

# Customer Supplied Generation Imbalance Pilot

October 2010

*Elk River Wind Power Project, Kansas*



**IBERDROLA  
RENEWABLES**

# About Us: Iberdrola Group



**More than 43,300 MWs of installed capacity**

108-year history with roots in hydroelectric

Leading wind producer worldwide with 10 GW installed, 58.4 GW pipeline

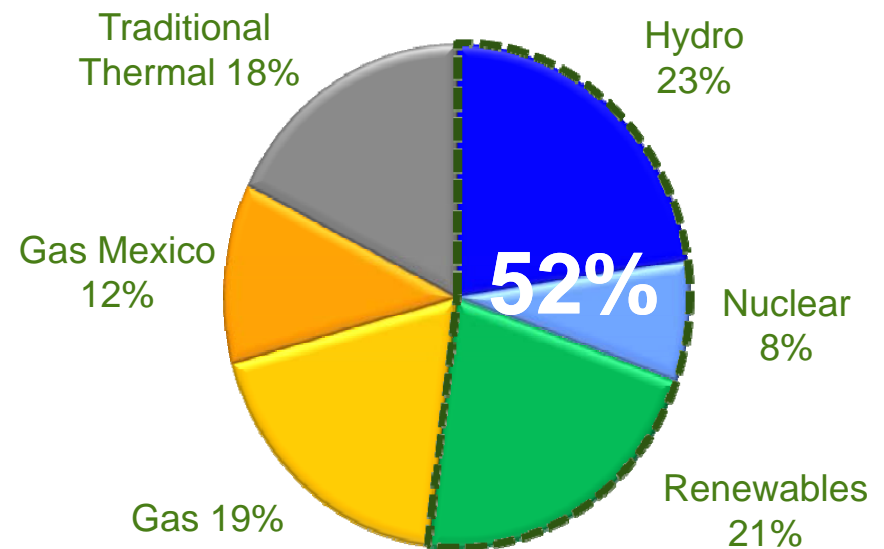
Installed wind represents 1/12 of the world's total capacity

33,000 employees in 40 countries

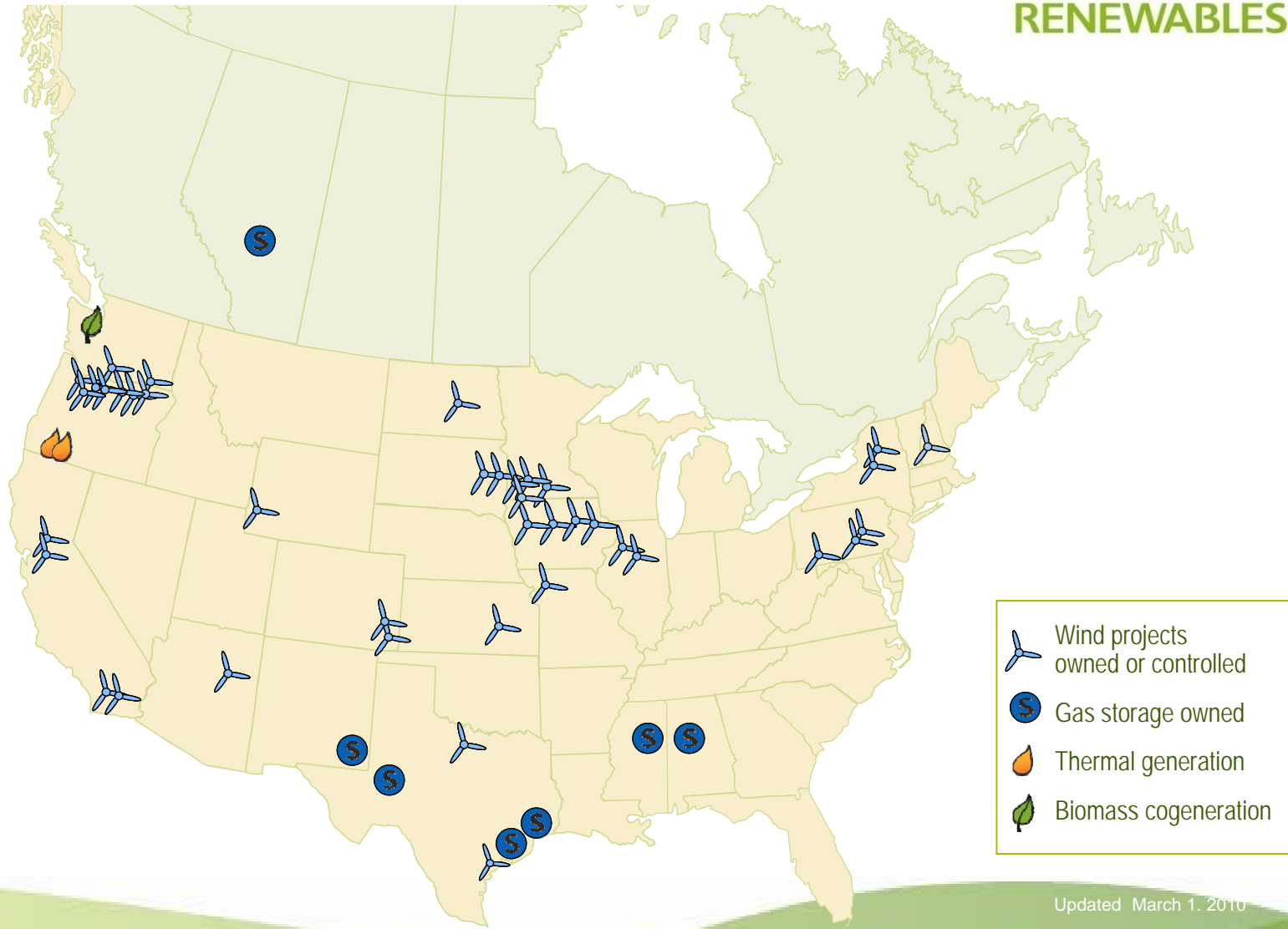
One of the lowest CO2 emissions levels in the electricity sector

Strategic focus on US, UK, Latin America and Spain

## Generation Capacity (52% emissions-free)



# North American Asset Portfolio



Updated March 1, 2010

# NW Wind Integration Background

- Wind generation's variable output is difficult to precisely forecast which drives the need for flexible generation to provide balancing reserves to ensure output remains equal to the schedule over the scheduling period
- Historically, balancing reserves have been the responsibility of the host Balancing Authority and have been procured at a level to ensure full coverage for all possible wind event contingencies 24/7
- This method and level of balancing reserve procurement results in high Wind Integration Cost (WIC) charges and places considerable burden on Bonneville Power Administration (BPA) given the high and increasing amounts of wind generation interconnected to their system
- In its 2009 rate case, BPA implemented alternatives to the traditional balancing reserve procurement model and provided an option for wind generators to self-supply all or a portion of balancing reserves
  - Regulation Reserves – reserve required to balance error every 4 seconds
  - Following Reserves – reserve required to balance error every 10 minutes
  - Generation Imbalance Reserves – reserve required to balance error outside of 10-minute window through the balance of the hour

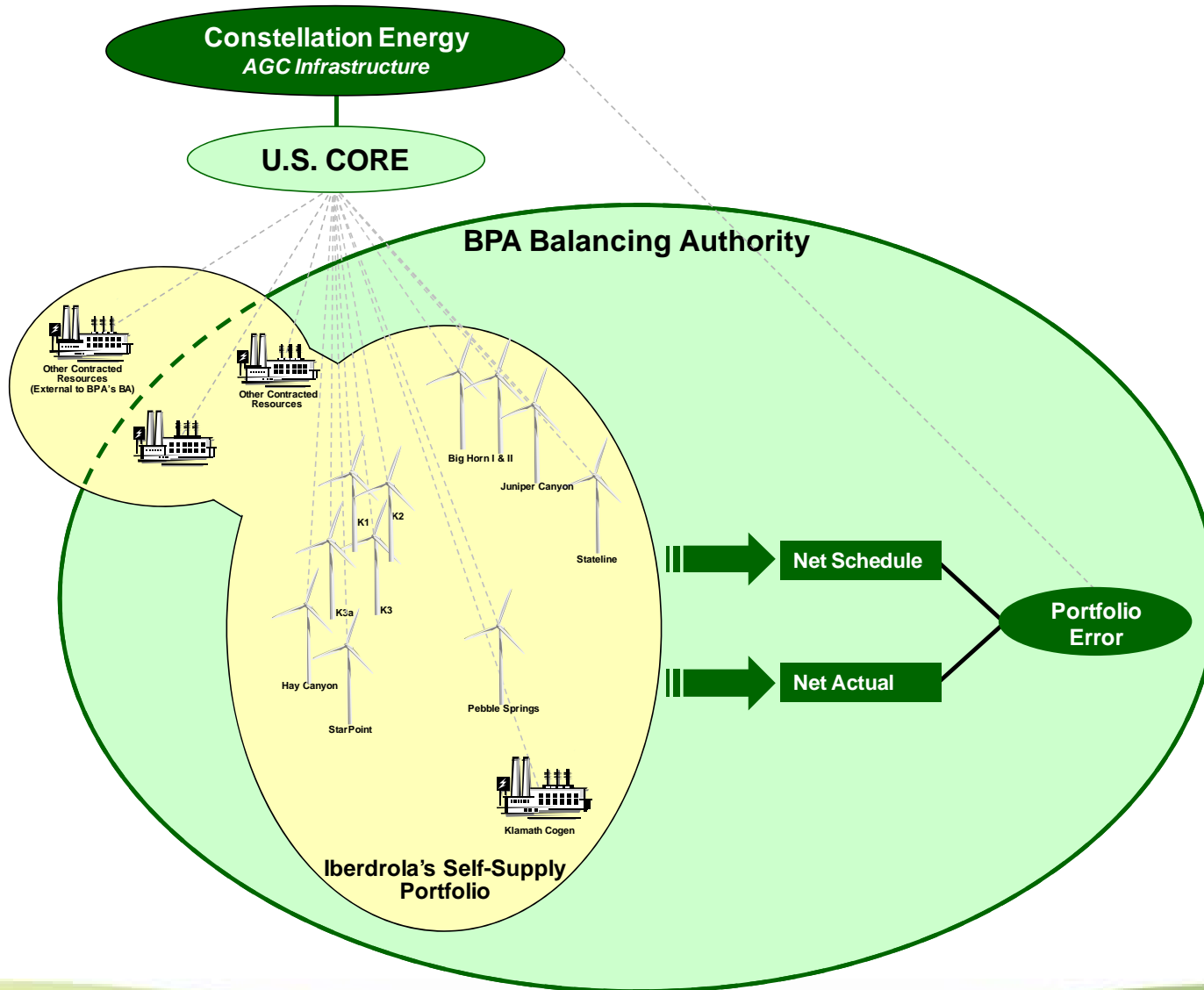
# Self-Supply Pilot Introduction

- Iberdrola Renewables elected to self-supply Generation Imbalance Reserves and will continue to purchase Regulation Reserves and Following Reserves from BPA
- Iberdrola Renewables worked with BPA over a twelve month period to implement the first Customer Supplied Generation Imbalance (CSGI) pilot that went live September 1, 2010
  - Development and execution of the Participant Agreement which outlines the requirements for both BPA and Iberdrola Renewables through the pilot period
    - Data Exchange Requirements
    - Performance Parameters
    - Dynamic Transfer Capability Specifications
    - Dynamic Scheduling Rules
  - Installation of required communications and signaling equipment
  - Completion of comprehensive testing
  - Reconfiguration of settlement systems and processes
- The pilot is scheduled to continue through September 30, 2011 but either party has the ability to terminate the pilot with notice if it proves to be unworkable or undesirable

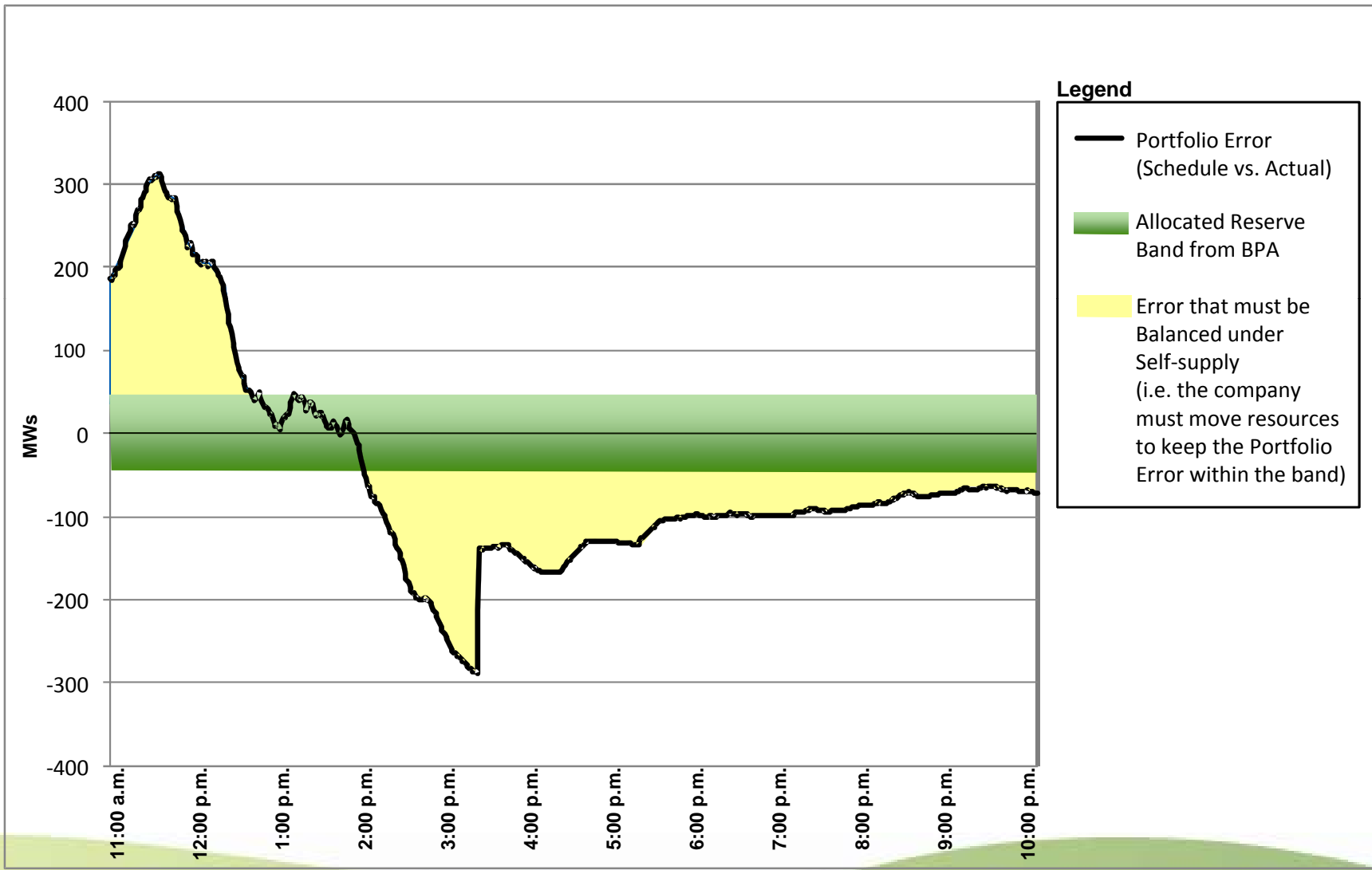
# Self-Supply Pilot Structure

- BPA has allocated a portion of Regulation and Following reserves to Iberdrola's generation portfolio and Iberdrola is responsible to self-supply Generation Imbalance reserves to resolve any remaining Station Control Error (SCE) – the difference between the net schedule and net output of Iberdrola Renewables northwest wind portfolio
  - If the wind fleet is generating more than the scheduled amount, or the SCE is positive, Iberdrola Renewables must decrease the total amount of generation (“DEC” the portfolio)
  - If the wind fleet is generating less than its scheduled amount, or the SCE is negative, Iberdrola Renewables must increase the total amount of generation (“INC” the portfolio)
- Iberdrola Renewables' robust forecasting capabilities help to minimize the SCE of the northwest wind portfolio
  - Maintain a 24/7 forecasting desk to continuously refine the wind portfolio forecasts
  - Engaged Versify Solutions to develop a cutting edge tool to improve forecast tracking and entry
- Iberdrola Renewables' Klamath Cogeneration facility is utilized to provide a portion of the needed INC and DEC to keep Iberdrola's portfolio balanced
- Iberdrola has also entered into contractual relationships with entities with dispatchable resources to provide additional INC and DEC capability
  - Grant County PUD
  - TransAlta
- Iberdrola Renewables is engaged with other prospective balancing resources to provide INC and DEC capability on an hourly, “bid-in” basis
- All INC and DEC balancing is provided over dynamic schedules on an intra-hour basis

# Self-Supply Diagram



# Self-Supply Balancing Illustration



# Constellation Energy Control & Dispatch



- Iberdrola has engaged Constellation Energy Control & Dispatch (CECD) to provide consulting services and Automatic Generation Control (AGC) infrastructure
- CECD provides balancing services for 15 Balancing Authorities across the United States including the nation's first wind-only Balancing Authority
- BPA's willingness to move forward with the pilot program largely stemmed from their confidence in Constellation's ability to leverage their experience and successfully balance our portfolio
- Constellation's Responsibilities
  - Respond on a 4-second basis to the Portfolio Error
    - Execute dispatch of resources per resource stack
      - Klamath Cogen & Peakers
      - External contractual resources
      - Wind resources
  - Monitor and respond to applicable compliance parameters
  - Report all aspects of self-supply portfolio
    - Tracking of exercise of external resources
    - Generation Imbalance accounts
    - Compliance with performance parameters

# Initial Pilot Assessment

- Iberdrola Renewables has been successfully balancing and staying well within the established performance parameters since September 1, 2010
  - All DSO-216 tag curtailments and limitations have been avoided to date
- Processes and systems were a bit bumpy on initial go-live but have significantly improved over the first months of operation
- Tools used to assist the Trading team in hourly decisions are being slowly modified to improve optimization
- Self-Supply has created additional complexity for Energy and Asset Management teams but management of the portfolio on a netted basis reduces administrative burden (i.e. fewer tag changes)

***Iberdrola Renewables remains cautiously optimistic that self-supply can be an interim wind integration solution in the Northwest until a fully functional balancing market evolves***

## What's Next?

- BPA's rate case process has begun for the 2011-2013 rate period and self-supply will be offered as an option available to all wind participants
- Dynamic Transfer Capability is critical to the continuation of expansion of self-supply or intra-hour transactions
- Iberdrola Renewables is hopeful the Northwest will evolve into an environment where there is efficient use of transmission and energy flexibility on an intra-hour basis
  - Ongoing initiatives (i.e. ITAP, DSS, Intra-hour Scheduling Business Practice, etc.), if implemented as planned, will further the development of intra-hour access to flexible resources
- Potential exists for a self-supply type model to be implemented in other regions to catalyze more efficient, cost-effective integration services for renewable generation