

# **OSEA Price-Setting Workshop**

**with**

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**Bernard CHABOT**  
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**Maitrise de l'Energie)**

- **30+ Years in Renewables**
- **Profitability Index Method**
- **Devised Prices for French Feed Law**
- **Assisted Irish Sustainable Energy Office**
- **Assisted Hydro Quebec**

# Why We Are Here Today



**Why We Are Here Today . . .**

**To Explain How OSEA  
Determined the Tariffs Used in  
the Proposed SOC Pilot Program**

# Renewable Tariffs in Europe

- **Wind: \$0.11-\$0.16/kWh**
- **Solar PV: \$0.25-\$0.92/kWh**
- **Hydro: \$0.11-\$0.13/kWh**
- **Biomass: \$0.10-\$0.19/kWh**

# Renewable Tariffs or Standard Offer Contract Program Limits

Country	Wind	Solar PV	Hydro	Biomass
Germany	No Limits	No Limits	No Limits	No Limits
Spain	13,000 MW	150 MW	2,400 MW	3,200 MW
Denmark	20%			
France	1,500 MW			
Brazil	1,100 MW			
Minnesota	200 MW			

# Renewable Tariffs or Standard Offer Contract Length

Country	Wind	Solar PV	Hydro	Biomass
Germany	20	20	20	20
Spain	Project Life	Project Life	Project Life	Project Life
France	15	15		
Brazil	20			
Minnesota	20			

# What Price Works for Ontario?

- **Small Distributed Projects <10 MW**
- **20-year Contracts**
- **Wind, Solar PV, Hydro & Biomass**
- **RFP #1: \$0.08/kWh + WPPI = \$0.09/kWh**

**This is the Average Price of Bids!**

**OSEA High Wind Average Price:**

**Teq = \$0.091/kWh, NPV = \$0.047/kWh**



# Renewable Tariffs or Standard Offer Contracts Should

- **Be Simple, Comprehensible, & Transparent**
- **Allow Simplified Interconnection**
- **Have Prices Sufficient to Drive Development**
- **Have Lengths Sufficient for Profitability**
- **Have Prices Differentiated by Technology**
- **Have Prices Differentiated by Resource (for Wind)**

# Standard Offer Contract Pilot Program

- **Prices Determined using Profitability Index Method (Chabot)**
- **Targeted PI of 0.35 for High Wind Sites (Lakeshores, Highlands)**
- **Base Wind Sites Reduced Profitability Index of 0.10**
- **Lower PI at Lower Winds Pushes Development Toward Higher Wind Sites--Encouraging Economic Optimization**

# Standard Offer Contract Pilot Program

- **5 Year Pilot Program (no MW cap, Time Limit Cap)**
- **Wind, Solar PV, Biomass, & Small Hydro**
- **Project Limit: ~10 MW (<44 kV), “Last Turbine In”**
- **20-Year Contracts with Provision for Extension**
- **Inclusive: Open to All**
- **Contracts Must be Executed within 2 Years**
- **Review after 2 Years, Full Review after 5 Years**

# Standard Offer Contract Pilot Program Wind Energy

- **Prices Resource Dependent**
- **Prices First 5 Years Same for All Sites**
- **Prices for Years 6-20 Reduced**
  - Sliding Scale for:
    - High Wind Sites (Lakeshore, Highlands),  
and Moderate Wind Sites (Near Lakeshore)
- **Economic Efficiency Encouraged**
  - Windier Sites Make More Money

# Standard Offer Contract Pilot Program Wind Energy

- Prices Function of Annual Specific Yield (kWh/m<sup>2</sup>/yr)  
-- Not Capacity Factor
- Prices From Quote for 1.5 MW unit @ \$675 CAD/m<sup>2</sup>  
This is a low estimate in 2005 Market
- Prices a Function of Actual Ontario Performance
- ~~WPPI Not Included (Clawed Back by Province)~~
- OSEA Has Decided that WPPI Should Accrue to the Developer (Oct 7, 2005) Should the Developer wish to use it

# Standard Offer Contract Pilot Program Wind Energy

- Initial Price (T1) Only Relatively High
- In Line with Initial Price in Europe
- Average 20-Year Price (T1+T2=Teq)  
Much Less Than Initial Price (T1)  
For Windy Sites = RFP Price Less WPPI  
Teq=\$0.09/kWh  
For Moderately Windy Sites  
Teq= \$0.105/kWh

# **Standard Offer Contract Pilot Program Wind Energy**

- **Original Model Included 100% Inflation Indexing**
- **OSEA Report Stated only 15% Inflation Indexing**
- **OSEA Erred in not Re-Running the Model with 15% Inflation Indexing**
- **OSEA Now Suggests 80%-100% Inflation Indexing (Oct 7, 2005)**

# SOC Pilot Program Solar PV

- **Prices Based on \$10,000 CAD/kW**
- **Insolation Values for Ottawa**
- **90 MW Cap**
  - Potential to put Ontario 2nd Behind California in NA
- **Options provided for**
  - Price Escalating with Inflation
  - Price Non Escalating with Low-Interest Loan from Check-off (Tick Box) Funds
- **Prices and Contract Length--In Line with Other Countries**



# **Standard Offer Contract Pilot Program Biomass**

- **Prices Based on Farm-Size Digester**
- **Prices Based on Actual Digester  
Near Ottawa**

# Standard Offer Contract Pilot Program Small Hydro

- Price as Place Holder
- Project Limit: 10 MW (<44 kV)

# Standard Offer Contract Prices Proposed for Ontario

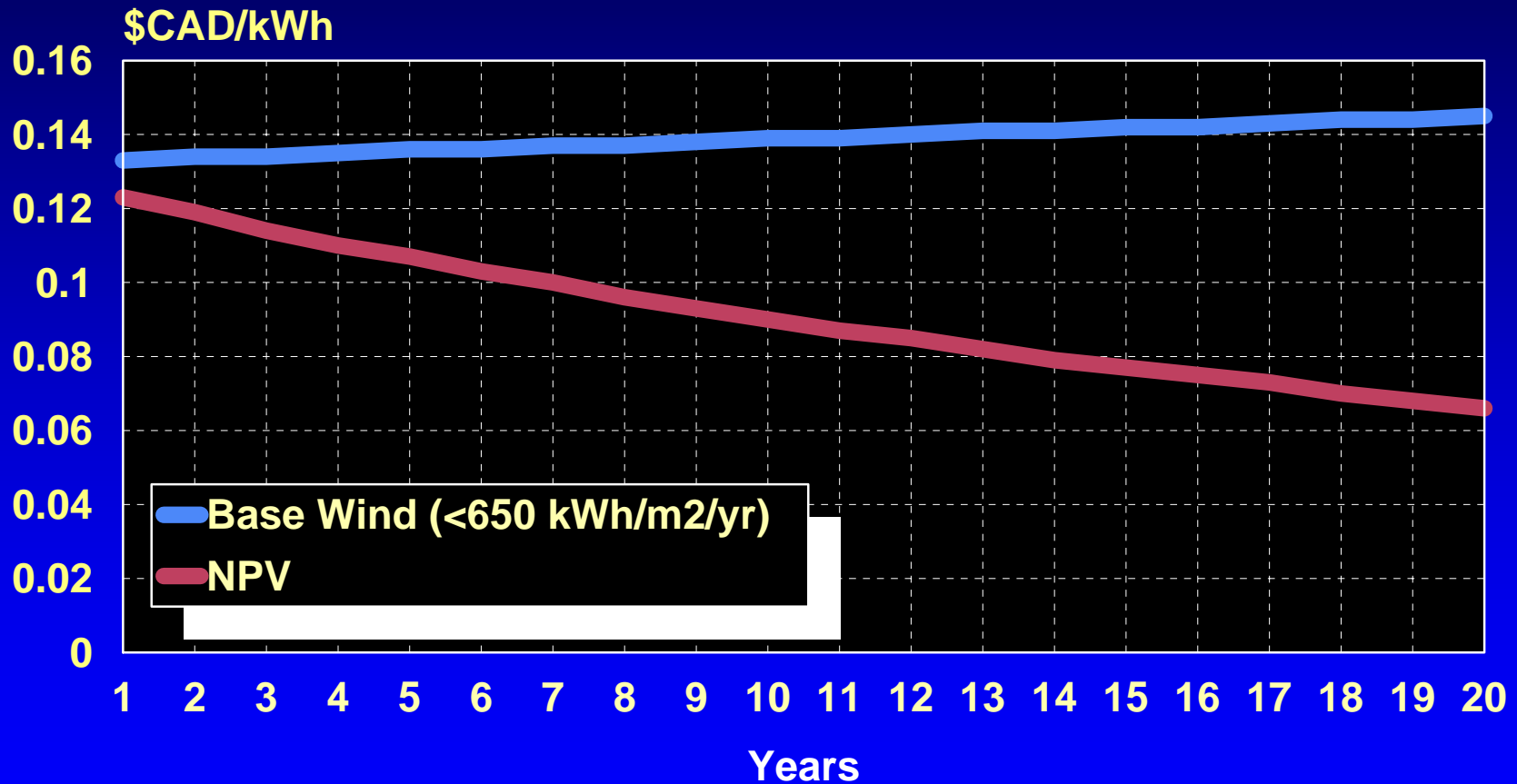
	Initial Price	Average Price (Teq)	Net Present Value
Wind 1-5 (T1)	0.133		
High Wind (T2)	0.069	<u>0.091</u>	0.047
Medium Wind (T2)	0.09	0.105	0.054
Base Wind (T2)	0.133	0.133	0.066
Solar PV	0.83	0.83	0.414
Solar PV (Soft Loans)	0.67	0.67	0.518
Biomass	0.133	0.133	0.066
Small Hydro	0.133	0.133	0.066

NPV @ 8.2% Discount Rate

# **Standard Offer Contract Prices Proposed for Ontario**

- **Note that NPV Calculations in Previous Chart are No Longer Valid if Inflation Indexing is 80%-100% (Oct 7, 2005)**

# Standard Offer Contract Base Wind Case



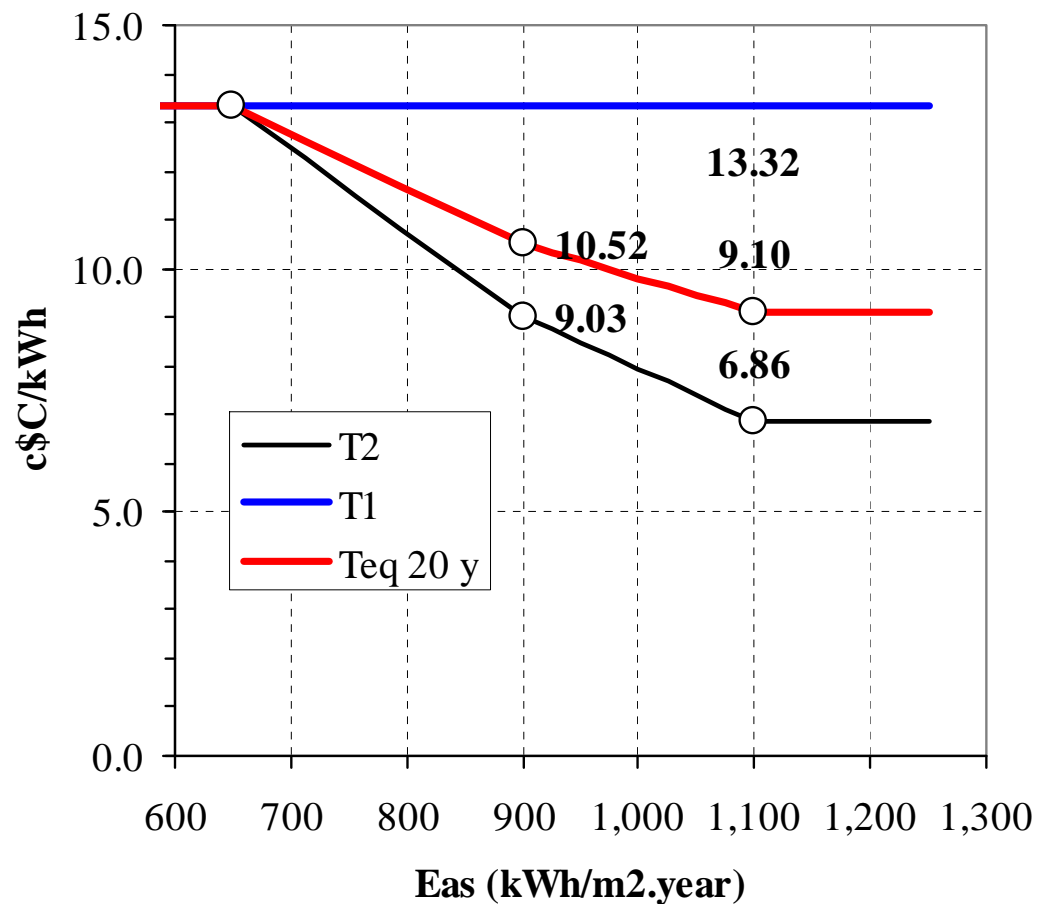
# **Standard Offer Contract Base Wind Case**

- **Note that the previous chart is invalid if Inflation Indexing is 80%-100% (Oct 7, 2005)**

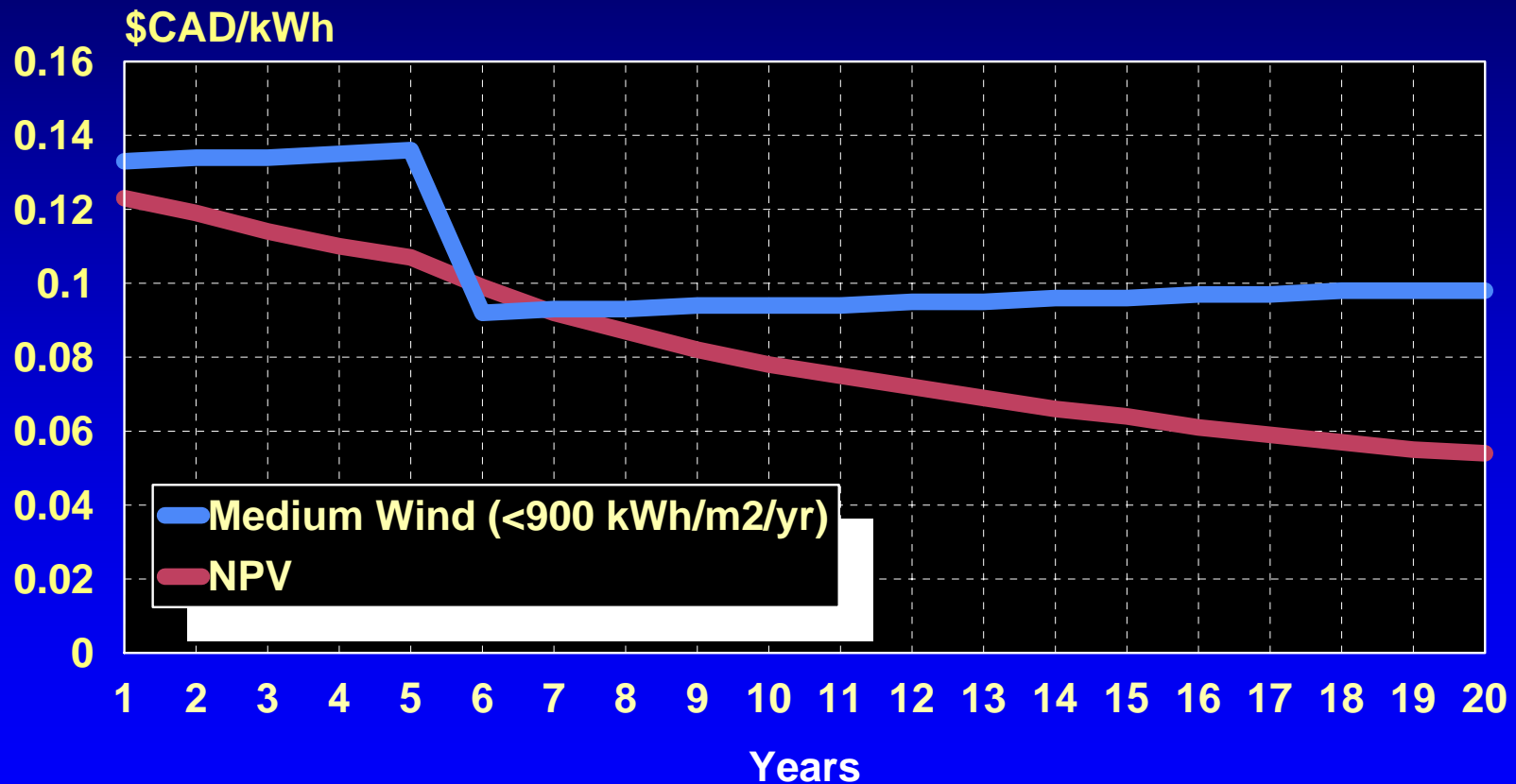
# OSEA T2 Wind Tariff Years 6-10

**Tariffs versus energy yield per kWh/m<sup>2</sup>**

$t = 5\%$  (real),  $n = 20$  years,  $K_{om} = 4\%$ ,  
 $I_u = 675/\text{kWh}/\text{m}^2/\text{yr}$



# Standard Offer Contract Medium Wind Case

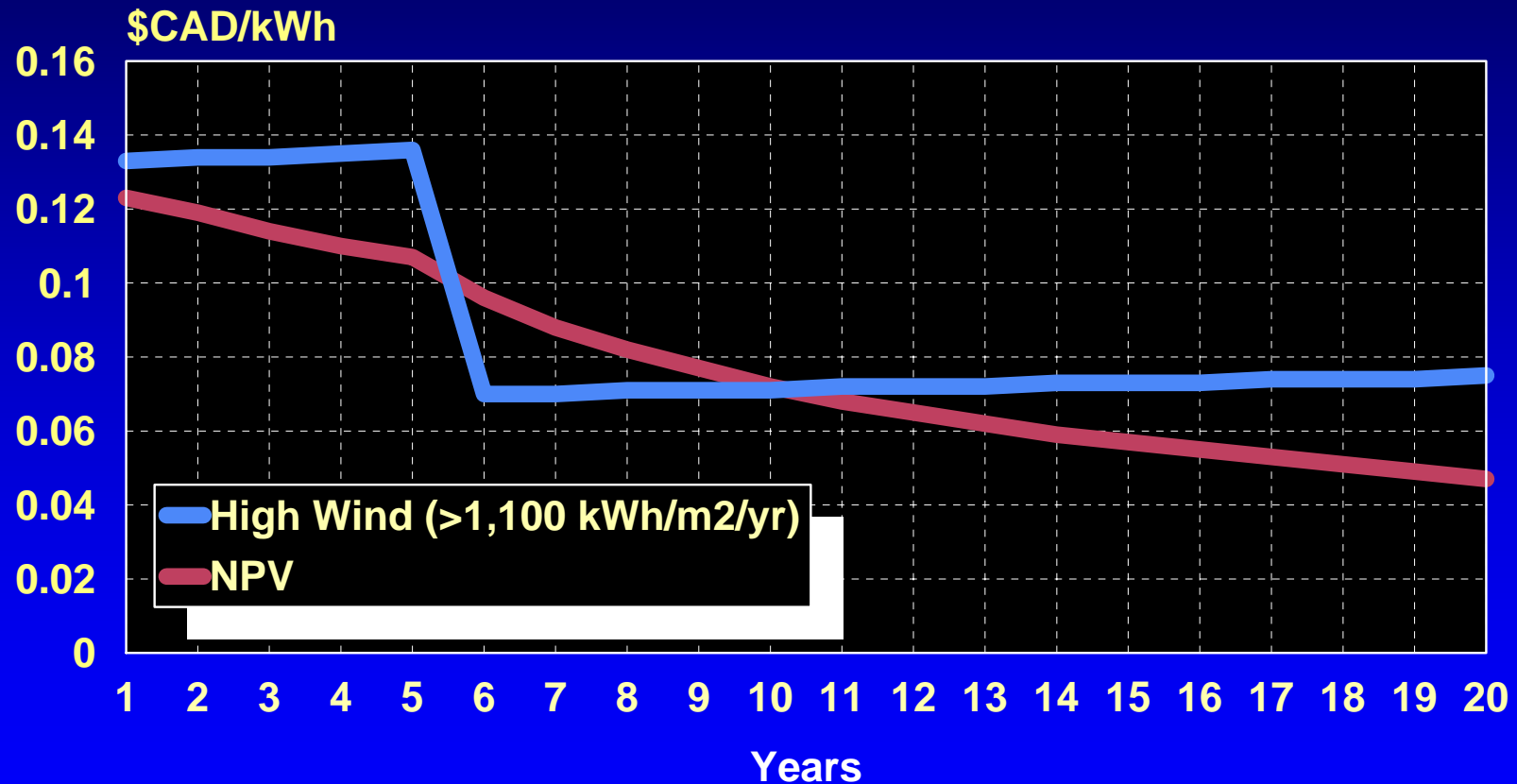




# **Standard Offer Contract Medium Wind Case**

- **Note that the previous chart is invalid if Inflation Indexing is 80%-100% (Oct 7, 2005)**

# Standard Offer Contract High Wind Case



# **Standard Offer Contract High Wind Case**

- **Note that the previous chart is invalid if Inflation Indexing is 80%-100% (Oct 7, 2005)**