



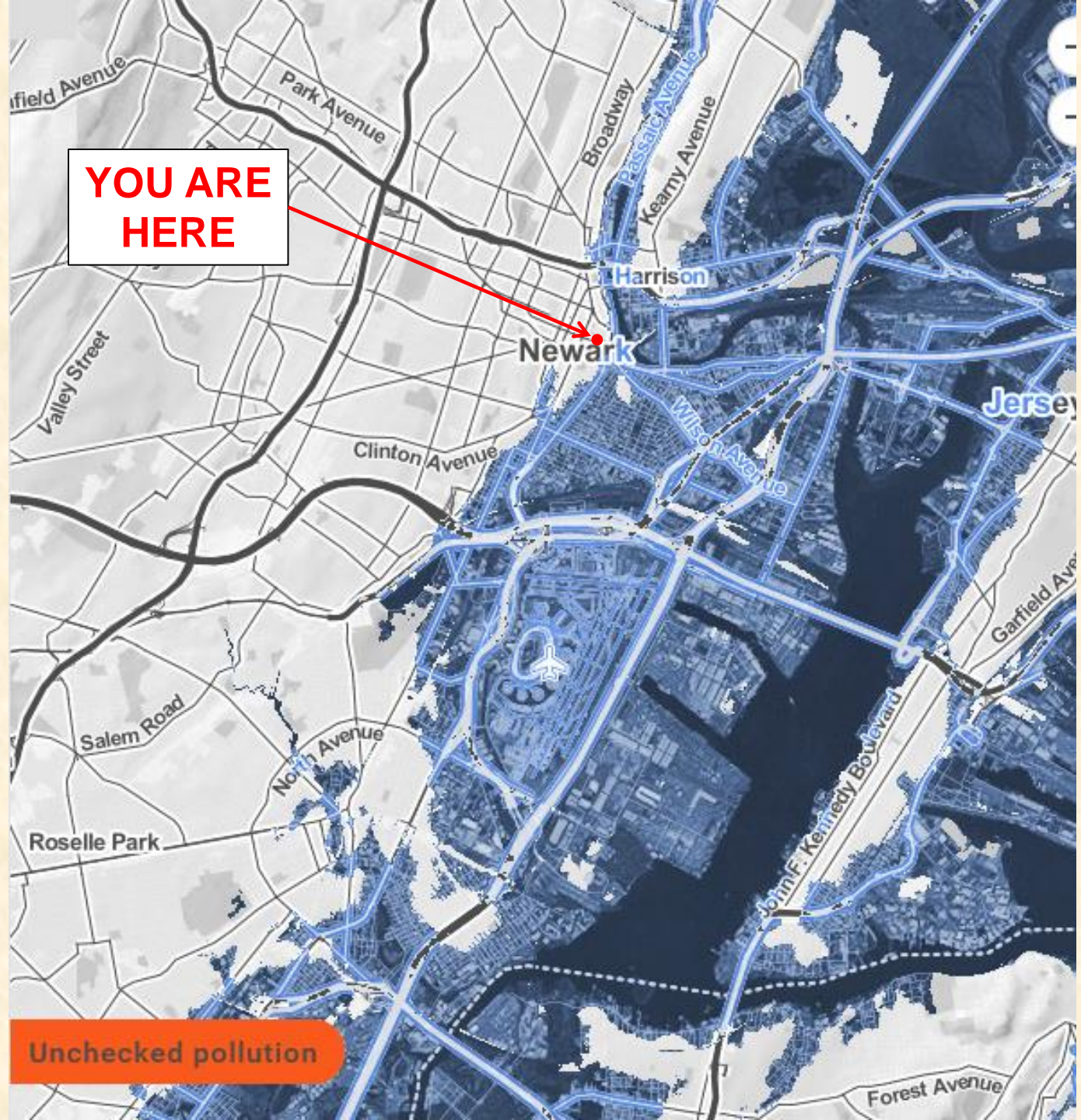
*The Role of Renewable Energy in New Jersey:
Technical and Economic Challenges*

Joint Conference of
The Mid-Atlantic Solar Energy Industries Association
and
PSE&G

November 2, 2015
PSE&G
80 Park Plaza
Newark, NJ

**Sea level in
Northern NJ
late this
century:**

**PSE&G HQ
is waterfront
property**



INFRASTRUCTURE FOR A RENEWABLE FUTURE – UTILITY ROLES

1. **Generation mix** – A mix of solar, wind, and biomass is synergistic and helps provide baseload and peak.
 - *Utilities can play a role in building generation facilities, along with private industry.*
2. **Geographic mixing** – The more numerous and the more widely dispersed the solar and wind generation sources are, the more their individual intermittencies cancel each other out. They are then able to match load better. This means building long-distance transmission assets such as HVDC transmission lines.
 - *Utilities are well-suited to build transmission infrastructure.*
3. **Load shaping/demand management** – large amounts of solar power will create low pricing in the middle of the day, the opposite of the case now. This and other changes will create the need for much greater investment in load shaping and demand side management.
 - *Utilities are uniquely positioned to invest in load shaping/demand management resources and manage them*
4. **Curtailement of renewable generators** – Solar and wind cannot be curtailed without economic loss, but as their cost drops and the amount generated grows larger than the load at times, they will need to be curtailed
 - *Utilities are uniquely positioned to invest in curtailment infrastructure and manage it.*
5. **Electric energy storage** – To the extent that the first four measures are not enough to match generation and load, electric energy storage will be needed.
 - *Utilities can play a role in building electric energy storage facilities, along with private industry.*
6. **State-of-the-art, fast-ramp, efficient natural gas plants as a bridge** - It is important not to build more new fossil plant than is necessary, but what is built should be compatible with a growing share of renewables.
 - *Utilities are well-suited to build state-of-the-art gas generating facilities.*
7. **More complex control of the grid & transactions** – All of the above measures require controlling and balancing sources and loads in a more complex fashion than yesterday's grid, and transactions are far more numerous and complex.
 - *Utilities are uniquely positioned to provide the infrastructure and management resources for the new grid.*