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# Georgia Rural Infrastructure in Georgia Improving Service Delivery

(In Two Volumes) Volume II: Annexes

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Transport Unit, Sustainable Development Department  
Europe and Central Asia Region

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## **CURRENCY EQUIVALENTS**

Currency Unit – Georgian Lari

Exchange Rate – US\$1 = 1.773 GEL (as at July 24, 2006)

Currency Unit – EURO

Exchange Rate – US\$1 = 0.792 Euro (as at July 24, 2006)

## **WEIGHTS AND MEASURES**

Metric System

## **GOVERNMENT FISCAL YEAR**

January 1<sup>st</sup> – December 31<sup>st</sup>

## **ABBREVIATIONS AND ACRONYMS**

AA	Amelioration Associations
BDD	Basic Data and Directions document
CDD	Community Driven Development
DAWE	Department of Amelioration and Water Economy
DASM	Department of Amelioration System Management
ECA	Europe and Central Asia (World Bank Region)
EDPRP	Economic Development and Poverty Reduction Paper
GEL	Georgian Lari
GIS	Geographic Information Systems
GNCC	Georgian National Communications Commission
GNERC	Georgian National Energy Regulatory Commission
GPS	Global Positioning System
GSIF	Georgian Social Investment Fund
GTZ	Gesellschaft für Technische Zusammenarbeit, German Government Development Agency
GWEM	Georgian Wholesale Electricity Market
I&D	Irrigation and Drainage
IDA	International Development Agency, part of the World Bank Group
KfW	Kreditanstalt für Wiederaufbau
LSG	Local Self Government
MED	Ministry of Economic Development
MCC	Millennium Challenge Corporation
MDDP	Municipal Development and Decentralization project
MDF	Municipal Development Fund of Georgia
MDG	Millennium Development Goal
MLS	Minimum Level of Service
MOE	Ministry of Environmental Protection and Natural Resources
MOM	Management, Operation and Maintenance
MTEF	Medium Term Expenditure Framework
RDMED	Road Department of the Ministry of Economic Development
RCIS	Rural Communities Infrastructure Survey
RIAT	Rural Infrastructure Assessment Toolkit
SDSG	State Department of Statistics of Georgia
SEMA	State Enterprise Management Agency
SGHH	Survey of Georgian Households
UED	United Electric Distribution Company
USAID	United States Agency for International Development
WTP	Willingness to Pay

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# **Rural Infrastructure in Georgia – *Improving Service Delivery***

## **TABLE OF CONTENTS**

Acknowledgments .....	iii
The Development of Rural Infrastructure in Georgia .....	1
Annex A – The Methodology of the Study .....	2
Annex B - The Institutional Context of the Study .....	7
Annex C - The Main Findings from Previous Programs/Studies.....	37
Annex D – The Coverage, Source, Condition and User Satisfaction With Existing Services .....	43
Annex E – The Output from the Willingness to Pay Study .....	59
Annex F – The Sampling Strategy .....	76
Annex G – Preferences for Infrastructure Improvement by Community (100 Sakrebulo).....	81
Annex H – Rural Road Condition by Rayon and Community.....	99
Annex I – The Delphi Approach.....	101
Annex J – The Estimation of the Willingness to Pay.....	102
Annex K – Willingness to Pay Sample Questionnaire.....	105

## **LIST OF FIGURES**

Figure 1 : Division of Functions in the Water Sector .....	12
Figure 2 : Actual average tariff (US\$ per cubic meter).....	14
Figure 3 : The difference of utility charges to costs (in GGL per cubic meter) .....	16
Figure 4 : Collection of irrigation/drainage service fee (1997-2003).....	24
Figure 5 : Division of Functions in Communications Sector.....	27
Figure 6 : Percentage of electricity consumed .....	30
Figure 7 : The Structure of the Electricity Sector and Funds Flow.....	32
Figure 8: The structure of the Gas Sector in Georgia .....	33
Figure 9 : Example of Community Meeting and Focus Group conducted during study.....	53
Figure 10 : Rating of infrastructure services, sorted by rating average.....	67
Figure 11 : Preferred ownership of electricity and gas .....	75

## LIST OF TABLES

Table 1 : Estimated Short Term Rehabilitation and Maintenance Expenditure Needs (GEL Millions) .....	18
Table 2 : Maintenance and Rehabilitation Expenditure in 2004 (GEL Million).....	19
Table 3 : Number of customers for different distribution companies .....	30
Table 4 : Nameplate, and effective capacities and annual generation of the HPPs.....	31
Table 5 : Tariffs for selected rural gas distribution companies .....	34
Table 6 : Rural Population of Georgia by type of main road serving their villages.....	41
Table 7 : Percent of the population with 24 hours uninterrupted electricity supply .....	41
Table 8 : Piped water availability by regions.....	42
Table 9 : Access, availability and consumption of electricity within households, by region.....	43
Table 10 : Supply of electricity to communities by electricity provider (% of communities) .....	44
Table 11 : Condition of electricity network (% of communities) .....	45
Table 12 : Access to Gas Supply System.....	46
Table 13 : Condition of Gas Supply System by community and region .....	46
Table 14 : Access to water and main source of water by region (% of households, % of communities).....	47
Table 15 : Availability of water and water quality by source of water (% of communities with access) .....	48
Table 16 : Condition of landline network (% of communities) .....	49
Table 17 : Comparative Road Indicators by Region .....	50
Table 18 : Number of years since the roads in the community were last maintained (Percent of Communities) 50	50
Table 19 : Surface Type on Local Road Network by Rayon (2005).....	51
Table 20 : Percentage of irrigable land receiving irrigation in communities (units: % of surveyed communities)52	52
Table 21 : Condition of irrigation systems (units: % of surveyed communities).....	52
Table 22: Proportion of communities expressed preference for infrastructure rehabilitation, by type .....	53
Table 23 : Expressed Preferences Towards Community Ownership .....	57
Table 24 : Present level of electricity services, by region.....	61
Table 25 : Present level of roads, by region.....	62
Table 26 : Present level of drinking water services, by region .....	63
Table 27 : Present level of telephone landline services, by region .....	64
Table 28 : Present level of irrigation services, by region.....	65
Table 29 : Present level of natural gas supply, by region .....	66
Table 30 : Willingness to pay estimates for service improvements, by expenditure group, GEL per month (according to the estimated model).....	68
Table 31 : Willingness to pay estimates for road improvements, by expenditure group, GEL per month (according to the estimated model).....	70
Table 32 : Estimation of the potential savings if the households receive natural piped gas .....	70
Table 33 : Sum of willingness to pay estimates, GEL per month (according to the estimated model).....	71
Table 34 : Willingness to pay estimates for Package 1 and Package 2, GEL per month (according to the estimated model).....	71
Table 35 : Relation between the sum of WTP and maximum WTP for all services (according to the estimated models) .....	72
Table 36 : Representative willingness to pay estimates for Package 1 and Package 2, GEL per month .....	72
Table 37 : Willingness to pay estimates simplified model, WTP for partial services by region, GEL per month73	73
Table 38 : Preferred payment scenario .....	74
Table 39 : Preferred payment scenario by expenditure group.....	74
Table 40 : Strata, weight, population and number of interviews in the sample .....	78
Table 41 : Villages where interviews were undertaken .....	79

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## **THE DEVELOPMENT OF RURAL INFRASTRUCTURE IN GEORGIA**

1. Rural infrastructure in Georgia is at present in a precarious state and is not providing the services needed for the socio-economic development of the regions. Fifty percent of the labor force is currently engaged in rural activities and poverty is widespread. A broad strategy and detailed action plan are needed for the development of the physical rural infrastructure in Georgia. The intention of this study's findings is to enhance a wider dialogue between the Government, key stakeholders, and the general public on the development of a prospective Rural Infrastructure Strategy. The primary emphasis in this study is on physical infrastructure: roads, drinking water, irrigation and drainage, electricity supply and gas supply. This focus is in accordance with the wishes of the Government of Georgia, earlier research conducted by the World Bank<sup>1</sup>, and the feedback during the design stage of the study. An additional benefit was the opportunity to focus the study on those infrastructure types that had similar network and operational characteristics.

2. The study has conducted a range of surveys across Georgia in order to address a number of issues:

- (i) What is the coverage and condition of rural infrastructure?
- (ii) What are the community preferences in rural infrastructure?
- (iii) What is the household willingness to pay for rural infrastructure?
- (iv) What is the estimated cost to rehabilitate the rural infrastructure networks?

The detailed description of the study approach, the sampling methodology, and the findings are provided in this volume as an annex to the main report.

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<sup>1</sup> See World Bank (2001) for a discussion of the priorities of the poor and non-poor in respect of infrastructure types.

## ANNEX A – THE METHODOLOGY OF THE STUDY

3. The study aimed to answer the following research questions: (a) what are rural communities' priorities with respect to infrastructure improvement investment? (b) what are the key determinants of the sustainability of infrastructure rehabilitation? What institutional arrangement will make basic infrastructure investments sustainable? What can the Government do to help communities enhance their capacity to make the potential investments sustainable? (c) How do the community and local authorities evaluate the quality of infrastructure services and the condition of physical infrastructure?

4. The approach adopted during the course of this study was multi-faceted, in that it employed four main approaches to the collection of the required quantitative and qualitative data to inform the work.

### *The first stage*

5. The first stage aimed at creating a database with statistical data describing the state of rural infrastructure. The data was collected at the Sakrebulo level for 10 percent of Sacrebulos in the country. The indicators, for which the data was collected, include distance from Sakrebulo to the capital, to the nearest rayon center, market and hospital; access to and quality of infrastructure services - roads and transportation, telecommunication, potable water and sanitation, water for irrigation, electricity and network gas. Statistical data was collected using administrative sources and expert observation.<sup>2</sup>

### *The second stage*

6. The second stage of the study aimed at complementing statistical data obtained during the first phase with data collected using interviews with local population. The second stage involved a qualitative survey of 100 representative rural communities to investigate community preferences about rural infrastructure provision, and how the priorities change to reflect differences in the following criteria: (a) differences in the administrative districts (the LSG/Rayon); (b) distance from the highway; (c) community altitude above the sea; (d) community size (number of households); (e) state of the infrastructure in the community; and (f) type of infrastructure ownership. Three types of interviews were used:

(i) Individual in-depth interviews with community leaders.

(ii) Group interviews with the community.

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<sup>2</sup> For example, quality of roads in many cases was determined by experts who traveled to Sakrebulos and examined the roads used by the local population.

(iii) Focus group discussions.

7. In the second phase of the study, it was impossible to cover 100 percent of Sakrebulo and a sample of 100 Sakrebulo was designed. A two-stage stratified sampling was used. In the first stage, it was decided that all regions should be represented by the equal number of observations (Sakrebulo). Abkhazia Region was not included in the study due to political situation, and each of the remaining 10 regions were represented by 10 Sakrebulo ( $100/10=10$ ).

8. At the second stage of the sampling, 10 Sakrebulo were selected for each region in the study. The selection was based on grouping the Sakrebulo using the following three criteria:

- Distance to main road: (1) less than 10 km and (2) 10 km or more.
- Altitude above sea level: (1) less than 1,000 m, (2) 1,000-3,000 m and (3) above 3000 m.
- Community size measured by adult population: (1) less than 1,000 adults, (2) 1,000-3,000 adults, (3) above 3,000 adults.

9. These groupings give 18 strata ( $2*3*3=18$ ). In each region, for each non-empty stratum (stratum that contains at least one Sakrebulo), the ratio of Sakrebulo in the stratum to total number of Sakrebulo in the region was calculated. Then 10 Sakrebulo were chosen in each region proportionally to non-empty strata ratio, randomly (using Statistical Package for Social Sciences - SPSS). The resulting sample had to be modified for political and climatic reasons: due to tense political situation in the Adjara region, the field work there had to be suspended. Additional 10 Sakrebulo were allocated to other Regions, taking into account total number of Sakrebulo per each region:

- Imereti – 3 Sakrebulo were added.
- Samegrelo – 3 Sakrebulo were added.
- Mtskheta-Mtianeti – 2 Sakrebulo were added.
- Kakheti – 1 Sakrebulo was added.
- Kvemo Kartli – 1 Sakrebulo was added.

10. Due to heavy snow, Kvemo Svaneti and Zemo Svaneti regions could not be accessed, and were removed from the study. **Therefore, due to changes in the sample, the study does not cover Adjara, Zemo Svaneti and Kvemo Svaneti Regions.**

(i) Individual in-depth interviews with community leaders.

11. These were one-on-one interviews; the study group conducted 4-5 such interviews in each community. The respondents were formal and informal community leaders: council members, rural intelligentsia (e.g., school principals), community activists, and businessmen. The method of snowball sampling was used to select the respondents: the study group had a name of at least one community leader before arriving in the community, and this individual would recommend another one-two people to interview, who would in turn give more recommendations.

12. The interviews were focused on infrastructure accessibility and quality, type of ownership of infrastructure, infrastructure maintenance financing, type of economic activity on the community, types of job, income, community budget management, community development projects, social space – solidarity and cooperation in the community, trust and cohesion and participation in community projects.

(ii) Group Interviews with the community.

13. For small communities, the number of participants was approximately 30 and for large communities 50 to 60. Community interview participants were chosen according to the following principles. The groups included women and men; people of young, middle and old age; people from different income groups. The idea was to have sufficient representation in the meetings from all named groups.

14. The selection process was random and based on registration books. First, the selection step was determined: to select 30 participants, the number of households in the registration book was divided by 30 and thus the step was determined. For example there are 600 households in the registration book. The step will be 20, and every 20<sup>th</sup> household would be selected from the registration book. While inviting to the interview the representatives of those households, the study group took into consideration the gender and age of the people, in order to ensure the representation of those groups. The presence of village authorities at the meeting was discouraged to avoid their influence on opinions expressed. These principles were followed by the study team, however, there were some problems:

- In Racha-Lechkhumi region, some Sakrebulo are fully inhabited only in summer. As the study field work was conducted in the winter, only men doing agricultural work were present in these Sakrebulo.
- In Sakrebulo of Kvemo Kartli mostly inhabited by Azerbaijani, women's attendance was limited, as women are less active socially.

15. The emphasis of the community meeting discussion was on infrastructure access, quality and maintenance, and priorities in infrastructure rehabilitation.

(iii) Focus group discussions.

16. While selecting participants for focus group discussions, the study team ensured that they represented different social strata, gender and age group. For this purpose the study group used random selection of households from the community lists and then, when inviting people to participate in a group, were maintaining age and gender balance.

17. The emphasis of the focus group discussions was on infrastructure access, quality and maintenance, economic activities in the community, community cultural and social profile, trust among community members, community coherence and integrity, social inclusion, decision making and accountability, efficient leadership.

### ***The third stage – the willingness to pay study***

18. The third phase of the work involved a survey to ascertain the proportion that communities would be willing to pay for improvements in rural infrastructure. A representative sample (N=1000) of rural households were surveyed to ascertain household willingness to pay for the offered improvements in infrastructure availability and/or quality (Questionnaire sample for the willingness to pay surveys is attached in Annex K). And the final phase, although the work was conducted concurrently with the other phases, the study included a visual condition survey of the defined ‘lifeline’ road infrastructure and the associated structures.

#### **The use of the data**

19. The resulting data were collated into a Geographic Information Systems (GIS) enabled database, which can be used both to indicate, in a visual format, the condition of the different rural infrastructure networks (road, irrigation, electricity, gas, drinking water) in Georgia, and, hence, used for network management. The GIS enabled database can also, potentially, have a significant impact on the identification of linkages between the different sectors of rural infrastructure. By combining information on all infrastructure networks, GIS can be used to identify areas where synergies in infrastructure development can be exploited as well as areas that are just missing “one small piece of the puzzle.” When combined with external information sources from census data and economic data the potential of this analysis is even more significant.

### ***The fourth stage***

20. The final step involved the development of a ‘Rural Infrastructure Assessment Toolkit’ (RIAT) for the Government. This is a ‘spread sheet’ based matrix, which incorporates collected data on the condition of the individual infrastructure types in each community, the preferences of the respondents in each community, the agricultural potential, and the potential for poverty alleviation, and the cost of the intervention. The criteria were combined using a simple additive function in the ‘Toolkit’ to construct a decision tool to assist the Government in project identification and selection, consistent with their policy priorities.

#### ***What would be the next steps in the establishment of the RIAT?***

21. The World Bank has a program that seeks to establish GIS based systems in client countries, involving the use of capacity building devices to Government agencies and other institutions to operatize the systems. A recent review of the use of asset management systems in the highway sector<sup>3</sup> found that there are three key elements to the sustainable introduction of such a system: technical aspects, the system itself and whether it is appropriate for the context; processes, establishing the processes that will use the system; and finally the people, ensuring that training is provided to suitable individuals within the stakeholder institutions.

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<sup>3</sup> See McPherson, K. and Bennett, C. (2006) for more information.

22. **The system requirements.** The GIS database relies on open source Arcview 9.0 software, which is provided free, although functionality would be enhanced with the purchase of a Network Analyst Package (estimated cost US\$700). The Decision Matrix currently uses a standard flat file, and is easily constructed in any one of the commercially available spreadsheet packages. The RIAT could then be installed on a suitable work station at no charge (assuming sufficient capacity, estimated cost US\$ 3,500 per station, including hard drive 2X250 GB, RAM 2 GB, RAID card, dual processor), or provided to a local area network, or web access, with the purchase of a database and web server (estimated cost US\$6,000, including server, hosting, tape backup, etc.).

23. **The required operators.** This software is not hard to learn, given a certain aptitude and ability, and with some training and backup could be established in any interested stakeholder institution. The costs associated with training would not be expected to amount to more than three man-months over the first twelve months of use (estimated cost US\$60,000).

24. **The required processes.** This is possibly the most difficult of the three hurdles to the establishment and use of the system, and would require some planning on the part of the stakeholder institutions. The World Bank would be happy to provide technical assistance as necessary to identify required changes to facilitate the sustainable introduction and use of such a system.

## ANNEX B - THE INSTITUTIONAL CONTEXT OF THE STUDY

25. There were four levels in the administrative framework in Georgia before the implementation of the new organic Law on Local Self-Government Units (of December 2005). The new Law provides for the implementation of the new administrative-territorial framework in Georgia effective November 2006. Two-level administrative framework has been applied consisting of central government and local self-government (LSG) levels. Former 1,100 local self-government units were consolidated into 69 (59 former Rayons, 4 former Districts, and 4 special status cities - Tbilisi, Kutaisi, Batumi, Rustavi, and Poti). Local councils are elected in these 69 LSGs, which encompass 3,736 settlements (cities, towns and villages).

### **Current Issues in the Institutional Framework of 1997-2006**

26. **The LSGs suffer currently from an unfunded mandate.** The Law on Local Self-Government and Government passed in 1997, and amended in 2000, and new organic Law on LSG Units (2005) that became effective in November 2006 endow LSGs with the responsibility to provide basic utility services to the local population and maintain local infrastructure (such as public safety, social assistance, local roads, water services, etc). However, the mandate is currently unfunded, as the State has failed to transfer sufficient resources to allow the LSGs to meet these responsibilities. In the previous system, the Treasury received funds from the National Bank of Georgia, and then allocated them to the Rayons for distribution. The Rayon level governments then had the discretion to allocate funds to local self-governments, as they saw fit, within their domain. However, there was no mechanism to transfer funds directly to LSGs. This system will be changed along with effectiveness of new territorial-administrative structure in November 2006 and provided by the new Law on Local Budgets adopted in June 2006. The latter will be applied to 2007 budget and will ensure increased transparency and formula-based objective equalization system.

27. **The mechanism for transferring resources to and between LSGs in 1997-2006 was unclear.** Georgian legislation defines three types of transfers: (i) targeted; (ii) balancing; and (iii) special<sup>4</sup>. The first, the targeted transfer, is used to finance specific delegated functions. The second, the balancing transfer, serves as an equalization, or redistribution, transfer, and is intended to act as a balance to the socio-economic potential of the different LSGs. Transfers are calculated in a pragmatic manner by examining the difference between expenses and revenues for each Rayon, and tend to be used for funding

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<sup>4</sup> See Schaeffer, Michael and Makhatadze, Mamuka. (2004). Revenue and Intergovernmental Assessment and Proposed Action Plan. (Unpublished).

salaries. The third, the special transfers, tend to be utilized in the case of emergencies (e.g. natural disasters).

28. More specifically, the existing institutional framework does not provide the LSG with fiscal autonomy, nor clearly assign expenditure management and revenue mobilization responsibilities, nor property ownership between the various levels of government. The Law on the Transfer of State Property was adopted in April 2005, and will address some of these concerns, but the implementation of the law could, potentially, take more than two years and the actual impact will depend on implementation.

29. **There were no basic regulated (clear and transparent) criteria for the allocation of responsibilities and financial resources between the rayon(s) and local self-governments in 1997-2006 system.** The Law on Budget System and Budgetary Regulation of 1996, and the Law on Local Self-Government and Government of 1997 provided the LSG units with the responsibility to define and implement the local budget. However, the next administrative level, the Rayons, had the authority to supervise the implementation and apply changes, if necessary, as long as they did not increase/cause any deficit in budget revenues and expenditures. The new Law on Local Self Government of 2005 has provided enlargement of current over 1,100 LSG units into about 69, which are mainly set at the current Rayon and special status city level. Respectively, the Government plans to revise the current intergovernmental fiscal relations system and it is expected that the 2007 local budgets will be developed according to the new Law on Local Budgets.

30. **There is little certainty in local service provision under the 1997-2006 system.** A small portion of local government resources are expanded on the provision of local services, including gas, water, roads/transport, and communications. Since revenue allocations from the Rayons are made on a discretionary basis, the provision of service, and variations therein, reflect the success, or otherwise, of the negotiations between the rayon authorities and the various LSGs<sup>5</sup>. A process that is contrary to the recurrent needs of constant service provision. The new Law on Local Self-Governments clearly specifies exclusive rights of LSGs and there will be no “rayon authority” any more which can intervene in these functions. Below is a list of exclusive authorities of the self-governing unit from the Law Article 16:

- a. management and disposal of the property under the ownership of the self-governing unit;
- b. management and disposal of the land resources under the ownership of the self-governing unit according to the Georgian legislation;
- c. review, approval of the budget of the self-governing unit, introduction of amendments and additions to it, hearing of the reports on the budget execution and its assessment;
- d. introduction of local taxes and fees, definition of their rates within the limits envisaged by the law;
- e. collection of local fees;

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<sup>5</sup> Davey, Kenneth , ed. (2002), “ *Fiscal Autonomy and Efficiency. Reforms in the Former Soviet Union*”. Budapest: OSI. Pp. 83-85.

- f. land use planning, division of self-government unit territories by zones (planting, recreational, industrial, commercial and other special zones), demarcation and alteration of their borders;
- g. management of forest and water resources of local importance;
- h. issuance of permissions on constructions, supervision of the construction underway on the territory of the self-governing unit;
- i. regulation of local passenger transportation;
- j. regulation of outdoor trade;
- k. regulation of placement of outdoor advertisements;
- l. setting housing and communal service tariffs and service rules; determining vehicle parking lots, planning of cleaning and lighting of the streets of settlements, water supply, drainage and sewage system, planning and implementation of collection of solid waste and utilization works or conducting municipal purchases for their implementation, maintenance of cemeteries;
- m. maintenance, construction and development of the roads of local importance;
- n. performance of social-cultural activities and support to the activities of the relevant objects (archives, libraries, museums, educational and youth institutions, etc.) having local importance.
- o. establishment of pre-school educational institutions, approval of their statute, appointment of a person responsible for the representation and control of their affairs;
- p. spatial - territorial arrangement of the self-governing unit in compliance with the Georgian legislation;
- q. approval of priorities of social-economic development of the self-governing unit, of the municipal programs and plans;
- r. mobilizing the resources in the spheres of health and social defense/ social welfare on the territory of self-governing unit, working out, implementing and informing the population about the appropriate events/actions, such as the creation of safety environment for people's health, the establishment of a wholesome manner of life and the identification of risk factors concerning health;
- s. municipal fire safety of the self-governing unit;
- t. traffic planning on the territory of the self-governing unit except international and national roads;
- u. regulation of the issues in regard to organizing meetings, rallies, demonstrations according to the rule set by legislation;
- v. local purchases;
- w. giving names and numbers to the streets and squares;

31. **Local self-government budgets are very small with education, health, culture and sports representing the priorities.** Sepieti, a village in Abasha Rayon, with a population of 1242, had revenues of approximately US\$ 3,000 in 2004, or a per capita income of about US\$ 2.40. This modest level is not uncommon for LSGs in rural Georgia. On average, about 70-80 percent of local expenditures are spent on funding education, health, culture and sports<sup>6</sup>. As a result, there is extremely limited financial capacity to maintain

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<sup>6</sup> Shergelashvili, Tengiz (2002). "The Financial Aspects of Decentralization", p. 28-43. In Sulukhia, Tamara (ed.), "Governing City". Tbilisi, Georgia.

infrastructure and provide utility services in rural areas. Current investment levels are negligible, and borrowing capacity highly limited, especially in the case of rural local self-governments. In addition, the absence of an enabling environment for private sector engagement means their involvement, even where possible, has been limited.

32. **Limited or poor cost recovery impedes improvement.** The provision of services has not improved in a meaningful way throughout the last decade, and one aspect of this weakness relates to the limited, or non-existent, level of cost recovery. Prior to transition, consumers of local public utilities were subsidized – directly and indirectly. In March 2002, Georgia adopted the State Program for Second Phase of Municipal Development. The major objectives of which were the reform of the policy pertaining to local public utility service provision, and the rehabilitation and development of the local municipal economy. Improved cost recovery was seen as key part of this, but so far little progress has been achieved. The Law on Local Budgets was adopted in summer 2006. It will set new intergovernmental fiscal relations and imply better consistency between the functions and resources provided to the local self governments. Providing local governments with its own sources of income, formula based equalization, improved fiscal discipline and performance in country sets promising grounds for such positive trend.

33. **The recent Rose Revolution has brought a number of actual and prospective improvements to the institutional framework.** Improved tax receipts and administration in 2004 resulted in increases in the budgets for the majority of Rayons (In 2003 cumulative actual budget revenues of territorial units were at 95 percent of planned, while in 2004 actual revenues went up to 101.2 percent of planned<sup>7</sup>), with the Treasury reporting that some may have reached 300 percent of projected levels of expenditure.

34. However, even these increases are still insufficient to meet the maintenance backlog, and needs for service provision, for rural infrastructure. The Law on Local Budgets adopted in June 2006 is intended to ensure fiscal autonomy of local budgets, as well as set clear mechanisms for equalization. In addition, the Law on the Transfer of State Property was adopted in 2005, which established the legal basis for the transfer of state property into municipal ownership.

35. The New Tax Code (2004) was expected to have a positive impact on local budgets, considering 100 percent of personal income tax to be retained by Rayons. In addition, 100 percent of the revenues raised from the property tax, which also includes land tax (in case of agricultural land plots only for the ones of over 5 Ha in size) and property transfer tax, were also retained by the local self-governments. Since these changes took effect in the fiscal year starting on January 1, 2005, the revenue impact is not fully clear, but expected to be significant. However, upcoming territorial-administrative reform considers that there will be no Rayons in their earlier form, and neither municipality will retain income tax. Property tax, gambling tax and property transfer tax will be retained by municipalities.

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<sup>7</sup> Ministry of Finance.

36. Other prospective policy reforms in the sector include: (i) decentralization strategy; and (ii) territorial-administrative reform. The State Commission on Territorial Reform and Good Governance had been established in 2004 Chaired by President Saakashvili to take the lead in planning and implementation of these reforms. The three-year Action Plan approved by the Commission envisages design, adoption and implementation of major strategies, policies, and legal acts to support efficient local governance. The territorial-administrative reform consolidated all LSGs (over 1000 units) into 69 LSGs. These two major strategies should establish a firm basis for further institutional reform in management and administration of rural infrastructure and utility services.

### **The Water Supply Sector**

37. Since transition, and the concomitant civil and military unrest, the quality and coverage of water supply and sanitation services has deteriorated markedly. This reflects the inadequate maintenance of water networks and treatment plants, but also, more generally, limited financial resources, the lack of a clear sector strategy, and poor management and planning. While drinking water from different sources is accessible by 96 percent of households, only 27 percent of them have access to the central water at home. The remaining portions of the population are supplied from a local water supply system. However, a substantial part of rural supply infrastructure is currently out of order.

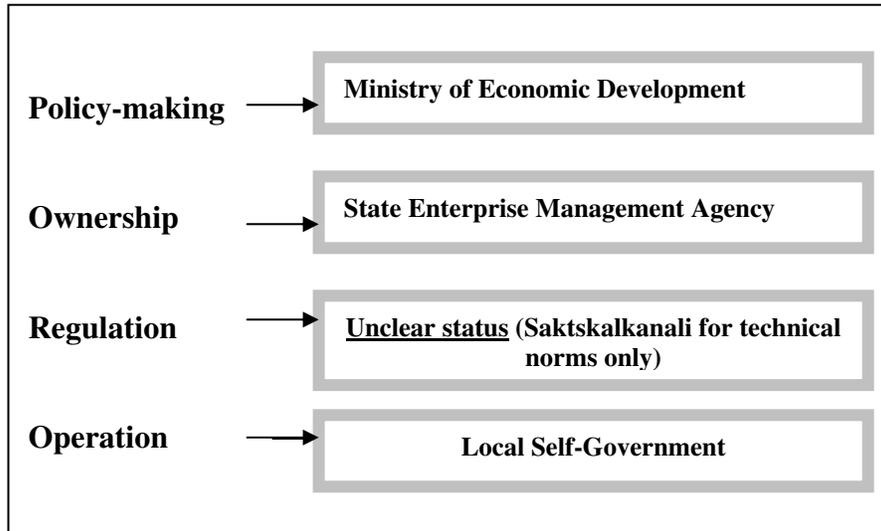
38. Households, who form the largest group of water consumers, are commonly billed on a per capita basis, while commercial and industrial consumers are either metered and pay according to their consumption, or have a special arrangement for their water supply.

### ***The policy framework of the water sector***

39. In 1998, in recognition of the difficulties faced by the sector, the Ministry of Construction and Urban Development designed a state program to improve the sanitary and technical condition of water and sewerage systems in towns and regional centers. This program was approved by Presidential Decree No. 531, but a lack of funds has precluded implementation up to this time.

40. The main legal document governing the management and use of water resources in Georgia is the Water Resources Law, which was adopted in 1997 and amended in 2000. Under this Law, central government – currently the Ministry of Economic Development – has the responsibility to develop sector policy, set service standards and mobilize financing, whilst the management of the sector is undertaken by the State Enterprise Management Agency (SEMA), which is a state entity under the Ministry of Economic Development. The operators of the networks are the LSGs. Figure 1 provides a schematic illustration of responsibilities in the water sector.

Figure 1 : Division of Functions in the Water Sector



41. The Law on Local Self-Government and Local Government of 1997 and new Organic Law on LSG Units effective November 2006 provide exclusive responsibilities for the provision of water supply and sanitation services to the local self-government units. Local authorities are provided with the explicit authority to establish tariffs for municipal services, including water and sanitation, as well as for setting the rules for billing, payment collection, and administration. However, there are a number of significant obstacles to be overcome in the sector:

- a) Firstly, there remains a lack of clear division of responsibilities between those local entities which represented local branches of central government agencies or public owned enterprises at the Rayon level and self-governing authorities for communal services. Specifically, while operations and management in the Rayons were under the control of the departments of municipal services (communal services), all the operational and maintenance activities of water pipe system at the level of the LSG were under the control of LSGs. LSG consolidation should suggest some solution to this problem.
- b) Secondly, the majority of water entities charged with the provision of water and sanitation services are unable to satisfy the roles and responsibilities devolved to them. A number of studies have identified a non-commercial approach to the provision of water and sanitation services, and limitations in managerial, accounting and technical resources and skills, lack of operations and systems data, lack of standards and monitoring capacity<sup>8</sup>.

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<sup>8</sup> DHV, (2004).

- c) Thirdly, during Soviet times the rural population was exempt from paying taxes on water, and the lack of culture of paying for water results in extremely low collection rates. One recent study estimated that increased tariffs, appropriate to levels of costs recovery, would mean that 15-20 percent of people have problems paying water bills<sup>9</sup>, and that specific targeted assistance should be provided to ensure the continued supply of basic services to the most vulnerable.

42. There is also recognition that the required investment costs exceed the capacity of the central government, and that the increased participation of the private sector in water service provision is necessary. As a result, some private companies and operators (international and local) are examining the possibility of venturing into urban water supply services, although at the moment they are displaying a degree of caution, and almost no inclination to consider investment in rural infrastructure.

### ***Regulation in the water sector***

43. There is no single regulator to regulate tariffs or user charges for the water sector. The one constraint from the central level is, in accordance with the Anti-monopoly Law of Georgia water and sanitation; a service provider cannot discriminate amongst customers within a single customer category. According to Article 35 of the Law on Local Self-Government and Government, local self-government is explicitly given the authority to establish tariffs for municipal services including water and sanitation, as well as rules for billing, payment collection, and administration. In practice, Sakrebulo – the local Self-Government administration, sets tariffs on the basis of proposals by the provider company.

44. Some (very limited) regulatory functions of the sector are the responsibility of Saktskalkalanali, the agency managed by the SEMA under the Ministry of Economic Development. Saktskalkalanali has the responsibility of providing technical advisory assistance to all municipal utilities, as well as minor water suppliers in urban (small towns) and rural areas. However its functions and capacity have not enabled fulfillment of this role and its status is unclear.

45. Some of regulations by Saktskalkalanali include: Rules for the Use of Public Water and Sewage systems, Specifications for the Quality of Wastewater Discharged by Industrial Enterprises into Municipal Sewage Networks, and Rules of Operation of Water Supply and Sewerage Systems in Inhabited Localities.<sup>10</sup> However, the role of Saktskalkalanali is estimated to be rather formal, as it plays no significant role in practice, its role currently is limited to the operation of the regional wastewater collector and treatment plant in Garadabani.<sup>11</sup>

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<sup>9</sup> DHV, (2004).

<sup>10</sup> Saktskalkalanali. (2004) *Water and Sewerage Utilities in Georgia – Operations and Financial Performance Indicators*.

<sup>11</sup> DHV (2004).

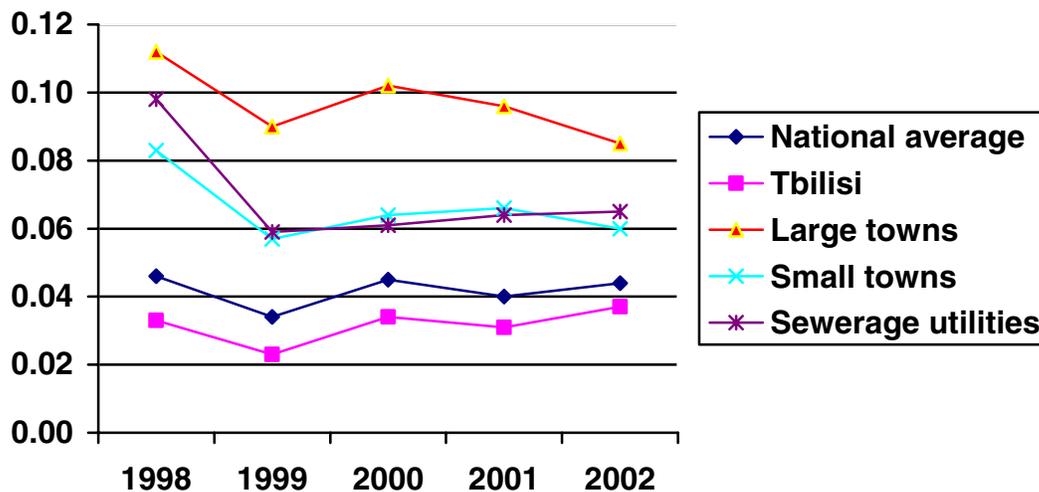
### *Tariffs in the water sector*

46. Water charges remain a political issue in Georgia. Charges do not cover utility costs. The fees paid by user of water resources are of two types: a one-time license fee, and a volumetric fee (natural resources use tax) paid on a monthly basis. The rate varies according to the classification of the water resources. By custom, tariffs for residential users are based on price per capita per month. For metered commercial and institutional users, the price is fixed per cubic meter of water. There are no separate water and wastewater bills or separate lines in the bill for the two services. Neither bad debts, nor operating costs, are currently considered in the tariff setting process. Whilst public announcements on tariff changes are not made, the LSG issues a special decree that reflects the tariff change, which is published in a local newspaper.

47. It is estimated that currently water losses amount to 30-50 percent. Water consumption is very high compared to other European countries (for instance about 900 liters per persons daily in Tbilisi).<sup>12</sup> Heavy consumption is implied by the lack of metering practices and low charges and payment discipline. Metering is almost non-existent for residential users resulting in extremely low collection rates. The average collection rate is extremely low - in year 2003 it was 58 percent across the whole of Georgia. [households 42.3 percent; commerce 68.1 percent; industry 57.6 percent; public sector 82.4 percent].

48. Almost all utilities have significant debts due to unpaid electricity and taxes (only 20 to 35 percent of taxes are paid). These debts are 3 to 5 years old and continue to grow. Water companies represent the largest debtors to the energy distribution system.

Figure 2 : Actual average tariff (US\$ per cubic meter)



Source: Saktskalkalanali, 2004.

<sup>12</sup> Saktskalkalanali. (2004) *Water and Sewerage Utilities in Georgia – Operations and Financial Performance Indicators*.

49. While there are no official statistics available on collection rates in rural areas, a recent survey<sup>13</sup> of several hundred villages in Eastern and Western Georgia revealed that about 20 percent of users in the villages pay for their service.<sup>14</sup> It also revealed that in some villages, charges were imposed even though the water supply came from natural springs and artesian wells. Possibly not surprisingly, in each case the numbers paying, less than 12 percent, was smaller.

50. There are no contracts between the service providers and customers, except for a limited number of large users. As a result, if the company charges a customer but does not provide water, it is not clear how the customer should respond. By contrast, the Rule of Usage of Systems for Municipal Water Supply and Wastewater of 1998 allows disconnection of a user from water supply under the terms stipulated in the contract or in the Rule, with or without prior notice, if the user does not fulfill the obligations provided under the Rule or contract.

51. In practice, in many towns and cities, many individuals simply do not pay their water bills and hardly any attempts are made to compel them to pay. Even though water and sewage tariffs are different they are calculated and submitted in one bill. Such billing system makes the collection process more convenient since consumers who pay for one service normally pay for the other one as well.<sup>15</sup>

52. According to Presidential Decree # 521 (1998), local government units must provide certain subsidies for water companies operating costs, with the subsidies until they are phased out entirely by the end of 2005. (For instance, the budget for Tbilisi envisages GEL 16 million for Tbilisi Water Utility in 2005, out of which GEL 1.9 million is to subsidize social safety net).

53. There is major cross-subsidization between residential tariffs and other – commercial, industrial, etc users. For instance in Tbilisi, residential water tariffs are set at GEL 0.04 per cubic meter and GEL 0.01 GEL per cubic meter for wastewater, while non-residential water supply and sanitation tariffs are set at GEL 2.2 per cubic meter.

54. As there are no water meters, customers are billed a fixed fee per month based on ratio of 800 cubic meter consumption per capita/per day. But charges do not cover utility costs despite cross-subsidizing and systematic forgiveness of debt, and the gap continues to increase. Cross-subsidizing is the major social security tool used to preserve low residential charges in large cities (mainly Tbilisi, Batumi, Kutaisi and some others).

55. This practice is not as wide-spread in small towns or villages, as the latter have no industrial customers. Therefore in many areas outside Tbilisi the residential tariffs are higher (another argument for this is that in some areas it is more costly to deliver water and wastewater services). In general tariffs greatly vary, from GEL 0.02 to GEL 0.55.

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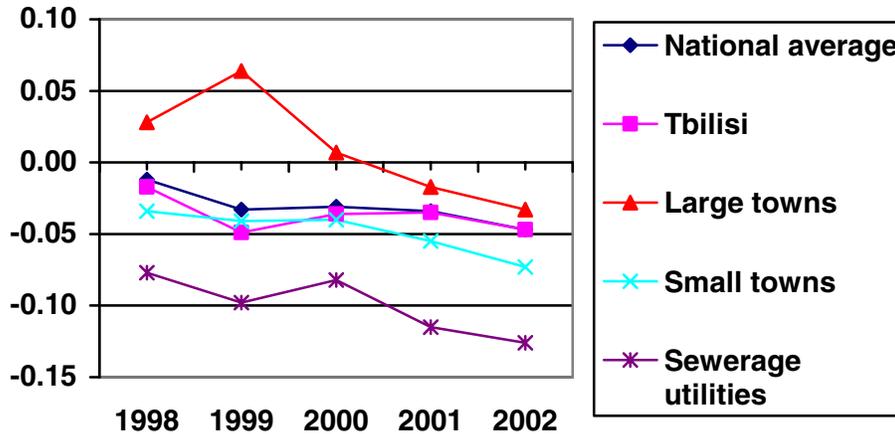
<sup>13</sup> Gorbi and SDSG (2003) *Survey on Rural Settlements Infrastructure*. p. 17-19.

<sup>14</sup> IPM (2003) *Rural Infrastructure Study*. Page 36.

<sup>15</sup> DHV (2004).

Customers are billed based on fixed consumption norms around the country and it varies from 60 to 500 liters per capita per day based on area.<sup>16</sup>

Figure 3 : The difference of utility charges to costs (in GGL per cubic meter)



Source: Saktskalkalanali, (2004).

### *The organizations in the water sector*

56. In accordance with the Law on Water Resources and other legislation, the following central government departments have responsibilities related to the provision of water and wastewater services:

- The Ministry of Economic Development has a number of general responsibilities relating to water and sanitation, such as planning, policy-making, technology innovation, as well as guidance on water infrastructure development.
- The SEMA – an “entity of public law” under the Ministry of Economic Development, manages state-owned assets including water infrastructure and enterprises, and acts as the founder of water and sewerage utilities.
- The Ministry of Environmental Protection and Natural Resources issues licenses for the use of water resources and for wastewater discharges, defines discharge limits, and monitors environmental impact and compliance with the terms of the licenses. Licenses are issued for abstraction of groundwater, use of surface water, discharge of effluent water, and for other uses of bodies of water (e.g. recreation). Licenses for water of “state importance” are issued by the Ministry, while responsibility for licensing in respect to water of “local importance” lies with local authorities.
- The Ministry of Labor, Health, and Social Affairs has responsibilities involving the supervision, protection, and monitoring of sanitary and hygienic conditions and security requirements relating to drinking water supply and wastewater discharge. It

<sup>16</sup> OECD, (2005) Financial Strategy for Water and Wastewater Sector in Georgia: Assessment of Existing Situation in the Sector and the Baseline Scenario. Interim Report.

- develops respective rules and norms. Specifically, the State Sanitation Supervision Service, a division within the ministry, monitors compliance.
- The State Department of Geology is engaged in surveying, controlling, and monitoring the use of ground water.
  - The State Department of Standardization, Certification and Metrology (which has local offices in some areas) is responsible for assuring compliance with drinking water standards.
  - The State Inspectorate for Technical Supervision mostly supervises the technical aspects of devices and equipment relating to the extraction, use, treatment, or discharge of water and wastewater.

### ***The policy objectives of the Government in the water sector***

57. The Economic Development and Poverty Reduction paper (EDPRP) calls for radical reform in water supply and sewage treatment. Specifically, it emphasizes need for reform in management, financing and efficient use of resources in water sector. The program sees gradual state withdrawal from the sector to a position of regulator of service quality and tariff.

58. Georgia's Millennium Development Goal (MDG) "*Goal 7: Ensure environmental sustainability addresses access to water*" through its Target 15 aims to "*Halve, by 2015, the proportion of people without sustainable access to safe water*". In order to achieve this target MDG recognizes need for granting greater independence to water supply services, enhance financial planning and management capacity, establish sustained mechanisms to secure water supply systems and for repair and maintenance, and engagement of the private sector unto the management of water supply and sewage systems.

59. A number of international Development Agencies (USAID, KfW, GTZ, the World Bank) are active in the water and sewerage sector in Georgia, mostly at the local level. Lately two major donors have committed to provide assistance in the water sector - KfW/Germany and the Millennium Challenge Corporation (MCC), USA. IDA has been financing various water infrastructure investment projects through Municipal Development and Decentralization project (MDDP) I and MDDP II, and continues to view water sector as a priority investment area.

### **The Rural Transport Sector**

60. The rural transport sector in Georgia primarily relates to the road network, which consists of 1,474 kilometers of primary/international roads, 3,392 kilometers of secondary roads, and about 15,430 kilometers of local roads, of which most of the latter are, generally, in a poor, or very poor, condition. Rehabilitation and maintenance of most of these roads has been the responsibility of Road Department of the Ministry of Economic Development (RDMED). In addition, there is a substantial part of the road network - so called community roads, which are not under the jurisdiction of central government, and belong to exclusive functions of the local self-government. The 1997 Law on Local Self-Government specifies that rehabilitation and maintenance of the community roads (where almost all rural roads

fall) are the responsibility of the local government. The new 2005 Law specifies that rehabilitation and maintenance of all local roads is now an exclusive right of LSG.

61. One implication of this new law is that the length of roads under the LSGs will increase substantially. This approach has been adopted in many countries and has in many cases resulted in both an unfunded mandate, in that sufficient resources and capacities are not available to the LSGs to fulfill their responsibilities. It would be prudent to introduce this approach in a scheduled manner, allowing problems to be identified and addressed in a limited number of pilot regions, before wider implementation.

62. The primary legislation in the transport sector is the Law on State Management and Regulation in Transport and Communications (2000, amended in 2003). Every sub-sector – aviation, railway and marine transport – is regulated by separate Codes: Aviation Code, Railway Code, and Marine Transport Code. Road Transport is regulated by the Law on Road Transport (1995). The road sector is regulated by the Law on Roads of 1993.

63. Georgia’s Road Fund, established in 1995<sup>17</sup>, was the mechanism utilized to fund the road sector until mid-2004 when it was abolished. The Road fund received its funding from a number of user charges (fuel levy, turnover tax on enterprises, vehicle license fees, etc), but in the Post-Revolutionary period, the new Government initiated a major reform of its budgetary processes and, as part of that process, abolished all special funds. Accordingly, the activities of RDMED are now financed directly from the state budget.

**Table 1 : Estimated Short Term Rehabilitation and Maintenance Expenditure Needs (GEL Millions)**

Road Class	Routine Maintenance	Periodic Maintenance	Rehabilitation	Other	Total
Main and Secondary	4.3	34.3	84.0	1.5	124.1
Local	6.6	41.5			48.1
Urban	3.8	49.8			53.6
Total	14.7	125.6	84.0	1.5	225.8

Source: World Bank (2004).

64. The funding needs of the road sector in the short to medium term exceed current expenditures in the sector (see Table 1). Total expenditures on all levels of the network, both recurrent and investment, in 2002, amounted to GEL 24.8 million, with 72 percent being expended on the primary road network (see Table 2). The level of expenditures available for the secondary and local road networks under the responsibility of the Roads Department has been, and remains limited despite the fact that the most roads qualify in these categories. This has a corresponding impact on road condition and, ultimately, transport costs. In many cases, road condition has been the determining factor in the withdrawal of any form of public transport service as transport operators became increasingly reluctant to operate on roads with a high risk of vehicle damage.

<sup>17</sup> Council of Ministers Decree No 674 of October 18, 1995

**Table 2 : Maintenance and Rehabilitation Expenditure in 2004 (GEL Million)**

<b>Road Class</b>	<b>Routine Maintenance</b>	<b>Periodic Maintenance</b>	<b>Rehabilitation</b>	<b>Total</b>
Main Roads	5,615,000	2,981,000	7,338,000	15,934,000
Secondary Roads	6,047,000	1,124,000	1,338,000	9,937,000
Local Roads	2,430,000	1,628,000	446,000	4,407,000
Total	14,092,000	5,733,000	10,453,000	30,278,000

Source: State Roads Department.

65. A further unresolved issue pertains to the geometric standards and technical specifications which are used on the roads in Georgia at present. The current standards and specifications are relics from the Soviet era, and are not reflective of the principles of economic appraisal and allocated efficiency. As a result, roads are sometimes constructed to standards in excess of need and maintenance capacity. In addition, drainage, traffic safety, and continuity of road design are not given explicit considerations. The World Bank financed Secondary and Local Roads Projects aims to assist in the design and adoption of new geometric standards for roads.

#### ***Regulation in the transport sector***

66. The Road transport sector is regulated by Motor Transport Administration, independent regulator, which was established in 2003 under the Law on State Administration and Regulation of Transport and Communications Sectors (2001, amended in 2003). It is an entity of Public Law and its Head reports to the President. The Administration is responsible to set tariffs for specific types of road transportation, ensure fair competition and provide licenses to private transport companies. The administration is not financed from the budget; rather it accumulates a fee for regulation and licensing. In every region the Administration has regional offices.

67. However, recent amendments to the Law on Independent National Regulatory Bodies (September 13, 2002, and amended on July 1, 2005) considers creation of single regulator in transport area. Specifically, according to amendment effective June 1, 2006 Motor Transport Administration, Civil Aviation and Naval Transport Administration have merged into the National Commission on Transport Regulation that will be a successor of the three administrations.

#### ***Organizations in the road sector***

68. The Ministry of Economic Development (MED) is a policy-making and oversight body for the roads sector. The Road Department of MED (RDMED) is the Legal Entity of the Public Law under the Ministry, with the function of sector administration and management. In the past several years the design, construction and maintenance units have been privatized and modern management procedures and systems introduced. Through introducing private sector into design, works and supervision of roads, the Roads Department's function is now limited to administration or road infrastructure. The Head of RDMED is appointed by the Prime Minister of the country.

69. The RDMED is in the process of establishing two Road Directorates (“territorial entities”), serving Adjara, and four Regional Offices (having initially a staff of 3-4 persons). These entities are part of RDMED and report to RDMED Director. The decentralized offices, both the Directorates and the Regional Offices, have the function of supervising the road works in their areas, liaising with the local officials and local communities, and updating the road data systems.

70. The RDMED has a Technical Committee that consists of representatives from various sectors and organizations and which makes decisions about technical design of specific projects. While the RDMED is the sector administrator and many functions are contracted out in the private sector, responsibility for local roads lies with communities and RDMED does not finance its repair or rehabilitation.

71. Under the Law on Local Self-Governance and Governance (1998) and new Organic Law on Local Self-governance (2005), LSGs have responsibility to repair, reconstruct and maintain roads of local importance (which are not under jurisdiction of RDMED), as well as provide local population with transport service delivery. Heads of village council often receive requests regarding roads, but as the resources of local self-governments are limited (especially in rural areas), they mainly seek support at the Rayon or central level.

72. The local government’s funding does not also allow for supplying needed resources, and often the request ends with the Road Department. If funding is not available, minor maintenance works are done using the local government budget and contributions from community members. Community members and industries located in the area sometimes (but very rarely) fix roads using their own resources. However, due to the limited resources, keeping local roads in good shape is extremely difficult. In addition, as a remnant from Soviet legacy, communities still often view roads as belonging to the government and expect central government to take care of the needs.

73. The design of new standards is also underway in order to gradually substitute Soviet-tailored outdated standards for design, construction and maintenance with the new applicable and internationally accepted ones. The Ministry of Economic development is an agency responsible for standards of roads.<sup>18</sup>

### ***The policy objectives of the Government for the transport sector***

74. The Government has recognized the importance of an effective road network for local economic development, and indicated that increasing funding for road repair, maintenance and rehabilitation is a major priority in 2005. In addition, Government has stated that it will further increase funding for repair, maintenance and rehabilitation of roads annually. Before the Rose Revolution, in 2003 the state roads budget was GEL 51.4 million, and subsequently increased to GEL 121.4 million in 2005, GEL 186 million in 2006, and is projected to reach GEL 215 million in 2007.

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<sup>18</sup> RDMED has hired an international consultant to develop new standards.

75. In addition to increasing funding for the sector, the task of improving the secondary and local road network is being approached by the government through improved expenditure management, to be attained by reducing costs and better programming of available resources in the roads sector, and strengthening institutional capacity and governance through introduction of modern road management systems and participatory mechanisms for roads sector programs at the local level.

76. Government's strategy (BDD, MTEF) sets transport sector among economic priorities up to 2010. Since 2004 the rehabilitation of roads has increasingly been acknowledged by the Government as a priority for rehabilitation of the country's economy and provision of equal socio-economic opportunities to the population throughout the country. In 2004 repairs were carried out on roads of international and interstate use of 4000 km of length in total. 2005 had been announced by the President as the breaking point for Georgia in improving the state of roads. The road budget was GEL 121.4 million in 2005, GEL 186 million in 2006 and budgeted to be GEL 215 million in 2007.

77. There have been three IDA funded road projects in Georgia: The Transport Rehabilitation project (1995-99); Restructuring of the Ministry of Transport (1998-2003) under LIL; Georgia Roads project (2000-2005). These projects aimed at institution building and capacity strengthening in the transport/road sector, increasing efficiency of the sector and policy reforms along with physical investment component in rehabilitation and maintenance of roads.

78. The new Secondary and Local Roads Project directly targets local and secondary roads and aims at improvement of economic and social well-being of the rural population in selected areas through upgrading of their secondary (350 Km) and local road (250 km) networks along with improvement of capacity of Roads Department in maintaining a cost-effective and sustainable secondary and local roads network.

79. In addition, IDA funds the Municipal Development and Decentralization project (MDDP I – 1997-2002 and MDDP II 2002- ongoing) which aims at increasing the effectiveness of participating LSGs in identification, planning, delivery and cost-recovery of investment projects on local infrastructure services, and where roads components amounts approximately 20 percent of disbursed funding.

### **The Irrigation/Drainage Sector**

80. The rural agricultural sector is heavily dependent on irrigation in the east and drainage infrastructure in the west, both of which have deteriorated significantly since transition, as a result of war, theft, vandalism and years of deferred maintenance. During the Soviet period, infrastructure was built to irrigate 469,000 hectares and drain 163,000 hectares, but with little consideration as to the economic cost of provision or use. Pumps were used to irrigate 143,000 hectares and drain about 35,000 hectares. The rest of the area was irrigated, or drained, by gravity. The irrigated area has since declined to 105,600 hectares and the drained area to some 25,000 hectares in 2004.

81. The major legal document is the Law on Amelioration of 1997, which has been amended in 2000 and 2001. Responsibilities for policy lie with Ministry of Agriculture, and the Department of Amelioration and Scheme Management under the Ministry of Agriculture is responsible for management, operation and maintenance of amelioration systems in Georgia.

82. In 1996, in recognition of the need for new local institutions to distribute water to the large number of new private irrigators, the Department of Amelioration and Water Economy (DAWE), the predecessor of Department of Amelioration System Management (DASM), established around 200 Amelioration Service Cooperatives (ASC) on about 200,000 hectares – mainly the area of the former kolkhozes and sovkhozes. These ASCs then entered into water contracts with DAWE, which made them responsible for the distribution, and collection of charges, within their domain.

83. However, the level of the charge, which was set generally at about GEL 7/1,000m<sup>3</sup> was too high. The level was designed to cover both the cost of water to DAWE, which was set at GEL 4/1,000 m<sup>3</sup> plus the administrative costs of the ASC, which were estimated at GEL 3/1,000 m<sup>3</sup>. The high charges, and limited capacity of the ASCs, failed to improve supply, and the reality was further deterioration of irrigation and drainage systems and retrenchment of the irrigated and drained areas.

84. With assistance from the World Bank, the Government has initiated a number of reforms in the sector, and in 2000 amended the Law on Amelioration in order to establish new private, non-profit-making entities – Amelioration Associations (AA) and foster greater participation of farmers. Amelioration Association (AA) refers to community-based organizations for water management, either in drainage schemes or irrigation schemes. DASM established a standard Service Agreements for contracting irrigation water delivery and drainage water removal with AAs.

85. In December 2001, the Law on Amelioration was amended again, and AAs were established as entities of Public Law. In addition, the infrastructure within the boundary (i.e. service territory) of an AA was transferred to AAs initially on a long-term usufruct basis. The ownership of the major infrastructure currently remains with DASM until AAs have shown the capability to adequately manage irrigation and drainage infrastructure. In addition, AAs are exempt from property tax for irrigation and drainage infrastructure till 2014.

### ***Regulation in the irrigation/drainage sector***

86. The Ministry of Agriculture (MOA) is responsible for policy setting and regulation of the sector. The Ministry is mainly guided by the Law on Amelioration of 1997, which has been amended in 2000 and 2001. The Law envisages that the regulation of the sector is undertaken by a Regulatory Office to be established within the Ministry of Agriculture. This office would have audit and controlling powers, especially geared towards ensuring that Amelioration Associations (AAs), which are community-based organizations for water management, carry out the intended services for their members and take care of the upkeep of infrastructure under the management of AAs.

87. The Ministry of Environmental Protection and Natural Resources (MOE) controls and charges for the abstraction of water from rivers and is also responsible for monitoring pollution levels in rivers and groundwater. AAs taking water directly from public sources need to obtain a license from the MOE. Similarly, AAs discharging water directly into public water bodies also need to obtain a license.

*Organizations in the irrigation/drainage sector*

88. DASM is responsible for the management, operation and maintenance of the main systems (comprising the head-works and primary canal, but also in some cases, large secondary canals), while responsibility for the remainder of the secondary systems has been transferred to Village Councils, and in some cases to recently formed Amelioration Associations (AA).

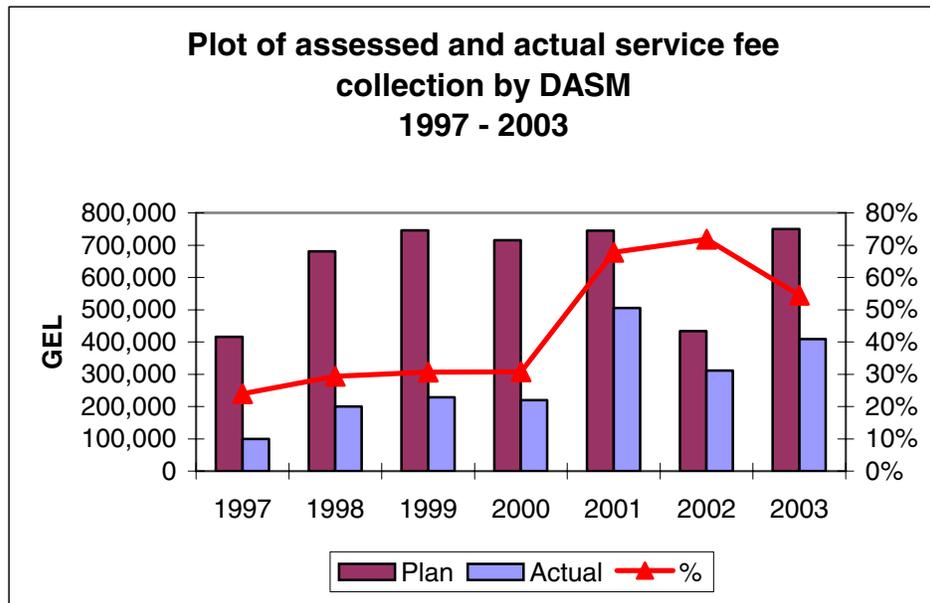
89. DASM is a part of the Ministry of Agriculture. Funding for DASM comes from the government through the Ministry of Agriculture on one hand, and from the water users through the Amelioration Associations on the other. Currently, funds collected from AAs/users go to the state budget and do not remain with DASM, as fee recovery from water users increases, the level of financing from Government is expected to reduce. However, in Georgia, like other FSU countries, the concept of paying for service (electricity, water, irrigation, etc) is not universally accepted, and collection rates have been substantially lower than planned throughout the years.

90. DASM presently owns about 60 percent of the secondary networks, many of which are within the command areas of future AAs<sup>19</sup>. Use of the infrastructure within the territory of an AA is transferred to the AA on a usufruct basis. Options for AAs to apply for ownership of infrastructure and to federate and take over entire irrigation and drainage schemes for operation and maintenance will be considered by the government at a later stage, pending upon improved capacity of AAs managing the lower order systems. This will change the role of DASM as the sole provider for irrigation and drainage operation and maintenance.

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<sup>19</sup> Institutional Study for the Medium and Long-term Structural and Functional Reorganization of the Department of Amelioration Scheme Management, 2004.

Figure 4 : Collection of irrigation/drainage service fee (1997-2003).



Source: DASM (2004) Institutional Study Reorganization of the Department of Amelioration Scheme Management, p. 47.

91. Neither DASM nor the Village Councils have been able to raise the funds necessary to ensure adequate operation and maintenance. Village councils do not possess financial resources and capacity to provide adequate service either.

92. The AAs establish a contract for water delivery with DASM, and are responsible for paying to DASM, as well as for setting water charges to their members based on operation and maintenance needs. Non-members within the service territory have to contract for water with AAs. AAs in drainage areas will similarly be required to set fees. The current water charges of GEL 6 per 1,000 m<sup>3</sup> for irrigation and GEL 3 per hectare for drainage, payable to DASM, are only expected to meet about 30 percent of the cost of operating and maintaining the system.

93. Due to the current limited coverage of operational discharge measuring structures it is proposed that in the short and medium term the variable fee is collected based on the area irrigated and the crop type. Different fee rates will be set for different crop types based on their average seasonal irrigation water requirements. The different rates to be charged for each crop type will be negotiated between DASM and the AA and entered into the Service Agreement.

94. In 1996, in recognition of the need for new local institutions to distribute water to the large number of new private irrigators, the DAWE, the predecessor of DASM, established around 2000 Amelioration Service Cooperatives (ASC) on about 200,000 hectares – mainly the area of the former kolkhozes and sovkhoses. These ASCs then entered into water contracts with DAWE, which made them responsible for the distribution, and collection of charges, within their domain. Because of lack of support and financial and technical

capacity very few of these ASCs functioned properly and the concept was abolished after a few years. Instead, government started focusing on AAs as the organization for the operation and maintenance of lower-order irrigation and drainage systems. As it takes a long time for such organizations to become viable, there have been few successes so far.

95. In drainage areas, there is inherently less incentive for farmers to participate in AAs. However, the Government's policy based on the Land Law foresees administrative penalties for land owners, or land leasers, if their land is not maintained in good condition, which includes drainage. Therefore, non-members will also be obliged to pay charges for maintenance of drainage networks.

### ***The policy objectives of the Government for the irrigation and drainage sector***

96. The EDPRP states that in support of rural development, special attention will be given to the rehabilitation of irrigation and drainage systems, central facilities, mains and distribution channels and pumping stations, as well as development of institutions for the sub-sectors' long-term sustainability. The document calls for the creation of water user associations, which would have responsibilities to maintain the tertiary system, while the central authorities will retain responsibility over the operation and maintenance of primary systems.

97. In response to these priorities, IDA credit finances rehabilitation and improvement of the irrigation and drainage infrastructure, as well as reform of institutional framework and strengthening capacity of respective public institutions and local communities (through farmers participation in Amelioration Associations) to address the problems in the most cost efficient way. The purpose of the program is to revitalize the irrigation and drainage subsectors to facilitate increased crop production, and subsequent improvement in farm family incomes, on an area of about 255,000 hectares.

98. The current government is striving to establish a dynamic strategy for improving the economy in the country. In this regard developing and maintaining a profitable agriculture and food sector is one of the main components of improved social-economic development in Georgia. The government recognizes the difficulties facing agriculture and the necessity of certain steps towards its revival in order to achieve the full potential in the sector. The main goal of the draft strategy for the agricultural sector is to create a market and export oriented agriculture. The government believes that the private sector will play a major role in developing agriculture in the country. As part of their overall economic strategy, the government is also discussing a new strategy for managing the irrigation and drainage systems in the country. At present, these systems are, mainly, centrally operated. Management is weak, budget provisions are very low, and the vast majority of farmers do not have sufficient water supply, mainly because the infrastructure between the main conveyance canals and the agricultural lands are damaged or destroyed.

99. At the request of IDA, the Minister of Agriculture has confirmed in writing government's draft policy for the I&D sub-sector:

- Focus on the rehabilitation of the main canal systems and structures. Only the associated large secondary canals with the importance and capacity almost the same as of main canals could be rehabilitated as well.
- Reconsider the AA concept and look for better management structures at farm level.
- Limit DASM's mandate and have the private sector or state-owned limited companies undertake management, operation and maintenance (MOM) functions currently carried out by DASM.

100. This proposed vision will require extensive consultation and debate amongst stakeholders, including policy makers, technicians, relevant public and private agencies, donors, and water users. Moving ahead without due deliberation and consultation with inappropriate haste is causing uncertainty and unease amongst all parties with involvement in the I&D sub-sector.

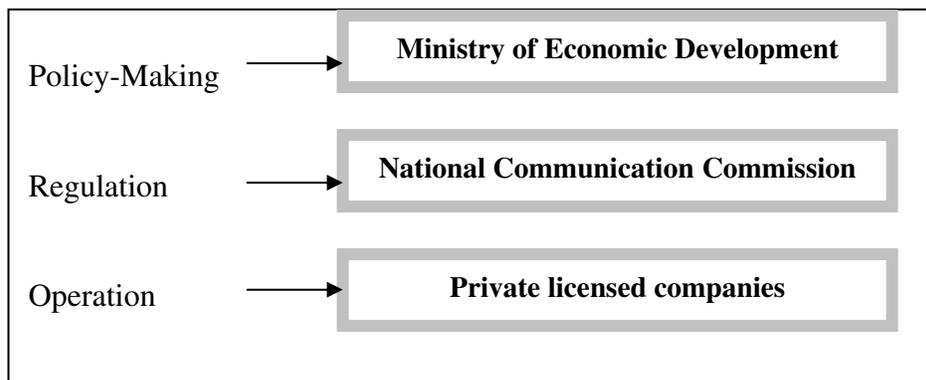
101. There are concerns about the involvement at this moment of the private sector in MOM and excluding lower-order infrastructure from rehabilitation programs. Private sector water suppliers are for-profit companies and therefore they have to charge the real MOM costs for irrigation water as well as a profit. In contrast to private operators, not-for-profit farmer-owned associations have proven much more efficient and able to provide services at lower costs. This is why farmers should preferably have a major responsibility for the management of irrigation and drainage systems.

102. Most of the lower-order irrigation infrastructure is in exceptionally poor condition and substantial investments in rehabilitation are needed before irrigation water can be diverted and distributed to farmers' fields. MOA intends to encourage private land owners to take on the responsibility for repairing, owning, and operating infrastructure below main canals. There may indeed be certain areas, e.g. in vineyards, where large private farmers are able to develop and manage secondary and tertiary irrigation infrastructure, but government's strategy would exclude many areas where small farmers will continue to operate.

### **The Telecommunications Sector**

103. The telecommunications sector is regulated under the Law on Post and Communications (enacted in 1999 and amended in 2000, 2001 and 2002). Georgia has demonstrated a strong commitment to reform and liberalization of the information and communications technologies sector. Regulation has been separated from policymaking function since 1999 – the new pro-competitive telecommunications law has been enacted and an independent regulatory authority, the Georgian National Communications Commission (GNCC) established. Development of communications policy is the responsibility of the respective Ministry - currently the Ministry of Economic Development. The structure of the sector is illustrated in Figure 5.

**Figure 5 : Division of Functions in Communications Sector**



***Organizations in the telecommunications sector***

104. The GNCC was created on the basis of the Georgia Law on Post and Telecommunications (1999) and Law on National Regulatory Authorities. This major piece of legislation in the post and telecommunication sector resolves a new organizational, legal and economic basis of activities, determines the rights and obligations of legal and physical entities in ownership, service and utilization of respective networks and facilities. It separates policy-making function of the sectoral Ministry - currently the Ministry of Economic Development, and GNCC as a regulatory body.

105. The Commission commenced its activities on July 1, 2000. The Commission is a legal entity of the public law. Since February 2004 according to the law on Structure, Authority and Rules of Government Activities GNCC became accountable to the President's Administration. The President of Georgia appoints 3 members of the Commission including the Chairman for six-year term. The President appoints one of the Commissioners as a Chairman, and the Chairman reports to the President.

106. Major objectives of Commission are creation of competitive environment and prevention of monopolistic activity in telecommunications and post sector; facilitation of modern technologies; and protection of consumer rights. GNCC is the sole authorized body to determine licensing conditions, as well as issue, modify, extend, suspend and revoke the licenses; issue permissions; set and regulate tariff caps; certify post and telecommunications facilities; determine and allocate radio-frequencies (with participation of the Ministry of Economic Development); determine and assign numbering resources. GNCC supervises and monitors implementation and status of fulfillment of responsibilities by private license holders and market participants.<sup>20</sup>

107. GNCC is not financed from the central budget. The license fee, the annual regulatory fee and other sources create the budget of GNCC. Annual regulatory fee is one percent of

<sup>20</sup> For reference see Charter of GNCC Approved by Presidential Decree #326 of June 29, 2003.

the annual income of license holder in the sphere of post and telecommunications. 20 percent of the license fee is transferred to the Commission to cover its operational/administrative expenses.

108. In addition to two mobile network providers (Geocell and Magticom) there are two major telecommunications operators providing telephony in rural areas: (i) Elektrokavshiri, which is now a private enterprise; and (ii) Iberiatel, a private provider. Elektrokavshiri has been providing telephony since Soviet times and covers most of the countryside. It was a 100 percent state owned enterprise until June, 2006, when it was privatized through international competitive bidding.

109. Elektrokavshiri has a unified tariff policy throughout country, which is then differentiated for physical persons, entities under private law and entities under public law. Specifically, it is a 10 GEL monthly fee for private entities, and 3 GEL for physical persons and public entities. The fee charged to install a telephone is also differentiated: 450GEL for private entities, and 180 GEL for physical persons and public entities (provided that the line exists in that specific area. The last change in tariffs was applied in 2000.

110. Elektrokavshiri maintains the urban and rural network, which is divided into 61 city and regional centers (it covers all the Rayons of the country). The existing cable infrastructure has been developed since 1960. The total length of cables is 137,708 km, of which most is buried, except in rural areas where overhead lines have been used primarily with the length of 11,849 km. About 10-20 percent of the overall cable length is in the rural areas, the rest 80-90 percent in regional centers of 57 branches. Elektrokavshiri has 349 exchanges out of which 229 exchanges are located in rural areas with total capacity of 32,290 numbers.

111. Bills are not issued by Elektrokavshiri or any other entity; citizens and entities are required to go to the regional telephone office every month, and pay their bill. If a bill is not paid, the line is blocked until payment is received. The overall collection rate varies between 90 percent and 95 percent. The collection rate from individuals is higher than from legal persons. Several categories of citizens have tariff subsidies from 20 percent to 50 percent of monthly fee, depending on the category (households with multiple children, invalids, and the War veterans). These subsidies are paid from local budget directly to Elektrokavshiri.

112. Iberiatel is a privately owned company with about 6,000 clients in most of Georgia's territory. Mainly it operates in rural areas in Kakheti, Samtskhe-Javakheti, Kvemo Kartli and Shida Kartli regions. It is a provider of wireless telephony and provides Minimum Level of Service (MLS) in villages through Wireless Local Loops. The service fee is paid according to service duration per minutes and is paid at service point. Per minute tariffs are as follows: 0.02 GEL in Tbilisi; 0.05 GEL within the same region; 0.15 from the region to Tbilisi, 0.2 GEL between East and West Georgian regions.

113. The competitive environment has resulted in considerable benefits for the urban population, but the service available to the rural population remains woefully inadequate. Mobile operators (Geocell and Magticom) cover most of the territory, but the cost of service is still beyond the reach of the majority of the rural population, while landline provision is

very low (12.6 fixed phones per 100 inhabitants in urban areas, while the equivalent number in rural areas is 1.5).<sup>21</sup> Internet service is nonexistent outside the main urban centers.

### ***The policy objectives of the Government for the telecommunications sector***

114. EDPRP contains provisions for the development of new technologies and building of information society in Georgia as one of the most efficient ways for building a development democratic state. EDPRP emphasizes communication and digital inequality between urban and rural areas. While considering differences between urban and rural poverty, the program document states that lack of provision of MLS constraints socio-economic opportunities for people with low income and generally for residents of rural areas.

115. The MDG discusses low access to communications in rural areas. MDG's "*Goal 8. Develop global partnerships for development*", in its Target 19 calls for ensuring "*Improved accessibility to communication systems countrywide, minimizing digital inequality between urban and rural area.*" MDG/Georgia document calls for elaboration of "ICT Development Framework for Georgia" in order to mainstream ICTs at legislative, technological, economic and social levels.

116. A recent Government policy document<sup>22</sup> identified the introduction of MLS as the solution to the communications problem in rural Georgia. Government sees the restructuring and improvement of the efficiency of state-owned assets to prepare them for eventual private participation.

### **The Electricity and Gas Sectors**

117. The entire electricity sector is organized around the Georgian Wholesale Electricity Market (GWEM). All licensees are members of the Market and most of the energy is sold through the Market. Although the use of the term "market" suggests some trading, GWEM is not a true electricity trading organization as it only acts as a clearing house for the electricity. All generators deliver their electricity to the market. The market then sells this electricity to the wholesale customers and distribution companies, issues bills, collects funds, and redistributes them among generators, and transmission service providers. (The structure of the sector is depicted in Figure 7).

118. While most of the funds flow through the Market some bilateral arrangements exist, which bypass the market. Direct contracts make direct payment. These bilateral contracts are subject to GWEM and the Georgian National Energy Regulatory Commission (GNERC) approval. GWEM also sets the power limits in the case of power shortage, and issues a disconnection orders to nonpaying wholesale customer.

119. All wholesale customers are connected at a high voltage level and receive electricity from the grid. There are four distribution companies in Abkhazeti region which are connected to the grid. The number of customers for different distribution companies is

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<sup>21</sup> MDGs in Georgia, (2004).

<sup>22</sup> Government (2004) *ICT Development Framework in Georgia*.

illustrated in Table 3. In addition, there are few customers which are not connected to the distribution grid, but are treated as wholesale customers. These customers settle their bill with the Market and pay fees to the distribution companies for electricity transit.

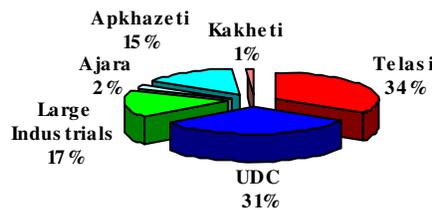
**Table 3 : Number of customers for different distribution companies**

Distribution Company	Number of Customers
TELASI	380,000
GUDC	670,000
Adjara	96,000
Kakheti	110,000
Total (w/o Abkhazia, and Sth. Ossetia)	1,256,000

120. With the exception of large cities GUDC, Adjara, and Kakheti are mostly rural distribution companies. These companies fully cover Georgia’s rural area. (See Figure 6).

**Figure 6 : Percentage of electricity consumed**

**Average Consumption of Electricity**



121. The national transmission system, or grid, consists of 500, 330, and 220 kV lines and 500, 330, 220, 110, and 35 kV substations. The grid is connected with the neighboring countries: Armenia, Azerbaijan, Turkey and Russia. The grid is organized as two separate entities: Georgian State Energosystem (GSE) which owns everything below the 500 kV lines<sup>23</sup>, and Saqrusenero which owns and manages the 500 kV lines. Total generation of Georgia comes primarily from hydroelectric sources, as revealed in Table 4.

<sup>23</sup> The 110 kV and 35 kV lines are owned by distribution companies.

**Table 4 : Nameplate, and effective capacities and annual generation of the HPPs**

Power Plant	Name Plate Capacity (MW)	Effective Capacity (MW)	Production (TWh)
Enguri	1300	500	2.34
Vardnili 1	220	96	0.46
Khrami I	113	86	0.16
Khrami II	110	56	0.24
Lajanuri	111	57	0.18
Jinali	128	80	0.36
Vartsikhe	184	122	0.66
Total main hydros	2066	1000	4.4
AES Mtkvari	600	250	1.2
Tbilsresi (units 3, 4, 8)	750	300	0.14
Total main thermal	1350	550	1.34
<b>Total</b>	<b>3416</b>	<b>2100</b>	<b>5.74</b>

122. Currently, the private sector is involved in all subsectors of the power sector. Private participation varies from ownership to management contracts. RAO UES owns power distribution company Telasi, and thermal generation plant Mtkvari. GUDC is under the state ownership but it is managed by PA Government Services. Kakheti Distribution Company is owned by a local investor. Adjara Distribution Company remains under state ownership and state management.

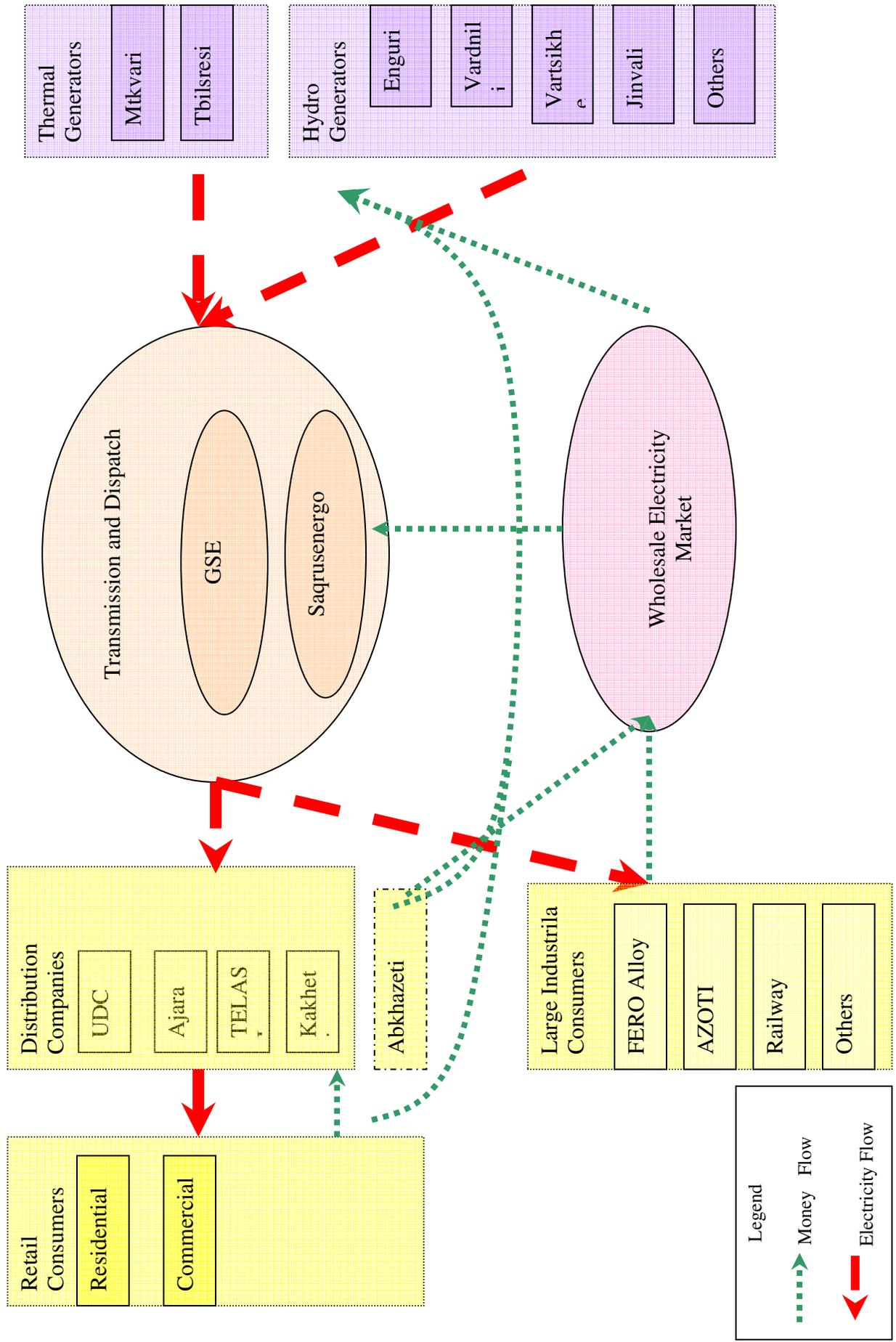
123. The grid company GSE is managed by an Irish company, ESBI International. Saqrusenero is co-owned by RAO UES and the Government. Similarly, GWEM is managed by Iberdrola Ingenieriy Consultoria (Spain) with partners IPA Energy Consulting (UK) and OMEL (Spain). The thermal generation is owned by RAO UES, Energy Invest and the state. All the large hydroelectric generating plants are state owned.

124. Similarly to the electricity sector, gas sector of Georgia is fully unbundled, consisting of gas transportation, gas supply, and gas distribution subsectors (see Figure 8). Licenses in gas sector are issued according to their functions. There are two gas supply licensees Gazexport, and Itera Georgia<sup>24</sup>. Gazexport is a subsidiary of Gazprom, and Itera Georgia is a Georgian subsidiary of Itera, which in turn receives gas from Gazprom. All gas distribution companies except Tbilgazi, Dushetigazi and Kazbegigazi are owned by Itera.

125. Georgia consumes approximately 1 billion m<sup>3</sup> of gas on average every year, out of which rural areas consume approximately 30 percent. All gas distribution companies except Tbilgazi, Dusheti gazi and Kazbegigazi are owned by Itera.

<sup>24</sup> Georgian Gas Transportation Company has recently withdrawn its supply license

Figure 7 : The Structure of the Electricity Sector and Funds Flow



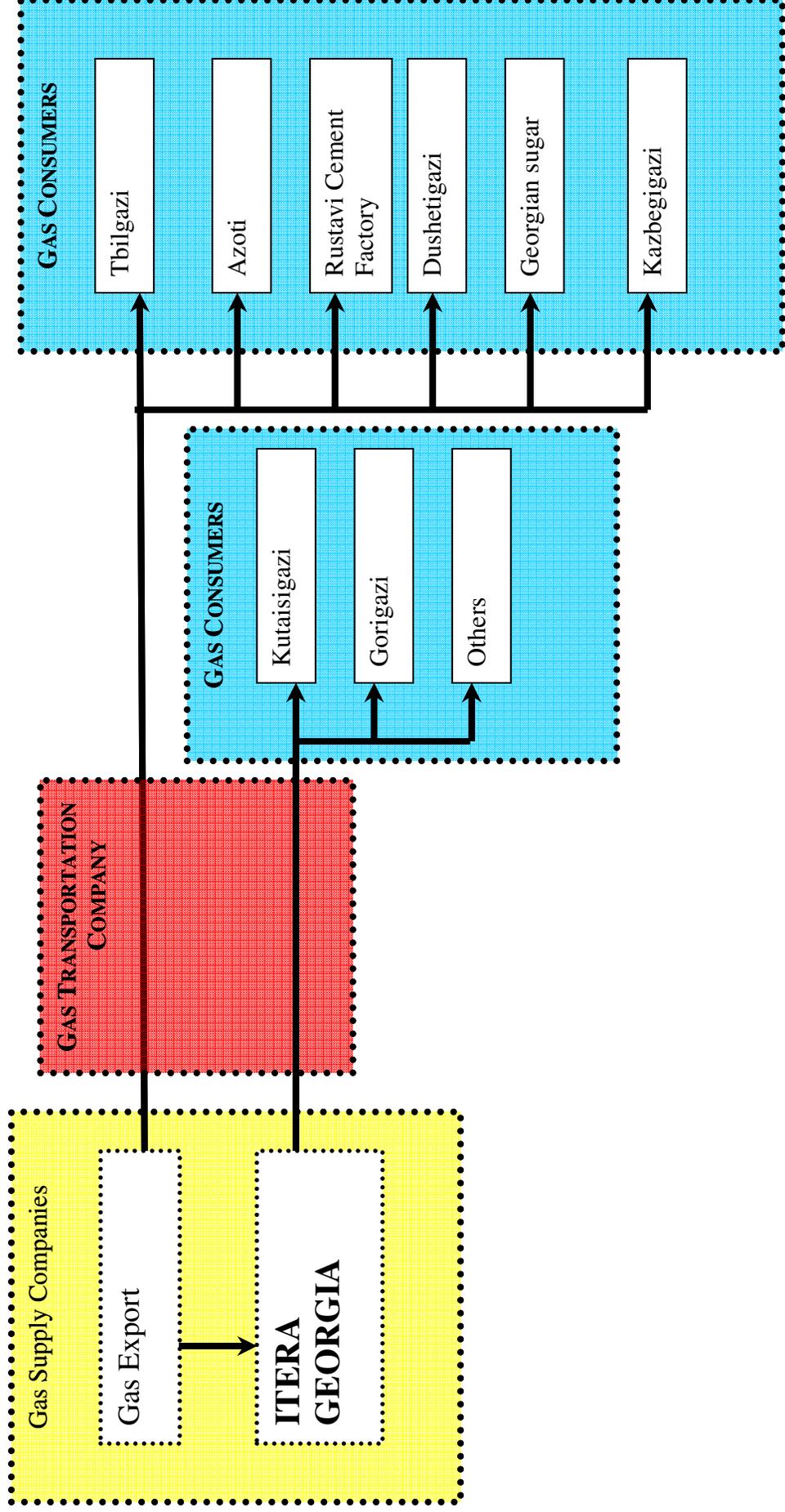


Figure 8: The structure of the Gas Sector in Georgia

126. The tariffs for the electricity sector are set by the GNERC, based on application of the “cost-plus” pricing methodology. The tariff system uses so called step tariff system which is applied to the individually metered customers. The tariff electricity for rural areas of GUDC, Adjara, and Kakheti equal to 12.98 Tetri/kWh for communal customers and those which use 100 kWh of electricity per 30 days and less. Customers which use from 101 to 300 kWh and 301 more pay 16.52 and 17.49 Tetri/kWh respectively. Every step tariff is applied to the entire 30 day consumption. Communally metered customers pay the first step tariff.

127. The true costs in the power sector are difficult to estimate, even though the current rates for power distribution are based on historic costs, they are outdated and do not reflect the true current cost of service. In addition, the costs are determined using Georgian Accounting Standards which differ from International Accounting Standards, leading to greater deviation from real costs.

**Table 5 : Tariffs for selected rural gas distribution companies**

N	Name of the Distribution Company	Retail Tariff Tetri/M3
1	JSC "Kaspi Gas"	36.54
2	JSC "Dusheti Gas"	31.46
3	JSC "Marneuli Gas"	39.50
4	JSC "Kvareli Gas"	39.50
5	JSC "Gardabani Gas"	36.54
6	JSC "Gurjaani Gas"	38.50
7	JSC "Mgebrishvili XXI Century" (Velistsikhe)	38.50
8	"Iaganashvili and Orovelashvili" Ltd. (Kachreti)	38.50
9	JSC "Dmanisi Gas"	39.50
10	JSC "Terjola Gas"	38.50
11	JSC "Tskaltubo Gas"	37.51
12	JSC "Tetrtskaro Gas"	39.70
13	JSC "Dedoplistskaro"	39.50
14	JSC "Lagodekhi Gas"	36.54
16	JSC "Vani Gas"	38.50
17	JSC "Bagdati Gas"	37.51
18	JSC "Kazbegi Gas"	25.45
19	"Gama" Ltd.	31.46
20	JSC "Signagi Gas"	26,67
21	"V.G.K." Ltd. (Tianeti)	26,67

Source GNERC Decree No15 April 14, 2006.

128. During last four years collection rates for GUDC have been below those for TELASI, however recent efforts to introduce communal meters and improve management of GUDC, resulted in improved collections rates. The GUDC collection rates for summer 2005 were more than 50 percent<sup>25</sup>.

129. In addition, GUDC increasingly finds communal metering the most appropriate solution to tackling the electricity theft problem in rural areas. Communal meters measure

<sup>25</sup> For the first half of 2006 UDC collection rate reached 65 percent.

kWh at a feeder level and the communities are jointly responsible for paying the electricity bill. GUDC has found that communal metering is cheap to implement and forms an effective solution to the issue of leakage and bill payment.

130. The theft of gas is also widespread in rural gas, despite reasonable tariffs<sup>26</sup>, which are also adequate to allow moderate rate of return on investment/assets. Again, few customers have individual meters, and those which have been installed are either not functioning or have been tampered with. The tariffs for rural gas distribution range from GEL 314 to 401 for 1000 m<sup>3</sup>, (31.4 – 40.1 Tetri/ m<sup>3</sup> respectively).<sup>27</sup>

### ***Organizations in the power sector***

131. The Government of Georgia launched energy sector reforms in 1996 by demonopolization, unbundling, and in part privatization of the power sector. During the first two years, a market-oriented legal and regulatory framework was created. An Electricity Law<sup>28</sup> was passed in 1997, which laid the foundation for the current structure of the sector and established an independent regulator overseeing licensing and tariff setting in the electricity sector. In 1999, the Electricity Regulatory Commission extended its authority and was transformed into the GNERC covering the gas sector as well.

132. Currently the Electricity Law is the legal foundation which governs the sector. The Law assigns the Ministry of Energy a role of a “policy maker”. The Ministry defines a long and short run strategy for the sector. Based on this strategy the Ministry develops laws, which then are put to the Parliament for ratification. While the Law assigns the Ministry a role of a policy maker, the Article 3 of the Electricity Law mandates establishment of GNERC. The Commission is setup to protect interests of consumers of energy, energy resources, and energy companies. It adjusts prices of energy resources, services in the sector, and ensures that a due process is followed during application of those prices.

133. The GNERC comprises the Chairman and 2 members; they are appointed and dismissed by the President of Georgia for 6 years. The Commission in its activity follows the Constitution of the Republic of Georgia, the Energy Law, other laws, decrees of the Georgia, and also laws enacted by the GNERC. The basic functions of the GNERC are as follows:

- Regulatory oversight of wholesale and retail tariffs of electricity and natural gas.
- Licensing and compliance monitoring of electricity and natural gas sector operators.
- Dispute resolution pertaining to electricity and natural gas sectors.
- Oversight of Georgian Wholesale Electricity Market (GWEM).
- Promotion of competitiveness in the electricity and natural gas markets.
- Regulation of electricity import and export.

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<sup>26</sup> Starting from January 2006, Gasexport has increased the import price for gas to 110 \$US/ 1000 m<sup>3</sup>.

<sup>27</sup> With the exception of Kazbegi gazi, which sells gas for GEL 254.5.

<sup>28</sup> Georgian Law on Electricity and Natural Gas (1997, amendments in 1999, 2004, and 2005)

134. Even though the GNERC is a Legal Entity of Public Law, it is not funded from the budget. Funds for the Commission are recovered from the sector via licensing fees paid by the electricity and natural gas sector operators and/or licensees.

***The policy objectives of the Government for the energy sector***

135. Prior to transition, the power sector produced 16 TWh and consumed almost 18 TWh. The power system in Georgia currently generates 7 TWh, and consumes 8 TWh. Imports are required in the winter period when the flow of water in the rivers is insufficient to generate adequate electricity.

136. In addition, the problems of insufficient generating capacity are exacerbated by the prolonged absence of maintenance, which has led to the deterioration of generation and transmission assets. Faults occur frequently leading to blackouts and interruptions in the power supply. Inadequate maintenance reflects the limited cost recovery in the sector, as nonpayment for electricity is widespread, additional support from the public budget is limited.

137. The power sector of Georgia is characterized by a very high electrification rate in the rural communities. Almost all the rural settlements are electrified, and most villages have at least one transformer to connect them to the distribution system. Despite this, the irregularity of supply is even more severe in rural areas as scarce supplies are dispatched to consumers who have the capacity to pay, primarily the urban markets. As a result, there are regions that at best only get power during the off-peak period, and which can suffer one or two days of blackouts.

138. The Government has recently declared its specific objective which is to make the sector self-sufficient by 2006. To achieve this, the Government has substantially increased budget expenditure on the sector. In particular, the Government invested in generation, transmission and distribution. In addition, the Ministry of Energy produced a Strategic Action Plan which reprioritized investments in the sector and addressed respective financial and strategic challenges.

## ANNEX C - THE MAIN FINDINGS FROM PREVIOUS PROGRAMS/STUDIES

### The Main Issues in the Rural Infrastructure Literature

139. The earlier section noted that the improvement of the rural infrastructure is an explicit objective for the Government of the Republic of Georgia. This predicated that rural infrastructure provision is a key element for rural poverty alleviation. This section provides a summary of, what might be termed, the main research literature to highlight the strength of the evidence as to whether, or not, infrastructure provision is the *sine quo non* of poverty reduction in rural areas, and identifying the current gaps in knowledge as a guide to policy in the sector.

140. There are three main issues:

- Links between agricultural growth and poverty reduction.
- Links between infrastructure improvements and agricultural growth.
- Links between infrastructure improvements and poverty reduction.

### *Agricultural growth and poverty reduction*

141. One of the central tenets in the ‘research’ literature is the efficacy of agricultural productivity on poverty reduction. In a recent WB study “Agricultural productivity growth and poverty alleviation” (Irz *et al.*, 2001), the authors use cross-country empirical data to examine the links between agricultural yield per unit area and measures of poverty. They show that an increase in crop yield of ten per cent led to a six to ten per cent reduction in the number of people living on less than one dollar a day. In a study in Bangladesh, Wodon (1999) demonstrates that pro-rural development strategy would, probably, reduce the poverty headcount by three per cent, compared with a base policy scenario with no specific emphasis on rural development.

142. Similarly, Coxhead and Warr (1991), in their empirical study of the Philippines farm economy, estimated that in the case of a 10 percent improvement in farm output, applicable to irrigated areas, with technology that is productivity-increasing but labor-conserving, will engender an eight percent increase in the income of landless workers. In another empirical study (Timmer, 1997), agriculture is regarded as a key ingredient in attaining sustainable poverty reduction: the authors estimate that a one per cent increase in agricultural GDP per capita led to a 1.6 per cent gain in the per capita income of the poorest one fifth of the population in the 35 countries that were included in the study.

143. Lanjouw and Feder (2001) note that although the traditional image of rural households in developing countries is that they are engaged, primarily, in farming and animal husbandry activities, in recent decades, this view has been changing. The emerging consensus is that rural households are often quite diversified in their activities, with non-agricultural sources often contributing substantially to household income, and that the scale of non-farm activities are generally associated with lower absolute poverty. The impact of non-farm economy on inequality is less straightforward, but also positive: non-farm activities when profitable generally accrue to the relatively wealthy and growth in these activities increases inequality in the short run. The poor don't possess the skills, contacts and assets needed to access these activities, therefore they don't benefit directly from them. However, there may be an indirect impact: high-productivity activities tighten the rural labor markets and increase rural employment and wages in general.

144. The consensus appears to be that although there are reasons to believe that agricultural growth relieves rural poverty and there is empirical evidence, including the above *inter alia*, of the positive link between agricultural growth and poverty reduction, both the robustness and the generality of this link is unclear. Specific factors that condition the sustainability of growth outcomes, include sources of growth (high-productivity or low productivity), diversity of rural economy, access to broader than local markets. Different policies are designed to promote investment in high-productivity rural activities, to increase the diversity of rural economy by including agricultural processing, manufacturing and tourism in it, to liberalize markets and create mechanisms for engaging the rural population in the diversified and widened activities.

### ***Infrastructure improvements and agricultural growth***

145. A recent WB rural strategy background paper "Rural Infrastructure, Development and Poverty Reduction" (Calvo *et al.*, 2001), notes that there are indications that improved infrastructure promotes economic growth, and has relatively high rates of return compared with other forms of investment. The provision of rural infrastructure, in particular, is linked to increases in agricultural growth and improved productivity in a number of studies.

146. Binswanger *et al.*, (1987) note a strong correlation between the percentage of paved roads and road density, and crop yield, reporting estimated elasticities of 0.305 and 0.058 respectively. The implication, in the case of the former, is that a 10 percent increase in paved roads leads to a 3 percent in crop yields.

147. Wiggins and Proctor (2001), present evidence of increased diversification of rural economies with more opportunities created by location close to major cities and much lower opportunities for development for remote areas. The comparative advantage of these areas is activities based on immobile natural and cultural resources and closely related activities. Improved transport and communication as well as other infrastructure services create opportunities for this type of development.

148. Lanjouw and Feder, (2001), argue that a key element of the non-farm rural development strategy is infrastructure. They emphasize the importance of infrastructure in supporting non-farm rural economy and demonstrate the robustness of findings in many

studies. Rural infrastructure is viewed as a necessary condition for the growth of the rural non-farm economy, since poor infrastructure imposes high costs on all economic activity and private investments tend to occur when infrastructure is of a reasonable standard. In addition, infrastructure helps to expand the output market and break away from limited demand of the local market.

149. The general conclusion from this, admittedly brief, review of the literature is that infrastructure provision has a positive impact on rural economic growth through the following mechanisms: it attracts private sector investment; it broadens the output markets; it helps increase productivity of the traditional sector (farm activity) and to move it from subsistence agriculture to a higher-productivity farming; and, it helps diversify the rural economy. If traditional farming can survive (at a subsistence level) without easily accessible and reliable infrastructure services, non-farm businesses cannot be not viable without it.

### ***Infrastructure improvements and poverty reduction***

150. There is some evidence that the benefits of infrastructure favour poor people by generating more equitable growth (see the review of literature by Malmberg-Calvo *et al.*, 2001): investments in roads are twice as effective in targeting and reducing rural poverty as any other form of intervention; more equitable access to infrastructure services encouraged growth with equity. The authors conclude that infrastructure development enhances capabilities, facilitates empowerment and reduces vulnerability, thus contributing to reducing not only income poverty, but no-income poverty as well.

151. Linkages between rural infrastructure investments and household welfare are examined in the WB Policy Research Paper “*Do Rural Infrastructure Investments Benefit the Poor?*” (Songco, 2002). The paper argues that the poor do benefit from infrastructure improvements, but in order to generate and maximize these benefits, it is critical to remove impediments and create a supportive environment for rural economic growth. The paper notes that combined interventions are important and the development of other services, such as micro enterprise advice is important. One of the most important conclusions of this paper is that the poverty reduction impact increases with the complementarity of the interventions (e.g., when the provision of roads is combined with provision of other necessary services).

152. The importance of complementarity of infrastructure interventions to achieve positive poverty outcomes is argued in the paper “*Achieving the Millennium Development Goals: the Role of Infrastructure*” (Leipziger *et al.*, 2003). A key argument in this paper is that some of the biggest improvements are likely to come from combined interventions: it is well known that improved impact of water and sanitation is much greater when accompanied by information on hygiene practices. Another study supports the same argument: in India, child infectious diseases are much less prevalent and severe in households with piped water, but this gain is largely by-passed by poor households especially when the mother is less educated (Jalan and Ravallion, 2001).

## A Summary of Relevant Willingness to Pay Literature

153. A review of the literature revealed a considerable amount of earlier work which sought to investigate household or individual willingness to pay for improvements in water and sanitation over the last decade (see Briscoe *et al*, 1993; World Bank 2005, World Bank 2006 amongst others). The *a priori* expectation that poor households could, or would be willing to pay very little was generally not supported (see World Bank 1993). Willingness to pay was found to vary significantly, reflecting differences in education, occupation, gender, household size and composition, and measures of income and expenditure. In addition, the characteristics of the existing supply, in terms of its quality or reliability, and the attitude of the respondents to the role of the public sector in service provision were also found to be significant. However, there were few studies identified which sought to ascertain household willingness to pay for improvements in rural infrastructure *per se*. This was particularly true for studies where respondents were asked to trade-off between the different types.

### *The main lessons from earlier rural infrastructure studies in Georgia*

154. The World Bank undertook a comprehensive investigation of the poverty impact of improvements in rural infrastructure in 2002, the conclusions of which are summarized in a working paper published in 2003<sup>29</sup>. This study used a number of different sources of data, but the two most relevant to this study were the following:

- Rural Communities Infrastructure Survey (RCIS) undertaken in 2002 with the support of the World Bank and the Dutch Trust fund<sup>30</sup>.
- Household level information from an on-going general nationally representative multi-topic Survey of Georgian Households (SGHH) – main official household survey in Georgia - for the period 1996 to 2001<sup>31</sup>.

155. The former surveyed the quality of road infrastructure and the access to public transportation in the communities in the study (N=249), and found that the condition and type of road surface varied markedly across the surveyed communities, as revealed in Table 6. The road surface is not the only determinant of the quality of the road; it is also important how the infrastructure is maintained. The RCIS found that as much as 60 percent of the rural population inhabits villages where the main road can be characterized as being in a bad or very bad state; for secondary (feeder) roads, this share was 92 percent.

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<sup>29</sup> World Bank (2003).

<sup>30</sup> SDSG/GORBI (2003).

<sup>31</sup> The Survey of Georgian Households (SGHH) is a key source of data on national economy in Georgia, on poverty (for PRSP) and on labor markets. It is regionally representative quarterly survey which is on-going since mid-1996 with a sample of around 2,800 households. SGHH provides us with quarterly data on welfare, expenditures and employment starting from 1996, but collection of data in SGHH on the access to social services started (with GSIF support) only in 2000.

**Table 6 : Rural Population of Georgia by type of main road serving their villages**

	<i>Asphalt and other paved</i>	<i>Gravel</i>	<i>Dirt and other</i>	<i>Total</i>
Kakheti	15	43	42	100
Shida (Inner) Kartli	72	23	5	100
Kvemo (Lower) Kartli	11	4	86	100
Samtskhe-Djavakheti	6	31	63	100
Adjara	72	18	11	100
Guria	30	70	0	100
Samegrelo	48	52	0	100
Imereti	50	41	8	100
<b>Total</b>	<b>34</b>	<b>34</b>	<b>31</b>	<b>100</b>

Source: RCIS 2002, actual village population used as weights. Communities matched with SGHH only.

156. The existence of road itself was not found to guarantee that it can be used. For about 5 percent of rural population living in villages with road connection, roads are closed to truck traffic for at least 3 months during the year, with this share reaching almost 20 percent of the rural population in Samtskhe Djavakheti. In addition, the majority of villagers in Georgia have to rely on somebody else's car or truck to get around to the nearest market. Only about 20 percent of rural families have cars, trucks or carriages.

157. In terms of public transport, not all villages were found to be directly served (ten percent of rural population has to go to the nearest village or farther away to catch transport). When the public transport is available it is normally available several times a day (with the exception of 7 percent of the rural population served on a weekly basis).

158. In terms of access and quality of electricity, Table 7 highlights regional differences in the indicator of availability of stable supply (its improvement in Tbilisi and some adjacent regions). Basically, there were no rural areas with a stable electricity supply in 2000-01 in Samtskhe Djavakheti, Kvemo Kartli and Samegrelo.

**Table 7 : Percent of the population with 24 hours uninterrupted electricity supply**

<i>Region</i>	<i>2000</i>	<i>2001</i>	<i>Urban</i>	<i>Rural</i>	<i>Total</i>
Kakheti	6 percent	10%	5%	9%	8%
Tbilisi	46%	51%	48%	.	48%
Shida (Inner) Kartli	11%	23%	5%	24%	17%
Kvemo (Lower) Kartli	7%	5%	11%	3%	6%
Samtskhe-Djavakheti	4%	4%	13%	1%	4%
Adjara	30%	23%	24%	29%	26%
Guria	8%	12%	5%	11%	10%
Samegrelo	0%	1%	1%	0%	1%
Imereti	14%	12%	16%	11%	13%
<b>Total</b>	<b>20%</b>	<b>22%</b>	<b>30%</b>	<b>11%</b>	<b>21%</b>

Source: SGHH 2000 and 2001.

159. Table 8 provides summaries by regions reporting the connection rates to piped water of rural households and the periodicity of water supply.

**Table 8 : Piped water availability by regions**

	Household is connected to functioning piped water			If connected, hours water is supplied on average per day		
	<i>Urban</i>	<i>Rural</i>	<i>Total</i>	<i>Urban</i>	<i>Rural</i>	<i>Total</i>
Kakheti	72%	72%	72%	11	6	7
Tbilisi	98%	.	98%	20	.	20
Shida (Inner) Kartli	87%	47%	60%	12	8	9
Kvemo (Lower) Kartli	97%	78%	85%	4	10	8
Samtskhe-Djavakheti	97%	95%	95%	8	14	12
Adjara	85%	74%	80%	16	17	17
Guria	55%	21%	28%	7	4	5
Samegrelo	49%	1%	17%	4	0	1
Imereti	67%	45%	54%	4	8	6
<b>Total</b>	<b>87%</b>	<b>52%</b>	<b>70%</b>	<b>14</b>	<b>8</b>	<b>11</b>

Source: SGHH 2000 and 2001.

160. The survey found high overall connection rates – 70 percent of the population at that time had access to piped water. However, a water connection does not in itself imply water availability: on average a household was receiving water in 2000-01 for about 11 hours per day. The table also shows that significantly fewer households are connected to piped water supply in rural areas. The community survey (RCIS) found similar connection rates and water availability as the Household Survey data (SGHH). But, it also found that, on average, 80 percent of the population with piped water considered its quality to be good for drinking, with only 20 percent reporting inadequate quality. The share of villages with water quality problems is the highest in Guria, Samtskhe Djavakheti and Imereti, and the lowest in Adjara and Kvemo Kartli.

## ANNEX D – THE COVERAGE, SOURCE, CONDITION AND USER SATISFACTION WITH EXISTING SERVICES

### The Electricity Sector

#### *Access to and availability of electricity*

161. The survey of local communities, undertaken as an input to this study, found that 97.3 percent of the rural population has access<sup>32</sup> to electricity, however, availability<sup>33</sup> is low. Across the country as whole, the average household in a rural area is supplied with electricity for between 6-11 hours per day. However, there is considerable variation in supply, with electricity available for more than six hours a day for only 30 percent of rural households, from three to five hours a day for 36 percent of rural households, and 32 percent of rural households having access for less than two hours a day or less. The average monthly household consumption of electricity was revealed to be 250 kWh, but with significant regional variation. Kakheti region in the west had the lowest average monthly consumption of 75 kWh, whilst Shida Kartli region had the highest with an average monthly household consumption of 500 kWh, as revealed in Table 9.

**Table 9 : Access, availability and consumption of electricity within households, by region**

	Access to electricity, % of households	Availability of electricity, % of households with access			Household monthly consumption of electricity, kWh
		6 or more hours a day	3-5 hours a day	2 hours a day or less	
Adjara	93.9	NA	NA	NA	NA
Imereti	97.6	40.0	37.9	22.1	333
Guria	72.8	48.6	29.9	21.5	250
Samegrelo	89.1	0	56.4	43.6	333
Shida Kartli	96.0	65.7	34.3	0	500
Racha-Lechkhumi	98.1	100	0	0	250
Mtskheta –Tianeti	96.1	39.3	38.8	21.8	333
Kakheti	96.1	14.8	59.4	25.8	75
Samtskhe-Javakheti	96.4	44.9	55.0	0	166
Kvemo Kartli	97.2	36.3	0	69.2	250
Rural Georgia	93.7	29.5	36.1	34.4	250

Source: study data

<sup>32</sup> Defined as an existing physical connection, whether operational or not.

<sup>33</sup> Defined as: (a) an operational connection; or (b) service is provided by the supplier.

162. The relatively high average consumption level and the high variance can be explained by supply rationing and poor billing and revenue collection. Electricity is not metered at the household level in rural areas, and households are billed a fixed monthly rate of about GEL 5 (US\$2.5) each, providing little incentive to individual households to reduce consumption. In the 30 days prior to the interview, only 19 percent of communities had uninterrupted supply, while 61 percent were supplied according to a previously determined schedule and 20 percent had irregular supply interruptions. Respondents were also asked if the quality of the power supply has deteriorated since the pre-transition year of 1990: in 73 percent of surveyed communities (N=100) electric power supply was asserted to have worsened, while it was unchanged in 12 percent of communities and supply had improved in 15 percent.

***The sources of electricity supply***

163. The data reveal that electricity is supplied by a public company in 94 percent of the communities, whilst the remaining six percent receive it from a private company. In the latter cases, the power is produced by a small local power station or by generator, either at the household or at the community level. However the unreliability and/or rationed power supply from the public company means that 23 percent of those communities that have access to mains supply, also have a secondary source of supply, either in the form of a private company, or a generator.

164. These latter options are clearly inefficient and expensive methods of ensuring supply, either by a community or by a private company. It requires a substantial upfront investment, and expected revenues are low, as the tariffs are required to be set at the same level as the public sector supplier (GEL 5 per month), which receives significant subsidy. The period of supply of electricity to communities, by source of supply, is provided in Table 10. The number of hours a day when electricity is supplied by the public company is defined by rationing and supply interruptions, the remaining two sources are utilized mainly as substitutes.

**Table 10 : Supply of electricity to communities by electricity provider (% of communities)**

Source of Supply	Average Period of Supply		
	6 hours a day or less	7 - 12 hours a day	13 - 24 hours a day
public company	39%	26%	35%
private company	26%	37%	37%
own generator	94%	3%	3%

Source: Study data

***The condition of the electricity network***

165. Respondents in only 0.1 percent of communities (1/100) responded that the electricity network is in good condition, while respondents in 33 percent of communities think that the network requires major repairs, and 67 percent thinks there is a need for immediate major repairs, with wide variation by region around the average (see Table 11).

**Table 11 : Condition of electricity network (% of communities)**

Region	Good	Requires Major Repair	Requires Immediate Major Repair
Adjara	NA	NA	NA
Imereti	0.1	49.3	50.0
Guria	0	58.0	42.0
Samegrelo	0	14.2	85.8
Shida Kartli	0	81.4	18.6
Racha-Lechkhumi	0	72.3	27.7
Mtskheta –Tianeti	0	3.8	96.2
Kakheti	0	99.0	1.0
Samtskhe-Javakheti	0	24.7	75.3
Kvemo Kartli	0	30.8	69.2
Rural Georgia	<b>0.1</b>	<b>33.1</b>	<b>66.8</b>

Source: Study data

## **The Gas Sector**

### *Access to and availability of mains gas supply*

166. The data for the access and availability of the supply of mains gas is revealed in Table 12. On average, across all the regions, just over 20 percent of households have access to the gas supply, whilst only just over three percent are actually consuming gas in their homes. Three regions, Adjara, Guria and Samegrelo have no access to mains gas, whilst in Imereti only 3.3 percent of communities and households have gas supply. On average, 81 percent of LSGs are within a distance of 50 km from the nearest gas pipeline, but Samegrelo is something of an outlier as only just over 42 percent of communities lie within the same threshold.

**Table 12 : Access to Gas Supply System**

Region	Have access to Gas supply % of HH	% HH being supplied	Distance to the nearest Gas Supply Pipeline					
			<50km		50-100km		>100km	
			%LSG	%HH	%LSG	%HH	%LSG	%HH
Adjara	0	0	64.5	74.7	35.5	25.3	0	0
Imereti	3.3	3.3	96.2	95.2	3.1	4.5	0.6	0.2
Guria	0	0	100	100	0	0	0	0
Samegrelo	0	0	42.2	39.2	43.7	54.3	14.1	6.5
Shida Kartli	70.9	1.2	91.4	99.0	0	0	0	0
Racha-Lechkhumi	0	0	NA	NA	NA	NA	NA	NA
Mtskheta –Tianeti	46.7	10.8	83.0	93.8	5.7	1.2	0	0
Kakheti	37.4	1.8	99.2	98.2	0.8	1.8	0	0
Samtskhe-Javakheti	11.8	8.6	59.0	70.0	41.0	30.0	0	0
Kvemo Kartli	17.4	31.0	84.6	88.4	15.4	4.0	0	0
Average rural Georgia	20.65	3.29	81.0	83.4	16.6	15.3	2.4	1.3

Source: Study data

***The condition of the gas distribution network***

167. The condition of the main gas systems in rural Georgia is very poor, with an average of 86 percent of all communities having a mains gas system that is in very poor condition. Again, there is variability, with four regions having 100 percent of their respective systems in very poor condition. By contrast, on average only 19 percent of the mains gas system is in good condition, driven mainly by the condition in Racha-Lechkhumi and Mtskheta-Tianeti. The average gas consumption of those households being supplied with gas is 19 kbm.

**Table 13 : Condition of Gas Supply System by community and region**

Region	Average consumption per Household (supplied Kbm)	% in Good Condition	% in Poor Condition	% in Very Poor Condition
Adjara	0	0	0	100.0
Imereti	62.9	4.4	3.1	92.5
Guria	0	0	0	100.0
Samegrelo	0	0	0	100.0
Shida Kartli	3.99	1.4	24.3	74.3
Racha-Lechkhumi	0	0	0	100.0
Mtskheta –Tianeti	24.75	3.8	13.2	83.0
Kakheti	22.9	1.8	53.2	46.0
Samtskhe-Javakheti	9.8	2.5	1.2	96.3
Kvemo Kartli	1.2	5.8	16.3	77.9
Average rural Georgia	19.0	2.0	12.3	85.7

Source: Study data

**The Drinking Water Sector**

168. The survey data reveals that 96 percent of rural households have access to drinking water, and only 27 percent have access to centrally supplied water. In addition, supply even

where provided is not perfect, with frequent interruptions and quality variations. This reflects the poor condition of the assets in the sector, and the lack of substantive reform. The survey data reveal that only 64 percent of those who receive centrally supplied water pay anything for it, with a mean monthly charge of GEL 1 per month.

### *Access to water from different sources*

169. In schools and local markets, drinking water is accessible in 61 percent of communities. Most of the communities (62 percent) are supplied with central water, and in these Communities households have access to it either through a tap in the house or in the yard or through street stand pipes. The rest use well water (33 percent of communities) and springs (4.5 percent of communities) (see Table 14).

**Table 14 : Access to water and main source of water by region (% of households, % of communities)**

	% Households/Communities with Access				Main source of water		
	Drinkin g Water	tap water	drinking water in schools	drinking water in market	Central (house tap, yard tap, street stand pipe), % communities	Well, % commu nities	Spring, % commu nities
Adjara	96.7	53.6	95.1	95.1	93.4	6.6	0
Imereti	81.1	27.6	68.6	68.6	68.6	30.9	0.6
Guria	100.0	10.4	54.2	54.2	61.0	0	39.0
Samegrelo	100.0	13.4	41.2	41.2	41.9	10.8	47.3
Shida Kartli	100.0	17.5	60.0	60.0	60.0	40.0	0
Racha-Lechkhumi	100.0	39.2	55.4	55.4	55.4	10.8	33.8
Mtskheta –Tianeti	100.0	24.9	38.5	38.5	43.4	9.4	47.2
Kakheti	100.0	21.9	47.2	47.2	64.2	35.8	0
Samtskhe- Iavakheti	100.0	20.9	70.6	70.6	70.6	17.6	11.8
Kvemo Kartli	100.0	53.5	78.5	78.5	73.8	0	26.2
Rural Georgia	96.1	27.1	60.5	60.5	62.4	33.1	4.5

\*Source: RCIS

170. The community survey, conducted as part of this study, reveals that only 29 percent of the sampled Georgian Communities have access to centrally supplied water, with only 25 percent considering it as their main source of water. The remaining communities use wells, stand pipes or natural sources (springs, rivers, lakes) as their main sources (respectively 36 percent, 10 percent and 28 percent of surveyed communities).

### *Availability of water and water quality*

171. However, both scheduled and irregular interruptions in central water supply during the day means that even those communities that have access to central water, and those that consider it as their main water source, are required to use alternative sources of water: wells, stand pipes and springs/rivers. Accordingly, four percent of surveyed communities have

central water access, but don't consider it their main water source. A further 25 percent of surveyed communities that use central water as their main water source, more than half of these communities regularly use other sources of water, mostly natural springs and wells, as substitutes.

172. Table 15 presents data from the Survey of Rural Settlements (in this study) showing that 69 percent of respondents in communities with access to a mains water supply, reported an uninterrupted supply. A further 23 percent reported supply only during scheduled hours, typically for 8 hours only, with the remaining 8 percent reporting seasonal supply only. 82 percent of respondents receiving mains water reported that the quality of from water from that source was good. The corresponding proportions for water from wells, stand pipes and springs/lakes was 75 percent, 34 percent and 25 percent respectively.

**Table 15 : Availability of water and water quality by source of water (% of communities with access)**

	Quality of water: water is good for drinking	Availability of water		
		uninterrupted supply	supply during scheduled hours	seasonal supply
Mains water supply	82%	69%	23%	8%
Well	75%	91%	NA	9%
Stand pipe	34%	79%	5%	16%
Spring, river, lake	25%	88%	NA	12%

Source: Study data

## **The Telecommunications Sector**

### ***Access to telecommunication services***

173. The survey of rural communities, conducted as part of this study, revealed that only 26 percent of surveyed communities have working telephone lines. In communities with working telephone lines, about 20 percent of households have a landline telephone service at home. The situation with cellular telephones is different: while almost all communities (94 percent) have access to the cellular network, only a very small percentage of households (seven percent) own cellular phones and thus are able to use the network. In addition, access to public telephone is also limited: only 42 percent of communities have public phones.

### ***The condition of landline network***

174. The condition of the telecommunication infrastructure in rural Georgia cannot be considered good. The earlier survey conducted for the Rural Infrastructure Study revealed that only three percent of communities have telephone infrastructure that is in good condition, 25 percent of communities it requires rehabilitation and repair, and whilst in 73 percent it requires immediate repairs with considerable investment.

**Table 16 : Condition of landline network (% of communities)**

Regions	Condition of landline network		
	Good	Need Major Repair	Needs Urgent Major Repair
Adjara	0	73.8	26.2
Imereti	0	42.9	57.1
Guria	0	6.8	93.2
Samegrelo	0	4.1	95.9
Shida Kartli	37.1	0	62.9
Racha-Lechkhumi	0	3.1	96.9
Mtskheta –Tianeti	0	58.5	41.5
Kakheti	0	9.4	90.6
Samtskhe-Javakheti	0	18.6	81.4
Kvemo Kartli	0	9.2	90.8
Rural Georgia	2.9	24.7	72.5

Source: Study data

175. Figure 8 of main report (see Volume I) reveals that on average 82.5 percent of LSGs and 76.8 percent of households have some access to the telecommunication, however telephone density measured as telephones per 100 households appears to be low and on average across the country only 13 households per every hundred have telephone lines installed in their homes. This indicator is different across the regions. The Racha-Lechkhumi region is characterized with the lowest rural telephone density (0.01/100 HH), while the highest is observed in Kvemo Kartli region (21.0/100 HH).

176. Landline telephone connection is more common in the district centers and LSGs located nearby the district capital, where the phone stations are located, however the latter is also available in other LSGs, although their number is limited and varies from 3.1 percent of LSGs in Racha-Lechkhumi region to 64 percent of LSGs in Adjara region. The status of telecommunication infrastructure across rural Georgia is poor. Only 2.9 percent of total LSGs in the rural areas have telephone infrastructure in a relatively good condition, while 24.7 percent require major repair and investments, and 72.5 percent immediate investment in the system. By contrast, on average, 87 percent of rural areas have cellular coverage, although, the extent of use by rural residents is unclear given cost and incomes in these areas.

### **The Rural Transport System**

#### ***Length and accessibility of local roads***

177. Georgia has a relatively small road network consisting of roughly 23,550 kilometers, of which the primary and secondary network comprises some 19 percent, (4500 kilometers), and the remaining 19,050 kilometers are local roads. Table 17 presents main sector indicators by region.

**Table 17 : Comparative Road Indicators by Region**

Regions	Population Density	Length Road Network	Main and Secondary Roads	Rural Roads		
	Persons per sq km	(km)	(km)	Length (km)	Density (m/sq.km)	Density (m/person)
Adjara	1.06	1,136	176	636	3.2	3.03
Imereti	0.83	2,975	564	2,411	39	21
Guria	0.90	919	129	790	6.7	7.5
Samegrelo	0.75	2,699	500	2,199	5.9	7.8
Shida Kartli	0.86	2,348	361	1,987	5.7	10.6
Racha-Lechkhumi	0.22	1,065	283	782	4.1	18.9
Mtskheta –Tianeti	0.26	1,977	407	1,570	5.1	17.1
Kakheti	0.66	3,053	510	2,543	6.0	7.9
Samtskhe-Javakheti	0.34	1,595	377	1,218	3.7	8.0
Kvemo Kartli	0.11	2,697	534	2,163	7.6	7.9

Source: Rural Infrastructure Study

178. The study included a visual condition survey, and Global Positioning System (GPS) mapping, of the defined ‘lifeline’ road infrastructure. The latter was defined as that proportion of the network that represented the shortest distance between any one community and the nearest road in the next highest category of road. So for any one community, it would be the shortest length of tertiary road to the nearest section of secondary road. All these lengths, which were identified in a GIS based system, were aggregated and amounted to some 5755 km of road, or 30 percent of the entire local road network.

179. The survey data also reveals that the rural road network within the communities is generally in a poor, or very poor, condition. The majority of roads are unpaved, and have received little if any maintenance for some years: only in five percent of communities roads were repaired within the last 5 years, while in 41 percent of communities they were repaired last 15 or more years ago, as revealed in the following table:

**Table 18 : Number of years since the roads in the community were last maintained (Percent of Communities)**

Number of years since last repair	Communities in each group
less than 5 years ago	19%
5-14 years ago	40%
15-24 years ago	32%
25 or more years ago	9%
Total	100%

Source: Study data

180. The data also reveal that respondents in 31 percent of communities estimate the condition of their main access road to be good, whilst 61 percent of communities regard the condition to be bad. The following table summarizes the findings of the survey of the ‘lifeline’ road network on surface type on the local road network.

**Table 19 : Surface Type on Local Road Network by Rayon (2005)**

Region	Asphalt	Former Asphalt	Gravel or Earth	No Survey conducted	Grand Total
Adjara	64.4	28.5	197.2	277.2	567.4
Guria	131.5	143.8	152.5	86.0	513.7
Imereti	373.0	401.8	493.0	481.6	1749.4
Javakheti	72.5	72.0	456.0	228.8	829.3
Kakheti	209.1	104.0	231.2	281.0	825.3
Kvemo Kartli	154.0	95.1	322.9	384.6	956.6
Mtsketa-Mtianeti	55.1	118.8	339.6	892.2	1405.7
Racha		3.8	273.9	226.7	504.4
Samegrelo	86.4	327.0	301.8	667.2	1382.4
Shida Kartli	53.9	164.0	328.3	868.5	1414.7
	<b>1,199.8</b>	<b>1,458.8</b>	<b>3,096.4</b>	<b>4,393.8</b>	<b>10,148.8</b>

Source: Study data

### *Access to transportation services*

181. The survey of rural communities confirmed the finding of the earlier RCIS that transport remains a serious problem for many Georgian communities: respondents in 31 percent of surveyed communities reported that public transportation to the nearest market place was not available. Accordingly, they were reliant on lifts to get a departing point for public transport (in the form of minibuses generally), or direct to the market.

182. The survey also revealed that in 74 percent of surveyed communities, there was no transport to the nearest health facility, and 50 percent of communities had no transportation access to the regional center. The data also shows that whilst public transportation is available in some form in many, but not all, communities, the proportion of communities with public transport to the nearest health facility was 24 percent. , The comparable figure to the nearest rayon capital is 36 percent.

### **The Irrigation Sector**

#### *The availability of irrigation*

183. Irrigation is a necessity in Eastern Georgia, but needed less in Western Georgia, where climatic differences, notably the presence of convection rainfall, means that drainage is more important. According to the survey, 52 percent of Georgian communities require irrigation for the whole arable land area, whilst 34 percent of communities do not need irrigation at all, with the remaining 14 percent requiring irrigation for a part of their arable land. In 2/3 of communities in the former category, i.e. those requiring irrigation of 100 percent of their arable land, only 50 percent or less of the land requiring irrigation actually benefits from a functioning irrigation system, as revealed in Table 20.

**Table 20 : Percentage of irrigable land receiving irrigation in communities (units: % of surveyed communities)**

Percentage of irrigated land	Communities in each group
25% or less	37%
26-50%	30%
51-75%	11%
76-100%	22%
Total	100%

Source: Study data

### ***The condition of irrigation systems***

184. The data collected during the course of the survey reveals that out of communities that have irrigation systems, only 15 percent report that their systems function effectively all the time, with another 19 percent reporting that their irrigation systems are working, although with interruptions. The remainder report problems with irrigation systems: they are in bad condition or don't work at all. Table 21 presents a comparison of the condition of the respective irrigation systems in 2001 with 1990 to reveal the extent of the deterioration. However, it should be noted that the comparison reveals nothing about the desirability, or the viability, of returning the whole network to operational condition.

**Table 21 : Condition of irrigation systems (units: % of surveyed communities)**

Irrigation system...	Communities in each group	
	Year 2002 (current)	Year 1990 (retrospective)
Operates uninterruptedly	15%	55%
Operates with interruptions	23%	29%
Is in bad condition	51%	12%
Does not operate	11%	4%
Total	100%	100%

Source: Study data

### **What Are the Community Preferences for Rural Infrastructure Improvements?**

185. The qualitative survey of rural communities (N=100) was undertaken to ascertain community preferences in terms of improvements to their rural infrastructure, and to gain an insight into how those preferences changed, reflecting variation in the following key parameters: (a) territorial-administrative division; (b) distance from the highway; (c) community altitude above the sea; (d) community size (number of households); (e) state of the infrastructure in the community; and (f) type of infrastructure ownership. Preferences were solicited in focus groups and community meetings in the sampled communities, and an example of each such event is provided in the following figure.

**Figure 9 : Example of Community Meeting and Focus Group conducted during study**



186. Respondents were asked to indicate which type of rural infrastructure was, in their opinion, the priority for rehabilitation. Table 22 reveals that electricity supply, gas supply and roads/transport were selected as the main priorities for the majority of communities in each of three regions. As an example, improved electricity was seen as a priority in just over 42 percent of surveyed communities in Guria, 34 percent in Samegrelo, and 23 percent in Shida-Kartli.

**Table 22: Proportion of communities expressed preference for infrastructure rehabilitation, by type**

	Guria	Imereti	Kakheti	Mtianeti	Kvemo Kartli	Racha	Samegrelo	Samtskhe-Javakheti	Shida-Kartli
Drinking Water	12.0%	4.8%	28.5%	13.8%	15.0%	21.9%	4.3%	12.3%	15.9%
Irrigation	0.4%	2.8%	4.8%	9.3%	13.1%	0.7%	0.2%	21.3%	19.1%
Telecommunications	2.6%	13.9%	8.4%	15.9%	5.7%	17.3%	5.4%	9.6%	5.4%
Natural Gas	26.4%	35.5%	18.9%	27.5%	23.1%	3.0%	21.4%	18.4%	23.0%
Roads/Transport	16.5%	18.9%	11.7%	14.9%	22.8%	31.6%	34.4%	22.5%	12.7%
Electric Power	42.2%	24.1%	27.7%	18.6%	20.4%	25.6%	34.4%	15.9%	23.9%

Source: Study data

187. By contrast, irrigation was not reported to be the highest priority in any region, but it was important in some communities. In Shida-Kartli and Samtskhe-Javakheti, irrigation was the third and second most important priority at the regional level, but about 20 percent of communities indicated that it was their priority, in each case. In humid regions such as Guria, Racha and Samegrelo, very few people voted for irrigation. Drinking water was also not given a high priority, except in Kakheti and Gacha regions. The relative abundance of natural sources of water in Georgia is probably a factor behind the low importance allocated to water supply. Improved telecommunications was also not seen as a priority in any region.

188. There was also a significant difference of opinion as to what was the most important within the different regions. In Kakheti, for example, where drinking water was found to

have the highest priority on average across all the communities, only 2.6 percent of respondents prioritized drinking water in Toxliauri and 5.7 percent in Kimiti. By contrast, more than 70 percent prioritized water in Veliscixe. In Mtianeti, where natural gas was given the highest priority, only 3.6 percent prioritized gas in Tskhvarichamia, and virtually no-one voted for gas in Kvesheti. Instead, 62.5 percent voted for electricity in Tskhvarichamia and 81.5 percent voted for telecommunication in Kvesheti. Such a significant intra-regional disparity indicates the danger of generalizing preference at the regional level. A table summarizing the preferences by community and region are provided in Annex G.

## **What were the Reported Perceptions of Respondents towards Rural Infrastructure?**

### **The Drinking Water Sector**

189. A significant proportion of the rural population considers that the provision of drinking water is currently inadequate, both in terms of access and quality. Water collection, where necessary, is reported to be both tiring and time consuming. In those locations where centralized supply is available, the quality is perceived to be poor. A number of villagers remarked that they do not drink tap water without treatment because they consider it unsafe. Local leaders, in all regions except Kakheti, claimed that tap water is not regularly tested. Drinking water, however, was given the highest priority only in Kakheti region, and only in Racha region did more than 20 percent of communities vote for drinking water as the priority. This is partly due to the fact that serious water problems can be mitigated by local initiatives: many individual/common wells have been built purely by individual initiatives or under the leadership of local self-governments. Micro-infrastructure projects such as Georgian Social Investment Fund (GSIF) and Community Mobilization Initiative (CMI) also help communities build wells and water supply system, many of which provide reliable source of water to the great satisfaction of beneficiary communities.

190. Drinking water is given very high priority where, due to unfavorable soil and topographical conditions, digging water is technically difficult. For example, in Ninoshvili, Guria region, where source of water is far for half the population and it can take three hours by cart to collect water, as much as 46 percent prioritized drinking water. In almost all regions there exist a number of councils where drinking water is given the highest priority although water is not necessarily a priority in their neighboring councils. Forty-six percent votes for drinking water in Ninoshvili of Guria region, when the regional average is 12 percent and water is prioritized by less than one percent in five other councils. Also, in Samegrelo, where on average only 4.3 percent voted for drinking water as priority, 38 percent voted for water in Nakifu, where in dry seasons people need to travel one km to fetch water.

### **The Electricity Sector**

191. The majority of rural people perceive improvements in the supply of electricity to be the first priority. It is an essential element in running water pumps for drinking water supply, and irrigation systems. The operation of telecommunication systems, mills and other machines necessary in rural life, all require a reliable power supply. The rural population also emphasized that without electricity, they cannot watch television, and so feel cut off

from various information sources, and hence opportunities, outside their villages. A problem particularly pronounced for those who live far from the main road networks. Also many pointed out that it is extremely problematic to be living without light during winter.

192. More than 20 percent of the rural population in the majority of the regions selected electricity as the first priority. The exceptions were Mtianeti and Samtskhe-Javakheti regions. In Guria, where only 72 percent of people are connected with electricity, 42 percent of people prioritized electricity. Intra-regional differences also exist as to the demands for rehabilitation of electricity, though smaller than for other infrastructure. In Mtianeti, no one in Boli and Dzegvi voted for electricity, while 62.5 percent prioritized electricity in Tskhvarichamia. While 23.9 percent voted for electricity in Shida Kartli on average, no one prioritized electricity in Shindisi.

193. Such an intra-regional difference is partly because there are pockets of villages where small-scale community electrification programs are implemented, mostly using a hydro power source. For example, in some districts in Kakheti region, local population contributed GEL 30-35 per household to build their own hydro plant which supplies power 24 hours to their satisfaction. Hydro power plants are also constructed under donor-supported community infrastructure projects such as GSIF. Apparently some regions in Georgia are well suited for hydro power generation and hydro plants can be built by local initiative at a low cost.

### **The Irrigation Sector**

194. Irrigation was not selected as the highest priority in any of the regions, but about 20 percent voted for irrigation in the regions of Samtskhe-Javakheti and Shida-Kartli. Farmers in Samtskhe-Javakheti region claimed that lack of irrigation reduced their harvest by as much as 30-40 percent. In some councils of Mtskheta Tianeti, such as Mukhrani and Nichbisi, the lost output can amount to as much as 70 percent of potential output. And some farmers had stopped producing vegetables and grapes. Demand for irrigation is naturally high in such councils, at above 30 percent. In neighboring councils, such as Lisi and Simoniatkhevi, however, no one prioritized irrigation despite the absence of irrigation. As a result, on an average only 9.3 percent prioritized irrigation.

195. Less than one percent voted for irrigation in Guria, Racha and Samegrelo regions, where irrigation is unnecessary due to the more favorable climate. Only in two councils, among the 33 surveyed in these regions, irrigation was prioritized by more than two percent, namely, Kvashkhieti and Lia of Samegrelo. Adequate drainage is perceived to be a far more serious problem in these regions. Intra-regional differences also exist for demands for irrigation. People of Kvashkhieti consider that irrigation, currently unnecessary, will be necessary to expand output. In Lia, corn is produced on a relatively large scale (seven ha), and farmers consider that increased production of corn would be possible with irrigation.

### **The Natural Gas Sector**

196. Natural gas is given a high priority in many regions, especially Mtianeti, Imereti and Kvemo Kartli, where it is given the highest priority. Many users of natural gas seem to be

satisfied with the service, though they consider the tariff levels, and especially the initial cost required to install meters (which can cost as much as GEL 180 – 200) too expensive. Those who are not connected wish almost unanimously (85 percent) to be connected.

197. There is a considerable intra-regional disparity in terms of preference for the rehabilitation of the supply of natural gas, which cannot be explained simply by access. For instance, in Shida Kartli, 75.4 percent prioritized gas in Shindisi council, but only 8.1 percent prioritized gas in Teliani councils, although both councils are not currently supplied with gas. State of access and service level, and preference to rehabilitation of gas, does not necessarily coincide in other regions either. It is not clear what combination of factors determines preferences towards the rehabilitation of natural gas, but the availability and price of alternative source of heating and cooking, such as firewood, appear to be important determinants. Rural Georgians prefer natural gas to firewood, reflecting the additional monetary or time costs involved in buying or collecting firewood. However, in the absence of a central heating system, firewood will continue to be used even if gas becomes available, especially during winter to save the overall energy cost, as indicated in the previous section.

### **The Transport Sector**

198. The improvement of local roads was ranked as the first priority in three regions, Racha, Samegrelo and Samtskhe-Javakheti, and given priority by more than 15 percent in all regions. Demands for improved roads are especially high in the mountainous Racha region: in Skhvana and Gadishi councils, where more than 70 percent indicated road improvement was the priority. Western and north-western regions tend to have more villages with high preference for road improvement than do eastern regions where less than 20 percent prefer roads in the majority of villages except in a few of Kvemo Kartli region and mountainous councils of Mtianeti region.

199. Farmers in all regions consider that improved roads will help increase income since they are often forced to sell their products to visiting merchants at a very low price, or see their products spoiled, due to a lack of means to transport them to the market. In all regions except for Adjara, more than 40 percent of respondent believe that improved roads will significantly, or slightly, improve their income prospects. In other regions, more than half the surveyed people in Kvemo Kartli and Imereti consider their income will significantly increase.

### **The Telecommunications Sector**

200. Improving telecommunications was not given the highest priority in any region, and in no region, except in Mtianeti, Racha and Imereti regions, it was prioritized by more than 10 percent. This is probably due to the availability of mobile phones in many parts of rural Georgia. As mentioned in the previous part, the mobile telephone network covers many parts of rural Georgia, and a lot of the rural population can use the mobile phones of their neighbors or friends at free or low service fees. Since mobile phones are expensive, many in the rural population prefer network telephone and consider its rehabilitation will improve their livelihood by reducing household expenditure, and by increasing the frequency of use of telephone and their exposure to external information and opportunities.

201. Neither mobile nor network telephone is available to very remote areas, and access to telephone service was highly prioritized in such areas. For example, telephone network was prioritized by 81.5 percent in Kvesheti of Mtianeti region, and 68.3 percent in Znakvi of Racha district. These are where communication beyond the close neighborhood becomes almost impossible during bad weather due to very limited access to transport and poor roads, and where it can take as much as three hours to get to where telephone service is accessible.

### **Community Preference towards Utility Ownership**

202. Generally speaking, community members prefer state ownership of infrastructure utilities and roads to private ownership. As shown in the Table 23 below, predominant majority of rural population consider state ownership is preferable to other forms of infrastructure ownership<sup>34</sup>. There are several reasons for the preference for state ownership. Firstly, rural Georgians tend to consider that government has the responsibility to provide services to citizens, and this is why they pay tax. Secondly they expect government will be more considerate about their welfare than the private sector, and will not just cut service even if they do not pay user fees. Many rural Georgians have trouble paying user fees, and they expect, as some farmers in Racha put it, that while private operators would stop providing services, the public sector would ensure service is provided. By contrast, they do not necessarily consider private ownership to be more efficient or effective than state ownership, since the supply of electricity and gas, both of which are provided by private companies, is no more reliable than supply of water and other services provided by state owned enterprises.

**Table 23 : Expressed Preferences Towards Community Ownership**

	<b>Electricity</b>	<b>Gas</b>
State owned enterprise	69.6%	80.0%
Privately owned company	7.4%	7.9%
Local administrative body	4.3%	4.7%
Community owned	1.9%	2.3%
No preference	16.8%	5.1%
	100.0%	100.0%

Source: Study data.

### **Potentials of Local Initiatives and Role of Local Governments**

203. The selected priorities do not always coincide with actual preferences, as rehabilitated under local initiatives or donor-financed small-infrastructure projects. This is probably because the infrastructure selected as a priority, by most respondents, requires more than small-scale intervention, typical of community-based infrastructure projects. Interventions in electricity, roads and natural gas supply require substantial resources which cannot be mobilized locally. Whereas small-scale water supply system or hydro power generation, or roads leading to the cemetery or other communal places, are more suitable to be undertaken locally, frequently under the leadership of the elected mayors. Community members usually

<sup>34</sup> Preferred ownership was asked only about gas and electricity since other infrastructure, such as water, roads and irrigation, are provided solely by government or owned by community, and respondents will not have solid information to compare state from private ownership.

contribute most of the cost, but their financial capacity is also very limited. All mayors interviewed mentioned that it is virtually impossible to finance rehabilitation of infrastructure on a local budget.

## **ANNEX E – THE OUTPUT FROM THE WILLINGNESS TO PAY STUDY**

204. This annex presents the results of the investigation into the willingness to pay (WTP) survey, using the stated preference techniques, of respondents for rural infrastructure services in Georgia. This survey was undertaken by a consortium of international and local consultants for the purposes of this study. The study restricted its consideration to rural roads, electricity, gas, drinking water, irrigation and telecommunication, to simplify the scope of work and the design, and the results are presented in the subsequent paragraphs.

### **The Employed Methodology**

205. A quantitative approach was undertaken to collect the respondents' explicit choices between defined hypothetical packages of improvements of infrastructure services. The discrete choices were then used to inform an econometric choice model, based on a conditional logit model, to estimate household willingness to pay for various service improvements. The usual stages of good design practice were followed: commencing with in-depth interviews, a pilot survey, and then a main survey comprising one thousand (1,000) households (the formal approach employed to select the sample is provided in Annex F). The sample was selected to ensure that the resulting willingness to pay estimates would be representative for the entire population in Georgia.

### **The Structure of the Questionnaire**

206. The survey instrument, or questionnaire, included a number of questions about each infrastructure service to ascertain current availability, and perception of condition and quality of the service. These questions were followed by a number of stated preference games where the respondents were asked to make trade-offs between different service improvements and cost levels. Households were also asked to choose between different payment profiles, comprising different mixtures of upfront fee and monthly payments. Finally, a set of socio-economic variables were collected, to investigate how differences in socio-economic characteristics explained variation in the willingness to pay estimates.

### **The Willingness to Pay Analysis**

207. The aim of the willingness to pay analysis for households was twofold:

- To estimate the willingness to pay for improved infrastructure services and possibly different levels of the following services: electricity, gas, drinking water, water for irrigation, landline telephone and roads.
- To estimate a maximum willingness to pay for infrastructure services.

208. In order to cover both these targets, three stated preference games were designed:

- Game 1 included electricity and roads.
- Game 2 included drinking water, irrigation and landline telephone.
- Game 3 all services.

209. The reason for splitting the improvements of infrastructure services into two games was to keep the games simple. The unexplained variation of the answers is reduced and the results more trustworthy, when the questions are easier to answer. In addition, the fatigue effect is reduced. The third game was designed to get an overall willingness to pay for all improvements so that the values derived from Games and 1 and 2 are not inflated as a result of the ‘package effect’<sup>35</sup>.

210. Gas was not included in the willingness to pay games because piped gas was considered to lower household expenditure on cooking fuel. Instead, the households’ expected savings from switching to gas from other fuels is estimated. Further, some households have 24 hours electricity supply with no voltage fluctuations and, hence, they were not interested in improved electricity supply. For these households a separate game (a variation on the second game) including improved roads, drinking water, water for irrigation and landline telephone was designed. Before introducing the stated preference games, respondents were asked a number of questions about the present level of service aimed at gathering relevant information and making respondents consider the existing level of service they received.

211. When designing the stated preference games it was assumed that a ‘better’ service level than currently received would be preferable and that lower cost levels would be preferable to higher costs (the orthodox economic assumption that consumers are utility maximizers). Choice pairs with obvious answers were not included. This was in order to obtain an efficient design – the drawback is that there was some correlation between the factors in the stated preference game as the improved service levels were presented with higher cost levels.

## **The Output from the Study – Current Availability of Service**

### ***Electricity***

212. All interviewed households were connected to the electricity supply network. Nearly two thirds of households (64 percent) have electricity every day and 24 percent of all households have electricity 24 hours a day. However, there is significant variation in electricity supply across regions. The lowest level of electricity service is in Guria, where most households have irregular supply and less than 8 hours of electricity supply per day.

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<sup>35</sup> Previous empirical research examining customer priorities has found a significant package effect, i.e. namely the sum of valuations of many non-primary attributes is greater than the valuations of a ‘package’ of the same effects.

**Table 24 : Present level of electricity services, by region**

	Kakheti	Shida Kartli	Kvemo Kartli	Samtskhe Javakheti	Adjara	Guria	Samegrelo	Imereti	Mtskheta Mtianeti	Georgia
<b>Regularity</b>										
Electricity every day	46%	47%	88%	100%	59%	14%	82%	62%	64%	64%
Electricity every other day	8%	1%	1%	0%	3%	0%	5%	12%	0%	5%
Irregular supply	45%	52%	11%	0%	37%	86%	13%	26%	36%	31%
Total, observations	150	110	130	90	100	80	120	140	80	1000
<b>Hours of electricity supply</b>										
2 or less hours per day	8%	0%	0%	0%	0%	0%	3%	1%	12%	3%
3-4 hours per day	24%	44%	11%	0%	3%	20%	7%	25%	0%	17%
5-8 hours per day	46%	41%	22%	0%	24%	45%	28%	50%	9%	34%
9-12 hours per day	8%	10%	3%	0%	13%	5%	17%	14%	8%	10%
13-18 hours per day	8%	3%	9%	0%	36%	27%	18%	3%	2%	10%
19-23 hours per day	4%	0%	2%	0%	2%	1%	0%	4%	16%	3%
24 hours per day	2%	3%	53%	100%	21%	1%	28%	4%	53%	24%
Total, observations	150	110	130	90	100	80	120	140	80	1000
<b>Days without electricity during the past 30 days</b>										
None	29%	8%	39%	60%	69%	19%	24%	23%	49%	32%
1-2 days	36%	19%	24%	29%	27%	18%	33%	38%	35%	30%
3-5 days	34%	44%	20%	11%	5%	38%	24%	31%	6%	26%
6-10 days	0%	25%	17%	0%	0%	26%	12%	6%	11%	10%
More than 10 days	1%	4%	0%	0%	0%	0%	8%	2%	0%	2%
Total, observations	150	110	130	90	100	80	120	140	80	1000
<b>Voltage fluctuations</b>	37%	13%	32%	34%	74%	26%	44%	51%	38%	40%
Households experiencing voltage fluctuations	37%	13%	32%	34%	74%	26%	44%	51%	38%	40%
Households with 24 hours supply experiencing no voltage fluctuations	2%	1%	44%	66%	20%	0%	18%	4%	53%	18%
Total, observations	150	110	130	90	100	80	120	140	80	1000

Source: COWI (2005).

## **Roads**

213. The great majority of respondents travel by bus (43 percent) or minibus (49 percent) to the city or urban centre they most frequently visit. 13 percent of respondents go to the city or the nearest urban centre by car and 11 percent walk<sup>36</sup>. The respondents were asked to assess the expected time savings if the road were paved with asphalt and well maintained and 31 percent said it would save them between 11 and 30 minutes and a fifth said it would save them over 30 minutes per trip. Respondents were also asked whether a good quality road to their local city/urban centre would improve their prospects of earning income. Over a third (36 percent) said it would make a significant improvement.

<sup>36</sup> The sum of percentages adds up to more than 100 percent as multiple answers were allowed.

**Table 25 : Present level of roads, by region**

	Kakheti	Shida Kartli	Kvemo Kartli	Samtskhe Javakheti	Adjara	Guria	Samegrelo	Imereti	Mtskheta Mtianeti	Georgia
<b>Expected time savings from improved road</b>										
0 minutes	7%	10%	12%	1%	19%	16%	3%	9%	3%	9%
1-10 minutes	61%	33%	34%	24%	36%	44%	48%	23%	54%	39%
11-20 minutes	19%	44%	21%	16%	15%	10%	18%	17%	6%	20%
21-30 minutes	6%	10%	10%	20%	9%	9%	13%	13%	16%	11%
31-40 minutes	1%	2%	3%	7%	2%	6%	2%	11%	1%	4%
41-50 minutes	2%	0%	2%	4%	5%	3%	1%	12%	9%	4%
51-60 minutes	2%	0%	10%	17%	11%	1%	6%	6%	8%	6%
More than 60 minutes	1%	1%	8%	11%	3%	11%	9%	9%	2%	6%
Mean, minutes	13	15	26	35	20	21	25	30	21	23
Total, observations	146	110	125	90	99	80	120	140	79	989
<b>Impact on income prospects of improved roads</b>										
Significant improvement	19%	15%	64%	46%	30%	26%	32%	51%	22%	36%
Slight improvement	23%	31%	11%	20%	0%	33%	34%	21%	16%	21%
Don't know	25%	4%	15%	17%	5%	1%	5%	8%	12%	11%
No prospect	34%	50%	10%	18%	65%	40%	28%	20%	50%	31%
Total, observations	150	110	130	90	100	80	120	140	80	1000

Source: COWI (2005).

214. Almost a third (31 percent) of the households participates in repairing the village roads, when necessary, whereas four percent participate in repairing the access road to the urban centre. When asked if the household would prefer to help repair the roads or pay a monthly fee of GEL 3, 40 percent chose the former, whilst 60 percent preferred to pay the monthly fee.

### *Drinking water*

215. The primary source of water varies across regions; for instance in Samegrelo most households get water from a family owned well, cf. Table 26. Only 16 percent have water piped into their dwelling and 23 percent have water piped into their yard. Over a fifth (21 percent) has a well. 41 percent do not have to spend any time to get water supply and 30 percent spend less than two minutes. However, 16 percent spend six or more minutes fetching the water and a majority spends less than two minutes.

**Table 26 : Present level of drinking water services, by region**

	Kakheti	Shida Kartli	Kvemo Kartli	Samtskhe Javakheti	Adjara	Guria	Samegrelo	Imereti	Mtskheta Mtianeti	Georgia
<b>Primary source of water</b>										
Piped water into dwelling	9%	7%	13%	19%	66%	8%	2%	19%	18%	16%
Piped water into yard	32%	28%	37%	31%	5%	10%	6%	26%	13%	23%
Public tap/standpipe/well	41%	24%	19%	37%	9%	25%	2%	10%	28%	20%
Spring/surface water	15%	18%	21%	4%	21%	8%	9%	17%	34%	16%
Water vendor	2%	0%	7%	0%	0%	0%	0%	1%	0%	1%
Neighbors	1%	3%	1%	0%	0%	10%	0%	3%	4%	2%
Own family well	0%	19%	1%	9%	0%	39%	82%	24%	2%	21%
Total, observations	150	110	130	90	100	80	120	140	80	1,000
<b>Time to fetch water</b>										
0 minutes	44%	37%	51%	51%	71%	18%	8%	49%	31%	41%
Less than 2 minutes	12%	24%	6%	14%	25%	54%	90%	27%	26%	30%
3-5 minutes	17%	24%	12%	9%	5%	22%	3%	12%	15%	13%
6-10 minutes	17%	6%	5%	11%	0%	2%	0%	6%	12%	7%
11-20 minutes	7%	6%	5%	6%	0%	4%	0%	3%	11%	4%
More than 21 minutes	3%	2%	20%	9%	0%	0%	0%	3%	5%	5%
Total, observations	150	110	130	90	100	80	120	140	80	1,000

Source: COWI (2005).

216. Seven percent of the households bought bottled water in the previous month, with amounts spent varying from GEL 1 to GEL 40.

### *Telephone landline*

217. In rural Georgia, four percent of the households have a telephone landline with between zero and six percent in each region except Mtskheta Mtianeti which had 38 percent, cf. Table 27. However, nearly half of those with a landline connection reported that they did not have a working telephone for one or more days in the preceding 30 days. 23 percent had had no service for over 20 days. In contrast to the landline levels, more than a third of households (39 percent) have access to mobile telephones. Regardless of whether the household has a mobile or not, most households would like to have a landline telephone.

**Table 27 : Present level of telephone landline services, by region**

	Kakheti	Shida Kartli	Kvemo Kartli	Samtskhe Javakheti	Adjara	Guria	Samegrelo	Imereti	Mtskheta Mtianeti	Georgia
<b>Landline telephone in household</b>	0%	0%	3%	3%	6%	3%	3%	0%	38%	4%
Total, observation	150	110	130	90	100	80	120	140	80	1,000
<b>Telephone out of work during the past 30 days</b>										
None	na	na	25%	0%	43%	54%	75%	na	64%	53%
1-2 days	na	na	50%	33%	29%	0%	25%	na	0%	16%
3-5 days	na	na	25%	0%	0%	0%	0%	na	0%	3%
6-10 days	na	na	0%	0%	29%	0%	0%	na	0%	4%
11-20 days	na	na	0%	0%	0%	0%	0%	na	3%	2%
More than 20 days	na	na	0%	67%	0%	46%	0%	na	33%	23%
Total, observations	0	0	4	3	7	2	4	0	28	48
<b>Access to mobile phone</b>										
Own mobile telephone	35%	22%	34%	49%	55%	42%	28%	35%	50%	36%
Shared mobile telephone	1%	2%	2%	2%	0%	0%	10%	1%	2%	2%
Not access	64%	76%	64%	49%	45%	58%	62%	65%	49%	61%
Total, observations	150	110	130	90	100	80	120	140	80	1,000
<b>Would like to have a telephone landline</b>	96%	87%	80%	69%	87%	68%	88%	78%	87%	84%
Total, observations	150	110	126	87	93	78	116	140	52	952

Source: COWI (2005).

218. Among households that have landline telephone, one in every four does not pay for the services – for households that do pay, the cost ranges between GEL 2 and GEL 25 per month with a mean payment of GEL 4.2 GEL. The range of mobile phone payments is between GEL 5 and GEL 100 a month with a mean payment of GEL 20.

### *Water for irrigation*

219. Just over one fifth of households (22 percent) receive water for irrigation, cf. Table 28. The existence of water for irrigation, and the desire to have water for irrigation both vary significantly between regions; in the regions in the west of Georgia a high percentage have irrigation and a high number of household not presently served would like to receive the irrigation service.

**Table 28 : Present level of irrigation services, by region**

	Kakheti	Shida Kartli	Kvemo Kartli	Samtskhe Javakheti	Adjara	Guria	Samegrelo	Imereti	Mtskheta Mtianeti	Georgia
<b>Receives water for irrigation at present</b>	39%	61%	31%	24%	0%	0%	8%	0%	21%	21%
Total, observation	150	110	130	90	100	80	120	140	80	1,000
<b>Water during the growing season</b>										
Sufficient amount	84%	88%	69%	27%	0%	0%	90%	0%	39%	76%
Insufficient amount	16%	12%	31%	73%	0%	0%	10%	0%	61%	24%
Total, observation	57	68	41	22	0	0	10	0	18	216
<b>Would like to receive water for irrigation</b>	85%	98%	83%	62%	22%	9%	38%	31%	87%	52%
Total, observation	93	42	89	68	100	80	110	140	62	784

Source: COWI (2005).

### *Gas*

220. Gas was not included in the stated preference games because in many cases the provision of gas to households would lead to a saving in the total household budget due to lower fuel costs for cooking and heating. This would confuse the result because the potential savings due to connection to piped gas may be significant and hence dominate the answers to the choice tasks.

221. Ten percent of households are connected to natural gas supply, and four percent of households say they have a good supply. Those who are not connected wish almost unanimously (85 percent) to be connected.

**Table 29 : Present level of natural gas supply, by region**

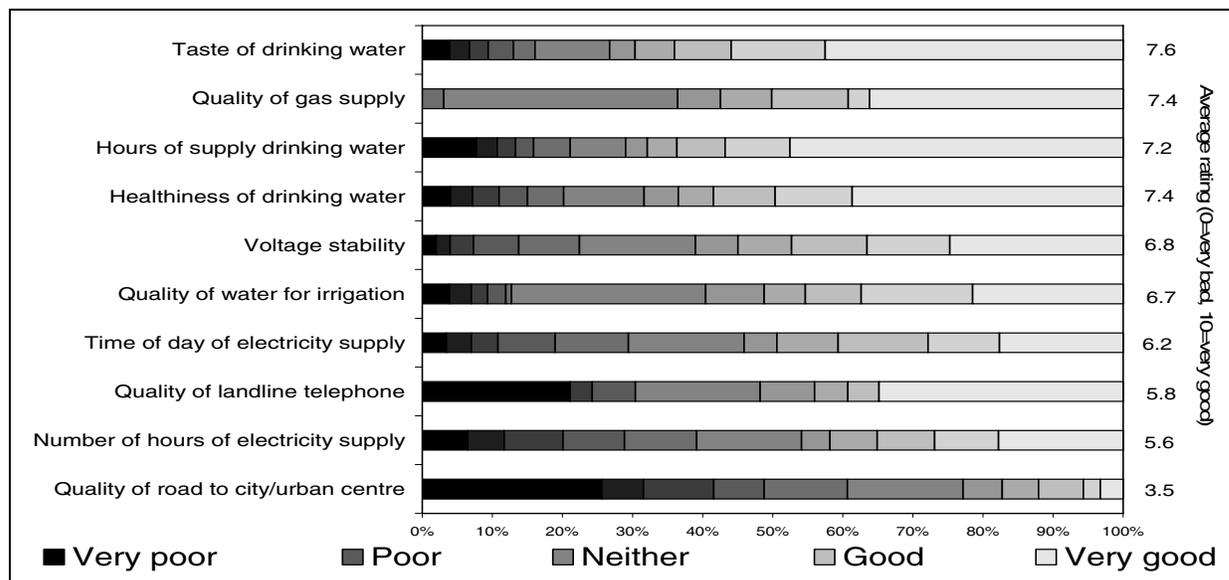
	Kakheti	Shida Kartli	Kvemo Kartli	Samtskhe Javakheti	Adjara	Guria	Samegrelo	Imereti	Mtskheta Mtianeti	Georgia
<b>Connection</b>										
Connected and works well	12%	0%	7%	0%	0%	0%	0%	0%	19%	4%
Connected, does not work	22%	0%	8%	0%	1%	0%	0%	3%	1%	6%
Not connected	66%	100%	85%	100%	99%	100%	100%	97%	80%	90%
Total, observations	150	110	130	90	100	80	120	140	80	1000
<b>Days without gas during the past 30 days</b>										
None	31%	na	0%	na	0%	na	na	0%	85%	27%
1-2 days	2%	na	5%	na	0%	na	na	0%	0%	2%
3-5 days	4%	na	40%	na	0%	na	na	0%	0%	11%
6-10 days	0%	na	0%	na	0%	na	na	0%	9%	1%
More than 10 days	63%	na	55%	na	100%	na	na	100%	6%	58%
Total, observations	49	0	20	0	1	0	0	4	13	87
<b>Would like to get connected</b>										
Total, observations	99%	99%	97%	87%	93%	83%	97%	94%	94%	95%
Total, observations	101	110	110	90	99	80	120	136	67	913

Source: COWI (2005)

### **The Output from the Study – Respondent Satisfaction with Current Service**

222. Respondents were asked to rate the infrastructure services that they currently receive on a scale from zero to ten, where zero represents very poor service and ten represents very good service. The results of this simple rating exercise are summarized in Figure 10:

**Figure 10 : Rating of infrastructure services, sorted by rating average**



Note: (1) The evaluation of gas was based on 39 observations; the evaluation of irrigation service was based on 216 observations and the evaluation of landline telephone was based on 48 observations. The remaining services are based on 1,000 observations; (2) The services are sorted by average rating so that the highest scoring service is written first.

223. The evaluation of the electricity supply was based on three aspects: hours of supply, time of day of supply and voltage stability. The best rated aspects were the voltage stability and time of the day electricity is supplied (means of 6.8 and 6.4 respectively). Fewer were satisfied with the number of hours of electricity supply (mean of 5.9). The quality of roads was rated very poor by most households with a mean rating of 3.5. The evaluation of the water supply was based on three aspects: hours of supply, perceived healthiness and taste. All three aspects received similarly good ratings – the mean ratings for taste and hours of supply were 7.5 and for healthiness 7.2.

### The Output from the Willingness to Pay (WTP) Questions

224. The estimates of willingness to pay were estimated in a logit model, which included all the potential service improvements, in the stated preference games: electricity, roads, drinking water, irrigation and landline telephone, both separately and collectively in defined packages. The stated preference questions proposed certain service improvements and commensurate increases in the monthly tariff in the range of GEL 2 to GEL 25 for each of the partial service improvements, and between GEL 6 and GEL 45 for packages of services. The results of this exercise, in absolute terms, are presented in the next table:

**Table 30 : Willingness to pay estimates for service improvements, by expenditure group, GEL per month (according to the estimated model)**

Variable	Households with monthly expenditures between 0-100 GEL	Households with monthly expenditures between 100-200 GEL	Households with monthly expenditures over 200 GEL
<b>8 hours electricity supply, no fluctuations</b>			
Household with less than 8 h supply	8	8	8
Household with 9-23 hours supply	0	0	0
Household with 24 hours supply, but with voltage fluctuations	0	0	0
WTP for fixed payment, households currently paying by consumption	0	0	0
<b>24 hours electricity supply, no fluctuations</b>			
Household with less than 8 h supply	12	15	15
Household with 9-23 hours supply	5	5	5
Household with 24 hours supply, but with voltage fluctuations	0	0	0
WTP for fixed payment, households currently paying by consumption	2	2	2
<b>24 h drinking water supply, always safe to drink</b>			
Households with piped water into dwelling	6	6	6
Households with piped water into yard	11	11	11
Households with own family well	7	7	7
Households using water vendors	25	25	25
Households using public tap/standpipe/well	13	13	13
Households using surface/spring water	14	14	14
Households using water from neighbors	20	20	20
<b>Landline telephone</b>			
Households with mobile telephone	7	7	7
Households without mobile telephone	3	3	3
<b>Irrigation water during the growing season</b>			
Households having income from land use, east	7	7	7
Households having income from land use, west	3	3	3
Households not having income from land use, east	4	4	4
Households not having income from land use, west	0	0	0
<b>Improved road</b>			
All households	4	4	6
Improved roads per minute saved	0,13	0,13	0,13

Source: COWI, (2005).

### *Electricity*

225. Households with fewer than eight hours of electricity supply per day have the highest willingness to pay for 24 hours electricity supply (GEL 12-17 per month depending on the level of total household expenditures). These households are also willing to pay GEL 10 per month to get electricity eight hours per day. Whilst the WTP of households who already receive 9-23 hours of electricity per day is GEL, across all income groups.

226. There is also a small difference in the average willingness to pay for 24 hours supply depending on the present method of payment: households paying per consumed KW/hr

currently are willing to pay GEL 3 extra per month in order to pay a fixed fee for electricity 24 hours a day. This can be interpreted either as a preference for paying a fixed monthly amount rather than a varying amount based on actual consumption for budgetary reasons, or it reflects the respondent perception that the fee would be unreflective of consumption.

### ***Water supply***

227. Households that already have piped water into the dwelling have the lowest willingness to pay to receive 24 hours a day service (GEL 3 per month presumably reflecting current poor quality). Households with water supply in the yard have a slightly higher willingness to pay to receive 24 hour supply into the dwelling (family well: GEL 5 per month; piped water in yard GEL 9 per month), whereas households that need to collect water have a significantly higher willingness to pay: households that buy the water from water vendors have the highest willingness to pay for 24 hours piped water (GEL 31 per month). The willingness to pay does not increase with higher total household expenditures.

### ***Landline telephone***

228. Households are willing to pay between GEL 5 per month and GEL 8 per month to receive landline telephone connection and unlimited national calls. Households who already have mobile phones are willing to pay more for this service than those without. This reflects that the latter need to communicate and are used to paying a higher rate for their communications.

### ***Water for irrigation***

229. The willingness to pay for irrigation depends on the geography. Households in the east of Georgia (Kakheti, Shida Kartli, Kvemo Kartli, Samtskhe, Javakheti, Mtskheta Mtianeti) have the highest willingness to pay, reflecting the drier climate of those areas. Households in these areas are willing to pay an amount between GEL 6 and GEL 8 per month, and households with income from the use of the land, not surprisingly, have the highest willingness to pay for irrigation water. WTP does not depend on the level of total household expenditures. Households in the west are willing to pay up to GEL 5 per month.

### ***Improved roads***

230. The willingness to pay for improved roads is estimated as a constant willingness to pay per month and a term that varies with the potential time savings. For instance for households with the lowest household budget, the willingness to pay is calculated:

- $WTP(\text{road improvement, expenditure lower than 200 GEL/month}) = 4 \text{ GEL} + 0.18 \text{ GEL} * \text{minutes saved per trip}$

231. Hence, the average willingness to pay for all households varies depending on time saving and the total budget of the household and is presented in Table 31.

**Table 31 : Willingness to pay estimates for road improvements, by expenditure group, GEL per month (according to the estimated model)**

	Households with monthly expenditures between 0-200 GEL, WTP in GEL per month	Households with monthly expenditures over 200 GEL, WTP in GEL per month
Expected time saving:		
0	4	6
10	5	7
20	6	8
30	8	10
40	9	11
50	10	12
60	12	14
Mean	7	9

Source: COWI (2005).

### *Gas*

232. Potential savings for households without connection to the natural gas network was calculated on the basis of the cost for cooking, heating and lighting in the summer. This assumption was supported by the pilot results as the households with natural gas connection used firewood for heating in the winter months. Using gas for heating efficiently would require a central heating system. The potential savings in fuels for cooking with a connection to natural gas is generally lower in the winter than in the summer. This is because more households use firewood for cooking in the winter, as heating and cooking is combined to save bottled gas. Consequently, the average consumption of bottled gas is higher in the summer than in the winter, cf. Table 32.

**Table 32 : Estimation of the potential savings if the households receive natural piped gas**

	Percentage households using the cooking fuel	Average expenditure per household using the cooking fuel, GEL per month	Average expenditure per household among all households, GEL per month
Bottled gas, winter	35%	13	5
Bottled gas, summer	62%	18	11
Firewood, summer	71%	39	28

233. Cooking fuel costs are calculated as the summer time cost of the bottled gas and firewood, assuming that households do not heat their dwellings in summer time. Hence the expected savings in summer time is GEL 57 per month (sum of expenditures on bottled gas and firewood). In the winter time, the savings are more uncertain as they depend on the amount of wood that can be saved when natural gas is used for cooking. For instance, it could be assumed that the amount of firewood used in the summer could be saved in the wintertime. In this case the estimated savings in the winter time is GEL 39 per month.

**Maximum WTP for infrastructure services**

234. The total willingness to pay for all infrastructure services can be estimated in two ways: firstly, all the WTP estimates for the individual infrastructure services can be, and have been, added up. The result is presented in Table 33, and assumes that all households get an improved level of 24 hours electricity supply. The WTP is broadly consistent across all income groups, ranging between GEL 44 and GEL 48 per household per month.

**Table 33 : Sum of willingness to pay estimates, GEL per month (according to the estimated model)**

Variable	Households with monthly expenditures between 0-100 GEL	Households with monthly expenditures between 100-200 GEL	Households with monthly expenditures over 200 GEL
Sum of WTP	44	46	48

Source: COWI (2005)

235. However, the willingness to pay estimates summarized in this table reflects the *ceteris paribus* assumption, all other things remaining unchanged. So each WTP amount obtained from respondents was based on all other infrastructure types remaining the same. Once this principle is sacrificed, i.e. more than one infrastructure type is improved (there is a package of improvements), then the WTP figures ‘may’ exceed actual total WTP for the joint improvement, for the package. A respondent may wish to spend a lower amount on electricity if they know that their water bill is also going to increase due to improved water services.

236. Therefore the second way of estimating total WTP is by using the information from Game 3. The results from this game can be interpreted as an overall average maximum willingness to pay for infrastructure services. The average total willingness to pay for defined improvements to all services is between GEL 31 and GEL 45 per household per month depending on the expenditure level of the household, cf. Table 34. The willingness to pay for Package 1 is slightly lower than that for Package 2 and the willingness to pay for either package depends on the expenditure group.

**Table 34 : Willingness to pay estimates for Package 1 and Package 2, GEL per month (according to the estimated model)**

Variable	Households with monthly expenditures between 0-100 GEL	Households with monthly expenditures between 100-200 GEL	Households with monthly expenditures over 200 GEL
<b>Packages</b>			
Package 1: Electricity and roads	17	22	26
Package 2: Drinking water, irrigation and landline telephone	14	18	19
Total, Package 1 + Package 2	31	39	45

Source: COWI (2005)

237. Comparing the result in Table 34 with the result in Table 30 indicates that the maximum WTP for improvement of all services is lower than the sum of the WTP of the services. For comparison, the two sets of results are reported in the table below along with the ratio between the two estimates of total willingness to pay for all service improvements, called the multiplication factor. The multiplication factor indicates that households in the expenditure group with GEL 0-100 GEL per month in expenditures are willing to pay on average 70 percent of the WTPs given in Table 30 if all services are improved simultaneously.

**Table 35 : Relation between the sum of WTP and maximum WTP for all services (according to the estimated models)**

Variable	Households with monthly expenditures between 0-100 GEL	Households with monthly expenditures between 100-200 GEL	Households with monthly expenditures over 200 GEL
Sum of WTP for the services	44 GEL	46 GEL	48 GEL
Total maximum WTP	31 GEL	39 GEL	45 GEL
Multiplication factor for partial WTPs if all services are improved simultaneously	70%	85%	94%

Source: COWI (2005)

238. In accordance with the hypothesis, maximum willingness to pay is lower than the sum of the partial WTPs. There is also an income effect such that the sum of partial WTPs is closer to maximum WTP for households with higher total expenditures. The difference between the two estimates is reduced for the two other expenditure groups which accords with the expectation that households in these groups are less budget constrained.

**Table 36 : Representative willingness to pay estimates for Package 1 and Package 2, GEL per month**

Variable	Households with monthly expenditures between 0-100 GEL	Households with monthly expenditures between 100-200 GEL	Households with monthly expenditures over 200 GEL
<b>Packages</b>			
Package 1: Electricity and roads	15	19	22
Package 2: Drinking water, irrigation and landline telephone	13	15	17
Total, Package 1 + Package 2	27	34	38

### ***Regional variation in Willingness to Pay***

239. WTP has also been calculated to investigate the regional differences and are presented in Table 37. As the sample was designed primarily to provide a representative picture of WTP across all regions, the disaggregate results presented here are less robust. However, important insight can still be gained. Ideally these WTP estimates should also be corrected for those households that have no WTP for improved services and those who have

a very high WTP. However, the results provide an indication as to how WTP varies across the different regions.

**Table 37 : Willingness to pay estimates simplified model, WTP for partial services by region, GEL per month**

	Kakheti	Shida Kartli	Kvemo Kartli	Samtskhe Javakheti	Adjara	Guria	Samegrelo	Imereti	Mtskheta Mtianeti	Georgia
8 h electricity supply and no fluctuations, households with less than 8 h supply	18	10	9	-	-	13	7	6	14	10
24 h electricity supply and no fluctuations, households with less than 24 h supply	30	10	9	-	3	21	10	10	14	14
24 h drinking water supply always safe to drink, households with piped water into dwelling/yard/well	23	7	5	-	-	8	3	-	6	6
24 h drinking water supply always safe to drink, households with other sources	23	4	22	-	10	10	-	10	19	14
Landline telephone, household without landline telephone	14	2	-	-	6	-	9	4	7	6
Irrigation water during the growing season, households with income from land use	6	9	15	-	7	-	4	6	7	7
Improved road	6	5	16	-	8	-	7	8	5	8

Note: Willingness to pay have not been calculated where the parameters are insignificant.

### The Issue of Upfront Investment

240. The lack of WTP estimates from Samtskhe Javakheti cannot be interpreted as a low WTP for the service improvements, but rather that the WTP cannot be determined based on the survey data. Households' preference between up-front investment and lower monthly costs as opposed to no upfront investment and higher monthly payments was investigated in a question where the households were asked to choose between the two different payment schemes over three years. The results indicate that households generally are willing to pay quite high interest rates in order to avoid an upfront fee. This would suggest that the service provider rather than the household makes the necessary loans in order to pay for e.g. connections, as the service provider often would be able to make the loans at better terms. More than half (58 percent) preferred the option with no upfront investment, cf. Table 38. This means that a majority of households consider that it would be more expensive for them to borrow GEL 100 than the yearly return of investment of 29 percent would give them.

**Table 38 : Preferred payment scenario**

Up front fee	Monthly payment	Preferred by	Interpretation
0 GEL	15 GEL	58%	This group do not wish to pay even 100 GEL up front even though it would give them a return of investment on 29% per year
100 GEL	11 GEL	7%	This group wish to pay 100 up front to receive the return of investment of 29% per year, but does not wish to pay 200 GEL up front even if this would give them a return of investment of 65%
200 GEL	4 GEL	33%	The group is willing to pay 200 GEL up front in order to make a return of investment of 65%
Don't know		2%	-

241. Even among the households in the high expenditure quantile, more than half prefer to make the upfront payment even though return of that investment is very high.

**Table 39 : Preferred payment scenario by expenditure group**

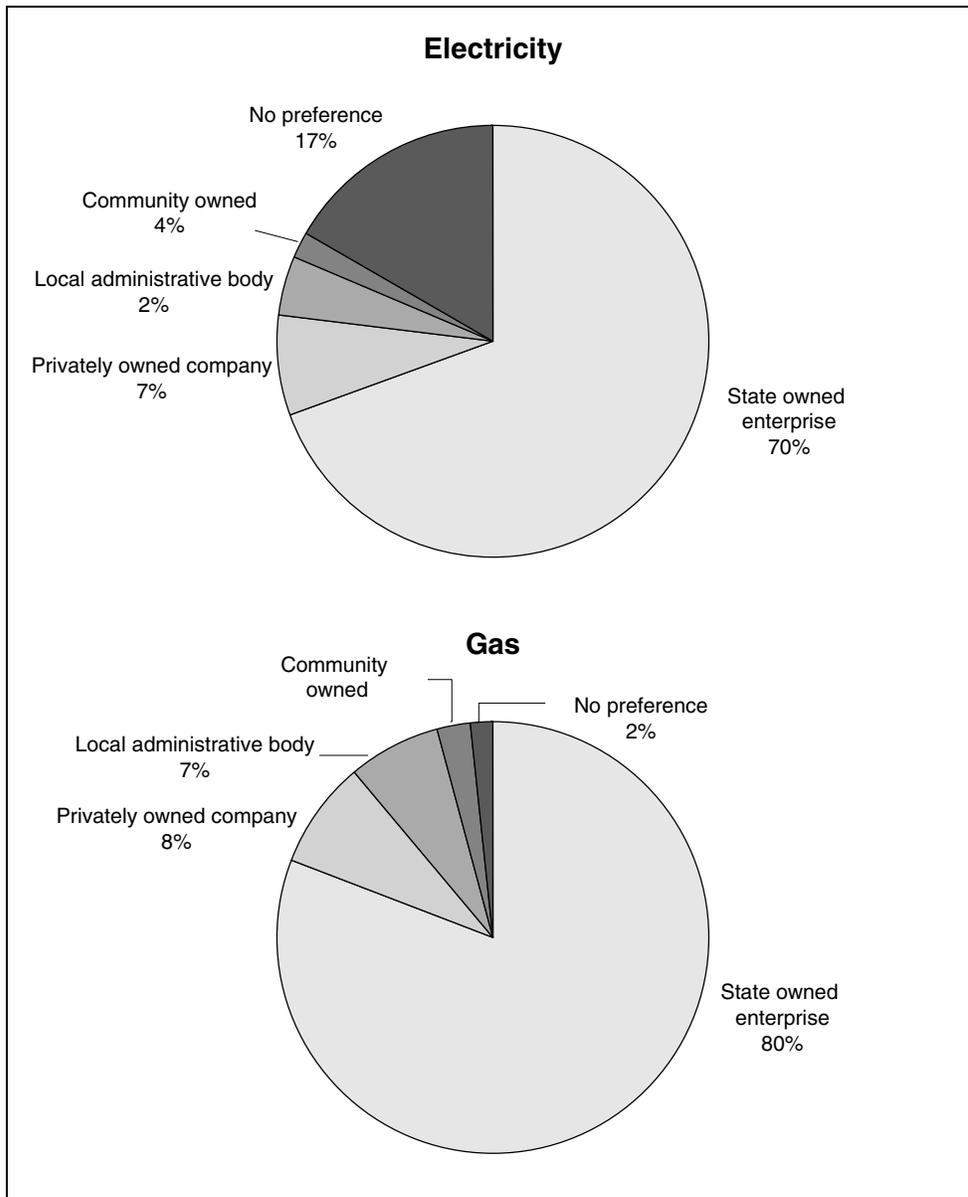
Up front fee	Monthly payment	Households with monthly expenditures between 0-100 GEL	Households with monthly expenditures between 100-200 GEL	Households with monthly expenditures between 100-200 GEL
0 GEL	15 GEL	65%	59%	49%
100 GEL	11 GEL	6%	7%	7%
200 GEL	4 GEL	25%	32%	44%
Don't know		4%	2%	0%
Total		100%	100%	199%

242. In practical terms, this means that two out of three households are credit constrained to a point where it would be more economically viable that the service provider makes the necessary loans and increases the monthly tariffs accordingly.

### **Respondent Preference for Ownership**

243. For both electricity and gas services, the majority of households prefer state ownership of the services – 70 percent for electricity and 80 percent for gas.

**Figure 11 : Preferred ownership of electricity and gas**



244. Eighty percent of households have the same preference for the ownership of service provider of electricity as for gas services.

## ANNEX F – THE SAMPLING STRATEGY

### 1. The Community Survey

245. In the second phase of the study, it was impossible to cover 100 percent of Sakrebulo and hence a sample of 100 Sakrebulo was designed. A two-stage stratified sampling was used. In the first stage, it was decided that all regions should be represented by equal number of observations (Sakrebulo). Abkhazia Region was not included in the study due to the political situation, and each of the remaining 10 regions was represented by 10 Sakrebulo ( $100/10=10$ ).

246. At the second stage of the sampling, 10 Sakrebulo were selected for each region in the study. The selection was based on grouping the Sakrebulo using the following three criteria:

- Distance to main road: (1) less than 10 km and (2) 10 km or more.
- Altitude above sea level: (1) less than 1,000 m, (2) 1,000-3,000 m and (3) above 3000 m.
- Community size measured by adult population: (1) less than 1,000 adults, (2) 1,000-3,000 adults, (3) above 3,000 adults.

247. These groupings give 18 strata ( $2*3*3=18$ ). In each region, for each non-empty stratum (stratum that contains at least one Sakrebulo), the ratio of Sakrebulo in the stratum to the total number of Sakrebulo in the region was calculated. Then 10 Sakrebulo were chosen in each region proportionally to non-empty strata ratio, randomly (using Statistical Package for Social Sciences - SPSS). The resulting sample had to be modified for political and climatic reasons: due to tense political situation in the Adjara region, the field work there had to be suspended. Additional 10 Sakrebulo were allocated to other Regions, taking into account total number of Sakrebulo per each region:

- Imereti – 3 Sakrebulo were added.
- Samegrelo – 3 Sakrebulo were added.
- Mtskheta-Mtianeti – 2 Sakrebulo were added.
- Kakheti – 1 Sakrebulo was added.
- Kvemo Kartli – 1 Sakrebulo was added.

248. Due to heavy snow, Kvemo Svaneti and Zemo Svaneti regions could not be accessed, and were removed from the study. *Therefore, due to changes in the sample, the study does not cover Adjara, Zemo Svaneti and Kvemo Svaneti Regions.*

## **2. The Willingness to Pay Study**

249. The sample strategy for the Willingness to Pay study was undertaken using the stratified two stage process employed by the State Department of Statistics of Georgia (SDSG) for the Household Survey. The approach firstly divides Georgia into a number of strata, and then a random sampling procedure is used to select the towns in which interviews are to be conducted. The second stage then also employs a random sample approach to select the households to conduct interviews.

250. This equivalence with the methodology used in the Household Survey carried out by the State Department for Statistics in Georgia was deliberate to facilitate data consolidation subsequently. A total of 100 towns were selected and 10 interviews were to be conducted in each town. However, due to extreme flooding and heavy snowfall, households in the regions Racha-Lochumi and Kvemo Svaneti were excluded from the sample, and a new sample drawn, and two villages in the Adjara region were excluded. The latter were replaced by similar but accessible villages. This replacement may be slightly biased towards households in more accessible areas.

### ***Stratification***

251. The formal process of sample selection involved the selection of a sample that was representative of the entire rural population of Georgia, so required that the population be divided into a number of strata. These strata were defined according to region, size of towns and low land/high land. For instance the share of the sample drawn from Adjara, in small towns in low land is:

$$\begin{aligned} \text{Share} &= \frac{\sqrt{\text{Households in Adjara}}}{\sum_{\text{All regions}} \sqrt{\text{Households in region}}} * \frac{\text{Low land, small towns households in Adjara}}{\text{Total households in Adjara}} \\ &= 0.086 * 0.10 = 1\% \end{aligned}$$

252. This share was used to determine the number of interviews that were to be conducted in the area and hence the number of towns where interviews were to be conducted. Hence ten households in one town were interviewed.

### ***Selection of towns***

253. In the first stage of the two stage selection procedure, the towns for interviews were selected. In each stratum, the towns in which to conduct interviews were selected by random selection proportional to size among all towns in the stratum. The sample chosen for interviews are given in Table 40.

**Table 40 : Strata, weight, population and number of interviews in the sample**

<b>Stratum</b>	<b>Weight</b>	<b>Population</b>	<b>Interviews</b>
Kakheti - Low land/Small village	492.70	9,854	20
Kakheti - Low land /Large village	698.33	90,783	130
Shida Kartli - Low land /Small village	568.03	17,041	30
Shida Kartli - Low land /Large village	528.84	42,307	80
Kvemo Kartli - Low land /Small village	657.45	13,149	20
Kvemo Kartli - Low land /Large village	598.16	59,816	100
Kvemo Kartli - High land	747.80	7,478	10
Samtskhe Javakheti - High land	425.23	38,271	90
Adjara - Low land /Small village	411.30	4,113	10
Adjara - Low land /Large village	428.36	21,418	50
Adjara - High land	529.60	21,184	40
Guria - Low land /Small village	413.93	12,418	30
Guria - Low land /Large village	349.44	17,472	50
Samegrelo - Low land /Small village	640.25	25,610	40
Samegrelo - Low land /Large village	645.89	51,671	80
Imereti - Low/Small village	836.50	25,095	30
Imereti - Low land /Large	748.23	67,341	90
Imereti - High land	886.25	17,725	20
Mtskheta Tianeti - Low land /Small village	477.40	4,774	10
Mtskheta Tianeti - Low land /Large village	315.20	12,608	40
Mtskheta Tianeti - High land	299.20	8,976	30
Georgia		569,104	1,000

Source: COWI (2005)

254. The villages where interviews were undertaken are given in Table 41. Ten interviews were conducted in each village.

**Table 41 : Villages where interviews were undertaken**

Stratum	Village
Kakheti - Low land/Small village	Magraani, Fichkhigori
Kakheti - Low land /Large village	Kvemo Alvani, Uzuntala, Vazisubani, Kardanaxhi, Chumlaki, Zemo kedi, Kisiskhevi, Karajala, Tokhliauri, Patardzeuli, Vakiri, Akhalsofeli, Shilda
Shida Kartli - Low land /Small village	Arashenda, Noste,Zguderi
Shida Kartli - Low land /Large village	Akhalubani, Zagduleti, Patara Mejvriskhevi, Shindisi, Tamarasheni, Metekhi, Dzvelidjvari, Ftsa
Kvemo Kartli - Low land /Small village	Tandzia, Ivanovka
Kvemo Kartli - Low land /Large village	Mukhrana, Varketili, Gamarjveba, Martkofi, Sartichala, Safarlo, Sabirkendi,Sadakhlo, Kachagani,Kvemo Sarali
Kvemo Kartli - High land	Chomlani
Samtskhe Javakheti - High land	Ijareti, Gokio, Vachiani, Dadeshi, Tsinubani, Naokhrebi,Tsemi, Gorelovka,Damala
Adjara - Low land /Small village	Sarfi
Adjara - Low land /Large village	Shua makhinjauri, Charnali, Tsinsvla, Sakhalvasho, Kveda Kvirike
Adjara - High land	Tsihisdziri, Dgvani*, Dioknisi*, Riketi
Guria – Low land /Small village	Junetseri, Bialeti, Sakvavistke
Guria – Low land /Large village	Khidmagala, Dvadzbu, Meria, Khrialeti, Shuaganaxleba
Samegrelo - Low land /Small village	Gagma kodori, Lefochkhue, kvemo Magri, Uluria
Samegrelo - Low land /Large village	Marani, Jumi, Kakhati, Rike, Tsakvinji, Gejeti, Legakhare, Akhalsofeli
Imereti - Low/Small village	Safrasia, Dafrani, Khoriti
Imereti - Low land /Large	Kveda Gora,Ofshkviti, Dimi, Zovreti, Tklapivake, Kveda Simoneti, Makhatauri, Speti, Kutiri
Imereti - High land	Sochkheti, Khreiti
Mtskheta Tianeti - Low land /Small village	Zurgovana
Mtskheta Tianeti - Low land /Large village	Digomi, Mukhrani, Dzegvi, Mchadidjvari
Mtskheta Tianeti - High land	Tsikhedvavi, Akhmaji, Tolenji

Note: \* Compared to the original randomly selected sample, Kveti was replaced by Dgvani and Shuasopeli was replaced by Dioknisi due to inaccessibility of Kveti and Shuasopeli.

### ***Selections of households***

255. The procedure for selection of households in the villages employed a Random Walking Procedure. This involved the selection of three starting points in each rural settlement. N1 starting point was the administrative centre of the settlement. N2 and N3 starting points were selected at the outskirts in different directions, so that they were maximally separated from each other. At each starting point, an approximately equal number of interviews were conducted. If the size of a rural settlement was more than 100 households, the step size was five, that is, every 6th household was selected for the interview. If a rural settlement had less than 100 households, the step size was calculated in the following way: number of households / 10 (number of interviews to be conducted in one village) = the step size. The first household to be interviewed was the closest one to the starting point.

256. If the starting point was at the border of a rural settlement, then the interviewer moved towards the geographical centre of the settlement and by applying the pre-determined step size identified the second household in the same street where the first household had been interviewed. If starting point was in the geographical centre of a rural settlement, then all possible directions in which the interviewer could move after interviewing the first household were written down on pieces of paper. The randomly selected piece of paper showed the direction after interviewing, for the second household to be selected by the pre-determined step size. If an apartment building was encountered, then the households residing in the apartment building were to be interviewed using the same step size. The interviewer moved in the selected direction until one of the following:

- 1) The road forks.
- 2) A crossroad.
- 3) A blind alley.
- 4) End of the village.
- 5) An unsettled area.

257. If the road forked or there was a crossroad on the way, the next direction was selected randomly. Specifically, all the possible directions were written down on pieces of paper and a randomly selected piece of paper showed the next direction. If there was a blind alley, the end of the village or an unsettled area, where there were no dwelling units up to the end of rural settlement, then the interviewer turned around and started moving in an opposite direction on the other side of the street. The processes described above came to an end when the appropriate number of respondents was interviewed for the given starting point.

**ANNEX G – PREFERENCES FOR INFRASTRUCTURE  
IMPROVEMENT BY COMMUNITY (100 SAKREBULOS)**

Region	Council	Infrastructure	Total votes	Women	Men
Guria	Ozurgeti	Drinking Water	0	0	0
		Irrigation	0	0	0
		Telephone Communications	2	1	1
		Natural Gas	65	52	13
		Roads/Transport	18	6	12
		Electric Power	97	74	23
	Bokhvauri	Drinking Water	1	0	1
		Irrigation	1	0	1
		Telephone Communications	0	0	0
		Natural Gas	95	50	45
		Roads/Transport	7	4	3
		Electric Power	106	58	48
	Dvabzu	Drinking Water	2	0	2
		Irrigation	1	0	1
		Telephone Communications	15	5	10
		Natural Gas	58	26	32
		Roads/Transport	26	5	21
		Electric Power	101	34	67
	Nagomari	Drinking Water	16	13	3
		Irrigation	2	0	2
		Telephone Communications	14	12	2
		Natural Gas	36	22	14
		Roads/Transport	41	14	27
		Electric Power	66	30	36
	Tkhinvali	Drinking Water	0	0	0
		Irrigation	0	0	0
		Telephone Communications	11	7	4
		Natural Gas	37	20	17
		Roads/Transport	61	25	36
		Electric Power	45	25	20
Meria	Drinking Water	36	19	17	
	Irrigation	0	0	0	
	Telephone Communications	0	0	0	
	Natural Gas	63	36	27	
	Roads/Transport	10	2	8	
	Electric Power	101	29	72	

Region	Council	Infrastructure	Total votes	Women	Men
Guria	Askana	Drinking Water	66	38	28
		Irrigation	2	0	2
		Telephone Communications	3	3	0
		Natural Gas	19	18	1
		Roads/Transport	35	23	12
		Electric Power	57	35	22
	Zomleto	Drinking Water	0	0	0
		Irrigation	1	0	1
		Telephone Communications	4	1	3
		Natural Gas	5	3	2
		Roads/Transport	92	47	45
		Electric Power	73	37	36
	Gogolesubani	Drinking Water	1	1	0
		Irrigation	1	0	1
		Telephone Communications	1	1	0
		Natural Gas	140	41	99
		Roads/Transport	9	6	3
		Electric Power	75	42	33
	Ninoshvili	Drinking Water	111	50	61
		Irrigation	0	0	0
		Telephone Communications	0	0	0
		Natural Gas	0	0	0
		Roads/Transport	29	5	24
		Electric Power	98	29	69

Region	Council	Infrastructure	Total votes	Women	Men
Imereti	Gormagali	Drinking Water	10	6	4
		Irrigation	0	0	0
		Telephone Communications	28	16	12
		Natural Gas	32	22	10
		Roads/Transport	55	17	38
		Electric Power	64	30	34
	Etseri	Drinking Water	1	1	0
		Irrigation	14	3	11
		Telephone Communications	15	8	7
		Natural Gas	181	99	82
		Roads/Transport	35	15	20
		Electric Power	69	35	34
	Geguti	Drinking Water	6	6	0
		Irrigation	1	1	0
		Telephone Communications	18	16	2
		Natural Gas	53	38	15
		Roads/Transport	19	18	1
		Electric Power	43	33	10
	Patriketi	Drinking Water	3	0	3
		Irrigation	0	0	0
		Telephone Communications	23	17	6
		Natural Gas	36	31	5
		Roads/Transport	36	25	11
		Electric Power	35	18	17
	Gvankiti	Drinking Water	37	19	18
		Irrigation	0	0	0
		Telephone Communications	8	8	0
		Natural Gas	115	41	74
		Roads/Transport	36	8	28
		Electric Power	35	29	6
Tobanieri	Drinking Water	3	0	3	
	Irrigation	0	0	0	
	Telephone Communications	23	17	6	
	Natural Gas	36	31	5	
	Roads/Transport	36	25	11	
	Electric Power	35	18	17	

Region	Council	Infrastructure	Total votes	Women	Men
Imereti	Tsikhesulori	Drinking Water	5	5	0
		Irrigation	0	0	0
		Telephone Communications	0	0	0
		Natural Gas	40	29	11
		Roads/Transport	71	35	36
		Electric Power	38	22	16
	Kvacixe	Drinking Water	31	5	26
		Irrigation	2	2	0
		Telephone Communications	52	20	32
		Natural Gas	61	20	41
		Roads/Transport	38	12	26
		Electric Power	47	18	29
	Sairxe	Drinking Water	9	9	0
		Irrigation	12	9	3
		Telephone Communications	76	32	44
		Natural Gas	81	25	56
		Roads/Transport	17	13	4
		Electric Power	50	17	33
	Nakhakhulevi	Drinking Water	0	0	0
		Irrigation	11	7	4
		Telephone Communications	10	10	0
		Natural Gas	82	58	24
		Roads/Transport	43	35	8
		Electric Power	78	72	6
	Shrosha	Drinking Water	6	6	0
		Irrigation	3	2	1
		Telephone Communications	51	42	9
		Natural Gas	36	28	8
		Roads/Transport	5	0	5
		Electric Power	39	13	26
Meore Obcha	Drinking Water	0	0	0	
	Irrigation	0	0	0	
	Telephone Communications	18	14	4	
	Natural Gas	44	28	16	
	Roads/Transport	39	25	14	
	Electric Power	25	17	8	

Region	Council	Infrastructure	Total votes	Women	Men
Imereti	Dimi	Drinking Water	4	2	2
		Irrigation	24	21	3
		Telephone Communications	12	10	2
		Natural Gas	59	53	6
		Roads/Transport	26	24	2
		Electric Power	22	16	6

Region	Council	Infrastructure	Total votes	Women	Men
Kakheti	Patardzeuli	Drinking Water	25	16	9
		Irrigation	25	2	23
		Telephone Communications	33	24	9
		Natural Gas	18	13	5
		Roads/Transport	22	17	5
		Electric Power	31	26	5
	Cailuri	Drinking Water	91	85	6
		Irrigation	24	19	5
		Telephone Communications	27	25	2
		Natural Gas	45	40	5
		Roads/Transport	32	28	4
		Electric Power	47	41	6
	Toxliauri	Drinking Water	4	1	3
		Irrigation	3	1	2
		Telephone Communications	17	8	9
		Natural Gas	52	22	30
		Roads/Transport	9	3	6
		Electric Power	69	21	48
	Jimiti	Drinking Water	12	2	10
		Irrigation	1	0	1
		Telephone Communications	12	2	10
		Natural Gas	74	17	57
		Roads/Transport	41	5	36
		Electric Power	70	30	40
Veliscixe	Drinking Water	158	90	68	
	Irrigation	8	7	1	
	Telephone Communications	3	3	0	
	Natural Gas	5	5	0	
	Roads/Transport	9	9	0	
	Electric Power	41	40	1	

Region	Council	Infrastructure	Total votes	Women	Men
Kakheti	Balghogiani	Drinking Water	85	44	41
		Irrigation	6	6	0
		Telephone Communications	31	26	5
		Natural Gas	45	29	16
		Roads/Transport	65	38	27
		Electric Power	118	60	58

	Axalsofeli	Drinking Water	49	15	34
		Irrigation	30	5	25
		Telephone Communications	0	0	0
		Natural Gas	0	0	0
		Roads/Transport	2	2	0
		Electric Power	31	13	18
	Zemo Xalatsani	Drinking Water	64	2	62
		Irrigation	0	0	0
		Telephone Communications	9	1	8
		Natural Gas	9	1	8
		Roads/Transport	14	1	13
		Electric Power	23	2	21
	Gamargveba	Drinking Water	82	33	49
		Irrigation	2	2	0
		Telephone Communications	24	17	7
		Natural Gas	47	17	30
		Roads/Transport	5	4	1
		Electric Power	57	25	32
	Bodbe	Drinking Water	33	14	19
		Irrigation	0	0	0
		Telephone Communications	5	5	0
		Natural Gas	66	25	41
		Roads/Transport	32	13	19
		Electric Power	46	20	26
	Bodbisxevi	Drinking Water	25	12	13
		Irrigation	7	2	5
		Telephone Communications	25	22	3
Natural Gas		55	41	14	
Roads/Transport		28	19	9	
Electric Power		77	51	26	

Region	Council	Infrastructure	Total votes	Women	Men
Mtskheta-tianeti	Mukhrani	Drinking Water	13	9	4
		Irrigation	77	35	42
		Telephone Communications	5	5	0
		Natural Gas	58	23	35
		Roads/Transport	7	7	0
		Electric Power	43	19	24
	Misaktsieli	Drinking Water	15	10	5
		Irrigation	5	0	5
		Telephone Communications	30	21	9
		Natural Gas	62	44	18
		Roads/Transport	3	0	3
		Electric Power	60	44	16
	Tskhvarichamia	Drinking Water	6	0	6
		Irrigation	0	0	0
		Telephone Communications	8	6	2
		Natural Gas	4	4	0
		Roads/Transport	24	5	19
		Electric Power	70	34	36
	Saguramo	Drinking Water	19	4	15
		Irrigation	21	6	15
		Telephone Communications	17	5	12
		Natural Gas	29	5	24
		Roads/Transport	11	1	10
		Electric Power	15	7	8
	Dzegvi	Drinking Water	57	29	28
		Irrigation	5	0	5
		Telephone Communications	5	2	3
		Natural Gas	110	52	58
		Roads/Transport	19	8	11
		Electric Power	0	0	0
Lisi	Drinking Water	0	0	0	
	Irrigation	0	0	0	
	Telephone Communications	46	23	23	
	Natural Gas	43	19	24	
	Roads/Transport	79	30	49	
	Electric Power	21	5	16	

Region	Council	Infrastructure	Total votes	Women	Men
Mtskheta-tianeti	Nichbisi	Drinking Water	28	8	20
		Irrigation	56	16	40
		Telephone Communications	7	1	6
		Natural Gas	23	10	23
		Roads/Transport	27	10	27
		Electric Power	34	11	34
	Boli	Drinking Water	0	0	0
		Irrigation	9	7	2
		Telephone Communications	0	0	0
		Natural Gas	97	39	58
		Roads/Transport	48	10	38
		Electric Power	0	0	0
	Akhalsopeli	Drinking Water	49	25	24
		Irrigation	3	2	1
		Telephone Communications	28	23	5
		Natural Gas	23	5	18
		Roads/Transport	5	2	3
		Electric Power	32	13	19
	Simoniatkhevi	Drinking Water	64	34	30
		Irrigation	0	0	0
		Telephone Communications	19	10	9
		Natural Gas	21	11	10
		Roads/Transport	33	22	11
		Electric Power	31	14	17
	Kvesheti	Drinking Water	7	7	0
		Irrigation	0	0	0
		Telephone Communications	137	42	95
		Natural Gas	0	0	0
		Roads/Transport	24	0	24
		Electric Power	0	0	0
Bazaleti	Drinking Water	16	10	6	
	Irrigation	8	3	5	
	Telephone Communications	12	8	4	
	Natural Gas	74	40	34	
	Roads/Transport	16	10	6	
	Electric Power	63	34	29	

Region	Council	Infrastructure	Total votes	Women	Men
Kvemo Kartli	Nakhiduri	Drinking Water	33	-	33
		Irrigation	54	-	54
		Telephone Communications	6	-	6
		Natural Gas	20	-	20
		Roads/Transport	13	-	13
		Electric Power	21	-	21
	Ratevani	Drinking Water	26	18	8
		Irrigation	62	35	27
		Telephone Communications	10	8	2
		Natural Gas	34	18	16
		Roads/Transport	43	26	17
		Electric Power	21	14	7
	Darbazi	Drinking Water	29	1	28
		Irrigation	10	1	9
		Telephone Communications	21	1	20
		Natural Gas	1	0	1
		Roads/Transport	34	2	32
		Electric Power	101	2	99
	Sakire	Drinking Water	17	11	6
		Irrigation	13	10	3
		Telephone Communications	12	6	6
		Natural Gas	12	8	4
		Roads/Transport	86	27	59
		Electric Power	56	29	27
	Gantiadi	Drinking Water	0	0	0
		Irrigation	31	7	24
		Telephone Communications	4	4	0
		Natural Gas	116	28	88
		Roads/Transport	19	11	8
		Electric Power	12	6	6
Guguti	Drinking Water	32	16	16	
	Irrigation	11	4	7	
	Telephone Communications	10	4	6	
	Natural Gas	24	15	9	
	Roads/Transport	63	12	51	
	Electric Power	28	12	16	

Region	Council	Infrastructure	Total votes	Women	Men
Kvemo Kartli	Durnuki	Drinking Water	47	30	17
		Irrigation	17	9	8
		Telephone Communications	0	0	0
		Natural Gas	11	5	6
		Roads/Transport	40	32	8
		Electric Power	25	15	10
	Asureti	Drinking Water	32	16	16
		Irrigation	19	10	9
		Telephone Communications	21	11	10
		Natural Gas	31	16	15
		Roads/Transport	23	11	12
		Electric Power	28	13	15
	Chivchavi	Drinking Water	39	35	4
		Irrigation	0	0	0
		Telephone Communications	0	0	0
		Natural Gas	44	38	6
		Roads/Transport	0	0	0
		Electric Power	36	32	4
	Nazarlo	Drinking Water	0	0	0
		Irrigation	0	0	0
		Telephone Communications	0	0	0
		Natural Gas	109	36	73
		Roads/Transport	71	20	51
		Electric Power	16	7	9
Tserakvi	Drinking Water	18	9	9	
	Irrigation	21	10	11	
	Telephone Communications	19	10	9	
	Natural Gas	18	9	9	
	Roads/Transport	23	12	11	
	Electric Power	27	13	14	

Region	Council	Infrastructure	Total votes	Women	Men
Racha	Khotevi	Drinking Water	11	6	5
		Irrigation	0	0	0
		Telephone Communications	37	29	8
		Natural Gas	8	1	7
		Roads/Transport	25	12	13
		Electric Power	31	29	2
	Skhvava	Drinking Water	28	12	16
		Irrigation	0	0	0
		Telephone Communications	0	0	0
		Natural Gas	0	0	0
		Roads/Transport	91	23	68
		Electric Power	0	0	0
	Gadishi	Drinking Water	13	5	8
		Irrigation	0	0	0
		Telephone Communications	1	1	0
		Natural Gas	0	0	0
		Roads/Transport	133	34	99
		Electric Power	42	9	33
	Likheti	Drinking Water	16	9	7
		Irrigation	0	0	0
		Telephone Communications	29	15	14
		Natural Gas	1	1	0
		Roads/Transport	71	33	38
		Electric Power	65	54	11
	Znakvi	Drinking Water	21	13	8
		Irrigation	0	0	0
		Telephone Communications	86	71	15
		Natural Gas	0	0	0
		Roads/Transport	5	5	0
		Electric Power	14	9	5
Tsesi	Drinking Water	24	6	18	
	Irrigation	1	0	1	
	Telephone Communications	32	24	8	
	Natural Gas	2	0	2	
	Roads/Transport	2	2	0	
	Electric Power	37	17	20	

Region	Council	Infrastructure	Total votes	Women	Men
Racha	Sheubani	Drinking Water	78	38	40
		Irrigation	0	0	0
		Telephone Communications	2	1	1
		Natural Gas	8	5	3
		Roads/Transport	40	4	36
		Electric Power	26	8	18
	Gari	Drinking Water	64	44	20
		Irrigation	1	1	0
		Telephone Communications	42	22	20
		Natural Gas	13	10	3
		Roads/Transport	16	10	6
		Electric Power	95	53	42
	Bari	Drinking Water	35		35
		Irrigation	2		2
		Telephone Communications	14		14
		Natural Gas	7		7
		Roads/Transport	19		19
		Electric Power	35		35
	Kvashkhieti	Drinking Water	30	11	19
		Irrigation	6	1	5
		Telephone Communications	10	7	3
		Natural Gas	5	3	2
		Roads/Transport	60	24	36
		Electric Power	29	17	12

Region	Council	Infrastructure	Total votes	Women	Men
Samckhe-Javakheti	Agara	Drinking Water	35	18	17
		Irrigation	57	29	28
		Telephone Communications	2	2	0
		Natural Gas	2	0	2
		Roads/Transport	30	8	22
		Electric Power	49	13	36
	Sadseli	Drinking Water	0	0	0
		Irrigation	100	29	71
		Telephone Communications	0	0	0
		Natural Gas	0	0	0
		Roads/Transport	31	5	26
		Electric Power	30	8	22
	Lelovani	Drinking Water	9	3	6
		Irrigation	1	0	1
		Telephone Communications	65	45	20
		Natural Gas	40	8	32
		Roads/Transport	30	7	23
		Electric Power	37	21	16
	Fzero	Drinking Water	25	6	19
		Irrigation	54	13	41
		Telephone Communications	10	4	6
		Natural Gas	39	6	33
		Roads/Transport	23	13	10
		Electric Power	24	14	10
	Checla	Drinking Water	5	5	0
		Irrigation	25	13	12
		Telephone Communications	5	5	0
		Natural Gas	33	10	23
		Roads/Transport	121	30	91
		Electric Power	0	0	0
Naqalaqevi	Drinking Water	48	6	42	
	Irrigation	45	14	31	
	Telephone Communications	5	5	0	
	Natural Gas	24	12	12	
	Roads/Transport	48	16	32	
	Electric Power	56	14	42	

Region	Council	Infrastructure	Total votes	Women	Men
Samckhe-Javakheti	Turxvi	Drinking Water	27	19	8
		Irrigation	62	34	28
		Telephone Communications	8	4	4
		Natural Gas	25	25	0
		Roads/Transport	47	24	23
		Electric Power	62	34	28
	Eshtia	Drinking Water	23	17	6
		Irrigation	26	9	17
		Telephone Communications	15	10	5
		Natural Gas	58	25	33
		Roads/Transport	23	10	13
		Electric Power	16	13	3
	Didi xanchali	Drinking Water	23	32	31
		Irrigation	2	2	0
		Telephone Communications	47	22	25
		Natural Gas	49	26	23
		Roads/Transport	38	16	22
		Electric Power	4	0	4
	Jigrasheni	Drinking Water	31	25	6
		Irrigation	19	8	11
		Telephone Communications	19	14	5
		Natural Gas	68	35	33
		Roads/Transport	23	10	13
		Electric Power	15	13	12

Region	Council	Infrastructure	Total votes	Women	Men
Shida Kartli	Kvemo Gomi	Drinking Water	16	4	12
		Irrigation	44	14	30
		Telephone Communications	3	0	3
		Natural Gas	15	4	11
		Roads/Transport	16	3	12
		Electric Power	12	10	2
	Tsinarekhi	Drinking Water	79	46	33
		Irrigation	48	23	25
		Telephone Communications	16	16	0
		Natural Gas	33	20	13
		Roads/Transport	23	12	11
		Electric Power	25	16	9
	Teliani	Drinking Water	66	31	35
		Irrigation	75	26	49
		Telephone Communications	4	4	0
		Natural Gas	17	6	11
		Roads/Transport	28	21	7
		Electric Power	20	17	3
	Akhalkalaki	Drinking Water	27	15	12
		Irrigation	6	0	6
		Telephone Communications	18	6	12
		Natural Gas	19	10	9
		Roads/Transport	29	17	12
		Electric Power	27	8	19
	Shindisi	Drinking Water	10	4	6
		Irrigation	0	0	0
		Telephone Communications	0	0	0
		Natural Gas	95	7	88
		Roads/Transport	21	3	18
		Electric Power	0	0	0
Shavshvebi	Drinking Water	9	3	6	
	Irrigation	56	43	13	
	Telephone Communications	6	3	3	
	Natural Gas	20	8	12	
	Roads/Transport	15	6	9	
	Electric Power	56	43	13	

Region	Council	Infrastructure	Total votes	Women	Men
Shida Kartli	Qurta	Drinking Water	66	30	36
		Irrigation	45	20	25
		Telephone Communications	17	1	16
		Natural Gas	26	7	19
		Roads/Transport	18	3	15
		Electric Power	17	2	15
	Zguderi	Drinking Water	0	0	0
		Irrigation	5	5	0
		Telephone Communications	22	5	17
		Natural Gas	30	8	22
		Roads/Transport	41	9	32
		Electric Power	42	8	34
	Mokhisi	Drinking Water	0	0	0
		Irrigation	3	3	0
		Telephone Communications	2	1	1
		Natural Gas	86	45	41
		Roads/Transport	27	24	3
		Electric Power	106	60	46
	Gomi	Drinking Water	8	8	0
		Irrigation	55	20	35
		Telephone Communications	7	5	2
Natural Gas		66	52	14	
Roads/Transport		6	6	0	
Electric Power		117	105	12	

Region	Council	Infrastructure	Total votes	Women	Men
Samegrelo	Zeda Nagvazao	Drinking Water	0	0	0
		Irrigation	0	0	0
		Telephone Communications	19	6	13
		Natural Gas	43	19	24
		Roads/Transport	83	34	49
		Electric Power	79	25	54
	Gurdzeni	Drinking Water	0	0	0
		Irrigation	0	0	0
		Telephone Communications	39	23	16
		Natural Gas	0	0	0
		Roads/Transport	77	40	37
		Electric Power	73	35	38
Region	Council	Infrastructure	Total votes	Women	Men
Samegrelo	Lia	Drinking Water	23	3	20
		Irrigation	4	0	4
		Telephone Communications	12	0	12
		Natural Gas	60	14	46
		Roads/Transport	29	4	25
		Electric Power	61	7	54

	Nakifu	Drinking Water	84	10	74
		Irrigation	0	0	0
		Telephone Communications	8	3	5
		Natural Gas	26	6	20
		Roads/Transport	85	9	76
		Electric Power	70	7	63
	Sachino	Drinking Water	1	0	1
		Irrigation	0	0	0
		Telephone Communications	0	0	0
		Natural Gas	136	53	83
		Roads/Transport	66	16	50
		Electric Power	0	0	0
	Naesakoo	Drinking Water	0	0	0
		Irrigation	1	0	1
		Telephone Communications	25	6	19
		Natural Gas	60	30	30
		Roads/Transport	29	7	22
		Electric Power	95	20	75
	Tskemi	Drinking Water	0	0	0
		Irrigation	0	0	0
		Telephone Communications	1	1	0
		Natural Gas	54	45	9
		Roads/Transport	35	10	25
		Electric Power	120	70	50
	Potkho	Drinking Water	0	0	0
		Irrigation	0	0	0
		Telephone Communications	17	8	9
Natural Gas		37	23	14	
Roads/Transport		64	16	48	
Electric Power		92	30	62	

Region	Council	Infrastructure	Total votes	Women	Men
Samegrelo	Oktoberi	Drinking Water	1	0	1
		Irrigation	0	0	0
		Telephone Communications	5	0	5
		Natural Gas	106	58	48
		Roads/Transport	38	7	31
		Electric Power	53	12	41
	Shamgona	Drinking Water	0	0	0
		Irrigation	0	0	0
		Telephone Communications	6	4	2
		Natural Gas	13	8	5
		Roads/Transport	108	93	15
		Electric Power	83	70	13
	Kakhati	Drinking Water	0	0	0
		Irrigation	0	0	0
		Telephone Communications	15	6	9
		Natural Gas	29	14	15
		Roads/Transport	67	25	42
		Electric Power	85	32	53
	Abastumani	Drinking Water	8	1	7
		Irrigation	0	0	0
		Telephone Communications	2	1	1
		Natural Gas	6	3	3
		Roads/Transport	143	118	25
		Electric Power	52	12	40
Koki	Drinking Water	1	1	0	
	Irrigation	0	0	0	
	Telephone Communications	2	2	0	
	Natural Gas	23	17	6	
	Roads/Transport	130	56	74	
	Electric Power	90	30	60	

## ANNEX H – RURAL ROAD CONDITION BY RAYON AND COMMUNITY

Region	District	Very Poor Condition	Poor Condition	Fair Condition	Good Condition	No Survey conducted	Grand Total
Adjara	Keda		18.2		12.3	44.1	74.7
	Khelvachauri	28.2	6.0	2.7	0.4	44.2	81.5
	Khulo	70.1	10.5	9.5		20.1	110.2
	Kobuleti	73.0			14.7	31.5	119.2
	Shuakhevi	38.5	6.0			137.3	181.8
<b>Adjara Total</b>		<b>209.9</b>	<b>40.7</b>	<b>12.1</b>	<b>27.4</b>	<b>277.2</b>	<b>567.4</b>
Guria	Chokhatauri	57.3			38.9	89.4	185.5
	Lanchkhuti	46.1	49.8	16.5	2.3	6.4	121.1
	Ozurgeti	151.4	5.4	15.8	24.4	10.1	207.1
<b>Guria Total</b>		<b>254.7</b>	<b>55.2</b>	<b>32.2</b>	<b>65.6</b>	<b>106.0</b>	<b>513.7</b>
Imereti	Bagdati	6.5			16.4	65.8	88.7
	Chiatura	59.6	113.7		18.3	32.8	224.4
	Kharagauli	20.6	25.5	5.7	21.5	155.8	229.1
	Khoni	19.6	7.6		65.1	5.2	97.5
	Sachkhere	80.7	8.6		62.5	20.0	171.8
	Samtredia	70.0	0.3		62.1	10.7	143.1
	Terjola	114.7	21.2		40.1	22.3	198.3
	Tkibuli	50.5				72.6	123.0
	Tskaltubo	113.3	1.4		15.6	37.8	168.0
	Vani	45.9	3.2		19.4	31.8	100.3
	Zestafoni	64.7	22.3		10.7	107.4	205.1
<b>Imereti Total</b>		<b>646.1</b>	<b>203.7</b>	<b>5.7</b>	<b>331.7</b>	<b>562.1</b>	<b>1749.4</b>
Javakheti	Adigeni	69.4				60.0	129.4
	Akhalkalaki	160.5	43.7	16.0	10.4	28.6	259.3
	Akhaltzikhe	84.5				40.1	124.6
	Aspindza	46.1		8.4		24.3	78.8
	Borjomi	76.3				54.8	131.1
	Ninotsminda	55.8	29.3			21.0	106.1
<b>Javakheti Total</b>		<b>492.7</b>	<b>73.0</b>	<b>24.5</b>	<b>10.4</b>	<b>228.8</b>	<b>829.3</b>
Kakheti	Akhmeta	83.4	0.6	6.5		58.3	148.8
	Dedoplistskaa	62.8	7.5			27.6	97.9
	Gurjaani	30.3	6.5			38.2	75.0
	Kvareli	26.9		24.8		32.8	84.6
	Lagodekhi	43.0	13.0	13.6	14.0	36.7	120.3
	Sagarejo	45.6	2.2		64.1	62.1	174.0
	Signagi	65.6		3.3		15.0	83.9
	Telavi	29.1	1.4			10.4	40.9

Kakheti Total		386.6	31.3	48.2	78.1	281.0	825.3
Region	District	Very Poor Condition	Poor Condition	Fair Condition	Good Condition	No Survey conducted	Grand Total
Kvemo Kartli	Bolnisi	20.6	27.0	4.7	10.9	66.6	129.9
	Dmanisi	15.9	56.6	23.4	6.5	40.1	142.4
	Gardabani	17.3	1.1	14.4	46.1	76.2	155.2
	Marneuli	68.7	8.8	28.0	21.0	85.2	211.6
	Tetritskaro	62.7	30.2	11.2	2.6	68.3	175.1
	Tsalka	81.0	13.2			48.2	142.4
Kvemo Kartli Total		266.2	136.9	81.7	87.1	384.6	956.6
Mtsketa-Mtianeti	Akhlagori	46.5	2.1		6.8	248.7	304.1
	Dusheti	192.0	47.1		11.5	359.6	610.2
	Kazbegi	16.4			8.2	42.2	66.9
	Mtskheta	68.0	28.7			138.6	235.4
	Tianeti	48.4	29.2	5.8	2.8	103.0	189.2
Mtsketa-Mtianeti Total		371.3	107.1	5.8	29.3	892.2	1405.7
Racha	Ambrolauri	94.3	12.0	27.3		37.2	170.8
	Lentekhi					80.1	80.1
	Oni	81.2	7.0	0.3	5.8	61.8	156.1
	Tsageri	38.3	11.6			47.6	97.4
Racha Total		213.8	30.5	27.6	5.8	226.7	504.4
Samegrelo	Abasha	78.9	0.0			4.1	83.0
	Chkhorotsku	7.0	69.8	7.5	19.2	23.7	127.2
	Chokharauri					10.2	10.2
	Khobi	14.4	89.1			76.7	180.2
	Martvili	139.3	6.3		1.3	118.2	265.1
	Mestia					246.2	246.2
	Senaki	57.0	49.2			86.2	192.3
	Tsalenjikha		22.5	39.3	27.6	7.7	97.0
	Zugdidi		16.6	70.2		94.2	181.1
Samegrelo Total		296.6	253.5	116.9	48.2	667.2	1382.4
Shida Kartli	Gori	210.2				217.9	428.1
	Java					46.3	46.3
	Kareli	36.6	101.7			113.2	251.5
	Kaspi	66.5	14.2			83.7	164.3
	Khashuri	59.0	42.7			87.7	189.5
	Khelvacauri	0.2	1.7	1.1	1.0	1.9	5.9
	Kornisi					128.1	128.1
	Tskhinvali	11.3				189.6	200.9
Shida Kartli Total		383.7	160.3	1.1	1.0	868.5	1414.7
		<b>3,521.7</b>	<b>1,092.3</b>	<b>355.9</b>	<b>684.5</b>	<b>4,494.3</b>	<b>10,148.8</b>

## **ANNEX I – THE DELPHI APPROACH**

### **The Economic Growth Potential for Each Region Based on Delphi Method**

258. The economic development of the communities is largely dependent on the availability of adequate economic infrastructure services. This impact, though, is not identical for all of the rural communities and is correlated with such factors as the geographical location, climate, size and productivity of arable land, etc., which together determine the economic growth potential of communities. In order to account for the effectiveness of the rural infrastructure interventions the economic growth potential of the communities was selected as one of the criteria in the Decision Matrix.

259. The economic potential of the rural communities has been assessed based on the Delphi method, i.e. a structured process of collecting, and distilling knowledge from a group of experts by means of a series of questionnaires interspersed with controlled opinion feedback. Two different panels of experts were selected to estimate the growth potential of agriculture, and tourism and off-farm employment for the rayons. Each panel consisted of six experts with expertise in the relevant area. The experts included representatives from the government agencies, NGOs, associations and donor organizations.

260. The Delphi exercise consisted of the following steps:

1. A questionnaire was transmitted to each panelist asking him to rank the potential for growth at rayon level on a scale of 1-7. It also requested the panelists to provide a brief rationale for ranking, identify impediments to growth for each of the above specified areas and also list the infrastructure service the improvement of which would have the largest impact on the growth.
2. The second round questionnaire was developed reflecting average rankings collated, justifications of the experts and transmitted to the experts requesting them to reconsider their assessment in the light of the provided information.
3. The second round rankings and justifications were analyzed and reflected in the third round questionnaire.
4. The third round responses were analyzed and since the ranking and expert justifications were largely in agreement the exercise was concluded at this stage.

## ANNEX J – THE ESTIMATION OF THE WILLINGNESS TO PAY

261. The estimation of the willingness to pay estimates from Game 1, 2 and 2X were estimated in one model. In this model the current levels of services were taken into account because it was expected that households with a low level of services at present were willing to pay more for a certain change in the service level than households whose services were already at a relatively high level.

262. Game 3 was estimated separately and the results served as an overall guideline to the maximum willingness to pay for infrastructure service improvements.

263. From the answers to the stated preference choice pairs a utility function was estimated. The preferences regarding infrastructure services were analyzed by estimating a utility function. The utility function evaluates the alternatives by cost and service characteristics.

264. The theoretical approach to the estimation of willingness to pay higher tariffs is that of microeconomic consumer theory. In consumer theory, individual consumers choose consumption bundles to maximize utility. In stated preference games, the respondent is asked to choose an alternative between two alternatives, A and B, so this is a discrete choice. Letting  $U$  represent the utility function respondent  $i$  will choose the alternative that implies the highest utility:

$$U(x_{1i}, x_{2i}, \dots, x_{ki}) = \max[U(x_{1i}^A, x_{2i}^A, \dots, x_{ki}^A), U_i(x_{1i}^B, x_{2i}^B, \dots, x_{ki}^B)]$$

265. The alternatives are described by a number of attributes,  $x_1, x_2, \dots, x_k$ , and these attributes are different for each respondent and each choice. The choice of the consumer reveals the consumer's preferences among the alternatives.

266. A probability model is used in order to allow effects of unobserved variation among the respondents and to take pure random choices into account as well as errors due to measurement or incorrect information. The random utility approach was formalized by Manski (1977)<sup>37</sup>. Let  $V_i$  be the random utility of consumer  $i$ :

$$V_i = U_i + \varepsilon_i$$

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<sup>37</sup> Manski, C. 1977. The structure of random utility models. *Theory and Decision* 8, 229-54.

267. Here  $U_i$  represents the observed part of the respondents  $i$ 's observed utility while  $\varepsilon_i$  represents the unobserved or random part. The unobserved part,  $\varepsilon_i$ , is assumed to be independently and identically distributed. When uncertainty is introduced, the choice is treated as a random variable, and the choice probability of alternative A then equals the probability that the utility of alternative A is greater than the utility of alternative B.

268. Letting  $P$  denote a probability, this can be written as:

$$\begin{aligned} P_i(A) &= P[V_i^A + \varepsilon_i^A \geq V_i^B + \varepsilon_i^B] \\ &= P[V_i^A - V_i^B \geq \varepsilon_i^B - \varepsilon_i^A] \end{aligned}$$

In other words, the choice probability of alternative A is a function of the differences between alternative A and alternative B.

269. In order to estimate the model, a probability function and functional form of the utility function must be specified. The cumulative logit function,  $\Lambda(\ )$ , is applied and the utility function is assumed to be of a simple linear form. The probability of choosing A can then be written as follows:

$$P_i(A) = \Lambda[\beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_n x_{ni}],$$

where  $x_{1i} \equiv x_{1i}^A - x_{1i}^B$ ,  $x_{2i} \equiv x_{2i}^A - x_{2i}^B$  etc. and the standard deviation is normalized to 1.

270. In order to take heterogeneity among respondents into account, socio-economic variables and variables describing the respondents' current level of services are allowed in the model. These background variables reflect the different preferences about the attributes included in the game, and are included by letting the coefficients of the utility function vary for different groups of respondents. Let  $s$  denote a variable defining a specific group of respondents such that  $s_i$  denotes the membership of respondent  $i$ . Hence, the coefficients for the attributes in the games are different according to the subgroup membership of the respondent.

$$P_i(A) = \Lambda[\beta_1(s_i)x_{1i} + \beta_2(s_i)x_{2i} + \dots + \beta_k(s_i)x_{ki}]$$

The model is estimated by maximum likelihood. This estimation method gives unbiased and efficient estimates. The method is described e.g. in Greene (1993)<sup>38</sup>.

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<sup>38</sup> Greene, W.H. 1993. *Econometric Analysis*. Second edition. Prentice Hall.

271. The willingness to pay is calculated from the parameter values. This is done by dividing the parameter for the service level(s) of interest by the cost parameter. By this method the value of a service level is measured in the same units as for the tariff.

$$WTP = \frac{\textit{Parameter for the service level of interest}}{\textit{Cost parameter}}$$

## **ANNEX K – WILLINGNESS TO PAY SAMPLE QUESTIONNAIRE**



- |                            |  |   |   |
|----------------------------|--|---|---|
| 1. 2 or less hours per day | 4. 9-12 hours per day                  | 1 | 4 |
| 2. 3-4 hours per day       | 5. 13-18 hours per day                 | 2 | 5 |
| 3. 5-8 hours per day       | 6. 19-23 hours per day <b>GO TO Q6</b> | 3 | 6 |

Q5. Which hours of the day do you usually have access to electricity? **PROBE. CIRCLE '1' FOR ALL MENTIONED**

- |   |                |   |
|---|----------------|---|
| 1 | morning .....  | 1 |
| 2 | afternoon..... | 1 |
| 3 | evening .....  | 1 |
| 4 | night.....     | 1 |

Q6. Do you usually experience voltage fluctuations in your electricity supply?

- |        |   |
|--------|---|
| 1. yes | 1 |
| 2. no  | 2 |

Q7. During the past 30 days, how many days did you not get any electricity at all?

- |             |                      |   |   |
|-------------|----------------------|---|---|
| 1. None     | 4. 6-10 days         | 1 | 4 |
| 2. 1-2 days | 5. 11-20 days        | 2 | 5 |
| 3. 3-5 days | 6. more than 20 days | 3 | 6 |

Q8. How would you rate the following aspects of your electricity supply on a scale of 0 to 10 where 0 is very bad and 10 is very good? **SHOWCARD A. READ OUT, CIRCLE ONE NUMBER IN EACH ROW**

	V. bad			Neither						V. good	
	0	1	2	3	4	5	6	7	8	9	10
Number of hours of supply											
Time of day of supply											
Voltage stability											

Q9. Which of the following appliances do you own? **PROBE. CIRCLE '1' FOR ALL MENTIONED**

	Circle '1' if household owns the appliance	Average winter hours/day with electricity	Average summer hours/day with electricity
Electric stove	1		
Electric oven	1		
Refrigerator	1		
Electric heater	1		
Air conditioner	1		
Electric water heater	1		
Radio	1		
TV	1		
Incandescent bulbs for lightning	1	*	*
Fluorescent tubes for lightning	1	*	*
Other electric appliances:.....	1		
Other electric appliances:.....	1		

\*: Sum of number of hours if the household owns several bulbs/tubes

How many hours per day (where you receive electricity) do you use each of the appliances in an average winter month? **FILL IN COLUMN 2 IN BOX ABOVE**

How many hours per day (where you receive electricity) do you use each of the appliances in an average summer month? **FILL IN COLUMN 3 IN BOX ABOVE**

Q10. Do you pay a fixed monthly amount for your electricity or are you charged by consumption?

- 1. Fixed monthly amount 1
- 2. Charged by consumption. **INTERVIEWER: PROBE RATE PER KWH .....TETRIS/KWH** 2

Q11. How much was your last electricity bill? **INTERVIEWER: ASK TO SEE THE LATEST BILL. IF NOT MONTHLY, CALCULATE MONTHLY AMOUNT**

.....

	Billed amount, GEL/month	<i>Interviewer:</i> bill observed (circle)
X Electricity from network		1. Yes 2. No
Y Electricity from generator (Q2)		

**IF CHARGED FIXED MONTHLY AMOUNT (IF Q10= 1): GO TO Q13.  
IF 24 HOURS SUPPLIED CURRENTLY (IF Q3 = 1): GO TO Q13:**

Q12. How much money would you spend on electricity if you had 24 hour supply at the current rate per KWH? **IF DON'T KNOW PROBE BEST ESTIMATE.**

New monthly amount in GEL.....

**Roads**

Q13. How far is the city/urban centre where you most often travel to from your household in kilometres?

.....

Q14. How do you usually travel to this city/urban centre? **CIRCLE '1' FOR ALL MENTIONED**

- 1 minibus..... 1
- 2 bus..... 1
- 3 car..... 1
- 4 walk all the way..... 1
- 5 taxi..... 1
- 6 bicycle..... 1
- 7 tractor..... 1
- 8 horse..... 1
- 9 other (write in)..... 1

Q15. How would you rate the quality of the road to this city/urban centre on a scale of 0 to 10 where 0 is very bad and 10 is very good?

V. bad	Neither								V. good	
0	1	2	3	4	5	6	7	8	9	10

Q16. How long does it typically take you to travel to this city/urban centre?

..... MINUTES

Q17. How long would it take if the road was good quality?

..... MINUTES

Q18. Would a good quality road to this city/urban centre improve your prospects of earning income?

- 1. Yes, significantly 3. No 1 3

2. Yes, slightly

4. Don't know

2

4

**INTERVIEWER: If the households has 24 hours electricity supply with no voltage fluctuation currently (Q3=1 AND Q6=2) GO TO Q19.**

**Game 1: Willingness to pay for electricity and roads**

I will now ask you to choose between different options for your electricity supply and the road to the city/urban centre you most often travel to and the cost for these services. Some of the options include improvements to your electricity supply and the road to the city/urban centre. This will imply that a monthly charge for the repair and maintenance of the roads will be charged and the monthly electricity bill may increase.

A new national organisation will be responsible for the repair and maintenance of the roads and the collection of monthly charges. Furthermore, while your household is required to pay the monthly charge, the organisation will guarantee that the roads will be maintained in a good condition as described below.

Your electricity will continue to be supplied by the current electricity utility which will also continue to collect the monthly payment. Two levels of service improvements of your household's electricity supply are considered in the options. In both improved service levels there will be no voltage fluctuations in the electricity supply. In the case where electricity is supplied 8 hours per day, your household will receive electricity from 6 to 10 the morning and from 18 to 22 in the evening. Again, your household will be required to pay the electricity bill and will in return be guaranteed the service described.

If service is improved to 8 or 24 hours electricity supply, the monthly payment is a fixed fee independent of your household's electricity consumption.

The monthly payment shown in the option pairs below is the sum of the payment for electricity and roads.

**INTERVIEWER TO CALCULATE AMOUNT FOR RESPONDENT FOR EACH OPTION AND WRITE DOWN BELOW**

<b>A</b>	Current (X in Q11)	
<b>B</b>	Current + 2	
<b>C</b>	Current + 5	
<b>D</b>	Current + 10	
<b>E</b>	Current + 20	

**BEFORE CONTINUING THE INTERVIEW, FILL IN THE MONTHLY COST ON THE DOTTED LINES BELOW.**

For each pair of options I would like you to say which one you would prefer. You may not like either of them, but please choose one.

When making your choices, please assume that all aspects of the services that are not mentioned are the same as now. This is a very important part of the questionnaire, so please consider each of the pair-wise choices carefully.

1A

3

A
<ul style="list-style-type: none"><li>• Electricity: As now</li><li>• Road to city/urban centre: As now</li><li>• Monthly cost: ..... GEL (A)</li></ul>

or

B
<ul style="list-style-type: none"><li>• Electricity: As now</li><li>• Road to city/urban centre: Good condition and well maintained asphalt</li><li>• Monthly cost: ..... GEL (B)</li></ul>

A B

5

A
<ul style="list-style-type: none"><li>• Electricity: As now</li><li>• Road to city/urban centre: Good condition and well maintained asphalt</li><li>• Monthly cost: ..... GEL (C)</li></ul>

or

B
<ul style="list-style-type: none"><li>• Electricity: Always 8 hours supply without voltage fluctuations</li><li>• Road to city/urban centre: As now</li><li>• Monthly cost: ..... GEL (B)</li></ul>

A B

7

A
<ul style="list-style-type: none"><li>• Electricity: As now</li><li>• Road to city/urban centre: As now</li><li>• Monthly cost: ..... GEL (A)</li></ul>

or

B
<ul style="list-style-type: none"><li>• Electricity: Always 24 hours supply without voltage fluctuations</li><li>• Road to city/urban centre: As now</li><li>• Monthly cost: ..... GEL (E)</li></ul>

A B

9

A
<ul style="list-style-type: none"><li>• Electricity: Always 24 hours supply without voltage fluctuations</li><li>• Road to city/urban centre: As now</li><li>• Monthly cost: ..... GEL (C)</li></ul>

or

B
<ul style="list-style-type: none"><li>• Electricity: As now</li><li>• Road to city/urban centre: Good condition and well maintained asphalt</li><li>• Monthly cost: ..... GEL (D)</li></ul>

A B

12

A
<ul style="list-style-type: none"><li>• Electricity: Always 24 hours supply without voltage fluctuations</li><li>• Road to city/urban centre: Good condition and well maintained asphalt</li><li>• Monthly cost: ..... GEL (D)</li></ul>

or

B
<ul style="list-style-type: none"><li>• Electricity: Always 8 hours supply without voltage fluctuations</li><li>• Road to city/urban centre: Good condition and well maintained asphalt</li><li>• Monthly cost: ..... GEL (C)</li></ul>

A B

22

A
<ul style="list-style-type: none"><li>• Electricity: As now</li><li>• Road to city/urban centre: As now</li><li>• Monthly cost: ..... GEL (C)</li></ul>

or

B
<ul style="list-style-type: none"><li>• Electricity: Always 8 hours supply without voltage fluctuations</li><li>• Road to city/urban centre: As now</li><li>• Monthly cost: ..... GEL (D)</li></ul>

A B

A
<ul style="list-style-type: none"> <li>• Electricity: As now</li> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> <li>• Monthly cost: ..... GEL (A)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>• Electricity: Always 24 hours supply without voltage fluctuations</li> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> <li>• Monthly cost: ..... GEL (D)</li> </ul>

A B

Q19. Does your household participate in the maintenance of the village roads or the road to the city/urban centre you most of travel to, for example helping repair potholes?

Roads within the village

1 Yes 2 No 1 2

Road to city/urban centre you most often travel to

1 Yes 2 No 1 2

Q20. Which would your household prefer: to be involved in the maintenance of roads, for example helping repair potholes or to pay a monthly fee of 3 GEL?

1 Participate in maintenance 2 Pay monthly fee 1 2

**Drinking Water**

Q21. What is your primary source of drinking water?

1. Piped water into dwelling **GO TO Q23** 5 Water vendor 1 5  
 2. Piped water into yard **GO TO Q23** 6 Neighbours 2 6  
 3. Public tap/standpipe/well 7 Other, specify..... 3 7  
 4. Spring/Surface water (lake, river) 4

Q22. How long does it usually take you to travel to your **primary drinking water** source (one way)?

1. Less than 2 minutes 4 11-20 minutes 1 4  
 2. 3-5 minutes 5 More than 21 minutes 2 5  
 3. 6-10 minutes 6 Not sure 3 6

Q23. During the past 30 days how many hours per day did you usually have access to drinking water from the primary source?

1 2 or less hours per day 4 13-18 hours per day 1 4  
 2 3- 5 hours per day 5 19-23 hours per day 2 5  
 3 6-12 hours per day 6 24 hours per day 3 6

Q24. Is the water supply dependent on electricity supply? **INTERVIEWER: PROBE IF THE HOUSEHOLD HAS TO USE ELECTRICITY TO GET RUNNING WATER, FOR INSTANCE IF THEY HAVE AN ELECTRICITY OPERATED PUMP**

1 Yes 3 Don't know 1 3  
 2 No 2

Q25. How would you rate the following aspects of the drinking water from your primary source on a scale of 0 to 10 where 0 is very bad and 10 is very good? **SHOWCARD B. READ OUT, CIRCLE ONE NUMBER IN EACH ROW**

	V. bad		Neither								V. good	
	0	1	2	3	4	5	6	7	8	9	10	
Hours of supply	0	1	2	3	4	5	6	7	8	9	10	
Healthiness	0	1	2	3	4	5	6	7	8	9	10	
Taste	0	1	2	3	4	5	6	7	8	9	10	



## Water for Irrigation

Q36. Do you currently get irrigation water?

1 Yes 2 No **GO TO Q40** 1 2

Q37. How would you rate the following aspects of your irrigation service on a scale of 0 to 10 where 0 is very bad and 10 is very good? **SHOWCARD C. READ OUT, CIRCLE ONE NUMBER**

	V. bad		Neither						V. good		
	0	1	2	3	4	5	6	7	8	9	10
Amount of water	0	1	2	3	4	5	6	7	8	9	10
Regularity of water supply	0	1	2	3	4	5	6	7	8	9	10
Quality of water	0	1	2	3	4	5	6	7	8	9	10

Q38. How much did you spend last year on water for irrigation?

..... GEL per year

**INTERVIEWER: CALCULATE MONTHLY AMOUNT ..... GEL/MONTH**

Q39. Do you receive a sufficient amount of water for irrigation during the growing season?

1. Yes **GO TO GAME 2** 2. No **GO TO Q41** 1 2

Q40. Would you like to receive water for irrigation?

1. Yes 2. No **GO TO GAME 2** 1 2

Q41. How much water would you like to receive on a yearly basis?

**INTERVIEWER: IF RESPONDENT CURRENTLY RECEIVES IRRIGATION WATER, ASSUME THAT THE RATE PER CUBIC METER FOR EXTRA IRRIGATION WATER WILL BE THE SAME AS NOW**

.....M<sup>3</sup>

999. Don't know

999

## Game 2: Willingness to pay for drinking water, water for irrigation and telephone landline

**INTERVIEWER: If the household has 24 hours electricity supply with no voltage fluctuation currently (Q3=1 AND Q6=2) GO TO Game 2X.**

I will now ask you to choose between different options for drinking water, water for irrigation and telephone landline and costs.

For the water, landline and irrigation services that your household already receives, the services will continue to be supplied by the current utility company. Your household will be required to pay the monthly charge and in return the utility company will guarantee the service levels described in the pair wise choice tasks below.

For the water, landline and irrigation services that are NOT presently received from a utility company, that is if the drinking water currently is collected from a lake and/or if no landline is presently available, new national organisations will be responsible for providing the service and these organisations will collect the monthly charges. Again, your household will be required to pay the monthly charges and will be guaranteed the service improvements described below.

When the services have been improved, neither supply of drinking water nor the landline service will depend on the households electricity supply. The landline service will include unlimited national calls.

**INTERVIEWER TO CALCULATE AMOUNT FOR RESPONDENT FOR EACH OPTION**

	<b>GEL</b>
Drinking water cost (Q26)	
Telephone landline (Q32)	
Water for irrigation (Q38)	
<b>CURRENT TOTAL</b>	

A	Current total (cf. above)	
B	Current + 4	
C	Current + 9	
D	Current + 16	
E	Current + 25	

**BEFORE CONTINUING THE INTERVIEW, FILL IN THE MONTHLY COST ON THE DOTTED LINES BELOW.**

For each pair of options I would like you to say which one you would prefer. You may not like either of them, but please choose one.

When making your choices, please assume that all aspects of the services that are not mentioned are the same as now.

This is a very important part of the questionnaire, so please consider each of the pair-wise choices carefully

**2A**

2

<b>A</b>
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (C)</li> </ul>

or

<b>B</b>
<ul style="list-style-type: none"> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (C)</li> </ul>

A B

3

<b>A</b>
<ul style="list-style-type: none"> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (B)</li> </ul>

or

<b>B</b>
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (A)</li> </ul>

A B

4

A
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (A)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (E)</li> </ul>

A B

8

A
<ul style="list-style-type: none"> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (A)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (C)</li> </ul>

A B

19

A
<ul style="list-style-type: none"> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (B)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (A)</li> </ul>

A B

20

A
<ul style="list-style-type: none"> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (C)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (C)</li> </ul>

A B

21

A
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (A)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (B)</li> </ul>

A B

**GO TO GAME 3**

**Game 2X: Willingness to pay for drinking water, water for irrigation, telephone landline and roads**

**ONLY for respondents with 24 hours electricity supply and no voltage fluctuations**

I will now ask you to choose between different options for drinking water, water for irrigation and telephone landline, roads and costs.

For the water, landline and irrigation services that your household already receives, the services will continue to be supplied by the current utility company. Your household will be required to pay the monthly charge and in return the utility company will guarantee the service levels described in the pair wise choice tasks below.

For the water, landline and irrigation services that are NOT presently received from a utility company, that is if the drinking water currently is collected from a lake and/or if no landline is presently available, new national organisations will be responsible for providing the service and these organisations will collect the monthly charges. Again, your household will be required to pay the monthly charges and will be guaranteed the service improvements described below.

The improvement of roads will imply that a monthly charge for the repair and maintenance of the roads will be charged. A new national organisation will be responsible for the repair and maintenance of the roads and the collection of monthly charges. Furthermore, while your household is required to pay the monthly charge, the organisation will guarantee that the roads will be maintained in a good condition as described below.

When the services have been improved, neither supply of drinking water nor the landline service will depend on the households electricity supply. The landline service will include unlimited national calls.

**INTERVIEWER TO CALCULATE AMOUNT FOR RESPONDENT FOR EACH OPTION**

	<b>GEL</b>
Drinking water cost (Q26)	
Telephone landline (Q32)	
Water for irrigation (Q38)	
<b>CURRENT TOTAL</b>	

A	Current total (cf. above)	
B	Current + 4	
C	Current + 9	
D	Current + 16	
E	Current + 25	

**BEFORE CONTINUING THE INTERVIEW, FILL IN THE MONTHLY COST ON THE DOTTED LINES BELOW.**

For each pair of options I would like you to say which one you would prefer. You may not like either of them, but please choose one.

When making your choices, please assume that all aspects of the services that are not mentioned are the same as now.

This is a very important part of the questionnaire, so please consider each of the pair-wise choices carefully

**2XA**

1

<b>A</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (C)</li> </ul>

or

<b>B</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> <li>• Drinking water: As now</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (A)</li> </ul>

A B

2

<b>A</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> <li>• Drinking water: As now</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (A)</li> </ul>

or

<b>B</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> <li>• Drinking water: As now</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (B)</li> </ul>

A B

5

<b>A</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: As now</li> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (E)</li> </ul>

or

<b>B</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: As now</li> <li>• Drinking water: As now</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (A)</li> </ul>

A B

6

<b>A</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: As now</li> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (B)</li> </ul>

or

<b>B</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: As now</li> <li>• Drinking water: As now</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (A)</li> </ul>

A B

8

<b>A</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (C)</li> </ul>

or

<b>B</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: As now</li> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (D)</li> </ul>

A B

15

<b>A</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> <li>• Drinking water: As now</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (C)</li> </ul>

or

<b>B</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (C)</li> </ul>

A B

17

<b>A</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: As now</li> <li>• Drinking water: As now</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: As now</li> <li>• Monthly cost: ..... GEL (A)</li> </ul>

or

<b>B</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (C)</li> </ul>

A B

18

<b>A</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (C)</li> </ul>

or

<b>B</b>
<ul style="list-style-type: none"> <li>• Road to city/urban centre: As now</li> <li>• Drinking water: As now</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> <li>• Monthly cost: ..... GEL (B)</li> </ul>

A B

### Game 3: Willingness to pay for all service improvements

I will now ask you to choose between packages of services. These include electricity services, maintenance of the roads to the city/urban centre, drinking water, landline and irrigation.

For the services that your household already receives, the services will continue to be supplied by the current utility company. Your household will be required to pay the monthly charge and in return the utility company will guarantee the service levels described in the pair wise choice tasks below.

For the services that are NOT presently received from a utility company, e.g. roads to the city/urban centre, new national organisations will be responsible for providing the service and these organisations will collect the monthly charges. Again, your household will be required to pay the monthly charges and will be guaranteed the service improvements described.

These packages will either show all the services improved or as now.

#### INTERVIEWER TO CALCULATE AMOUNT FOR RESPONDENT FOR EACH OPTION

If Game 2X was used

A in Game 3 = A in Game 2X	
B	+6
C	+14
D	+26
E	+45

All other cases

(1) A in Game 1	
(2) A in Game 2	
A in Game 3 = (1)+(2)	
B	+6
C	+14
D	+26
E	+45

For each pair of options I would like you to say which one you would prefer. You may not like either of them, but please choose one.

When making your choices, please assume that all aspects of the services that are not mentioned are the same as now. This is a very important part of the questionnaire, so please consider each of the pair-wise choices carefully

### 3A

2

A
<ul style="list-style-type: none"> <li>Electricity: Always 24 hours supply without voltage fluctuations</li> <li>Road to city/urban centre: Good condition and well maintained asphalt</li> </ul>
<ul style="list-style-type: none"> <li>Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>Water for irrigation: Sufficient supply of irrigation during the growing season</li> </ul>
<ul style="list-style-type: none"> <li>Monthly cost: ..... GEL (B)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>Electricity: As now</li> <li>Road to city/urban centre: As now</li> </ul>
<ul style="list-style-type: none"> <li>Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>Water for irrigation: Sufficient supply of irrigation during the growing season</li> </ul>
<ul style="list-style-type: none"> <li>Monthly cost: ..... GEL (A)</li> </ul>

A B

5

A
<ul style="list-style-type: none"> <li>• Electricity: As now</li> <li>• Road to city/urban centre: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> </ul>
<ul style="list-style-type: none"> <li>• Monthly cost: ..... GEL (D)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>• Electricity: As now</li> <li>• Road to city/urban centre: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Monthly cost: ..... GEL (B)</li> </ul>

A B

7

A
<ul style="list-style-type: none"> <li>• Electricity: As now</li> <li>• Road to city/urban centre: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Monthly cost: ..... GEL (C)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>• Electricity: Always 24 hours supply without voltage fluctuations</li> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> </ul>
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Monthly cost: ..... GEL (D)</li> </ul>

A B

12

A
<ul style="list-style-type: none"> <li>• Electricity: Always 24 hours supply without voltage fluctuations</li> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> </ul>
<ul style="list-style-type: none"> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> </ul>
<ul style="list-style-type: none"> <li>• Monthly cost: ..... GEL (B)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>• Electricity: Always 24 hours supply without voltage fluctuations</li> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> </ul>
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Monthly cost: ..... GEL (A)</li> </ul>

A B

18

A
<ul style="list-style-type: none"> <li>• Electricity: As now</li> <li>• Road to city/urban centre: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> <li>• Telephone landline: As now</li> <li>• Water for irrigation: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Monthly cost: ..... GEL (A)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>• Electricity: Always 24 hours supply without voltage fluctuations</li> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> </ul>
<ul style="list-style-type: none"> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> </ul>
<ul style="list-style-type: none"> <li>• Monthly cost: ..... GEL (E)</li> </ul>

A B

21

A
<ul style="list-style-type: none"> <li>• Electricity: Always 24 hours supply without voltage fluctuations</li> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> </ul>
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Telephone landline: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Water for irrigation: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Monthly cost: ..... GEL (A)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>• Electricity: As now</li> <li>• Road to city/urban centre: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> </ul>
<ul style="list-style-type: none"> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> </ul>
<ul style="list-style-type: none"> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> </ul>
<ul style="list-style-type: none"> <li>• Monthly cost: ..... GEL (A)</li> </ul>

A B

24

A
<ul style="list-style-type: none"> <li>• Electricity: Always 24 hours supply without voltage fluctuations</li> <li>• Road to city/urban centre: Good condition and well maintained asphalt</li> </ul>
<ul style="list-style-type: none"> <li>• Drinking water: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Telephone landline: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Water for irrigation: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Monthly cost: ..... GEL (D)</li> </ul>

or

B
<ul style="list-style-type: none"> <li>• Electricity: As now</li> <li>• Road to city/urban centre: As now</li> </ul>
<ul style="list-style-type: none"> <li>• Drinking water: 24 hours tap water supply to your house, always safe to drink</li> </ul>
<ul style="list-style-type: none"> <li>• Telephone landline: Telephone landline to your house with unlimited national calls</li> </ul>
<ul style="list-style-type: none"> <li>• Water for irrigation: Sufficient supply of irrigation during the growing season</li> </ul>
<ul style="list-style-type: none"> <li>• Monthly cost: ..... GEL (A)</li> </ul>

A B

### Gas supply

Q42. Is your household connected to the natural gas network? **IF YES, ASK WHETHER WORKS**

- |  |   |
|--|---|
| 1. Yes, works well <b>GO TO Q44</b>    | 1 |
| 2. Yes, does not work <b>GO TO Q44</b> | 2 |
| 3. No                                  | 3 |

Q43. Would you like to get connected?

- |                        |                       |   |   |
|------------------------|-----------------------|---|---|
| 1 yes <b>GO TO Q46</b> | 2 no <b>GO TO Q46</b> | 1 | 2 |
|------------------------|-----------------------|---|---|

Q44. During the past 30 days, how many days did you not get gas to in your household due to interruptions?

- |             |                      |   |   |
|-------------|----------------------|---|---|
| 1. None     | 4. 6-10 days         | 1 | 4 |
| 2. 1-2 days | 5. More than 10 days | 2 | 5 |
| 3. 3-5 days | 6. Don't know        | 3 | 6 |

Q45. How would you rate the quality of the gas supply (for example, pressure, hours of supply and service), on a scale of 0 to 10 where 0 is very bad and 10 is very good?

V. bad					Neither						V. good
0	1	2	3	4	5	6	7	8	9	10	

## Up front investment

Q46. For investment in improving services such as we have been discussing, one option is to ask households to pay a fee up front to help pay for connecting households and other infrastructure costs such as pipes. Such an investment would imply either an up front cost or a higher monthly cost in a period of three years. After this period of three years the monthly cost will be 3 GEL for all three options.

Which of the following options would you prefer?

- A. No up front cost and 15 GEL a month for 3 years – total cost = 540 GEL for 3 years  
 B. 100 GEL up front cost and 11 GEL a month for 3 years – total cost = 496 GEL for 3 years  
 C. 200 GEL up front cost and 4 GEL a month for 3 years – total cost = 344 GEL for 3 years

1	A	3	C	1	3
2	B			2	

## Ownership

Q47. For electricity services, would you prefer the supplier to be state, private, local administrative body or community owned?

1.	State owned enterprise	4.	Community owned	1	4
2.	Privately owned company	5.	No preference	2	5
3.	Local administrative body	6.	Other, specify.....	3	6

Q48. For gas services, would you prefer the supplier to be state, private, local administrative body or community owned?

1.	State owned enterprise	4.	Community owned	1	4
2.	Privately owned company	5.	No preference	2	5
3.	Local administrative body	6.	Other, specify.....	3	6

## Primary Fuel Source

Q49. What is your primary cooking fuel?

1.	Electricity	5.	Firewood	1	5
2.	Natural gas from network	6.	Charcoal	2	6
3.	Bottled gas	7.	Other, specify.....	3	7
4.	Oil/Paraffin/Kerosene			4	

Q50. What other sources of cooking fuel do you use? **PROBE. CIRCLE '1' FOR ALL MENTIONED**

1	Electricity .....	1
2	Natural gas from network.....	1
3	Bottled gas.....	1
4	Oil/Paraffin/Kerosene.....	1
5	Firewood.....	1
6	Charcoal .....	1
7	Other, specify.....	1

Q51. What is your primary source of heating?

- |                             |                        |   |   |
|-----------------------------|------------------------|---|---|
| 1. Electricity              | 5. Firewood            | 1 | 5 |
| 2. Natural gas from network | 6. Charcoal            | 2 | 6 |
| 3. Bottled gas              | 7. Other, specify..... | 3 | 7 |
| 4. Oil/Paraffin/Kerosene    |                        | 4 |   |

Q52. What were your household's expenditure on the following items for cooking, heating and lightning last month? **FILL IN COLUMN 1 IN BOX BELOW**

	Last month GEL/ month	Average Winter GEL/ month	Average summer GEL/ month
Natural gas from network			
Bottled gas			
Oil/Paraffin/Kerosene			
Firewood			
Charcoal			
Other (write in)			

What is your household's expenditure on the following items in an average winter month? **FILL IN COLUMN 2 IN BOX ABOVE**

What is your household's expenditure on the following items in an average summer month? **FILL IN COLUMN 3 IN BOX ABOVE**

### Demographics and household composition

The questions in this module seek to provide information on the household size and composition as well as educational level. The personal information you provide during this survey will be kept confidential by COWI and will not be disclosed to third parties. It will be used by COWI only for this study, which is being undertaken for the World Bank.

Q53. How many persons are there in your household (i.e. persons who usually live here with you and share this house/room and share income)?

	Total	Adults Aged 17 or older	Children 6 -17 years	Children, 5 years or younger
Number in household				

### Income and expenditure

Q54. Please estimate your household's total expenditures **the past month. IF DON'T KNOW PROBE BEST ESTIMATE**

The total expenditures include food, beverages, tobacco, clothes and footwear, transport, infrastructure services (electricity, water, telephone, etc.), household goods, health care, education, housing (rent/repairs) etc. Do not include purchase of any durable goods bought less often than once a year, such as refrigerators, TV sets and so on, as well as expenses on special events such as weddings, funerals and so on.

- |                    |                  |   |    |
|--------------------|------------------|---|----|
| 1 Less than 25 GEL | 10 251 - 300 GEL | 1 | 10 |
| 2 26 - 50 GEL      | 11 301 - 350 GEL | 2 | 11 |
| 3 51 - 75 GEL      | 12 351 - 400 GEL | 3 | 12 |
| 4 76 - 100 GEL     | 13 401 - 500 GEL | 4 | 13 |

5	101 - 125 GEL	14	501 - 600 GEL	5	14
6	126 - 150 GEL	15	601 - 700 GEL	6	15
7	151 - 175 GEL	16	701 - 800 GEL	7	16
8	176 - 200 GEL	17	801 - 900 GEL	8	17
9	201 - 250 GEL	18	901 or more	9	18
		19	Refused		19

Q55. Does your household consume food produced by its members using your land plot?

- |   |     |   |                     |   |   |
|---|-----|---|---------------------|---|---|
| 1 | Yes | 2 | No <b>GO TO Q57</b> | 1 | 2 |
|---|-----|---|---------------------|---|---|

Q56. Please, estimate how much money you would have had to pay last year for the food consumed by your household that was produced by its members using your land plot?

..... GEL

Q57. Does your household consume food as a present received from persons not living in your household (e.g. from relatives, friends, persons from humanitarian organizations)?

- |    |     |    |                     |   |   |
|----|-----|----|---------------------|---|---|
| 1. | Yes | 2. | No <b>GO TO Q59</b> | 1 | 2 |
|----|-----|----|---------------------|---|---|

Q58. Please, estimate how much money you would have had to pay last year for the food received as a present?

..... GEL

Q59. Does your household get income from the use of land? **IF YES, PROBE IF MAIN OR SECONDARY INCOME LAST YEAR**

- |    |   |    |    |   |   |
|----|---|----|----|---|---|
| 1. | Yes, this was the main income last year | 3. | No | 1 | 3 |
| 2. | Yes, secondary income                   |    |    | 2 |   |

Q60. What is the total area of the household's land in hectares?

..... Hectares

Q61. What is your education level?

- |   |                       |   |                             |   |   |
|---|-----------------------|---|-----------------------------|---|---|
| 1 | Higher                | 5 | Secondary school            | 1 | 5 |
| 2 | Incomplete higher     | 6 | Incomplete secondary school | 2 | 6 |
| 3 | Specialized secondary | 7 | Primary school              | 3 | 7 |
| 4 | Technical school      | 8 | Incomplete primary school   | 4 | 8 |

Q62. What year were you born in?

.....

Q63. **INTERVIEWER: CODE GENDER.**

- |   |      |   |        |   |   |
|---|------|---|--------|---|---|
| 1 | male | 2 | female | 1 | 2 |
|---|------|---|--------|---|---|

**INTERVIEWER: THE FOLLOWING SHOULD BE FILLED IN AFTER THE INTERVIEW**

Q64. How would you rate the overall quality of the interview in terms of willingness to answer correctly and willingly?

- |    |      |    |      |   |   |
|----|------|----|------|---|---|
| 1. | Poor | 3. | Good | 1 | 3 |
| 2. | Fair |    |      | 2 |   |

Q65. How do you rate the households' economic well being compared to the average level in the country?

- |    |                             |    |                             |   |   |
|----|-----------------------------|----|-----------------------------|---|---|
| 1. | Substantially above average | 4. | Below average               | 1 | 4 |
| 2. | Above average               | 5. | Substantially below average | 2 | 5 |

3. Average

6. Don't know

3

6

End time : 

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--	--

Signature, Interviewer.....