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**Policy Simulation
Analysis in
the Water Sector**

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Summary

Access to water supply and its affordability is definitely one of the central points in current policy discussions in Armenia. As it does and will continue to require significant monetary injections into the sector from the central government, discussing ways to improve targeting to help those who are in need, including budgeting issues, are of central importance. The AST survey findings show that the poorest 20 percent of households benefit from only 11 percent of subsidies (on a per capita consumption basis),[1] while the richest get 37 percent due to higher per capita use of water. Although the solution to the policy dilemma seems to be straightforward at the analyses stage—i.e. stop direct subsidy and switch to paying the poor to encourage water consumption—implementation is another dimension altogether. It is often delayed by exogenous factors despite being legislation in Armenia.

The policy stated in the Water Code[2] is to gradually move towards cost-recovery of tariffs, along with increasing incomes of populations and improving both water supply and sewerage companies (WSCs). So far, the government has been subsidizing WSC companies, both for operational and capital expenditures, so as to avoid drastically increasing tariffs. Logically, any subsidization policy, or policy to maintain tariffs at low, affordable levels, is a policy targeted at the poor. In other words, the government addresses the social, health, and other concerns connected with access to water. The current policy covers all five quintiles, indifferent to revenue level in terms of service access or coverage. However, in terms of actual use of services, the richest are favored almost four times more than the poorest. Meanwhile, logically, affordability is a concern for the poor, i.e. Quintile 1, and also Quintile 2 to a lesser degree.

Government interventions in this sector have so far been mostly in the form of (i) subsidies to water companies owned (partially or entirely) by the central government to cover operational gaps, and (ii) direct investments in these companies to repair and improve water supply and sewerage infrastructure and provision of concessional loans for the same.

It is believed that water differs from other commodities because water services are a basic right, regardless of whether or not people can afford to pay for it. This has led to the recommendation that water tariffs be kept low, at least for the poor. However, this means that someone else will have to pay the difference: That "someone" in practice is either the taxpayer or other customers or the international community (in some cases).

For comparison, as noted in the World Bank's "Armenia Waster Sector Note",[3] "tariff levels; at around AMD 200 per cubic meters appear low in relation to regional or international norms (where typical norms are around AMD 400 per CM)". For instance, the tariff in Tbilisi, Georgia, is more than three times that in Yerevan and about 2.5 times higher in Moscow and Bucharest.

Our recent survey[4] showed that households are willing to pay extra for improved water supply on average by AMD 179 (USD 0.5 or 9.2 percent more on current average bill) per month. Notably, households in the poorest quintile are ready to pay much more (AMD 295 or about 22 percent more on their current bill), while the richest are willing to pay only AMD 144 (or an increase of 5.3 percent). Extrapolating the average monthly AMD that households are willing to

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[1] For details please see the section "Policy Issue and Policy Question".
[2] Water Code of the Republic of Armenia, adopted by the National Assembly in 2002.
[3] Armenia Water Sector Note, World Bank, Report No. 61317-AM, May 2011.
[4] Conducted by AST in June–July 2011.

pay for improved services, and taking into account the number of connections/households served by five WSCs (720,000), we arrive at an additional AMD 1.5 billion annual inflow to the WSCs (720,000 households *AMD 179 * 12 months = AMD 1,544 million).

This shows that the government can go as far as Option 2 (see for details Section on "Policy Alternatives and Simulation of Solutions") discussed in the CEA report, i.e. increasing tariffs to a level that ensures Operational Cost-recovery, simultaneously providing compensation to the poor households for the increased amount of tariff (capital expenditures will continue to be funded by the government as the owner or co-owner of water supply companies).

Literature Review

As noted, access to water supply and its affordability are a priority in current policy discussions in Armenia. High losses due to worn-out infrastructure, and a reliance on pumping inherited from the Soviet period affects the quality of services delivered to the population. Thus, the sector has so far required huge capital inflow and by all accounts will continue to do so. It is therefore important to examine ways in which to improve targeting the needy, including issues concerning budgeting. Despite the fact that current legislation in Armenia requires cost-recovery of water supply tariffs (but without a set deadline), cost-recovery of tariffs from the five major water supply companies is yet to be achieved.

Regarding the question of subsidies and social policies, Straub[5] argues that it is unclear whether these need to be infrastructure-specific, and whether water regulators should be involved in designing or administering welfare programs. Evidence on the efficiency of direct consumption subsidies through utilities prices indicates that it would be better to integrate them into the government's general welfare and poverty alleviation policies.

Meanwhile Whittington and Hanem[6] state that most people are "unaware of the magnitude of the true economic costs of municipal water and sanitation network services". According to them, there are several reasons for this: the capital costs are heavily subsidized by higher levels of government (and, in developing countries, by international donors), so that households with services do not see the true capital costs reflected in the volumetric prices they pay. This is also relevant for Armenia. Other reasons mentioned by the authors (not paying adequate fees for water supply, utilities running large deficits, etc.) also hold true for Armenia. The last factor they note is that "the subsidies provided to consumers of water and sanitation services are not only huge, but also regressive. It is often not politically desirable to allow people to understand that middle- and upper-income households, which generally use more water, are thus actually receiving the most benefit from subsidies."

According to Whittington et al.,[7] "Reform of water and sanitation reforms occur in many countries. Of particular concern is the situation of poor. And reforms must be designed so that they receive access to affordable services. A key issue is water pricing. However, experience

[5] Straub, S. 2009. Governance in Water Supply. Thematic paper for the Global Development Network project "Varieties of Governance: Effective Public Service Delivery"
[6] Whittington, D and Hanem, W. Michael, 2009. The Challenge of Improving Water and Sanitation Services in Less Developed Countries
[7] Whittington, D, Boland, J and Foster, V. Water Tariffs and Subsidies in South Asia: Understanding the Basics.

shows that the pricing and subsidies, often delivered through water tariffs, can be a source of major inefficiencies in the sector." Moreover, they say, setting tariffs has four main objectives: cost-recovery, economic efficiency, equity, and affordability.

The paper discusses the experience of using various tariff structures to address the issue of affordability, looking at using water tariffs to redistribute income between customers, especially in circumstances where there are no well-designed and effective welfare programs. However, the problem is that this creates serious conflicts with efficiency by creating perverse incentives to those who receive services at lower tariffs. Eventually, the subsidy may or may not reach the poor, depending on their consumption levels, and the fact of being connected to the system and the tariff design structure itself.

The following is their schematic presentation of direct subsidization of services:

a) Supply side

```
                 Tariffs below cost
    /\
   /  \
  / Company \  ───────────────▶  (  Consumers  )
   \  /
    \/
    ▲
    │
  Subsidy
    │
 ┌──────────────┐
 │  Government  │
 └──────────────┘
```

b) Demand side

```
                          (  Rich Consumers  )
    /\                 ▲
   /  \               /
  / Company \ ───────    Uniform cost-
   \  /       \          reflective tariff
    \/         ▼
              (  Poor Consumers  )
                          ▲
                          │
                       Subsidy
                          │
                   ┌──────────────┐
                   │  Government   │
                   └──────────────┘
```
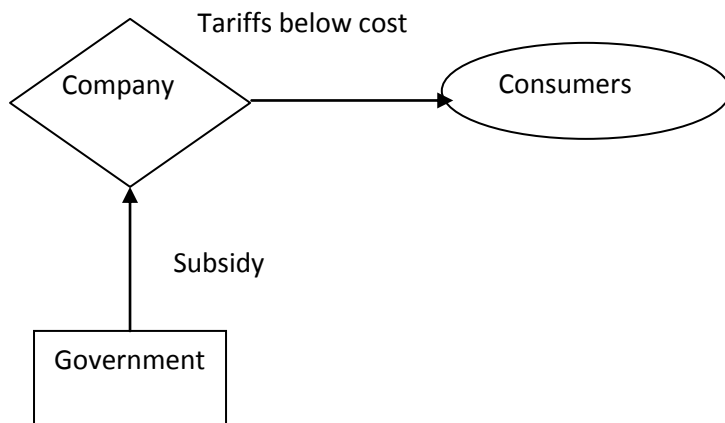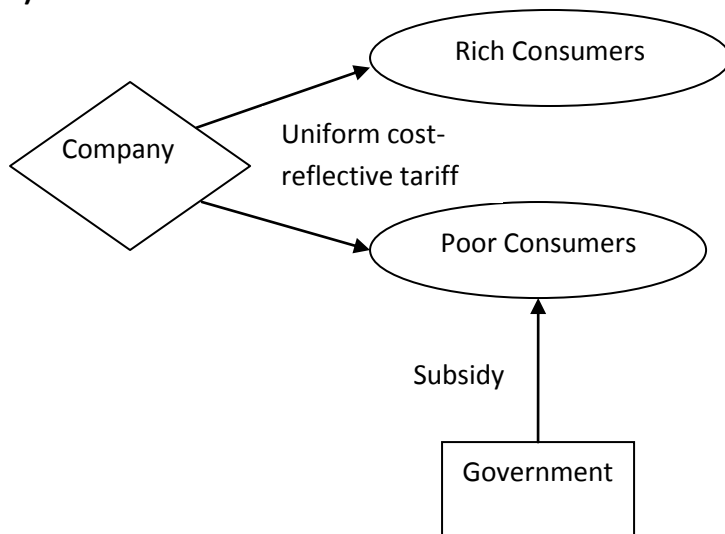
In another work entitled "Municipal Water Pricing and Tariff Design: A Reform Agenda for South Asia" (2003), Whittington suggests that "water tariffs often are not serving the main purpose: they are not generating sufficient revenues to cover financial costs; they are not

sending correct economic signals to households and not helping the majority of poor." The paper describes the major elements of a package of pricing and tariff reforms in many South Asian cities. It recommends some pro-poor policies, such as ensuring that poor households have access to a connection when they want it, subsidizing upfront connection costs but not volumetric water use, providing public taps, etc.

Nauges and Wittington[8] concluded that household water-demand functions in developing countries suggest that estimates of own-price elasticity for water from private connections is in the range 0.3 to -0.6, and that income elasticity is typically in the range 0.1–0.3, both close to what is usually reported for industrialized countries. This is an important component of a water-demand management program.

The review of literature suggests that one of the options for addressing the affordability issue, without compromising efficiency, revenue generation and equity goals, is to subsidize only the poor households which, along with other customers, will pay the full tariff to the water supply company.

Policy Issue and Policy Question

Water supply and sanitation in Armenia are faced with numerous problems: apart from insufficient tariffs to cover current costs of services, the magnitude of investment required is huge. However, it is not feasible to estimate the actual total investments needed over the next 10 to 20 years to achieve the desired results as defined in various government documents. Eventually, though, these investments will need to be repaid from tariffs since the bulk of investments so far have come from concessional donor loans.

Government interventions in this sector have been mostly in the form of (i) subsidies to water supply and sewerage companies (WSCs) owned (partially or entirely) by the central government to cover operational gaps, and (ii) direct investments in these companies to repair and improve water supply and sewerage infrastructure and provide concessional loans for the same purpose. Notably, all the five WSCs considered are currently managed or leased by private operators under private-sector participation arrangements. This form of form of intervention was financed out of International Financial Institutions' credits that are initially tied to an infrastructure repair/renovation program. Thus, the two main channels of intervention are subsidies for operating gaps (including effects of low tariffs and incomplete tariff collections[9]) and capital expenditure funding.

However, the policy stated in the Water Code adopted in 2002 is to gradually move towards cost-recovery of tariffs, along with raising incomes of the poor, and improving the performance of water supply and sewerage companies. To that end, tariffs have been gradually increased during the past 10 years from AMD 46 to the current level of about AMD 185 per cubic meters (CM) of supplied water. Along with tariff increases, the revenues from customer payments have

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[8] Nauges C., Wittington D., "Estimation of Water Demand in Developing Countries: An Overview", The World Bank Research Observer, Vol. 25, no. 2, August 2010.
[9] This has become a minor problem in recent years, e.g. collection efficiency for all five companies for 2010 was 97 percent, including 95 percent from residential consumers.

increased, while the amount of subsidies decreased up until 2009.[10] However, subsidization of water tariffs by companies is still ongoing in Armenia.

Table 1. Main parameters of the water sector in 2005-2009

	2005	2006	2007	2008	2009	2010
Water supplied (mln CM)	114.9	96.3	91.7	98.6	92.0	84.9
Total sales (mln AMD)	12,691.1	12,792.5	13,571.1	14,179.8	14,723.1	15,747.9
Payments from customers (mln AMD)	8,993.8	10,295	11,719.4	12,588.1	13,834.6	15,245.5
Payment collection rates (%)	71%	80%	86%	89%	94%	97%
Current subsidies to WSCs (mln AMD)	2,568.8	1,633.6	1,381.3	1,287.0	901.8	1500.9[11]
Total current expenditures (mln AMD)	11,562.6	11,928.6	13,100.7	13,875.1	14,736.4	16,746.5

According to the findings of the 2009 survey as noted in the BIA Report, average consumption of drinking water at the household level was 1,695 AMD (USD 5.5) per month in 2008 (or 1.08 percent of total household expenditure), covering 91.4 percent of the population as beneficiaries of government programs in the drinking water sector. The survey conducted in 2011 revealed that on average, the monthly payments increased after 2008 by AMD 250 (about 15 percent). The breakdown of household payments per quintile in 2010 is shown in Table 2. Notably, the average payment as a share of household expenditure is 0.9 percent.

Table 2 Financial burden of water bills on household budget

	Expenditure Quintile					
2010	1 (lowest)	2	3	4	5 (highest)	Total
Monthly average water payments (AMD)	1,362	1,522	1,918	2,218	2,711	1,946
Monthly average spending of HHs (AMD)	88,584	134,888	184,303	249,711	440,499	219,597
Average monthly WSS bills as share of total HH expenditure (AMD)	1.5%	1.1%	1.0%	0.9%	0.62%	0.9%

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[10] It is worth noting that subsidization was seized in 2006 for Yerevan Municipality until 2010. Starting June 2010, the Regulator left unchanged the tariff for Yerevan Jur Company; therefore, Yerevan intends to compensate the difference to the private operator (Lessee) directly. The total amount of subsidies will thus increase in 2010 and presumably, 2011.
[11] Includes estimates of the subsidy for Yerevan Jur in the amount of AMD 663 million: actual data not available.

The 2008 survey revealed the following picture of benefit incidence of the programs for water supply per quintile:

Table 3 Distribution of water connections by quintiles

	Expenditure Quintile				
	1 (lowest)	**2**	**3**	**4**	**5 (highest)**
Drinking water supply (connections to the supply systems), 2008	19%	19.8%	19.9%	20.5%	20.8%

While distribution across quintiles is quite similar, it reflects only access to the water supply system, and not the variations in benefit incidence in terms of "usage" of the system or, rather, the actual consumption of water by households across the quintiles. The 2010 survey data was used to estimate this: first, per capita payments were calculated for all respondent households; then, per capita consumption was estimated based on per capita payments.[12] Based on per capita consumption estimates, benefit incidence changes, as shown in Table 4.

Table 4 Water consumption per capita by quintiles

Benefit Incidence	Expenditure Quintile				
	1 (lowest)	**2**	**3**	**4**	**5 (highest)**
Benefit incidence depending on the consumption volumes per capita, 2008	9.6%	13.2%	17.0%	23.6%	36.6%
Benefit incidence depending on the consumption volumes per capita, 2010	10.6%	14.2%	17.5%	20.9%	36.8%

According to the AST survey findings, the poorest 20 percent of households benefit from only 11 percent of subsidies (on a per capita consumption basis),[13] while the richest benefit from 37 percent due to higher per capita use of water, i.e. almost four times more. Therefore, despite a relatively proportionate distribution of access to the system in all five quintiles, it is clear that the poorest households benefit much less from the government's expenditure programs in the water supply sector. There was a slight improvement in distribution between 2008 and 2010, which has taken place at the expense of Quintile 4 only. This can be explained by the adjustments in consumer behavior in that quintile due to increased tariffs. Meanwhile, benefit incidence in Quintile 5 even increased slightly—by 0.2 percentage points.

Thus, the survey reveals that the benefit to rich households from government water subsidies is almost four times more than for poor households (37 percent as compared to 11 percent).

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[12] It was impossible to identify which WSC supplies each of the households. Moreover, as tariffs are changed in April–June every year, the average tariff for all five WSCs was used to estimate per capita consumption. Since tariffs for all five companies do not vary drastically and fall into a relatively narrow range of AMD 172 to 202 per cubic meter (CM), the resulting error would not significantly affect the analyses of benefit incidence.
[13] For details please see the section "Policy Issue and Policy Question".

Although the goal of the policy is to make water supply services affordable (presumably to the poorest in the population), this is apparently not met through direct subsidies. The best way to target any subsidization program is to narrow the beneficiary group to the poorest population. To do that, it is necessary to analyze whether improved targeting is at all beneficial—e.g. by way of savings in monetary inflows into the sector that can be used in another sector or in the same sector for other purposes.

The main aim is for the richer households to pay the increased tariffs,[14] while subsidizing the poorer households by that amount to neutralize the effect of tariff increase. This corresponds to the Demand Side of the graph presented in the Literature Review earlier.

Naturally, there is skepticism on whether or not the population (especially the lowest quintile) will accept this as a valid proposition. This is why AST tried to test the possible level of acceptance of policy alternatives in its recent survey. The results presented in Table 5 indicate that the population is prepared for a slightly higher tariff, provided this is accompanied by improvements in service delivery.

More specifically, the 2011 summer survey included a question on potential willingness to pay for improved services. The responses are summarized in Table 5.

Table 5 Propensity to pay extra money for better services by quintiles

	1 (lowest)	2	3	4	5 (highest)	Average
Total amount willingly forthcoming for improved water supply services (AMD per month)	1,657	1,702	2,031	2,380	2,855	2,125
Increased average monthly WSS bills as share of total HH expenditure	1.9%	1.3%	1.1%	1.0%	0.65%	1.0%
Increase in HHs monthly payment (AMD)	295	180	113	161	144	179

This shows that households are willing, on average, to pay an extra AMD 179 per month for improved services of water supply. Notably, households in the poorest quintile are ready to pay much more (AMD 295), while the richest are willing to pay only AMD 144[15]. Extrapolating the average monthly AMD that households are willing to pay for improved services, and taking into account the number of connections/households served by five WSCs (720,000), we arrive at an additional AMD 1.5 billion annual inflow to WSCs (720,000 households *AMD 179 * 12 months = AMD 1,544 million). This is about the same magnitude of current subsidies paid by the government to water suppliers which, again, supports the idea that Option 2 (see next section) is the feasible policy for the government to consider.

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[14] See sections on "Policy Options" and "Recommended Option".
[15] This still does not reach the level of monthly average bills for the highest quintile, but the marginal propensity of the poor HHs is worth noting.

On the one hand this shows the willingness of consumers to pay more, and, on other, supports the idea that in general no affordability issues will arise. However, the willingness of households in Quintile 1 to pay about AMD 300 more means that they will have to spend about 2 percent of their total household (HH) expenditure, while the richest would put in only 0.65 percent of their expenditure. Despite the additional amount from both the poorer and the richer households, one would expect certain interventions to neutralize the impact of tariff increase, taking into account health, sanitation, and social aspects of water consumption.

At the same time, the additional AMD 1.5 billion from increased tariff shows that the government can go as far as Option 2 discussed in the CEA report: increasing tariffs to a level that ensures operational cost-recovery, simultaneously compensating poor households for the increased amount of tariffs (capital expenditure will continue to be funded by the government as the owner or co-owner of water supply companies). The justification is that the additional amount that households are willing to pay is almost equivalent to replacing the current government subsidies for the operational lacunae of the WSCs.[16] In other words, Armenian households are not willing to pay for capital (renovation) costs which are currently fully covered by the government.

The lowest quintile would spend 1.9 percent of their household expenditure on water services according to the willingness-to-pay estimates: that is, they will almost reach the assumed affordability threshold. This is why we suggest helping needy households by neutralizing the effect of tariff increase on them. The proposed subsidy scheme will allow them to spend the same amount on water supply and consume the same quantity of water—other things being equal (the difference arising from tariff increase will be paid to the household so that they can pay the supplier).

Specific question: by how much will savings improve the household budget if subsidies are focused on only the neediest households? (In particular, removing direct subsidies for covering operational inadequacies of water supply companies, assuming that capital expenditure will continue to be funded by the government). In other words, the policy question we address looks at the problem from the government's point of view, assuming that savings from (any) expenditure items can be diverted to funding any other urgent program, including in the water supply and sanitation sector. Subsequently, the "effect measure" of the proposed policy option is "less government expenditures" for the same result as previously.

Discussion of Policy Alternatives and Simulation of Solutions

Background on Previous Policy Solutions

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[16] Annual subsidies were estimated to be about AMD 1.3 billion for a designed reference year under the CEA.

Based on the long-term objectives of the government and the current state of tariffs and subsidies , we designed the following options:

- Option 1 (**status quo**): Continuing the current practice of subsidies and investment financing for an indefinite period of time.
- Option 2: Increasing the tariffs to a level that ensures **operational cost-recovery**, simultaneously providing compensation to the poor households for the increased tariffs (not including capital expenditure which will continue to be funded by the government).
- Option 3: Increasing tariff to ensure **full cost-recovery** (including capital expenditure) and simultaneously compensating the poor households so that the effect of tariff increase on them is minimal.

Option 3 is not practical in the short and medium term for several reasons, such as access to concessional donor funding, as well as the level of marginal increase of tariffs supported by the population. However, this alternative can be a worthwhile point of discussion to estimate its *potential* impact on households and the government budget. It is apparent that capital financing from concessional donor funds is the preferred option as compared to increasing tariffs, as long as such funds are available. However, in a long-term perspective, bilateral and multilateral donors may divert their funds to other sectors (or discontinue concessional lending to Armenia), which will leave two options available: all capital expenditure to be funded by the government from general taxes, or transfer all or part of the burden to consumers through tariffs. There could be another option which represents a combination of the two: gradual or partial increase in tariffs to include capital expenditures with some investments continuing to be funded by the government. We can estimate the potential impact on tariffs and further discuss policy options.

There is another indirect reason why Option 3 is not of immediate interest: the magnitude of investment needs to be clearly identified and estimated. Various sources suggest that the amount of investment is huge, while available or potential financing is limited. World Bank estimates state that[17] USD 179 mln is immediately needed in Yerevan Municipality and the Armenian Water and Sewerage company (AWSC) areas within the next five years, whereas long-term investment needs are estimated at around USD 1.6 bln (USD 1 bln for Yerevan and USD 0.6 bln for AWSC).

It is important to note that there is no need to expand the system as the majority of the population is already connected to the water supply system. The same report notes that consumption of free, non-revenue water is extremely high in relation to international standards: 75 to 85 percent, which is explained, first, by very old and poor physical infrastructure, and, second by commercial losses due to insufficient metering. World Bank data shows that 40 percent of all losses are commercial losses, while 40 to 45 percent are technical losses and leakages. This also affects operating expenses in terms of repair, and increases the need for enhanced water supply to meet the demands of customers which is in compliance with the service delivery indicators.

Discussion of Policy Alternatives (Impact Simulation of Policies)

Option estimates were designed based on:

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[17] Republic of Armenia Water Sector Note, May 2011, World Bank, pp. 46-47.

- recent average consumption patterns for the period 2005–2010,[18]
- actual payments—receipts of funds from customers and the government (versus sales that are calculated on the basis of set tariffs),[19]
- actual capital expenditures borne during the last several years (versus depreciation of assets that ideally should be part of the tariff), [20]
- average number of households that received regular family benefits during 2007–2009 (117,779 households).[21]

Furthermore, taking into account that the companies underwent significant reforms and changes during the past five to seven years, a "reference year" was chosen that reflects the most recent scenario in the sector. In particular, the main assumptions and estimates used in the model are:

- Volumetric supply of water to customers—Option 1: Water consumption has been decreasing over the years. The two major impacts were (i) introduction of metering at the household level, and (ii) gradual tariff increases. When designing a model with proposals to increase tariffs, one should take into account elasticity of water consumption as well. It is not possible to estimate the "actual" price elasticity of water demand in Armenia from the current household data available. Instead, we relied on the findings and conclusions by Nauges and Wittington in their study, "Estimation of Water Demand in Developing Countries: An Overview" (2010). According to them, estimates of own-price elasticity for water from private connections is in the range of -0.3 to -0.6. Based on these estimates and in the absence of any elasticity coefficient from data available, we chose to use price elasticity coefficient equal to -0.5. Thus, total consumption (sales) of water will further decrease by around 8 percent if tariffs are increased by 16 percent, as assumed in Option 1. This implies that water supplied to and consumed by customers in the reference year for Option 1 will drop to 78.5 mln CM for the five major companies. This magnitude of tariff increase is within the range that Armenian households have been facing during the past several years, the response to which will be in line with the trends observed in recent years in terms of consumer behavior. Volumetric supply of water to customers —Option 2: In order to compare Option 1 and Option 2, the calculations and comparison are based on the same estimate of water consumption by households. i.e. we deliberately assumed that households will be indifferent to tariff increases in both cases to make the results comparable. However, one should not overlook the elasticity factor when referring to a tariff increase of about 70 percent. Thus, elasticity calculations are presented separately (see Section on "Price Elasticity of Water Demand under Option 2"), together with an explanation of the findings.

- Annual capital expenditure volumes: the average for the past five years is taken to neutralize the effects of annual fluctuations which are usually the result of the slow pace of development at the beginning of a project, and accelerating towards the end. Capital expenditures are necessary to replace worn-out assets and optimize the system. There is no need to expand the system because there is a high degree of access throughout the country (see Box 1). There is no risk of overstating the amount of

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[18] Reports of WSCs to the PSRC, SCWS reports. www.psrc.am, www scws.am.
[19] www.psrc.am
[20] Annual State Budget Laws, 2005-2009 , adopted by the National Assembly of RA.
[21] www.mss.am

investment necessary by using the actual data as the basis because various studies have estimated the total requirement to be in the range of USD 400–800 mln.

- Tariffs and collection rates: tariff collection level was above 90 percent of bills for the past three to four years, which implies that the actual "burden" on households is lower than it would be if calculated at tariffs set by the regulator. On the other hand, this is exactly the reason why the government subsidizes these companies. Therefore, the actual average "effective" tariff for households would be total payments, divided by the volumes of water billed. (It was assumed that tariffs set by the regulator will be the same as in 2009.)

- Amount of subsidies under Option 1: (i) average for the past three years was taken as the basis. In addition, a sum equivalent to the subsidies announced by the Yerevan Municipality was included (annual volume of water supplied to consumers, multiplied by the difference in tariffs applied for and approved to the tune of AMD 14 per CM); (ii) average of capital expenditures funded by the government in the sector for the past five years was also taken.

These assumptions are subject to various factors that will affect the level of tariffs resulting from our model. Changes in any of them will determine the magnitude by which tariffs will need to be adjusted for any of the options; however, the compensation model can be used regardless of the magnitude of tariff increase or even the choice of beneficiaries (e.g. households in Quintile 1 only or part of those in Quintile 2 as well).

Box 1. Investment Estimates and Capital Expenditures vs. Depreciation

If all costs of water supply and sanitation are to ever be funded through tariffs, it is better to take into account the annual depreciation costs of assets in calculating tariff, instead of capital expenditures estimates which tend to fluctuate, largely due to availability and/or magnitude of funds. However, this approach does not seem to be feasible at the moment for a number of reasons:

- Book value of assets is not currently known; moreover, as assets are usually very old (they date to the Soviet period and their re-valuation does not reflect the actual cost to be included in the tariff). Asset re-valuation has been initiated by the major WSCs, but the findings are not expected within the time-frame of our study.
- Replacement value is not an adequate method either, because available investment estimates are very rough and mostly show the degree and not actual investment needs.

Therefore, taking the most recent capital expenditures data is a much more conservative approach that does vary significantly over the years. However, there is a growing trend: (AMD 10.8 bln in 2009, AMD 13.0 bln in 2010, and AMD 15.3 bln in 2011 in contrast to AMD 4-5 bln in 2006–2008). For comparison, capital expenditures of AMD 15.3 bln in 2011 are equivalent to USD 40 mln.

The three options can be compared on the basis of their total impact (cost) on the government budget, as it is assumed that gradually (and eventually) the consumers will need to pay the full cost of services they consume. However, consumption of water is determined at the household

level rather than the individual level because many household chores are "centralized". Therefore, we preferred to make all calculations at the household level.

Assuming that a subsidization program by definition is a pro-poor policy instrument and strives to ensure improved access to or affordability of certain services or goods for the poorest strata of a country's population, one would take the number of poor to calculate the CE ratios. In Armenia, social support programs are mostly implemented through the family benefit program[22] which targets the poorest households. According to the World Bank report, "Armenia: The 2008-09 Global Economic Crisis, Policy Responses, and Household Coping Strategies" (2010),[23] about 61 percent of family benefit program funds went to the lowest quintile, making it one of the better-targeted programs in the region. Thus, choosing the actual beneficiaries of the family benefit program for any subsidization or support program will automatically ensure reasonably adequate and accurate targeting of assistance.

A household is considered eligible for inclusion in the family benefit program if it meets certain criteria: various parameters are taken into account to calculate the total household score, such as social group of each of the household members, number of individuals unable to work, location, housing conditions, average monthly income, etc. During 2007–2009, on average 11,7779 households received family benefits.[24] Thus, one could consider this figure as a good proxy for the number of poor households —i.e. primary target beneficiaries for any subsidization program in Armenia. In our calculation of CE ratios, this number is taken as the beneficiary number.

Box 2. Family Benefit System in Armenia

The Family Benefit (FB) system is Armenia's main, last-resort, social assistance program aimed at protecting the very poor and vulnerable groups. In the late 1990s, Armenia reformed its social assistance system by integrating specifically targeted programs into a version of proxy- means testing to target the intended beneficiaries. The result is a simple, cash-based system that accords priority to the elderly, those with disabilities, and poor families with children. As a result of these changes, the non-contributory safety net programs consist of one main anti-poverty scheme for low-income and vulnerable households: the Family Benefit. The FB is proxy means-tested on income and other poverty risk factors and is targeted at the most vulnerable families. The FB beneficiaries also qualify for a free basic health package.

Family benefit targeting is done using the so-called household poverty and vulnerability scoring formula. The scoring formula ranks applicants in terms of their expected poverty level. It gives preference to certain social groups such as the disabled, single mothers, orphans, and families with many children, as also a host of other variables such as income, place and condition of residence, car ownership, and utility bills.

The FB program accounts for about 60 percent of total spending on social assistance programs. As a share of GDP, Armenia's social assistance spending is on par with the average of 1.7 percent in Europe and Central Asia, but less than the 2.5 percent average for OECD countries.

In 2009, about 107,000 households received family benefits with about 61 percent of the program resources accruing to families in the first quintile, making it one of the well-targeted programs in the region.

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[22] Under the Ministry of Labor and Social Issues. www.mss.am
[23] Page 28, p 4.22, 4.25.
[24] Annual Budget Reports, Ministry of Labor and Social Issues of Armenia, 2007, 2008, 2009.

the same tariffs to all" is an economically unsound policy. Therefore, the main component in the measurement of effectiveness is those beneficiaries most in need of subsidies. In the Armenian context, it is the lowest quintile of the population. Hence, the methodology of effectiveness assessment is to identify the real costs of the policy options on the real beneficiary of that policy (including the current policy).

Results of the calculations are summarized in Table 6.

Table 6. Calculation results (simulations on options)

	Option 1 (Status quo)	Option 2 (Operational cost- recovery)	Option 3 (Full cost- recovery)
Increase in tariff level (%)	unchanged	16%	69%
Subsidies to water companies (AMD mln)	1,967.0	0	0
Benefits (compensation) to the poor (AMD mln)		331.3	1,419.6
Capital expenditures funded by the government, (average 2005-09) (AMD mln)	6,460	6,460	0
Total expenditures from the Budget,[25] (AMD mln)	8,427.5	6,791.8	1,419.6

Option 2 shows that the tariff increase in operational cost-recovery (by 16 percent from their current level) can be borne by the non-poor households without causing affordability issues. However, in order to neutralize the effects of tariff increase on poor households in Quintile 1, the government will need to provide (at least in the mid-term but also as a long-term solution) compensation to about 117,000 households (about 460,000 individuals), amounting to AMD 331.3 million.

The difference in amount of about AMD 1.6 bln (1,967 -331.3 = 1,635.7) will be borne by non-poor households in Quintiles 2 to 5, proportionate to their consumption volumes.[26]

The purpose in Option 3 was to estimate the amount to be paid as compensation to the poor if the tariff is set to cover the full cost of services (including annual capital expenditure as a proxy for depreciation of fixed assets). According to data for recent years, the tariffs will need to be increased by 69 percent in order to cover not only total operational expenses, but also about AMD 6.5 bln as average annual capital expenses. Other things being equal, such an increase will raise the share of water supply and sewerage (WSS) expenses in the household budget by the same magnitude. Table 7 shows the average share of payments for WSS services in household expenditures per quintile, as well as the share if tariffs are increased to the level of full cost-recovery.

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[25] Includes the amount of subsidies paid by the Yerevan Municipality as compensation for the rejected tariff increase (AMD 14 per CM) for half a year.

[26] Benefit incidence in terms of connection to the system of drinking water supply ranges from 19.75 percent in Quintile 2 to 20.85 percent in Quintile 5. "Benefit Incident Analyses, Strengthening Institutions to Improve Public Expenditure Accountability Project", AST, Armenia 2010.

Table 7. Average monthly WSS bills under status quo and discussed options

	Average monthly HH bills, AMD	Increase from Status quo, AMD mln
Status quo	1,453.0	
Option 2	1,687.4	234.4
Option 3	2,457.4	1004.4

For Quintiles 2 to 5, the share in total household expenditure will be below 2.5 percent. An increase in tariffs should not create any major problems for the non-poor households. As for households in Quintile 1, the burden of new tariffs may be quite substantial.

Table 8. Current and potential costs (share in HH budget)

	Share of WW payments in household expenditures, 2009[27]	Share of WW payments in household expenditures, tariffs increased by 69%
Q1	2.16%	3.65%
Q2	1.50%	2.53%
Q3	1.34%	2.26%
Q4	1.21%	2.05%
Q5	0.76%	1.28%

Therefore, again, Quintile 1 (and maybe some households in Quintile 2) will need compensation in order to neutralize or mitigate affordability problems that may arise. If the government chooses to fully apply this option, then the total compensation will amount to AMD 1419.1 for the poorest households included in the family benefit program. This amount will be sufficient to neutralize the effects of raising the "effective" tariffs from their current average level of AMD 155 to AMD 263. It is worth noting that AMD 1419.1 already includes the compensations necessary for the level of tariffs to reach operational cost-recovery (AMD 331.3 mln), while the remaining AMD 1088.3 mln will be the "contribution" of the poor to the pool of funds necessary for capital expenditures. The non-poor households will therefore pay for the corresponding remaining blocks of operational and capital expenditures.

As noted, the government currently subsidizes the WSS companies, both for operational and capital expenditures, in order to avoid the need to drastically increase tariffs. Logically, any subsidization policy, or policy to maintain tariffs at low and affordable levels, is a policy geared to help the poorest strata. In other words, the government addresses the social, health, and other concerns connected with access to water. Although the current policy covers all five quintiles almost evenly in terms of access to services, it favors the rich almost four times more as their consumption in per capita terms is much higher. Logically, affordability is a major concern for the poor, i.e. Quintile 1 and partially Quintile 2. In other words, all taxpayers pay for a part of the services rendered to all five quintiles, which apparently favors the rich households more than the poor. However, any subsidization program can be improved in terms of accurate targeting by narrowing the beneficiary group to the poorest population; i.e. taxpayers can

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[27] AST Survey, 2009.

"save" money by paying only for any intended part of the services delivered to the poorest households. Overall, the total impact on the government will be:
- under Option 2, decreased from AMD 8.4 bln to AMD 6.8 bln (savings of AMD 1.6 bln)
- under Option 3, decrease from AMD 8.4 bln to AMD 1.4 bln (savings of AMD 7.0 bln) (see Table 8).

It should be noted that although the differences under both Options 1 and 2 (AMD 1.6 bln and AMD 7.0 bln) will be met by the non-poor households[28] without any major impact on the water supply companies in terms of finances, the sector will overall be much more sustainable and will operate on a commercial basis. Under the considered options, there will be no direct subsidies from the government to water supply companies: all revenues will come from actual customers as payment for services. However, part of the total number of households will be supported financially to neutralize the burden of increased tariffs on them.

Price Elasticity of Water Demand under Option 2

As already noted, Nauges and Wittington found that literature on household water-demand in developing countries suggests that estimates of own-price elasticity for water from private connections is in the range of -0.3 to -0.6, and that income elasticity is typically in the range 0.1–0.3, both close to what is usually reported for industrialized countries.

For our analyses, we assumed that price elasticity for Armenian water consumers would be -0.5 due to lack of any evidence of actual elasticity: this is close to the mid-point of the range – 0.45, then rounded off . Table 9 presents the calculation of possible demand values if tariffs increased by 16 percent and 69 percent, respectively, for Options 1 and 2.

Table 9. Calculation of demand for water with elasticity factor incorporated

	2009	**Option 1**	**Option 2**
Proposed increased tariffs (AMD)		180.3	262.5
Proposed increase in the tariff (%)		16%	69%
Water supplied (mln CM)	92.0	78.5	55.7
Change from previous year	-5%	-8%	-35%
Total sales (mln AMD)	14,723.1	14159.71	14614.69
Payment collection rates (%)	94%	97%	97%
Payments from customers (mln AMD)	13,834.6	13,734.9	14,176.2
Total capital expenditures (mln AMD)	10,851.2	6,460.5	441.3

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[28] This, in effect, also includes consumption by small commercial entities connected to the centralized water supply.

If, as Option 1 suggests, tariffs are increased by 16 percent to meet operations cost-recovery, households will reduce their consumption by half the increased percentage (-0.5*16%=8%). This will lead to a drop in total consumption from 85 mln CM to 78.5 mln CM (other things being equal). Thus, the total sales of water will amount to AMD 14.2 bln and, if the same collection efficiency (97 percent) is assumed, total payments for water supply and sanitation services will amount to AMD 13.7 bln. Capital expenditures will be financed by the government under Option 1.

Similar calculations for Option 2 show that a 69 percent tariff increase will force consumers to reduce consumption by half that value (-0.5*69%=34.5%). This will lead to a decline in total water consumption to 55.7 mln CM per year, total sales reaching AMD 14.6 bln. Even if we assume that collection efficiency will be maintained at 97 percent, total payments will equal AMD 14.2bln. Keeping in mind that under this Option capital expenditures will no longer be financed by the government, and that the companies would have to finance them out of total payment received from customers, only about AMD 450 mln remains for annual depreciation out of increased tariffs; I.e. under given income constraints in the short and medium terms, it is apparent that consumers will adjust their consumption to pay approximately the same amount for services—AMD 13.7 bln or AMD 14.2 bln. In other words, there will be little difference in terms of total revenues of water supply companies whether the tariff is increased by 16 or 69 percent (other things leaving equal).

At this point in time, as already noted, there is no clear data to analyze whether or not that amount will be sufficient: investment needs are huge, but their expected life is uncertain.

Therefore, these calculations are another reason why Option 3 cannot be recommended in the short and medium terms, taking into account that overall income level and service improvements will not be sufficient to switch to full cost-recovery of tariffs.

Recommended Option

Based on this analysis, our recommendation would be to consider introducing only Option 2. There are a number of reasons that justify this:

- Indications are that households are willing to pay an additional AMD 1.5 bln to cover only the operational costs of improved water supply services. That is about the current level of subsidies paid by various levels of government to the WSCs. However, they expect the government to pay for improvement in services in terms of capital rehabilitation and renovation of water supply infrastructure.

- Elasticity of demand in the range of -0.3-0.6 suggests that consumers are likely to adjust their consumption such that that pay approximately the same (or marginally more) amount for water. This, in practice, implies the exclusion of Option 2 in the short and medium terms.

- Capital expenditures until now were mostly financed from IFI loans at concessional terms. There is still a substantial amount of such funds available to Armenia's proposed or on-going projects. Given the current state of infrastructure, it would not be reasonable to reject these funds outright: they can be efficiently used to rehabilitate

infrastructure and improve the services. At the same time, IFI loans are often conditional on involving a private operator. This is also a very positive second reason not to think about replacing IFI loans with local funding, even if it were feasible.

- At the same time, the savings expected to accrue to the government as a result of subsidizing the poor households instead of WSCs can be effectively used in the same sector: eventually, IFI loans cannot cover the entire cost of rehabilitation and renovation of infrastructure. The government is not flexible in using loan proceeds of any of the five WSCs for purposes other than demarcated since they are tied to a particular company and intended for a certain range of rehabilitation works. Thus, savings from removing subsidies for the rich can be used to finance emergency or urgent capital works during the financial year.

Policy Implementation

Policy Decision

The recommended policy option needs to be adopted by a Government Decree stating the government's intention to discontinue subsidies to the WSCs and replace it with direct compensation to the poor households. Ideally, the Public Services Regulatory Commission (PSRC) which is responsible for setting the tariffs should also take a decision and make the relevant announcement to the public. Prior to the final decision, intensive discussions need to be held (a) between the State Committee on Water Systems, Ministry of Labor and Social Affairs, on the details of adding the compensation for increased tariffs to the ordinary family benefit, as well as additional grounds for inclusion/exclusion of a poor household from compensation for water supply services; and (b) between the government and Public Services Regulatory Commission[29] on the date the tariff increase will take place and coordination of steps and measures to be taken by both sides. The PSRC should commit to an increase in tariffs to the operational cost-recovery level so that the recommended policy option is feasible to implement.

Based on the agreements between these players, the government should adopt a Decree stating its intentions and timing. It is best to do that in advance, i.e. mid-year, with the plan to stop subsidizing the companies at the beginning of the following year. In this case, the government can also reflect the relevant program changes in its Draft Budget for the next year. At the same time, the PSRC should also announce its intentions to increase tariffs the following year.

In addition, consultations should be held with existing operators under existing PPP arrangements (Lease and Management contracts) to inform them of the details of the proposed policy so that they are prepared for any changes, either in consumer behavior or with the willingness to pay.

The change in subsidization policy at the first instance should be at a joint press conference by the Chairman of the State Committee on Water Systems, Ministry of Labor and Social Affairs

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[29] According to Armenian legislation, the Public Service Regulatory Commission (PSRC) is an independent body.

(from the government's side) and the PSRC Chairman. They should give the first indications of changes so that the households have sufficient time to apply for compensation, if eligible.

Subsequently, PR campaigns should be organized through the media to increase awareness among the population of the real cost of supplying the services, explain the advantages of the new policy (e. g. better targeting of the poor, transparency, increased revenues for WSCs without dependence on direct subsidies), as well as information on procedures to apply for compensation. This will help mitigate potential risks of tariffs being unacceptable, thus creating problems with collection efficiency in future.

Improvements in Legislation

Current legislation fully supports the idea of tariffs covering the full cost of water supply and sewerage services. The policy stated in the Water Code is to gradually move towards cost-recovery of tariffs**,** along with increasing incomes and improvement in the performance of WSCs. Thus, operational cost-recovery of tariffs is an even softer option than envisaged by the Water Code. Therefore no adjustment in current legislation is required.

I*mprovements in Data Collection and Monitoring*

Steps should be taken to regularly monitor the households included in the family benefit package (and thus compensated for increased water supply bills). This is necessary to ensure that these households consume enough water per capita so as to avoid any major health or hygiene problems. This is not possible through WSC data which does not have information on the number of household members. Moreover, regular surveys should be carried out to determine issues that might arise in non-poor households (households that are currently not included in the family benefit program). These surveys can either be incorporated into the Integrated Survey of Living Standards of Households carried out by the NSS every year, or can be outsourced to other organizations. In both cases, AST is ready to share the methodology used for its surveys and assist in developing regular survey methodologies if necessary.

Risk Management

As noted, there is no major affordability risk expected for Quintiles 2 to 5. Meanwhile, the expected affordability risk in the poorest quintile will be dealt with directly. However, there is a risk of overall reluctance among consumers to tariff increases as water is perceived as a "public good". To cope with that risk, it will be necessary to organize a public awareness campaign with the involvement of respective public bodies and officials to explain in detail the current arrangements whereby the rich get a greater share of the subsidies, stress the importance of the new policy, and highlight the benefits and increased fairness of the new tariff and compensation system. Details of such public awareness campaigns can be further refined through the stakeholder mapping exercise presented in Annex 4.

Financial Framework

In net terms, no financial allocation is required for the proposed policy. On the contrary, it will bring savings to the government in the amount of the difference between annual subsidies previously paid to WSCs and the compensation to the poor to neutralize the effect of tariff

increase (AMD 1.9 bln - AMD 331 mln = app. AMD 1.6 bln). However, the introduction of a new budget program (or an increase in the existing family benefit program) will be required for which we have prepared an MTEF new initiative submission (in accordance with the guidelines of the Ministry of Finance) to support this process (see

Annex 3. Draft of the MTEF Template on New Initiatives to be Presented to the Ministry of Finance

Further Elaboration of the Model

Prior to policy implementation, we suggest that the relevant government agency consider options for enhancing as many aspects as possible should the relevant data become available by that time. The specific areas of improvement can be:

- Use of consumption elasticity instead of rough estimates of total water consumption (some base analysis of consumption elasticity using international practices has been provided earlier in this report). However, elasticity may affect the magnitude of tariff increase required, but the model itself can still be used. While our policy simulation takes into account some level of elasticity built on earlier behavior of Armenian consumers, those calculations are based on a set of different factors that have affected the consumption behavior in a combined fashion (systemic changes, introduction of meters, etc). We at AST cannot calculate Armenian country-specific pure price elasticity due to lack of proper empirical data, which is why an international experience has been used instead. AST will continue its efforts in seeking solutions for calculating in-country elasticity ratio.

- Details of compensation: currently, 61 percent of family benefits go to Quintile 1, and 39 percent to Quintile 2. The government may choose to subsidize only those households in Quintile 1 by setting a threshold on the "eligibility" score of individual households to be compensated. Alternatively, the government may choose to partially compensate for the impact of tariff increase on households in Quintile 2 (e.g. by compensating certain fixed consumption volumes). Finally, the government may adopt AST's suggestion and decide not to link it to any other existing system but to use an independent system of compensating the poor families with a different method of identifying poverty levels (based solely on water consumption rather than general poverty). There may be many other options that can be formulated if the umbrella decision on the compensation system and its possible linkage with the existing family benefit system is chosen.

- A more specific investment program to identify financing needs (in case partial implementation of Option 3 is chosen to be implemented). Our model is a "finance minister's perspective" of the solution to the existing policy issue. This is why the solution is based on optimizing the budget allocation system (including the aspects of capital financing, which look like a model of using today's capital expenditures levels as exogenous factors). A "water sector specialist perspective" on capital expenditures might consider a "needs-based" model. The choice of the model is for policy decision makers to consider. In any case, the overall concept of substituting the existing

"subsidization of the whole system" with a more adequate system of "subsidization of poor families" is constant for both models.

These are the sort of enhancements that policy decision makers can make if the general concept behind this policy simulation is adopted by the government. However, the details of the policy simulation models are subject to initial decisions taken to switch to this concept. This report is primarily aimed to assist in informed decision making, rather than on specific details of the model that can be chosen in a more flexible fashion.

Next Steps

The Gantt chart below summarizes the steps to be taken by various ministries and bodies to ensure that new tariffs are effective starting April 2013, with respective compensations paid to poor households through the family benefit system.

Table 10 Timetable for proposed activities

Steps	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12
Step 1. Internal ministry discussion of the PS paper presented by AST for decision making	▓	▓	▓							
Step 2. Discussion with other relevant ministries and agencies (Ministry of Finance, Ministry of Labor and Social Affairs, PSRC, etc.)			▓	▓	▓					
Step 3. Presentation of the policy paper to the government						▓				
Step 4. Discussion by government, presentation to the Cabinet session and approval						▓				
Step 5. Reflection of the government-approved policy proposal in the draft Budget Bid 2013 (by SCWS and MoLSI to MoF)								▓		
Step 6. Public outreach events, press conferences of relevant officials							▓	▓	▓	▓
Step 7. Projected date for new tariff effectiveness and monthly compensations paid as part of family benefits										Apr-13

Impact Analysis

As noted above, total cost can be divided by the number of program beneficiaries to arrive at the cost to the government per beneficiary. The CE ratios or cost per beneficiary is presented both in annual and monthly terms.

Table 11. CEA ratios for water sector policy alternatives

	Option 1 (Status quo)	Option 2 (Operational cost-recovery)	Option 3 (Full cost-recovery)
Total cost (Operational Subsidy + Capital expenditures), AMD mln	8,427.5	6,791.8	1,419.6
Number of poor HHs	117,779	117,779	117,779
Total cost per 1 poor HH, AMD annually	71,553.4	57,665.7	12,053.1
Total cost per 1 poor HH, AMD monthly	5,962.8	4,805.5	1,004.4
Comparison to status quo, % change		-19%	-83%

The ratios show that currently the government spends AMD 5900per month per potential beneficiary household. However, if tariffs are increased by 16 percent to cover full operational cost-recovery (capital expenditures continuing to be funded by the government), the government would have to pay AMD 4800 to each poor household to make up for the increased tariffs. This AMD 4800 is the part that corresponds to the amount of capital subsidies to WSCs and direct compensation (of AMD 234.4[30]) to a poor household in order to neutralize the impact of tariff increase. The remaining non-poor households would have to pay, respectively, 16 percent more for water supply services (provided they do not change the consumption pattern as a result of tariff increase). Nevertheless, Option 2 still leaves the burden of financing the capital expenditures on the government (approx. 6.4 bln AMD annually) in order to improve services while reducing the overall annual burden by about 20 percent (see Table 11).

The recent survey showed that households are willing to pay extra for improved services of water supply on average by AMD 179 per month. Notably, households in the poorest quintile are ready to pay much more (AMD 295), while the richest are willing to go up to only AMD 144. If we extrapolate the average monthly AMD that households are willing to pay for improved services, and taking into account the number of connections/households served by five WSCs (720,000), one arrives at an additional AMD of 1.5 bln annual inflows to WSCs (720,000 households *AMD 179 * 12 months = AMD 1,544 mln).

On the one hand this shows the willingness of consumers to pay extra and, on other hand, supports the idea that in general no affordability issues will arise. However, despite the willingness of households in Quintile 1 to pay about AMD 300 more than they pay now, they will have to pay 2 percent of their total expenditures as a whole. Taking into account health, sanitary, and social aspects of improved water facilities, one could conclude that the poorer households will need to be assisted in order to avoid affordability problems.

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[30] AMD 331.3 mln / 117, 779 beneficiary households/12 months = AMD 234.4 per month.

In this way, the overall sustainability of the sector will be much higher as compared to the current situation. The potential problems with the current scenario, as seen above, relate to capital expenditure funding, while operational expenditures will not constitute a serious problem. In particular, problems will become evident when donor funds are no longer available to finance capital expenditures necessary to repair the existing infrastructure. Meanwhile, if the sector gradually switches to fully paid services it will become less vulnerable to decisions made exogenously.

This will change the picture of benefit incidence drastically (with regard to subsidization programs). The benefits will accrue entirely to Quintile 1 as part of family benefits, shifting the target of the government policy to the poor, instead of an almost even distribution across all five quintiles. Meanwhile, with regard to capital rehabilitation expenditures, the benefit incidence will remain as it was in 2008—an almost flat line across all quintiles. Table 12 shows benefit distribution of various types of budget expenditures, as well as calculation of expected benefit incidence across quintiles after the proposed policy option is implemented.

Table 12. Calculation of impact of the proposed policy per quintile

Distribution of benefit incidence for different types of budget expenditures	Expenditure Quintile						
	1 (lowest)	2	3	4	5 (highest)	Average	Total
Benefit incidence depending on the consumption volumes per capita (2010)	10.6%	14.2%	17.5%	20.9%	36.8%	20.0%	
Distribution of CapEx subsidies across quintiles (according to 2010 distribution shares) (AMD mln)	684.4	914.8	1,132.6	1,350.1	2,378.7	1,292.1	6,460.5
Distribution of direct compensation to the poor HHs across quintiles (AMD mln)	331.3						331.3
Total subsidies per quintile (AMD mln)	1,015.7	914.8	1,132.6	1,350.1	2,378.7	1,358.4	6,791.8
Distribution across quintiles, total subsidies and compensations under proposed policy option	15.0%	13.5%	16.7%	19.9%	35.0%	20.0%	

This was calculated for the proposed policy option of replacing only those subsidies for operation and maintenance with direct subsidies/compensation to the poor households. A major assumption made in estimating the possible impact is that all (current) subsidies will go to Quintile 1. Meanwhile, all quintiles will continue benefiting from subsidies for capital expenditures in the same proportions as they did in 2010.

Annex 1. Statistics and Financial Data

Table 13. Underlying data and construction of a reference year

	2005	2006	2007	2008	2009	Reference year
Water supplied (mln CM)	114.9	96.3	91.7	96.6	92.0	78.5
Total sales (mln AMD)	12691.1	12792.5	13571.1	14179.8	14,723.1	12,568.4
Payments from customers (mln AMD)	8993.8	10295	11719.4	12588.1	13,834.6	12,191.3
Payment collection rates (%)	71%	80%	86%	89%	94%	97%
Current Subsidies to WSCs (mln AMD)	2,568.8	1,633.6	1,381.3	1,287.0	901.8	1,967.0
Total current	11,562.6	11,928.6	13,100.7	13,875.1	14,736.4	14,158.3
Effective tariff per 1 CM, average, w/o subsidies(AMD/CM)	78.3	107.0	127.9	130.3	150.4	155.2
Effective tariff per 1 CM, average, including subsidies (AMD/CM)	100.7	123.9	142.9	143.6	160.2	180.3
Increase in tariff to reach operational cost-recovery (%)	29%	16%	12%	10%	7%	16%
Total capital expenditures (mln AMD), including:	7,297.8	4,075.9	4,722.9	5,354.6	10,851.2	6,460.5
Donor-funded	_7,297.8_	_3,977.9_	_4,614.6_	_5,295.2_	_10,468.8_	_6,330.8_
Assumed full-cost tariff (AMD/CM)	164.2	166.3	194.4	199.1	278.1	262.5
Increase in tariff to reach cost-recovery (%)	110%	55%	52%	53%	85%	69%

Table 14. Calculation of policy option cost

Number of beneficiary HHs under family benefit	117,779
Average family size	3.9
Total amount of subsidies to neutralize the impact of tariff increase for the poor (total cost to the government) (AMD mln)	331.3

Annex 2. Comparison of Options 1–3

Table 15 Comparative table on policy options from state budget perspective

(Absolute figures)	Option 1 (Status quo)	Option 2 (Operational cost-recovery)	Option 3 (Full cost-recovery)
Increase in tariff level (%)	unchanged	16%	69%
Subsidies to water companies (AMD mln)	1,967.0	0	0
Benefits (compensation) to the poor (AMD mln)		331.3	1,419.6
Capital expenditures funded by the gvt (avg for 2005-09) (AMD mln)	6,460	6,460	0
TOTAL expenditures from the budget (AMD mln)	8,427.5	6,791.8	1,419.6

Table 16 Comparative table on policy options from family budget perspective

(CEA Ratios)	Option 1 (Status quo)	Option 2 (Operational cost-recovery)	Option 3 (Full cost-recovery)
Total subsidies, AMD mln	8,427.5	6,791.8	1,419.6
Number of poor HHs	117,779	117,779	117,779
Total subsidy per 1 poor HH, AMD annually	71,553.4	57,665.7	12,053.1
Total subsidy per 1 poor HH, AMD monthly	5,962.8	4,805.5	1,004.4
Comparison to status quo, % change		-19%	-83%

Table 17 Impact on poor HHs

Impact on poor HHs	Option 2	Option 3
Average consumption (lpd)	80	80
Average monthly HH consumption (CM)	9.36	9.36
Average monthly bill (current tariffs (AMD)	1,453.0	1,453.0
Average monthly bill (tariffs increased as described above for each option) (AMD)	1,687.4	2,457.4
Increase in monthly bills (as compared to the current tariffs, consumption unchanged) (AMD)	234.4	1,004.4

Annex 3. Draft of the MTEF Template on New Initiatives to be Presented to the Ministry of Finance

NEW INITIATIVES SAMPLE FORMAT

State Budget Agency
Ministry of Labor and Social Affairs

Description of the proposal/initaive
The initiative aims at replacing the current practice of subsidizing the Water Supply companies (so as to leave the tariffs low) with compensation for those who are included in the family benefit program in such a way that they will not be affected by the increase in water supply tariffs.

Priority
As part of the overall social policy aimed at protecting the poor, the family benefit program overall, and any expansion or increase thereof, is considered to be a high priority. Therefore, this initiative can be ranked as high priority and assigned rank 1.

Impact of new initiatives on expenditures

			(AMD mln)
	2013	**2014**	**2015**
Additional current expenditures	331	331	331
Additional current expenditures	0	0	0
(Savings/additional revenues)	(1,967)	(1,967)	(1,967)
Net Impact	1,636	1,636	1,636

Advantages

Advantages of the proposed initiative are (i) better targeting of budget expenditures towards the poor households (as opposed to subsidizing all quintiles) and (ii) savings to the government in the amount of more than AMD 1.5 bln annually.

Data on cost and distribution of priorities

If approved, the family benefit program will be allocated an additional AMD 331 mln each year to offset the impact of increased water supply tariffs for 117 799 Households included in the FB program. It will result in an average AMD 234 per month per household, or approximately AMD 2,800 per household per year.

Discussions

For details of discussions please visit www.ast.am.

**Other sources of financing for new initiatives**

<div align="right">

(AMD mln)

</div>

		2013	2014	2015
1	Total cost of new initiatives or expansions of existing programs	331	331	331
2	Other financing sources for new initiatives (2.1 + 2.2)	1,967	1,967	1,967
2.1	Financing from other sources	0	0	0
2.2	Cost savings from other programs	1,967	1,967	1,967
3	Net impact of new initiatives (expansions of existing) on the total budget (total cost less financing from other sources and savings); (1 – 2)	1,636	1,636	1,636

Annex 4. Stakeholder Mapping for Proposed Policy Option

The Graph below depicts the major stakeholders in the proposed policy initiative in terms of their relative alignment with or interest in the issue. The mapping helps to identify potentially influential players in pursuing the proposed policy and to better fine-tune awareness campaigns.
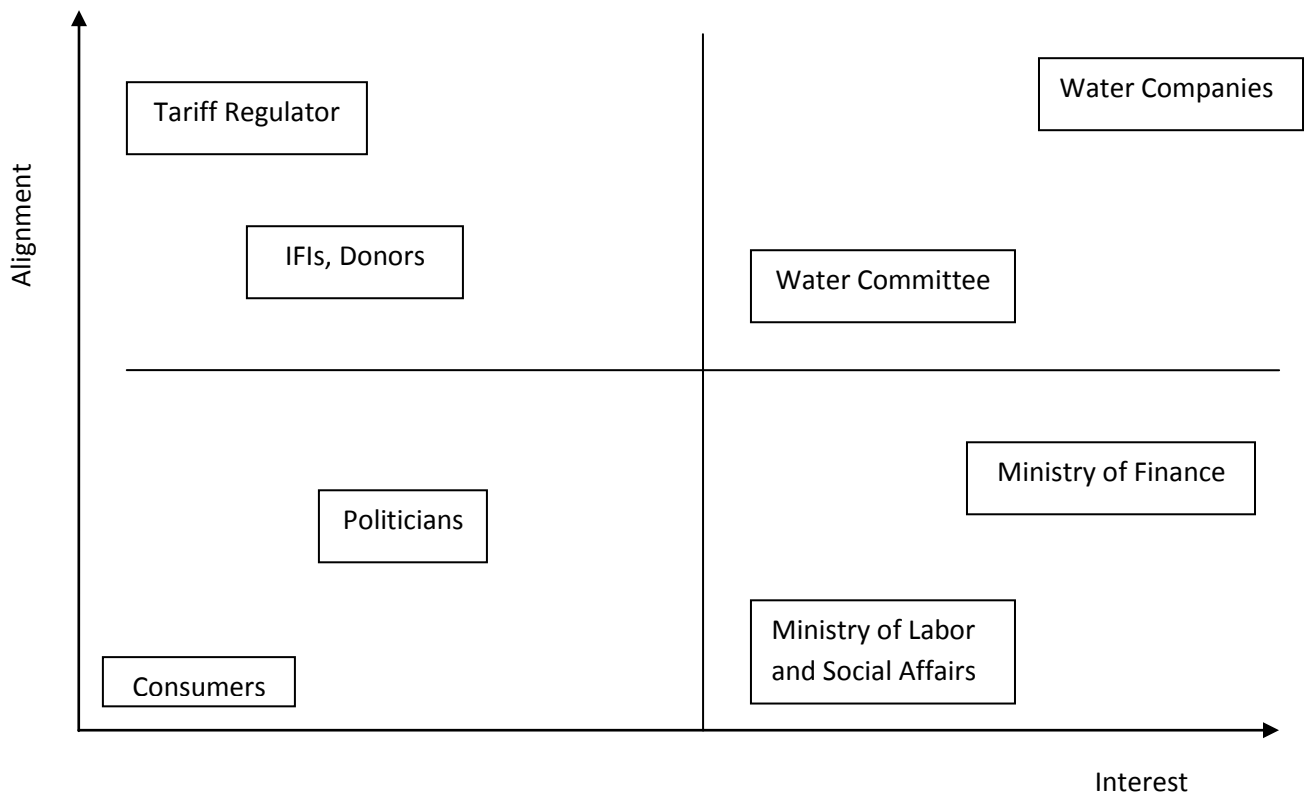
Preliminary analyses of stakeholders hints that the Water Committee and the water companies (operators) should both be interested in and aligned with increasing tariffs to the level of operational cost-recovery. They would be the easiest to engage, but politicians are not expected to be inclined towards tariff increases as it is not a popular measure in the eyes of consumers/voters. This gives an initial sense of how the awareness campaigns or approaches to various stakeholders need to be designed to support achieving the policy change.

Annex 5. Effectiveness Measure and Impact on Benefit Incidence

Benefit incidence was calculated from 2008 and 2010 survey data which not only reflects connection to the system, but also the actual use or consumption of water supply services across all quintiles.

Table 18. Effectiveness measure: expected benefit incidence across quintiles if proposed policy implemented

Benefit Incidence	Expenditure Quintile				
	1 (lowest)	2	3	4	5 (highest)
Benefit incidence drinking water supply (connections to the supply systems), 2008	19%	19.8%	19.9%	20.5%	20.8%
Benefit incidence depending on the consumption volumes per capita, 2008	9.6%	13.2%	17.0%	23.6%	36.6%
Benefit incidence depending on the consumption volumes per capita, 2010	10.6%	14.2%	17.5%	20.9%	36.8%
Expected distribution across quintiles, total subsidies and compensations under proposed policy option	15.0%	13.5%	16.7%	19.9%	35.0%

One can see that despite a relatively proportionate distribution of access to the system across all five quintiles, the poorest households benefit much less from the government's expenditure programs in this sector then their 20 percent share. There was a slight improvement in that distribution between 2008 and 2010, but has been at the expense of Quintile 4. This can be explained by the adjustments in consumer behavior in that quintile due to increased tariffs. Meanwhile, benefit incidence in Quintile 5 even increased slightly by 0.2 percentage points.

After the proposed policy option is implemented, i.e. direct compensation is paid to the poorest households (assumed to fall into Quintile 1), the distribution of benefits across quintiles will improve to a certain degree. The lowest 20 percent of households will receive 15 percent of total benefits (improvement from 10.6 percent), while the highest 20 percent will receive 35 percent (a decrease from 36.8 percent). The improvement will only be partial because the capital expenditures will continue to be subsidized by the government, and all quintiles will continue to benefit almost evenly. Thus, improvement will take place due to adjustment in so-called operational subsidies which, under the proposed policy, will go only to the poorest quintile (see also Table 11).

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