- ability to use different tariffs for the electricity consumption;
- automated data processing, storage and presentation of data in user-friendly mode;
- construction of multi-level systems and the ability to transfer data to other levels of the system;
- possibility of operational data in a convenient mode for analysis;
- ability to obtain information remotely via the Internet;
- control and protection from criminals [3].

Disadvantages refer to greater complexity of data collection and technical impossibility of applying meters with pulse output.

Modern computerized accounting system consists of three levels:

1. Measuring. It comprises measuring means and performs a function of measurements (low level). Elements of this level are instruments that measure various parameters of the system. These devices can be employed will various sensors.
2. Binding. It includes wardrobes data collection and transmission and a function of transmitting information about this property or group of objects (medium);
3. Data collection and storage. It includes data collection center or information-processing complex (computer, controller or server) (high level) [3].

Data collection can be carried out through various communication channels. Choice of communication channels, as well as communication equipment carried out on the stage of research and design. ASCAP supports the following types of channels: RS 232/485, PLC modems, Internet, GSM, GPRS, radio modems (433 MHz), FM radio, DSL modems, etc. As workstation user uses a PC-compatible computer, server database and server survey also use PC-compatible computer. It is possible to spread the polling server and database server on different equipment [2].

The key aspect of ASCAP selection is the quality and security of communication between levels, as well as the economic issue. Providing reliable, efficient and inexpensive delivery system that will provide reliable and secure transmission and data exchange, between consumers and suppliers of energy is crucial choice of power supply systems [1].

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Risk assessment

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This article is concerned with the assessment of economic risks and suggests new methodology.

A risk assessment is a process of identification and detection of potential hazards with further analysis of the consequences of hazards. A business impact analysis is the process for determining the potential impacts resulting from the interruption of time sensitive or critical business processes [1].

Identification of the whole life assessment of the economic, environmental and risk performance of new network assets is critical for making investment decisions. Thus, it is essential to understand and assess possible future liabilities that occur from potential hazards.

Risk assessment is the process that includes the following stages:

- Identification of hazards.
- Analysis or evaluation of the risk associated with these hazards.
- Determination of appropriate ways to eliminate or control the hazards.

In practical terms, a risk assessment can be defined as a thorough look at your workplace to identify those things, situations, processes that may cause harm, particularly to people. After identification is made, it is possible to evaluate how likely and severe the risk is, and then decide what measures should be taken to prevent effectively or analyze the caused harm [2].

Methodology

Life-cycle assessment (LCA, also known as life-cycle analysis, ecobalance, and cradle-to-cradle analysis) is a technique to assess environmental impacts associated with all the stages of a product's life from-cradle-to-cradle (i.e. from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling). LCAs can help avoid a narrow outlook on environmental concerns by:

- compiling an inventory of relevant energy and material inputs and environmental releases;
- evaluating the potential impacts associated with identified inputs and releases;
- interpreting the results to help make a more informed decision [3].

Cost Categories

There are a lot of different factors that the whole life assessment depends on, such as historic failure rates, vulnerability, weighting factor, exposure and hazard zones etc.

There’s one more factor that the whole assessment depends on. It’s a cost.

Cost is usually a monetary valuation of effort, material, resources, time and utilities consumed, and risks incurred. All expenses are costs.

As costs occur from a lot of different sources, with varying degrees of certainty, accuracy and methods of quantification, they are divided into five groups. These groups describe the general source and significance of the costs assigned. The whole-life cost categories are:.

Type I – Direct costs (e.g. capital investment, labour costs, raw materials and waste disposal and etc.);.

Type II – Indirect or “hidden” direct costs(e.g. operational or site overhead costs not assigned to a single asset or project such as electrical losses);.

Type III – Contingent future costs and liabilities (e.g. compliance costs, fines, compensation payments or costs associated with unplanned maintenance, failures and other catastrophic events);

Type IV – Internal intangible costs (such as impact of asset failures on market share, staff morale and reputation as a result of the project success or failure);.

Type V – External intangible costs (e.g. impact on the environment both locally and globally, or the impact on society, e.g. cost of carbon that could be internalized in the future i.e. carbon trading) [4].

Asset Policy Studies: Cable Tunnel Co-location

This case study was used to inform decision-making on the potential life time costs, and the benefits or otherwise associated with co-location of 400kV transmission and 132kV distribution cable lines, in comparison with single owner/occupier tunnel systems for each cable type.

The functional units for comparison were:

1. 1 x 3m tunnel for 132kV cables (a DNO perspective);
2. 1 x 3m tunnel for 400kV cables (TSO perspective);
3. A combination of the two 3m tunnels;
4. 1 x 4m tunnel for co-location (regulator encouraged position).

It was found that there is a short-term capital investment saving and a long-term whole life cost saving, and significant environmental benefits, from the adoption of a 4m diameter co-located cable tunnel facility rather than the combined 3m diameter cable tunnels costs.

The economic benefit of the 4m co-location cable tunnel in regard to total Type I to III costs, covering all direct, indirect and contingent liability costs, is equivalent to a saving of between 26% and 36% over the combined 3m tunnel modal cost. When the intangible internal and external Type IV and V costs are also accounted for, the overall economic benefit of the 4m co-location cable tunnel spans a saving of 11% to 27% with respect to the combined 3m tunnel modal cost.

However, the level of additional co-location risk must however be carefully considered, particularly in regard to cable circuit operational factors such as thermal management, cable current ratings and also the possibility of cable joint failures and tunnel fires.

Conclusion

The new methodology for whole life costing and risk assessment of assets provides a powerful and insightful integration of assessments associated with economic and environmental risks. It is a very useful an assessment of the risk of technology selection, operation and management, overall policy and health and safety issues [5].

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Mechatronic device objectives

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1 INTRODUCTION TO MECHATRONICS.

Mechatronic is a term coined by the Japanese to describe the integration of mechanical and electronic engineering. More specifically, it refers to a multidisciplinary approach to product and manufacturing system design [1]. It represents the next generation machines, robots and smart mechanisms for carrying out work in a variety of environments predominantly factory automation, office automation and home automation as shown in figure 1.1(a) [3].

As a discipline, mechatronic encompasses electronics enhancing mechanics (to provide high levels of precision and reliability) and electronics replacing mechanics (to provide new functions and capabilities). Some examples where mechanics has been enhanced by elec-