

TA-INSTITUTION

Technology Assessment for the United States Congress

The Government Accountability Office's Center for Science, Technology, and Engineering

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In 1972, the U.S. Congress established the Office of Technology Assessment (OTA) to provide it with independent, credible, comprehensive and nonpartisan analysis of S&T issues:

“As technology continues to change and expand rapidly, its applications are – (1) large and growing in scale; and (2) increasingly extensive, pervasive, and critical in their impact, beneficial and adverse, on the natural and social environment. Therefore, it is essential that, to the fullest extent possible, the consequences of technological applications be anticipated, understood, and considered in determination of public policy on existing and emerging national problems.”¹

During its existence, OTA published almost 750 full assessments, background papers, technical memoranda, case studies, and workshops.² At its peak operational capacity, OTA was staffed by approx. 200 full time equivalents (approx. 70 % civil service with 30 % contractor support) and an annual budget of \$20 million (fiscal year 1994 dollars). Though the U.S. Congress discontinued funding OTA in 1995, the need for independent, deliberate, transparent, timely, and credible S&T advice on policy issues remained.

The U.S. Government Accountability Office (GAO), Center for Science, Technology, and Engineering (CSTE) has been producing Technology Assessments (TAs) since 2001, at first on a pilot basis between 2002 and 2006, and then in a permanent capacity since 2007 per the U.S. Congress Fiscal Year 2008 Legislative Branch Appropriations Act. The produc-

tion of TAs is not the sole mission of CSTE, which also serves the U.S. Congress by performing technical performance audits and by providing technical consulting services to the whole of GAO and the Congress over all manner of issues related to technology, engineering, and science.³

Like its counterparts in Europe and Asia, CSTE views TA as making complex S&T issues more accessible to legislators by analyzing the values and trade-offs of various technologies and presenting them in a public policy context that can be applied directly into the legislative process. GAO defines TA as “*the thorough and balanced analysis of all significant primary, indirect and delayed consequences or impacts, present and foreseen, of a technological innovation on society, the environment or the economy.*”

Because all GAO work is to be conducted according to the highest quality standards, CSTE has been moving deliberately in developing its TA processes and methods. As such, it has initiated a project to develop a methodological guide on the design and execution of TAs, to include an elucidation of diverse methodologies, the logic and structure of technology assessments, and a discussion on outcomes/metrics for TAs. If successful, this guide will provide a synopsis of global TA best practices and various tool/methodological options for the conduct of TA based on the nature and extent of the legislative inquiry/need.

GAO initiates technology assessments via three different mechanisms (in order of strength): (1) Legislative mandate, (2) Letter of request from a congressional committee of jurisdiction, and (3) On the authority of the Comptroller General of the United States (the head of GAO). As directors of TA studies, either of the Chief Scientist or Chief Technologist will assemble a multidisciplinary team based on the topic and develop a production schedule that involves design, information collection, message development, and report drafting, reviewing (both internal and external), and issuance procedures. To supplement internal TA product review, GAO contracts with the U.S. National Academies to formulate multidisciplinary ex-

pert groups for independent advice and support throughout the lifecycle of the report production process. For additional quality assurance, GAO uses an extensive process to index and reference large amounts of relevant information to provide a highly credible basis for GAO findings, conclusions, and recommendations in any of its reports.

The range of topics CSTE could potentially address for the Congress is quite broad and intended to serve the full spectrum of committees and sub-committees within the U.S. Congress – the U.S. House currently has 23 active committees of which three are special committees and 20 are standing committees, which are divided into 104 sub-committees, whereas the U.S. Senate currently has 17 standing committees, which are divided into 70 sub-committees. Therefore, CSTE could be asked to conduct TA work on topics ranging from energy and climate change, biomedical and health, national and homeland security, transportation and infrastructure, and information security concerns, among others.

CSTE intends for its TA portfolio to operate on a legislatively-relevant timeline. Specifically, CSTE is designing its TA production process to enable final delivery of the finished product (be it a full report, briefing, or testimony package) within twelve months or less. Client oversight is accomplished through periodic status reports to the mandating or requesting committee(s). GAO TA reports may then be used by the congressional clients to support legislative issues or in the service of congressional hearings and testimonies.

Because of current staff size limitations and austerity measures currently expected of the U.S. public sector, the production of GAO TAs is currently set at a rate of two per year. Although this is a low rate of production as compared to TA institutions world-wide (and represents a very small fraction of GAO's total reports per year), the current focus on both quality standards and economizing report production timelines (without degrading report quality) remains central to ensuring a sustainable, high-quality, and enduring operational capability in support of the U.S. Congress.

At the time of this article, CSTE is working on a TA concerning freshwater conservation technologies for use in the energy sector (including both extraction and production domains). This study was requested in October 2012 by the Ranking Member of the U.S. House Natural Resources Committee, Mr. Edward Markey.⁴ The three major areas of examination are:

1. technologies available or being researched to reduce fresh water consumption and employ alternative water sources in thermoelectric power plants,
2. technologies either available or being researched to reduce fresh water consumption and prevent or address water contamination in drilling and mining activities, such as commercial oil and shale-gas development and uranium mining, and
3. locations in the United States facing water scarcity problems that would benefit most from available and developing technologies.

The scope and methodology for this study are outlined as follows:

- Conduct semi-structured interviews with stakeholders from federal and state governments, U.S. national laboratories, electric power generation industries, shale gas, coal, and uranium mining industries, as well as academia, advocacy groups, and professional organizations/societies to identify technologies/approaches that address water conservation and scarcity.
- Review literature on water conservation technologies applicable to electric power generation, shale oil and gas development, and mining.
- Conduct site visits to thermoelectric power and desalination plants and mining sites as appropriate.
- Convene a National Academies group of experts for consultation services to include design verification and S&T quality assurance.

This report is expected to be issued by the end of calendar year 2013. For more information on GAO's TA program, including fully downloadable issued reports, cf., http://www.gao.gov/technology_assessment.

Notes

- 1) The Technology Assessment Act of 1972 (Public Law 92-484, §2, Oct. 13, 1972).
- 2) Archives can be found here <http://www.princeton.edu/~ota/>.
- 3) The GAO is an independent agency in the legislative branch of the U.S. federal government known for providing timely analyses that are professional, objective, fact-based, non-ideological, nonpartisan, fair, and balanced to improve the performance and accountability of the federal government for the benefit of the American people.
- 4) http://democrats.naturalresources.house.gov/sites/democrats.naturalresources.house.gov/files/documents/2012-08-13_WaterEnergy_GAO.pdf

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Length of contributions: The maximum number of characters of a *printed page* in the journal “Technikfolgenabschätzung – Theorie und Praxis” is 3,500 characters (without spaces). The length of a contribution depends on the section in which it appears. More detailed information is provided by the editorial office.

Abstract / introduction: Contributions under the *main theme* of an issue or in the sections *TA-Konzepte und -Methoden (TA Concepts and Methods)*, *Diskussionsforum (Discussion Forum)* and *TA-Projekte (TA Projects)* should be preceded by a concise abstract, summarising the significant points of the paper. The abstract should not exceed 780 characters (without spaces).

Figures, graphs and tables: Figures and tables should be both embedded in the manuscript and supplied separately from the first version of the manuscript. All figures and tables should have a caption and source and must be numbered separately within the text. If created by the author, please use the phrase “Own compilation” to indicate the source.

Format: Tables should be supplied in *Word*, graphs in *Excel* and figures in *Adobe Illustrator* or *PowerPoint* format. Please contact the editorial office early if the material is only available in other formats. For reasons of page design and layout, the decision on the final size and location of the figures and tables in a contribution lies with the editorial team.

References / bibliography: Cited references are listed alphabetically at the end of the manuscript. In the text the citation should appear in parentheses (e. g. Bauer, Schneider 2006); in the case of a direct quotation the page number has to be included (e. g. Maurer et al. 2007, p. 34). Citations in the reference list should be formatted according to the following examples:

Monographs: Wieglerling, K., 2011: Philosophie intelligenter Welten. Munich

Articles in journals: Fink, R.D.; Weyer, J., 2011: Autonome Technik als Herausforderung der soziologischen Handlungstheorie. In: Zeitschrift für Soziologie 40/2 (2011), pp. 91–111

Chapters in books: Mehler, A., 2010: Artificielle Interaktivität. Eine semiotische Betrachtung. In: Sutter, T.; Mehler, A. (eds.): Medienwandel als Wandel von Interaktionsformen. Heidelberg

Websites and online publications: iRobot Corporation, 2011: One Robot, Unlimited Possibilities. iRobot 510 PackBot. Bedford, MA; http://www.irobot.com/gi/filelibrary/pdfs/robots/iRobot_510_PackBot.pdf (download 30.3.11)

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