Meeting the Climate Challenge in New Buildings

7/16 COUNCIL MEETING

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Councilmember District 4

Berkeley: A Leader in Green Buildings

- **Setting Goals**
  - 2006 Measure G (reducing GHG emissions by 80% by 2050)
  - 2009 Climate Action Plan (by 2020, reduce emissions 33% below 2000, by 2050, 80% below 2000 levels)
  - 2018 Climate Emergency and Fossil Free Declarations
- **Information**
  - Building Energy Savings Ordinance (reporting energy usage)
- **Incentives**
  - Paying for upgrades through property tax bills
  - Transfer tax rebates for green retrofits
- **Mandates**
  - Reach codes

California: A Leader in Green Building

- **AB 3232**
  - Mandates a plan to reduce greenhouse gas emissions from building stock by 40% below 1990 levels by 2030
- **2018 Building Standards Commission Ruling**
  - Require solar on all new homes built after 2020

Impact of Gas on Climate Change

- **Natural gas** responsible for **27% of Berkeley GHG** emissions, 73% of building sector GHGs
- Berkeley is **18% behind** its 2020 goal
- **U.N. report (2018):** climate change requires "far-reaching and unprecedented changes in all aspects of society" to reach needed reductions in greenhouse gases by 2030
- Catastrophic fires, smoke, drought, heat, flooding dramatically underscore the **need for immediate action**
- Every new building with natural gas **locks in** GHGs for decades

Visualizing our greenhouse gas emissions

What does Berkeley's yearly emissions of 620 thousand metric tons of greenhouse gas look like in real, everyday terms?

It is **equivalent** to consuming **70 million gallons** of gasoline.

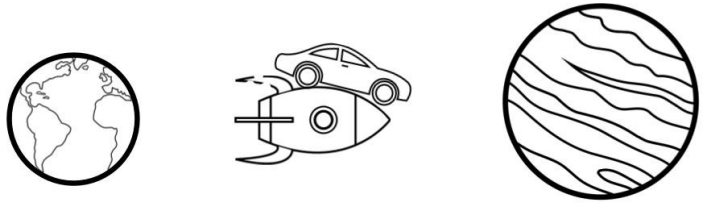
= ten million gallons of gasoline

To sequester these greenhouse gases, **730 thousand acres** of forests would have to be planted.

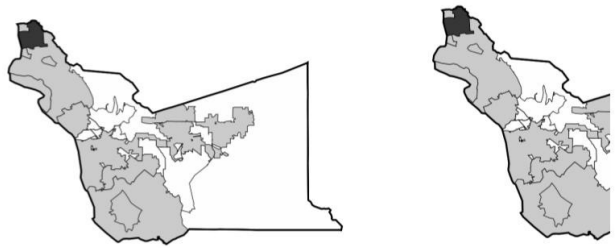
= hundred thousand acres of forest

Key

Transportation
Electricity
Natural gas
Waste



That's equivalent to 1.5 billion miles of driving, or driving to the planet Jupiter and back twice! See more at **bit.ly/ghgcoal**.



That's an area over 64 times the size of Berkeley and over one and a half times the size of Alameda County! See more at **bit.ly/ghgforests**.

Sources: Berkeley Climate Action Plan Update 2018; Environmental Protection Agency

THE CITY OF BERKELEY

THE BANE OF METHANE.

CH4 has a **greater** warming effect in atmosphere than CO_2

25% of global warming we're experiencing is caused by methane leaks

CH4

84x more emissions than carbon dioxide in first 20 years after emission

the consequence:

25x more emissions than carbon dioxide over 100 years

Tale of a Pipeline

1. THE OIL FIELDS OF TEXAS AND CANADA

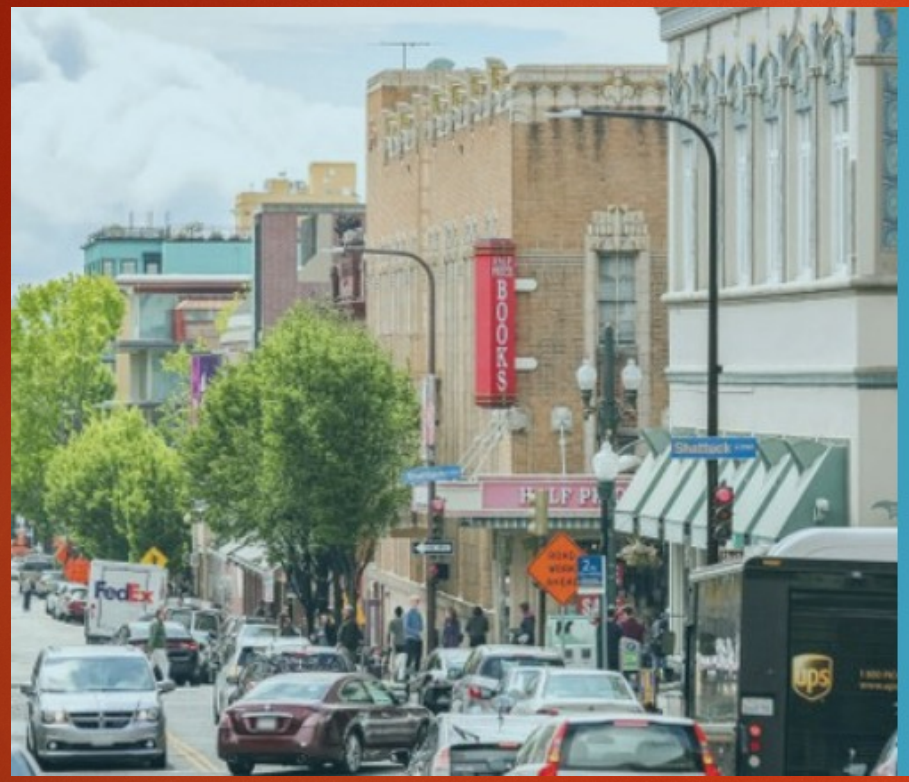
Natural gas is extracted from the oil fields of Texas and Canada, increasing greenhouse gas emissions, jeopardizing the health of workers, and resulting in fires and methane leaks.

Tale of a Pipeline

2. ACROSS THE COUNTRY

As these natural gas deposits make their way across the country, more leaks occur and greenhouse gases are emitted, exacerbating climate change.

Tale of a Pipeline



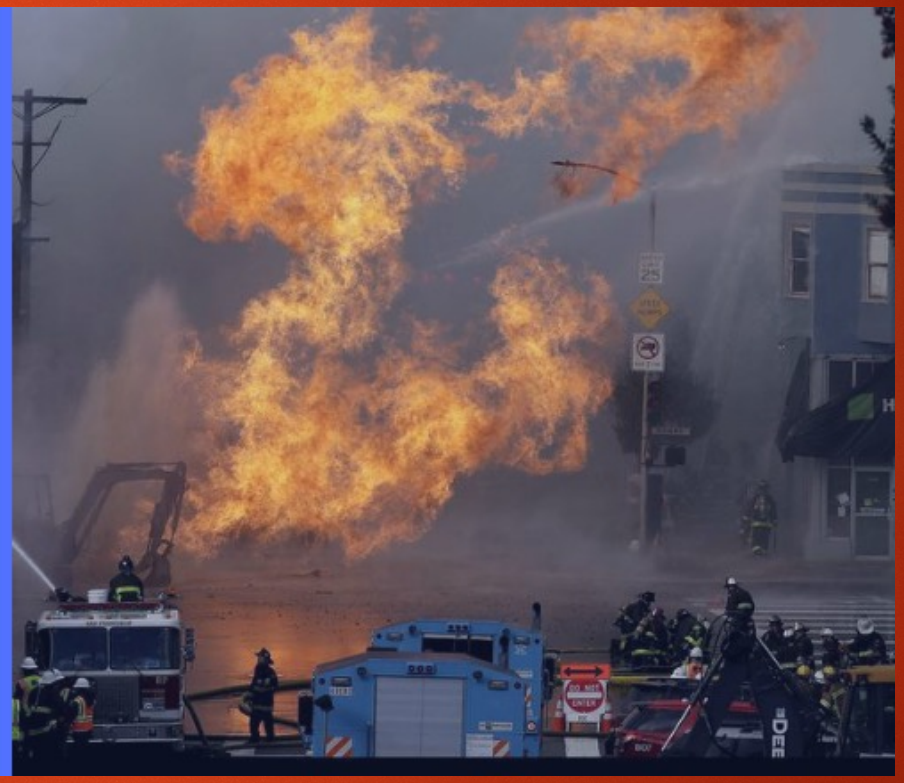
3. UNDER OUR DOWTOWN

These gases eventually make their way under our beautiful downtown and high school. The gas lines are volatile, at high risk of exploding and leaking; many run directly over the Hayward Fault. In case of earthquake, gas lines will rupture and result in fires that would destroy tens of thousands of homes and buildings.

Tale of a Pipeline

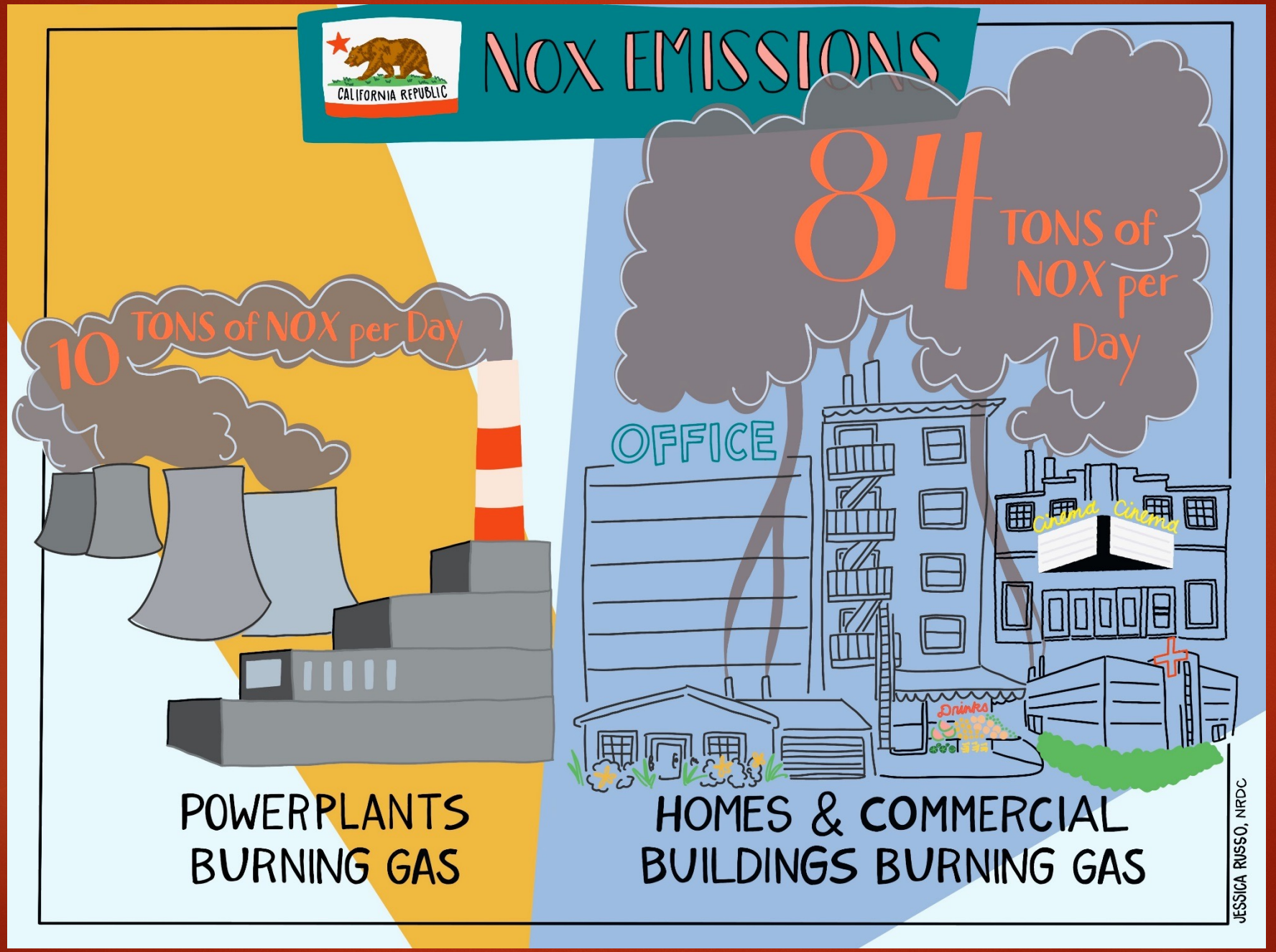
4. INTO OUR HOMES

Natural gas finally enters our homes through stoves and other appliances, with more greenhouse gas leaks. This increases the risk of health issues like asthma, and the danger of catastrophic natural gas fires.



Impacts on Health and Safety

- Natural gas produces **hazardous levels of nitrogen dioxide, carbon monoxide, formaldehyde** indoors not allowed outdoors, and is made worse with super-efficient buildings
- Gas is particularly **dangerous on an earthquake fault**
  - San Bruno pipeline explosion, fires after Loma Prieta
- Electricity **easier to reinstate** after disasters; more resilient


CALIFORNIA REPUBLIC
NOX EMISSIONS
10 TONS of NOX per Day
84 TONS of NOX per Day
OFFICE
Cinema
Drinks
POWERPLANTS BURNING GAS
HOMES & COMMERCIAL BUILDINGS BURNING GAS
JESSICA RUSSO, NRDC

Impact on Costs

- **To the Developer**
  - Capital **costs for electrification lower overall**
    - **Gas entails trenching and plumbing costs**
- **To Owners/Residents**
  - PG&E requested a **significant increase in gas prices** in 2020
  - **Stranded old gas assets** – Everyone left on gas pays the costs
  - **Creating green buildings upfront is far cheaper** way
  - Gas prices subject to **volatility** from natural disasters
- **To Society**
  - Ignores externalities – **costs to health and environment**
  - Fire department spends time responding to gas leaks

Statutorily Sound Underpinnings of the Ordinance

Climatic Impacts	Impacts from Geologic Events	Health & Safety Impacts	Economic Impacts	Policy Underpinnings
CO_2 & CH_4 emissions leading to: 1) Sea level rise 2) Fires 3) Extreme heat 4) Drought 5) Flooding	1) USGS Hayward Fault 7.0 earthquake simulation: a) 450 major Bay Area fires (many from gas lines) b) Death c) Loss of residential & commercial building floor area equivalent to more than 52k single-family homes d) Property losses approaching $30 billion	1) Toxic air quality a) indoor stove exhaust b) outdoor flue exhaust 2) Pipeline explosions	1) Gas prices increasing – PG&E has already requested a 10% rate increase in 2020, expected to go up 2) Construction cost savings - *no trenching + plumbing* 3) Most cost effective during new construction vs. retrofit 4) Future state regulation will lead to stranded utility-owned gas assets – with costs passed to ratepayers	1) Measure G 2) CAP obligations 3) Climate Emergency Declaration obligations 4) Fossil Free Resolution 5) Prior Council, CEAC, Energy Commission policies

Federal Court Agrees

- Federal court found that our ordinance was not preempted by the federal U.S. Energy Policy and Conservation Act (EPCA) – we dealt with hookups, not appliances
- Found that the federal Natural Gas Act leaves issues of direct consumption of gas to the states
- Did not rule of preemption by California Building Standards or Energy Code but we have the full support of the CEC
- Court emphasized municipal **authority to "regulate infrastructure" by amending and enforcing the local Building Code** (BMC Title 19) to protect health and safety under the U.S. Constitution

The Proposed Ordinance

- **Requires buildings to be electric-ready.** This prevents expensive future retrofits and allows for more EV charging
- **Phases out** natural gas infrastructure in **new buildings and/or** systems that can be modelled under Title 24
  - Requirement kicks in at application, not building permit
- **Planning staff added** to:
  - Guide developers through the electrification process
  - Develop codes for future green building standards
  - Assist property owners with green incentives
  - Support education and outreach

What's Not Included

- **Renovations to existing buildings**
- **Infrastructure leading up to the building**
- **Specific exemptions:**
  - Internal ADUs
  - Public Interest exemption
    - Public Interest exemption considers the unavailability of electric systems and the impact that natural gas may have on the welfare of the public

Outreach

- Berkeley Energy Commission – two special meetings and unanimous endorsement
- Berkeley Community Environmental Advisory Commission – unanimous endorsement
- Berkeley Community Health Commission - unanimous
- Downtown Business Association
- Meetings with developers, climate activists, engineers, utility unions

Evolution of the Ordinance

- **Changed to a phased systems-based approach**
  - Original proposal was an outright ban on natural gas hookups
    - Latest version exempts certain systems that the CEC has not yet modelled
- **Added electrification-ready**
  - As gas is phased out, mixed-fuel buildings required to be all-electric ready
- **Added exemption process**

Frequently Asked Questions

- **What happens when the power goes out?**
  - Many modern gas appliances do not work without electricity
  - Electricity is easier and faster to reinstate, and backup options are safer
  - Resiliency is improving with local clean generation and backup –resources to EBCE bring resiliency
  - Electric water tanks provide on-demand hot water supply
- **Isn't electricity dirty too?**
  - Berkeley residents enjoy electricity that is 78-100% carbon-free
  - Electric heat pump water and space heating technology is 3-5 times more efficient than the best gas technology.

FAQs, Continued

- **Isn't gas cheaper than electricity?**
  - "Cheaper" is different than "more cost-effective"
    - Modern electric 5X more efficient and can be offset with solar
    - Usage lower with more efficient systems
  - Gas costs are increasing so gas will cost more in the future
  - There are upfront capital savings – builders are realizing this
  - Per unit costs are evaluated without considering externalities

FAQs, Continued

- **Doesn't this just benefit the rich who can afford this tech?**
  - Tenants don't have choice about the systems in their units but pay the ongoing costs
  - Affordable housing developers have embraced all-electric design due to lower ongoing utility costs
  - Construction costs are skyrocketing, limiting housing production
- **What about jobs in the gas industry?**
  - U.S. and local clean jobs far surpass fossil fuel employment
  - EBCE's mandate for local jobs supported

FAQs, Continued

- **Why not just wait for the state to do this?**
  - Berkeley on tap to build 5,000 more units in the next 5 years
  - Our efforts will help spawn an industry/bring down costs
  - We are going to have to do this soon anyway
  - The U.S. is one of the biggest emitters in the world

FAQs, Continued

Will I have to give up my gas stove? Isn't gas cooking better?

- No! The ordinance applies only to new buildings
- Julia Child, Wolfgang Puck, other famous chefs don't think so!

Do people know how to build these buildings?

- They are being built all over the world, including here
- Local developers are already making the switch
- We are providing resources:
  - Position in Planning
  - Connecting residents to contractors
  - All Electric Multi Family and Commercial Construction Guides, Induction Cooking Factsheet

All Electric Commercial Buildings

Current examples

June 12, 2019

STET SANBORN
AIA NCARB CPHC LEED AP
Principal | Engineering Discipline Lead

SmithGroup
301 Battery Street, 7th Floor
San Francisco, CA 94111
T 415.343.2032
stet.sanborn@smithgroup.com

ehdd
SMITHGROUP

ALL ELECTRIC COMMERCIAL BUILDINGS

K-12 Schools **Higher Ed** **Civic / Office** **Complex Labs**

Jess Jackson Sustainable Winery Building: Siegel & Strain Architects + Guttman & Bleavoet Engineers

SMITHGROUP

29 all-electric restaurants at LAX's International Terminal feed 10 million people

California Universities Are Transitioning to All-Electric Buildings

The University of California system and Stanford University are making all-electric buildings the default in new construction.

JUSTIN GERDES | SEPTEMBER 24, 2018

"No new UC buildings or major renovations after June 2019, except in special circumstances, will use on-site fossil fuel combustion, such as natural gas, for space and water heating"

https://www.greentechmedia.com/articles/read/california-universities-are-transitioning-to-all-electric-buildings#gs.QUr5W_E

ehdd.

UC Santa Cruz Student Housing West

750,000 sf, 3,000 beds, under construction

P3, Capstone is Developer, Sundt is GC, HED Architects, Interface Engineering
Central Heat Pump Water Heating

ehdd.

Casa Adelante, 2060 Folsom, San Francisco

127 Units, under construction

Mithun:
"We have found first costs to be neutral for all electric construction"

Developers: TNDC/CCDC, Architect: Mithun & YA Studio, Association for Energy Affordability
Central Heat Pump Water Heating

ehdd.

Kaiser Santa Rosa Medical Office

87,300 SF Medical Office

LEED Platinum, ZNE

Hawley Peterson & Sydney, Integral Group

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SFO Admin

San Francisco

SF, Office

Cavagnero

ehdd.

Cascade Apartments, Seattle

230 Units, 44 floors. At 95% Construction Docs.

Developer is Vulcan, Ankrom Mosian Architects,
Engineering by Ecotope

ehdd.

Other Berkeley Building Decarbonization Efforts

- **Joint cost-effectiveness study** with a number of other cities to develop reach codes
  - Cannot apply to appliances like stoves
- **Streamline/reduce cost of green retrofits**
- Enhance Building Energy Savings Ordinance (BESO)
- Consider **rebates on transfer tax** for energy savings