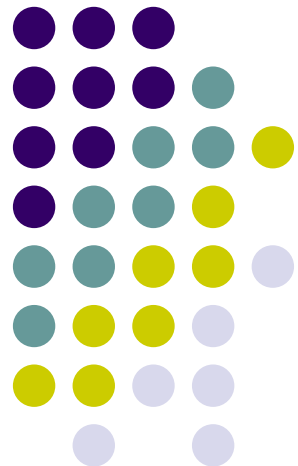
Nationally Appropriate Mitigation Actions

Perspective on Technology and Finance needs for low carbon energy development in SA



KM Nassiep

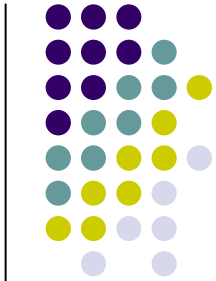
CEO, SANERI (Pty) Ltd

Political Will in SA

President Motlanthe – said on the 3 Mar 09

"The outcome of the negotiations, to be concluded in Copenhagen at the end of this year, will have to achieve a delicate balance of interests that accommodates the concerns and aspirations of developing and developed countries alike"

South Africa as a Global Citizen



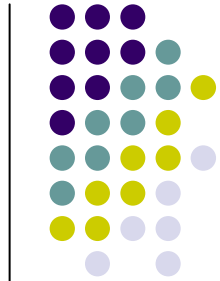
- While developed countries are expected to make deep and binding commitments to mid-term goals (25-40% reduction on 1990 levels by 2020), SA willing to play its part
- SA willing to reduce, in line with initial sustainable development and economic growth imperatives, its emissions as follows:
  - Peak (by 2025)
  - Plateau (by 2050-60)
  - Reduce (thereafter)
- Focus must remain on poverty eradication and addressing equitable funding for adaptation measures

Key Issues

Technology, finance & capacity (both mitigation & adaptation)

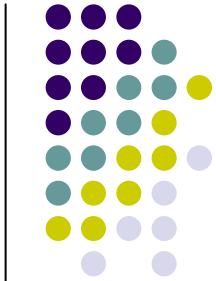
- Technology - IPR, trade vs transfer, domestic licensing/production, development, diffusion, cost
- Finance & investment – Source, Scale, Mechanism(s), Access, Governance & flexibility (stages of technology maturity)
- Capacity – to research, develop & bring to market ie. new “green growth capacity” (produce, install, operate, maintain & decommission)

SA Recent Response Measures



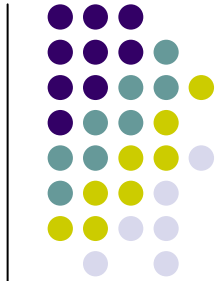
- Government Interventions
  - Summits (CC and RE)
  - REFIT tariff for Grid-connected RE
  - EE tax incentives for Industry
  - Establishment of SA National Energy Development Institute
  - Policies and Strategies

Recent Government Interventions



- National Climate Change Summit – 3-6 March 2009
  - Provided for review of current scientific studies and policy measures proposed by the State
  - Provided a platform for discussion of the proposed Climate Change Response Policy (due in 2010)
  - Energy Sector Climate Change Response Strategy under development by Dept of Minerals and Energy (due September 2009)

Recent Government Interventions

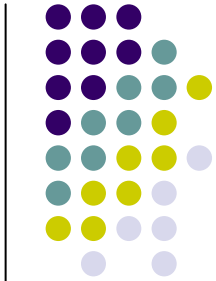


- National Renewable Energy Summit – 19-20 March 2009
  - Provided for review of current status of implementation of RE target in SA
  - Provided a platform for discussion of new proposed measures, including REFIT (feed-in tariff)
  - Process of establishing future target defined – will be informed by REFIT introduction and new fiscal support measures

Recent Government Interventions

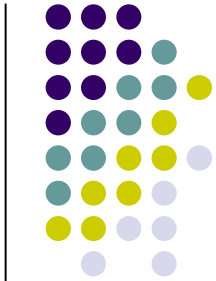
- Renewable Energy Feed-in Tariff (REFIT)
  - National Energy Regulator of SA, under leadership of DME, has introduced the following set of tariffs for immediate implementation in 2009
    - Wind R/kWh 1.25 (~0.15 USD/kWh)
    - Small hydro R/kWh 0.94 (~0.11 USD/kWh)
    - Landfill gas R/kWh 0.90 (~0.11 USD/kWh)
    - Concentrated solar R/kWh 2.10 (~0.25 USD/kWh)
  - A new set of tariffs being developed for:
    - Solar PV
    - Biomass (bagasse cogeneration)
    - SWH (?)

Long Term Mitigation Scenarios Study



- Long-term, research-based scenario building process that identified key trajectories for emission reduction
- The Required by Science scenario involves reduction of some 1300 Mt CO_2eq (where we are going), over study period, as opposed to annual emissions of some 446 MtCO_2eq (where we were in 2003)
- LTMS identified 3 strategies to be explored:
  - Start Now
  - Scale Up
  - Use the Market

Proposed activities under LTMS Strategy



- **Start Now** – a combination of interventions that save money over time including, industrial efficiency, renewables, nuclear, passenger modal shift and improved vehicle efficiency.
- **Scale Up** – a combination of interventions that further extend the actions in Start Now and adding more interventions with positive cost including, industrial efficiency, renewables (extended), nuclear (extended), carbon capture and storage (CCS) from synfuels (23 Mt) and electric vehicles powered from a coal-dominated grid.
- **Use the Market** – a combination that is additional to, or replacing, the first two options, with an emphasis on tax and incentive packages including an escalating CO_2 tax and subsidies for renewables, biofuels and solar water heating.

Selected Technology-based Options

- Solar Water Heating
- Green Transport Revolution
- Tax Incentives for EE in Industry
- Carbon Capture and Storage

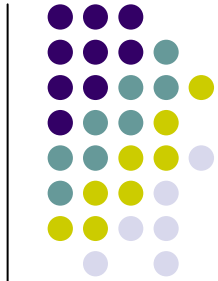
What has happened to the SWH industry?

- Over 200 new suppliers / manufacturers have entered the market since first pilot project (CEF 500 project in 2005/6)
- SA Bureau of Standards has procured test facility but has a backlog which needs to be addressed
- Still a lack of trained installers / maintenance personnel
- R&D in SA would point to increasing skills in the industry both from a manufacturing and installer point of view
- Emphasis now on middle to high income households – Eskom pilot programme

Eskom subsidy programme

- About 900 installations have been completed over a one year period.
- Average rebate value of ~$500
- Largest uptake in the Gauteng (Province in which Johannesburg and Pretoria are located) area
- 33 accredited suppliers to date – more being tested at present
- The concerns regarding retention of specialists and applicable technical knowledge at the SABS is being addressed.

Challenges still facing the Industry …



- Lack of researchers, trained installers and maintenance personnel
- Lack of a reliable and lower cost unit for RDP / Low Income Housing
- Lack of skills and test equipment at SABS
- Isolated and limited local manufacturing activity
- Disjuncture between CDM potential and timing and actual returns from carbon market
- Industry Association has never really reached its potential
- Lack of credible evidence of success of different financing mechanisms

What is still needed…

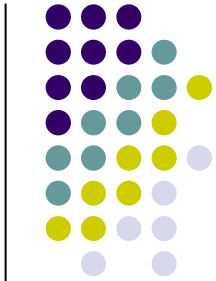
- Intelligent Subsidies
  - ◊ Complement existing Rebate Programme (favouring middle to high income households) with utility model for SWH with TRECS/REFIT and/or CDM
  - ◊ REFIT should look at differentiated tariffs, not necessarily differentiated by technology but by functionality (different criteria set)

- Establish local manufacturing Capability
  - ◊ Evaluate technology (best of breed, international partnerships)
  - ◊ Strong linkage to housing developments (NSHF, Integrated Housing and Energy concepts)
  - ◊ Supplement imports of other products

Finance Mechanism for SWH

- Initially, units will be imported due to high cost differential with local product offering
- For middle to high income households, Eskom rebate should suffice to entice homeowners, with balance of unit price (~$600-700) financed by commercial banks as draw down against bond
- For low-income households, low-cost product supported by REFIT in utility model
- Insurance companies to be regulated in terms of replacement of defunct conventional water heaters with SWH – draft regulations under development

Green Transport Revolution



- Programme to develop alternative propulsion systems for public and private commuting
  - Bus proposals include diesel/electric hybrid as part of Bus Rapid Transit scheme for city of Johannesburg
  - Centre for Green Transport being developed that will allow for retrofit of vehicles to run on CNG, LPG, full electric or biofuels
  - Most projects will be run as PPP, involving city metros and bus companies or private sector investors
  - Motor manufacturers required to come on board, to provide “gliders” as base for retrofits
  - State can assist by reducing import duties on hybrid / full electric technology (incentivise manufacturers)
  - SA has introduced its own electric vehicle, the Joule (scheduled for production in late 2010)

EE Tax Incentive for Industry

- Scheme to be introduced by National Treasury, supported by SA Revenue Services with NEEA as monitoring agent
- Industries may claim benefit after purchasing EE equipment or reducing energy consumption as follows:
- Capital purchase: accelerated depreciation on asset, from 3 years to 2 years
- EE improvement: tax rebate equal to 150% of actual expenditure on making the improvements
- Audit costs to be covered by industry
- Scheme to be extended to commercial and possibly residential sector after successful trial in industrial sector

Carbon Capture and Storage

- With limited alternatives, SA will continue to pursue use of coal, albeit with focus on clean coal technologies and carbon capture and storage
- Currently, SA developing carbon storage atlas (due in Dec 2009) – identifying suitable geological storage sites, mainly abandoned mines
- Centre for Carbon Capture and Storage launched on 30 March 2009, hosted by SANERI but involves local and international partnerships
- Focus is on commercial pilot project for CO_2 storage from possibly SASOL plant in 2016

Financing CCS

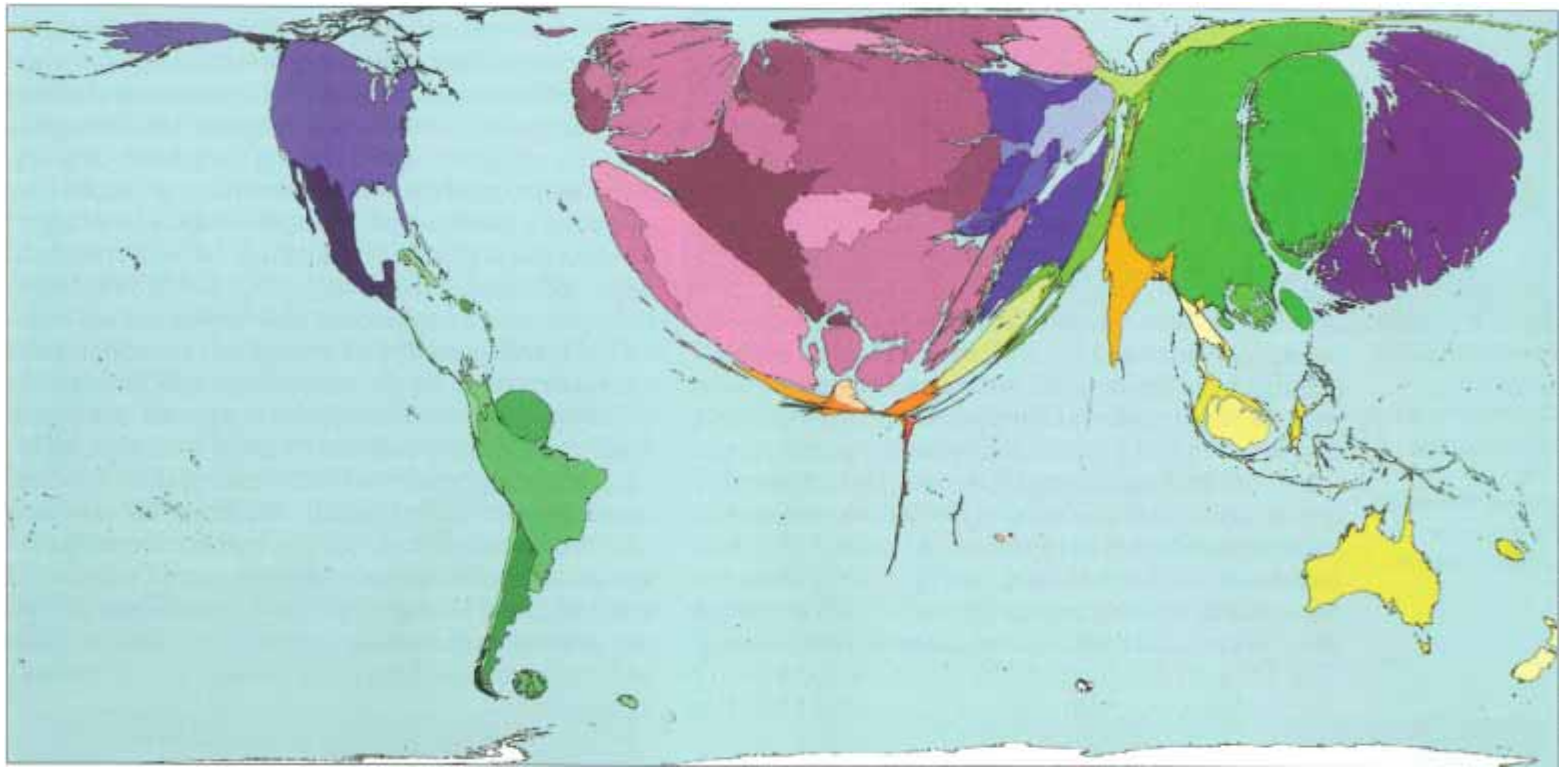
- A carbon tax is being investigated by National Treasury as part of Environmental Fiscal Reform Policy
- Currently a tax of $0.003/kWh is being levied on non-renewable energy sources of electricity generation, essentially a precursor to a carbon tax
- Tech transfer will have to be enabled through PPP partnership with international tech provider
- Grant funding domestically should focus on improving injection system for storage, as well as developing post combustion capture technology for other emitters (SASOL produces about 95% pure CO_2)

Skills Challenge facing SA

- If Physics is regarded as a fundamental pre-requisite course of study for most Science and Engineering disciplines, then one should look at the relative strengths of the various countries in this course of study

- The results speak for themselves..

World Physics Research ‘Map’



Physics World V21 No10 2008

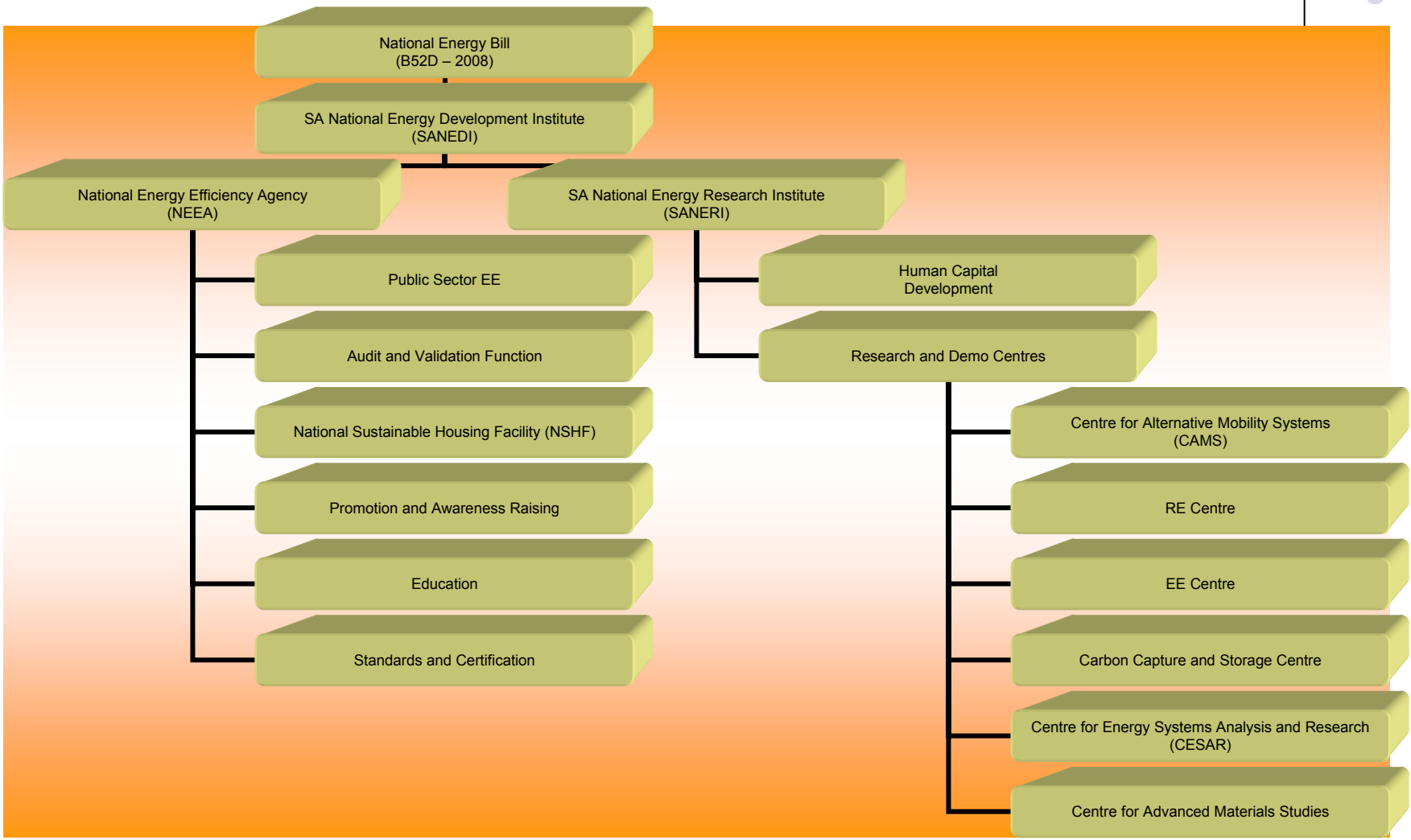
So how does SANERI fit in?

- SANERI focuses mainly on applied research – i.e. accelerating uptake of existing but unproven technology
- Establishment of SANEDI as a Development Institute promotes demonstration and ultimately commercialisation of products developed in SA
- Human Capital Development initiatives target postgraduate capacity (research capability) and artisan development (operational efficiency)
- Research centres target product development and ongoing refinement of existing designs

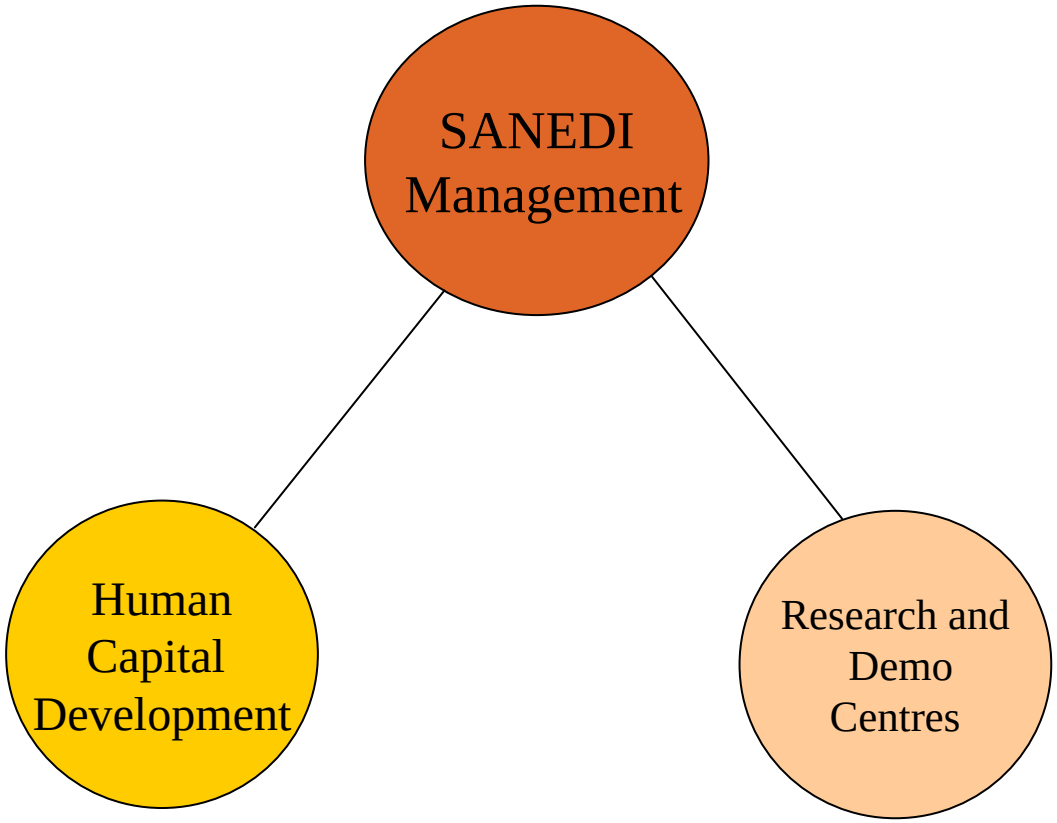
SANERI is concerned with..

- Infrastructure Optimisation (electricity networks, liquid fuel transportation, road/rail infrastructure)
- Energy Efficiency and DSM
- Renewable Energy and Alternative Energy
- Cleaner fossil fuels (including CCT, CCS, NG)
- Impact of energy use on the environment
- Stimulating socio-economic upliftment through productive use of energy
- Human capital development across all sectors addressed by SANERI
- Support to Departments on data collection, systems analysis and planning tool development

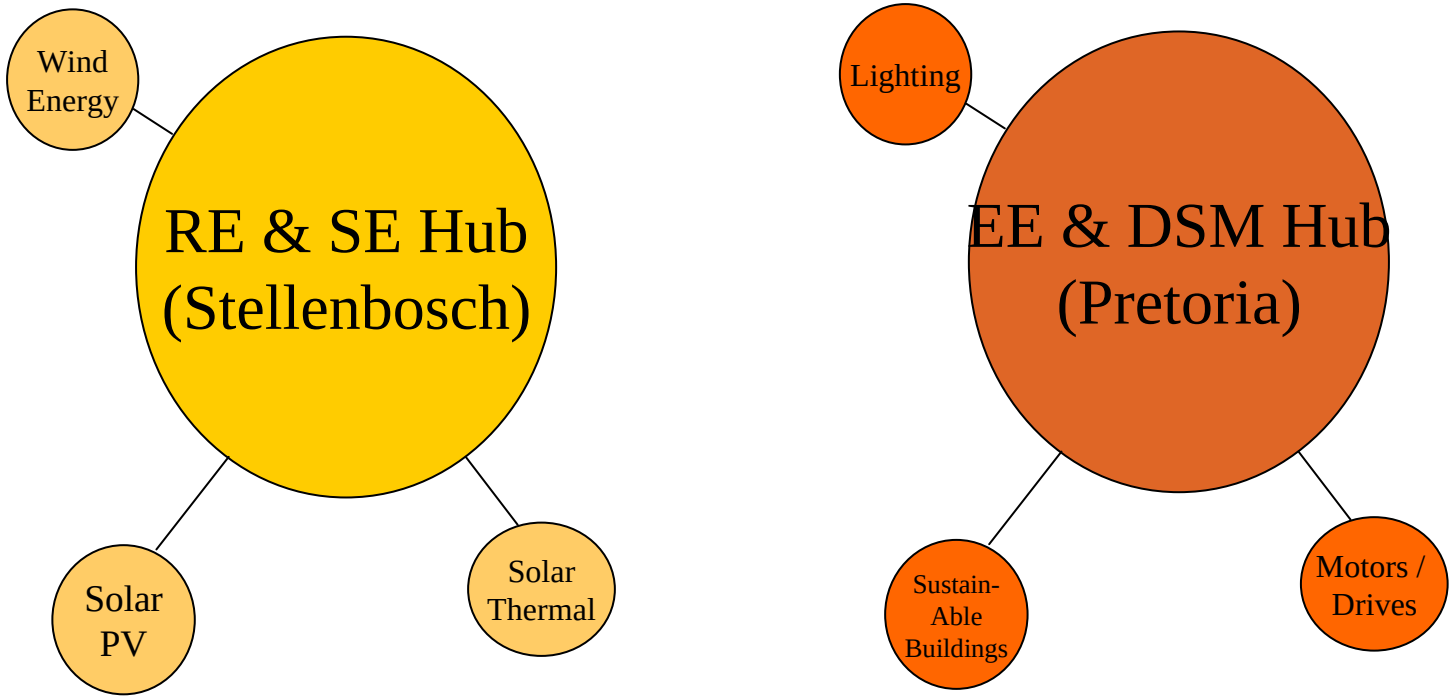
Proposed SANEDI Organisational Structure



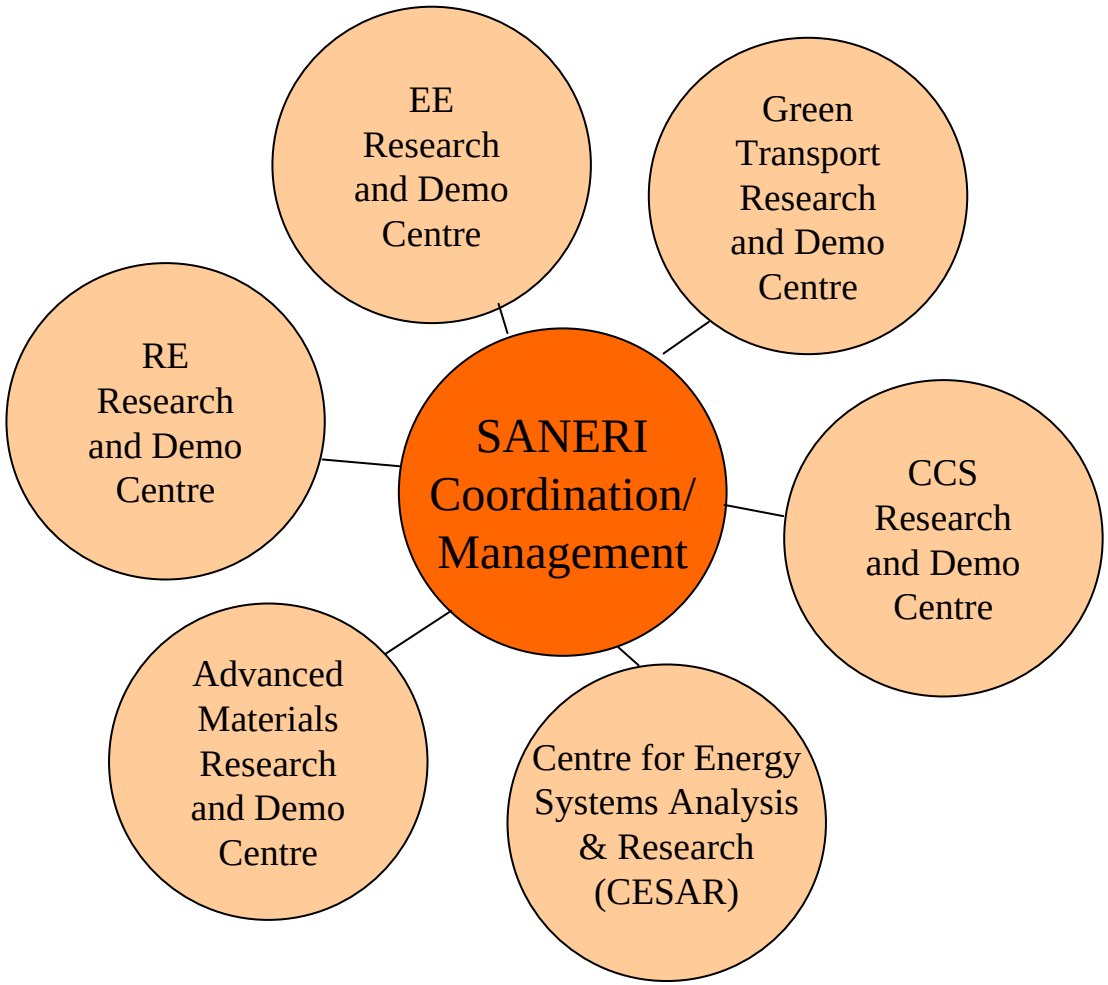
SANEDI Core Activities



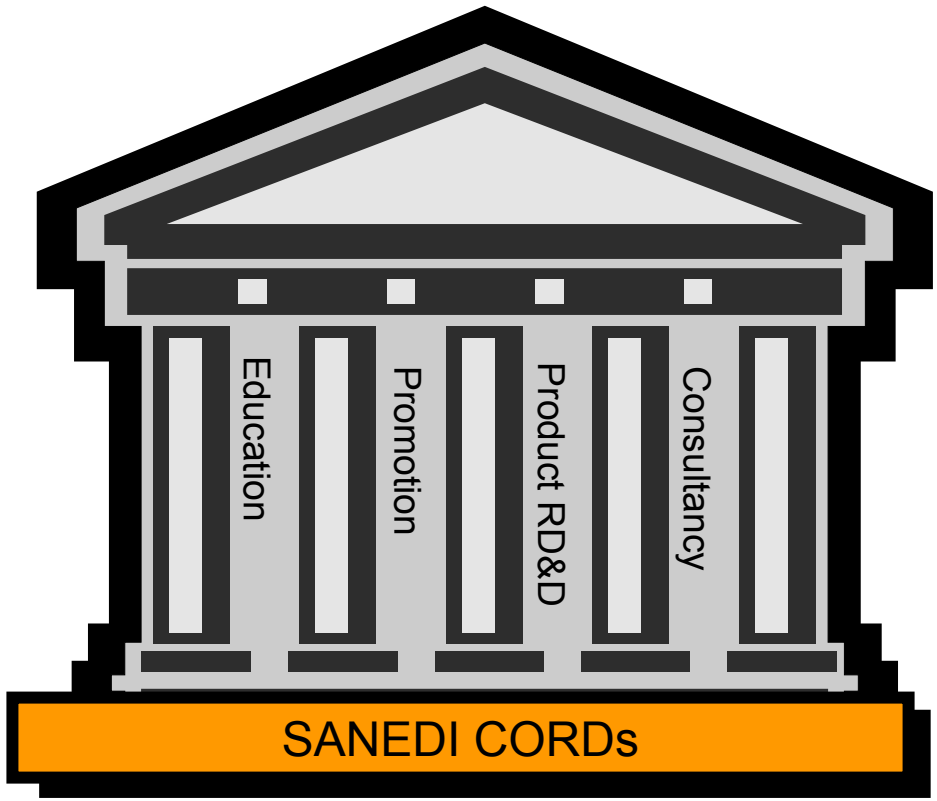
Hub and Spokes



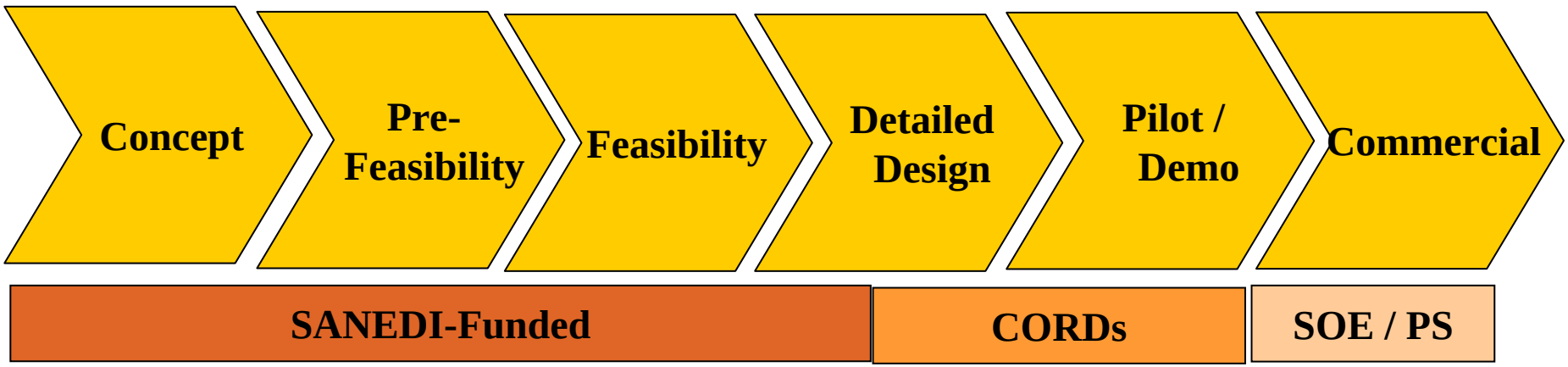
Research and Demo Centres (CORDs)



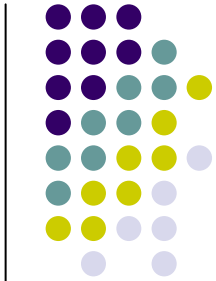
CORD Fundamentals



SANEDI involvement in project life cycle

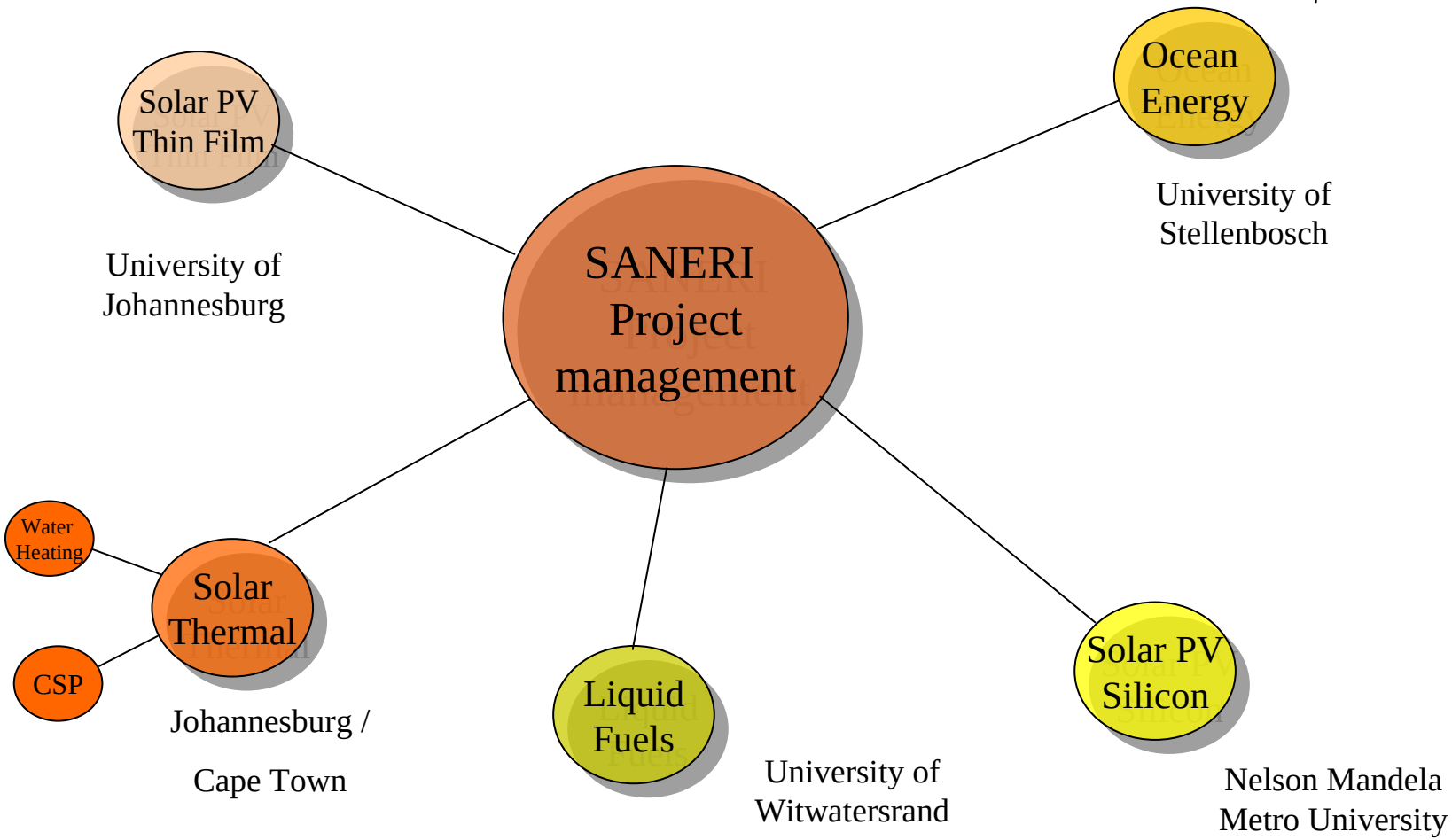


RE Research and Demonstration Centre



- Multi-disciplinary centre focusing on three major programmes
  - Education and Training
    - Grade 10-12 Learners
    - Science and Engineering Undergraduates
    - Artisans
  - Product Development
    - Solar PV products, ocean energy technology, cleaner liquid fuels, large-scale concentrating solar power
  - Contract Research aimed at specific requests from public / private sector
- Centre will be project managed by SANERI staff but hosted by different universities to minimise duplication and reduce overheads
- Centre will build on existing strengths from different universities
- Funding will be split between fiscal funding and private sector programmatic funding with UNIDO supporting the proposal and will assist in fundraising for learnership programmes

Institutional Framework (RE Research Demo Centres)



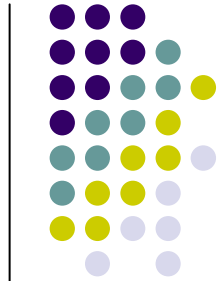
Other Areas of Interest

- Sustainable low-income EE housing with integrated energy supply
  - Involves EE building materials
  - Houses manufactured in factory and transported to site in halves
  - SWH, biogas digester and thin-film PV deposited on stainless steel will provide 75% of energy needs
  - Installed gas hob will allow for use of LPG to supplement biogas use

Financing of programme

- Current national housing subsidy can be extended somewhat to include some EE interventions
- CDM, REFIT and possibly TRECs to be used to cover majority of energy supply costs
- Balanced bonded, or financed by National Sustainable Housing Facility, in partnership with Development Bank of Southern Africa

Other areas of Interest



- Municipal Street Lighting and Traffic Lights
- Green IT Strategy for SA
- Working for Energy Programme

Thank You

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