treasury, dtic, DBSA, NEAC, Presidency and Communities
- ✓ Team mobilisation and establishment of the PMO at the DBSA is underway.
- ✓ The **Action Plan** proposes the development of innovative funding models aimed at attracting investment from the **private sector** and **development banks**.
- ✓ **The "Action Plan" was presented and approved by Cabinet in September 2025**.

IDENTIFIED RISKS & MITIGANTS

IDENTIFIED RISKS & PROPOSED MITIGATING MEASURES

✓ Strengthen security of Installed Infrastructure. ✓ Illegal Connections and Vandalism.	✓ Strengthen security with surveillance, fencing, and law enforcement support. ✓ Increase patrols, install tamper-proof tech, and engage communities.
✓ Community Resistance/Lack of Social Acceptance. ✓ Procurement Delays.	✓ Intensify stakeholder engagement and public awareness efforts. ✓ Streamline processes and plan early to avoid delays.
✓ Supply Chain Constraints. ✓ Institutional Capacity Constraints.	✓ Supply local suppliers and build resilient value chains. ✓ Provide training and strengthen internal capacity.
✓ Inadequate Financial Resourcing ✓ Policy Misalignment	✓ Align funding with timelines and mobilise diverse finance sources. ✓ Fast-track enabling policies and improve interdepartmental coordination.

MICRO-GRID CASE STUDY



Madimbo Village Information												
Home Power (Max W)	Home Power Usage	Home Power (Avg W)	Home	Backup Time (H)	KWH	PCS (kW)		BESS (kWh)	PV (KW)	Wire Pole+PDU (PCS)	Wire (m)	WIFI System (PCS)	Solar High Mast Lamp (PCS)
800	25%	200	475	9	855	95	304	1,073	530	150	5,000	100	10
800	80%	640	475	3	912	304							

- Partnership with Huawei will be useful to demonstrate the benefits of **Micro-Grids**.
- The **two pilot** sites in Limpopo will be used as case studies.
- Provide green, stable power and network for **475 Households.**
- Ensure each household with **800W Max** power and 24 hours backup.
- Based on the site survey and power statistics the village:
  - ✓ Currently the maximum load power of each household is **800W**;
  - ✓ System design: **Solar 530kWp + PCS 304kW + BESS 1 073kWh.**

CONCLUSION

- Department will introduce measures to ensure that **poor communities are cushioned** against high electricity costs.
- The **Free Basic Electricity policy** and tariff structure will be reviewed.
- Innovative **Technological solutions** will be rolled out to provide much needed relieve.
- **Decarbonisation, Decentralisation, Digitisation and Democratisation** of electricity generation are key for long term sustainability of the industry.
- Department will explore and implement Innovative funding models in collaboration with DBSA and private sector to fund the much-needed capex for the programme in the next five years.
- The **repurposing of INEP** is crucial towards achieving the **Universal Access of Electricity by 2030!**

THANK YOU