Statement of Gary L. Esslinger
Treasurer-Manager, Elephant Butte Irrigation District

Before the
Subcommittee on Water and Power
Natural Resources Committee
U.S. House of Representatives

On
"Investment in Small Hydropower: Prospects of Expanding Low-Impact and Affordable Hydropower Generation in the West"
July 29, 2010

[SLIDE 1]. Madam Chairwoman and members of the Subcommittee, I am Gary Esslinger, Treasurer-Manager of Elephant Butte Irrigation District ("EBID") in Southern New Mexico and a member of the Family Farm Alliance's Low Head Hydropower Committee. I am pleased to be here today to offer testimony about EBID's efforts to develop the hydroelectric power potential of many existing irrigation canal drops throughout our irrigation facilities [SLIDE 2]. It is my hope that these efforts will eventually create an ongoing revenue stream for EBID to contribute to our growing operation and maintenance ("O&M") expenses, help to maintain our 109-employee workforce, provide more affordable service rates for our farmers, and add to the local economy by purchasing material and equipment. Across the Western United States, we see such hydropower development as helping other irrigation districts to generate income to defray the cost of O&M services performed by the Bureau of Reclamation ("Reclamation"), help rebuild and modernize our aging water infrastructure in tandem with programs such as Title XVI, and hopefully keep our farmers' annual water assessments affordable.

EBID's approach to hydropower development has largely been experimental and internally focused. In speaking to other district managers about comparable projects, we were surprised by the cost of buying a ready-made turbine capable of producing 12-kilowatt hours ("KWH") of $50,000 and up [SLIDE 3]. Our challenge was to construct a turbine with similar capacity at far less cost using EBID's staff and facilities. We designed a pilot project using one of our replacement check structures that could be harnessed for hydropower production. The check structure pushes water through our canal at approximately 300 cubic feet per second [SLIDE 4]. The hydropower installation simply uses the normal operating flow, uninterrupted, to generate power as it goes through a turbine rather than dissipating that same energy in a constructed waterfall. We are planning to install the turbines on new canal structures already scheduled for routine replacement, as many are over 70 years old. This reduces the marginal cost of the hydropower installation substantially.

After some trial-and-error, we eventually developed a prototype for which we fabricated our own axial flow turbine [SLIDE 5]. Testing indicated the axial turbine is capable of producing 12 KW, the same as the expensive commercial products we observed in place

at other water districts. We estimate the total cost for our completed turbine to be approximately $3,500, or roughly 7% of the commercial product's cost [SLIDE 6]. This lower cost puts small scale, low head hydropower technology in range of economic viability. I believe many irrigation districts throughout the Western United States maintain similar in-house capabilities to develop hydropower turbines at low cost.

Satisfied with the results from our testing, EBID is now pursuing the development of four turbines on our pilot check structure, which would quadruple the power output. We will also continue to raise the production rate by improving our turbine design. Ultimately, we hope to explore and develop the hydropower potential of many sites throughout the district. We partnered with Los Alamos and Sandia National Laboratories to analyze approximately 18,000 acres of land to identify further hydropower potential and refine the design of our axial turbine [SLIDE 7].

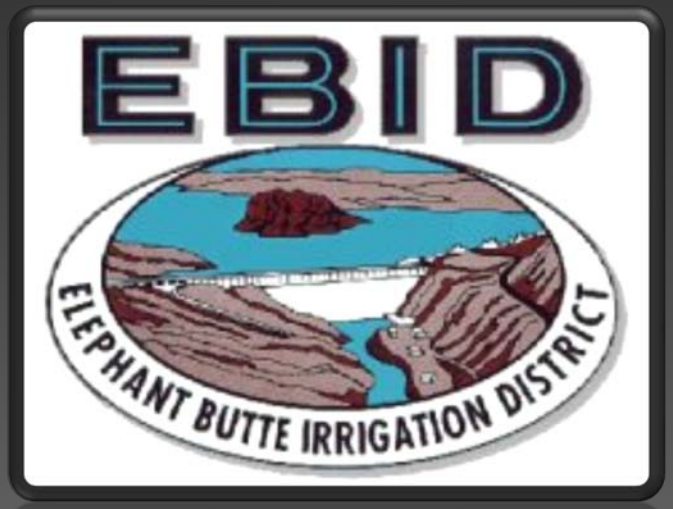
Our next step is working with the Federal Energy Regulatory Commission ("FERC") to obtain a conduit exemption from its regular licensing process in order to complete our work on the pilot check structure and eventually connect to the power grid. FERC staff members have been extremely helpful and receptive to our requests as we have prepared to file for the conduit exemption. I understand they intend to launch a website at the end of August intended to make the process as streamlined as possible. However, they can only do so much under the existing statutory framework to move cases such as ours through the process. Though simpler than the formal licensing requirements set up to govern large hydropower facilities constructed on dams, applying for a conduit exemption still requires months of processing and back-and-forth with federal and state agencies that is unnecessarily burdensome on irrigation districts with already limited resources. Furthermore, to develop the full hydropower potential of the many sites we hope to identify, EBID will likely have to file dozens of applications due to differences between each site and construction timing.

Small hydropower projects constructed on irrigation facilities do not require this degree of scrutiny given the minimal potential for environmental impact. These engineering structures are already off-river on constructed systems and offer the potential to create clean, renewable energy during growing season – a peak time for electricity use in the Western United States.

I understand there are both legislative and regulatory proposals intended to provide the statutory authority to further streamline the conduit exemption process for irrigation districts. EBID supports these efforts, as we believe it is important to ensure administrative costs are low as we enter a new stage of growth for this largely untapped renewable energy source. The economic feasibility of this technology is narrow. Although EBID has made significant strides to develop low cost turbines and combine efforts with ongoing maintenance projects, high regulatory compliance costs could very well tip the balance against the project. Specifically, a permanent legislative fix exempting low head hydropower projects from the FERC process altogether is likely necessary to provide FERC and Reclamation the statutory authority to ensure we are able to fully take advantage of small hydropower potential in an affordable manner.

Overall, EBID sees the development of its low head hydropower potential as a method to independently pay for its ongoing O&M expenses using an in-house model that could be replicated at many irrigation districts throughout the Western United States [SLIDE 8]. With an easy-to-navigate regulatory environment, our efforts could be replicated on a wider scale and free-up district revenues to invest in the aging infrastructure backlog and new resources – particularly investments in water efficiency enhancements, reuse, and recycling programs that are critical to meeting our nation's future water supply needs.

Thank you for the opportunity to testify before the Subcommittee today. I would be happy to answer any questions you may have.



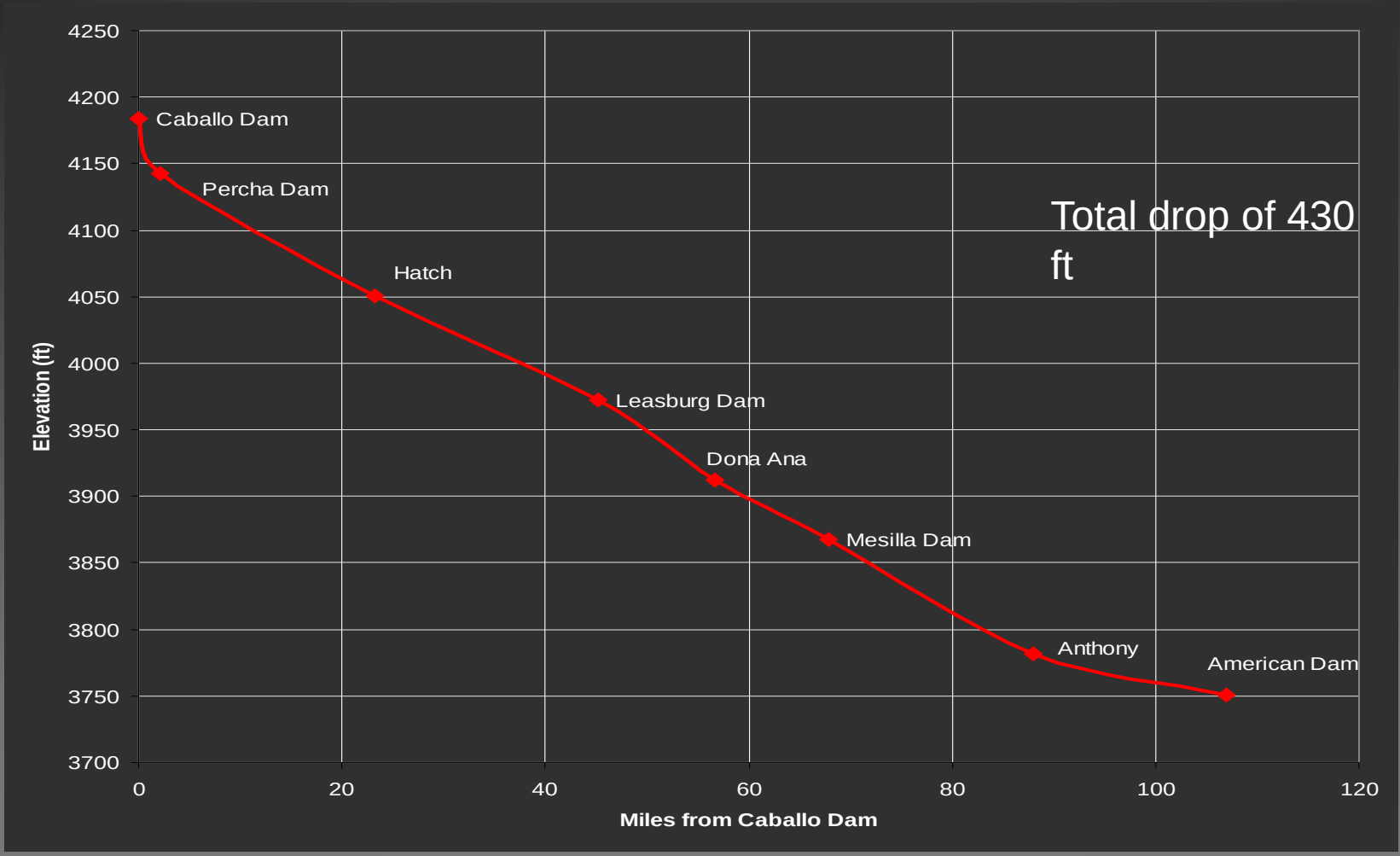
Micro-hydroelectric project

Location of EBID

Reclamation

- Single purpose project 1905
- Paid out 1972
- Federal facilities transfer 1996
- Surface water delivery to 90,640 acres
- 600 mile canal and drain system

Elevation Differentials of Gravity Flow Structures



Site Location Drop 8

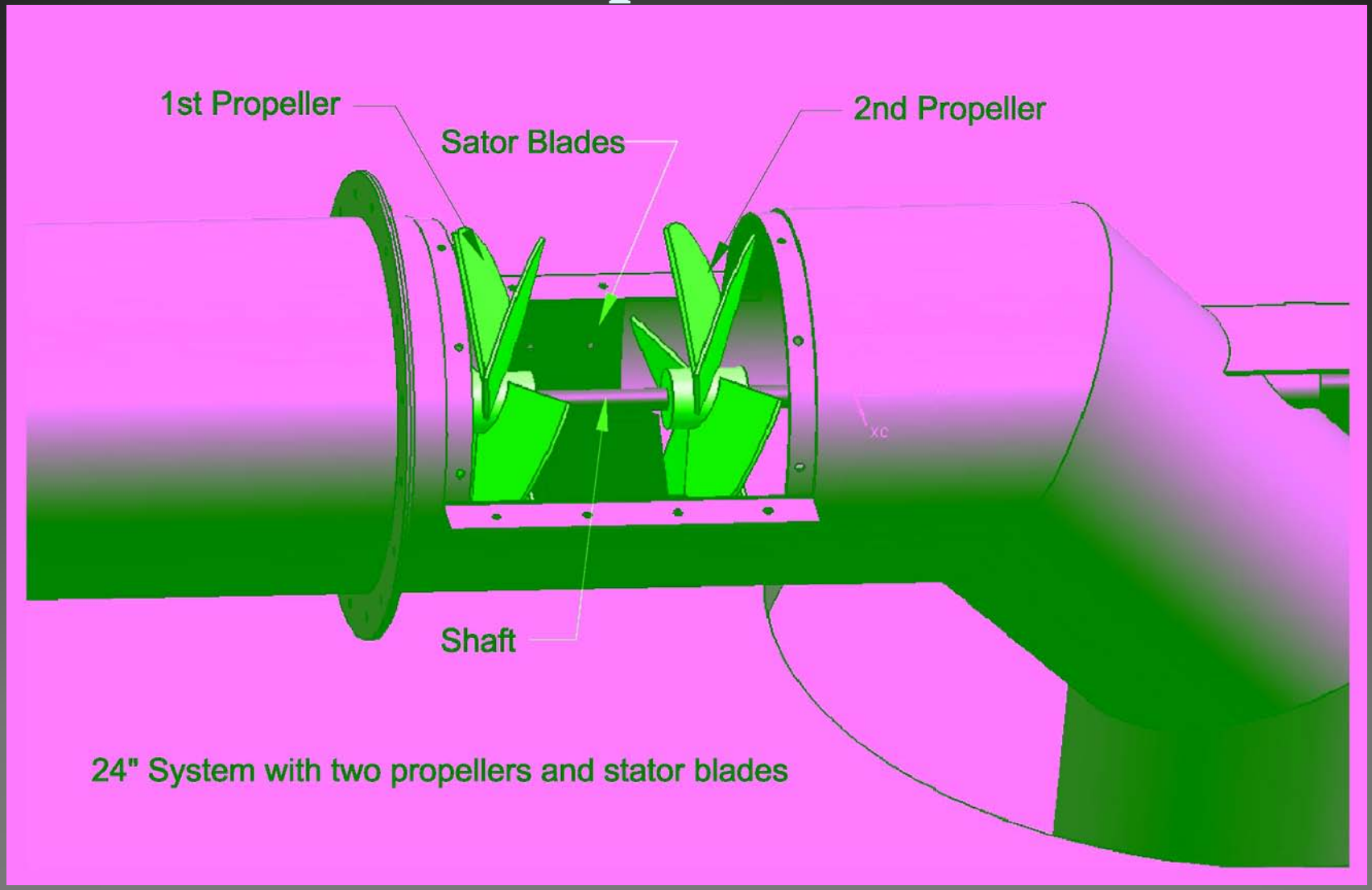
Upstream of Drum Structure 10/2008 (click to play)

- Elevation drop of 8 feet.
- Flow rate of 300 cubic feet per sec (CFS).
- Ample room for power house.
- Preservation of Historical Structure 1920

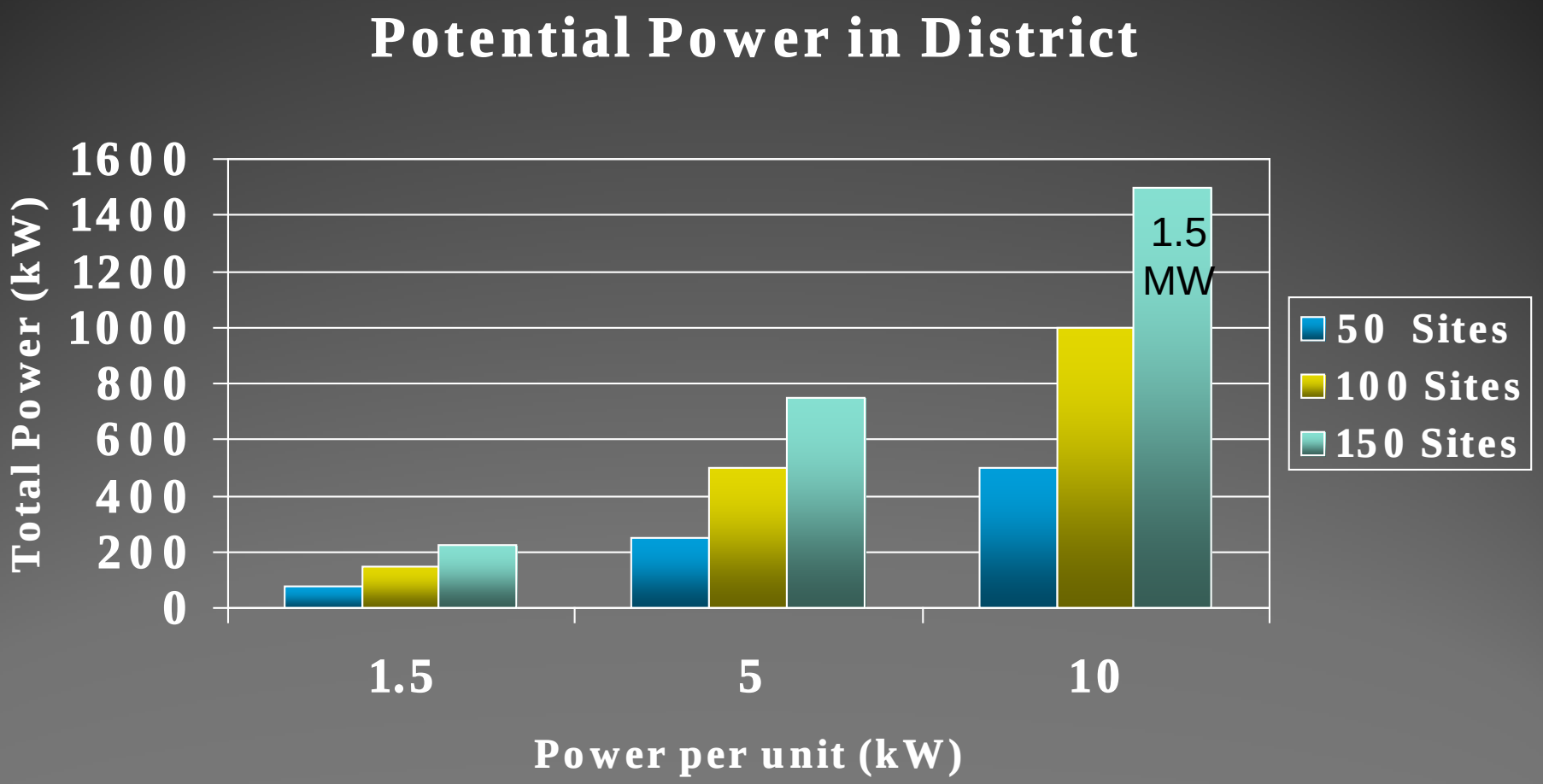
Old and the New

Arial view of site 7/2009

Turbine 4 Updated Version



Projections



2/16/10 Site Visit – Senator Bingaman & BOR Commissioner Connor