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IEPR Workshop

Quality Installation of Heating and Air Conditioning Equipment

Bill Pennington, Advisor to Commissioner McAllister for Building Efficiency Standards

September 10, 2021



Quality Installation Standards

- CEC Interest in energy savings from quality installation from 1990's
- Extensive research found poor installation undermines efficiency improvements
 - Proper installation leads to energy savings = 30-40%
 - Defects can also result in comfort and indoor air quality problems
- Active in development of ASHRAE standard for duct leakage testing
- Collaborative with CBIA and IOUs on installation protocols
- California field research for HVAC installation problems
- Building Standards field verification process from 1998
- Quality installation in the Building Standards from 2001 for Newly Constructed Buildings ... from 2005 for HVAC change-outs



10 % Pull Permits

- AB 2021 (2006): develop a plan to improve the energy efficiency and decrease the peak electricity demand of air-conditioners
- CEC/CPUC formed a 45-member working group of HVAC professionals to prepare the plan
- Working group identified widespread lack of quality installation of HVAC systems increasing peak demand by 20 to 30%
- Only 10% of 350,000 annual residential replacement installations are done with building permits
- Only 15% of all installations would meet CEC quality installation standards
- Estimated if 85% met CEC quality installation standards, save annually 130 MW (about 80% of entire energy efficiency program of SCE)



Actions Taken

- 2 CEC/CSLB MOUs to coordinate – CSLB stings, industry information
- CPUC formed Western HVAC Performance Alliance – action plan
- Compliance Improvement Advisory Group – white papers
- ARRA funded programs – encourage permits, improved quality
- AG’s Office request for utility rebates – owner declaration: “installed ... in accordance with all applicable permitting requirements, and where applicable by a licensed contractor”
- 2017 CPUC/DNV-GL: 7.9% permit rate; 1 million annual change-outs
- Well-intended actions have failed to move the needle
- Industry remains challenged to improve performance



Legislation

- AB 350 (2015) – Clean Energy and Pollution Reduction Act
 - “ensure that retrofits meet high-quality performance standards and reduce energy savings lost due to poor-quality workmanship”
- SB 1414 (2016)
 - “approve a plan that will promote compliance with Part 6 of Title 24 ... in the installation of central air-conditioning and heat pumps”
 - “adopt regulations to increase compliance with permitting and inspection requirements ... and associated sales and installations”
- SB 1383 (2016)
 - Reduce emissions of short-lived climate pollutants to achieve a reduction in ... hydrofluorocarbon gases by 40% ... by 2030



Climate Change Imperative

- EO B-55-18: “achieve carbon neutrality ... no later than 2045”
- Governor Newsom, September 11, 2020:
 - We’re in a climate crisis ... There is no doubt climate change is here and is happening faster than most had anticipated.
 - We’re going to have to fast track our efforts. We’re going to have to be more aggressive in terms of meeting our goals much sooner.
- Building decarbonization calls for rapid expansion of use of heat pumps for space heating systems
- Quality installation problems lead not only to energy losses but also to refrigerant loss to the atmosphere, both compromising GHG reductions
- More critical than ever to find ways to improve quality installation