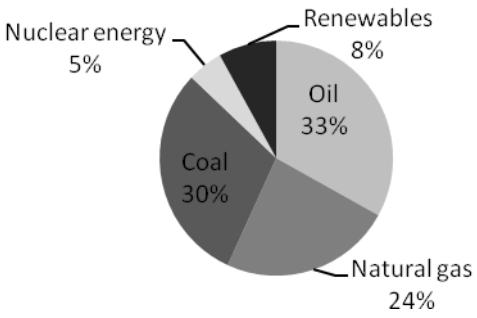

Fig. 1–2012 World Energy Consumption by Fuel Type

Relatively small percentage of renewable energy production may be explained by the following hurdles the renewable industry faces [2]:

- commercialization barriers faced by new technologies competing with mature technologies (undeveloped infrastructure and lack of economies of scale; most renewable energy technologies are manufactured on assembly lines, where mass production can greatly reduce cost);
- price distortions from existing subsidies and unequal tax burdens between renewables and other energy sources (compared with renewables, nuclear and fossil fuel technologies in many countries enjoy a considerable advantage in government subsidies for research and development);
- failure of the market to value the public benefits of renewables (public goods do not motivate everyone who benefits to pay for them, if they can choose to be "free riders" who benefit from the contributions of others);
- market barriers (inadequate information; lack of access to capital for renewable energy companies; renewables projects and companies are generally small; thus they have fewer resources than large generation companies or integrated utilities; these small companies are lessable to communicate directly with large numbers of customers);
- high financing costs(renewables developers and customers may have difficulty obtaining financing at rates as low as may be available for conventional energy facilities; in addition to having higher transaction costs, financial institutions are generally unfamiliar with the new technologies and likely to perceive them as risky, so that they may lend money at higher rates; high financing costs are especially significant to the competitive position of renewables, since renewables generally require higher initial investments than fossil fuel plants, even though they have lower operating costs).

References:

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2. Renewables Global Status Report 2012. on line athttp://www.ren21.net/REN21Activities/GlobalStatusReport.aspx

USERS' DATA SECURITY IN MOBILE DEVICES

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One of the most important parts of modern mobile operation systems is users' data security. It makes us to use embedded tools for managing storage and transmission of users' data.

Modern operating systems provide several tools for preventing damage, leakage of users' data and sensitive application data.

Application Sandboxis used as a safe environment for mobile applications. It manages process pool and process independency, application memory area and checks for required permissions. This tool prevents access to another application data and hardware.

Permission-based access is supported by a mobile OS. It is also used for managing applications access to core system functionality and to users' data. Both users and developers unlock their mobile phones by rooting (get root access) and unlocking bootloader that give them ability to manage OS kernel and related services. But this makes the device less protected.

While user browsing Internet lot of data transferred to/from mobile device. Pre-installed browser has advanced mechanism of controlling and filtering unsafe traffic such as JS- and SQL-injections or hacking data packages.

In public places Wi-Fi networks are usually applied, but sometimes such connection cannot be relied on. In this case HTTPS can provide secure access Internet. But sometimes this functionality cannot be supported by mobile applications or remote servers. In this case a user can use VPN (Virtual Private Network) to prevent damage or leakage data during transmission.

Another option for protecting user's device is to set up pass-lock combination. This is special application preinstalled in Android and iOS operating systems that gives users the possibility to set up a numeric or graphical password. The application will ask for the password every time if someone tries to unlock device.

Reviewed tools, services and applications can help to increase the level of protection of users' sensitive data and prevent them from damage and leakage.

List of used sources:

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2. Android Security / El. resource -- http://source.android.com/tech/security/
3. Android Security Tips / El. resource -- http://developer.android.com/training/articles/security-tips.html

QUANTIZATION AND ITS APPLICATION IN SIGNAL COMPRESSION

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Abstract – This paper explains what quantization is. The types of quantization algorithms and their application in digital signal coding are considered.

The representation of a large set of elements with a much smaller set is called quantization. Quantization is widely used in data compression methods, such as audio, speech, image, video compression. Almost all coders utilize quantization algorithms as a final (or pre final) stage of compression. It is necessary to reduce storage space or transmission bandwidth. The process of quantization is accompanied by some data loss, which leads to quality loss. In this case, the central problem of quantization is the minimization of this loss for a given amount of available resources.

There are two types of quantization: scalar and vector, which are divided into several subtypes.

Scalar quantization is a mapping from the real number $x \in R$ into a finite set Y containing N output values (also known as codewords) y_i. With knowledge of output values amount we can measure the number of bits needed to uniquely specify the quantized value r by formula 1 [1].

$$r = \log_2 N \tag{1}$$

There are two subtypes of scalar quantizers: uniform and non uniform. Figure 1 shows the input-output characteristics of a uniform quantizer.

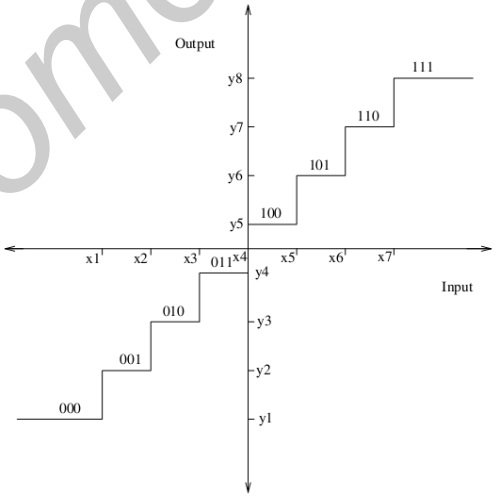

Figure 1. The input-output characteristics of a uniform quantizer.

As we can see at the input-output characteristics, all of the quantizer intervals (steps) are of the same width [2]. The difference of non uniform quantizers from uniform is the width of step – they are not the same.

Vector quantization (VQ) is the quantization process of values joint as a single vector. Basic VQ algorithm works as follows: a vector x with length equal to N mapped into vector y with the same length. The set of vectors y is assembled into a big collection – a codebook. All that is required to transfer (or store) is the index of corresponding vector y. A simple VQ algorithm is shown in figure 2.