MORTON STREET, CORNER OF BEDFORD, LOOKING TOWARD BLEECKER STREET, MARCH 17, 1903.
Turn of the century change
New York 1930s

Downtown Palo Alto in the mid-1930's
The Industrial Revolution

- 13-fold increases in GDP/capita in 200 years, after only doubling in 2000 years
- 200,000 kcal of energy per capita up from less than 2000 kcal
- Shift from wood to coal and then oil/gas and electricity as primary fuel
- Transport costs dropped from 25 cents/ton-mile to 0.88 cents
- NY to Chicago time dropped from 6 weeks to 2 days
- Life expectancy more than doubled
- 3 elements to over 20 in common usage
- Light affordable: from several days of labor per hour of light to seconds – added 4-5 hours of useful time to everyone’s typical day
- Books affordable: over a year of wages per book, down to a few days
We have seen this step change in labor productivity, but not yet in energy or resources.
Discontinuity today: 100x more people, 10x more income, 10x faster

GDP per capita in 1990 US dollars purchasing power parity

- $7,500
- $6,000
- $4,500
- $3,000
- $1,500
- $0

Year
- 1600
- 1700
- 1800
- 1900
- 2000
- 2100

Size of bubble = population
- 100 million
- 1 billion

- UK
- USA
- Germany
- Japan
- South Korea
- China
- India
Concurrent supply challenge: Reserves are getting more expensive to extract and lower grade

Costs
2005 U.S. dollars

Indexed units
$1,500
$1,000
$500
$0

1960
2011

Energy
Labor

+5% p.a.

Grades
Average Australian Grade Indexed 100

-11% p.a.

1844
2010

% Copper
% Lead

g/t Silver

g/t Gold

% Lead
A hundred year 1% annual commodity price benefit has reversed

1 Based on arithmetic average of 4 commodity sub-indices of food (coffee, cocoa, tea, rice, wheat, maize, sugar, beef, lamb, bananas and palm oil), agricultural raw materials (cotton, jute, wool, hides, tobacco, rubber and timber), metals (steel, aluminium, tin, copper, silver, lead and zinc), and energy (oil, coal, and gas) with each sub-index weighted by total world export volumes 1999-2001 at indexed prices over the same time period in real terms – note that gas prices are only available since 1922 and are therefore excluded from the index before this timeframe.

2 2011 prices based on average of first four months of 2011.

SOURCE: Grilli and Yang, 1988; Pfaffenzeller et al, 2007; World Bank Commodity Price Data; IMF primary commodity prices; OECD statistics; FAOStat; UN Comtrade; MGI Analysis.
Our diet changed, and with it the resources required.

<table>
<thead>
<tr>
<th></th>
<th>Land required m² per kg</th>
<th>Water required m³ per kg</th>
<th>Energy required Oil barrels per kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomato</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farmed fish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poultry meat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beef</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The entire western half of the US is impacted.

July 25, 2013

SOURCE: USDA; National Drought Mitigation Center; NOAA; Department of Commerce
The high degree of linkages among resources means strong demand for one can spread to others.
Most commodities have begun to show significant correlation with oil prices.

<table>
<thead>
<tr>
<th></th>
<th>Correlation with oil prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>-0.01</td>
</tr>
<tr>
<td>Wheat</td>
<td>-0.07</td>
</tr>
<tr>
<td>Rice</td>
<td>0.32</td>
</tr>
<tr>
<td>Beef</td>
<td>-0.11</td>
</tr>
<tr>
<td>Steel</td>
<td>-0.01</td>
</tr>
<tr>
<td>Timber</td>
<td>-0.52</td>
</tr>
</tbody>
</table>

SOURCE: McKinsey analysis
Success in the Resource Revolution requires a new management toolkit

- Reduce Waste
- Substitute
- Circularity
- Optimize
- Virtualize
1. Energy: We have seen complete generation shifts every half century

We waste more energy than we use – and we got worse since 1970

11% Increase in losses since 1970

Sources: Lawrence Livermore National Labs
Enough to power the UK for 7 Years

The amount of energy \textit{wasted} by the US economy in 2012...

...could power the United Kingdom for 7 years
Why was grid parity a surprise?
Those who said “solar is too expensive” were once right, but no longer are – the entire picture has changed in less than 5 years

Source: EIA, CIA, World Bank, AllianceBernstein
Taking learning into account is critical
China isn’t going to build a coal plant a week for 30 years
Emissions Peak as Countries Prosper

Sulfur dioxide emissions since 1850
Gg SO₂

1840 1860 1880 1900 1920 1940 1960 1980 2000 2020

China
USA & Canada
Western Europe

SOURCE: S. J. Smith et al.: Anthropogenic sulfur dioxide emissions: 1850-2005
We can decouple GHG from energy use, energy services, and GDP.
Global Power Generation Capacity Additions Have Already Shifted
2010 – 2030 (GW)

Fossil fuel and nuclear
- Nuclear
- Oil
- Gas
- Coal

Renewables, excl. Hydro
- Hydro
- Wind

Forecast

- Since 2000 US has built: 249GW gas, 57GW wind, 18GW coal, 10GW solar
- DTE lowered rates by 6.5% in 2014 citing wind
- MISO forecasting -1% load for next decade due to LED, efficient HVAC, and solar

SOURCE: Bloomberg New Energy Finance
Even beyond solar, utilities are facing the perfect storm

1. Energy efficiency
   - Heat reflective windows/films
   - LEDs and lighting controls
   - Energy service companies
   - Advanced HVAC
   - High efficiency devices (CFLs….)
   - Architectural upgrades

2. Demand response
   - Dynamic pricing (with and without enabling technology)
   - Direct load control
   - Interruptible tariffs
   - Other demand response programs (capacity bidding, demand aggregation)

3. Electric vehicles
   - Battery Electric Vehicles (BEV)
   - Plug in Hybrid Electric Vehicles (PHEV)
   - Related applications
     - Home and public charging
     - Vehicle to grid (V2G) storage

4. Distributed generation and storage
   - Solar PV and wind
   - Combined heat and power (CHP)
   - Virtual generation
   - Stationary storage (e.g., batteries, compressed air)

Examples

- Heat reflective windows/films
- LEDs and lighting controls
- Energy service companies
- Advanced HVAC
- High efficiency devices (CFLs….)
- Architectural upgrades

Change vs. EIA AEO forecast 2020, %

- High case: -6, -3
- Base case: -6, -3

Note: EIA reference assumes 1.07% CAGR in R+C demand resulting from continuation of secular trends in EE, low EV penetration (0.89% of new car sales by 2020), and an increase of 90 TWh for distributed generation

SOURCE: EIA AEO, 2008, 2010
Another hit from substitution: Making light affordable

**Total lighting output by source**\(^1\) (teralumen-hours per year)

<table>
<thead>
<tr>
<th>Source</th>
<th>Teralumen-hours</th>
<th>Average time/power cost per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tallow candle</td>
<td>6 hours</td>
<td>$0.01</td>
</tr>
<tr>
<td>Sesame oil lamp</td>
<td>50 hours</td>
<td>$0.1</td>
</tr>
<tr>
<td>Kerosene lamp</td>
<td>15 minutes</td>
<td>$1</td>
</tr>
<tr>
<td>Compact fluorescent bulb</td>
<td>0.5 seconds</td>
<td>$10</td>
</tr>
<tr>
<td>LED light</td>
<td>0.07 seconds</td>
<td>$100</td>
</tr>
<tr>
<td>Incandescent light bulb</td>
<td>8 seconds</td>
<td>$1000</td>
</tr>
<tr>
<td>Gas</td>
<td></td>
<td>$1000</td>
</tr>
<tr>
<td>Electricity</td>
<td></td>
<td>$1000</td>
</tr>
</tbody>
</table>

\(^1\) Based on United Kingdom data.
Grid storage is coming rapidly
4D: Restructuring the utility industry

- **Digital network**: 10^6 more information intensive
- **Disruptive**
  - Moving into transport with electric vehicles
  - GaN and SiC power electronics
  - GaN and SiC digital transformers
- **Distributed resources**
  - Grid automation
  - Solar becomes ubiquitous part of design
  - Storage for load leveling and T&D services
- **Dispatched demand**
  - Matching supply and demand resources in real time to keep market balanced
  - Declining kWh requirements
  - Levelized load

**Grid of Things**

- Matching supply and demand resources in real time to keep market balanced
- Digital network
- Disruptive
- Distributed resources
- Dispatched demand
The Tipping Point is Here
2. Transport
2. Transport: Oil Company View of Automotive Tipping Point

Light-duty fleet by type

Million cars

- Electric/plug-in
- Full hybrid
- CNG and LPG
- Conventional diesel
- Conventional gasoline

Year: 2010, 2015, 2020, 2025, 2030, 2035, 2040
But they too will be surprised….just like utilities
Even in mature industries, much structural waste remains

Energy flow through a combustion engine
- Energy used to move the person
- Rolling resistance
- Aerodynamics
- Auxiliary power
- Transmission losses
- Inertia
- Engine losses
- Idling

86% of fuel never reaches the wheels

Deaths per year from transport
- More than 33,000 in US
- $300B annually in cost
- >95% Caused by human error

An American road reaches peak throughput only 5% of the time...
...and even then, it is only 10% covered with cars

The typical American car spends 96% of its time parked

0.8% looking for parking
0.5% sitting in congestion
2.6% driving

Inertia
Auxiliary power
Transmission losses
Idling

Energy used to move the person
Rolling resistance
Aerodynamics
ACES: from 67 cents/mile today to 10 cents/mile and universal access

**Connected**
- Autonomous maintenance & charging
- Auto route
- Match open trips & 2 minute service
- Reroute around congestion
- Time & route shift
- Transit schedule integration
- Extend range
- No up front cost for batteries
- Use only size car you need

**Electrified**
- 1% to 85% efficiency
- 60% usage (4% avg/15% peak historically)

**Autonomous**
- 90% accident reduction

**Shared**
- 35
US car use and fuel efficiency

Fuel efficiency (miles/gallon)

Annual vehicle-distance travelled (1,000 miles per person)

Note: Mpg figures are sales weighted average. Total vehicle miles grew at 2.7% CAGR between 1971 and 2007

SOURCE: US DOT, University of Michigan Transportation Research Institute, Bloomberg New Energy Finance
Drivers of Reduced US Oil Imports, 2004-2013
(As % of domestic consumption)

- Miles driven & improved gas mileage reduced imports by 18% of consumption
- Increased production reduced imports by 10% of consumption

Note: Percentages do not add due to rounding errors

SOURCE: EIA, UMTRI, Bloomberg New Energy Finance
Electric Ship – USS Gerald Ford
3. Buildings
China is building the equivalent of 100 New Yorks

**Chinese building stock growth**
New York City floor space equivalents added

**2020 projections**
- 350 million in additional urban population
- 221 total cities with populations of more than 1 million
- 170 new mass transit systems
Not all cities are created equal

**Impact of urban form and transport infrastructure on CO₂ emissions: Atlanta vs Barcelona**

<table>
<thead>
<tr>
<th>ATLANTA</th>
<th>BARCELONA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlanta's built-up area</td>
<td>Barcelona's built-up area</td>
</tr>
<tr>
<td>Population: 5.25 million</td>
<td>Population: 5.33 million</td>
</tr>
<tr>
<td>Urban area: 4.280 km²</td>
<td>Urban area: 162 km²</td>
</tr>
<tr>
<td>Carbon emissions: 7.5 tonnes CO₂ per hectare per annum from public and private transport</td>
<td>Carbon emissions: 0.7 tonnes CO₂ per hectare per annum from public and private transport</td>
</tr>
</tbody>
</table>

Source: Bertaud and Richardson, 2004
Cement consumption declines with wealth

Source: Global Insight; ICR
Modular building techniques employed by the Chinese developer Broad Sustainable Building

**Modular building can save 30-80% of energy and materials**

**Some assembly required**
Each module is lifted by crane directly to the top of the building and connected.

**High-speed construction**
- 838 meters
- 3 months
- 2 months
- 1 month
- 2 weeks
- 1 week

**Floor/ceiling modules**
The floors of the skyscraper are built in sections at the factory.

**Columns**
Flooring is preinstalled.

**Pipes and ducts**
- Threading through each floor module in the factory.
- Vertical exhaust pipes
- Box of bolts
- Wall panels
Circularity – Broad Sustainable Building
PRIME: Advanced Buildings with Net Zero Energy at 0-5% premium

Moving from R2 to R30

**Efficient**
- More useable space
- Faster to build
- Easier to configure

**Modular**
- Advanced HVAC
- Solar plus storage
- LEDs plus wifi makes DSM

**Productive**
- 50-90% less on lighting
- 30-50% less on heating/air conditioning
- Higher rents
- Higher output

**Integrated**
- Better lighting; comfort; security
- More functional/more flexible
- 30% Lower cost to build
- Selling energy and capacity to the grid
4. Manufacturing
4. Manufacturing: We consume 86 tons per person per year

Total materials consumption in America (annual metric tons per capita)

- Purchased and used directly by consumer
- Used upstream in supply chain

- Nonrenewable organic material (e.g., fossil fuels)
  - Metals and minerals (e.g., steel, copper, cement)
    - Shared infrastructure (e.g., highway construction)
  - Agriculture (e.g., feedstocks, food)
  - Forestry (e.g., paper products, construction timber)

Total material requirement: 86
Our materials dependency has become more complex

Elements widely used in energy pathways
And we are increasingly drawing on rare materials
Substitutions inspired by Nature
Process substitutions

- Concentration of gold in electronics is 20x more than the best mine in South Africa
- Recycling, refurbishing, and reusing electronics could yield up to USD 130 billion in value per year by 2030
Many components in the power train turn into software

### Component markets, CAGR 2010 - 30, percent

<table>
<thead>
<tr>
<th>Components</th>
<th>Europe</th>
<th>North America</th>
<th>Japan</th>
<th>China, India</th>
<th>RoW</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission</td>
<td>-2</td>
<td>-4</td>
<td>-7</td>
<td>2</td>
<td>3</td>
<td>-1</td>
</tr>
<tr>
<td>Turbo charger</td>
<td>-1</td>
<td>-2</td>
<td>-6</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Injection sys.</td>
<td>-3</td>
<td>-4</td>
<td>-7</td>
<td>1</td>
<td>3</td>
<td>-1</td>
</tr>
<tr>
<td>Cylinder head</td>
<td>-2</td>
<td>-2</td>
<td>-6</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Brakes/recup.</td>
<td>1</td>
<td>0</td>
<td>-3</td>
<td>6</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Battery</td>
<td>37</td>
<td>26</td>
<td>13</td>
<td>52</td>
<td>45</td>
<td>29</td>
</tr>
<tr>
<td>E-motor</td>
<td>36</td>
<td>24</td>
<td>13</td>
<td>48</td>
<td>42</td>
<td>28</td>
</tr>
<tr>
<td>Power electr.</td>
<td>31</td>
<td>19</td>
<td>9</td>
<td>42</td>
<td>37</td>
<td>23</td>
</tr>
<tr>
<td>Thermal mgt.</td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>12</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

**Total**

<table>
<thead>
<tr>
<th>Europe</th>
<th>North America</th>
<th>Japan</th>
<th>China, India</th>
<th>RoW</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>6</td>
<td>3</td>
<td>12</td>
<td>9</td>
<td>38</td>
</tr>
</tbody>
</table>

**SOURCE:** McKinsey
Virtualize in business to business: 3D printed molds, turbine blades, online/remote service, predictive analytics
## Elance: service at lower price

<table>
<thead>
<tr>
<th>Service</th>
<th>Before Elance</th>
<th>Bid Selected</th>
<th># bids</th>
<th>Countries</th>
<th>Description of final freelancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web site</td>
<td>$21,000</td>
<td>$4,200</td>
<td>33</td>
<td>7 countries across four regions</td>
<td>Group of 3 based in India with over 10 years design and dev experience</td>
</tr>
<tr>
<td>Lawyer</td>
<td>$3,000</td>
<td>$1,100</td>
<td>14</td>
<td>2 countries across two regions</td>
<td>Lawyer based in San Diego with impressive academic credentials</td>
</tr>
<tr>
<td>Video</td>
<td>$3,500</td>
<td>$560</td>
<td>42</td>
<td>13 countries across six regions</td>
<td>Producer in US who has previously produced ~100 whiteboard videos including one for Verizon</td>
</tr>
<tr>
<td>Voice over</td>
<td>$200</td>
<td>$40</td>
<td>N/A</td>
<td>1 country</td>
<td>Professional voice over artist and singer based in Texas</td>
</tr>
</tbody>
</table>

**Bid Statistics**

- **Web site**
  - # bids: 33
  - Countries: 7 countries across four regions
- **Lawyer**
  - # bids: 14
  - Countries: 2 countries across two regions
- **Video**
  - # bids: 42
  - Countries: 13 countries across six regions
- **Voice over**
  - # bids: N/A
  - Countries: 1 country
5. Implications
What does the goal look like?

**Convenient and backwards compatible**
- Works with existing infrastructure
- Complementary with other products
- Easy to use (no or minimal learning required)
- Looks, smells, feels familiar

**Greener**
- Consumes less energy (or water) in use
- Less material or new eco material
- No or less waste or biodegradable
- Less packaging or transport
- Emits less CO₂

**Cheaper**
- Cheaper to produce
- Better Total Cost of Ownership
- Turn product into service (boosting utilization)
- Lower supply chain costs
- No disposal costs

**Surprisingly better**
- Quieter (EcoRock, EVs)
- More comfortable (new HVAC that adjust humidity)
- Safer, faster, stronger
- No hunt for parking or HOV access
- Solar power in remote locations
- Convenient automation

**Scalable**
- Underlying potential
- Supply chain ready
- Business model for scale
- Champions

SOURCE: McKinsey
For Governments: A step change improvement in resource productivity to sustain GDP growth

<table>
<thead>
<tr>
<th>Category</th>
<th>Actual (1990-2010)</th>
<th>Required to meet global demand as middle class grows (2010-2030)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (GDP/ BTU)</td>
<td>1.7</td>
<td>3.2</td>
</tr>
<tr>
<td>Materials (GPD/tonnes)</td>
<td>0.8</td>
<td>1.3</td>
</tr>
<tr>
<td>Water (GDP/m3)</td>
<td>2.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Food/feed (yield/hectare)</td>
<td>1.4</td>
<td>1.5</td>
</tr>
<tr>
<td>Greenhouse gases (GDP/tCO2e)</td>
<td>1.3</td>
<td>5.3</td>
</tr>
</tbody>
</table>
As citizens you can vote to create a level playing field

Subsidies for key resources\(^1\), $b

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ OECD estimates agricultural subsidies to be around $368 in 2009(^1)</td>
<td>395</td>
</tr>
<tr>
<td>▪ Subsidies to fisheries of £27b according to UNEP</td>
<td></td>
</tr>
<tr>
<td>▪ IEA June 2010 report estimated energy subsidies to be $312b</td>
<td>300-550</td>
</tr>
<tr>
<td>▪ Iran was identified as having the highest subsidies at about $101bn in 2008</td>
<td></td>
</tr>
<tr>
<td>▪ OECD estimates that water costs covered by tariffs vary widely between countries (e.g., Egypt 10%, Korea 40%, France 95%) – globally 40-60%</td>
<td>200–300</td>
</tr>
<tr>
<td>▪ Market value estimated by GWI to be around $500b</td>
<td></td>
</tr>
</tbody>
</table>

**Direct subsidies**

- Based on 2005 emissions of 45.9 GtCO2e and a carbon price ranging from $20–30
  - $900–1,300

- The Economics of Ecosystems and Biodiversity (TEEB) estimates the annual loss of biodiversity loss and ecosystem degradation at $2-4.5 trillion in 2008
  - $2,000–6,600

- Trucost estimates the annual figure to be $6.6tn (2008)
  - $2,900–8,000

**Implicit subsidies**

- $2,900–8,000

**Total subsidies**

- $3,800–9,300

---

1 Excludes other subsidies such as those related to land use

SOURCE: OECD; IEA; UNEP; GWI; The Economics of Ecosystems and Biodiversity (TEEB; Trucost; McKinsey analysis
Households: Less is more = more cash for the middle class

Savings on necessities...

- **Transport spend**
  - $7K / year
  - **75% saved**
  - EV: lower fuel & maintenance
  - Autonomous vehicles increase utilization, safety

- **Food spend**
  - $6.5K / year
  - 20% saved
  - Alternative proteins
  - Efficient ops, reduced waste
  - Local farming

- **Home spend**
  - $17 K / year
  - 37% saved
  - Shift to services
  - Increase efficiency of construction and home appliances
  - Reduce footprint

...Adds to household disposable income

- Average total spend
  - $50K / year

- 37% saved
- 20% saved
- 75% saved
- 30% additional income
- ~$15K / year
Investors: Less is more = drastic portfolio shift

<table>
<thead>
<tr>
<th>New Risks</th>
<th>New Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport</td>
<td>• Batteries, EVs, sensors</td>
</tr>
<tr>
<td>Energy</td>
<td>• Renewables learning curve</td>
</tr>
<tr>
<td>Structures</td>
<td>• Reuse, modularity</td>
</tr>
<tr>
<td>Fuels</td>
<td>• Shale Gas productivity</td>
</tr>
<tr>
<td>Industrial</td>
<td>• Variable speed drives, analytics</td>
</tr>
<tr>
<td>Utilities</td>
<td>• Demand management</td>
</tr>
<tr>
<td>Food</td>
<td>• Organics, plant productivity</td>
</tr>
<tr>
<td>Water</td>
<td>• Water treatment, embedded water</td>
</tr>
<tr>
<td>Materials</td>
<td>• Design, circularity, 3D printing</td>
</tr>
<tr>
<td>Services</td>
<td>• Online remote</td>
</tr>
<tr>
<td></td>
<td>• Combustion</td>
</tr>
<tr>
<td></td>
<td>• Coal</td>
</tr>
<tr>
<td></td>
<td>• Cement and iron</td>
</tr>
<tr>
<td></td>
<td>• Marginal oil</td>
</tr>
<tr>
<td></td>
<td>• Brakes, repair trucks</td>
</tr>
<tr>
<td></td>
<td>• Generation</td>
</tr>
<tr>
<td></td>
<td>• China contamination</td>
</tr>
<tr>
<td></td>
<td>• Shortages</td>
</tr>
<tr>
<td></td>
<td>• Machining</td>
</tr>
<tr>
<td></td>
<td>• Large firms</td>
</tr>
</tbody>
</table>
As consumers your choices make a real difference

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Shifting just 20% of global calorie consumption in 2010 to farmed fish from meat would save about <strong>60 to 80 million hectares of cropland</strong> (2 to 3 times the landmass of the UK)</td>
</tr>
<tr>
<td>▪ Reducing 30-50% food waste at the point of consumption in developed countries by 30% could save roughly <strong>40 million hectares of cropland</strong></td>
</tr>
<tr>
<td>▪ Moving the temperature at which heating and air conditioners are used by two degrees could reduce heating, ventilation, and air conditioner use by <strong>12%</strong></td>
</tr>
<tr>
<td>▪ Living in NY is three times more energy efficient than Kansas</td>
</tr>
<tr>
<td>▪ Smaller cars, more efficient driving, ride-sharing and avoiding trips would reduce fuel consumption for light duty vehicles could reduce fuel demand by roughly <strong>40%</strong> in 2030 – pick your future home and job carefully!</td>
</tr>
</tbody>
</table>

SOURCE: McKinsey analysis
Thank you!

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