In the event of consensus not been reached amongst water user sectors, Regional Offices or CMAs will go ahead with clearing in co-operation with those sectors who have agreed to participate in the clearing process. The resultant additional water after taking the ecological reserve and reducing over allocation into account may be allocated to sectors that financially participated in the clearing project.

7 FUNDING OF WATER RESOURCE DEVELOPMENT AND USE OF WATERWORKS

Water resource development and use of waterworks refer to the planning, design, development, operation, maintenance, refurbishment and betterment (improvement) of Government water schemes and schemes to be funded by water management institutions like the TCTA and WUAs. If water use charges are too low, they will lead to underinvestment, over-consumption and unwarranted fiscal subsidies. There is therefore a need to adjust to higher real prices over time to accommodate the cost of investing in supply capacity to meet rising demand and to refurbish existing infrastructure.

7.1 Government Waterworks

In terms of section 56 (2)(b) of the National Water Act, 1998, water resource development costs could include the related costs of investigation, planning design and construction of water schemes, **which constitute the capital cost of projects.** This revised pricing strategy utilises the **depreciation, return on assets (ROA), betterments, refurbishment and off-budget funding** approach for setting charges to recover capital cost in respect of schemes owned by Government. In recent times, given the budgetary constraints from National Treasury on large-scale water resource infrastructure development, the mechanism of off-budget funding of commercially viable new water infrastructure by Funding and Implementing agents such as TCTA, has become accepted practice. The funding of these infrastructure developments requires loans, which naturally have certain repayment periods associated with them during which bulk water users must pay charges as per contractual agreement. State funding will in future be confined mostly to social, water resource development or betterment projects which conform to the purpose set out in section 2 of the NWA, 1998 and where the demand is not driven by specific commercial water users or sectors. Capital expenditure related to the promoting of equitable access to water, meeting international obligations and dam safety betterments on State owned dams will qualify for State funding. New infrastructure development may have a social as well as a commercial component in which case State funding and related charges will apply on the social component, while loan funding and related charges will apply on the commercial component.

There may be instances when the state will develop water infrastructure in the expectation of promoting economic development. In these instances social users will be charged in terms of on-budget governmental funding, while a rate equivalent for off-budget funding will be negotiated with economic users. The classification of a project will be at the sole discretion of the Minister of Water Affairs and Forestry.

The table below shows the charges that will apply for schemes funded under different circumstances.

CHARGES TO BE LEVIED	EXISTING SCHEMES	NEW SCHEMES		
	Historically funded by Exchequer or where off-budget debt has been repaid	Fully or partially funded by Government	Initially funded by Government and recouped from end users	Off-budget funding applied fully or partially
Operation and Maintenance	✓ (see 7.1.1)	✓ (see 7.1.1)	✓ (see 7.1.1)	✓ (see 7.1.1)
Depreciation (Refurbishment)	✓ (see 7.1.2)	✓ (see 7.1.2)	x	✓ (see 7.1.2)
Return on Asset	✓ (see 7.1.3)	✓ (see 7.1.3)	x	x (see 7.1.3)
Betterment	x (see 7.1.5)	x (see 7.1.5)	✓ (see 7.1.5)	✓ (see 7.1.5)
Capital Unit Charge	x	X	✓ (see 7.1.4)	✓ (see 7.1.4)

7.1.1 Operations and Maintenance

The operation and maintenance charge shall consist of the following:-

a) Direct costs:

Fixed and variable costs which can be attributed directly to administrating, operating and maintaining schemes and include:

- Administrative costs
- Operating and maintenance costs
- Pumping costs
- Distribution cost

Direct costs will be allocated directly to sectors where this is possible. The cost of joint works and operations will be shared on a volumetric basis.

b) Indirect cost:

These are the costs which cannot be directly attributed to a specific scheme, but which contribute towards the management of the water schemes of the entire area, and comprise of:

- Allocated regional office/utility cost
- Allocated area office cost

Indirect cost that has been allocated to the schemes will be further allocated to the different sectors in an equitable time-based manner.

Operation and Maintenance charges shall be recovered on a scheme to scheme to basis. These charges (which include direct and indirect costs) can be recovered either on an

actual cost recovery basis or through an Operations and Maintenance Tariff which is based on the forecast of annual O&M costs.

7.1.2 Depreciation

Depreciation is defined as the loss in value of existing infrastructure that occurs due to wear and tear, decay, inadequacy and obsolescence, not restored by current maintenance. This capital value can only be restored through refurbishment.

For calculation purposes, depreciation is the systematic allocation of a depreciable amount of an asset over its useful life and will be applied as follows:-

- On a straight line basis over the useful life of the assets.
- The depreciation amount = annual depreciable portion of the replacement value of assets.
- Replacement value = revaluation of the value of the assets as determined in March 2000 (full technical revaluation will be carried out at least every 10 years). In intervening years, desk-top revaluation will be carried out annually which means that the Producer Price Index (PPI) of June of each year will be applied to escalate the base value of the infrastructure assets, and thus the annual depreciation amounts, to nominal values.

Schemes are in various stages of depreciation and need refurbishment at different points in time. It is intended that through cost recovery, depreciation charges will be used to refurbish existing assets on a prioritised basis, as and when required. Depreciation income from the general revenue base will only be used for the refurbishment of infrastructure assets once a dedicated refurbishment fund, from which refurbishment expenditure can be done in a controlled manner, has been put in place.

As refurbishment will only restore the original capital value of assets in real terms, no increases in charges will take place as a result of refurbishment. **On schemes funded off-budget, the depreciation charge will only be applicable once the loans have been repaid. If refurbishment is required during the repayment period, a refurbishment charge will be arranged by agreement between the parties.**

The depreciable portion and useful life over which the asset will be depreciated are in accordance with the table below, which is subject to revision when the next engineering revaluation of assets is due.

Component	Depreciable Portion (%)	Estimated Total Useful Life (years)
Dams & Weirs	10	45
Canals	40	45
Tunnels	10	45
Pump Stations	40	30
Syphons & Concrete pipelines	30	45
Steel pipelines	75	30
Buildings	100	40

Calculation formula for annual depreciation cost (ADC):

ADC = Replacement value * Depreciable portion%/expected useful life

The depreciation charge is applicable to all sectors supplied from Government waterworks.

7.1.3 Return on Assets (ROA)

This component of the charge reflects payment towards the development and betterment capital value of waterworks on government water schemes. It will be determined by fixing a charge to earn a specific rate of return on the current depreciated replacement value of the infrastructure.

ROA is based on the social opportunity cost of capital to government and this should approach a level sufficient to fund the annual capital expenditure budget requirement for the development of new waterworks and betterment of existing infrastructure from the fiscus.

In view of the off-budget funding arrangement for certain projects, the target level of income to be generated through ROA charges is directed towards recovering the annual capital cost requirement for State funded social projects.

An investigation of possible new social projects envisaged in terms of the National Water Resources Strategy and the capital required to fund dam safety betterments, revealed that the ROA rate of 4% laid down in terms of the 1999 Pricing Strategy and which was based on the estimated growth rate for industrial and domestic demands at the time, can not be adjusted downward without seriously affecting the duration of the implementation programme. To cater for the estimated medium term demand for capital to be funded from the general revenue base, ROA will thus continue to be determined on a scheme or system related basis by applying a 4% rate to the State funded completion cost of new infrastructure or the depreciated replacement cost of existing infrastructure. The replacement and depreciation values will be based on engineering valuations, which were initially competed in March 2000, to be repeated within maximum intervals of 10 years. Between engineering valuations, the previous year's asset values will be inflated by the Producer Price Index (PPI) of June each year to determine the nominal values of capital costs for pricing purposes. This is done to cater for the declining value of ROA over time in real terms due to depreciation and also to ensure that the value of assets over time will more closely reflect the actual replacement value when a technical revaluation is done.

The ROA charge is applicable to State funded and owned assets for as long as they exist in an operable condition. **On off-budget funded schemes no ROA charges will be imposed during the repayment periods to prevent double charging on water users. However ROA will be charged once the loans have been repaid.**

The ROA charge is applicable to the following sectors supplied from government waterworks:

- Local Government (domestic)
- Industrial

- Mining
- Energy
- Agriculture - only for new schemes

For the Agricultural sector, ROA charges would not be applied to existing State irrigation schemes. These charges will also not be applicable to resource-poor farmers for existing and new schemes constructed. ROA will however be applicable for new government schemes constructed for established commercial farmers.

7.1.4 Government schemes funded off-budget

Water management institutions such as the TCTA, which are directed by the Minister of Water Affairs and Forestry to implement and fund government water schemes off-budget, are entitled by the NWA to raise loans to finance the development of new water resource infrastructure, and should therefore be able to service these loans through cost recovery. These institutions, in consultation with stakeholders, can on a project by project basis determine the extent of charges as determined by the proposed financial modelling. The primary charge will be the Capital Unit Charge (CUC).

In these circumstances, the water management institution may enter into an implementation agreement with the Department of Water Affairs and Forestry ("DWAF") and DWAF may thereafter enter into a water supply agreement with the end-users. Consequently these agreements will be "back-to back" and serve the purpose of recording the rights and obligations of the parties in the implementation, financing and supply of water pertaining to the new government water work. In these instances, the water management institution will levy the CUC onto DWAF and DWAF will in turn levy the CUC onto the end-users. A cession may be signed between the parties whereby the CUC charge is paid directly to the water management institution.
In this scenario, when the project debt has been repaid, the project will be treated as an existing scheme and the charges relating thereto will be applied.

Key principles of the CUC

- A tariff is determined which will ensure that the debt on the project will be fully paid by the end user within a reasonable period of time. A reasonable period is usually determined as being between 18 to 25 years, taking cognisance of both end user affordability and future augmentation of a scheme.
- The reasonable period of time to repay the debt, which shall not be longer than the economic life of the asset, will be determined on the basis of:
  - The debt profile and acceptable growth and level of debt of the project;
  - Not allowing the debt of a project to overlap to an unreasonable extent with another project causing financial strain to end users or unhealthy financial balance in the water sector; and
  - The anticipated future funding requirements of the augmentation of the project.
- A tariff is calculated such that it is constant in real terms and grows with inflation, being CPIX, unless otherwise agreed to between the parties or any of the review triggers being applicable.

- A tariff may be phased-in during the construction period.
- Parties should endeavour not to capitalize interest after completion of construction.
- The tariff will be based on water used from a scheme and not necessarily water provided into a scheme, which will enable water demand management, water restrictions etc.
- Phasing-in and step down of the tariff can be allowed for if it still facilitates end user affordability, provision for future augmentation and debt is repaid within a reasonable period of time.
- Demand projections are used to determine a tariff which is reviewed annually taking account of changes in:
  - Water demand projections;
  - Real interest rate projections;
  - Inflation projections and/or
  - Cost of the scheme as well as cost and timing of future augmentation.
- From date of invoice amounts are payable to the water management institution within 30 days, unless otherwise agreed to between parties.

Review triggers of the CUC

The CUC charge may contractually be subject to an annual review where increases are passed through automatically or under specific conditions negotiated between the parties. These conditions shall take into account but not be limited to the following factors:

- Changes in the yield of the system;
- Changes in macro economic projections;
- Changes in legislative charges;
- Changes in construction costs;
- Any revenue generated by the scheme other than the CUC and as agreed to by the parties to decrease the amount outstanding to repay the scheme;
- Changes in water use allocations and compulsory licensing; and
- The timing and cost of future schemes.

7.1.5 Betterment charges

Betterment implies an improvement of an asset, resulting in an increased capital value thereof. Examples are the raising of an existing dam to increase the yield, the enlargement of a canal to increase capacity and improving the stability of dams for safety purposes.

On existing and new government funded schemes, betterments will be funded through the ROA provision. After betterment is introduced, the real value of the asset will

increase, resulting in an increased ROA amount for charge setting purposes. On off-budget schemes, the Minister of Water Affairs and Forestry or the water management institution may levy the charge in consultation with the end-users post construction of the new water infrastructure. The charge may, at the discretion of the end-user, either be determined on an actual costs recovery basis or determined taking into consideration the need to smooth over time the impact of the charge if high capital costs have to be incurred to increase the availability of water or to maintain the assurance of supply.

The same principles of the CUC will apply in collecting revenue from the charge.

7.1.6 Methodology in determining unit cost

7.1.6.1 Assurance of Supply (Section 56 (4)(b)(iii) of the Act)

The capital cost of multipurpose dams will be divided between sectors in proportion to the long term estimated average annual sector use of allocations. Average sectoral use will reflect curtailment during water restrictions, thus taking into account the assurance of supply. The ROA and depreciation charges per sector will then be determined by using the divided capital cost allocations.

Unless scheme-specific assurance of supply is available, the long term average annual use of the various user sectors will be considered to be the following percentage of allocations on government water schemes:

Sector	% of Sectoral allocation	Calculation of sectoral allocation %
Irrigation sector	91%	(100%@70%+70%@30% of the time)
Domestic, industrial and mining	97%	(100%@70%+90%@30% of the time)
Strategic industrial sector	100%	No water restrictions

- In the case of conveyance structures, the division of capital costs will be done in proportion to the required peak rates of supply to the various sectors.
- Percentages may be applied to determine the price differential on the CUC charges based on the Assurance of Supply.

The assurance of supply is applied as follows:-

- If for example a scheme has 100 million m^3 of available water per annum:
- If 30% is allocated to domestic and industry, (30 million m^3) and the balance of 70% is allocated to agriculture, then the long term average use of allocations will be calculated as follows:-

Domestic & Industry	30 million m^3 x 0,97	29.1 million m^3
Irrigation	70 million m^3 x 0,91	63,7 million m^3
Total		92,8 million m^3
Domestic and Industry allocation of cost will be		
	29,1 / 92,8	31.36%
Irrigation allocation of cost will be		
	63,7 / 92,8	68,64%
Total allocation		100 %

Under the current example, Domestic and Industry will pay a premium of 1.36% as a result of a greater assurance of supply while Irrigation will receive a discount of 1.36% as a result of a smaller assurance of supply.

7.1.6.2 Consumptive charges on social projects

A unit cost will represent the consumptive charges to be levied on existing and new social (Government funded) water schemes. Unit costs will be determined based on the annual sectoral cost allocations in respect of ROA (where applicable), Depreciation and Operation and Maintenance.

Unit costs will be based on the estimated water use but consumptive charges will be invoiced on actual measured use.

On social projects where the long term yield of the dams has not been fully allocated, consumptive charges will be based on the long term yield, which implies a State subsidy.

On canal or pipeline scheme elements of social projects which are under utilised because full utilisation as planned could not materialise, the capacity volume of the canal/pipeline should be used as a basis for calculating charges.

Unless other arrangements are approved by DWAF, consumptive charges will be invoiced on a monthly basis for the domestic/industrial sector and bi-annually for the agricultural sector.

In order to promote water conservation and demand management, consumptive charges can consist of fixed and variable payments where agreements are concluded with user bodies.

7.1.7 Phasing in of consumptive charges

- Domestic/Industrial/Mining/Energy sector

Annual increases for social schemes will be limited to 10%+ PPI (rate taken in June) until full cost recovery is reached. During the phasing in period, charges will not be reduced below the previous year's level, except in extraordinary circumstances, which would make a reduction inevitable.

- Agricultural sector

- **Established farmers**

  (a) Full Operation and Maintenance costs will be recovered annually, with an annual increase limited to 50%, if the current unit charge is still sufficiently far below the calculated unit cost to render reaching the full unit cost in one annual step impossible.
  (b) Depreciation charges for existing schemes will be capped at 1.5 cents per meter^3 plus PPI (rate) with 2006/07 as base year.
  (c) Full financial cost recovery (including ROA) for new schemes.

- Resource poor farmers

(a) Operation and maintenance charges will be phased in over five years from date of registration of the relevant water use.
(b) Depreciation charges will be waived for five years. Thereafter charges will be capped at 1.5 cent per meter^3 plus PPI (rate).
(c) Capital cost for new development will be subsidised by the fiscus.
(d) Further waiving of charges will be considered for a limited time period on request by the custodian Department, where land and agricultural reform programmes are involved.

- WUAs as Billing Agents

As WUAs capacity develops, they may be used as billing agent for water charges. The timing of the transfer of responsibilities will be subject to an assessment by the Department of Water Affairs and Forestry.

7.1.8 Treatment of Reserve Funds

The depreciation and return on assets charges will result in reserve funds theoretically being managed by DWAF over time.

DWAF will only be in a position to finance capital cost requirements for refurbishment on specific schemes from its general depreciation charge revenue base and to finance the development of new social projects and betterment of existing projects from the general ROA charge revenue base once a dedicated reserve fund has been put in place, from which capital expenditure can be made in a controlled manner.

When the above structures have been put in place the depreciation charge for refurbishment may serve as a stabilization reserve whilst the ROA may be a provisioning reserve.

As stated above, once a ring fenced provision account for ROA has been established, ROA revenue will be applied to the funding of water resource development, prioritised as follows:

(i) Planning and feasibility of future augmentation
(ii) Betterment
(iii) Social projects

7.1.9 Water Supply Agreements

DWAF shall enter into water supply agreements with water boards which have to enter into long term water supply agreements with municipalities and other major bulk raw water users.

7.2 Schemes Owned by CMA's and WUA's

Catchment management agencies and water user associations must, when determining their revenue requirements on which water use charges for development and use of waterworks are based, take into account the following:

(a) recovery of overheads/management, operations and maintenance costs;
(b) recovery of capital costs and the servicing of loans (water management institutions are entitled by the Act to raise loans to finance new water supply infrastructure, and should therefore be able to service these loans through cost recovery);
(c) reasonable provision for the depreciation of assets, which can be placed in a reserve fund for utilisation at the appropriate time for refurbishment;
(d) other charges levied by law on the institution and in terms of this pricing strategy; and
(e) the financial targets included in its business plan.

Charges levied by water management institutions may be levied on a proportional or differential basis, depending on the relevant constitution, or if directed so by the Minister to give effect to the provisions regarding the rendering of financial assistance in terms of the NWA.

8. ECONOMIC CHARGES (S56 (2) (c))

The economic charge can be set only by DWAF, either:-

- administratively by determining a proxy for the economic value of water, or
- by selling water by public tender or auction to the highest bidders in accordance with *regulations required in terms of the NWA, 1998*

The administratively determined charge can be used in water stressed catchments to promote beneficial use through the reallocation of water to higher value users. This can be accomplished, inter alia, by allowing the transfer of authorisations to use water by trading. The administratively determined charge will be based on:

- The return on assets charge for government water schemes
- The opportunity cost of water as determined by prevailing transactions

Since the financial charges will go a long way towards improving the efficient allocation of water, the administratively set economic charge will not be introduced before compulsory licensing is implemented, and then only after consulting stakeholders and CMAs.

Where amounts of water are still available for allocation after compulsory licenses have been issued and there is competition for using this water, the public tender procedure may be followed.

This annual charge will be an add on to any charges levied for water resource management and development and use of waterworks.

9 THE WASTE DISCHARGE CHARGE SYSTEM

9.1 The Basis for a Waste Discharge Charge System