Public Utility Research Center

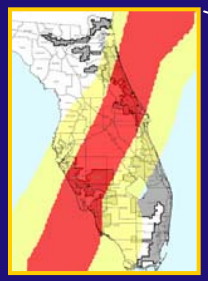
Workshop

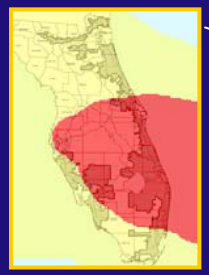
June, 2006

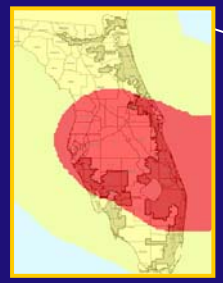
Storm Season 2004-2005

7 Storms / 15 Months

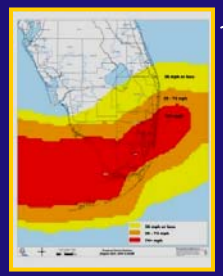
2004 Season







2005 Season



Event	Affected Customers	Days to Restore
Charley	874,000	13
Frances	2,786,300	12
Jeanne	1,737,400	8
Dennis	508,800	3
Katrina	1,453,000	8
Rita	140,000	2
Wilma	3,241,437	18

100%

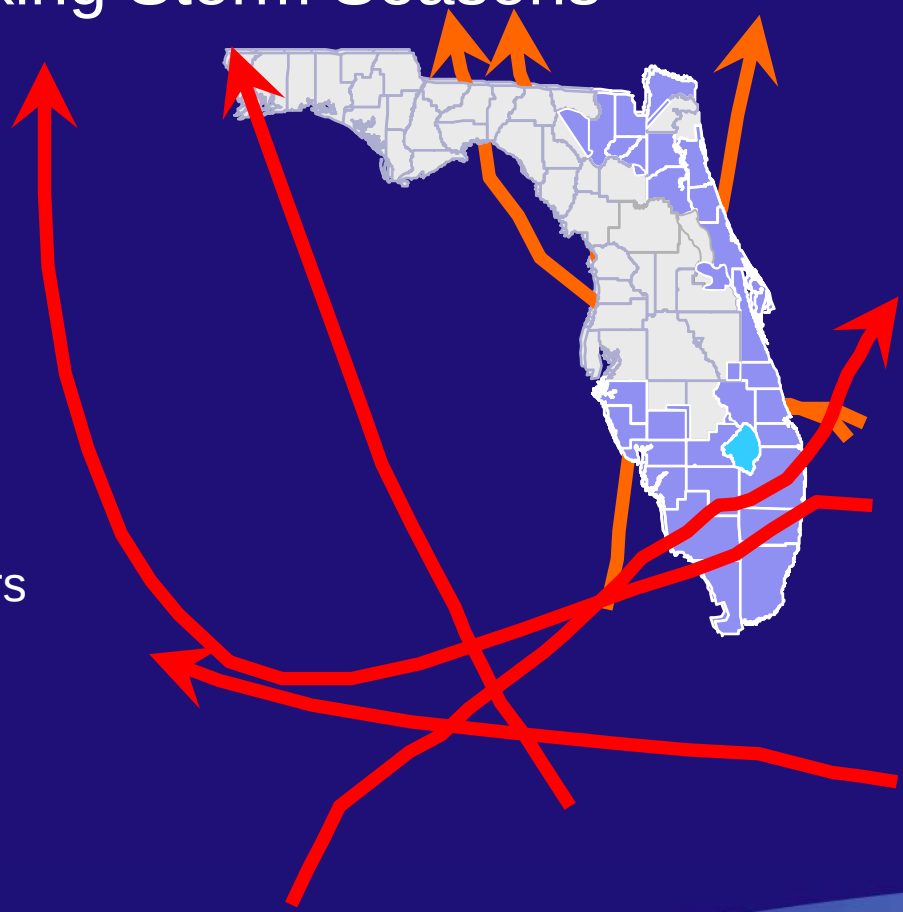
Hurricane force winds

Tropical storm force winds

FPL

Florida Power & Light

2004 - 2005 Record Breaking Storm Seasons



- 2004 was unprecedented
  - 3 back-to-back storms within 36 days
  - Nearly 47,000 workers from 39 states and Canada
  - 75% restored by third day after each storm
- 2005 is most active and destructive season on record
  - 4 hurricanes affected customers
  - Prepared for 7
  - Nearly 45,500 workers from 36 states and Canada
  - 130 days of storm restoration
- Wilma alone had the largest impact to our infrastructure
  - Largest amount of resources ever acquired
  - Quickest deployment of resources to the field after a major hurricane

FPL

2005 Storm Season - Distribution and Transmission Equipment Repaired

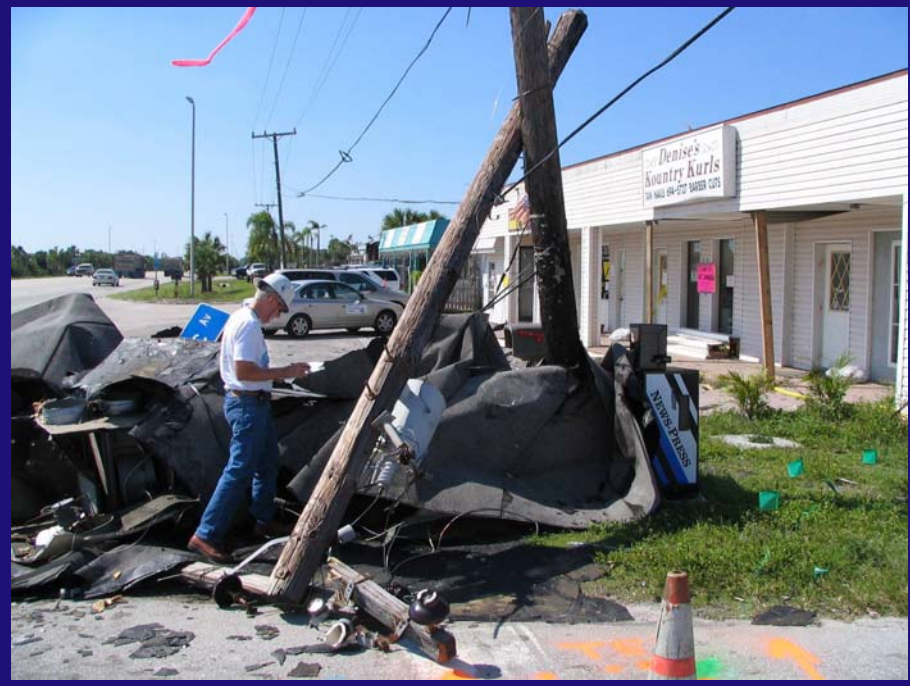
- **Distribution**
  - 12,632 poles (FPL & non-FPL)
  - 930 miles of OH conductor
  - 570 miles of OH service conductor
  - 1.1 million OH splices
  - 30 miles of UG cable
  - 100 miles of UG service cable
- **Transmission / Substation**
  - 100 structures
  - 7 miles of conductor
  - 1 substation transformers
  - 7 regulators
  - 16 breakers

FPL

2005 Storm Season Assessment

Forensic Team

- **Samples taken to determine and analyze cause of failures on equipment during hurricanes**
  - 2,571 observations
  - Observations focused on pole location to capture causes



2005 Storm Season Assessment

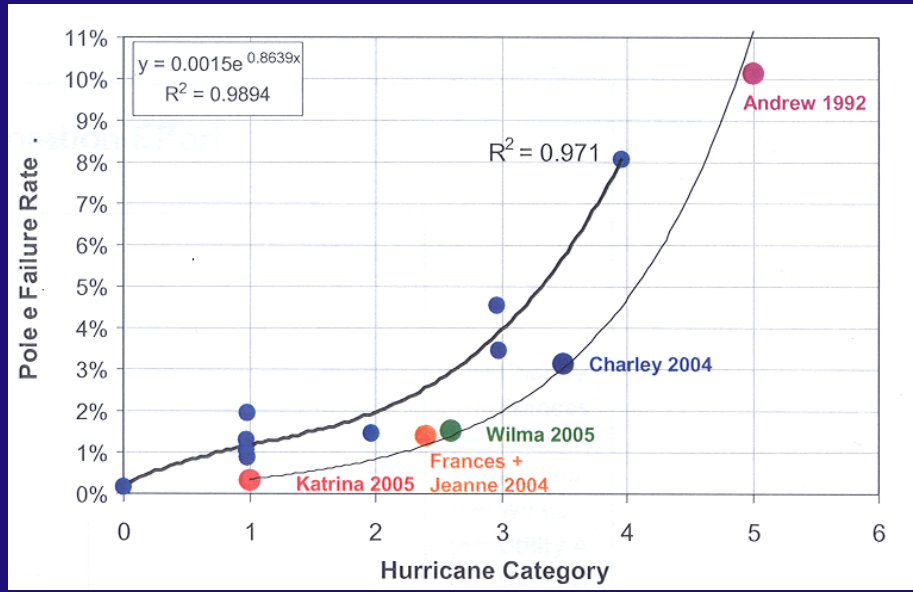
KEMA

- **Retained independent outside consultant (KEMA):**
  - Examine performance of FPL facilities
  - Understand whether transmission and distribution structures performed appropriately
    - Distribution Performance
    - Distribution Standards
    - Quality Processes
    - Pole Maintenance
    - Transmission Performance
    - Substation Performance
    - Weather Assessment
    - Industry Benchmark

2005 Storm Season Assessment

KEMA Findings

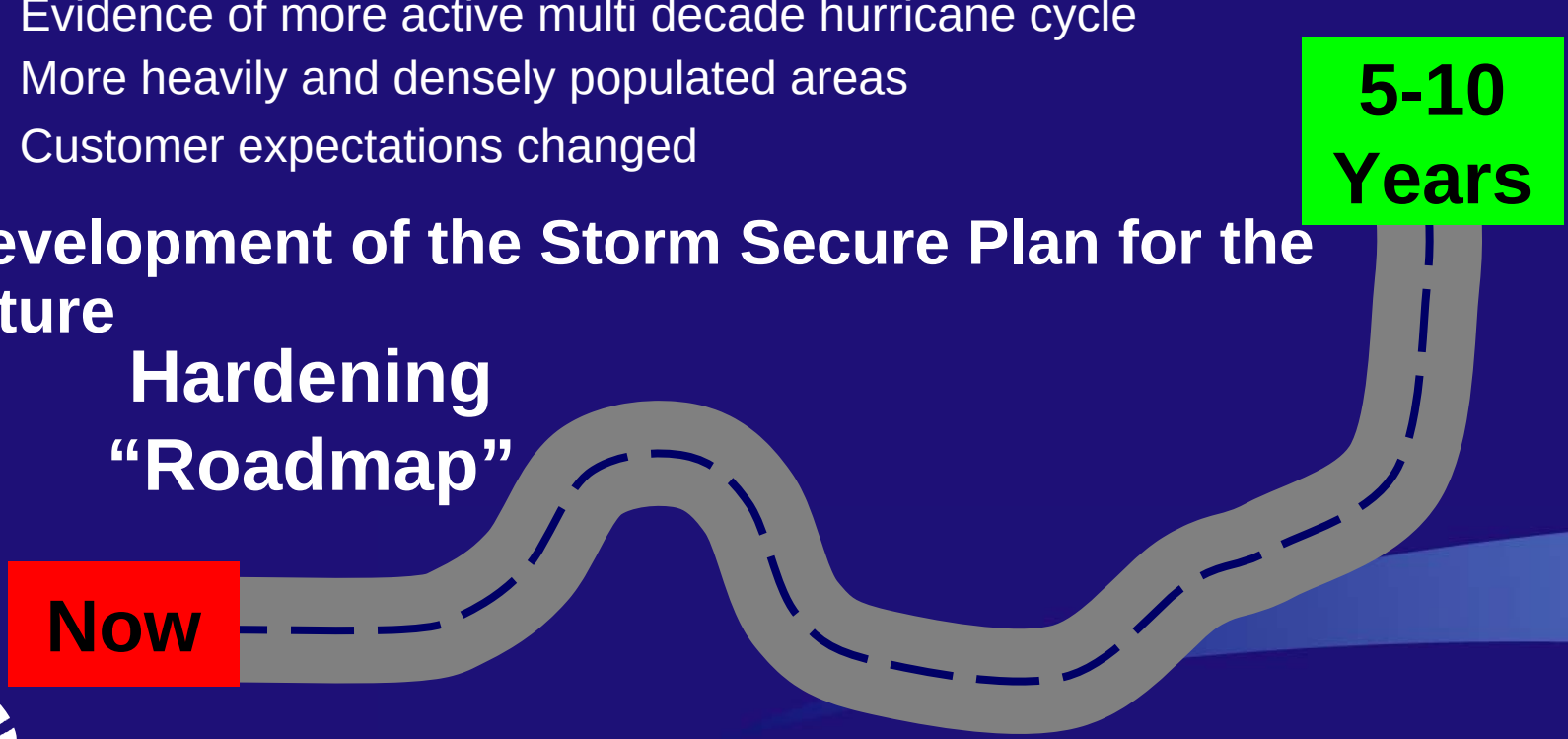
- **FPL meets or exceeds all required standards**
- **All quality systems are good**
- **Performance during Wilma was as expected**
- **Damage during Wilma was consistent with past hurricanes**



Five-Point Storm Secure Plan

A Hardening Roadmap

- **Significant changes are required in the design, construction and operational of electric systems**
  - Evidence of more active multi decade hurricane cycle
  - More heavily and densely populated areas
  - Customer expectations changed
- **Development of the Storm Secure Plan for the future**



Five-Point Storm Secure Plan

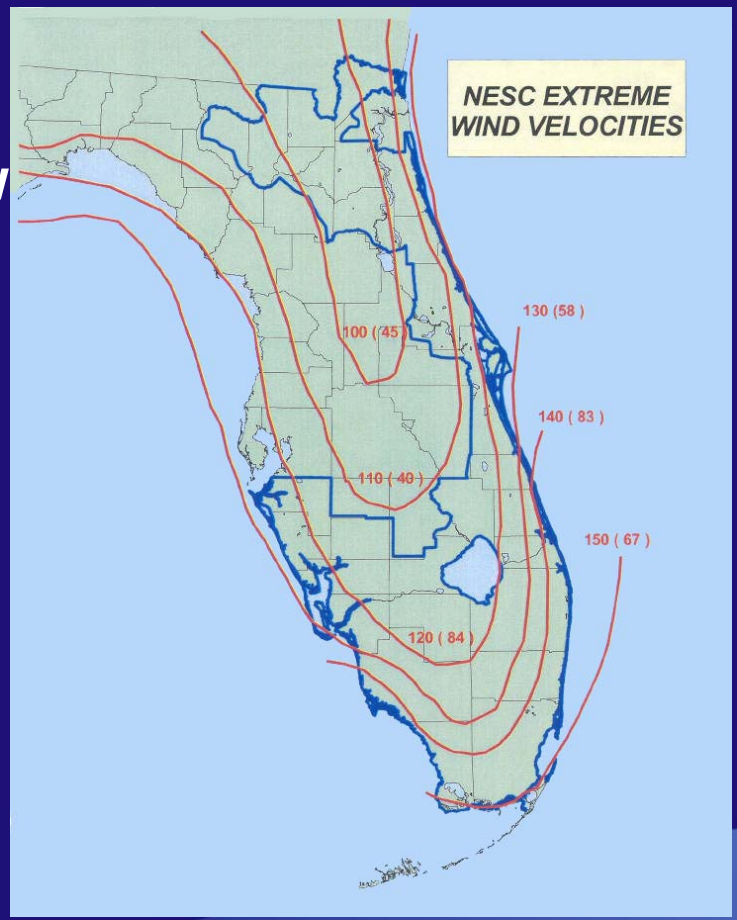
Strengthening the Grid

- **Complete Post-Hurricane and Targeted Facility Upgrades**
- **Step-up Pole Inspections**
- **Harden the Electrical Network**
- **Invest in Underground Conversions**
- **Increase Line Clearing**

Five-Point Storm Secure Plan

Distribution – Harden the Electrical System

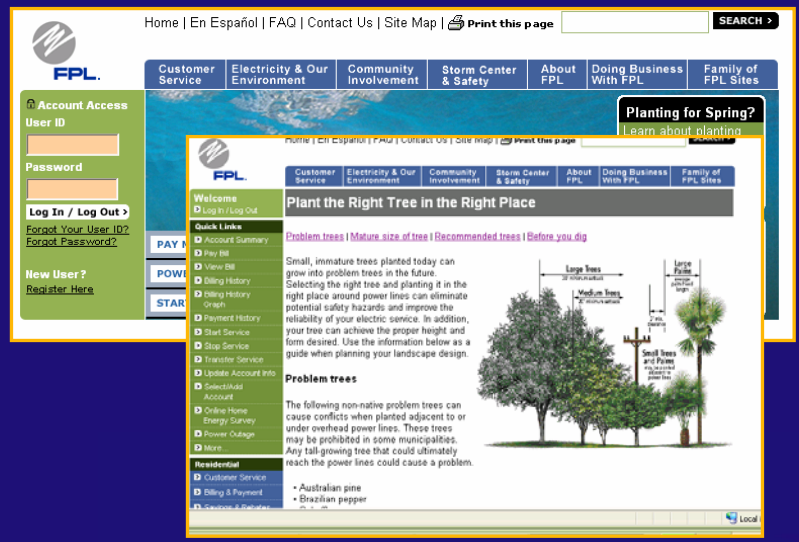
- **Adopt the NESC extreme wind velocity zone criteria as the new standard**
- **System upgrades of facilities through system expansion, relocations and major maintenance/rebuild projects**
- **Targeted, long term retrofit of existing facilities, that serve critical infrastructure facilities and major thoroughfares**



NESC Extreme Wind Map

Vegetation Management

- **Accelerate Vegetation Management**
  - Complete 75% before height of storm season
- **Evaluate alternative trim cycles**
  - Davies consulting retained to determine most cost effective trim cycle
- **Promote Right Tree Right Place**



2006 CIF Hardening Projects

- **Facilities having a direct effect on public health, safety, welfare and security**
- **Two South Florida ports**
  - Port Everglades
  - Port of Palm Beach
- **Several South Florida hospitals**
  - Jackson / UM Hospital Complex
  - Mt Sinai / Miami Heart
  - Saint Mary's Medical Center

FPL supplies Port Everglades with electricity to distribute the petroleum that supplies nearly one-fifth of Florida's energy requirements

FPL

How You Can Help

- **Overhead Hardening**
  - Need better materials and / or work methods
- **Effects of Wind**
  - Need better wind data at a granular level
  - Sustained winds vs. choppy winds
  - Testing and wind simulations
- **Storm Surge**
  - Need better materials and / or work methods
  - Network operations

Questions ?