



Grid Interactive Water Heaters

*Filling the Policy Gap:
A Role for Legislation?*

ACEEE Hot Water Forum

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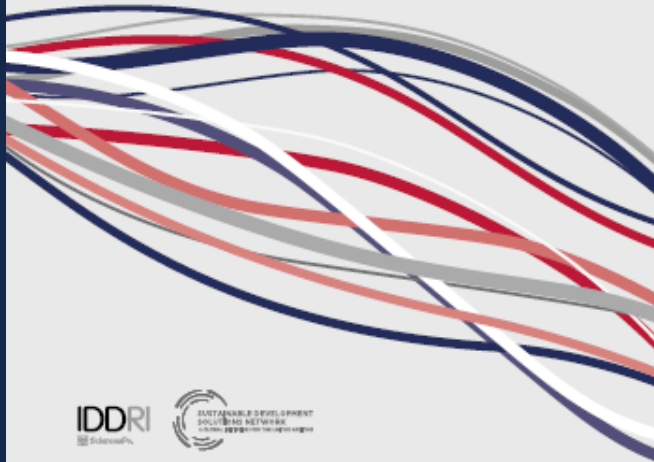
Consultant to Natural Resources Defense Council



Key Driver: Deep Decarbonization

US 2050 Report

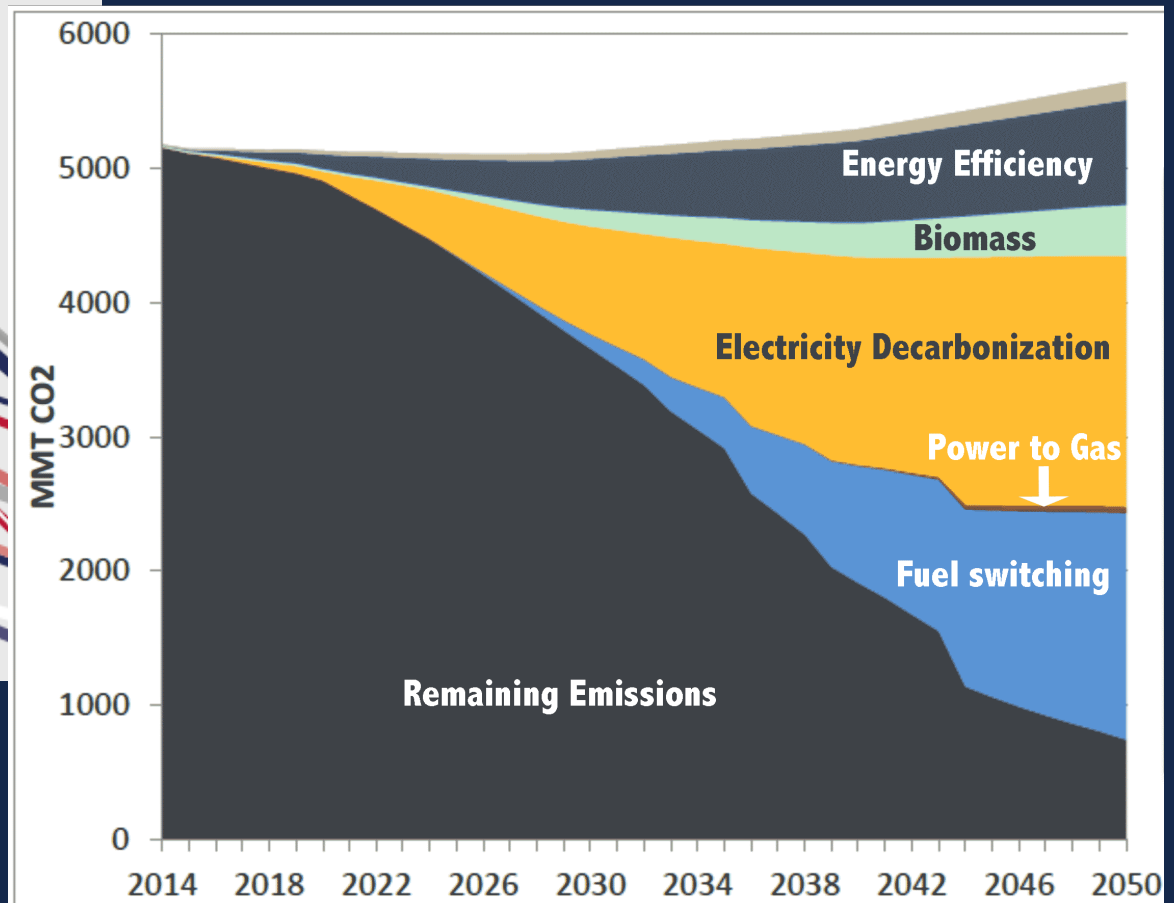
pathways to
deep decarbonization
in the United States



IDDRI



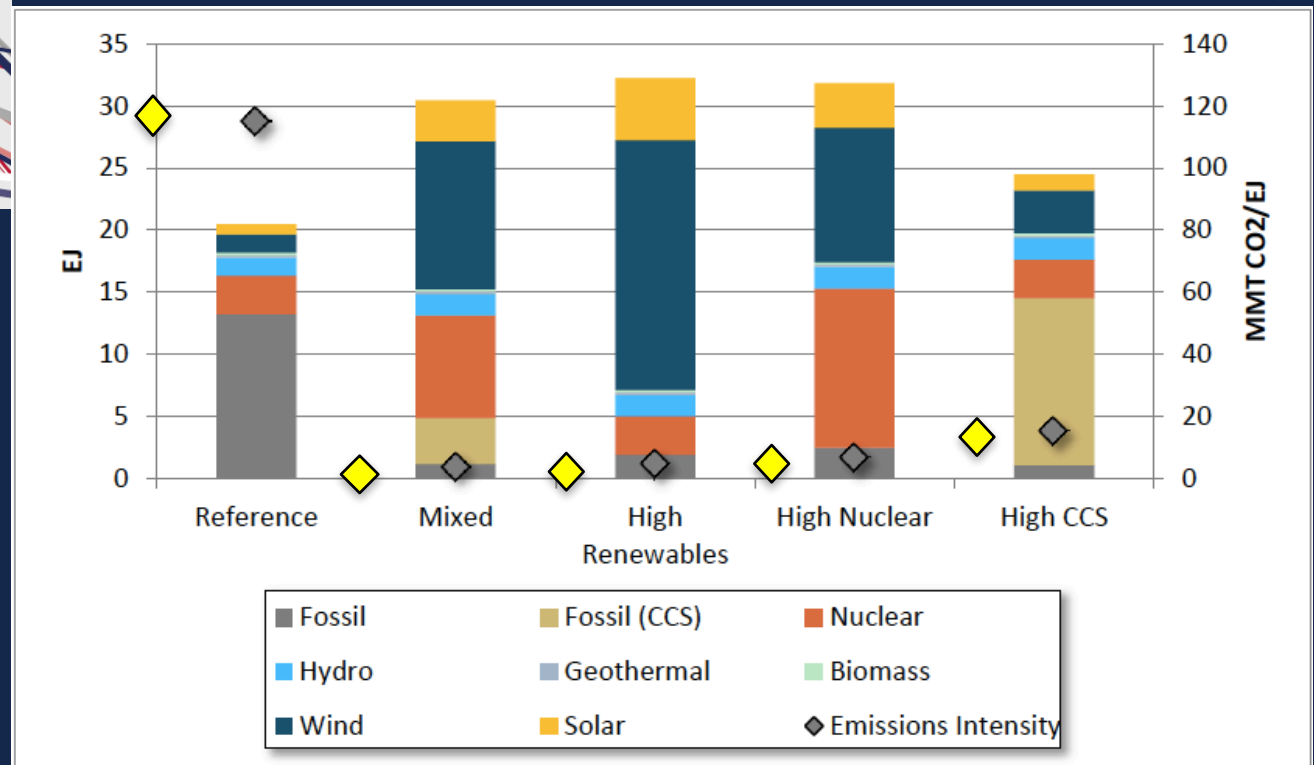
- Technically & economically **feasible**
- Must look to **all options**



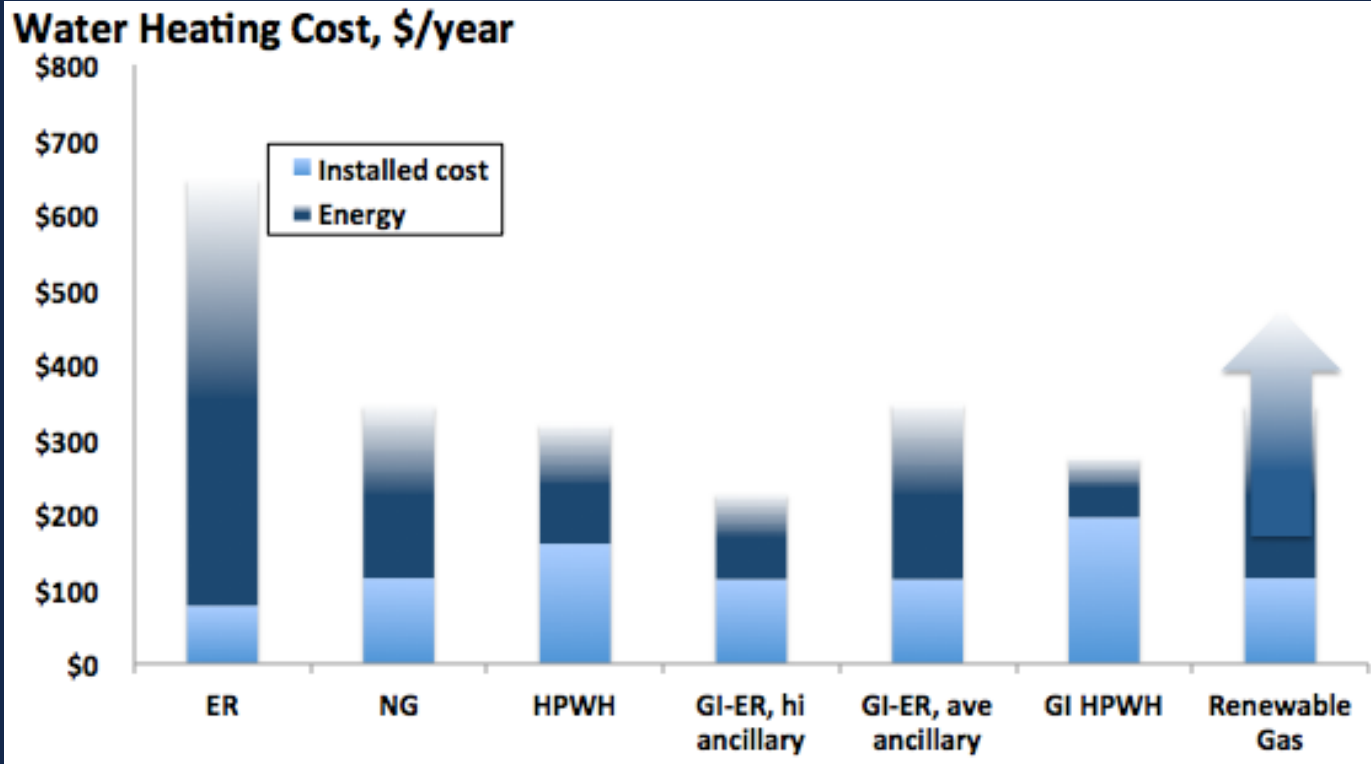
Multiple Electricity Decarbonization Pathways



- Challenging, but several options
- Very large capital investment
...but small net consumer impact
- All involve **much less flexible generation**



Cost and Emissions of Water Heating



Recent Legislation

- **Public Law 114–11** Energy Efficiency Improvement Act of 2015
 - Sec. 201 **Grid Enabled Water Heaters**
- **Public Law 114–113** Consolidated Appropriations Act 2016



Federal Policy Impacting GI-WH

- DOE appliance & equipment **minimum energy standards** **Big Gap**
- DOE **R&D** support for
 - **Grid interactive electric resistance technology** **Big Gap**
 - **Analysis** of cost and performance (i.e., emissions, amenity)
- DOE development of model **building energy codes** **Big Gap**
- FERC oversight of **wholesale electricity market design** **Narrowing**
 - FERC storage NOPR
- EPA development of **ENERGY STAR** specifications **Big Gap**
 - EPA **connected equipment** specifications?
- Federal **tax incentives** **Big Gap**
 - **ITC**
 - **24D & 25C**



Recently Proposed Legislation *(2015-16)*

- S.2012 (Senate) **Energy Policy Modernization Act**
- S.2012 (House) **North American Energy Security & Appropriations**
- S.1232 **Smart Grid Act** of 2015
- S.3159 **Energy Storage Tax Incentive & Deployment Act** of 2016



S.2012 Energy Policy Modernization Act

- **Died in Conference** Dec 2016
- **Senate Version: Energy Policy Modernization Act**
 - Title II Subtitle D: **Electricity and Energy Storage**
 - Sec 2301. **Grid Storage Program**
 - Sec 2302. Elec Sys **Grid Architecture, Scenario Devel, Modeling**
 - Sec 2304. **Voluntary Model Pathways**
 - Sec 2305. **Performance metrics** for electricity infrastructure providers
 - Sec 2306. State & Regional Elec **Distribution planning**
 - Sec 2307. **Authorization** of Appropriations
 - Sec 2308. Electric **Transmission Infrastructure** Permitting
 - Sec. 2309. **Report by Transmission Organizations** on DER
 - Sec 4402. **Quadrennial Energy Review**
- **House Version:**
 - Sec 1206. Closed Loop **Pumped Storage** Projects
 - Sec 3114. **Battery Storage Report**



S.1232 Smart Grid Act of 2015

- Sec. 2. Smart Grid **Interoperability Working Group**
- Sec. 3. Smart Grid **Technology RD&D** program policy
 - **Transactive Energy** Projects
 - Innovation in **Valuation** of New Technology Grid Services and Efficiency
 - **Rate Design-Distribution System**
 - Rate Design – **Consumer Acceptance** of Time-based Pricing
 - **Energy Storage**
 - Smart **Electric Vehicle Charging**
 - **Demonstration Projects**



S.3159 Energy Storage Tax Incentive...Act of 2016

- Sec. 2. Energy **ITC for Energy Storage** Technologies
- Sec. 3. Res'l Energy Efficient Property **25D Credit for Battery Storage** Technology



Federal Policy Impacting Community Storage

- DOE appliance & equipment **minimum energy standards** **Big Gap**
- DOE **R&D** support for
 - **Connected equipment & transactive technology** **Big Gap**
 - **Valuation** of connected equipment operation & retail electric **rate design**
- DOE development of model **building energy codes**
- FERC oversight of **wholesale electricity market design** **Gap**
 - **FERC storage inquiry**
- EPA development of **ENERGY STAR** specifications **Big Gap**
 - EPA **connected equipment** specifications
 - Specifications for non-connected equipment
- Federal **tax incentives** **Big Gap**
 - **ITC**
 - **24D & 25C**



Next Steps

- **Define and assess policy gaps**
- Explore **regulatory and legislative options**
 - Authorization, appropriations, report language, marker bill
 - Regulatory interpretation
- **Collaborate**
 - Across the supply chain, and across the policy and political spectrum
 - Join the Community Storage Initiative

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