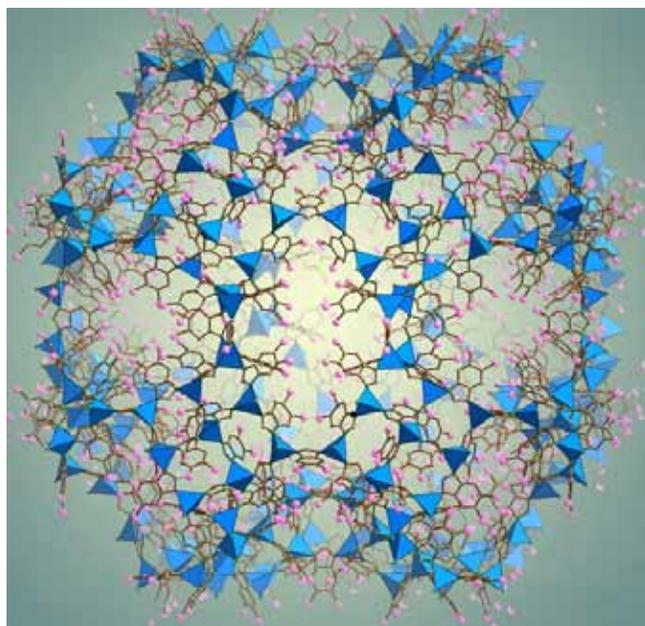


California Council
on Science
and Technology
2008
ANNUAL REPORT
2009



SEPTEMBER 2009

New Efficiencies



Karl S. Pister
Board Chair

The past year has been challenging for California. The state's record budget deficits forced it to slash many important programs. Our hopes for addressing California's serious problems with its physical, social, and economic infrastructure— science and math education, healthcare, water and energy supply— have been deferred. Science and technology are at the core of California's economic strength, and the state must use them to remedy the growing shortcomings in our infrastructure.



Charles F. Kennel
Council Chair

If we could have gone ahead, we would have discovered how fragmented our planning is. During the past year, the California Council on Science and Technology (CCST) focused on integration of planning as a way of creating future efficiencies. The first step was to develop better understanding of the present situation. We found some novel linkages between what appear to be separate systems. For example, California's water and energy uses are tightly linked; many people do not realize that power generation consumes as much freshwater as agricultural irrigation. They will both be affected by climate change, and our strategy for coping with climate change will have to take this linkage into account. Similarly, integration of the recent advances in healthcare information technology with personalized medicine promises significant savings through error reduction and more efficient procedures. But best of all, it makes for better healthcare.



Miriam E. John
Council Vice-chair

In such times, it seems counterintuitive to try to go beyond the status quo to an ambitious vision for the future, but that is what we must do. We must start by doing more with less. The key to doing more with less is to coordinate our resources in a systematic, rather than fragmented, approach. CCST is ready and able to advise California policymakers as they navigate these troubled times: it is our mandate to forge connections, to make the best science and technology expertise available to state leaders, to get the right information to the right people at the right time. There are no easy fixes for California's economic woes, but if we combine knowledge and expertise with political leadership, California will continue to be the Golden State.

Karl S. Pister Charles F. Kennel *Miriam E. John*

About CCST

CCST is a nonpartisan, impartial, not-for-profit 501(c)(3) corporation established via Assembly Concurrent Resolution (ACR 162) in 1988 by a unanimous vote of the California Legislature. It is designed to offer expert advice to the state government and to recommend solutions to science and technology-related public policy issues. CCST is modeled in part on the National Research Council, and has developed a close working relationship with the National Academies. More than half of CCST's members and fellows are members of the National Academies, and several are Nobel Laureates.

Since its creation, CCST has worked directly with the governor's office, state and federal legislators, and agencies to recommend policies that will maintain California's role as a leader in generating science and technology innovation and maintaining a vigorous economy.

Sustaining Institutions

The strength of CCST lies in the support and resources provided by its sustaining institutions, the University of California system, the California State University system, California Institute of Technology, Stanford University, University of Southern California, and the California Community Colleges, as well as its affiliate members, Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, Sandia National Laboratory in California, Stanford Linear Accelerator Center, and NASA Ames Research Center and Jet Propulsion Laboratory. CCST also has strong connections to industry through its membership.

Board and Council

A board of directors and council volunteer their time to govern and guide CCST. The board, which meets twice a year, is made up of 16 leaders from industry and academia. Karl S. Pister, UC's former vice president for educational outreach and chancellor emeritus of UC Santa Cruz, serves as CCST board chairman.

The council, which meets three times a year, currently includes 29 corporate leaders, academicians, scientists, and scholars of the highest distinction. Charles F. Kennel, distinguished professor of atmospheric science, Scripps Institution of Oceanography; founding director and chairman, International Advisory Board, Environment and Sustainability Initiative, University of California, San Diego, is the chair, and Miriam E. John, former vice president, California Division, Sandia National Laboratories, is the vice-chair.

The board establishes CCST's policies and provides oversight, while the council translates those directives into programs and projects that will ensure the state's science and technology leadership. The council is divided into subcommittees that manage and plan specific projects and studies.

Senior Fellows

CCST senior fellows are a select group of distinguished scientists, engineers, and technical experts who volunteer their time to address specific projects or conduct reviews. CCST created the program in 1997; since then, CCST has appointed 131 senior fellows who are engaged in all aspects of CCST's work addressing important science and technology issues facing government, education, and industry.

California Teacher Advisory Council (Cal TAC)

Cal TAC is a group of 12 outstanding K-14 science and math classroom teachers and is modeled after the successful National Teacher Advisory Council, established in 2002 by the National Academies. Cal TAC works to provide a valuable connection between the teaching community and the educational experts and policymakers who are shaping California's educational system. Ann Marie Bergen, district science coordinator & teacher in the Oakdale Joint Unified School District, is the chair, and Barbara Shannon, co-director of the Synergy Kinetic Academy, Los Angeles is the vice-chair.

Staff and Offices

Susan Hackwood is CCST's executive director and provides overall day-to-day leadership; she also sits on the board and council. CCST has two offices. One is in Southern California adjacent to UC Riverside; another is one block from the State Capitol in Sacramento.

Highlights 2008–2009

S&T Legislative Policy Fellows

CCST has launched the first state program in the nation that places Ph.D. level scientists and engineers in a fellowship position in a state legislature. The five-year pilot program, to begin in Fall 2009, is modeled after the 35-year-old Congressional S&T Fellows Program, administered by the American Association for the Advancement of Science (AAAS).

Personalized Health

CCST has entered into a partnership with the Business Transportation & Housing Agency and CalPERS to move California forward in personalized medicine/health. CCST has initiated a pilot study designed to develop health information technology (HIT) infrastructure goals for the state in support of personalized health.

Healthcare Workforce

In addition to the HIT pilot study, CCST is also conducting an analysis of how the state's healthcare industry workforce development may be advanced. The analysis will examine both existing and needed workforce development programs and strategies to support the shift of healthcare systems to personalized health practices.

Publication: Barriers to Financing Clinical Information Systems

This report, released in June 2009, describes current barriers to financing health information technology as a tool for healthcare delivery. It is an update to an earlier version of the report commissioned by the Governor's Health Information Technology Financing Advisory Commission (HITFAC) and

submitted to that body in May 2008.

California's Energy Future (CEF)

Executive Order S-3-05 calls for the California's greenhouse gas emissions in 2050 to be 80 percent lower than emission levels in 1990. The CEF study is examining what steps might be taken to achieve this important and ambitious target, exploring the feasibility of steps to reduce energy demand through improved efficiency and increasing the use of low-carbon energy supplies.

On-line Database

In response to a request from the California Air Resources Board, CCST is developing an on-line relational database to facilitate implementation of the Global Warming Solutions Act of 2006 (AB 32). The database will comprise a catalogue of climate change research.

Publication: Amicus Brief

In April 2009 CCST took action to support a University of California admissions process case, then under consideration in the U.S. Court of Appeals for the Ninth Circuit. The amicus brief, prepared for CCST by Pepper Hamilton LLP, focuses on the importance of good high school science education and defends UC's policy of requiring standard science curricular backgrounds for applicants, which had been challenged by a coalition of religious schools.

Highlights 2008–2009

California STEM Innovation Network (CSI-N)

The goal of this joint effort managed by CCST and Cal Poly San Luis Obispo is to return California to world prominence in science, technology, engineering and mathematics (STEM) education and create a workforce with the STEM skills needed to compete globally in the 21st century. This would lay the foundation for transforming California's STEM education structure into a 21st century K-12 and higher education system where a substantial and increasing number of students are either college bound or workforce ready.

Publication: Creating a Well-Prepared STEM Workforce: How Do We Get There From Here?

This report documents a symposium led by Cal TAC teachers, in which a group of over 50 leaders from schools, institutes of higher education, business and industry, federal laboratories, science centers and the policy community joined together to consider how California could do a better job of preparing today's students for the future workforce.

Publication: Articulating a Vision and Opportunities for a California STEM Innovation

On February 18-19, 2009, the National Research Council (NRC) Center for Education and the National Academy of Engineering (NAE) convened a strategic visioning meeting designed to guide and inform the work of leaders from the CCST and CSU who are planning a process to establish a CSI-N and framework for advocacy in the state.

National Research Council and National Academy of Engineering Convocation: Building a Village: Learning from and Sustaining Successful Programs in Elementary Science Education

This convocation, held in April 2009, was designed to launch a longer-term, statewide effort to engage government, business and industry, private foundations, education researchers, and formal and informal education organizations (both K-12 and postsecondary) across California in developing collaborative efforts to envision, nurture and scale up effective and interconnected STEM programs for Grades K-8.

A Qualitative Examination of the Preparation of Elementary School Teachers to Teach Science in California

This project will provide a descriptive and qualitative review of how well elementary school teachers are prepared to teach science, using new data including CSU documenting the preparedness of elementary school teachers to teach science. The report will identify and discuss best practice programs as identified both by the survey data and stakeholder experts.

California's Uphill Battle



Susan Hackwood
Executive Director

California is no stranger to budgetary quandaries, but the deficit hole to be filled this year – approximately \$24 billion – exceeded anything this state, or indeed any other state government, has had to cope with. No one who follows the news will be unfamiliar with the mandated furloughs for state workers and for cuts to desperately needed programs across the board.

In a climate where everyone has something to lose, the value of communicating with one another and doing our best to both understand and respond intelligently to the fiscal crisis is central. California must be flexible in adapting to its current constraints, and so must we. The state has made significant strides in addressing issues of emissions control and environmental awareness; become a national leader in state-funded research and development – a new role for state governments; initiated broader efforts to develop widespread healthcare information technology networks; and begun to focus on better strategies for energy and water use.

Steps such as these have long-lasting implications for California and cannot be abandoned wholesale. If cuts must be made, they need to be done with as strategic an eye as possible, and the maximum possible effectiveness of state programs must be retained. “Smart governance in times of sharply diminished resources” was, in fact, the focus of CCST’s May 2009 meeting, when instead of the usual single dinner speaker, CCST hosted a panel of experts with backgrounds in economics, public policy, and political science.

The news is not all grim. The federal stimulus package enacted earlier this year, the American Recovery and Reinvestment Act (ARRA), has

significant potential for California, with billions in funding projected to be available for education, infrastructure, energy, and public safety. In particular, several provisions of ARRA align well with recent California priorities, and follow the principles of the America COMPETES Act, a landmark federal bill from 2007 that was intended to provide a significant boost to education, science and technology spending.

It will be some time before the full impact of the stimulus package on California is apparent. However, early projections suggest that California could be receiving at least \$400 million to support state energy programs (with California local governments receiving hundreds of millions more in block grants) and up to \$8 billion for education, as well as support for healthcare. The funding will go a long way towards sustaining critical programs at a time when the state has little to give.

California remains a national S&T leader: first in national standards for greenhouse gas emission legislation, first in creating a state-funded research institution to pursue embryonic stem cell research when federal funding was not available and first in creating a state-level advisory organization such as CCST itself. We must all work together to ensure that, especially now, California benefits from a level of science and technology policy knowledge and wisdom suitable to maintain its status as America's leading science and technology state.

Susan Hachwood

Policy Fellows

CCST has launched a new fellowship for professional scientists and engineers to spend a year working in Sacramento with the California State Legislature.

The California Science and Technology (S&T) Policy Fellowships provide a professional development opportunity that will enable members of the scientific community to contribute to scientific and technical issues facing California through their interaction with the legislative process. Fellows will learn about the legislative process while contributing their expertise and experience to help the Legislature effectively address complex science and technology issues.

To be eligible for the California S&T Policy Fellowship, candidates are required to have a Ph.D. or equivalent level degree in a physical, biological, or social science, or an M.S. in an engineering discipline with at least three years post-degree experience.

“With increasingly complex science and technological issues facing society today, the effective interface of science and public policy is becoming ever more important,” notes the Fellowship description. “Fellows will learn the intricacies of the California legislative process and will provide legislators and their staff with clear and unbiased advice, answers to technical questions, and clarification of policy options for issues with science and technology related attributes.”

An important logistical hurdle was overcome when Governor Schwarzenegger signed AB 573 in August 2009, a bill that enables placement of CCST paid fellows in the Legislature. Strong bipartisan support in the Legislature for the new fellowship program was evident with the passage of AB 573 in the Assembly and the Senate with unanimous support from both houses.

Up to 10 fellowships will be awarded each year. Fellows will attend a three-week training program developed by CCST to prepare them for the unique environment of the California Legislature before their placement in various legislative offices. Funding is being provided by a coalition of nonprofit foundations that include: the Gordon and Betty Moore Foundation, the S.D. Bechtel, Jr. Foundation, the Kingfisher Foundation, Gen-Probe Inc, the Heising Simons Foundation, and the TOSA Foundation.

The California S&T Policy Fellowships are adapted for California from a similar fellowship offered by the American Association for the Advancement of Science (AAAS) in the federal policy arena. The AAAS Fellowships have been successfully offered for 35 years, and AAAS Fellows have become sought-after resources in the federal policy community.

Exploring California's Energy Future

California is leading the nation in reinventing the state's energy system in response to climate change concerns. However, the state faces significant challenges associated with meeting the emissions reductions laid out by AB 32, the Global Warming Solutions Act of 2006, while ensuring its economic vitality and secure energy supplies.

California has aggressive goals for reducing greenhouse gas emissions. As the state makes critical choices to change its energy system, it needs a clear understanding of the technical potential and risks of various energy choices. Meeting these goals will have implications for energy efficiency, renewable energy, energy transmission and distribution, electricity generation, fuels, and land use. CCST is conducting a study to understand what these implications are and how best to approach them.

The California's Energy Future (CEF) study is building upon a \$3 million national project supported by the National Academy of Engineering, the National Research Council, Dow Chemical, the Kavli Foundation, the Intel Corporation, and the U.S. Department of Energy, to study America's Energy Future (AEF). With the AEF as a starting point and model, the CEF study is to provide critical, California-specific information to state and local governments relevant to implementation of the state's climate goals in energy.

Interpreting and focusing research from the National Academies for a California policymaking audience has been an increasingly important role for CCST, which performed a similar role in 2006 at the request of the Governor for the Academies report, *Rising Above the Gathering Storm*.

The CEF study, which will be released in time to impact the 2010 budget, will provide an authoritative, non-partisan analysis of energy efficiency, renewable energy, nuclear power, transmission and distribution, fuels and advanced coal technologies. Among other things, it will estimate their current contributions, future potential, associated impacts, and projected costs.

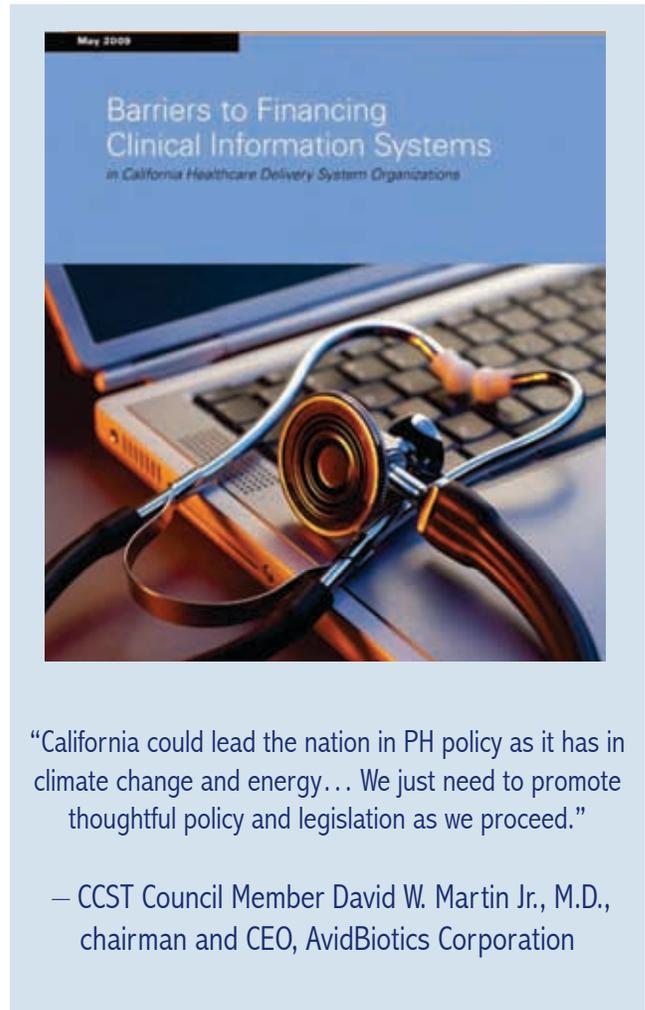
In addition to the AEF report, CCST will draw upon resources from the California Air Resources Board, the California Energy Commission, and the California Public Utilities Commission, which have worked for years to plan and regulate the energy future of the state.

Personalized Healthcare Information Technology

Personalized Health (PH) is a rapidly evolving field with significant opportunities for economic development as well as significant implications to California's healthcare system. As with any new field, however, there remain significant unknowns regarding the role that the state should play in supporting and/or implementing the growth of the high-tech infrastructure and policies needed to maximize the potential of personalized health.

CCST has convened a high-level Personalized Health Information Technology (pHIT) Task Force, which launched with several months of investigative work by a steering committee of pHIT Task Force members. The task force (chaired by Dr. Ramesh Rao, California Institute for Telecommunications and Information Technology, UCSD) is charged to propose HIT infrastructure goals for the state in support of personalized health. Its charge also includes scoping of a pilot project involving building a model system incorporating many sources, types and formats of data including genomic information, biomarkers, and images through one or more partners and enabling information exchange through electronic health records and personal health records within a private and secure system. The demonstration pilot study will create a single central database that offers, in an open electronic format, a comprehensive electronic record of a subject (patient) that tracks and captures multi-sourced data relevant to the health of the individual over time, while protecting privacy.

Recognizing the business implications to California, both as home to the emerging industries and the state government as a purchaser of healthcare services, the Business Transportation and Housing Agency has turned to CCST to help convene key stakeholders from the public and private sectors to solicit their input. In general, PH refers to the tailoring of medical treatment to the personal characteristics of each patient. Often this involves the incorporation of genomic information in an individual's medical record. It does not literally mean the creation of drugs or medical devices that are uniquely suited to each patient, but rather the ability to classify individuals into subpopulations that differ in their susceptibility to a particular disease or their response to a specific treatment. Preventive or therapeutic interventions can then be applied to those who will benefit, sparing expense and side effects for those who will not.



“California could lead the nation in PH policy as it has in climate change and energy... We just need to promote thoughtful policy and legislation as we proceed.”

– CCST Council Member David W. Martin Jr., M.D.,
chairman and CEO, AvidBiotics Corporation

The purpose of the pilot study is to recommend how the state's Business Transportation and Housing Agency, the Health and Human Services Agency's Health Information Exchange (HIE) workgroups, the Privacy and Security Advisory Board (PSAB), and the California Public Employees Retirement System should develop pHIT related policies, and to determine the potential value of pHIT as applied to personalized healthcare.

CCST has been exploring the potentials and policy implications of HIT for several years. In June 2009, CCST released a study, *Barriers to Financing Clinical Information Systems*, which describes current barriers to financing health information technology as a tool for healthcare delivery. An earlier version of this report was commissioned by the Governor's Health Information Technology Financing Advisory Commission (HITFAC) and submitted to that body in May 2008.

Conclusions from *Barriers to Financing Clinical Information Systems*

- Many market segments in California's healthcare delivery system lack financial health or credit worthiness for adoption of Clinical Information Systems (CIS) and face a negative business case, or had low CIS adoption rates.
- The highest priorities for potential CIS policy interventions should be:
 - o Community health center and similar organizations
 - o Public hospitals
 - o Unaffiliated rural hospitals
- Medi-Cal oriented solo and small group physicians.
- The February 2009 passage of the federal American Recovery and Reinvestment Act (ARRA) legislation has greatly increased federal funding available for Clinical Information Systems. The Health Information Technology for Economic and Clinical Health (HITECH) Act, as part of the ARRA, allocates \$36 billion over six years for HIT.

Re-Examining STEM Education

Science, technology, engineering and mathematics (STEM) are vital educational disciplines for California. In past years, CCST has analyzed the state's science and education system, as well as teacher preparation, in a bid to better assess next steps for the state. This year, to ensure that California continues to be able to field a talented and globally competitive STEM workforce, CCST has engaged in multiple related efforts to bolster science education in California, ranging from new analyses of teacher preparation to starting a blueprint to lay the foundation for transforming California's current STEM education structure into a 21st century K-12 and higher education system.

Building Networks: A Collaborative Effort

California is replete with innovative programs in STEM education excellence. However, they are encumbered by geography, limited by the current K-12 system, and are often not scalable. What is needed is a strong statewide collaborative network of interconnected P-20 stakeholders to craft and sustain a transformation of STEM education.

With funding from the Bill and Melinda Gates Foundation and the Bechtel Fund, CCST and Cal Poly San Luis Obispo have undertaken a 15-month planning effort to create a Reform and Advocacy Blueprint to elevate STEM education transformation to the top of California's public policy agenda.

CCST has hosted a series of symposia designed to inform and develop the blueprint, collaborating with The National Research Council Center for Education, the National Academy of Engineering (NAE), the Center for the Future of Teaching and Learning (CFTL), and the California Teacher Advisory Council (Cal TAC). The first of the meetings took place on February 2, 2009, when a group of California science and mathematics teachers, policymakers, researchers, and representatives from business, industry, and higher education met to consider how California could do a better job of preparing today's students to become the future STEM workforce.





The second and third symposia, hosted by CCST, the NRC and the NAE on February 18-19 (Integrating Science, Technology, and Mathematics Education) and April 29-30 (Building a Village: Learning from and Sustaining Successful Programs in Elementary Science Education), were strategic visioning meetings to address integrating STEM education through an innovation and learning network in California.

Elementary Science Teaching

In its 2007 report *Critical Path Analysis of California's Science and Mathematics Teacher Preparation System*, CCST found that, despite troubling performances of California 4th and 8th graders on national assessments, little attention has been paid to the preparation of elementary school teachers to teach science. The problem is that much of the discussion about science and math education focuses on high school, where single subject credentials are required to teach in the various disciplines. Not much is known about how California teachers are prepared to teach science in the lower grades.

With the support of the S.D. Bechtel, Jr. Foundation, CCST has undertaken a project to provide a descriptive and qualitative review of how well elementary school teachers are prepared to teach science. The report will use new survey data from CSU documenting the preparedness of elementary school teachers to teach science, sorted by the teacher preparation programs from which they graduated, and analyze best practice programs as identified both by the survey data and stakeholder experts. The primary audience for the report will be state policymakers and accredited teacher preparation programs that prepare teachers for the multiple subject credential.

California Innovation Corridor

Late in 2008, CCST completed the last of several contributions to a workforce development project funded by a \$15 million U.S. Department of Labor (DOL) initiative, the Workforce Innovation in Regional Economic Development (WIRED).

The DOL initiative is part of an ongoing focus at the federal level on the United States' economic competitiveness in the areas of science and technology. This stems in part from the National Innovation Initiative launched in 2003 by the Council on Competitiveness, and has been reinforced by warnings in reports such as the National Academies' 2005 report, *Rising Above the Gathering Storm*. The coalition, led by the California Space Authority, encompassed over 60 partners, including regional organizations such as the Bay Area Science and Innovation Consortium and private companies such as Boeing and Lockheed Martin, and NASA.

One of the projects CCST completed was an innovative website designed to make a wide range of workforce related materials available to Workforce Investment Boards (WIBs). The website WIB toolkit, *Racing for the Future* (www.wibtoolkit.net), unveiled in June 2008, includes a variety of materials designed to assist WIB partners in addressing workforce needs. The resources in the toolkit include examples of roles that WIBs can play to respond to local workforce needs, case studies of successful partnerships that WIBs can emulate, and overviews of key high-tech industries including nanotechnology, advanced manufacturing, biotechnology, and information technology related to transportation. It also contains analyses of economic trends in California. The toolkit is organized to facilitate rapid access to each of its principal categories of information, with extensive links to other parts of the toolkit and related resources elsewhere on the web. It also contains a library of documents for download, including eleven briefs and reports prepared exclusively for the toolkit.



A second output from this project was the report, *Overview of California State-Funded R&D, 2004-2007: Understanding the State's Role in Shaping R&D Spending*, released in November 2008, which provides a snapshot of R&D spending by the state government. The report in part provides an update to CCST's 1999 analysis of California state R&D funding, carried out as a component of the *California Report on the Environment for Science and Technology (CREST)*. The new study found that total state government and R&D expenditures in FY 2006 were approximately \$347 million, not counting the California Institute for Regenerative Medicine (CIRM), which had not yet begun to fund R&D at the time.

The estimated total represents only a modest fraction of total R&D activity in the state - approximately one half of one percent of the estimated \$63.9 billion total R&D in 2006. However, state investment is an effective way of focusing industry and federal R&D investment in areas of interest to the state, often bringing in matching funds at a rate of 2 to 1. Hence, California state government spending was judged to have a substantial impact on the focus and direction of overall R&D expenditures in the state.

California Teacher Advisory Council (Cal TAC)

On February 2, 2009, a group of California science and mathematics teachers, policymakers, researchers, and representatives from business, industry, and higher education met to consider how California could do a better job of preparing today's students for the future STEM workforce. The symposium was co-sponsored by CCST and the Center for the Future of Teaching and Learning (CFTL), as well as the California Teacher Advisory Council.

The Sacramento meeting fulfilled a Cal TAC goal of bringing together industry leaders, policymakers and classroom teachers to consider how California can do a better job of preparing today's students for the future STEM workforce, which is seen as vital to California's future.

“High-caliber science and math education pays many dividends,” said CCST Board Member Bruce Alberts. “It not only imparts precisely the critical thinking and problem-solving skills that modern business and industry need to compete in the global marketplace, but also promotes the rational decision making that yields thoughtful, productive citizens.”

Meeting participants identified specific options for creating a well-prepared STEM workforce, ranging from improving professional development opportunities for science and math teachers (so that the supply of qualified teachers increases and is more evenly distributed) to changing the assessment tools used to gauge students' proficiency in science and math. A detailed summary of the symposium, *Creating a Well-Prepared STEM Workforce: How Do We Get From Here To There?*, was published in April 2009.



Council Meeting Summaries

October 2008

Water Policy

Lieutenant Governor John Garamendi



CCST focused on water science and policy at the October 2008 council meeting, where Lieutenant Governor John Garamendi spoke about California's water crisis. The meeting was held in collaboration with the National Academies and the Royal Society of the United Kingdom. Water science and policies were examined in more detail.

"Most of the recent attention on climate change has focused on mitigation and energy issues, and much less on what we must do to adapt," said CCST Council Chair Charles Kennel. "For California and many other parts of the world, adaptation means, first and foremost, water."

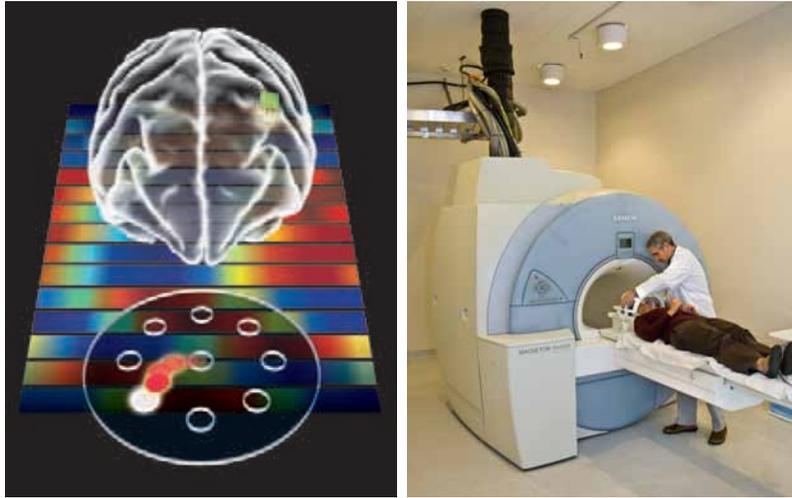
Climate changes are already impacting California's overstretched water supply system, as water content in the Sierra Mountain snowpack, a key source of water for the state, averaged only 67 percent of normal in 2008 after the state experienced its driest two-month period on record.

"Given the extreme uncertainty with respect to how climate will treat California, the most important thing is to build resiliency into our systems," said Soroosh Sorooshian, UC Irvine distinguished professor and director of the Center for Hydrometeorology and Remote Sensing. "Much of the water system is decades old. The bottom line is that the flow of population to our state has not stopped. Traditional approaches to build resiliency are no longer viable. We really have to become more creative."

February 2009

Personalized Medicine

M. Kathleen Behrens, President's Council of Advisors on Science and Technology



Personalized medicine and healthcare information technology (HIT) were the focus at the February 2009 meeting, which explored issues ranging from the confidentiality of medical records to the financial and logistical barriers necessary to overcome in order to implement a more widespread HIT network.

Kathleen Behrens, keynote speaker at the February CCST meeting, commented that personalized health “has the potential both to positively impact the increasing costs of healthcare and to decrease the rate of new medical product development.” Behrens served as a member of the President’s Council of Advisors on Science and Technology (PCAST) from 2001–2009, working on multiple national policy matters. Behrens chaired PCAST’s Subcommittee on Personalized Medicine and led a two-year study that culminated in the September 2008 report, *Priorities for Personalized Medicine*. This study identified several obstacles to effective implementation of personalized medicine, including regulatory systems that are not designed to accommodate complex genomics-based diagnostics.

Despite the obstacles, increased use of personalized medicine and HIT holds significant potential benefits both in cost savings and quality of care. Kathryn Lowell, Business, Transportation and Housing Agency’s (BT&H) deputy secretary for Health Systems and Life Sciences, commented that “With the advancement in personal health records, we are interested in exploring how to incorporate personalized health information in a manner that can lead to better patient identification, health outcomes and improved quality of care while reducing healthcare costs.”

May 2009

Smart Governance in Times of Sharply Diminished Resources

Roger Noll, Professor of Economics, Emeritus, Stanford University

John Ellwood, Professor of Public Policy, Goldman School of Public Policy, UC Berkeley

Thad Kousser, Associate Professor of Political Science, UC San Diego



The State budget was the primary focus of the May meeting, as predictions for the budget deficit continued to get worse despite the promise of federal stimulus funds.

At the time of the meeting it was apparent that the majority of ballot measures on the May 19th Special Election would fail, forcing California to cut more than \$21 billion from its budget. This May council meeting focused on strategies and opportunities that it might make sense to explore. The meeting goals were to identify crucial short-term and long-term structural S&T policy issues that can be addressed during a recession.

A panel discussion with experts in economics lead by Roger Noll, professor of economics emeritus at Stanford University; public policy lead by John Ellwood, professor of public policy at UC Berkeley; and political science lead by Thad Kousser, associate professor of political science at UC San Diego. The discussion helped put California's volatile budget in perspective, bringing together state policymakers - legislative and executive branches - and S&T experts to look at the new face of financial systems, and new federal initiatives planned.

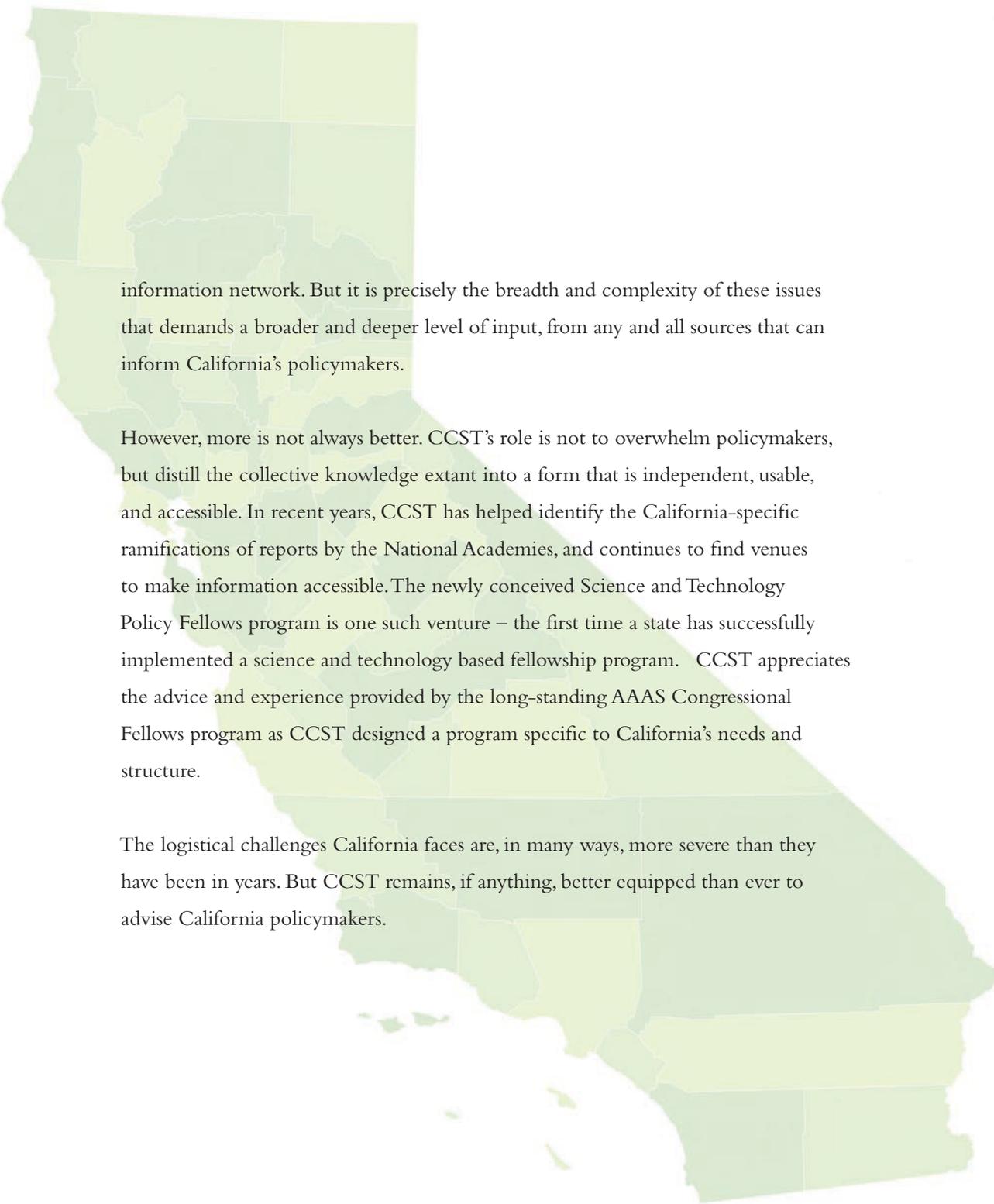
In addition to the keynote discussion, economically oriented panel discussions the next day focused on healthcare information technology, environmental and energy policy during a recession, and education funding.

CCST: Collaboration for a Better Future

CCST, at its core, is a collaborative organization. Deliberately inclusive from the onset, it was intended to provide a means for policymakers to tap the collective expertise of all of California's higher education institutions, as well as high-tech industry. Certainly, the state did not lack for internationally renowned S&T institutions, and could easily have turned to one or the other of them for a source of guidance on science and technology policy issues. But the collective approach which was adopted ensured a broader base of experience and a more balanced and independent presence.

Over the years CCST's networking has grown, gradually adding the voice of the federal funded laboratories – first individually in the form of several council members from one or the other of the laboratories, and eventually in the formalized addition of the six largest federal funded laboratories as CCST affiliates. The addition of Cal TAC brought the perspective of classroom teachers to its education studies. And a collaborative agreement with the National Academies has developed strongly over the past few years, with jointly hosted convocations on issues ranging from science and technology policy to education. And in Fall 2008, CCST extended its reach further to hold a joint meeting with the Royal Society of the United Kingdom.

This expanding network of connections is a vital part of CCST's mandate. Science and technology issues facing state governments today are both more numerous and more complex than in years past. The challenges have long-term consequences, such as plans made to address climate change, or involve infrastructure modifications scarcely imagined twenty years ago, such as the development of an interconnected healthcare



information network. But it is precisely the breadth and complexity of these issues that demands a broader and deeper level of input, from any and all sources that can inform California's policymakers.

However, more is not always better. CCST's role is not to overwhelm policymakers, but distill the collective knowledge extant into a form that is independent, usable, and accessible. In recent years, CCST has helped identify the California-specific ramifications of reports by the National Academies, and continues to find venues to make information accessible. The newly conceived Science and Technology Policy Fellows program is one such venture – the first time a state has successfully implemented a science and technology based fellowship program. CCST appreciates the advice and experience provided by the long-standing AAAS Congressional Fellows program as CCST designed a program specific to California's needs and structure.

The logistical challenges California faces are, in many ways, more severe than they have been in years. But CCST remains, if anything, better equipped than ever to advise California policymakers.

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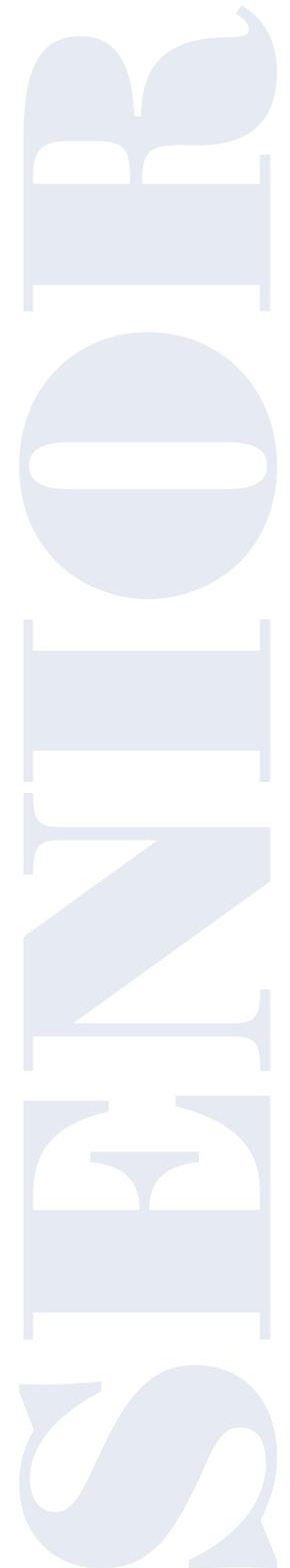
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