Methodology of Cost-Benefit Analysis of Energy Alternatives in Siberia

The world anticipates a vast electrification, and such a progress provides quite a number of advantages, mainly dependable on different sources of electricity generation, which aren’t simply different, but are in controversy struggling for the dominant position in entire energy space. All these contradictions, besides being general, manifest themselves differently in various socio-economic contexts. Siberia as a great megaregion of Russia is an excellent representative area for comparative analysis of prevailing sources of energy, such as coal and natural gas, and mostly promising, solar and wind energy.

Method of cost-benefit analysis appears to be quite adequate to elaborate our research strategy. This method is considered to be ‘the golden standard’ in economics and social science to carry out the comparative evaluation of different options of investment projects, government programmes and social initiatives. In our scientific research it is suggested to apply this method for comparing two alternatives of electricity generation – conventional and renewable sources of energy, in the socio-economic content of Siberia, as an important energy megaregion and a very demonstrative case.

Cost-benefit analysis (hereafter, CBA) has various interpretations and spheres of applications. At the highest level of generality it represents itself as a meta-method and appears to be the synthesis of methods, when advantages and disadvantages are weighed up in the quantity and quality terms. At the other end of the scale of generality, this method is used as purely economic tool in the frame of estimating costs and benefits of this or that project, programme and regulation, and it’s an essential goal to examine the extent to which these policies meet the Kaldor-Hicks criterion, that is, to be economically efficient.

Novelty of author’s methodology consists in two dimension cost-benefit analysis, which includes quantitative and qualitative approaches to comparing energy alternatives in socio-economic context of Siberia. In standard quantitative CBA the multifaceted energy choice might be reduced to only one parameter, i.e. monetary value. Monetary valuations of costs and benefits have some practical advantages, as they allow to consolidate different consequences to commensurable units and the efficient is considered to be preferable for counting and getting maximum net benefits. Quantitative method simplifies modeling, financial estimating and
making extrapolative prognosis, but the application of just quantitative CBA to analysis of
energy choice is constrained by serious methodological assumptions \([\text{viii ix}]\) and the methods’
difficulties \([\text{x xi}]\). Qualitative CBA tries to balance and get rid of the failures of one-dimensional
monetary view upon aims and consequences and become especially urgent in the situation of
great uncertainty. With this purpose in mind there is applied a set of flexible tools, such as
grading, rating, scoring, benchmarking, sociological polls, interviews and observations for
defining significance and worth of uncountable characteristics of energy choice, such as energy
safety, social stability, growth of protest moods in society. Though this synthesis of quantitative,
often monetary figures, and qualitative subjective assessments, nevertheless, don’t define the
goal of long-term actions, which are determined up by more basic values, e.g. equality, justice,
safety and common good. This is stressed by supporters of more complicated and fastidious
method, introducing civilization and culture as developing values, e.g. Veber M., Sorikin P., Sen
A. \[\text{xii}\].

So, based on data, evidences, facts, calculations proposed analytical framework allows to
present the logic of reasoning on the basis of making evident causes and consequences in favour
of this or that energy, correlating this logic with the value approach on the premises of cost-
benefit meta-analysis, which synthesizes quantitative, qualitative and value appreciations. If
quantitative and qualitative CBA allow to identify and measure various benefits and costs, which
are compared vice versa, then meta-analysis provides an integrated understanding of so-called
primary goals for using this or that source of energy. In the process of reflection and reasoning
cost-benefit meta-analysis aims at bringing together all the benefits and costs to make general
evaluation judgement.

Empirical basis of our research relies on the diversified information massive, which
includes the primary source of data such as economic estimations on three particular energy
projects (coal, gas and solar power stations in Siberia), data, semi-structured interviews, selected
regional cases, statistics and also the secondary materials such as regional strategies of socio-
economic and energy developments, local mass media releases, analytical reports of think tanks,
publications of research centers and NGOs.

As result, there are formed three alternative evaluation judgements, concerning how to
use conventional or renewable energy in Siberia to get more net benefits either for the efficient
performance of the governments, or profitability of energy companies, or for achieving common
good.

\[\text{\textsuperscript{i}}\] Ebinger C. K., Banks J. P. The Electricity Revolution. Report, the Energy Security Initiative
(ESI), Brookings Institution, November 8, 2013. Available at: https://www.brookings.edu/research/the-electricity-revolution/
Газман В.Д. Преодоление стереотипов, связанных с возобновляемой энергиетикой. Вопросы экономики, № 4, 2019, с. 124-136.

Ратнер С.В., Нижегородцев Р.М. Анализ опыта реализации проектов в области возобновляемой энергетики в России. Теплоэнергетика, №6, 2017, с. 38-47.

Дегтярев К.С. Состояние и территориальная организация фотovoltaической солнечной энергетики в России. Журнал «Окружающая среда и энерговедение», №1, 2019, с. 23-38.


