



Module 5

Regulation types and options

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1. MODULE OBJECTIVES

1.1. Module overview

This module examines different types of regulation commonly in use, including command and control, self-regulation and incentive-based regulation methods. The various market controls that can also be used for regulation purposes are also presented, such as trading permits, regulation by contract and competition laws. For each type of regulation some advantages and disadvantages are presented. The module also presents some examples of regulation used within African countries.

1.2. Module aims

The aims of the present module are listed below:

- To outline different types of regulation methods;
- To outline the advantages and disadvantages of different types of regulation;
- To present some examples of regulation in Africa.

1.3. Module learning outcomes

The present module attempts to achieve the following learning outcomes:

- To understand that there is no perfect way to regulate an industry and that different methods of regulation may be appropriate for different countries and the industries within those countries;
- To be able to describe some common types of electricity regulation such as command and control, self-regulation, regulation by contract and incentive-based regulation mechanisms;
- To be able to assess the advantages and disadvantages of the different types of electricity regulation options.

2. INTRODUCTION

Power sector reform in developing countries began over 10 years ago. Usually, the reforms have involved some combination of restructuring, privatization and unbundling. Regulatory reform has also been a key element of the overall process, with countries generally moving away from regulation through a government ministry, most often towards the creation of an “independent regulatory agency”.

The aim of regulatory reform was, and is, to depoliticize regulatory functions such as tariff setting, and improve the transparency of decision-making in the power sector. There are many different types of regulation, and all have their advantages and disadvantages. There is no single solution to suit all countries, so each situation has to be analysed to determine its characteristics and an appropriate regulation system designed and put in place.

This module covers a number of types of regulation commonly in use, including command and control, self-regulation and incentive-based regulation methods. The various market controls that can also be used for regulation purposes are also presented. It is not the purpose of the module to suggest that one system may be better than the other, rather to present the advantages and disadvantages of each and let the reader decide.

The module also presents some examples of regulatory activities in Africa.

3. TYPES OF REGULATION

3.1. Command and control

Command and control regulation (C&C) is typically the imposition of standards backed up by legal sanctions if the standards are not met. The law is therefore used to define and prohibit certain types of activity or force certain types of action. Standards can be set either through legislation, or by regulators empowered by regulation to define rules.

Advantages

There are a number of strengths in such a direct approach to acceptable behaviour: it can often be implemented quickly, sets out clearly defined limits and shows the government or regulator to be acting decisively.

Disadvantages

However, it can also be a somewhat heavy-handed and complex approach to regulating activities. The problems that can be created by this approach fall into a number of categories:

- **Regulatory capture:** C&C requires the regulator and the regulatee to cooperate, in particular to ensure that information is provided to allow the regulator to carry out its duties. This close relationship can lead to a situation where the regulator can be “captured” by the regulatee, and can begin to operate in their interests, rather than the interests of the public at large.
- **Legalism:** C&C has often been portrayed as complex, inflexible and over-intrusive. It can be difficult to devise precise rules, especially if an industry is undergoing change, and in addition, the direct involvement of politicians can mean that rules are drawn up in response to specific situations or areas of concern, often in a short time scale. This can mean that C&C regulation is not always an effective or forward-looking method of regulating industry.
- **Setting standards:** Sometimes it is difficult to set an appropriate standard—for example, to permit a specified level of pollution or realistic efficiency targets for transmission and distribution systems.
- **Enforcement:** The complexity of the rules and the possibility that their design may not encompass all possible activities, makes enforcement difficult for regulators. In addition, complexity can lead to a situation where attempted enforcement can be challenged in the courts.

Table 1. Strengths and weaknesses of command and control regulation

Strengths	Weaknesses
Fixed performance standards backed up in law	Close relationship between regulator and business could lead to “regulatory capture”
Clear definition of unacceptable behaviour	Can be complex and legalistic
Seen as politically decisive	Defining acceptable standards can be difficult

3.2. Self-regulation

This could be portrayed as a kind of do-it-yourself version of the command and control method. It often takes the form of a business or a trade association developing its own rules of performance, which it also monitors and enforces. There can be some government oversight of the regulation, but as a rule, self-regulation is often seen as a way of business taking pre-emptive action to avoid overly intrusive government intervention.

Advantages

The advantages of this approach include a high level of commitment from the businesses involved (given that it is in their interests to make the system work as the alternative is government intervention), and the well-informed and comprehensive nature of the rules that are set. It can also be more flexible than governmental C&C as it does not require legislation.

Disadvantages

On the other hand, it can also be seen as undemocratic, closed to outside scrutiny and open to abuse by the very interests who devise the rules. At the very least, self-regulation will always be open to challenge by outside interests who feel that the standards and rules are not primarily geared towards reducing the impacts of undesirable activities.

Table 2. Strengths and weaknesses of self-regulation

Strengths	Weaknesses
Can be well-informed, with a high-level of commitment from firms	Could be self-serving/undemocratic
Cheap for government	Legalism not necessarily avoided
Easy to change to fit circumstances	Weak enforcement
“Realistic” standards created	Independent oversight difficult

3.3. Incentive-based regulation

An incentive is any policy, rule, pricing mechanism, or procedure that seeks to modify the behaviour of persons or companies by changing the marginal costs or marginal benefits associated with particular decisions and activities. It could be said that all regulation is based on incentives in one way or another, as regulation functions through the basic concept of penalties for “bad” behaviour and rewards for “good” behaviour.

Incentive-based regulation tries to reward the utility with increased profits for reducing costs and improving services in a more pronounced fashion than other forms of regulations. The aim is to induce a regulatee to limit or stop an undesirable activity by imposing taxes or granting subsidies—in other words a “carrot and stick” approach to ensure a socially desirable end. To apply incentive-based regulation the general steps are to choose the units of measurement, set the baseline level, choose targets for improvement and/or maintenance and then apply incentives and penalties.

One type of incentive-based regulation is performance-based regulation (PBR), where incentives are tied to improvements in utility performance, price reduction and service quality improvement. There is less reliance on costs and less relationship to earning, with more emphasis on prices. PBR is also more reliant on external performance standards and less sensitive to company specific actions.

The advantages of PBR are that it may help improve plant utilization, reduce operation and maintenance (O&M) costs and improve system reliability. It also sets specific goals for utility management to focus on, can promote demand-side management (DSM) and simulates competition where real competition may not be practical. In general, PBR is also regarded as giving greater flexibility to utilities to make their own choices on how to respond to regulation. The disadvantages of PBR are that by placing emphasis on reducing costs, it may lead to inadequate O&M in an effort to save money. Incentives on certain items and not on others may divert attention to those areas where an incentive is offered to the detriment of other areas which may be equally important. It is also very important to set the rules correctly from the outset. If benchmarks and targets are wrong they could benefit the utility or the customer to the disadvantage of the other party.

However, overall, PBR aims to promote sharing of benefit between the utility and the customers. The utility benefits through incentives and lower costs, leading to higher profits and better return on investments for its shareholders. The customers benefit from lower prices and improved service.

Advantages

The scheme of punishment and reward operates in a mechanical way, so reducing the scope for regulatory discretion, which in turn reduces the possibility of regulatory capture. It also allows the company a degree of flexibility in deciding whether to conform to the rule, or to accept the punishment.

Disadvantages

The incentive-based approach can create rules that are too complicated and inflexible and do not take into account market realities, especially if they are not updated regularly to follow developments in the market. Incentive-based regulation assumes economic rationality, which may not always be the case. In addition, sometimes it is difficult to predict the impact of this type of regulation, for example, “bad” behaviour, e.g. polluting, could be rewarded if the rules are not set correctly.

Table 3. Strengths and weaknesses of incentive-based regulation

Strengths	Weaknesses
Low regulatory discretion	Rules may be complex and inflexible
Allows choice for regulatees	Assumes economic rationality—not always the case
Low enforcement costs	Difficult to predict impact
Encourages technological innovation	May reward polluters

3.4. Market-based mechanisms

There is a range of market-based mechanisms that can be used to regulate activities. Market-based regulations can prove cost effective, and minimize regulatory interference in the day-to-day operation of companies. Some of the more common market-based mechanisms are outlined below.

Competition laws

These are laws used to control the behaviour of companies to ensure that the market delivers services by limiting undesirable activities such as predatory pricing or cross-subsidization. Competition law can be preferred to command and control regulation because it is less intrusive for companies, and cheaper for the public purse, given that disputes are resolved in court rather than by publicly funded agencies.

However, the laws themselves only establish broad principles, rather than being defined for specific commercial or technical problems. Relying on courts to sort out the details of implementation risks a less than expert judgement than might be the case with decisions taken by a regulatory agency.

Regulation by contract

The government can use its own buying power to specify conditions in contracts with outside businesses. The contractual conditions can be used to drive socially desirable ends, such as a specified proportion of renewable power used in the production of goods. Regulation-by-contract is sometimes regarded as a short-term solution, worth considering when trying to increase regulatory robustness rapidly in the short-term, but preferably it should be reinforced and eventually replaced by more permanent regulatory measures.

Regulation-by-contract would be aimed at managing regulatory discretion resulting particularly from weak institutional environments and would be initiated in order to support regulatory independence.

Increasing regulation-by-contract should not be seen as an intention to replace existing regulatory agencies with an alternative mechanism, but rather as a method of complementing their work by enhancing the effectiveness and credibility of the regulator.

Under a regulation-by-contract regime a regulator will potentially have to engage in contract re-negotiations, and hence the regulator's role will increasingly be that of honest broker or even impartial player focused on creating solutions and building consensus between service providers/investors and governments. When designing regulation-by-contract arrangements, increased emphasis should be placed on the issue of pass-through costs, as well as the possible inclusion of re-opener clauses in contracts, although these are generally not favoured.



Discussion question/exercise

If the trend is to move towards more regulation by contract, what are the implications for the existing regulatory agencies? And what are the prospects for creating new regulatory agencies in countries and sections where they do not exist?

Tradable permits

This is an increasingly important approach for limiting carbon dioxide emissions following the development of the European Emissions Trading Scheme. A specified level of acceptable emissions is set by the government, and market participants are granted an allocation of allowances up to that limit. The participants can then choose to reduce their emissions below the allocated limit and trade their excess allowances, or to buy allowances to allow them to exceed the limit. In addition, participants may also choose to exceed the limit and pay a penalty rather than buy additional allowances.

Politically, this is an attractive mechanism as it leaves companies free to decide how to behave, so, in theory, achieving the most economically efficient route to reducing emissions. However, the success of the scheme depends on the limits set by governments: with undemanding limits, the price of traded allowances will be low, and there will be little financial incentive for companies to change their practices. In addition, the success of any scheme will depend on enforcement and verification by a regulatory body.

Disclosure regulation

This requires producers to state the source or content of their power product, and has been applied in some countries and states to ensure that information is provided on the generation mix used to produce electricity. The mechanism allows consumers to choose a preferred source of generation (e.g. renewable generation rather than fossil fuel), but it depends on the reliability of the information presented. It also assumes that consumers will make the ‘right’ choice to achieve the desired end.

Table 4. Strengths and weaknesses of market-based mechanisms

Strengths	Weaknesses
Firms respond to market not bureaucrats	Uncertainties and transaction costs
Applicable across sectors	Lack of response in crisis
Flexibility	Needs healthy permit market
Low enforcement costs (disputes resolved by participants)	Can create barriers to entry
	Depends a lot on reliability of information

Other regulation mechanisms

Other regulation methods that can be used include direct action by government, regulation through rights and liabilities laws and regulation through public compensation. The advantages and disadvantages of each of these are laid out in the table below.

Table 5. Strengths and weaknesses of other regulation methods

	Strengths	Weaknesses
Direct action	States can plan long term, “acceptable” infrastructure	Costly, can involve contentious subsidies
Rights/liabilities law	Low intervention	Costs to individuals, evidential and legal difficulties
Public compensation	Firms aware of costs	Monitoring performance difficult



Review questions

1. What are the advantages and disadvantages of:
 - (a) Command and control regulation?
 - (b) Self-regulation?
 - (c) Incentive-based regulation?
2. Name some market-based regulation mechanisms.

4. EXAMPLES OF REGULATION IN AFRICA

4.1. Energy regulation in Zambia

The regulatory structure for the electricity sector in Zambia is the independent Energy Regulation Board (ERB), which was created under the Energy Regulation Act of April 1995. Some of the provisions in the legislation that contributed to the successful establishment and development of the ERB were the following:

- Establishment of ERB as an independent statutory body and the sole licensing authority for operators in the energy sector (i.e. electricity, petroleum, renewable energy and other forms of energy).
- ERB Board members (regulators) are appointed on a professional basis, do not represent any stakeholder interests, serve a specified fixed term(s) and the basis for their removal from office is clearly stated in the legislation. Once appointed, the Board operates independently in its decision-making based on the governing legislation.
- There is a provision for earmarked funding for the ERB in the form of a percentage of energy cost passed on to the consumers.

The successful establishment and development of the ERB was a direct consequence of the Zambian Government's deliberate policy and political will to establish an independent regulator. With the policy and legislation in place, the Board was appointed in February 1997 and the ERB became operational immediately. Supported by strong political will and legislation, the ERB embarked on an aggressive capacity-building programme and as a result of this extensive capacity-building, ERB quickly developed into a strong regulatory authority with strong expertise, competency, independence and accountability.

The ERB has a mandate to regulate all undertakings in the energy sector, which comprises electricity, petroleum, coal, wood fuel and renewable sources of energy. The ERB regulates through the issue of licences, which stipulate the conditions under which the licence undertakings should operate.

In order to promote the development of renewable energy, the ERB zero-rated licence fees for this subsector. This measure is still on-going. For solar energy, there is no regulation for the retailers who sell mostly substandard imported PV modules in small shops: the licence is currently applied only to 17 individual companies that install solar equipment.

The ERB regulation for installers specifies 3-4 sets of equipment that can be installed (photovoltaic modules, batteries, fitting), in order to avoid the installation

of substandard equipment. Inspections are conducted, but for the moment without penalties. A code of practice for “photovoltaic systems designs and installation” is currently being produced by the Zambia Bureau of Standards. The question of the qualification of installers is also on the agenda and the introduction of competence certificates is under consideration by the ERB.¹

The ERB also recommended the Government to remove import duty on imported renewable energy products. This measure is also still ongoing but does not apply to solar panel batteries and some other components which are not renewable energy specific.

For a more detailed account of the establishment of the Zambian ERB, the reader should refer to case study 1, which is attached to this module.

4.2. Water sector reform in Uganda

The water sector in Uganda does not yet have an independent regulator. The primary responsibility for regulation is vested in the Ministry of Water, Land and Environment². However, regulation is complex, with a number of different agencies and bodies involved. The present approach is regulation-by-contract, with the Ministry responsible for monitoring performances according to the contracts.

Recognizing the need for promoting the attainment of the Millennium Development Goals (MDGs), the Uganda water sector found it necessary to separate the treatment of urban, commercial town operations from those of rural villages, which had a different framework in place in order to facilitate cross-subsidies, financial support and enhanced access to services.

The following lessons have been learnt from the water sector reform process so far in Uganda:

- Different models have to be used for small rural water operations and larger town water operations.
- Rural water operations make use of private contractors within a management contract framework, while the National Water and Sewerage Corporation (NWSC) takes responsibility in the towns, in terms of a performance contract with the Ministry.
- The present regulatory approach (by contract) does not sufficiently address such issues as tariff setting, contract disputes and capital investment planning.

¹Photovoltaic Energy Services for Zambia, X. Lemaire, Centre for Management under Regulation, Warwick Business School, April 2006.

²Mr. E. Kitembo, Reform manager, Ministry of Water, Land and Environment, Uganda, 2nd AFUR Annual Conference, March 2005, Kampala, Uganda.

- A certain amount of self-regulation is taking place in terms of the larger town operations, central government having transferred power to local authorities even though these commonly lack capacity to exercise such powers.
- Key regulatory challenges for the Uganda water sector include the formalizing of an appropriate regulatory framework promoting best practices and fostering confidence among private operators.

4.3. Electricity regulation in the United Republic of Tanzania: moving from government regulation to an independent regulatory body

Electricity transmission and distribution network

Electricity supply in the United Republic of Tanzania consists of both a national interconnected grid and isolated distribution systems. The electricity subsector is still dominated by the state-owned utility, Tanzania Electric Supply Company Ltd. (TANESCO).

TANESCO distribution network serves about 400,000 customers most of whom are supplied by the national grid.³ As such, the electrification level is still marginal leading to low per capita electricity consumption of about 84 kWh per year (figure for 2002). Extension of the distribution network is hampered by the historically poor financial performance of TANESCO partly in terms of unpaid bills, debt and interests accrued from long-term loans. Other reasons for the poor performance are reported to include weak management and operational performance. The insufficient delivery service of TANESCO is also characterized by high system losses, which are estimated to be in the order of 28 per cent.⁴

Institutional structure of the energy sector

The Government of the United Republic of Tanzania through the Ministry of Energy and Minerals is the policymaker and regulator of electricity generation and distribution in the country. The Government utility, TANESCO, is responsible for about 70 per cent of electricity generation and owns about 98 per cent of Tanzania's distribution network.

TANESCO has a monopoly on the interconnected electricity transmission grid and therefore, all independent power producers (IPPs) have to sell their power under

³Mwihava, 2005.

⁴Ngeleja, 2003.

special power purchase agreements (PPAs) to TANESCO. Since there are no standard PPAs set out by the government, each agreement is usually concluded after prolonged negotiations.

Legal and regulatory framework

The Government's long-term plan (Vision 2025) and sectoral policies such as the National Environmental Policy (1997), the National Science and Technology Policy for Tanzania (1996), and the National Energy Policy (2003) widely support energy conservation and efficiency, and the use of locally available energy streams to meet the challenging development process. The Government now needs to go further by providing regulatory and appropriate standardization for achieving policy objectives.

For instance, the Energy Policy needs be put into operation by the provision of a regulatory framework. The government must also ensure mandatory compliance to energy conservation and efficiency, and ensure minimum renewable energy streams into commercial energy. This should be done by regulating the energy sector and by providing appropriate incentives.

The Government being the regulator and policymaker needs to implement these kinds of actions by creating an enabling environment and by empowering appropriate institutions. The ongoing reforms in the power sector of Tanzania are steps in the right direction.

Power sector reforms

Tanzania's power sector reforms are important in accelerating its capacity to meet the challenge of electrification. Rural electrification currently stands at 2 per cent, while urban electrification is at 37 per cent. The reforms are expected to bring about:

- Regulation and control;
- Modernization;
- Meeting energy conservation and efficiency policies, including the emerging environmental legislations;
- Addressing barriers to electrification and investments in the electricity sector.

In order to prepare TANESCO for privatization, in 2002 the Government approved an arrangement to contract M/S Net Group Solutions Limited to manage TANESCO. This South African company was contracted to undertake the top management of the power utility. The decision to have a management contract was prompted by the poor performance of TANESCO.

In the forthcoming reforms, the government will remain the owner and policy-maker where as regulatory issues will be transferred to the Energy and Water Utilities Regulatory Authority (EWURA). EWURA was established by an Act of Parliament in 2003 and arrangements are under way to make it operational. Amongst others, the functions of EWURA will include the establishment of standards for goods and energy services and ensuring the efficiency of production and distribution of energy services.

TANESCO will be unbundled into separate segments responsible for power generation, transmission and distribution (Mwihava and Mbise, 2003). Generation and distribution activities will further be divided into a number of companies to allow private sector participation in a competitive manner. Besides competitiveness in the energy sector, the reforms in the corporate structure of TANESCO are expected to promote energy conservation and energy efficiency and to attract the utilization of alternative energy streams.

The way forward

The following are therefore some recommendations for improving the country's energy demand and supply, which take on board sustainable energy issues:

- Remove monopoly in the electricity sector by privatizing the national utility, TANESCO;
- Energy policy and power systems master plans should promote IPPs by creating appropriate incentives (such as low interest loans) for achieving specific mandates for renewable energy streams to the commercial energy sector;
- Institute more regulation to the power sector by enabling the functions and activities of relevant authorities such as EWURA;
- Increase capacity-building programmes to decision-makers and technical personnel in the power sector;
- Demonstrate further the advantages of energy conservation and efficiency by utilizing proven techniques and technologies. This should also include publicity and awareness programmes;
- Institute energy efficiency standards including energy star programmes and building code standards.

4.4. Power sector reform and regulatory institutions of Ghana

The power sector reforms in Ghana were driven by a shortage of financing for much-needed capacity expansion in 1995. Sector reform was a condition of the

World Bank lending for new electricity generation capacity. Since then, the reform has been extended to other subsectors in energy including petroleum.

Electricity reform programme

The main objectives of Ghana's electricity reform programme are as follows:

- Ensuring proper policies and incentives to expand electricity access to spur growth, improve productivity, service delivery and the quality of life, and institute programmes to enhance energy efficiency;
- Regulating the sector to make each part of the sector operate with economic efficiency;
- Delivering electricity and electricity-related services to customers in an efficient and cost effective manner, while ensuring the sector's financial viability;
- Harnessing Ghana's as well as the region's rich energy resources for development and making the necessary policy and institutional changes to pass on the economic benefits equitably to the people of Ghana;
- Increasing efficiency of asset utilization and thereby determining a realistic level of investments needed to meet energy demand created by growth.

Status of implementation of reform

Under the first round of sector reforms initiated in 1995, initiatives implemented include: Enactment of the Public Utilities Regulatory Commission (PURC) Act of 1997 (Act 538) and Energy Commission (EC) Act of 1997 (Act 541).

The PURC vets and approves tariff proposals from the utilities and develops consumer protection guidelines. The PURC has effected several tariff adjustments resulting in cost-reflective tariffs. In addition, an automatic price adjustment mechanism to effect quarterly adjustments for changes in foreign exchange fluctuations was introduced in 2003.

The EC's mandate is to put in place several pieces of subsidiary legislation ("Legislative Instruments") that are the key to more transparent regulation of the electricity supply industry. These include the "Technical and Operational Rules for Delivery of Electricity Services" and the "Electricity Supply (Standards of Performance) Rules" for the distribution segment. After extensive consultation with stakeholders, the EC expects to shortly complete drafting the "Technical and Operational Rules for the National Interconnected System" on "Wholesale Power Supply Market Rules".

In 1998, the Electricity Corporation of Ghana was converted into a limited liability company, Electricity Company of Ghana Limited (ECG) under the Statutory Corporations (Conversions to Companies) Act 461 of 1993. Subsequently now, it is proposed to unbundle the Northern Electrification Department (NED), the distribution business unit of the Volta River Authority (VRA) and merge it with ECG to create one distribution company.

In 1998, the Government issued policy directives requiring VRA to functionally unbundle and transfer national transmission and load dispatch assets to an Electricity Transmission Utility (ETU). As an initial step towards compliance, VRA registered (in 1999) a wholly owned subsidiary company—the National Grid Company Ltd. (GRIDCO) and commissioned a number of studies to facilitate the functional unbundling of the ETU from its other generation and distribution business units, including: (a) a Transmission System Pricing Study; (b) a Transmission System Expansion Plan; and (c) a Transmission Assets Valuation Study. The above notwithstanding, the Government has recently decided to completely separate the ETU from VRA.

In September 2005, parliament passed the VRA Act Amendment Bill which effectively amended the VRA Act (Act 46), paving the way for the formal separation of the generation and transmission functions of VRA.

The “Status of Implementation of Ghana Power Sector Reform Programme,” a paper dated June 9, 2004, issued by the Ministry of Energy, states that the following actions were ongoing or were intended to be completed shortly:

- Establishment and operation of a Power Sector Reform Implementation Secretariat.
- Preparation of legislative instruments to underpin the corporate unbundling of VRA to create an autonomous state-owned electricity transmission utility and a joint venture thermal power generation company while retaining (through a new VRA Act) the reservoir management and hydropower generation functions in the streamlined VRA Hydro.
- Establishment of an autonomous state-owned entity to which the EC can grant the ETU licence, following notification by the Minister of the legislative instrument that empowers the ETU to take over from VRA all system operation and dispatch functions. Until such time that the Energy Commission completes the preparation, approval and notification of the “Technical and Operational Rules of Practice for the National Interconnected System”, the Government has decided that VRA would continue to be responsible for the safe, reliable, economic dispatch of grid operations.
- Implementation of a proposed Aboadze Thermal Power Joint Venture: to complete development of the Takoradi Thermal Power Complex (consisting of

T1 and T2). The Government plans to assign CMS Energy as the T1 plant operator under a performance based contract. VRA, however, believes that the selection of a plant operator for T1 should be made based on an international competitive bidding process and has indicated this to the Government.

- Merger of NED into ECG to form a single distribution company (the consolidated ECG”), and implementation of a performance-based “management support services agreement” as a means to improve financial management, commercial and technical operations at ECG.
- Parliamentary ratification of the full complement of EC legislation instruments to underpin EC technical regulation functions, especially technical and operational rules for the national interconnected system, and standards of performance for delivery of electricity supply services.

As can be deduced from the above and as per the government paper cited in the previous paragraph, several actions under the reform programme have been completed. These include the establishment of the Reform Secretariat and activation of various committees to lead the respective initiatives on restructuring, determination of joint venture arrangements; the amendment of Act 46, engagement of a consultant to carry out asset revaluation as a prelude to the separation of the books of accounts for the newly restructured companies; and the implementation of a performance-based contract to put in place the proposed management services provider for the consolidated ECG.

In addition, the Government has initiated actions on preparing a comprehensive public education and awareness strategy and the Energy Commission is working towards notification of a series of legislative instruments to prescribe technical and operational rules for the national interconnected system (“Wholesale Power Supply Market Rules”).

The Energy Commission has already developed the Licensing Manual for the Electricity Sector. The electricity supply and distribution (“Electricity Distribution Rules”), which has been laid down in parliament, will attain the mandatory 21 parliament sitting days becoming law when parliament resumes sitting in mid January 2006.

Action has also been taken towards restructuring and cleaning up the VRA and ECG balance sheets, including debt restructuring to settle all payables/receivables among government entities and reduce some of the debt burden of these companies. Debt relief to the extent of US\$ 144.9 million equivalent of debt/government receivables for VRA and US\$ 95.06 million equivalent for ECG has been provided.



Exercises

What is the regulatory framework for the power sector in your country?

What regulatory mechanisms are being used?

Write a short summary of the situation (1-2 pages).

5. CONCLUSION

For each type of regulation presented above there are advantages and disadvantages. There is no perfect way to regulate an industry and different methods of regulation may be appropriate for different countries and the industries within those countries.

Trends in regulatory methodologies should be observed when discussing regulatory risks and arrangements, in particular the realization that greater use of high-powered utility regulatory models based on price-cap regulation often results in the necessity for more contract negotiations, which in turn poses new challenges to the regulatory agencies.

LEARNING RESOURCES

Key points covered

There are many different types and options for regulation. There is no standard method that works in every situation, therefore the circumstances of an industry and country have to be analysed and an appropriate regulation method selected depending on the results.

A number of regulation types and options were presented. These were:

- **Command-and-control regulation** is typically the imposition of standards backed up by legal sanctions if the standards are not met. The law is therefore used to define and prohibit certain types of activity or force certain types of action. Standards can be set either through legislation, or by regulators empowered by regulation to define rules.
- **Self-regulation.** This could be portrayed as a kind of do-it-yourself version of the command and control method. It often takes the form of a business or a trade association developing its own rules of performance, which it also monitors and enforces. There can be some government oversight of the regulation, but as a rule, self-regulation is often seen as a way of business taking pre-emptive action to avoid overly intrusive government intervention.
- **Incentive-based regulation.** An incentive is any policy, rule, pricing mechanism or procedure that seeks to modify the behaviour of persons or companies by changing the marginal costs or marginal benefits associated with particular decisions and activities. It could be said that all regulation is based on incentives in one way or another, as regulation functions through the basic concept of penalties for “bad” behaviour and rewards for “good”. Incentive-based regulation tries to reward the utility with increased profits for reducing costs and improving services in a more pronounced fashion than other forms of regulations.
- **Market controls.** There is a range of market-based mechanisms, which can be used to regulate activities. Market-based regulations can prove cost effective and minimize regulatory interference in the day-to-day operation of companies.



Answers to review questions

Question: What are the advantages and disadvantages of:

- (a) Command and control regulation?
- (b) Self-regulation?
- (c) Incentive-based regulation?

Answer:

Command and control regulation.

Advantages: it can often be implemented quickly, sets out clearly defined limits and shows the government or regulator to be acting decisively. Disadvantages: it can be a somewhat heavy-handed and complex approach to regulating activities.

Self-regulation.

Advantages: there is often a high level of commitment from the businesses involved, and the rules that are set are well-informed and of a comprehensive nature. It can also be more flexible than governmental C&C as it does not require legislation. Disadvantages: it can be seen as undemocratic, closed to outside scrutiny and open to abuse by the very interests who devise the rules.

Incentive-based regulation.

Advantages: the scheme of punishment and reward operates in a mechanical way, so reducing the scope for regulatory discretion, which in turn reduces the possibility of regulatory capture. It also allows the company a degree of flexibility in deciding whether to conform to the rule, or to accept the punishment. Disadvantages: The incentive-based approach can create rules that are too complicated and inflexible and do not take into account market realities. It also assumes economic rationality, which may not always be the case.

Question: Name some market-based regulation mechanisms.

Answer: Market-based regulation mechanisms: Competition laws, regulation by contract, tradable permits, disclosure regulation.



Presentation/suggested discussion topics

Presentation: ENERGY REGULATION – Module 5: Regulation types and options

Suggested discussion topics:

1. Compare and contrast different types of regulation, give example of each from the countries of the students.
2. Which type of regulation is most appropriate for developing countries which have developing power sector systems (electricity in particular)? Discuss.

Relevant case studies

1. Zambia Energy Regulation Board

REFERENCES

Report of the proceedings of the 2nd Annual Conference of the African Forum for Utility regulators (AFUR), Kampala, Uganda, 14-18 March 2005.

Global Regulatory Network, Incentive-based regulation, presentation by R. Addepalli.

Regulation by Contract: A new way to privatize electricity distribution?, T. Bakovic, B. Tenenbaum, F. Woolf, Energy and Mining Sector Board Discussion Paper Series, Paper no. 7, May 2003, World Bank.

Legal and regulatory framework of the electricity supply industry (ESI) in Southern and East Africa, Status report as at February 2005, SAD-ELEC Ltd., Norwegian Water Resources and Energy Directorate, February 2005.

CMUR, University of Warwick. Regulation and Sustainable Energy: Introductory Course. REEEP, 2005.

INTERNET RESOURCES

The Global Regulatory Network (GRN) strengthens regional associations and promotes the understanding of complex regulatory practices. www.globalregulatorynetwork.org

Regulatory Assistance Project (RAP): www.raonline.org

About regulated industry: www.utilityregulation.com

Public Utility Research Center: www.purc.org

Department of Water Development, Uganda: www.dwd.co.ug

African Forum of Utility Regulators: www.afurnet.org

Centre of Regulation and Competition: www.competition-regulation.org.uk

GLOSSARY/DEFINITION OF KEY CONCEPTS

Demand-side management	The planning, implementation and monitoring of utility activities designed to encourage consumers to modify patterns of electricity usage, including the timing and level of electricity demand.
Deregulation	The process of removing or reducing regulation. It is often employed in connection with the liberalization process for privatized industries.
Liberalization	Technically, the removal of restrictions on the movement of capital. It has come to refer to a policy of promoting liberal economics by limiting the role of government in the operation of the market economy. Liberalization can include privatization and deregulation/re-regulation. Typically, it refers to the establishment of an industry structure to allow competition. The process includes the shifting of publicly owned companies into the private sector, such that provision of services is subject to greater competition or, in the case of natural monopolies to greater oversight with regard to economic efficiency.
Monopoly	The situation where one company has the market power to control the price or availability of a good or service.
Performance-based regulation	Regulatory approaches rely on the application of financial incentives and disincentives related to specific outputs to induce desired behaviours on the part of regulated companies. PBR links company outputs to revenue and can be applied to achieve benefits such as increased innovation, increased standards for quality of supply, reduced losses and a range of other things which are perhaps otherwise not addressed by regulatory approaches such as rate-of-return.
Price capping	The application of a limit on the prices that a utility may charge in a given regulatory period. A regulator sets the amount with the aim of taking into account the increases in productivity expected of the sector in comparison with the ongoing inflation in the economy as a whole. Price capping will often be used in conjunction with benchmarking in order to allow the regulator to assess more easily the levels of productivity that a company should be achieving.
Price regulation	Regulation wherein utilities are incentivized to maximize their efficiency in order to maximize their profits. Prices are regulated but profits are not. The usual form is to allow prices to rise by an amount related to inflation minus an efficiency factor—if this factor is large enough prices would actually have to fall. The main criticism is that it can allow companies to make unreasonably high profits if the efficiency factor is set too low. It originated in the United Kingdom as RPI-X (retail price index less the expected future productivity gains (the X)). It is usually differentiated from the rate of return regulation.

Privatization	The process of moving a body or institution from ownership in the public sector to ownership in the private sector. This can be carried out using different processes, for example, the sale of shares to the general public or the sale of the whole company to a specific bidder.
Quota mechanism	More generally known as a Renewable Portfolio Standard or as an obligation mechanism.
Tariff mechanism	A mechanism to encourage the growth of renewable energy generating capacity. Notable examples are Denmark and Germany. A tariff mechanism generally provides a particular rate per kWh of electricity generated and guarantees that payments will continue for a fixed or minimum period. The tariff can be fixed beforehand, or can be fixed to reduce in specific gradations over time or can be linked to the average electricity tariff. Also known as a price mechanism.

Case study 1.

ZAMBIA ENERGY REGULATION BOARD

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1. BACKGROUND

Prior to the change of Government in 1991, state-owned companies (usually monopolies) operating under extensive Government control characterized the Zambian economy.

When the current Government assumed power in 1991, new economic liberalization policies were adopted leading to the promulgation of new legislation. In the energy sector, a new ministry responsible for energy was created (the Ministry of Energy and Water Development). The National Energy Policy was formulated and adopted in 1994, followed by enactment of the Electricity Act and the Energy Regulation Act in 1995.

The Energy Regulation Board (ERB) started operating in February 1997 following issuance, by the Minister of Energy, of the statutory instrument No. 6 of 1997, the Energy Regulation Act (Commencement) Order of 27 January 1997. By the year 2000 the ERB had undertaken several capacity-building activities, developed into a strong regulatory authority and was well recognized both by the Zambian stakeholders and the international community.

This case study outlines some of the factors which contributed to the successful establishment and development of the Zambian Energy Regulation Board.

2. POLICY AND REGULATORY FRAMEWORK

The Zambian National Energy Policy of 1994 (NEP 1994) clearly states the Government's intention to liberalize the energy sector. In order to achieve this, the policy identified the need to establish an independent energy regulatory authority.

The Energy Regulation Board was created under the Energy Regulation Act, Chapter 436 of the Laws of Zambia. Some of the provisions in this legislation which contributed to the successful establishment and development of the ERB are as follows:

- Establishment of ERB as an independent statutory body and the sole licensing authority for operators in the energy sector (i.e. electricity, petroleum, renewable energy and other forms of energy).
- ERB Board members (regulators), appointed on a professional basis, do not represent any stakeholder interests, serve a specified fixed term(s) and the

basis for their removal from office is clearly stated in the legislation. Once appointed, the Board operates independently in its decision-making based on the governing legislation.

- Provision for earmarked funding in form of a percentage of energy cost passed on to the consumers.

3. INSTITUTIONAL CAPACITY-BUILDING

The successful establishment and development of the ERB was a direct consequence of the Zambian Government's deliberate policy and political will to establish an independent regulator.

With the policy and legislation in place, the Board was appointed in February 1997 and the ERB became operational immediately. At that time, the only other known energy regulator in sub-Saharan Africa was the National Electricity Regulator (NER) of South Africa. NER was equally new and only regulated the electricity sector.

Supported by strong political will and legislation, the ERB embarked on an aggressive capacity-building programme. Some of the notable capacity-building activities carried out were as follows:

- With World Bank funding, some Board members (including the Chairman) attended the 2nd International Training Program on Utility Regulation and Strategy offered by the University of Florida (USA) in June 1997. This course equipped the Board members with useful knowledge on how regulatory institutions function and also provided strategic guidance on how to develop the ERB.
- The ERB engaged short-term international consultants to help with the drafting of temporary licences in order to conform with the requirements of the Energy Regulation Act which required that all operators in the energy sector be licensed by the ERB. The World Bank funded this activity. By December 1997, ERB had licensed the first private electricity company in Zambia, Copperbelt Energy Corporation (CEC). ERB had also issued temporary licences to the state-owned electricity utility company, ZESCO Ltd and all major operators in the Petroleum subsector. This activity enabled ERB to start collecting licence fees from the licensed undertakings.
- By the beginning of 1998, ERB had established a steady cash flow stream from licence fees. This enabled the Board to engage consultants to help with the development of a human resource manual, the organizational

structure and the staff recruitment process. This activity was completed by June 1998 with a staff compliment of about 25. The ERB Board decided to offer a competitive salary structure based on the Zambian private sector average. This way ERB was able to attract qualified professionals from both the private and public sector.

- It is worth noting that none of the recruited members of staff had previous regulatory experience since the profession was new to this part of the world. With funding from the World Bank, international consultants were engaged to train all ERB staff. In addition, all ERB staff were sent on educational tours to various regulatory institutions around the world. Countries visited included Australia, Canada, Jamaica, Philippines, South Africa, United Kingdom and the United States. This activity was executed between June 1998 and December 1998.
- In 1999, the Swedish International Development Agency (Sida) provided funding for further capacity-building activities and logistical support to the ERB. With this funding, more training programmes were conducted and study tours organized to Finland, Norway, South Africa, Sweden and the United Kingdom for all ERB staff. Further, international consultants were attached to the ERB to help with drafting of permanent licences under the same Sida support. By the end of 1999, all staff members had received adequate training, visited other regulatory agencies around the world and could now confidently perform their regulatory functions.
- At the beginning of 2000, USAID funded the twinning arrangement between two United States regulatory agencies and the ERB for an initial period of two years. The assistance also included other capacity-building activities.

As a result of the above-stated capacity-building activities, ERB quickly developed into a strong regulatory authority with strong expertise, competency, independence and accountability. Within the first three years of being established, ERB handled several regulatory functions such as tariff adjustment cases, drafting of technical standards, public hearings, technical support to the Government and licensed all operators in the energy sector.

In order to promote the development of renewable energy, the ERB initiated zero-rated licence fees for this subsector. This measure is still on going. The ERB also recommended to Government to remove import duty on imported renewable energy products. This measure is also still ongoing but does not apply to solar panel batteries and some components which are not renewable energy specific.

On the international level, ERB and NER (South Africa) initiated the SADC Regional Electricity Regulatory Authority (RERA). Initial conferences were co-chaired by ERB and NER in 1998 and 2000. The ERB also participated in the launch of the African Forum for Utility Regulators (AFUR) in 2000.

4. FOLLOW-UP ACTIVITIES

The ERB has continued with capacity-building programmes. In 2003, the Government amended the Energy Regulation Act in order to further strengthen the ERB. Some of the key amendments were:

- Stiffer penalties for contravention of the provisions of the act. This has made ERB stronger and more effective.
- Provision for appeal to the High Court of Zambia should a person be refused a licence by ERB. This has made ERB more accountable.
- Additional reporting requirements by licensed undertakings. This has given ERB more authority to enforce compliance.
- Restructuring the composition of the Board and provision for appointment of the Executive Director as chief executive of the Board.

It is the desire of the Government of the Republic of Zambia to strengthen the role and independence of the energy sector regulator. In 2005, the Government engaged a consultant to review and define the relationship between the Government and the ERB. This review is also intended to ensure that the ERB is not only independent but also accountable. The consultant has submitted a draft final report, which Government is currently studying (March 2006). Key elements of the report include:

- Definition of the role of the regulator based on international best practice;
- Definition and separation of policy and regulatory functions;
- Review of the performance of the ERB.

It is the intention of the Government to review the regulatory framework in the future, taking into account the recommendations of this report.

5. CONCLUSIONS/LESSONS LEARNED

The most important lesson from this Zambian ERB case study is that to build a successful independent regulatory authority, a country should ensure that there is strong political will, a clear policy, supporting legislation and appropriate institutional arrangements such as independence, earmarked funding, accountability, credibility, no regulatory capture, competency, regulators appointed on a professional basis and no arbitrary removal of regulators.



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Energy Regulation

Module 5: REGULATION TYPES AND OPTIONS

Module 5



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Module overview

- Examining different types of regulation commonly in use
 - Command and control (C&C)
 - Self-regulation
 - Incentive based regulation
 - Market controls
- Advantages and disadvantages of different types
- Examples of regulation in Africa

Module 5



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Module aims

- To outline different types of regulation methods
- To outline the advantages and disadvantages of different types of regulation
- To present some examples of regulation in Africa

Module 5



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Module learning outcomes

- To understand that there is no perfect way to regulate an industry and that different methods of regulation may be appropriate for different countries and the industries within those countries.
- To describe some common types of electricity regulation such as command-and-control, self-regulation, regulation-by-contract and incentive-based regulation mechanisms.
- To assess the advantages and disadvantages of different types of electricity regulation options

Module 5



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SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Types of Regulation

- The design and degree of regulation depends on the structure of the industry
 - Is it public or private?
 - Monopolies – What is the degree of competition?
 - Integration? Vertical? Horizontal?
 - Is the system established or developing
- There is no standard design for a regulatory system
- Different countries / industries = different solution

Module 5



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SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Types of Regulation

- Command-and-control
- Self-regulation
- Incentive-based regulation
- Market-based controls
- Other:
 - Disclosure
 - Direct government action
 - Rights and liabilities
 - Public compensation

Module 5



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Types: Command and Control

- Imposing rules and standards backed up with criminal sanctions

Strengths	Weaknesses
<ul style="list-style-type: none"> • Fixed performance standards backed up in law • Clear definition of unacceptable behaviour • Seen as politically decisive 	<ul style="list-style-type: none"> • Close relationship between regulator and business could lead to 'capture' • Can be complex and legalistic • Defining acceptable standards can be difficult

Module 5



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Types: Self-regulation

- Organisation or association setting rules which it monitors and enforces with its members (often to avoid or delay government action)

Strengths	Weaknesses
<ul style="list-style-type: none"> • Can be well-informed, with a high level of commitment from firms • Cheap for government • Easy to change to fit circumstances • 'Realistic' standards 	<ul style="list-style-type: none"> • Could be self-serving/undemocratic • Legalism not necessarily avoided • Weak enforcement/independent oversight difficult

Module 5



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Types: Incentive-based Regulation

- The use of taxes or subsidies/grants to encourage compliance

Strengths	Weaknesses
<ul style="list-style-type: none"> • Low regulatory discretion • Allows choice for regulatees • Low enforcement costs 	<ul style="list-style-type: none"> • Rules may be complex and inflexible • Assumes economic rationality – not always the case • Difficult to predict impact • Rewards polluters

Module 5



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Types: Market-based

- Channelling market forces to influence competition (competition laws; tradable permits, disclosure etc)

Strengths	Weaknesses
<ul style="list-style-type: none"> • Firms respond to market not bureaucrats • Applicable across sectors • Flexibility • Low enforcement costs (disputes resolved by participants) 	<ul style="list-style-type: none"> • Uncertainties and transaction costs • Reliability of information • Lack of response in crisis • Needs healthy permit market • Can create barriers to entry

Module 5



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Types: Other Mechanisms

	Strengths	Weaknesses
<u>Direct action</u>	State can plan long term, 'acceptable' infrastructure	Costly, can involve contentious subsidies
<u>Rights/liabilities law</u>	Low intervention	Costs to individuals, evidential and legal difficulties
<u>Public compensation</u>	Firms aware of costs	Monitoring performance difficult

Module 5



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Examples for Africa

- Energy regulation in Zambia
 - An independent regulatory body
- Water regulation in Uganda
 - Regulation through a Government Ministry
- Electricity regulation in Tanzania
 - Moving from government regulation to an independent regulatory body
- Energy regulation in Ghana
 - Mix of Government and independent regulation

Module 5



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Examples for Africa

- Energy regulation in Zambia
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Module 5



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

CONCLUSIONS

- Each type of regulation has some advantages and disadvantages
- No two countries are the same, so there is no single 'ideal' solution for energy regulation
- Care must be taken when setting the 'rules' for regulation
 - To avoid favouring utilities over customers or vice versa
 - To avoid unexpected market distortions

Module 5

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