

# Petroleum Pipelines in South Africa

Introducing Competition and a New Tariff Methodology



# Overview of Presentation

1. Overview of South Africa
2. Statement of the Problem
3. Description of Stakeholders – NERSA, Transnet, Petroline, South African Government, Consumers.
4. Factors that will determine the outcome – strengths and weaknesses
5. Solution NERSA came up with
6. How the solution can increase competition
7. Other steps NERSA can take to promote competition
8. Other possible solutions
9. Questions



# General Overview of South Africa

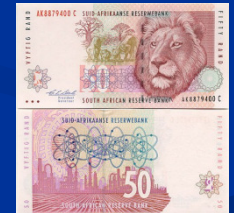
- Largest economy of Africa
- 24<sup>th</sup> largest economy in the world
- Largest energy producer and consumer in Africa
- Most socially, economically, and infrastructurally developed country in Africa
- Population (2007): 48.6 million
- 3 capitals: Pretoria (executive), Bloemfontein (judicial), and Cape Town (legislative)
- Largest city: Johannesburg – 3.9 million; Africa's most advanced city





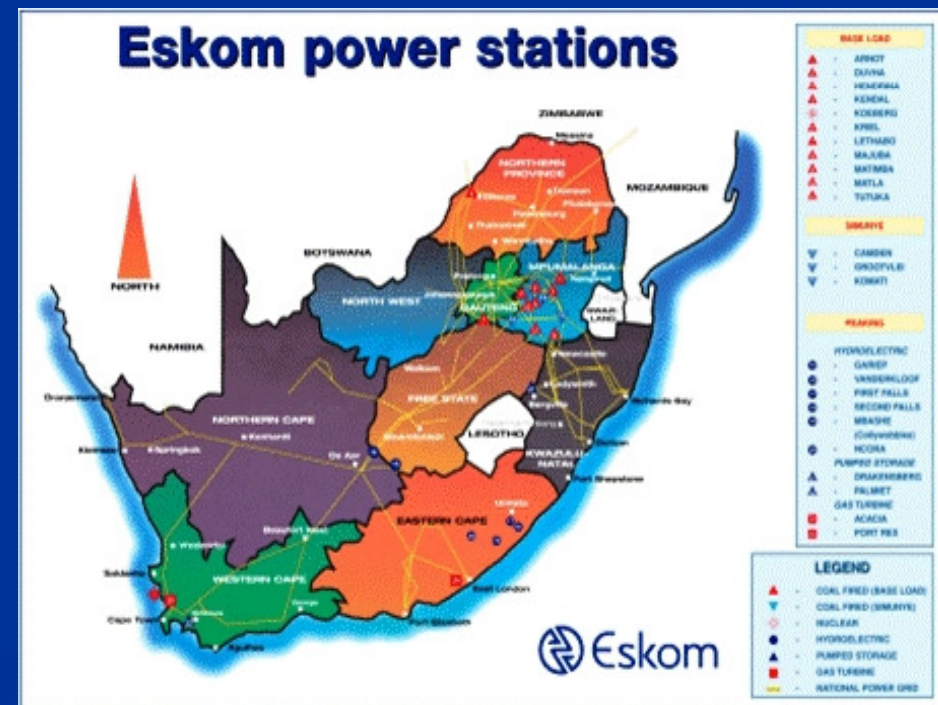
# Economic Characteristics

- GDP total (PPP): \$467.6 billion in 2007 (20<sup>th</sup> in the world) – middle income country.
- One of highest rates of income inequality with intense racial division still – legacy of apartheid.
- Unemployment rate: 28.4% in 2006
- Unemployment rate among blacks is more than 30%
- Almost 1/2 of black South Africans have either no formal education or left school at the primary level.
- Current government economic policy – Black Economic Empowerment, or BEE
- Focus of government: infrastructure, promoting industry, improving skills, accelerating land reform, and reducing crime.



# Current Electricity Crisis

- Beginning last year, the SOE, Eskom, could not meet demands of consumers and the industry.
- Lack of capacity in generation of electricity and infrastructure.
- Resulted in rolling blackouts; currently planned power cuts.
- Government of SA has been unable to encourage private construction of electricity generation capacity.
- Eskom blamed for failing to plan and construct sufficient electrical generating capacity.
- Eskom wants a 60% tariff increase; warn crisis may last years.





# Political Characteristics



- SA became democracy in 1994 after first all-race elections.
- The African National Congress, ANC, has been in power since.
- SA Government consists of an executive president, an independent judicial branch, and a legislative branch with a National Assembly and Senate.
- Current President: Thabo Mbeki
- Next elections: 2009
- Leading candidate: Jacob Zuma
- Currently facing corruption charges; found not guilty on charges of rape in 2006.



# Social Characteristics

- Inequality: percentage of total national income received by the poorest 20% of the population was 3.75% in 2003.
- HIV/AIDS: prevalence ages 15-49 was 18.8% in 2005.
- Still many racial tensions.
- People without access to an improved water source: 12% in 2004.



# General Petroleum Pipeline Background

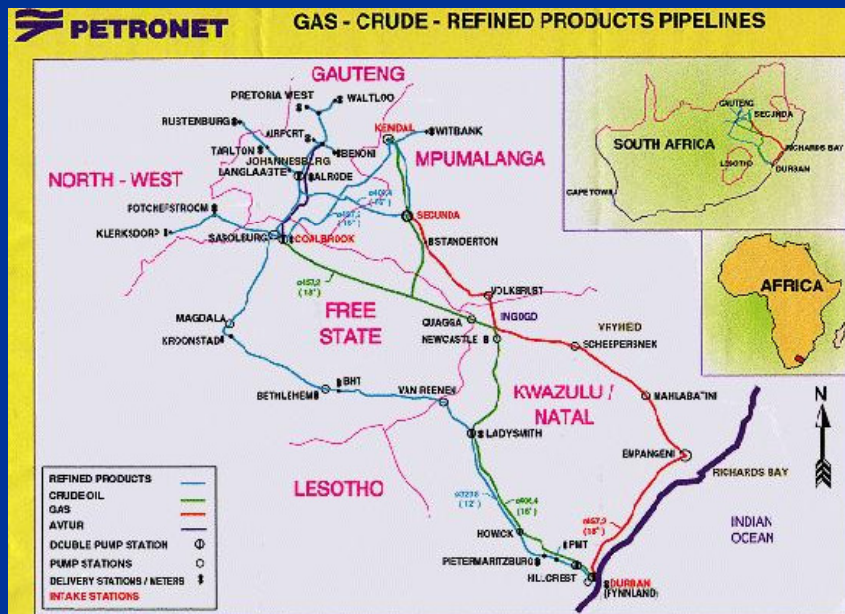
- Oil production: 200,000 bbl/day (2006 est.)
- Oil consumption: 519,000 bbl/day (2006 est.)
- Oil exports: 217,000 bbl/day (2004)
- Oil imports: 319,000 bbl/day (2006 est.)
- Oil proved reserves: 15 million bbl (Jan 2007)



# General Petroleum Pipeline Background

- Regulator in charge is the National Energy Regulator of South Africa (NERSA)
- Established in 2004 – young regulator
- Purpose is to develop energy sectors and facilitate investment
- NERSA hopes to accomplish this by introducing competition

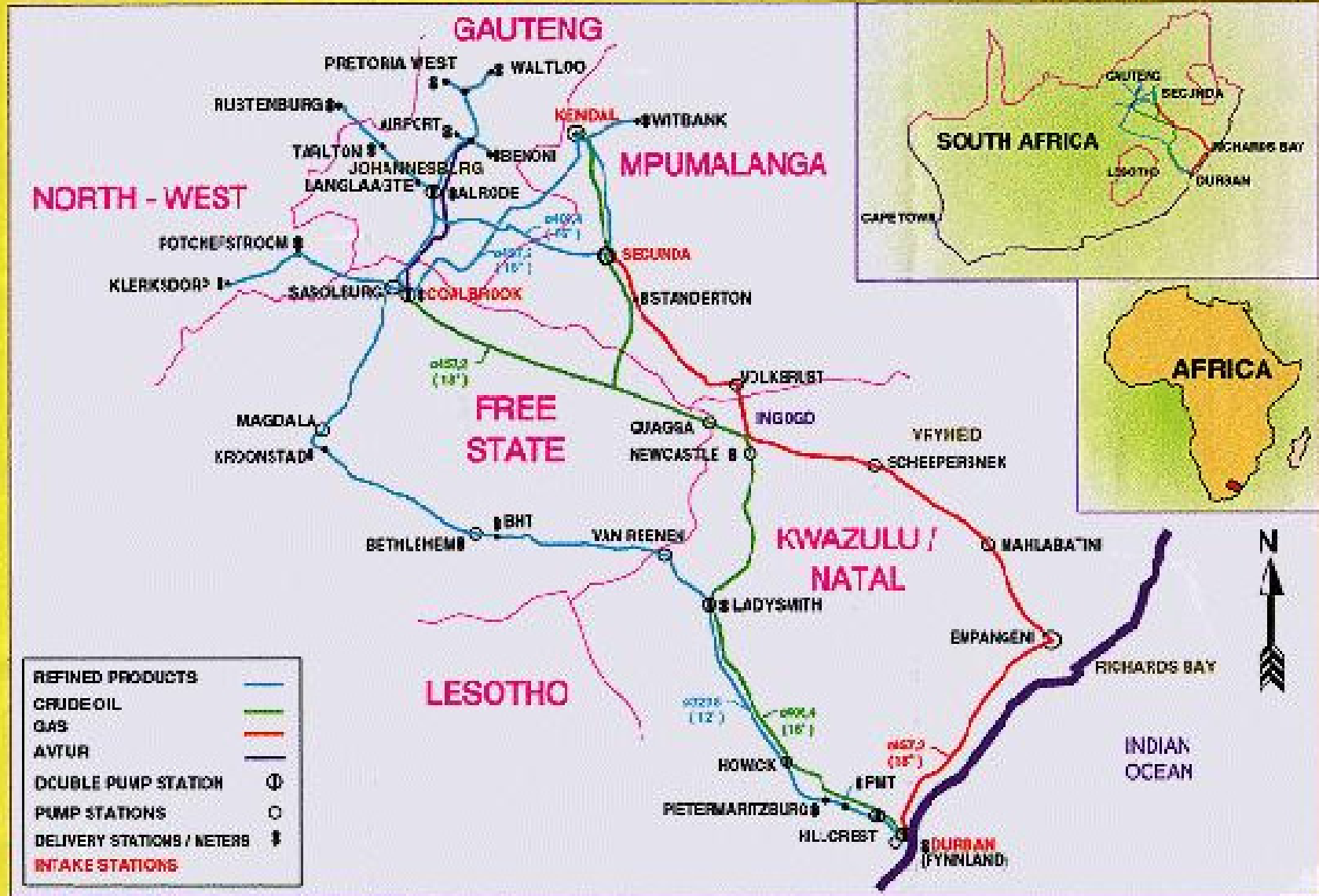
# General Petroleum Pipeline Background



- Single incumbent is Transnet Pipelines, formerly known as Petronet
- Earning a good return on old pipelines, but they are in need of a replacement
- Current pipeline runs from the south coast inland 600 km from the coast

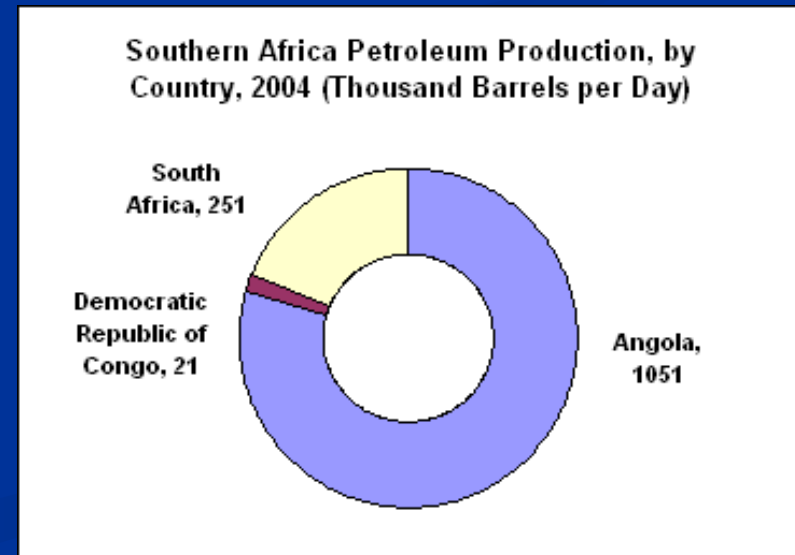


# GAS - CRUDE - REFINED PRODUCTS PIPELINES



# General Petroleum Pipeline Background

- Transnet recently received a license to build new pipelines that will run from Durban to Johannesburg
- Still sufficient demand to attract competition
- Process stalled because of need for new tariff methodology
- Competition needed for
  - Increased labor productivity
  - Improved pipelines
  - To meet existing and future demand
  - More investment



# Statement of the Problem

- The National Energy Regulator of South Africa is responsible for the prosperity of the natural gas sector.
- The State Owned Enterprise has been the only supplier in the region and wants to expand.
- Need new tariff methodology to improve the sector and introduce competition.

# NERSA



- National Energy Regulator of South Africa is one of the main stakeholders in the problem
- Created in 2004 through the National Energy Regulator Act – relatively inexperienced but independent
- Responsible for regulating the electricity, petroleum, and piped gas pipeline industries
- Petroleum pipeline industry regulated according to guidelines described in the Petroleum Pipelines Act of 2003 – no regulation in the petroleum pipelines industries prior to this



- Electricity
- Petroleum Pipelines
- Piped-Gas



# NERSA Continued

- NERSA wants to increase competition and investment, and lower barriers to entry.
  
- Petroleum Pipelines Act requires the tariffs to be:
  - Based on a systematic methodology applicable on a consistent and comparable basis
  - Fair
  - Non-discriminatory
  - Simple and transparent
  - Predictable and stable
  - Such as to promote access to affordable petroleum products
  
- Tariff must allow for companies to:
  - Recover investments
  - Operate and maintain the system
  - Make a profit proportionate to the risks involved
  
- Tariff must also encourage competition and investment.

# NERSA Continued

- NERSA is faced with the following pressures:
  - Growing demand of petroleum catching up with supply
  - Limited size and nature of petroleum pipelines
  - Pipeline currently being used is old and must be replaced by mid-2010
  - Construction of petroleum pipelines takes about 2 years
  - South Africa is the host of 2010 Soccer World Cup



# TRANSNET

(State Owned Entity)



- History – SOE since 1965
- Want current pipeline to fund new pipeline
  - Desire increased tariff rate by NERSA
  - Claim to be the only viable provider
- Level of Influence – Quite Significant
  - They control the information to NERSA
  - Benefits of a Monopoly
  - Political support of the government
  - Favorable external environment

# Petroline – The Entrant

- The only well-equipped competitor looking to enter the industry
- Wants to run pipeline from Mozambique to interior South Africa
- Cannot begin construction until new pipeline methodology in place



# The Department of Minerals and Energy

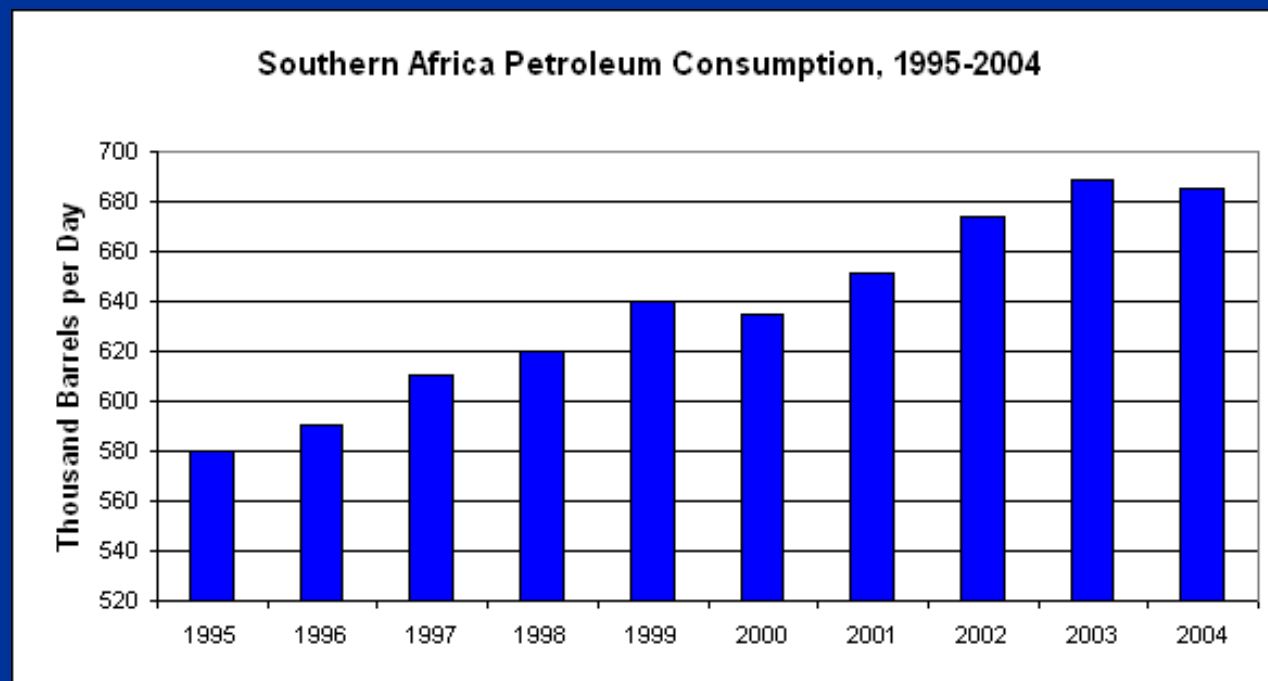
- Outlines their perspective on petroleum pipelines regulation in the White Paper on Energy Policy (1998)
- Established NERSA because they want an efficient pipeline network protected against monopolistic behavior
- Wants NERSA to create petroleum pipeline tariff that is:
  - Applicable on a consistent and comparable basis
  - Fair and Non-Discriminatory
  - Simple and Transparent
  - Predictable and Stable
  - Promotes access to affordable petroleum

# The Department of Minerals and Energy

- Actions sometimes contradictory to stated policies
  - In 2007 they suggested NERSA reject Petroline, Transnet competitor, a license to build a new pipeline between Maputo and Kendal
  - In the meantime, they supported approval of a Transnet pipeline running between Durban and Gauteng

# Petroleum Consumers

Petroleum providers are having difficulty meeting consumer needs with current pipelines



# Petroleum Consumers

- Adequate energy access a necessary component for economic growth and employment
- Want lower prices, may occur in long run, maybe not in the short run

**Factors that will determine the  
outcome:  
Strengths and Weaknesses**

# Internal Regulatory/Legal Factors

## ■ Strengths

- There are stated regulatory objectives
- There is a regulator with some power - NERSA

## ■ Weaknesses

- Regulatory objectives conflicting with economic theory
- Mandates without precedence.



# External Economic/Political Factors

## ■ Strengths

- Demands for the 2010 World Cup
- Overall increased demand for petroleum

## ■ Weaknesses

- Governmental Favoritism towards Transnet

# Transnet Takes Action

- NERSA received Transnet's tariff increase application in Feb. 2006 even though at the time, there was no tariff mechanism.
- Request: 5.6% increase in average tariff in addition to 7.4% expected volume growth of petroleum.
- NERSA realizes that this increase in revenue would allow Transnet to build new pipelines, but this would also increase barriers to entry and discourage competition.
- Therefore, more emphasis placed on coming up with new methodology which is fair for all current and potential stakeholders.
- Problem: current formula used to determine WACC does not provide the potential competitors with cash flows necessary to pay off the interest to banks during first 10 to 12 years of operation.
- Therefore, banks not willing to lend to private competitors.
- Also, one of biggest challenges is to determine whether the inclusion of future pipelines in the rate base will lead barriers to entry for private companies.

# Conflicts Between NERSA and Transnet

- NERSA and Transnet differ on whether or not competition in sector is imminent.
- NERSA states that there are several private companies that have submitted credible applications for pipeline construction licenses while Transnet believes that there is a lack of significant competitors that are ready to enter the market and that there is a lack of government policy that emphasizes competition.
- NERSA points to construction license given to Petroline, the first private competitor given a license.
- NERSA also critical of Transnet's claim that it is the "supplier of last resort."

# NERSA response to tariff increase application

- NERSA disagreed with tariff increase.
- Determined that no decision could be made until they came up with tariff mechanism that was consistent, fair, and non-discriminatory for all parties.
- Decision was reinforced by recommendations from the National Energy Research Associates – NERA – group of consultants used by NERSA.
- NERSA is especially worried about Transnet's desire to include future pipelines in the rate base and raising funds needed to build new pipelines from existing pipelines – would be barrier to entry for potential investors and would provide favorable treatment to Transnet.

# The Solution

Allowable Revenue =

$$(RAB \times WACC) + E + T + D + F + C$$

- RAB = Regulatory Asset Base or  $(V - d + w)$
- WACC = Weighted Average Cost of Capital
- E = Expenses
- T = Tax
- D = Depreciation
- F = Approved revenue to meet debt additions
- C = Claw Back Adjustment

# Weighted Average Cost of Capital

$$WACC = (E/(D+E) * K_e) + (D/(D+E) * K_d)$$

- E = Equity
- D = Debt
- $K_e$  = the cost of equity
- $K_d$  = the cost of debt



# Rate of Return on Equity Capital

$$K_{e \text{ nominal}} = R_f + \beta(R_m - R_f)$$

- $K_{e \text{ nominal}}$  = Allowable nominal rate of return on equity capital
- $R_f$  = The nominal risk-free rate of interest
- $\beta$  = 'beta'
- $R_m$  = Market return

# Rate of Return on Debt Capital

$$K_d = 1/12(\sum_{t=1}^{12} R_{Ft} + D_p)$$

- $K_d$  = nominal allowable rate of return on debt capital
- $R_{Ft}$  = the average monthly nominal risk-free rate of interest
- $D_p$  = Debt premium expected for the forthcoming period



# Debt Service Cover Ratio

- If the Allowable Revenue **excluding F** does not allow the applicant's Debt Service Cover Ratio (DSCR) to be met then additional revenue must be allowed



# Debt Service Cover Ratio

The Debt Service Cover Ratio is the ratio of net operating income to debt payments.

**DSCR = EBIT + depreciation / principal debt due and interest payable for the next tariff period**

- DSCR = Debt Service Cover Ratio
- EBIT = Earnings Before Income and Taxes

# Claw Back Adjustment

Claw back adjustment =

$$VA + OEA + Fa + DCA + GA$$

- VA = Volume Adjustment
- OEA = Operating Efficiency Adjustment
- Fa = F adjustment
- DCA = Debt Cost Adjustment
- GA = General Adjustment for remaining balances

# Review of the Tariff Methodology

- A wide range of tariff methodologies are used internationally
- Many based on Cost-of-Service or Rate of Return (ROR)
- NERSA's tariff formula based on ROR
- ROR allows the utility to recover costs and earn a reasonable return on investment

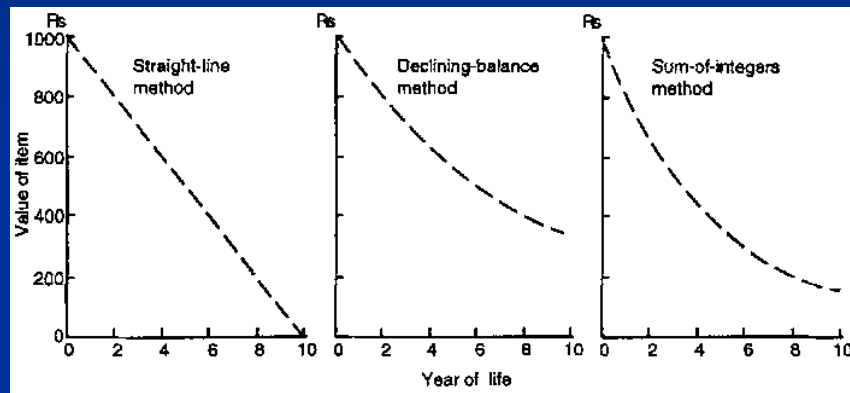
# Why Does it Work?

- Tested for reasonableness against DSCR and F
- Allows for return on RAB based on WACC
- RAB based on historic costs – objective
- Plant, property, and equipment under construction not included in RAB to avoid discrimination
- No bias for the incumbent

# Why Does it Work?

- Three possible methods to determine cost of equity
  - Dividend growth theory
  - The risk premium method
  - Capital asset pricing model (CAPM)
- Dividend growth theory and risk premium method rely on data not available in SA
- CAPM works – based on relationship between securities risk and return to its investors

# Why Does it Work?



Depreciation calculated with straight line method, not accelerated

- Thus, no added benefit for company with older equipment
- Depreciation expense remains the same each year over the life of the equipment

# A Successful Solution

- Found balance for licensees, customers, and public interest
- Developed quickly – tariff issued 2/26/08
- Allows for the utility companies to begin construction of new pipelines



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# Alternative Solution

- Price Cap Regulation or Fixed-price contract – Very High power
  - Allowed Price = Price (RPI - X + Y)
  - Where RPI is the Retail or Consumer Price Index, X (offset factor) =  $(T - T^e) + (W^e - W)$ , and Y is the full pass through of cost of inputs to customers.
  - $T - T^e$  is the difference in productivity growth rate between the sector and the economy.
  - $W^e - W$  is the difference in input price growth rate between the economy and the sector.

# Price Cap Advantages

- Prices do not vary with costs of firm – Customers are protected from bearing the costs of financial disasters
- Companies would have strong incentive to:
  - Pursue cost-reduction strategies
  - Innovation
  - Accurately report all costs to regulator
  - Minimize wasting of costs

# Price Cap Disadvantages

- Price Cap more prone to negotiations
- Regulator needs to be able to forecast future costs and revenue
- Price cap controls only average prices – end prices can be more flexible and higher
- Based on price cap index which reflects the rate of inflation in the economy – SA Rand highly volatile
- May reduce investment if capital costs are higher as a result of higher risks faced by firms

# What Could Be Next???

- Further increasing competition in the sector
  - Lowering barriers to entry
  - Investor friendly tariffs and regulations
  - Breaking up and Privatizing Transnet
- Empowering the consumer
  - More transparency in the regulatory process

# Questions?



There are  
**NO STUPID QUESTIONS**  
or stupid answers.