



# Hurricane Preparedness Workshop

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# About Keys Energy Services

- Public Power Community
- Elected Utility Board
- 31,034 Meters
- 131 Employees
- 148.7 MW Peak Demand
- Utility Board requires 60% On-island Generation
- FMPA Owns & Maintains this requirement level
- Seven Generating Units
  - 1 High Speed Diesel
  - 2 Medium-Speed Diesels
  - 4 GE Combustion Turbines



# About Keys Energy Services

- 67 miles of 69 & 138kV transmission
  - 1 radial line - interconnection to FKEC
  - 700 concrete poles
  - 150 steel poles
- 9 substations with 38 feeders
- 297 miles Overhead 13.8kV distribution
  - 5,793 wood poles (43.6%)
  - 3,771 non storm concrete Poles (28.4%)
  - 2,386 Storm Concrete Poles (17.9%)
  - 1,345 Ductile Iron Poles (10.1%)
- 42 Miles Underground 13.8kV distribution



# Hurricane Andrew - 1992

- Transmission down outside our service area
  - Two-Week Restoration
  - Local Generation Supplied Power Needs
  - Resulted in 60% On-Island Policy
- Non-Event in our Service Territory
  - Generation fine
  - Distribution fine
  - Work Force all available
  - No Mutual Aid/Contractors needed



# Hurricane Georges - 1998

- Category 2 Hurricane
  - Wind Event
  - Transmission
    - Significant Insulator Damage
    - Conductor Down
  - Severe Distribution Damage
  - Response
    - KEYS Work Force all available
    - Assistance from 296 lineworkers
      - Mutual Aid – FMEA Mutual Aid
      - Contractors



# Hurricane Georges - 1998

- 275 Down or Broken Poles
  - Key West 30
  - Stock Island 32
  - Bay Point 15
  - Sugarloaf Key 35
  - Cudjoe Key 45
  - Summerland Key 20
  - Torch Keys 23
  - Big Pine Key 75

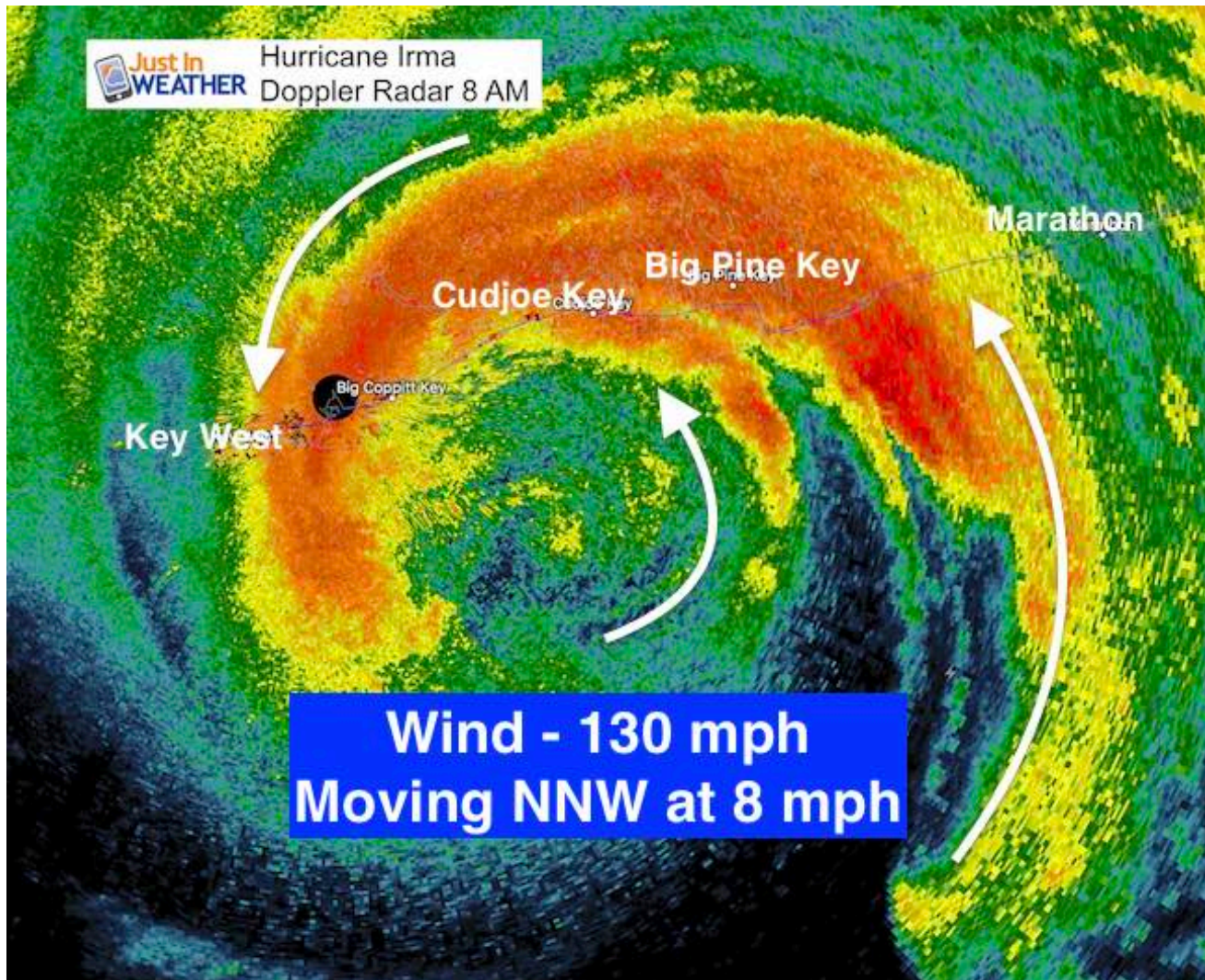


# Hurricane Wilma - 2005

- Wind and Flooding Event
- Generation fine
- Transmission fine
- Distribution damage
- Mutual Aid/Contractors

# Hurricane Irma September 11, 2017

## *Category 4 Hurricane Direct Hit*





# Hurricane Irma - Transmission



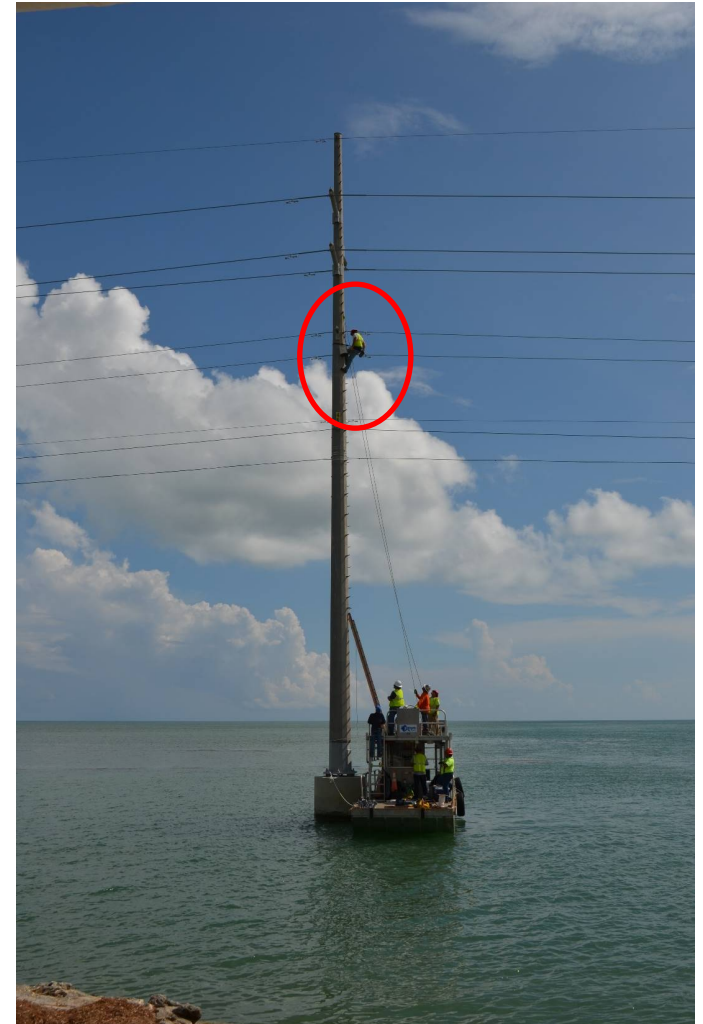
# Hurricane Irma – Damage Overview

- Transmission Poles Replaced: 9
- Distribution Poles Replaced: 670
- Transformers Replaced: 638
- Streetlights Replaced: 1,316
- Miles Conductor Replaced: 73
- Insulators Replaced: 3,253
- Cutouts Replaced: 414



# Hurricane Irma - Distribution

- Over water repairs



# Have a Plan

- Created Hurricane Plan in early 1990s
- Update Plan Annually
  - Updates based on Lessons Learned
- Success of our restoration based largely on following the plan
- Annual Meetings
  - Hurricane Plan Review – May 1
  - Tabletop Drill – late June – early July
- Every Storm is Different
  - Creates New Lessons Learned
  - Variables:
    - Generation
    - Transmission
    - Distribution
    - Materials
    - Work Force
    - Communications



# Have Dedicated Responders

- KEYS employees are highly committed
  - Irma
    - 57 of 90 First Responders Stayed
      - Remainder reported back by Wednesday 9/13
    - 5 of 57 Second Responders Stayed
- KEYS has access to Mutual Aid Network
  - Municipal and Cooperatives
    - FMEA
    - APPA
  - IOUs – Compact
- KEYS has multiple Storm Contracts in place with Private Contractors



# Protect/Harden Your Infrastructure

- Transmission
  - Inspections
    - Constant
    - Aerial – 2 years
    - Foundation/Anchors - 3-4 years
  - Pole Reinforcement
    - Utilizing LifeJacket Technology
  - Polymer Insulators
    - Installed after Hurricane Georges in 1998
    - Currently replacing post insulators with improved polymer
    - Currently replacing polymer deadends with glass



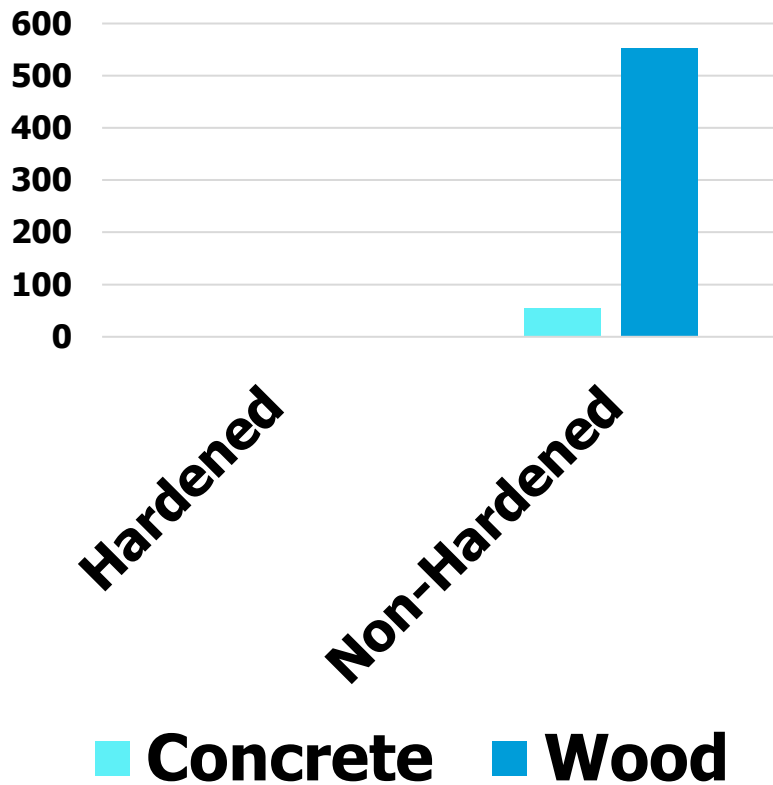
# Protect/Harden Your Infrastructure

- **Distribution Pole Replacements**
  - KEYS tests poles regularly
    - Historically eight-year cycle per FPSC - 2006 & 2014
    - Utility Board's Strategic Plan accelerates testing cycle
      - 2020 – 50%
      - 2023 – 50% (planned)
  - 2020 - Osmose tested 50%
    - 13,278 distribution poles
    - Total of 308 reject poles
      - 188 KEYS poles
      - 120 ATT poles
  - Focus on Poles to Critical Government Facilities
    - Plan to replace 491 non-storm poles



# Protect/Harden Your Infrastructure

**Irma Pole Failures**



- No “storm hardened” distribution poles failed during Irma



# Protect/Harden Your Infrastructure

- Vegetation Management
  - Transmission Trimming
    - Twice Yearly
    - 15 feet minimum on transmission lines
  - Distribution Trimming
    - Every Two Years
    - 10 feet minimum clearance on open conductors greater than 600 volts
    - 5 feet minimum clearance on open conductors less than 600 volts
  - Unique agreement with AT&T/Comcast

