

# PROJECT INFORMATION SHEET

## WATER AND WASTEWATER UTILITY INVESTMENTS AND PRICING

### PRODUCTS AND ACTIVITIES

### ASTEC AND WATER SYSTEM PLANNING

#### **CHALLENGES FACING LOCAL AND REGIONAL WATER SYSTEMS**

The regulatory, economic and institutional environment of local and regional water systems<sup>1</sup> in Central and Eastern Europe (CEE) is undergoing substantial change. Water systems in the region have to:

- > respond to new or redesigned environmental regulations such as standards, effluent charges<sup>2</sup> and fines
- > comply with revised and extended supervision of tariff<sup>3</sup> setting, tariff design and cost recovery
- > serve a market which is much more uncertain and erratic than it used to be

Meanwhile, operating and investment subsidies formerly provided by the central government are being eliminated or sharply curtailed. Those external sources that remain, whether domestic or international, are subject to new and often far-reaching restrictions. In parallel with these changes, the ownership of assets and service responsibilities have been, or are being, transferred from the central government to local levels. In some cases, private participation in the operation or ownership of water systems has become an option. In short, water systems are currently beset by a variety of interconnected technical, economic and organizational challenges.

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<sup>1</sup> "Water systems" here refer to those public utilities that provide continuous water and/or wastewater service to residents and commercial businesses in a municipality and, sometimes, adjacent communities using networks of pipes.

<sup>2</sup> "Effluent charges" are fees assessed on water systems by regulators for discharging effluent from the wastewater network into water bodies.

<sup>3</sup> "Tariff" is the traditional British term for the price approved by public regulators for use by public utilities such as water systems.

## ASTECS ROLE

Water systems must respond to these new challenges and opportunities by adopting a variety of new policies and strategies. Unfortunately, many water systems currently lack the data and tools to properly assess the consequences of measures undertaken in this new environment. This is why the 'Accounts Simulation for Tariffs and Effluent Charges (ASTECS Model)' was developed. ASTECS is an Excel-based model capable of broadly examining the interaction of a water system's tariffs and effluent charges with investment strategies, cost structures, customer behaviour and physical conditions.

## ASTECS STRUCTURE

The model is organized around groups of customers, or 'service users'. The main features of each service user group are characterized by input data such as: the number of accounts; average annual water consumption and annual discharge of wastewater per account; tariff structure and tariff levels; and elasticity of demand for services. Revenues from tariffs are computed-based on these inputs. Additional revenues, such as from non-core services, grants or subsidies, can also be supplied as inputs to ASTECS.

Cost data within the model are organized around the service (water or wastewater) as well as the nature of the cost -- fixed costs, and unit or variable cost that vary with the amount of water produced or wastewater treated. The design and level of effluent charges is also one type of cost input for the model. Moreover, ASTECS offers several methods for allocating each and every cost item among the service users, making it possible to compute the cost of providing service for each service user group. These can be compared with the revenues obtained from the service users and adjusted to reflect the water system's policy regarding the principle of 'full-cost pricing'.

## ASTECS APPLICATIONS

While water and wastewater tariffs can be supplied to the model at the outset, ASTECS can also be asked to compute a set of tariffs that recovers all costs. This can be done for customers as a whole or for each service user group. Furthermore, the tariffs computed can reflect a variety of designs, for example, either as a simple variable tariff or commodity charge, or as a multi-part tariff with a fixed charge (e.g. monthly). While computing new tariff levels, ASTECS simultaneously calculates new levels of consumption as customers react to tariff changes.

These features make it possible to investigate the consequences of different operating policies and development strategies on physical flows (e.g. system leakage) and financial accounts. It is possible to investigate what happens if cross-financing between industrial and households consumers is ended; to estimate the tariff consequences of a new investment with and without supporting grants; or to identify the most cost-effective strategy for dealing with a newly-introduced effluent charge regulation.

ASTECS has been implemented and used to examine various investment and tariff policy changes for seven CEE water systems over the past three years. In several cases, ASTECS modelled the implications of major changes to investment, tariffs and operating policies. This experience has demonstrated that ASTECS is a powerful tool for municipal water and wastewater (MWWU)

managers, municipal decision-makers and policy makers alike.<sup>4</sup> An updated and more powerful version of the model that allows the user to monitor up to fifteen different service user groups is presently available.

## ASTECS COST

ASTECS was developed by Glenn Morris and Andras Kis within the UNDP/GEF Danube Regional Project (DRP). ASTEC is public domain software and neither its developers nor the DRP charge for its use.<sup>5</sup> The only absolute requirement is that the ASTEC users have a recent version of Microsoft Excel installed on a modern computer.

At the same time, experience shows that using the model correctly and effectively usually requires a substantial commitment of staff time and water system resources. Ideally, the staff involved should have some understanding of English, spreadsheet models and economics and finance principles. While there is an 'ASTECS Users Guide', as well as detailed comments and alerts in the ASTEC spreadsheets themselves, prospective users are urged to obtain both introductory and periodic assistance from an experienced user. The biggest potential cost probably lies in misapplication of ASTEC or misunderstanding its output.

See more on the Municipal Water Supply and Wastewater section on the DRP website at: [www.undp-drp.org/drp/themes\\_municipal-ws-ww.html](http://www.undp-drp.org/drp/themes_municipal-ws-ww.html). To view or download the report, visit the DRP website at: [http://www.undp-drp.org/drp/activities\\_1-6\\_-7\\_tariffs\\_and\\_charges.html](http://www.undp-drp.org/drp/activities_1-6_-7_tariffs_and_charges.html)

## CONTACTS :

[www.icpdr.org](http://www.icpdr.org)

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<sup>4</sup> This experience is elaborated in a short paper by Morris and Kis, 'ASTECS: A Tool for Water System Discovery', available from the authors or on the DRP website.

<sup>5</sup> Neither ASTEC's developers nor sponsors warrantee the software or promise to support the software beyond DRP-related applications in which they have been involved.