

Bruce A. Measure
Chair
Montana

Rhonda Whiting
Montana

W. Bill Booth
Idaho

James A. Yost
Idaho



Dick Wallace
Vice-Chair
Washington

Tom Karier
Washington

Melinda S. Eden
Oregon

Joan M. Dukes
Oregon

September 9, 2010

MEMORANDUM

TO: Council Members

FROM: John Shurts

SUBJECT: Briefing from representatives of the Northwest Hydroelectric Association on low-impact hydroelectric generating opportunities and emerging technologies

Patti Kroen and Jan Lee, President and Executive Director of the Northwest Hydroelectric Association (NWEA), will brief the Council on the latest developments in the area of low-impact hydroelectric facilities. The NWEA is having a Low Impact Hydro Workshop in Bend at the same time as the Council meeting:

Low Impact Hydro Workshop September 22-23, 2010

Riverhouse Convention Center
Bend, OR

Workshop on "how to" for small hydro conduit exemptions, projects added to existing dams or incremental enlargement: incentive and finance, streamlining the FERC process, project stories, and other issues...followed by a tour of two new projects.

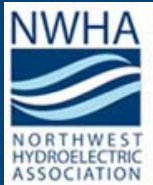
http://www.nwhydro.org/events_committees/low_impact_hydro_workshop.htm

Doubling America's Largest Renewable Resource

Hydropower on Hydropower

Patti Kroen

2010-11 President, Northwest Hydroelectric
Association



Update on SB722

Designed to revise previously never reached goal of 20% by 2010

Devil in the details – latest version required 75% sourced from in-house or nearby existing providers – the governor wants no more than 60%

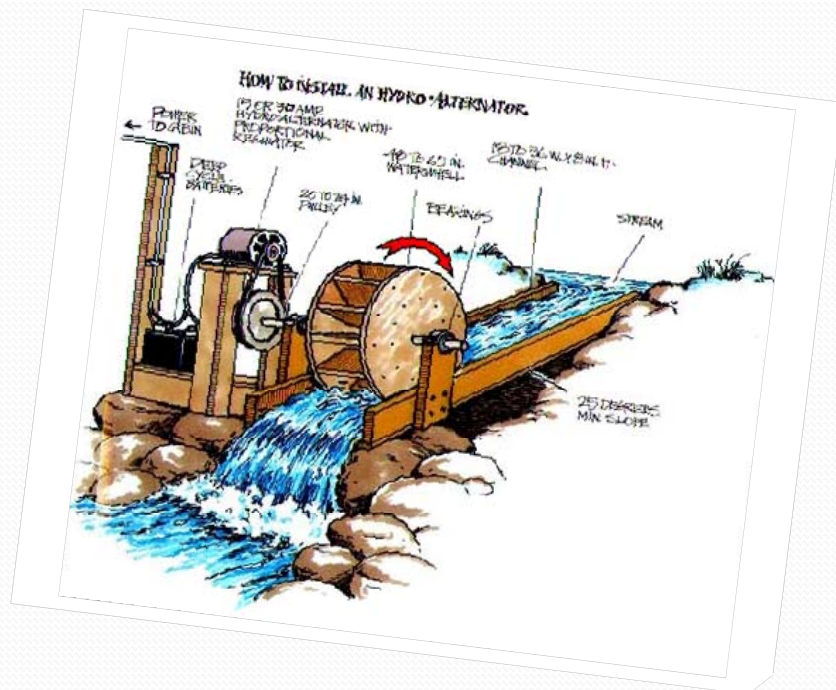
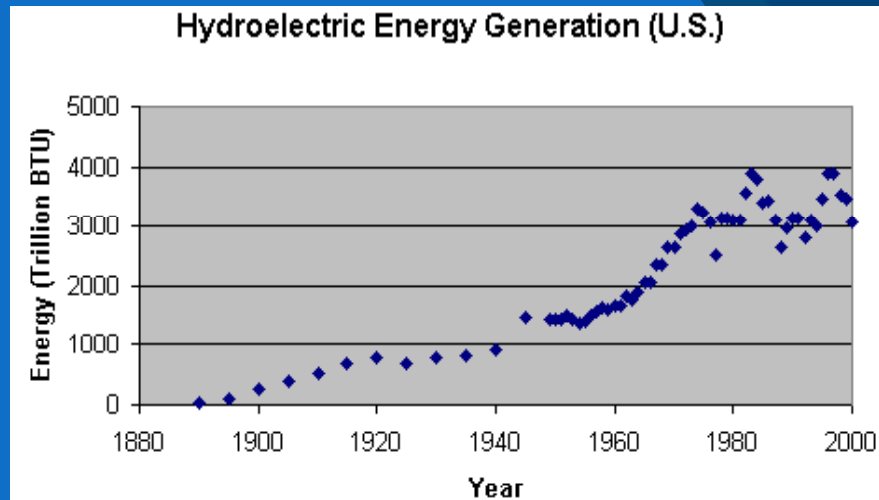
Didn't make it off Assembly floor until minutes before midnight and floundered on the senate floor as the hour struck

What's next? Air Resources Control Board will likely quickly adopt 33% goal by regulation without source restrictions

Next governor can undo

Current perspective:

Hydropower is hot and poised to make a comeback



Do it yourself hydro power for the ultimate

Just Double It



Double
installed
capacity
by 2030



Double
industry
jobs by
2030



✓ Double
MW
before
FERC by
2012

✓ Goal 3 - Accomplished

65 GW before FERC ~ Aug. 2009
(32 GW ~ May 2009)

Conventional Hydro Permits

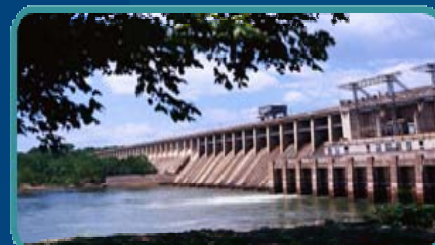
- 7,768 MW issued
- 3,625 MW pending

Hydrokinetic Permits

- 9,039 MW issued
- 6,875 MW pending

Pumped Storage Permits

- 28,323 MW issued
- 7,000 MW pending



Untapped New Hydro

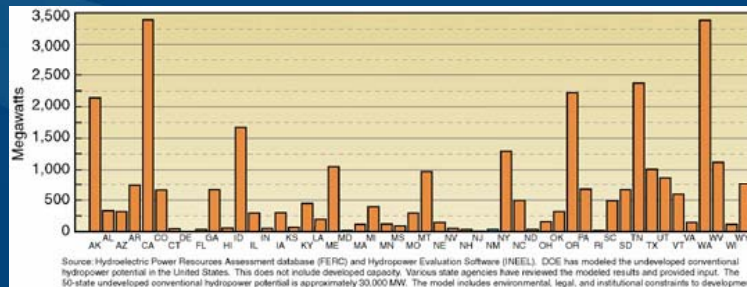
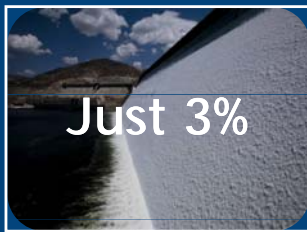
Conventional Hydro Pipeline (capacity)

Efficiency Gains
15 GW

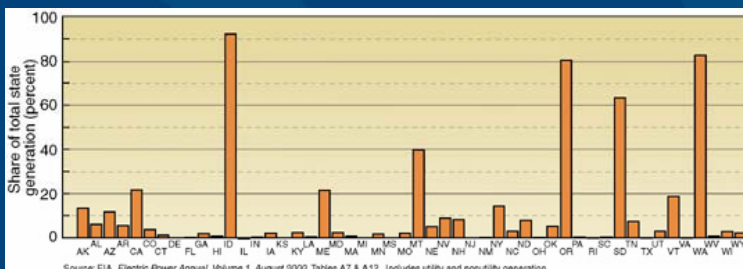
Non-Hydro Dams
63 GW

Pumped Storage
35 GW

Small hydro
36 GW



Modeled megawatts of undeveloped hydropower potential for United States

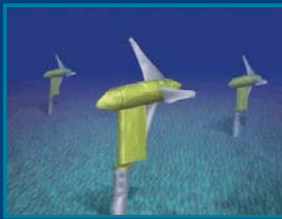


Hydroelectric Net Generation by State

Untapped New Hydro

New Technologies Pipeline (capacity)

In-Stream
Hydrokinetic,
Tidal, Ocean
and Waves
95 GW



..just beginning to be utilized.

Updated Jobs Report



www.hydro.org

Feb. 4, 2010

- 274,000 annual jobs created from hydro, wind, solar and biomass
- 1.4 Million total new jobs from hydro by 2025 (700k)
- Jobs in every state
- WA, OR & CA

National Goal/Policy

➤ Double Hydropower

➤ Create U.S. Jobs

U.S. Secretary of Energy, Stephen Chu -

“We could double hydropower
with minimal impact”.



Smarter Licensing

✓ Non-Hydro Dams

✓ Closed Loop
Pumped Storage

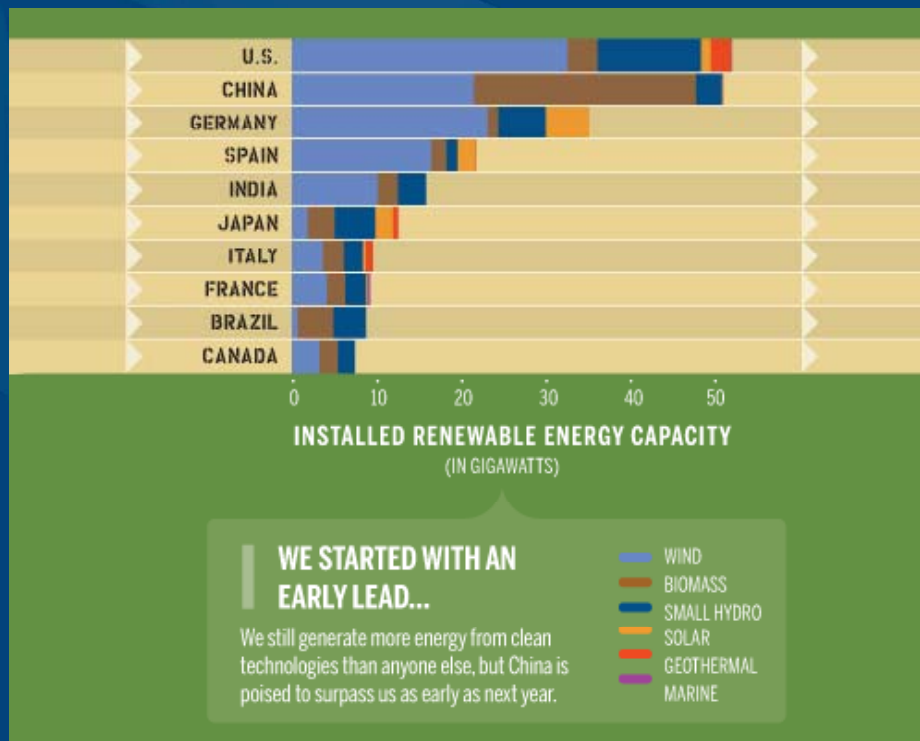


No Modifications
to FPA, NEPA,
CWA or ESA.

Hydro in the Pacific Northwest

- ▲ Increase installed renewable energy capacity (small hydro)
- ▲ Low impact opportunities
- ▲ Economic stimulus

Existing project add-ons – retrofits
 In-river turbine/generators
 Conduit exemptions



Irrigation Water Providers of Oregon

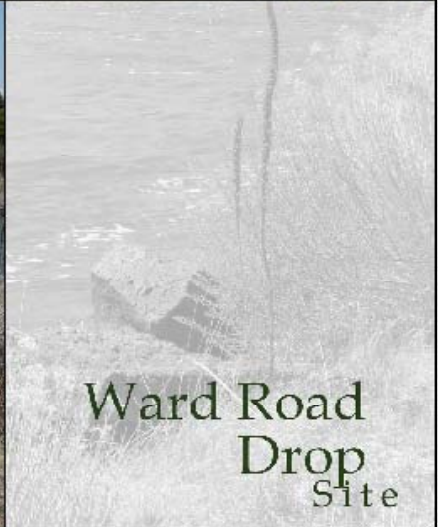
Hydropower Potential and Energy Savings Evaluation

BLACK ROCK
CONSULTING
20380 Halfway Road, Suite #1
Bend, Oregon 97701
541-480-6257

Irrigation Water Providers of Oregon

Western Oregon							
Site	Location	Utility	Net Head (ft)	Avg. Flow Rate (cfs)	Peak Power (MW)	Annual Power (MWh)	Conceptual Cost
Sidney Irrigation District							
Sidney	Jefferson	Pacificorp	30	70	0.17	757	
Santiam Water Control District							
Santiam	Stayton	Pacificorp	10	780	0.60	Pending	
Southern Oregon							
Lakeview Water Users, inc.							
Drews Reservoir	Lakeview	Surprise Valley Electric Coop	46-27	75	0.28	850	
Talent Irrigation District							
Howard Prairie Outlet Works	Talent	Pacificorp	40	23-52	0.13	732	
Ashland Canal	Talent	Pacificorp	130	15, 40	0.31	1,752	
Dead Indian Siphon	Talent	Pacificorp	118	10	0.07	304	
Payne Creek	Talent	Pacificorp	100	20	0.12	521	
Hyatt Reservoir Outlet Works	Talent	Pacificorp	30	3-19	0.03	122	
Keene Creek Reservoir	Talent	Pacificorp	14	28-50	0.04	139	
West Canal	Talent	Pacificorp	245	4	0.06	255	
Central Oregon							
Central Oregon Irrigation District							
Ward	Redmond	Central Oregon Coop/Pacificorp	25	330	0.80	2,480	
Binson	Redmond	Pacificorp	17	370	0.40	2,000	
10 Barr	Redmond	Central Oregon Coop	27	260	0.65	2,100	
Dodds	Redmond	Central Oregon Coop	79	245	1.85	5,800	
Shumway	Redmond	Central Oregon Coop	79-89	150	1.20-1.36	3,650-4,000	
Yew	Redmond	Pacificorp	45	190	0.94	2,600	
Three Sisters Irrigation District							
McKenzie	Sisters/Redmond	Central Oregon Coop	96	30	0.28	907	
Tumalo Irrigation District							
Columbia Southern Main	Bend	Central Oregon Coop	1,005	30	2.10	9,040	
Columbia Southern Lateral	Bend	Central Oregon Coop	68-111	65	0.38-0.61	1,325-2,160	
Northeast Oregon							
Columbia Improvement District							
Columbia 1	Boardman	Umatilla Electric Coop	5	180	0.10	260	
Columbia 2	Boardman	Umatilla Electric Coop	9.5	115	0.13	320	
Columbia 3	Boardman	Umatilla Electric Coop	15	64	0.11	280	
West Extension Irrigation District							
West Extension	Irrigon	Pacificorp	95	250	2.00	4,000	
Westland Irrigation District							
Westland	Hermiston	Umatilla Electric Coop	44	45	0.18	590	
Hermiston Irrigation District							
Cold Springs Outlet	Hermiston	Umatilla Electric Coop	42.4	129	0.43	1,010	
Cold Springs Outlet	Hermiston	Umatilla Electric Coop	33.2	174	0.34	360	
Westland/Stanfield Irrigation Districts							
McKay Reservoir	Hermiston/Stanfield	Pacificorp	130-40	150	2.6	4,500	
Eastern Oregon							
Burnt River Irrigation District							
Unity Reservoir	Hereford	Idaho Power	48-18	78	0.75	1,170	
Vale Oregon Irrigation District							
Beulah Reservoir	Vale	Idaho Power	60-18	310	1.65	3,688	

Statewide
At-A-Glance
Data



Project Details	
Water Provider:	Central Oregon Irrigation District
Contact:	Steve Johnson, Manager 1050 SW Lake Court Redmond, Oregon 97756
Interest Level:	High
Financial/Technical Ability for Project:	High (2 Existing Projects, 1 Under Construction)
Forebay Location:	lat: N44° 02' 29.04" lon: W121° 15' 21.96" el: 3689.8 ft.
Powerhouse Location:	lat: N44° 02' 33.60" lon: W121° 14' 49.38" el: 3659.9 ft.
Powerhouse Location Description:	In Main Canal at Coordinates Shown Above

Project Development/Cost Estimates	
Pipe Length and Cost:	Length=2,700 LF Cost=\$2,970,000.00
Powerhouse Cost:	\$600,000.00
Turbine/Gen. Controls Cost:	\$700,000.00 (Chinese)
Civil Site Work (Forebay & Tailrace):	\$500,000.00
Transmission Length and Cost:	Length=950 LF Cost=\$200,000.00
Range for Interconnection Cost:	\$100,000.00 to \$400,000.00
Permitting Costs:	\$50,000.00 with District Assistance
Engineering/Admin./CM Costs:	\$300,000.00
Contingency:	\$800,000.00

Resource Estimates	
Head:	Gross Head=31ft, Net Head=25ft
Flow:	Flow Rate Ranges = 200 cfs to 460 cfs Average Flow Rate = 330 cfs
Flow Annual Availability:	Irrigation Season (April-October) Possible 4 Winter Stock Runs

Potential Fatal Flaws or Issues of Concern
No known fatal flaws. Issues of concern would be site approval through local jurisdiction and ACOE exemption.

Power Potential Estimates	
Capacity:	0.8 MW Peak
Annual Output:	2 <80 MWh