

Transmission Chickens and Alternative Energy Eggs

Presentation by Christopher T. Ellison

Harvard Electricity Policy Group

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Ellison, Schneider & Harris L.L.P.

2015 H Street, Sacramento, California 95814

Phone: (916) 447-2166; Fax: (916) 447-3512

Email: cte@eslawfirm.com

Policy Makers Want More Wind



- Renewable Portfolio Standards in 20 States and the District of Columbia
- Possible federal RPS legislation
- Green-house gas legislation
- Rising natural gas prices; concerns about supply
- Renewal of the Production Tax Credit

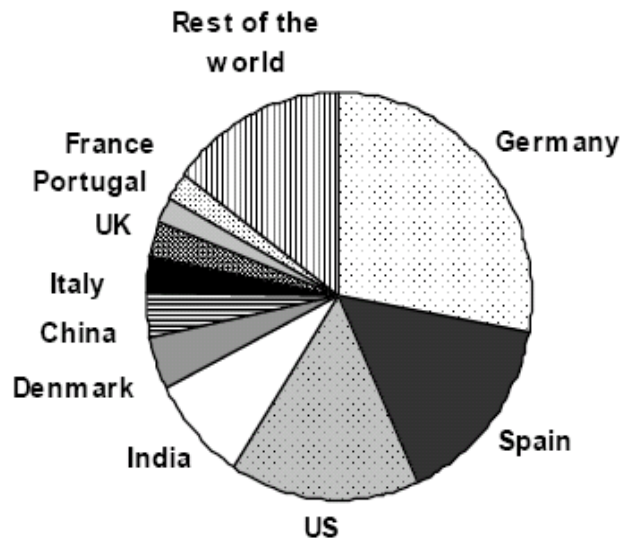
Wind Prices are Falling

- 80% drop in 20 years
- With PTC, large wind @ 4-7 cents/kwh
- “Inflation proof” – no fuel price risk
- High Energy Payback Ratio



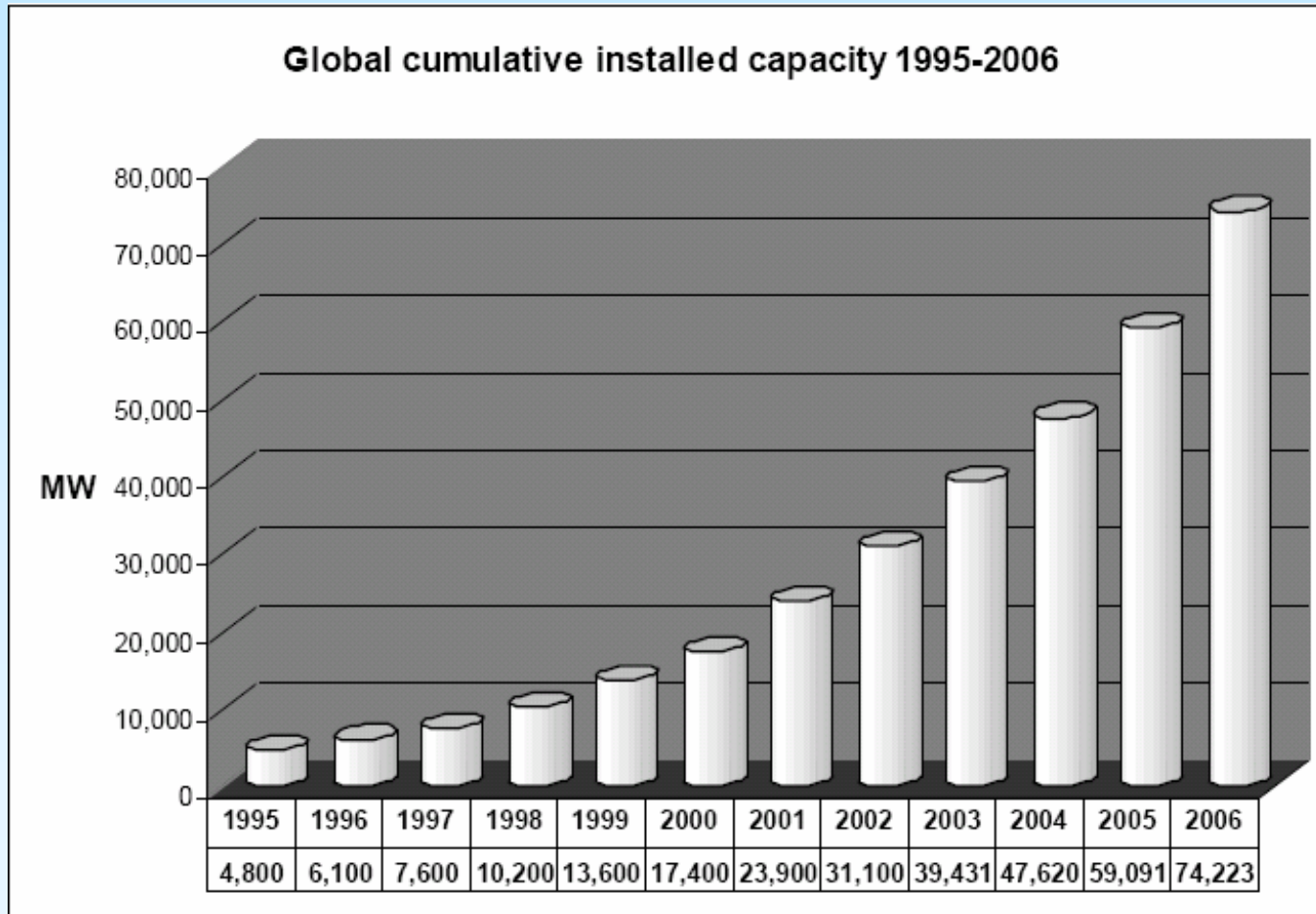
Worldwide Installed Capacity

Top 10 cumulative installed capacity
(Dec. 2006)



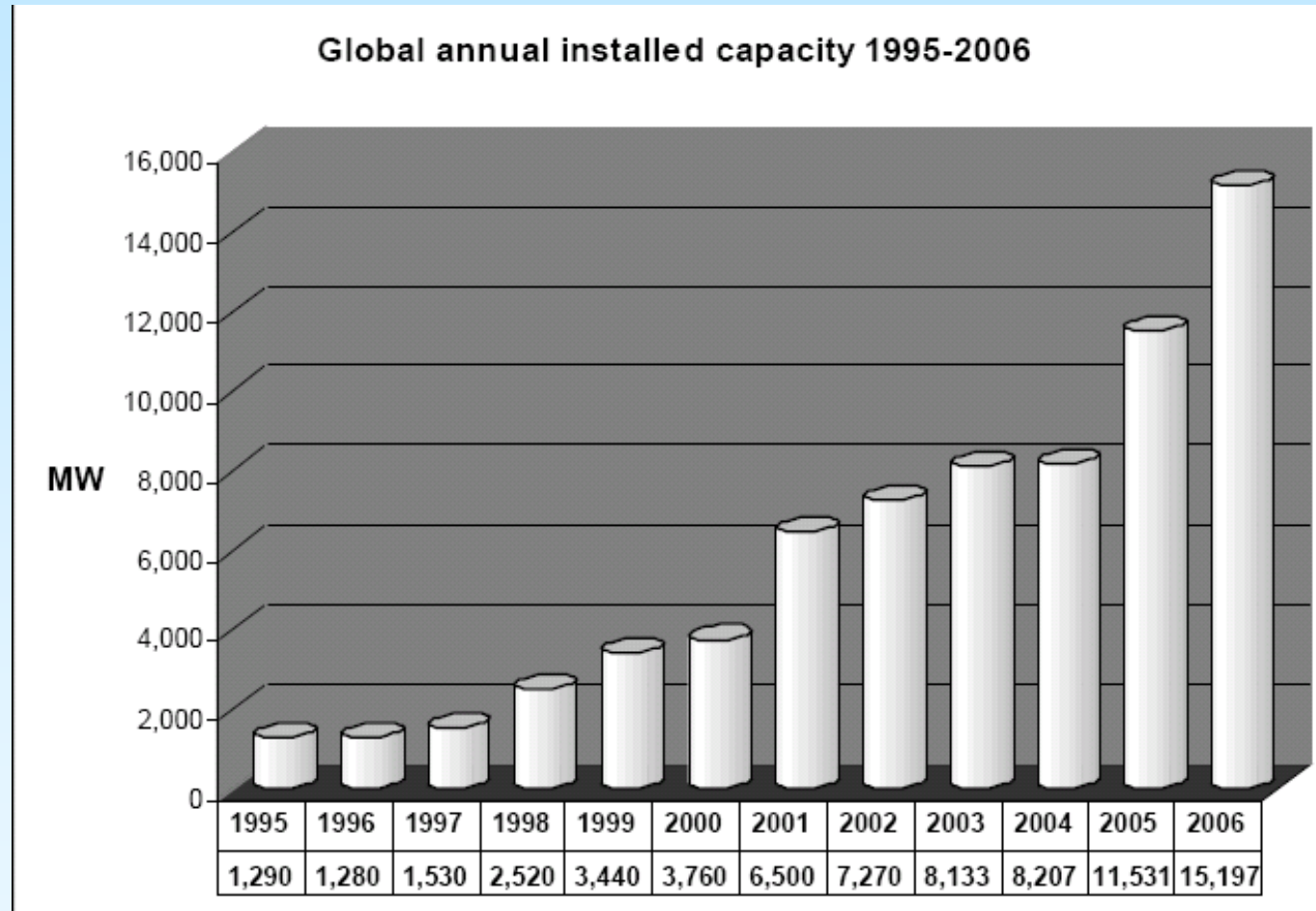
Total capacity	MW	Market share
Germany	20,622	27.8%
Spain	11,615	15.6%
US	11,603	15.6%
India	6,270	8.4%
Denmark	3,136	4.2%
China	2,604	3.5%
Italy	2,123	2.9%
UK	1,963	2.6%
Portugal	1,716	2.3%
France	1,567	2.1%
Top 10 - Total	63,217	85.2%
Rest of the World	11,004	14.8%
World total	74,221	

Worldwide Cumulative Growth



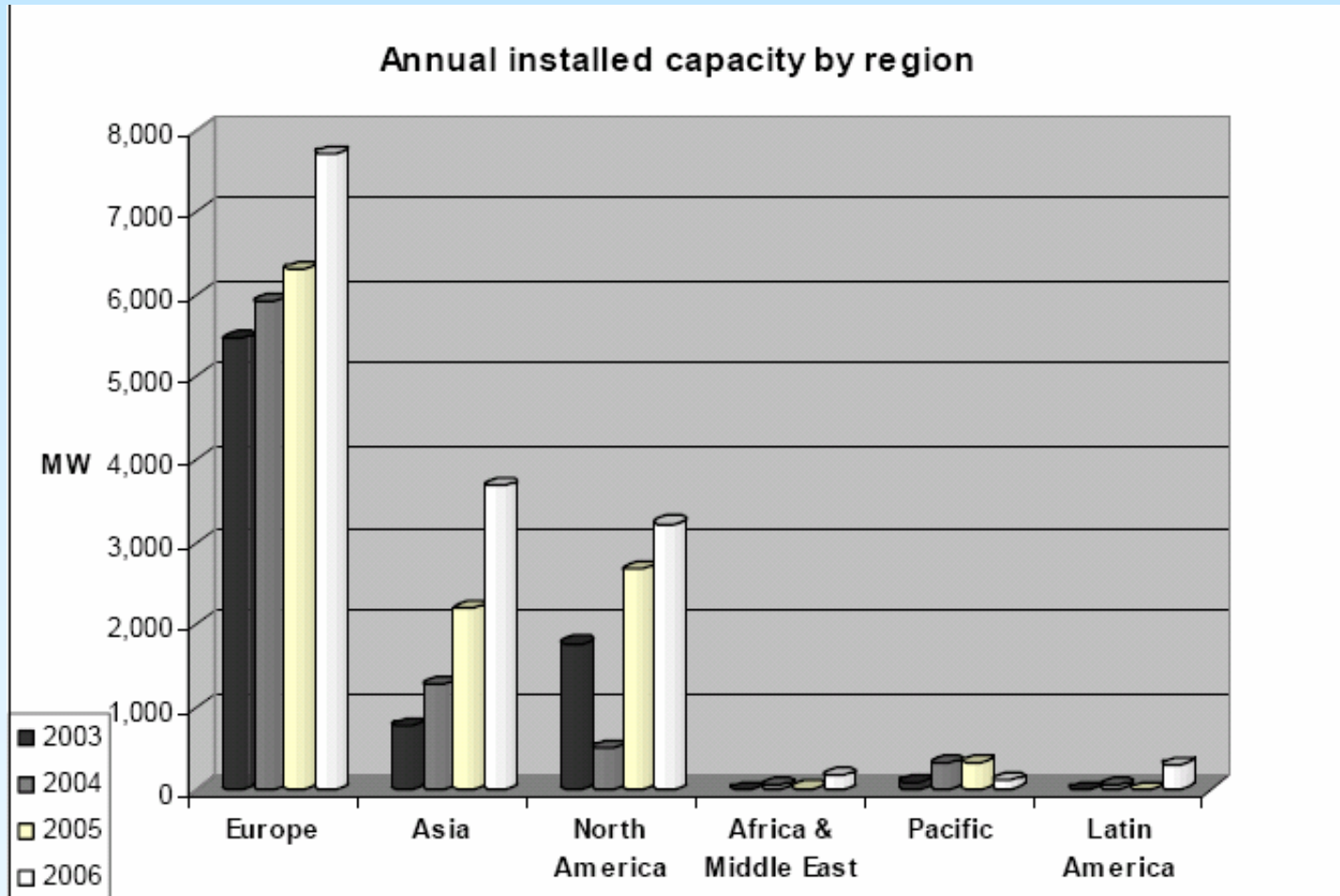
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(916) 447-2166

Worldwide Annual Growth



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Worldwide Growth By Region



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THE TOP TWENTY STATES FOR WIND ENERGY POTENTIAL

(measured by annual energy potential in the billions of kWh)

	B kWh/Yr		B kWh/Yr
1. North Dakota	1,210	11. Colorado	481
2. Texas	1,190	12. New Mexico	435
3. Kansas	1,070	13. Idaho	73
4. South Dakota	1,030	14. Michigan	65
5. Montana	1,020	15. New York	62
6. Nebraska	868	16. Illinois	61
7. Wyoming	747	17. California	59
8. Oklahoma	725	18. Wisconsin	58
9. Minnesota	657	19. Maine	56
10. Iowa	551	20. Missouri	52

Source: An Assessment of the Available Windy Land Area and Wind Energy Potential in the Contiguous United States, Pacific Northwest Laboratory, August 1991. PNL-7789

The Key Problem: Transmission

- Location constrained
- Built in small increments
- Short lead times
- Variable production
- The Chicken and the Egg

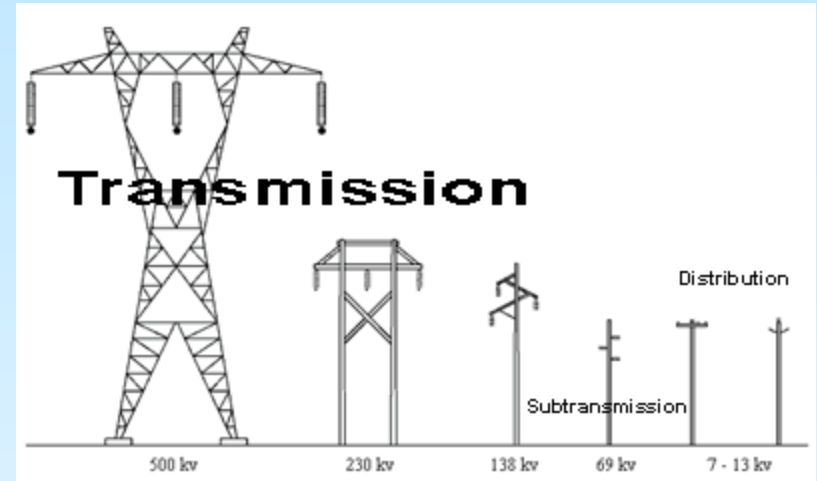
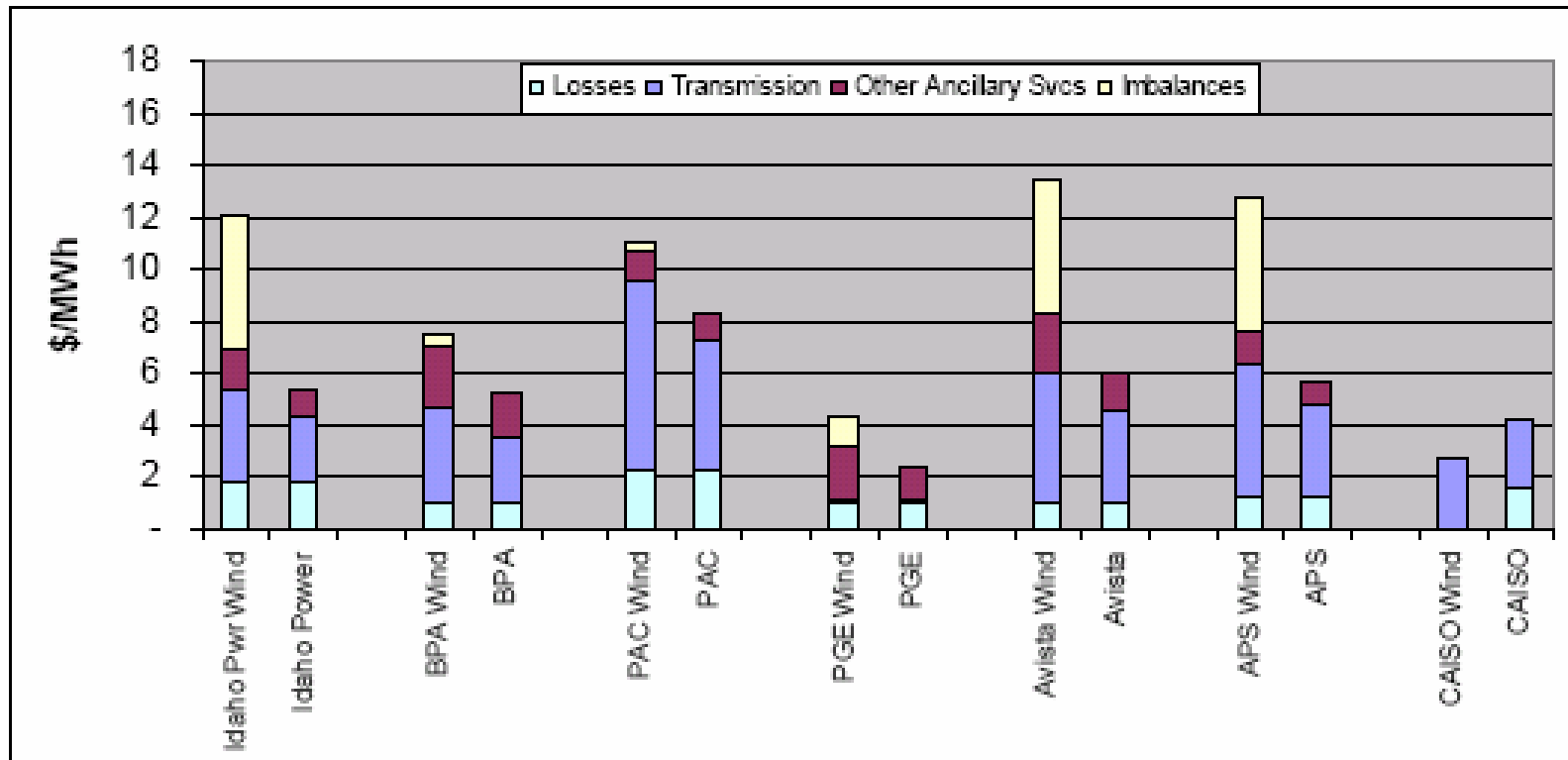


Figure 3: Cost Comparison of Transmission for Wind vs. CCGT Plants

Source: FERC analysis, derived from data in OATT Tariffs, NREL, CAISO, PacifiCorp, FERC OMTR, FERC OM OI



Note: Calculations based on OATT tariff schedules; 55 percent capacity factor for CCGT and 38 percent capacity factor for wind; scheduling imbalance error of 1 percent for CCGT and 20 percent for wind; \$50/MWh average system price for power; CAISO rate based on SCE TAC rate.

FERC Policy

- Gen-tie vs. Network
- Gen-ties are “direct assignment”
- Network upgrades charged and credited in rates



SCE “Renewable Trunk-line” Petition Regarding Tehachapi

- 3 Phase Project
- 100% Abandoned
Plant Relief Granted
- Rolled-in Treatment
for Phase 3 (Gen-tie)
Denied



Federal Initiatives

- OATT Reform
 - Conditional Firm
 - Imbalance Penalties
- “Clean-energy super highways” proposals



State Initiatives

- California RPS and CPUC Code 399.25
- Texas CREZ
- Colorado



Colorado SB-100

- Awaiting Signature
- Energy Resource Zones
- Not limited to Renewables
- Biennial Plans re Constraints
- 6 Month CPCN
- “Prudently Incurred Costs” Recovered During Construction



CAISO Renewable Trunk-line Petition for Declaratory Order

- Financing only—
generators repay
- Criteria for
eligibility
- Bounding the risk
 - Line must be cost-effective
 - Market test



Conclusions

- Wind Growth and Potential is Substantial
- Transmission is the Biggest Problem
- Policy-Makers Looking at Solutions at the Federal and State Level
- Different Solutions in Different Markets

