Report of IAPWS President Dan Friend to IAPWS Executive Committee.

8th September 2023

Good morning again! (Buongiorno!) As usual, it's been a wonderful week at the IAPWS Annual Meeting: we've had two years in which all meetings were virtual, and now two years with in-person meetings. It seems that we're starting to get things done again—I'm looking forward to hearing the reports of our Working Groups, and learning of accomplishments, plans, and progress in a general sense. That said, I feel a sense of disappointment and concern that Barry has reported on Monday, that no IAPWS business was completed during the last year—no releases, TGDs, ICRNs—or anything. I hope we will do better in the coming year.

Firstly, and on behalf of all of IAPWS, I must thank the Italian delegation—Simona—for the wonderful hospitality and effective logistical arrangements. I expressed our appreciation at the Monday meeting, but now that the week is nearly concluded I can provide more sincere and well-founded thanks: the meeting details have been essentially flawless.

So we are here together in Italy. From my perspective, it seems obvious that the networking and personal connections (and pressures) of in-person meetings are more conducive to actions—to IAPWS accomplishments. This perception (of mine) is despite my awareness of the costs of travel—not so much financial, although that is certainly an important factor—see agenda item 2.8 –but in terms of CO_2 costs to the planet.

And as I mention CO_2 I am brought back to Dr. Nakahara's Presidential report from last year in New Zealand—actually perhaps the subject of our concern for at least decades—that there is a relation between traditional electric energy production and global climate change.

We've all seen—in too many cases first hand--or at least heard about, the floods, the droughts, the wildfires; not to mention the pandemic, heat waves, weather extremes, climate migration, species extinction, overpopulation; and all the issues that could point to more horrors in this century. We do not really know how technological fixes will integrate with social needs and political realities. Every choice that is made to attempt to solve such issues will have consequences—risks—whether these are well known, unknown, or uncertain.

I'm not trying to dwell on catastrophe and depression; quite the opposite. Instead, I'm again emphasizing that we need to recognize, as did Dr. Nakahara, that there is an energy transition—and electric power generation remains a key part of that. Whether that means more geothermal as we saw in New Zealand or nuclear—or fusion even—or "all of the above" as we say, it puts this organization—IAPWS—near the center of things.

We used to speak of the "energy-water nexus," a descriptive term from the mid 1970's--for those intricate connections between power generation and the entirety of our water infrastructure. Now we should more accurately talk about the "energy-water-climate nexus," especially as we've added physical oceanography and humidity—the atmosphere—to our organizational scope. (And I will re-emphasize the importance of resurrecting the

Subcommittee on Seawater to our technical portfolio.) My conclusion here is that the International Association for the Properties of Water and Steam is central to the emerging science, engineering, and technology of this era. For more than 50 years, we have focused on harmonization of information on water and steam as key to progress in the electric power generation sector. Now, we should recognize the centrality and importance of IAPWS to a broader assortment of key global challenges of this century. This is the energy-water-climate nexus.

As individual scientists, engineers, technologists, and entrepreneurs we may look at fundamentals (perhaps aqueous physical chemistry or ab initio calculation of properties); or preservation of capital investments within a changing power grid—cycling of base load plants; or drivers of ocean currents, or whatever. But as an organization, we must continue to look at providing global harmonization of information, guidance, and documentation for the world (or at least our membership). We, as individuals, may play small roles, but IAPWS serves a core and vital mission with potentially unlimited opportunity and responsibility.

So where do we go from here. Initially, we'll listen to reports from our Working Groups and learn of the current activities, documents, and plans—as well as continue conducting the routine business of IAPWS.

Further, I urge you all to come to the conference next year and bring your delegations to share the technical progress and challenges with this international audience. As part of that, I'll suggest that we all try to think strategically and globally about how IAPWS can contribute to an understanding of the "energy-water-climate nexus," and what activities should become new focusses for the organization. I was pleased to learn that this strategic planning process has been occurring during this year's Annual Meeting, and I suggest that we approach the ICPWS as a means to push the bounds of IAPWS in strategically important directions.

Thank you—Barry, delegates, and all.