



# **Financing Small Hydro Projects (SHP): The Challenges and the Opportunities**

*Presented by:*

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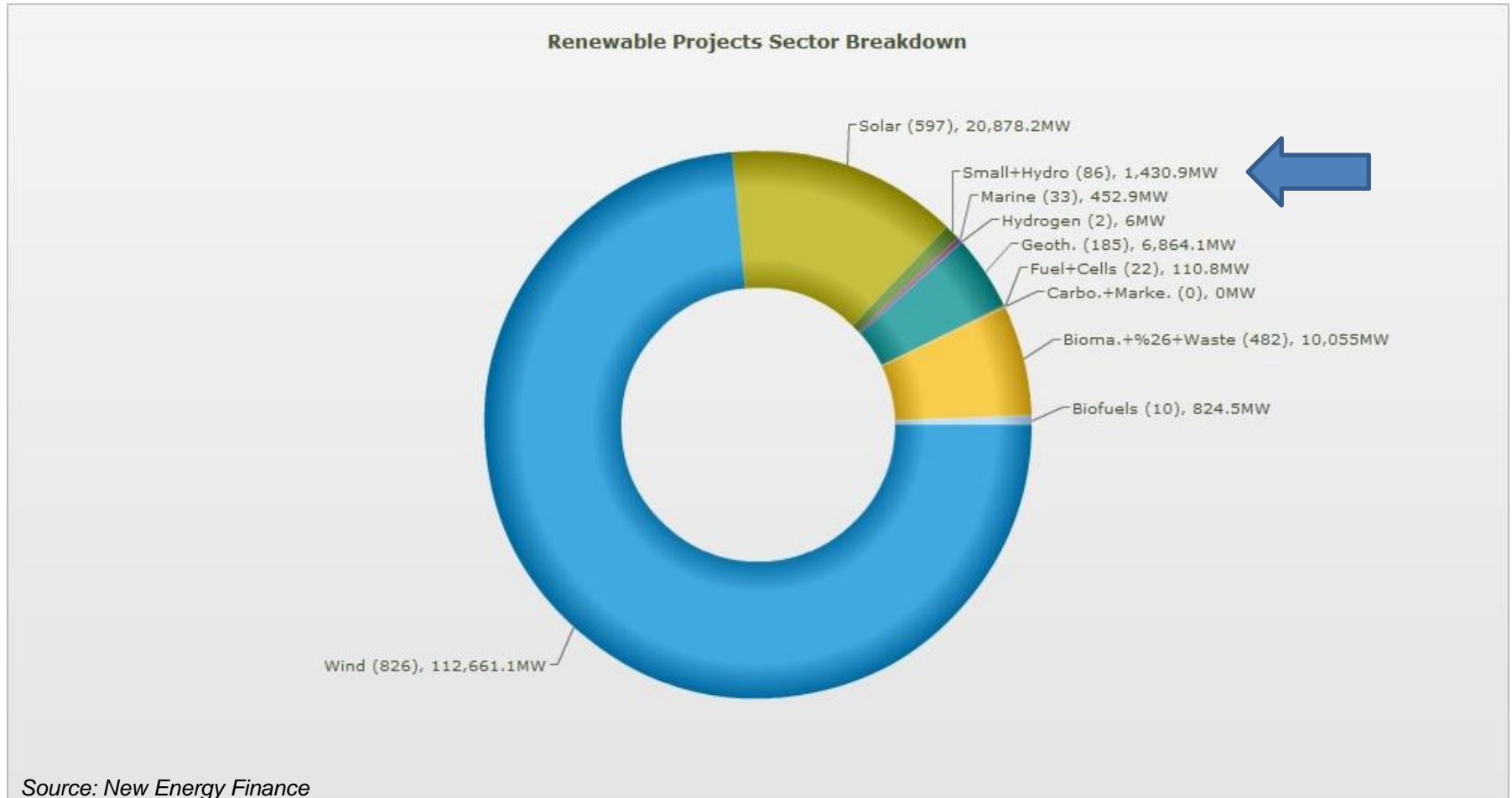
Founder & Vice Chairman – ORENCO Hydropower

*Presented at:*

**NWHA Small Hydro Workshop**

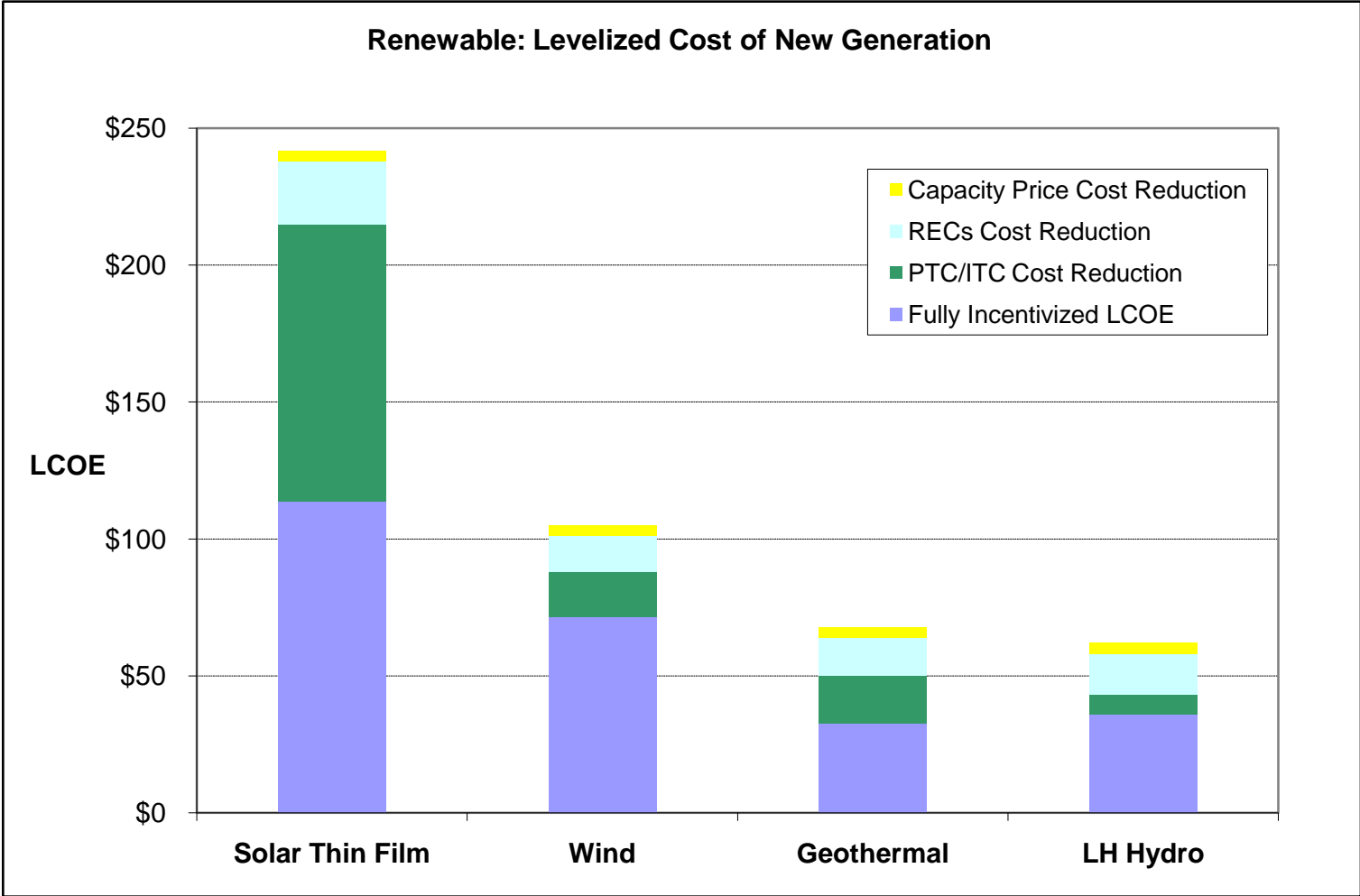
**September 22, 2011**

In North America over the last decade, development of small hydro (1 GW) has been dwarfed by wind (113 GW) and solar (21 GW).



At historical prices, \$300 billion was invested in wind vs. \$4 billion in small hydro during the last decade.

The dearth of small hydro financing is surprising given the significantly lower levelized cost of energy from small hydro and its ability to be viable without government subsidies.



Source: Strategic Decisions Group

# In our view, small hydro has been dwarfed by wind and solar in part because ...

- 1. Private Development Financing of individual projects is virtually impossible due to:**
  - Licensing is seen as betting on a risky coin flip:
    - 50/50 chance of licensing success,
    - 1 to 5 years before you know if it's heads or tails
  - About 10% of the project cost to even flip the coin
- 2. Private Project Financing is available for larger attractive projects**
  - Most private equity investors look for investments of significance (\$50 MM+)
  - Power industry investors look for purchases of scale (>50-100 MW)
- 3. Most Munis and Irrigations Districts only have a few opportunities, never building the necessary project and financing expertise**

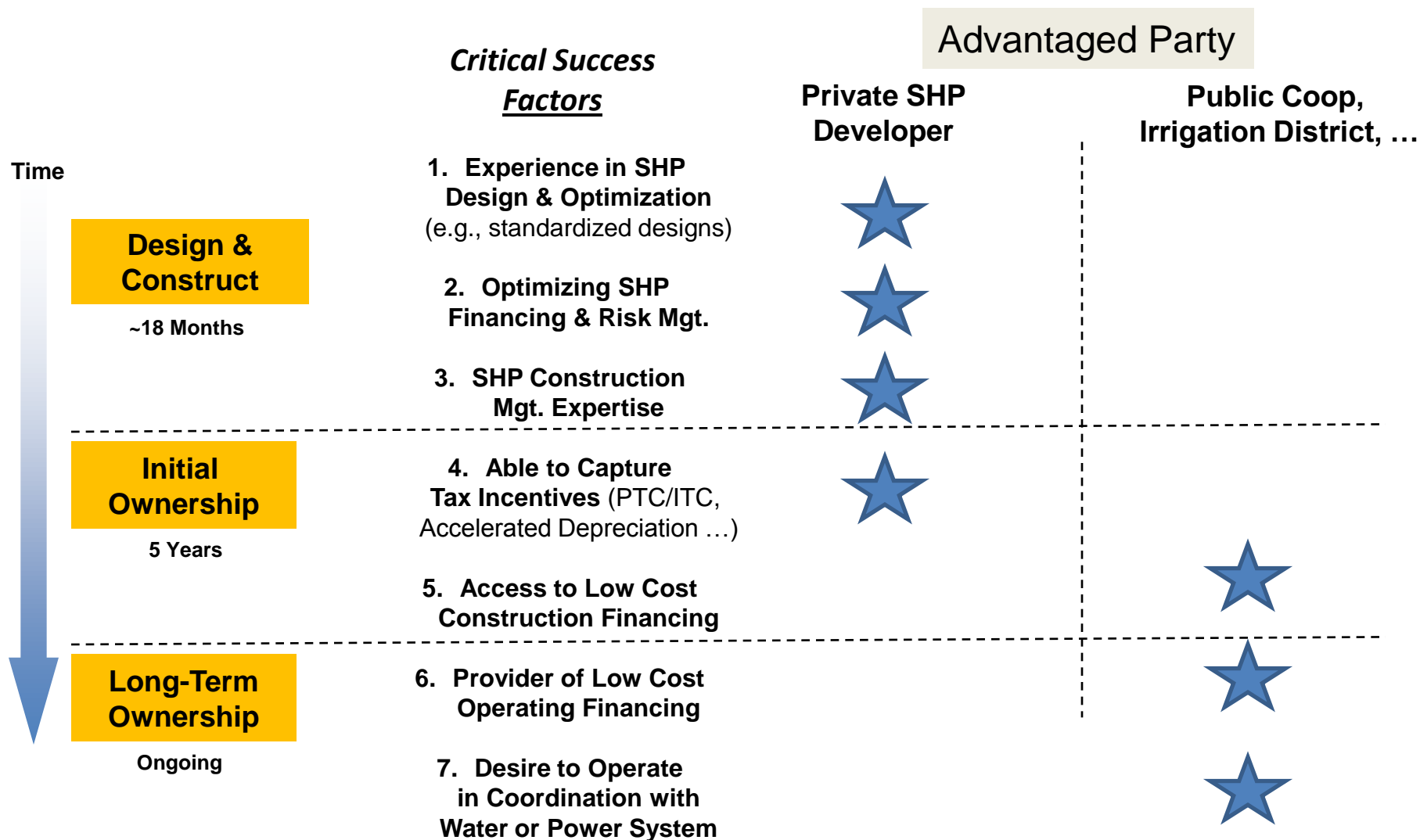
## What's Needed?

**Need to Build a  
Portfolio of Attractive  
Projects**

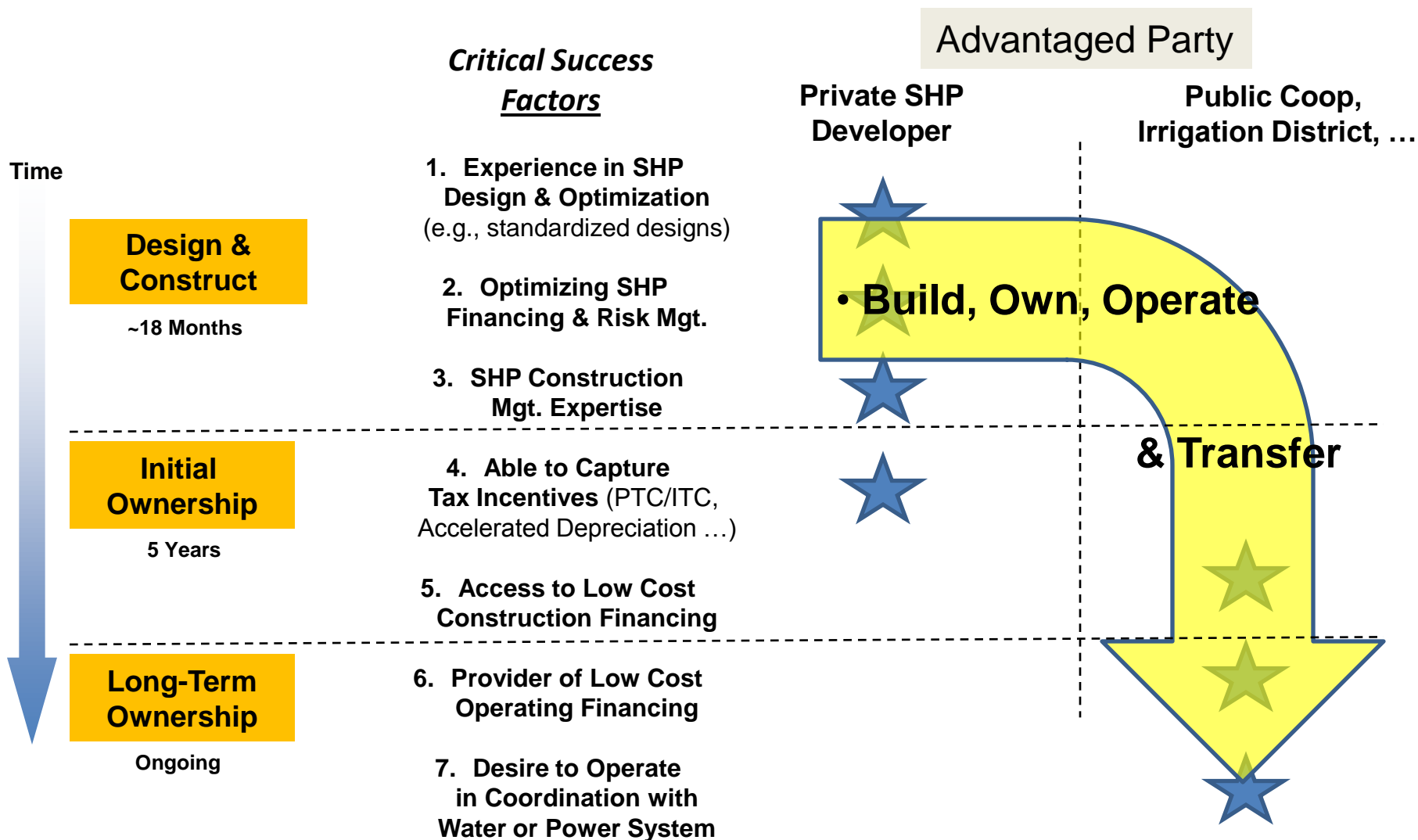
**Important to  
leverage low-cost  
public financing**

**Critical to leverage  
the expertise in  
project optimization  
and finance**

**Private/Public Partnerships are a compelling financing approach since they leverage the most advantaged party in each step of the process.**

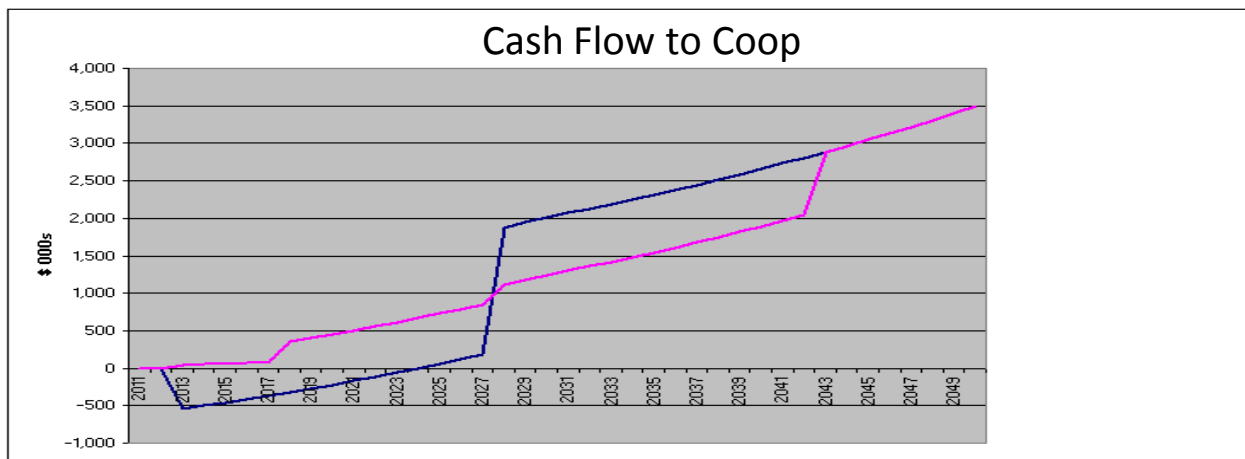


**Private/Public Partnerships are a compelling financing approach since they leverage the most advantaged party in each step of the process.**



## A recent 6.5MW project illustrates the upside of this Build/Own/Operate & Transfer (BOOT) financing approach.

- **Privately developed, the hydropower portion of the project qualifies for the 30% Investment Tax Credit Cash Grant (which has the government pay ~\$6MM of the capital cost of the project on project start-up)**
- **Ownership will be transferred to the regional Coop at the beginning of year 6 of operations**
- Privately financing displaced Coop's use 1.85% CREB financing on that portion.
- The resulting benefits to the Coop from private financing:
  - **Increases the project 's NPV to the Coop by from \$4MM to \$6.6MM**
  - **Eliminates Coop's negative cash flows during initial ~10 years of operations**
  - **Reduces Coop's project cost by 20%**



# Private Build, Own, Operate and Transfer (Year 1 through Year 5 of operations)

## • Coop

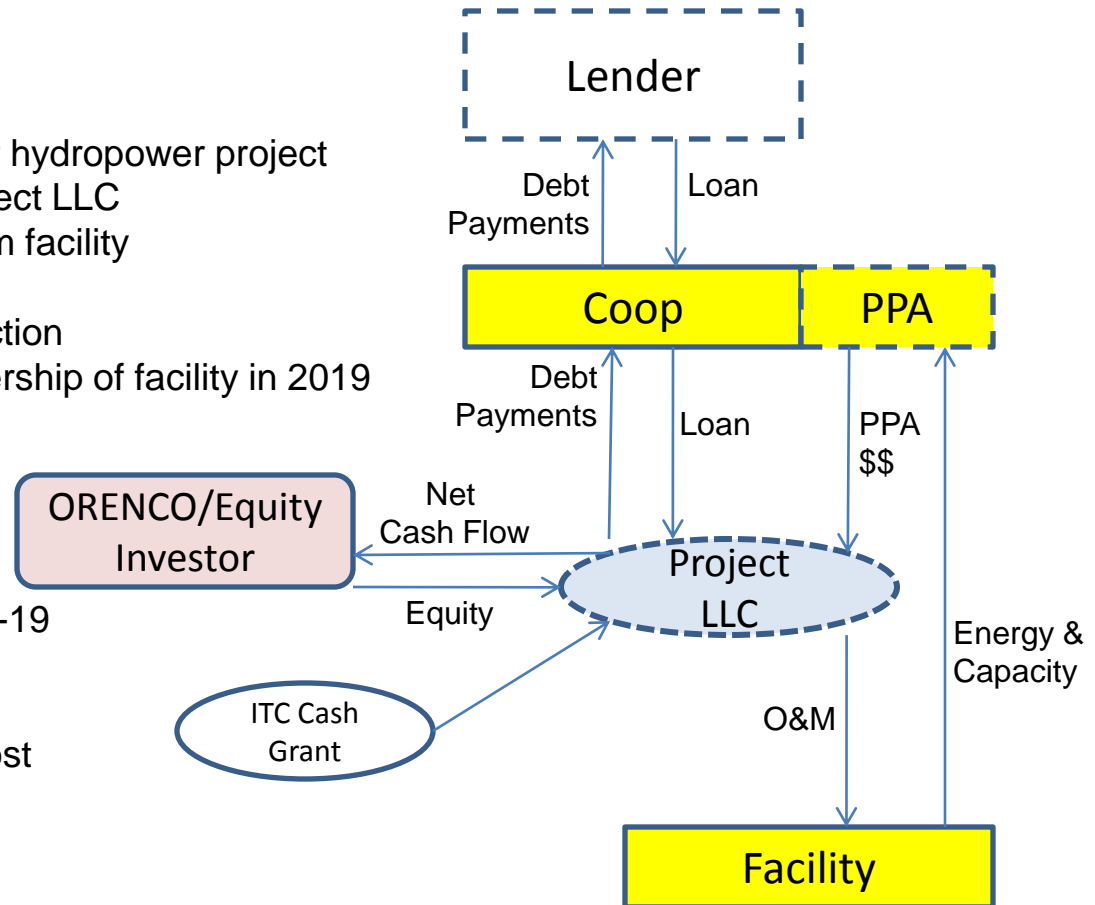
- Provides debt financing for 80% of hydropower project
- Receives debt payments from Project LLC
- Receives all energy & capacity from facility
- Pays LLC for energy & capacity
- Builds and finances Tr. Interconnection
- Exercises call option to takes ownership of facility in 2019

## • ORENCO/Equity Investor

- Contracts for facility construction
- Provides 20% equity financing
- Receives LLC's net cash flow 2011-19
- Receives ongoing share of REC and CO2 credits
- Pays Coop a spread on the debt cost

## • Project LLC

- Pays debt payments to Coop
- Enters in PPA with Coop
- Receives ITC cash grant
- Operates and maintains plant





## **APPENDIX & Contact Information:**

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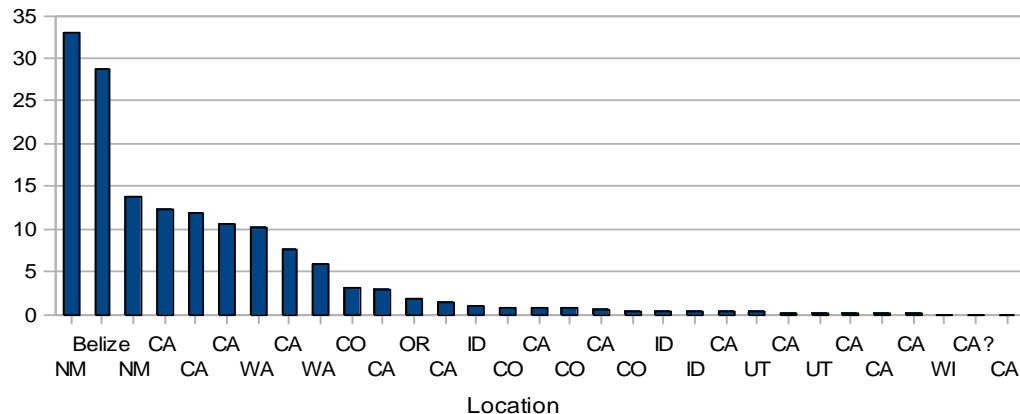
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# ORENCO Hydropower Focus and Project Experience

- ORENCO is a developer of small hydropower projects in the Western US and Midwest
  - Addition of hydropower capability to existing dams
  - Addition of hydropower to municipal water treatment and irrigation systems
  - Retrofit/refurbishment of existing hydropower facilities
- ORENCO's has designed and procured the hydropower systems of 31 completed projects in North America ranges from 0.01 MW to over 30 MW. Of these, 30 projects are in the U.S., 15 are in China and 1 is in Latin America.

ORENCO Projects by Size



- Primary provider of cost advantaged turbines and generators via unique and trusted arrangements with Chinese hydro engineering/manufacturing firms for over 30 years
  - Engineering and equipment procurement costs average about 30-40% less than U.S., Canadian or European vendors, due to cost-advantaged Chinese suppliers
  - Reliability of Chinese systems has been demonstrated over 30 years' experience.

# ORENCO Hydropower's business model & approach tackles the major limitations to project financing:

## 1. Individual projects are virtually impossible to finance:

- Developing portfolios of projects radically changes odds of success
  - A diversified portfolio of 20-30 small projects with a disciplined stage-gate decision process can significantly improve risk profile to the investors.
  - Optimizing Private/Public Partnerships

## 2. Industry Fragmentation:

- No economies of scale keep project cost 30-40% too high:
  - Tap into chain of Chinese suppliers that have developed 45,000 small hydro projects, and provide equipment and detailed engineering at 30-40% lower cost
  - Integrate a network of small project developers to provide negotiating leverage

## 3. Poor and Limited Perception of Small Hydro:

- Initially target the ~2GW of hydro projects that are FERC exempt (USBR, munis, irrigation districts)
- Work with leadership in this room to stress the fundamental attractiveness of this renewable resource on a story to FERC and Congress
- Put our “money where our mouth is” and invest heavily in small hydro over these next 5-10 years.

