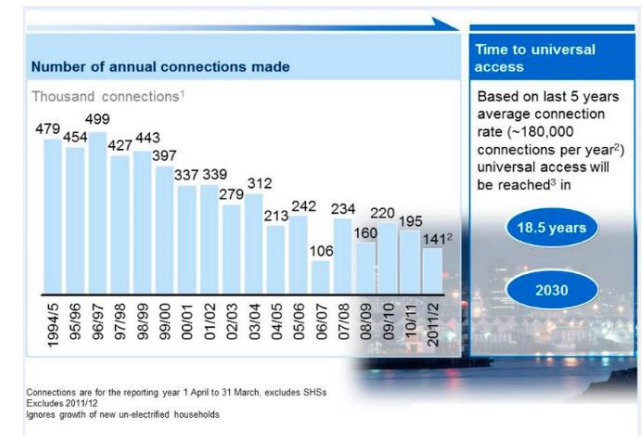


Stakeholder consultation
workshop:
Renewable energy contribution
towards universal access

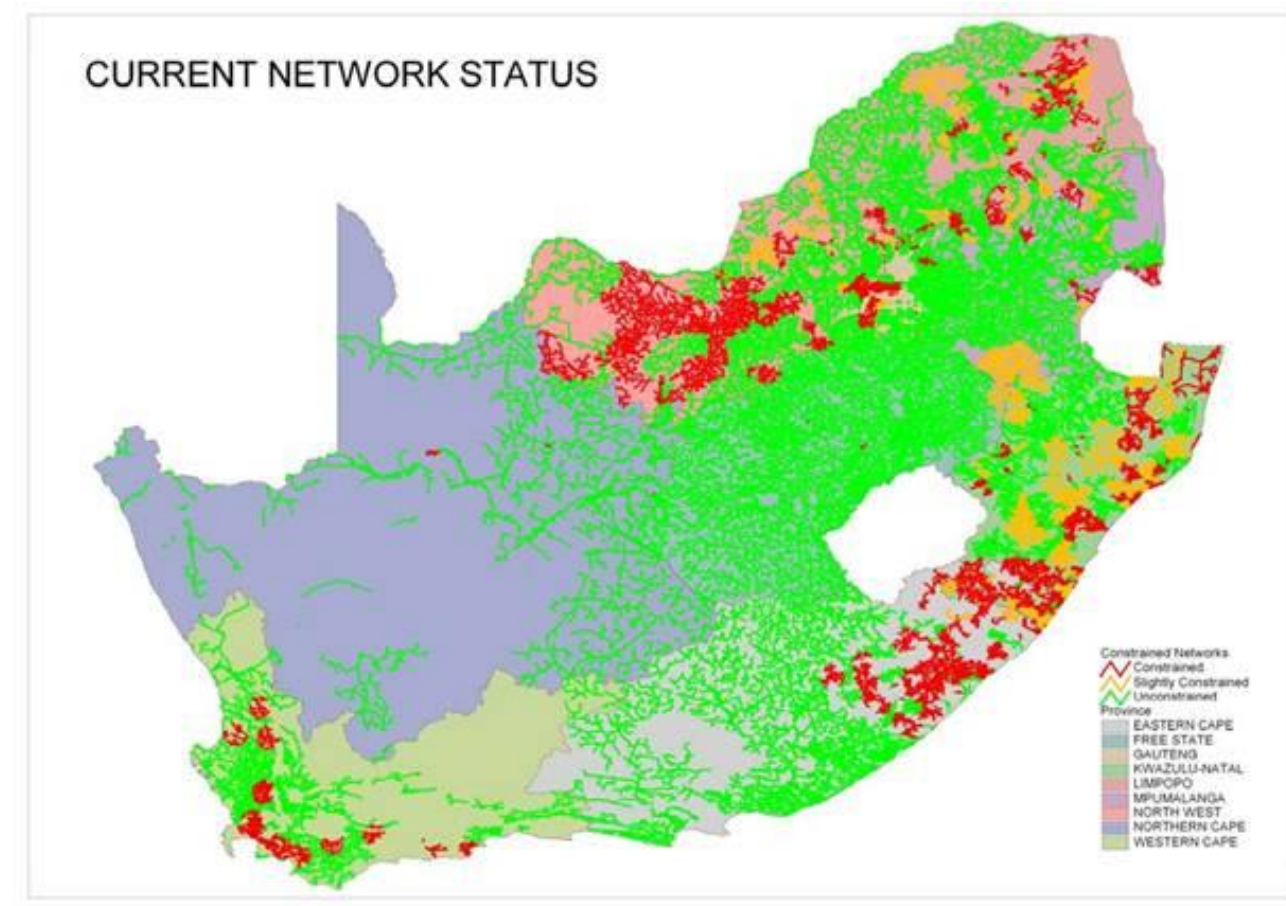
Off-grid access

Rationalising the need for off-grid

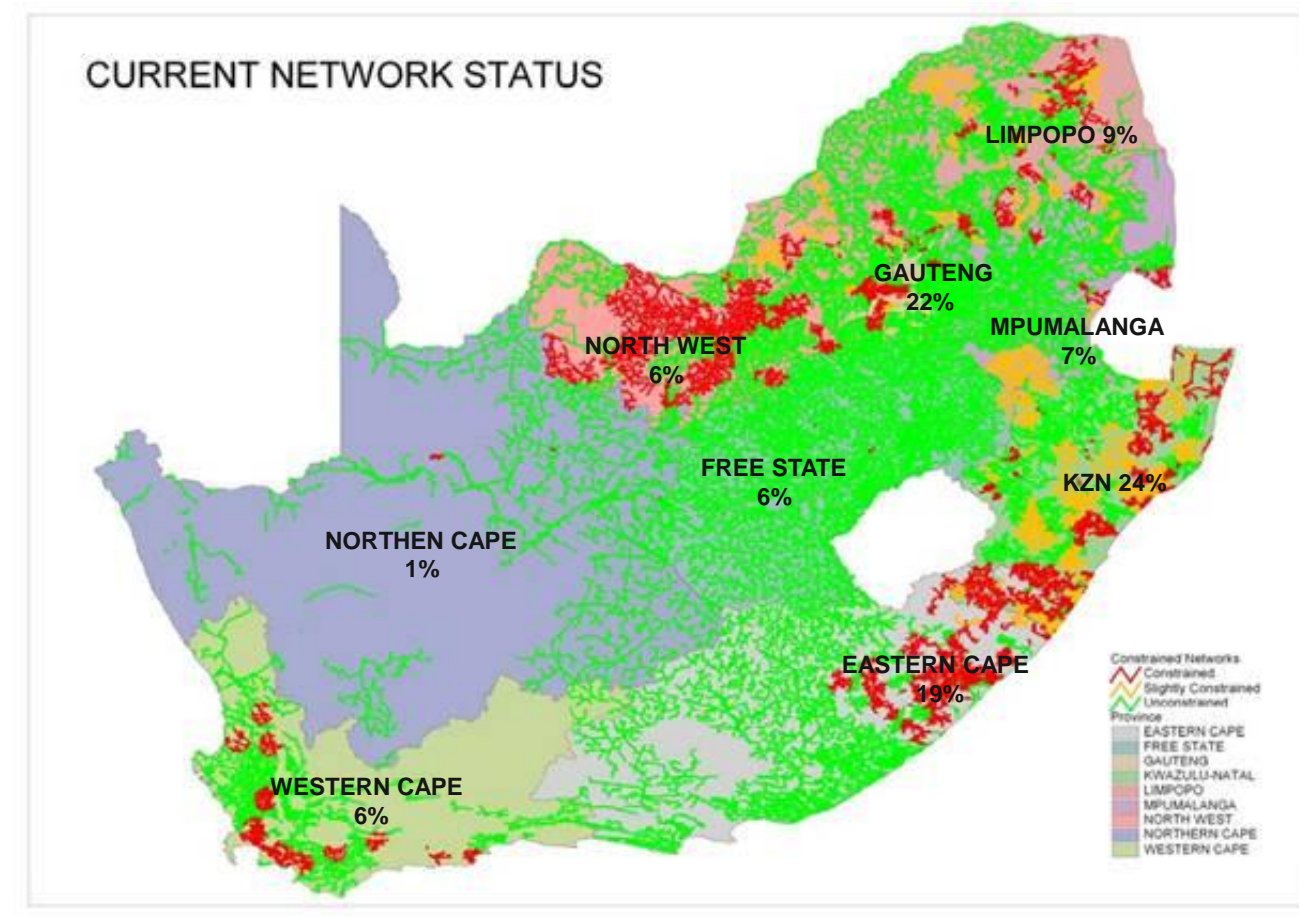
- Study (Aurecon) estimated ***maintenance backlog of R60-R80 billion***. Significant grid electrification in more remote areas is difficult as HHs at the end of existing distribution networks where performance (supply voltage & interruptions) at its lowest. Requires strengthening of reticulation and bulk networks.
- ***Connection costs rising*** – +/- R20,000 in rural areas (EC – 2012/3)
- Overall ***decline in installation rate***



Current network status



Network status & unelectrified HHs



The scale of the challenge/opportunity

| Year | Number of HHs | Household growth | % growth |
|------|---------------|------------------|----------|
| 2015 | 15274881 | | |
| 2016 | 15587093 | 312212 | 2.04% |
| 2017 | 15913537 | 326444 | 2.09% |
| 2018 | 16256442 | 342905 | 2.15% |
| 2019 | 16614917 | 358475 | 2.21% |
| 2020 | 16989407 | 374490 | 2.25% |
| 2021 | 17379366 | 389959 | 2.30% |

| | HH electrified | Budget | Ave cost/connection |
|------|----------------|-----------------|---------------------|
| 2013 | 202835 | R 3,117,211,000 | R 15,368 |

| | Unelectrified HH | New HH | Electrified HHs | Est budget required |
|------|------------------|--------|-----------------|---------------------|
| 2016 | 3,200,000 | 312212 | 234807 | R 3,608,561,384 |
| 2017 | 3,277,405 | 326444 | 246547 | R 3,788,989,453 |
| 2018 | 3,357,302 | 342905 | 258875 | R 3,978,438,926 |
| 2019 | 3,441,332 | 358475 | 271818 | R 4,177,360,872 |
| 2020 | 3,527,989 | 374490 | 285409 | R 4,386,228,916 |
| 2021 | 3,617,070 | 389959 | 299680 | R 4,605,540,361 |

Larger not
smaller

Current status of off-grid

- There is policy acknowledgement
 - NDP suggests role for off-grid (5% of HHs by 2030 $(60 \text{ mill}/3.5 \times 5\%) = 850,000$)
 - 50,000+/yr
 - New HH Electrification Strategy (Cabinet approved 26th June 2013)
 - 250,000 additional off-grid HHs by 2025 (25,000/yr)
 - Other policy resonance?
 - White papers (Energy & RE)
 - FBE/FBAE

Technology options

- Access to electricity
 - Solar lanterns – would this qualify as access? [Pico] – might not be ‘access’ but better than nothing – not UA but responsible service provision
 - SHS
 - Mini/micro-grids (solar, wind, biogas, etc.)
- General: improved access to modern energy services
 - Biogas
 - Improved cookstoves
 - LPG
 - SWH – not really addressing – DoE issue...

Commercial status?

| Technology | Commercial status – anywhere? | Commercial status – SA? | Policy position (SA) |
|---------------------|-------------------------------|--|--|
| Pico-solar products | Yes – Kenya, Tanzania, etc. | Yes – large retailers | Neutral/against (too small to officially sanction) |
| SHS | Yes – East Africa, Bangladesh | Yes, concession, non-concessions, pvt retailers | Pro |
| Mini/micro-grids | Yes(ish) – East Africa | No (there is interest) | Against (platinum exception) |
| Biogas digesters | Yes – Nepal | Small scale No (only 300 units in SA). Large scale possibly (Bio2Watt) | Neutral |
| ICS | Yes – Kenya | No | Neutral (DRDLR small quantities) |
| LPG | Yes – many places | Yes | Neutral – Pro; was good DSM tool in past |

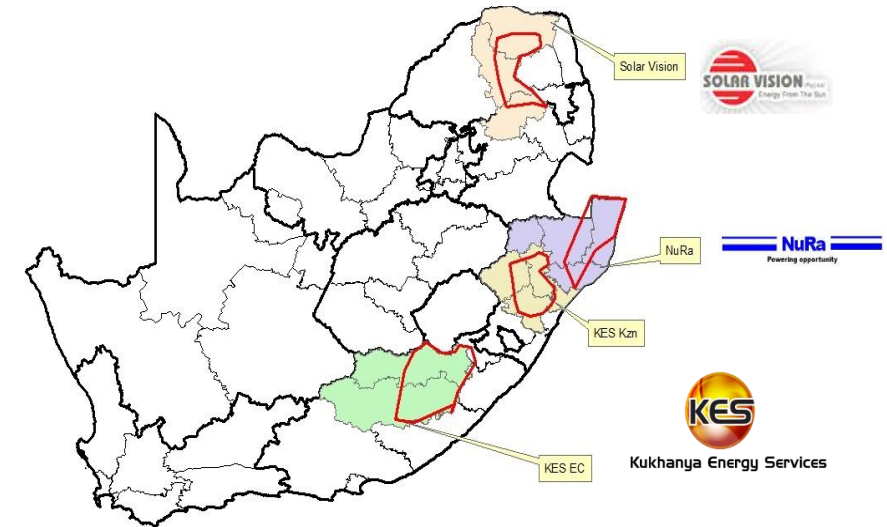
[currently] Realistic off-grid options?

| Technology | Commercial status – anywhere? | Commercial status – SA? | Policy position (SA) |
|---------------------|-------------------------------|---|-------------------------------------|
| Pico-solar products | Yes – Kenya, Tanzania, etc. | Yes – large retailers | Neutral (too small to sanction) |
| SHS | Yes – East Africa, Bangladesh | Yes, concession, non-concessions, pvt retailers | Pro |
| Mini/micro-grids | Yes(ish) – East Africa | No | Against (platinum exception) |
| Biogas digesters | Yes – Nepal | Small scale No (only 300 units in SA). Large scale possibly | Neutral |
| ICS | Yes – Kenya | No | Neutral (DRDLR small quantities) |
| LPG | Yes – many places | Yes | Neutral – was good DSM tool in past |

National SHS off-grid programme

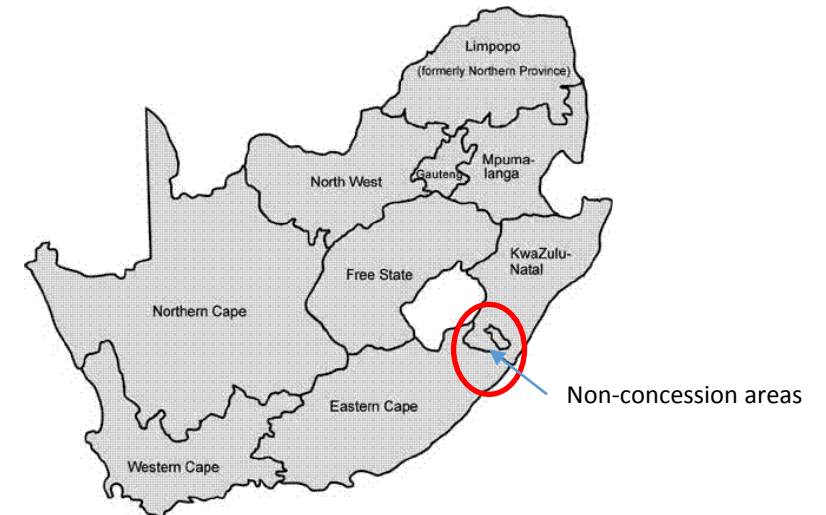
Previous focus;

- 2000 – 2014; **concession based**
 - +/- 80,000 over 14 yrs (5,500+/yr)



Current focus;

- 2015-2016; **non-concession**
 - +/- 18,000 (9,000/yr)

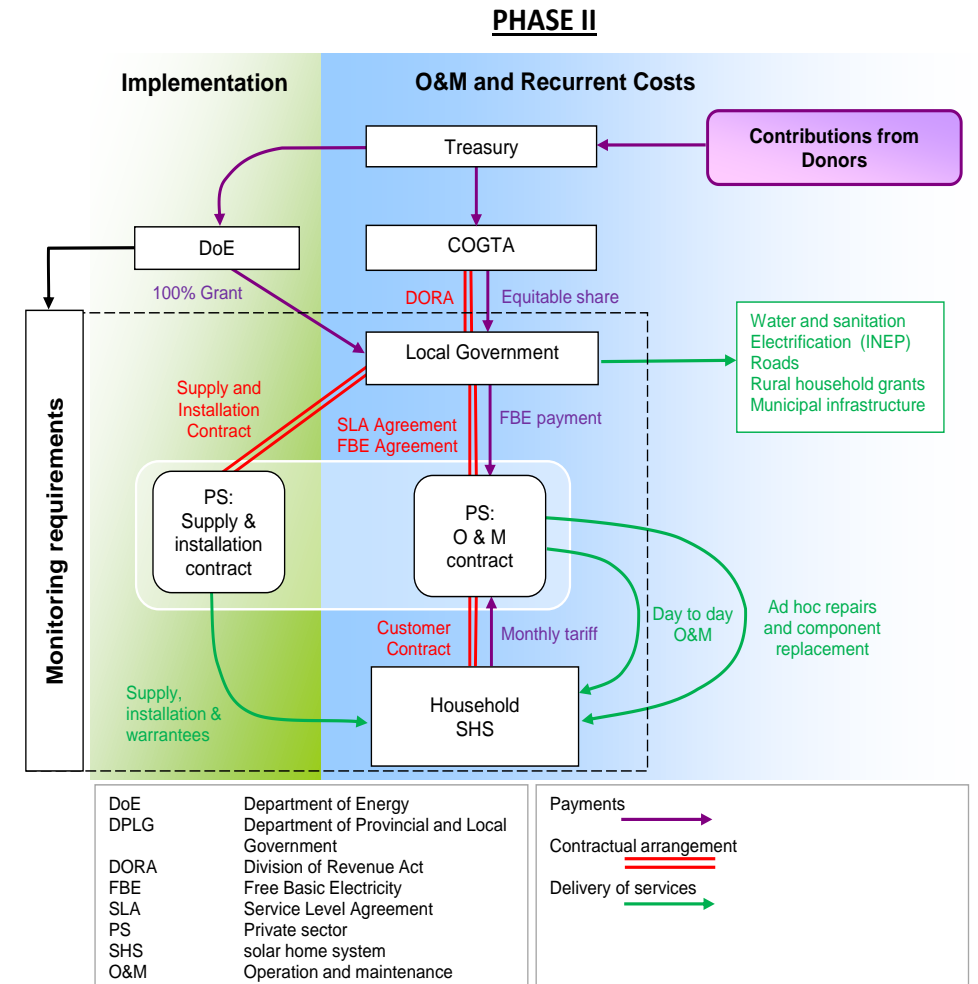


National SHS off-grid programme (cont.)

- Why the shift away from Concessions?
 - Gov/Treasury against central procurement – must devolve to LMs (constitutional mandate)
 - Requirement of PFMA – cannot procure goods/services over the long-term. MFMA is more amenable to longer-term procurement
 - SHS's must form part of LM's asset register – and O&M then more likely to be covered by LM (accounting officer responsible for managing assets and **maintenance** of assets...)
 - Better prospects of more targeted/optimal use of FBE (part of Equitable Share – unconditional)
 - May be option to include SHS subsidy under MIG – and then ensure FBE appropriately applied (M&O)

SHS plans going forward

- Existing concessions encouraged to secure installation and O&M agreements with LMs
- LMs to contract installations directly
- LMs to sign O&M agreements
- LMs to undertake local planning
- Clearer FBE application
- Oversight/planning from DoE
- Target 12,000 – 15,000/yr



Other SHS activities?

- IPPs – some investing in SHSs (Bokpoort CSP – Kheis LM)
 - Blend of DoE subsidy and SED spend
- Dispersed others?

Interesting development – urban focus

- NMBM – 3,000 SHS pilot
- iShack project in Stellenbosch
- Ekurhuleni
- Other Metros?

Urban activities

- *NMBM*; INEP and LM financing installation of 3,000 SHS on informal houses in townships; pilot on-going
- *The iShack Project*; Enkanini informal settlement (Stellenbosch) – agreement signed with municipality – FBAE goes to SHS HHs. Over 1000 solar home systems have been installed to-date.
- *Ekurhuleni Metro*; solar lighting to informal settlements (Daveyton) - 7,000 HHs to start [10Wp solar lighting unit]. Category 'C' – no plans for the settlement in short-medium term

Gauteng showing the way

- Most urbanised Province but highest electrification backlog
 - Most indigent HHs receiving FBAE for solar in RSA

Table 19 - Number of indigent households in each province provided with free basic alternative energy: 2014 and 2015

| Province | Coal | | Liquefied petroleum gas | | Paraffin | | Candles | | Solar home system | | Fire gel | | Other | |
|---------------|-------|------|-------------------------|------|----------|--------|---------|-------|-------------------|--------|----------|--------|-------|-------|
| | 2014* | 2015 | 2014* | 2015 | 2014* | 2015 | 2014* | 2015 | 2014* | 2015 | 2014* | 2015 | 2014* | 2015 |
| Western Cape | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 300 | 1 033 | 0 | 0 | 0 | 0 |
| Eastern Cape | 0 | 0 | 0 | 0 | 37 323 | 47 961 | 118 | 445 | 8 464 | 4 759 | 7 598 | 9 287 | 0 | 5 759 |
| Northern Cape | 0 | 0 | 0 | 0 | 1 218 | 1 481 | 903 | 1 017 | 368 | 152 | 0 | 0 | 747 | 1 122 |
| Free State | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 450 | 6 450 | 0 | 0 | 0 | 0 |
| KwaZulu-Natal | 0 | 0 | 0 | 0 | 780 | 600 | 780 | 600 | 11 832 | 10 212 | 13 247 | 10 336 | 2 405 | 600 |
| North West | 0 | 0 | 0 | 0 | 16 993 | 34 195 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gauteng | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 819 | 47 112 | 0 | 0 | 0 | 0 |
| Mpumalanga | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Limpopo | 0 | 0 | 0 | 0 | 0 | 0 | 5 400 | 6 385 | 5 871 | 6 020 | 250 | 190 | 12 | 190 |
| South Africa | 0 | 0 | 0 | 0 | 56 314 | 84 237 | 7 201 | 8 447 | 87 104 | 75 738 | 21 095 | 19 813 | 3 164 | 7 671 |

Growing the urban contribution?

- Need to perfect the model
 - One option – give it away (small) – no aftersales etc.
 - Use FBAE to underwrite O&M costs (small fee might be charged)
 - What standards are applied to systems (existing NRS 052 & 070... Lighting Africa...?)
 - LM's are pushing ahead – might be opportunity for DoE to provide policy guidance
 - Why bother? Shack fires, Illegal electricity connections, urban air pollution, increasing energy burdens, difficult to target subsidies, etc.
- Worth getting this right – will come back to this

Other off-grid technology options – what's happening?

| Technology | Current status | Examples/pilots | Comments |
|---------------------|--|---|--|
| Biogas digesters | Less than 300 units nationwide | Illembe (kzn) – 26 digesters Mpfuneko (Limpopo) – 55 digesters | No real plan, revenue collection, O&M options determined – largely tech demo |
| Mini/micro-grids | Interest in but little happening (Carbon Trust activities & platinum...) | Lucingweni and Hluleka | Both failed – no business/ maintenance plan, not part of strategic plan. Largely tech demo |
| Improved cookstoves | Some small-scale independent activities – 20,000 units over 7 yrs | East London charity Gauteng townships (Alex/Soweto) DRDLA – distributed 2,000 | Huge opportunities in rural & urban – but little policy interest . Think GIZ Bangladesh |
| LPG | Commercially available | | |
| Pico solar | In retailers | DRDLA distributed 2,000 | Very useful interim service opt. |
| SWH | Not addressed here | | |

There is interest in diversifying O-G market

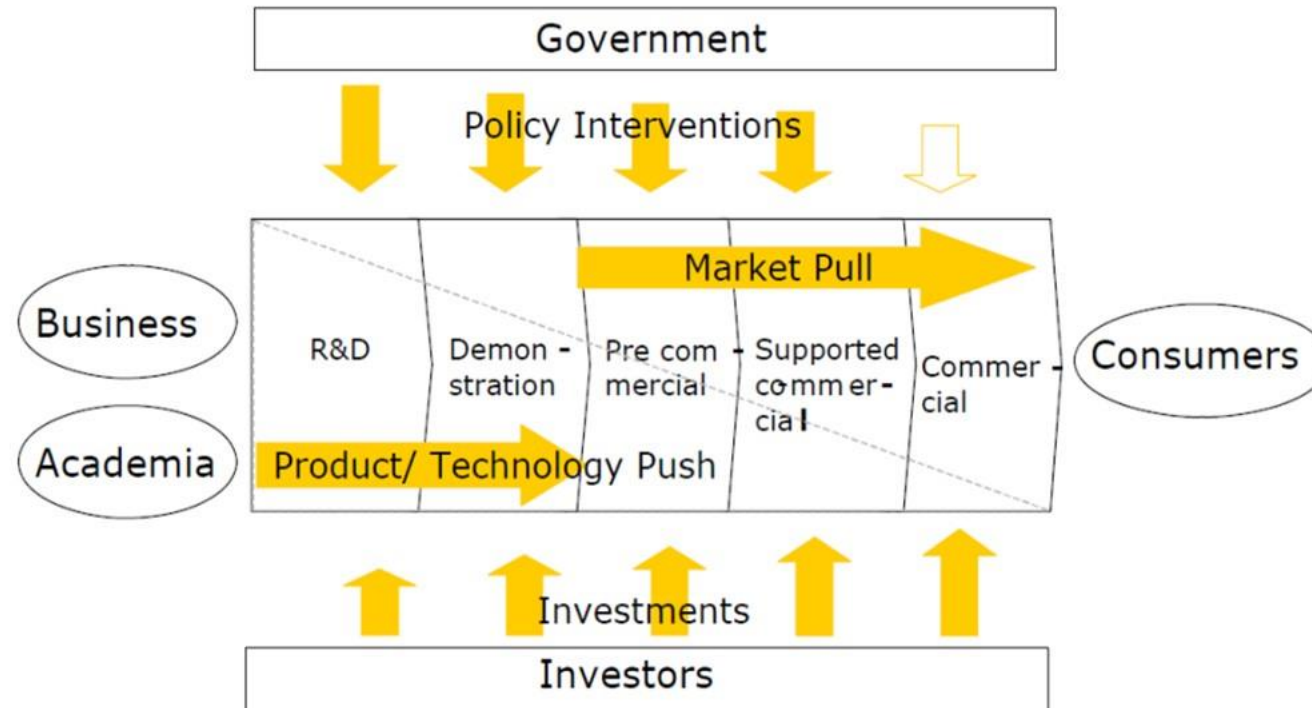
- Carbon Trust currently holding meetings around the country regarding mini-grids (Carbon Trust/CSIR/UNDP)
- SNV interested in promoting biogas in RSA – but only if policy interest is there (Nepal has 300,000 units – installing 30k/yr)
- Rocket Works in KZN produce an ICS (Rocket stove) which they could rolled-out
- There are a number of importers & distributors of small-scale/pico lighting systems in SA

The potential is there but...

What's required to strengthen & diversity off-grid sector?

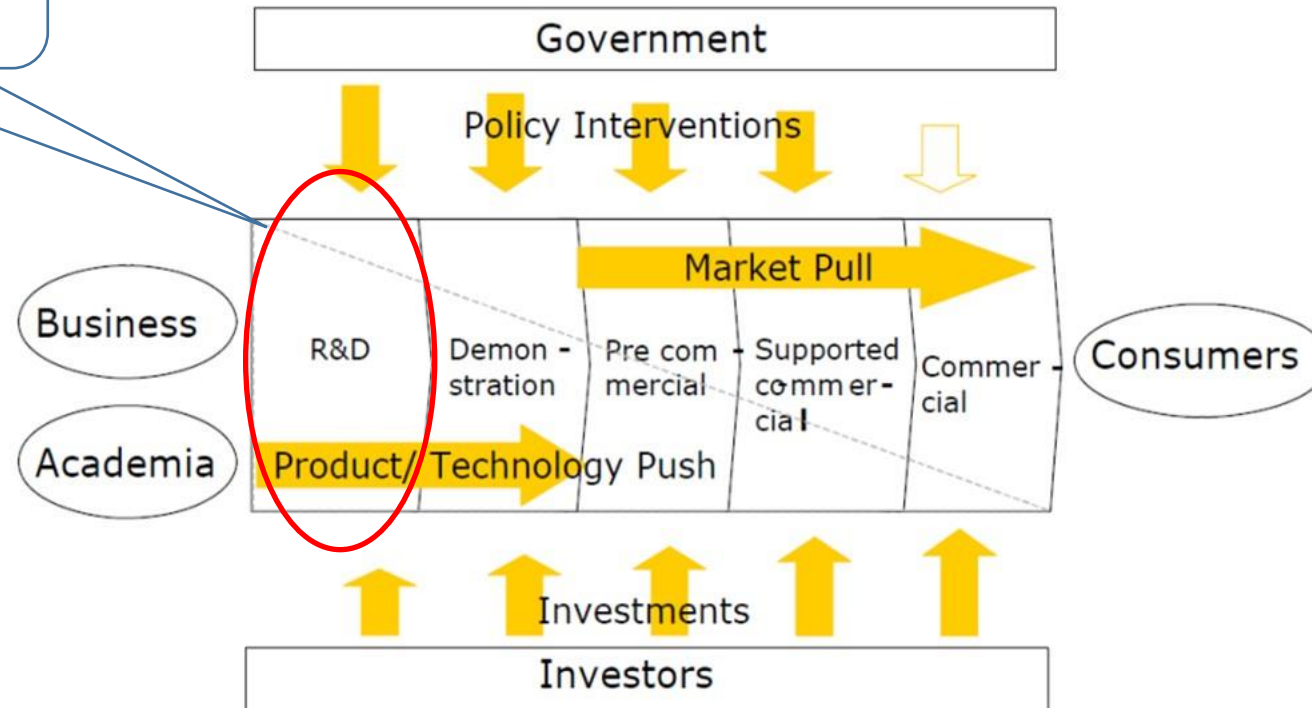
- Establish & strengthen sector institutions
 - Off-grid management authority (OGMA) – EU/TAF funded
 - Working for Energy (SANEDI) [David?] – creating a RD&D programme to pilot, test and pre-commercialize technologies
 - Research capacity – nationally (CSIR, ERC, etc.)
- Clarify & integrate mandates
 - OGMA;
 - national oversight, planning & comms – **VISION**
 - Develop/police technical standards
 - Co-ordinate large scale implementation – work with LMs & regional energy offices
 - SANEDI/WfE – RD&D; where technologies piloted, tested & matured – proposed link the EEP/REEEP, etc.
 - Research – CSIR, Universities, etc.

Developing the off-grid value chain

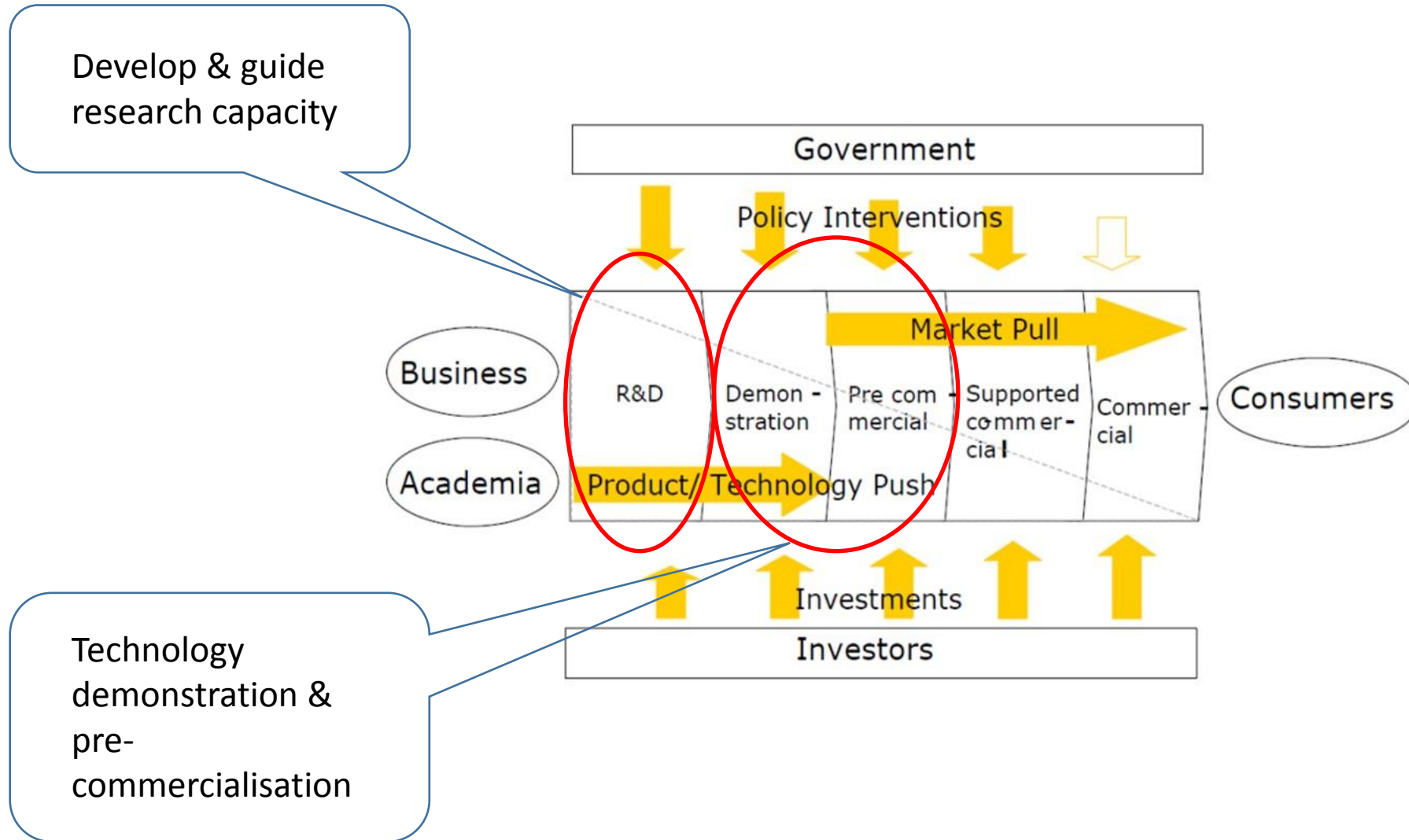


Developing the off-grid value chain

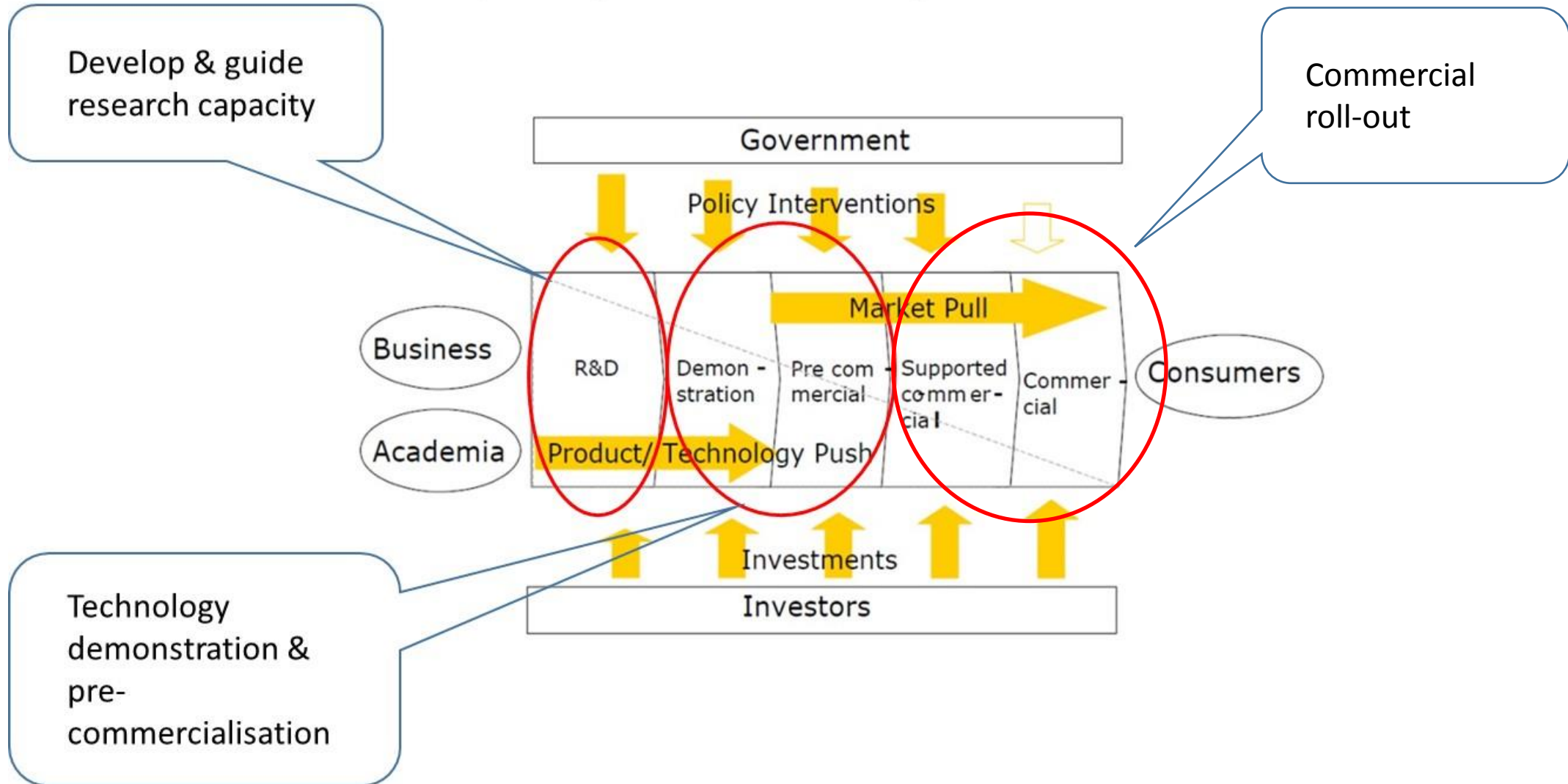
Develop & guide
research capacity



Developing the off-grid value chain



Developing the off-grid value chain



Proposed O-G institutional value chain



Closing

- The national off-grid SHS programme will form the backbone of SA's off-grid programme – aim to get up to 15,000/yr
- BUT; there are other technologies and/or markets (urban?) that need to be explored
- For this to happen; overall sector requires leadership & organisation
- Off-Grid can contribute meaningfully to achieving Universal Access quicker but will require overt policy support, institutional strengthening and a more predictable & stable planning environment (network masterplan).