initial goal of using a minimum of 10% renewable energy. Some of the power will come from a CLF&P coal-fired plant that chemically scrubs the coal to reduce emissions of certain pollutants. The project leaders hope to be certified by the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. "We want the most energy efficient design possible so we can minimize the carbon footprint," said Laursen.

Construction is planned to begin after the design review next spring. According to the proposed timeline, the NWSC will be completed by summer 2011 and will be online early in 2012. According to Craig Douglas, a University of Wyoming professor with a background in computer science and parallel algorithm development, the supercomputing center will be a peer with top-notch facilities like the National Center for Supercomputing Allocations (NCSA) at the University of Illinois. "This is a great resource for people in Colorado and Wyoming, and the world," he said.

Winds of Change in Wyoming

Wyoming is one of the least economically diversified states in the nation. However, this is changing, and the NWSC has a large role to play. The state of Wyoming and the University of Wyoming are investing heavily in the supercomputing center project. UW is providing $20 million to the center's construction, and the university plans to contribute $1 million annually toward computing and data storage costs. Over the next 20 years, the expected budget for the center is $535 million.

Being part of the NWSC fits in well with the state's push for more advanced energy research in Wyoming. "Even before we have shovels in the ground, the university has already benefited from the proposed center," said Laursen. UW has a new School of Energy Resources, and 20% of the center's computing resources will be shared by university and NCAR researchers. This has already attracted faculty to Wyoming. The center itself will employ a staff of roughly 20 people, about half of whom will move from NCAR in Boulder. And having a high-tech supercomputing center in Cheyenne could attract more technology-based business to the area.

Douglas was brought to the UW School of Energy Resources in 2008 because of his expertise in supercomputing. He is the Director for the Institute of Scientific Computation and a distinguished professor in mathematics. Douglas is anticipating using the NWSC for research on carbon sequestration techniques. "I'm really excited that the University of Wyoming is involved in this," he said. For Douglas, determining what research questions to pursue with the computing allocations is all "part of the fun and excitement." If the business, education and technology leaders who have pushed to bring the NWSC to Cheyenne are correct, watching Wyoming's economy grow and diversify will be exciting as well.

From Cheyenne to the World

The increased electrical and storage capacity of the new supercomputing center will benefit atmospheric scientists. From climate change to severe weather or carbon sequestration, the research that will be done at the center will have important implications, much like the work that has been done through the NCAR Mesa Lab over the past 42 years. Unger points out that much of the public is still unsure about if or how climate change will affect them. "[The NWSC] will take us a step closer to delving into local impacts and will give decision makers the tools to take action," she said. Laursen agrees, adding, "It will be a key piece to help researchers work on these problems."

Reference

Manabe, S., and R.T. Wetherald (1967), Thermal equilibrium of the atmosphere with a given distribution of relative humidity, *J. Atmos. Sci.*, *24*(3), 241-259.

* Incidentally, 1967 was a big year for the University of Wyoming as well. The Cowboys football team went 10-1, with their only loss coming against Louisiana State University in the Sugar Bowl**.**

Interview with Raino Heino

Hans von Storch

Raino Heino, Finnish Meteorologist and Climatologist, was born in 1943, with a M.Sc. in 1968 and a Ph.D. in 1994 from the University of Helsinki. Since 1996 responsible Research Manager for Climate at the Finnish Meteorological Institute (FMI), and an adjunct professor at the University of Helsinki since 1999. For more than 25 years representative of FMI at the World Meteorological Organization (WMO) (in particular in the Commission for Climatology); a national delegate for the Intergovernmental Panel on Climate Change (IPCC) since 1994; vice-president of the European Meteorological Society 2002-2008, and Chair of the Meteorological Division of the Geophysical Society of Finland since 1999. Among his more private achievements is his stamp collection of meteorology, which has received several gold medals in international stamp exhibitions. The collection was also published by the WMO (Nr. 1023).

Raino Heino in the military weather service (1964).

In which areas of meteorology have you worked?

Mostly in climatology at the Finnish Meteorological Institute (FMI). In the beginning of my professional life I also worked in the information-communication technology-area, for instance by using the first computer of my country in the mid-1960s. In addition, I was a teacher of meteorology at Helsinki University (Dept. of Meteorology) for 30 years.

What about your international activities?

Since the 1970s I worked with various climate-related tasks of the WMO; at present time I am leading the climate data management activities of the Commission for Climatology. In addition, I am serving on the Commission for Basic Systems (CBS) Expert Team on Evolution of Global Observing System and GCOS Atmospheric Observations Panel for Climate.

I have also taken part in different European activities during these years, for example in the European Meteorological Society from its foundation. In Europe, the climate-related cooperation is promoted by the European Climate Support Network (ECSN), which coordinates the work of the National Meteorological Services and

(continued in the next page)

Meteorology also as a hobby. Several gold medals for the thematic exhibit "From Weather Gods to Modern Meteorology" of meteorology-related stamps and postal history items, to trace the development of weather-related activities, as illustrated in the philatelic pictorial material published by the postal administration of numerous countries.

organizes conferences and workshops among European climatologists. I have been involved in that work from the beginning of the ECSN in the early 1990s, and worked since then as a member of its advisory committee. European Union-funded projects have also had a key role in European climatology.

What's your role in the IPCC as well as the BACC (BALTEX Assessment of the Baltic Sea Region)?

I was the Finnish national IPCC delegate and focal point for 15 years during the 2nd, 3rd and 4th Assessment Reports and thus I was part of the IPCC when it was awarded with the Nobel Prize in 2007.

BACC, also known as the "Baltic IPCC", was created to assemble, integrate and assess available knowledge of past, current, and expected future climate change and its impacts on ecosystems in the Baltic Sea basin. The BACC book was published in 2008. I was the coordinating lead author of the chapter on Past and Current Climate Change. Thanks to you Hans for working as the overall coordinator of the project. Also thanks for leading the new BACC II assessment that hopefully will result in a new book to be published in 2012, thus supporting the 5th IPCC report.

Is it an advantage to live and work in a relatively small meteorological community?

Well, it's nice to know practically all the Finnish meteorologists by first teaching them at the only university dedicated to meteorology in Finland, and afterwards by working with them at the FMI. But this is not limiting, since the involvement in various international projects results in having many contacts outside your own country, too.

What would you consider the two most significant achievements in your career?

The fact of initiating the computer-based work in the 1960s, not only in climatology, but also in many other fields of meteorology of the FMI, may be a major achievement. The FMI will soon celebrate the 50-year anniversary of the use of computers, and the 40-year anniversary of its own computers. I seem to be the only "pioneer" still working at the FMI.

Various climate-related activities ranging from data processing to all kind of climate applications and research represent maybe not major achievements, but the sum of this large number of smaller steps certainly had an impact.

The IPCC-related work is of course the "crown" of my career as a climatologist.

When you look back in time, what had been the most significant, exciting or surprising developments in atmospheric science?

The development of computers and new observing techniques have been the most significant, especially to our science. Both of them have improved weather forecasting as well as the research process as a whole. Quite surprising, on the other hand, was the sudden change of scientists' attitudes from the threat of the next ice age in the 1970s to the present over-warming by the greenhouse effect.

Is there a politicization of atmospheric science?

Yes, but only concerning the climate change issues. It is understandable, because the economic values involved are tremendous. The work of the IPCC, however, is the major cornerstone in assessing regularly what's going on in climate science. It makes it also easier for individual scientists to respond to increasing inquiries from all sides.

What constitutes "good" science?

Good education, hard work and honest output of the results.

What is the subjective element in scientific practice? Does culture matter? What is the role of instinct?

The subjective element is also present in science, but probably it is not very dominant, especially concerning the normal scientific communication. The internet has, however, opened an influential door for subjectivity. Culture may not matter very much in international science. Concerning the role of instinct I would like to refer to H.Wanner's interview [in Atmospheric Sciences Section of AGU Newsletter 3 (3), 4-5]: "Instinct is an important ingredient of a good scientist, but has to be combined with enthusiasm, creativity and stamina."

Reference

Heino, R. (Ed.) (2008), *WMO-No.1023. From Weather Gods to Modern Meteorology: A Philatelic Journey*, 112pp, World Meteorological Organization, ISBN: 978-92-63-11023-7.

"From Weather Gods to Modern Meteorology: A Philatelic Journey." (WMO) (cover).