

Low Impact Hydropower

Options and Innovations with Zero Emission, Base Load
Power Generation, An Underutilized Energy Resource

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About LIHI

- Founded in 1999
- Not for Profit, 501(c)3
- Purpose:
 - To establish “low impact” criteria for characterizing hydropower facilities
 - To conduct a program to certify facilities that meet these criteria
 - To inform consumers about the environmental effects of power generation



About LIHI - Governance

Current LIHI Board and Advisors NGO representation



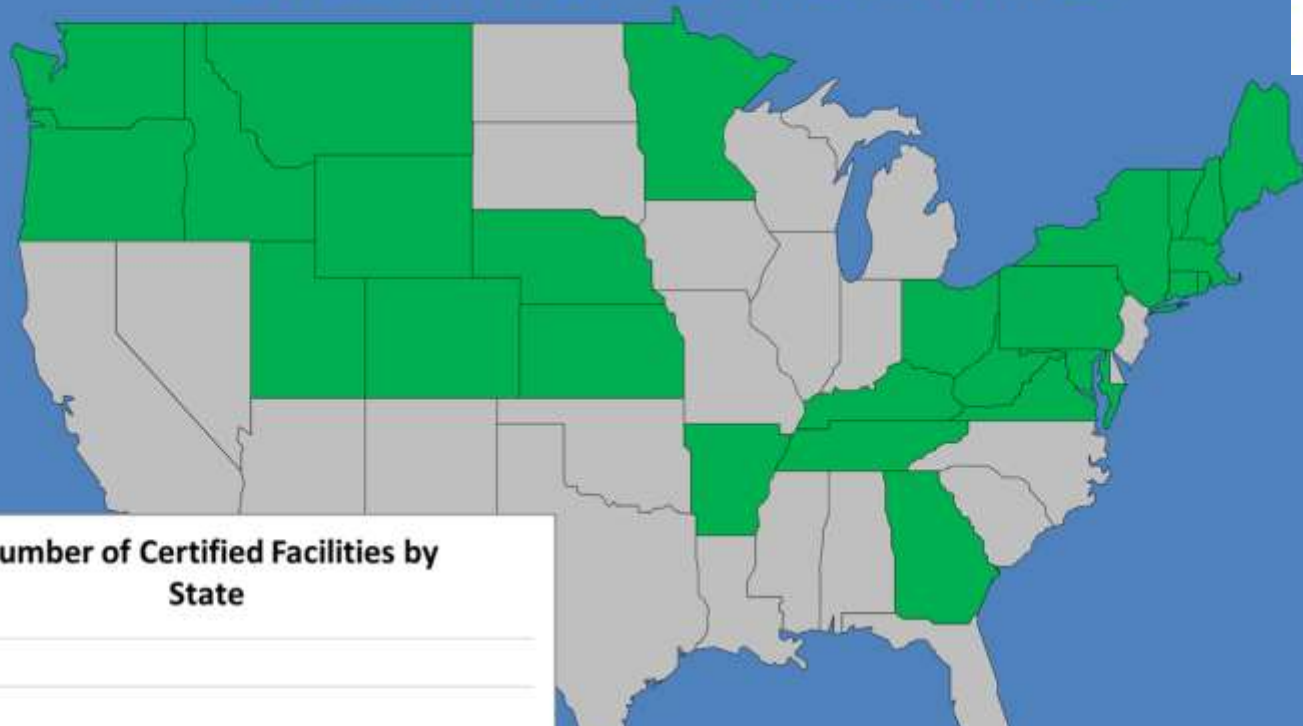
LIHI Board and Advisors also represent:

- Government agency/federal labs
- Hydropower industry and related services

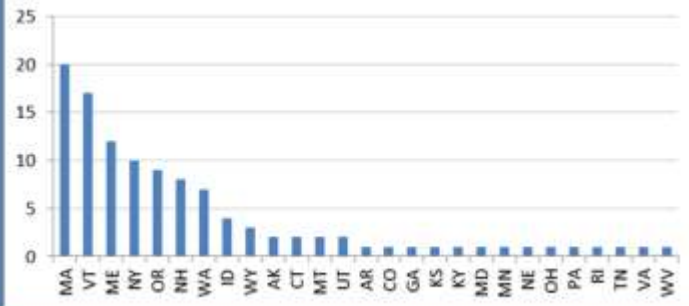
About LIHI – National Representation



States with LIHI-Certified Facilities



Number of Certified Facilities by State



*124 certifications, ~170 dams, 28 states.
Total capacity = 4.4 GW.*



Low Impact Hydropower

Presentation order:

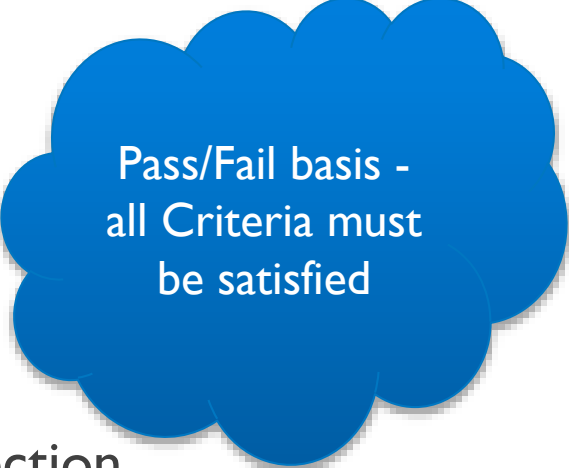
1. About LIHI
2. **LIHI Certification**
3. Low Impact Hydropower's Value and Role in Markets



LIHI Certification - Criteria

Evaluation criteria include:

1. Ecological Flow Regimes
2. Water Quality Protection
3. Upstream Fish Passage
4. Downstream Fish Passage and Protection
5. Watershed and Shoreline Protection
6. Threatened and Endangered Species Protection
7. Cultural and Historic Resource Protection
8. Recreational Resources



Pass/Fail basis -
all Criteria must
be satisfied

Default term:

- 5 year
- Annual Compliance
- Fees to apply, maintain certificate

New Features in 2016 update:

- Menu of alternative standards
- Very Low Impact (VLI)
- PLUS - extra years can be earned


LIHI Certification - Eligibility

Existing (and some new) US Resources are eligible:

- Facilities of all ages
- Generation installed on dams constructed prior to 8/1998
 - New capacity and incremental additions **after** 8/1998 are eligible

Ineligible for LIHI Certification:

- Facilities outside the United States
- Marine Hydrokinetic projects
- Pumped Storage
- Facilities on dams constructed after August 1998
- Facilities on dams recommended (by resource agencies) for removal



Eligibility is reviewed periodically

www.lowimpacthydro.org/eligibility

LIHI Certification – Certification Mark

U.S. Certification Mark

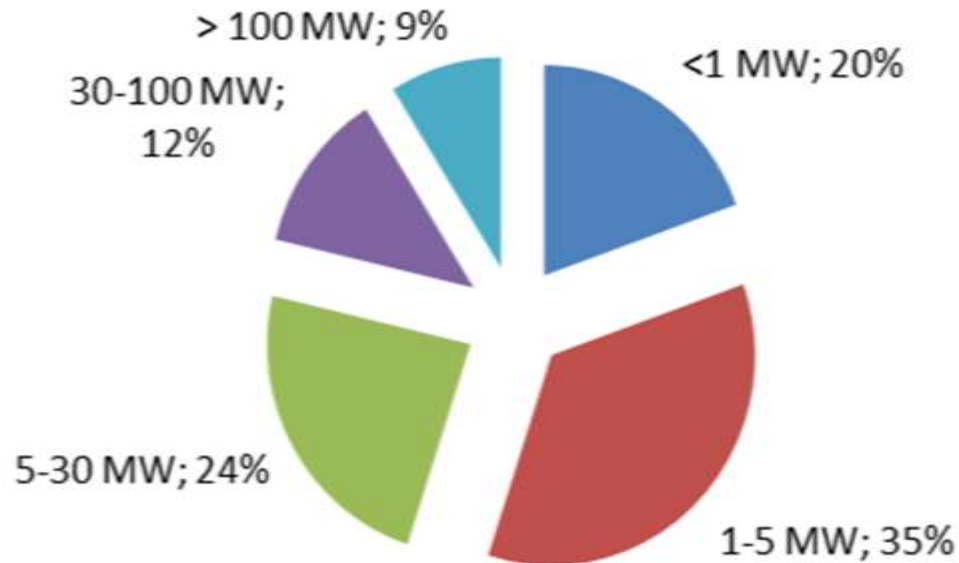
- Registered in the U.S. Patent and Trademark Office
- License use to certificate holders
- Marketing Guidelines
 - FTC Green Guides
 - Marketing/branding
 - Claims to state energy offices for RPS eligibility
 - Green/LIHI Certified for voluntary transactions



LIHI Certification - Size

Size alone does not reflect impact

Low-impact facilities are both big and small (% of certifications to date)



LIHI Certification - Mode

All operational modes can be low-impact

Run of River



Downer's Mill, VT
Oakdale, MA



Upper Raquette River, NY
Pelton Round Butte, OR

Peaking

Conduit



Reregulating



Low Impact Hydropower

Presentation order:

1. About LIHI
2. LIHI Certification
3. **Low Impact Hydropower's Value and Role in Markets**



Low Impact Hydropower – Value

- LHI certification encourages environmental optimization, sometimes resulting in generation reductions, but retaining base-load generation attributes
- LHI certification reflects effective fish restoration efforts and improvements to water quality
- Environmental benefits, unique to low-impact hydro, should be recognized
 - Tax incentives
 - Market pricing
 - RPS eligibility
 - Adaptation planning



Low Impact Hydropower – Role

Existing assets are significant contributors to today's renewable baseline.

They also need reinvestment to stay online.



Reinvestment

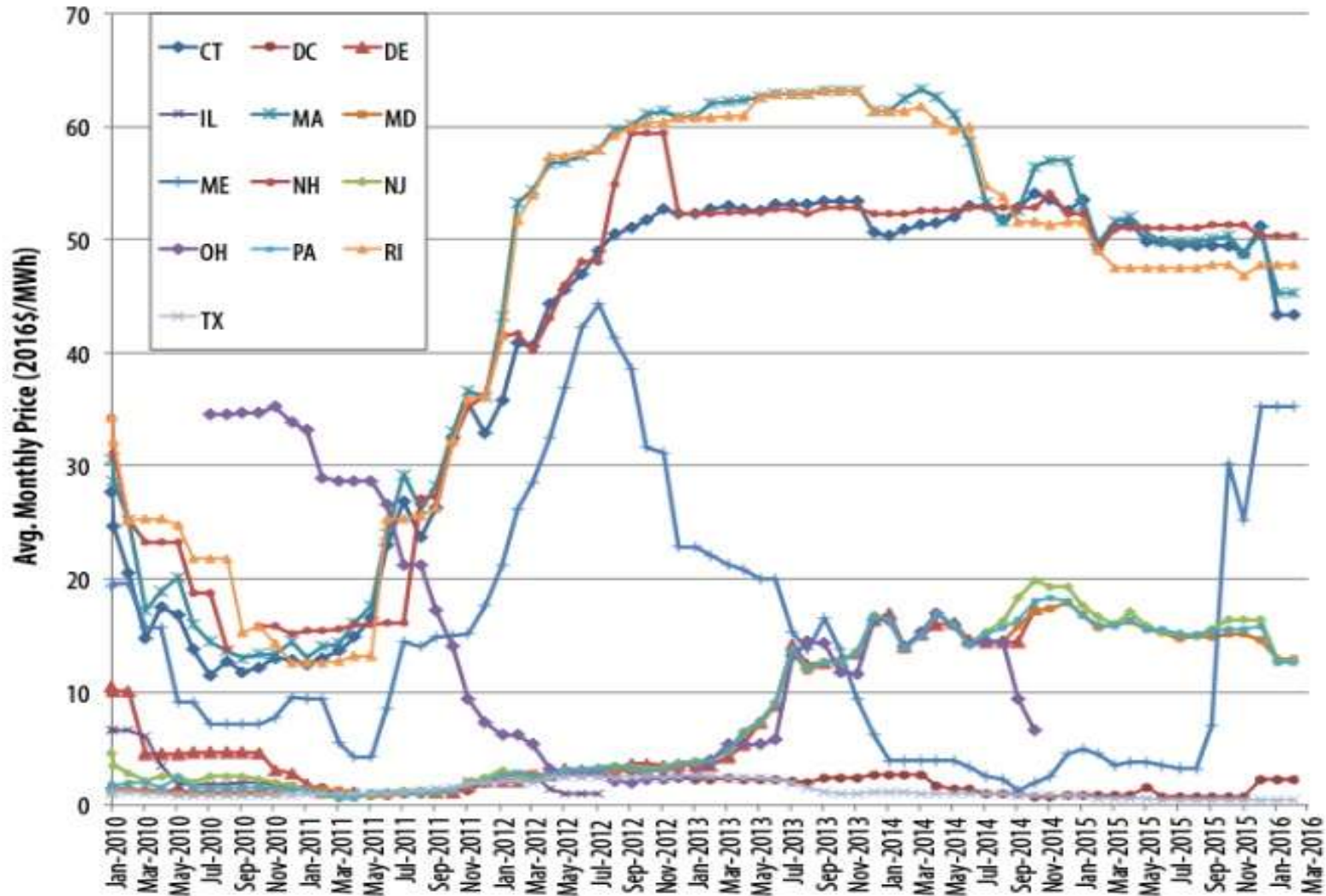
means environmental benefits and the renewable baseline are maintained (or even increased), and revenue from LIHI Certification can help the project economics

Decommissioning

aging assets that are uneconomical to keep in operation means they must be replaced with other forms of generation (and may require expensive dam removal)



Low Impact Hydropower - opportunity



Thank you!!

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