Presentation Outline

I. A. O. Smith – History (a little)
II. Top Trends - Snapshot
III. Prioritization
IV. Industry Impacts
V. Questions
For over 140 years, A. O. Smith Corporation has grown through diversity, innovation and its steadfast commitment to the customer

Machine Shop & Automotive – 1874 - 1915

- 1874 – Charles J. Smith opens a general machine shop in Milwaukee, Wisconsin
- 1906 – A. O. Smith takes an order for 10,000 auto frames used for the original model "K" Ford

Defense Industry & Water Heating – 1917 - 1945

- 1917 – 1918 – A. O. Smith is the largest American manufacturer of aerial bomb casings in World War I
- 1939 – A. O. Smith produces the first glass-lined residential water heater in Milwaukee
- 1941 – 1945 – A. O. Smith is the leading wartime producer of bomb casings, hollow steel propeller blades, aircraft landing gear and other defense items
A. O. Smith History

**Water Heating Focus – 1946 - 1965**
- 1950 – A. O. Smith introduces cathodic protection for water heater tanks
- 1952 – A. O. Smith celebrates production of its 2 millionth water heater
- 1965 – A. O. Smith formalizes its marketing philosophy; to manufacture only A. O. Smith brand products, sold only through plumbing professionals

**Water Centered Focus Grows – 1966 - Today**
- 1995 – A. O. Smith enters the China market with three joint ventures – automotive products, fiberglass oilfield pipe, and residential water heaters
- 2006 – A. O. Smith acquires GSW/American Water Heaters
- 2014 – A. O. Smith celebrates 140 years in business
- 2015 – A. O. Smith acquires Aquasana
- 2017 – A. O. Smith acquires Hague Quality Water
Top Trends - Snapshot

- Building Electrification
- Connectivity & Data
- Resiliency
- Utilities/Clean Energy
- Air Quality
- Water Quality
- Housing
- Technology Costs
- Codes & Standards
- Demographics
- Federal Regulations
Prioritization - Regulations
Prioritization – Regulations

Regulations

➢ Current State
  • **What Regulations?**
  • Federal Govt abdication to States and Cities
  • State and Cities drive changes
    o Energy, resiliency, climate, sustainability goals through codes
    o Over fifty cities actively moving code and standards

➢ Future State
  • Large and Small jurisdiction adoption
    o Nationwide building, mechanical, plumbing codes that drive high-efficiency appliance and mechanical decisions
Prioritization – Codes & Standards

Building Our New Energy Future

What Buildings Professionals Need to Know about Changes Coming to the Electricity Sector

The Electrical Grid Today
The 20th-century electrical grid has served us well, but times are changing. As the grid’s number one customer, the buildings sector has a critical role in these changes.

Changes to the Electrical Grid
Policies and new technologies are reshaping the outdated grid model. Buildings professionals can help lead the transition to a new 21st-century model for the electricity sector.

The Smart Grid
With a smart grid, buildings are transformed from the 20th-century model of passive loads on the grid to 21st-century dynamic partners in the electricity sector.

DID YOU KNOW?

Here are some “big picture” facts behind changes coming to the electricity sector.

Increasing Demands for Electricity
- 85% of world population has access to electricity now
- 15% of world population without electricity wants it

Population Growth
- 9.7 billion world population by 2050
- 68% expected to live in cities
- Compare to 7.2 billion and 53% in cities in 2014

5.8 Million
Increasing urbanization will result in construction of a city about the size of Singapore (5.8 million) each month until 2050

33% 2040
By 2040, 33% of all vehicles are projected to be electric

Burning Coal for Electricity
- 40% of world electricity comes from burning coal
- Future use of coal expected to remain flat

60%–70%+
Buildings use 80% of electricity worldwide

70%
Buildings in the developed world use more than 70% of electricity

Carbon dioxide (CO2) emissions from electricity generation

Renewable Energy and Electrical Storage on the Rise
- Renewables (biomass, hydropower, geothermal, wind, and solar) are the world’s fastest-growing energy source

CO2
- Coal contributes 70% of the carbon dioxide (CO2) emissions from electricity generation


AO Smith
Codes & Standards

➢ Current State
  • Federal Govt abdication to States and Cities
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➢ Future State
  • Large and Small jurisdiction adoption
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Prioritization - Utilities

29 states have Renewable Portfolio Standards

States with Renewable Portfolio Standards | States with a voluntary renewable energy standard or target | States with no standard or target

California

- California’s Renewable Portfolio Standard was established in 2002, requiring 20% of electricity retail sales be served by renewable energy resources by 2010
- The most recent acceleration, under Senate Bill 100 in 2018, requires retail sellers and municipal utilities to procure 100% of electricity from renewable resources by 2045*
- The standards apply to publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators

New York

- New York’s Renewable Portfolio Standard was established in 2004, requiring 29% of electricity retail sales be served by renewable energy resources by 2015
- The most recent RPS is included in the Reforming the Energy Vision Plan and requires municipal utilities retail suppliers to procure 50% of electricity from renewable resources by 2030
- The plan includes a 10-year budget commitment of $1.5 billion to stimulate greater investment in large-scale renewables **

Utilities

➢ Current State

  • Business models under pressure
    o Utility consolidation
    o Renewable energy & storage integration (batteries)
    o Forty States and District of Columbia Took Action on Distributed Energy Resources (DER) and Rate Design during Q1 2018 alone

➢ Future State

  • Utilities as energy and product service provider
    o Energy managers and customer solutions
    o Moving high efficiency appliances
    o DERs standardized
Prioritization – Building Electrification
Building Electrification

➢ Current State
  • States (CA) and Cities (NYC) leading the charge
    o 100% “clean” energy buildings
    o NGOs playing the long game

➢ Future State
  • Hybrid Electric Buildings
    o Fleets of dispatchable commercial buildings
  • Connected Homes and Multifamily Buildings
    o In-home & cloud based platforms (i.e. communication) that manage energy services for utilities across their distribution system
Mayor Michael Bloomberg, founder of Bloomberg Philanthropies, in his annual letter on philanthropy:

"[T]he increasing disdain for facts is making it harder for America to address major challenges here and around the world ... Fortunately, ... a counter-assault is under way in both red and blue states. ... While it doesn’t attract national headlines, there is a growing movement of big cities and small towns that are striving to use data to improve the performance of government and the lives of their citizens. ... As Washington has grown more dysfunctional, American cities have grown more dynamic."
Prioritization - Internet of Things

**Security**
New device hardware is focusing on security and machine learning is helping secure networks

**Platforms**
Software providers are pre-integrating third-party technology to integrate hardware, networks and applications

**Low-power, wide-area networks**
These networks provide low cost and low power requirements, relying on battery-powered sensors

**Artificial intelligence**
Machine learning and computer visions are increasingly being used to analyze IoT-generated data
Connectivity & Data

➢ Current State

• Private sector and States driving
  o Smart homes, smart devices, data aggregation, IoT
  o Privacy, informed consent, opt-in, ownership
  o CA – mandatory communication protocol for appliances

➢ Future State

• Standardized connected products & services
  o Light federal regulation?
  o Firmer State enforcement under consumer protection statutes
Industry Impacts
(Summary)

Short Term (5-10yrs)

- Policy & Regulatory roadmap post 2020
  - Federal vs State/Cities
- Customer preferences
  - Incentives
- Affordability of “all” electric
- Technology lead times
- Housing / Demographics
- Amazon effect

Longer Term (10-20yrs)

- Hybrid Electric Buildings
- Connected Built Environment
  - Cloud based energy management services
  - He who controls the data
- Utilities as energy solution providers
- City-States
- Who is the customer?
- Role of federal minimum efficiency standards?
- OEMs as “commodity” providers or “solution” providers?
QUESTIONS

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