Greater Philadelphia Futures Group

Background
September 17, 2014
Can you imagine doing this alone? Me either.
“This just isn’t doing it for me. Could we go back to using the crystal ball?”
"Oh, if only it were so simple."
DRIVING FORCES

Driving Forces
- Social
- Technological
- Economic
- Environmental
- Political

Economy

Transportation

Environment

Land Use
www.dvrpc.org/choicesandvoices
NEXT MEETINGS

☐ October
  ☐ Wednesday, 10/15 or
  ☐ Tuesday, 10/21

☐ December
  ☐ Thursday, 12/4 or
  ☐ Wednesday, 12/10
Greater Philadelphia Futures Group

Barry Seymour
9 – 17 - 2014
“We are called to be architects of the future, not its victims.”

- R. Buckminster Fuller
Previous Planning Scenarios

Transportation Investments

Land Use Development

“What-If” Drivers
Forecasting

“The best thing about the future is that it comes one day at a time.”
- Abraham Lincoln
HIT: 1993 Population Forecast
HIT: 1993 Population Forecast

2013 Population
5,688,000
MISS: Highway Network Vision Circa 1960s
3 Key Factors for Successfully Predicting the Future

1) Some basic training in probabilistic reasoning is useful

- Comparisons are important as a starting point
- Historical trends can help
- Average the opinions of different experts
- Mathematical models should be taken into account
- Predictable biases exist and can be allowed for

Source: The Good Judgment Project
3 Key Factors for Successfully Predicting the Future

1) Some basic training in probabilistic reasoning is useful

2) Actively open-minded people make better forecasters

3) Teams of good forecasters produce better results than individuals

Source: The Good Judgment Project
“Never make Predictions, especially about the Future.”

- Casey Stengel
Global and US Economic Trends that Will Affect the Greater Philadelphia Region

Greater Philadelphia Futures Group
September 17, 2014

Phil Hopkins
IHS Economics
Asia-Pacific (excluding Japan) and Sub-Saharan Africa will achieve the fastest growth in real GDP

Real GDP

Annual percent change

-1 0 1 2 3 4 5 6 7

NAFTA Other Americas Western Europe Emerging Europe Mideast-N. Africa Sub-Saharan Africa Japan Other Asia-Pacific

2012 2013 2014 2015 2016-20
Global GDP Shares

Levels of Real GDP by Country and Region

Real GDP in Billions of 2010 US dollars

- US
- BRIC (Brazil, Russia, India, China)
- European Union
- Japan
- South America
- Rest of World


GDP shares and real GDP levels over time.
Global Outlook

• Real Global GDP Growth (in US$) is forecast at:
  – 2.8% in 2014
  – 3.4% in 2015
  – 3.7% in 2016; averaging 3.7% thereafter
• Among developed countries the US is leading the way, Europe and Japan are slowing or contracting
• In emerging markets China leads with some weakness, India is recovering, but Brazil and Russia are in trouble
• Global economic news is good, but not great
• Commodity prices steady, world oil prices gradually higher over the next 5 years
• Businesses are cautiously optimistic, investment slowly rising
• Geopolitical risks, especially in oil-producing countries remain a concern
• Macroeconomic policies, especially timing, are keys in US, Eurozone, and Japan
US Outlook

- 2014q3 growth remains strong, due to pickup in homebuilding, a drop in imports, and robust capital spending.
  - Rises 3.7% in 2014q3, 3% in 2014q4,

- Real GDP growth is projected to pick up in 2015 and 2016, led by strengthening private-sector investment.
  - 2.9% in 2015. 3.1% in 2016 & 2017

- Homebuilding will rise in 2014–16 as supply catches up with demand.
  - Starts to exceed million, high % of multi-family. Sales up.

- Consumers will cautiously increase spending due to gains in employment, personal income, and household wealth.

- Capital spending will accelerate in 2014–15 in response to global market growth, replacement needs, and technological advances.
  - Real business fixed investment will increase 5–6% annually.


- Interest rates will rise through mid-2017.

- Inflation will stay relatively mild.
Growth Rates in Total Non-Farm Employment
Economic Forecasts – Average Annual Growth Rates

<table>
<thead>
<tr>
<th>Measure</th>
<th>2000 to 2014</th>
<th></th>
<th></th>
<th>2014 to 2019</th>
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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Phila. MSA</td>
<td>Trenton MSA</td>
<td>US</td>
<td>Phila. MSA</td>
<td>Trenton MSA</td>
<td>US</td>
</tr>
<tr>
<td>Real GDP/GRP</td>
<td>1.4%</td>
<td>2.6%</td>
<td>1.8%</td>
<td>2.5%</td>
<td>2.6%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Non-farm Employment</td>
<td>0.1%</td>
<td>1.1%</td>
<td>0.4%</td>
<td>1.2%</td>
<td>1.4%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Real Personal Income</td>
<td>1.6%</td>
<td>1.2%</td>
<td>1.9%</td>
<td>3.2%</td>
<td>3.2%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Population</td>
<td>0.4%</td>
<td>0.4%</td>
<td>0.9%</td>
<td>0.4%</td>
<td>0.5%</td>
<td>0.8%</td>
</tr>
</tbody>
</table>
Change in Economic Structure

Source: IHS Economics. 2014
Global Growth Factors Affecting GPR

- **Quality of Institutions** – government, non-profits
- **Hard connectivity and infrastructure**, including goods movement efficiency, digital infrastructure. Can we make the necessary investments?
- **Soft Connectivity and human capital**: health and primary education, training and higher education, digital infrastructure, entrepreneurial networks
- **Demographics** – aging population, slowing population & labor force growth and low LFPR
- **Rising inequality** – can we provide jobs for all?
- **Financing**, availability of capital

Global Growth Factors Affecting GPR (cont.)

- **Sustainable competitiveness**: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”
  - Energy, implications of global warming

- **Governance and the regulatory environment**: trend towards transparency, predictability, timeliness and reasonable cost

- **Indebtedness**: can governments afford to provide essential services and infrastructure? Student debt?

- **Technology and Innovation**: where will the next productivity enhancing technologies come from?

- **Attractiveness of urban areas**: with high qualities of life will continue
  - Decreasing reliance on autos

Thank you!

IHS
Greenworks Climate Initiatives

**MITIGATION**
- Energy-Efficient Capital Investments
- Energy Load Demand Management
- Greenworks Loan Fund
- GHG Working Group & Carbon Disclosure Project
- Greenhouse Gas Inventories
- Smart Meters
- Energy Efficiency Fund
- EnergySense and Smart Ideas
- Recycling
- Integrated Utility Bill Management System

**ADAPTATION**
- Green City, Clean Waters
- Rain Gardens
- Heat Alert System
- Heat Emergency Cooling Locations
- Heat Education Campaign
- Water Quality Standards
- Emergency Plans
- Percy Street Porous Pavement
- Stream Restoration
- Get Healthy Philly
- Resilient Infrastructure: South Street and 40th Street Bridge

**EnergyWorks**
- City Car Management Plan
- LED Traffic Lights
- LEED Legislation
- Greenworks Rebate Fund
- Weatherization Assistance Program
- Solar/PV Projects
- Green2015
- Cool Roofs Ordinance
- Plant One Million, TreePhilly
- Green Streets, Alleys, Roofs, Parking
- Air Management Services Smog Reduction Plan
- Anti-idling ordinance
- Reduce Vehicle Miles Traveled & Bicycle Commuting
- Hybrid Diesel Buses
Weather as a Driver of Energy Use

Citywide Building Energy Use (MMBTUs)

- **2006**: 3,952 MMBTUs with 1,289 hours of Cooling, 1,663 hours of Heating
- **2010**: 4,393 MMBTUs with 1,815 hours of Cooling, 2,578 hours of Heating
- **2011**: 4,153 MMBTUs with 1,617 hours of Cooling, 2,536 hours of Heating
- **2012**: 3,746 MMBTUs with 1,604 hours of Cooling, 2,142 hours of Heating
- **2013**: 4,473 MMBTUs with 1,411 hours of Cooling, 3,062 hours of Heating

- **Annual Citywide Energy Usage**
- **Hours Required Cooling**
- **Hours Required Heating**
Risk Reduction Measures

Federal, state, and local government

- Initial Risk
- Zoning
- Building Codes
- Risk Communication
- Emergency Management
- Infrastructure Upgrades
- Individual Action
- Insurance
- Residual Risk
Climate Projections: Observed (1961-2000)
Climate Projections: Near Term (2020-39)

- 2013 Climate Models, moderately low emissions (RCP4.5)
- 2013 Climate Models, moderately high emissions (RCP8.5)
- 2007 Climate Models, moderately low emissions (B1)
- 2007 Climate Models, moderately high emissions (A1)
- Near-term (2020-2039)
- Mid-century (2045-2065)
- End-of-Century (2081-2099)
Climate Projections: Mid-century (2045-65)

![Graph showing climate projections for average annual mean temperature and annual precipitation. The graph includes data from 2013 and 2007 climate models with low and high emissions scenarios. The observed data is indicated, with projections for near-term (2020-2039), mid-century (2045-2065), and end-of-century (2081-2099).]
Climate Projections: End-of-Century (2081-99)

Average Total Annual Precipitation (in) vs. Average Annual Mean Temperature (°F)

- 2013 Climate Models, moderately low emissions (RCP4.5)
- 2013 Climate Models, moderately high emissions (RCP8.5)
- 2007 Climate Models, moderately low emissions (B1)
- 2007 Climate Models, moderately high emissions (A1)
- Near-term (2020-2039)
- Mid-century (2045-2065)
- End-of-Century (2081-2099)
Climate Projections: Sea Level Rise

- High Estimate (90th percentile)
- Middle Range (75th percentile)
- Middle Range (25th percentile)
- Low Estimate (10th percentile)

Projected Sea Level Rise (inches) vs. Year

- Year: 2000 to 2090
- Sea Level Rise: 0 to 60 inches
Hurricane Surge Inundation Scenarios within the City of Philadelphia

Source:
Hurricane Surge Inundation areas for category 1 through 4 hurricanes arriving at high mean water. The hurricane surge elevation data used to define these areas was calculated by the National Hurricane Center using the Sea Lake and Overland Surge from Hurricanes (SLOSH) model. The SLOSH model hurricane surge elevations have an accuracy of +/- 26 percent. The hurricane surge inundation areas depict the inundation that can be expected to result from a worst-case combination of hurricane landfall location, forward speed, and direction for each hurricane category.

Neighborhood Boundaries - Philadelphia City Planning Commission
Regional Development Pattern

1930

3.3 MILLION PEOPLE
222,000 ACRES DEVELOPED

1970

5.1 MILLION PEOPLE
641,000 ACRES DEVELOPED

2010

5.6 MILLION PEOPLE
983,000 ACRES DEVELOPED
Forecasted Population Change, 2010-2040

People
- Loss of Population
- 1 - 1,500
- 1,501 - 4,000
- 4,001 - 10,000
- 10,001 or More
The Greying of the Region...

**2010**
- 65 years and older: 14%
- 45-64 years: 27%
- 25-44 years: 26%
- 20-24 years: 7%
- 0-4 years: 6%

**2040**
- 65 years and older: 19%
- 45-64 years: 25%
- 25-44 years: 25%
- 20-24 years: 6%
- 0-4 years: 6%

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Population Change, 2010-2040

- Total Population: 635,487
- 80 years and older: 152,915
- 65-79 years: 286,718
- 45-64 years: 32,124
- 25-44 years: 94,683
- 20-24 years: -13,255
- 5-19 years: 51,786
- 0-4 years: 30,516
Native versus Foreign Born Population Change, 2000-2010

<table>
<thead>
<tr>
<th>County</th>
<th>Native</th>
<th>Foreign Born</th>
<th>Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burlington County</td>
<td>12,013</td>
<td>15,929</td>
<td>27,942</td>
</tr>
<tr>
<td>Camden County</td>
<td>-14,017</td>
<td>18,624</td>
<td></td>
</tr>
<tr>
<td>Gloucester County</td>
<td></td>
<td>6,723</td>
<td>34,913</td>
</tr>
<tr>
<td>Mercer County</td>
<td>-8,365</td>
<td>25,907</td>
<td></td>
</tr>
<tr>
<td>Bucks County</td>
<td></td>
<td>13,264</td>
<td>29,418</td>
</tr>
<tr>
<td>Chester County</td>
<td></td>
<td>21,015</td>
<td>52,059</td>
</tr>
<tr>
<td>Delaware County</td>
<td>-5,465</td>
<td>15,699</td>
<td></td>
</tr>
<tr>
<td>Montgomery County</td>
<td></td>
<td>30,136</td>
<td>58,363</td>
</tr>
<tr>
<td>Philadelphia County</td>
<td></td>
<td>30,057</td>
<td>48,116</td>
</tr>
</tbody>
</table>
Percent Foreign-Born by County, 2011

- Mercer County, NJ: 20%
- Philadelphia County, PA: 12%
- Camden County, NJ: 10%
- Burlington County, NJ: 10%
- Montgomery County, PA: 10%
- Delaware County, PA: 9%
- Chester County, PA: 8%
- Bucks County, PA: 8%
- Gloucester County, NJ: 5%
Figure 2: Percent Foreign-Born Population

Legend:
- 0% to 5%
- 5.1% to 10%
- 10.1% to 15%
- 15.1% to 25%
- 25.1% or More

Source: US Census Bureau 2007-2011 American Community Survey Five-Year Estimates

September 2013

Delaware Valley Regional Planning Commission (DVRPC)
Countries of Origin

- Europe, 20%
- Central America, 14%
- Caribbean, 11%
- South America, 8%
- Africa, 6%
- North America, 2%
- Asia, 39%

- Eastern Asia (China, Korea), 11%
- Southeastern Asia (Philippines, Vietnam), 9%
- South Central Asia (India), 17%
- Western Asia (Israel, Lebanon, Turkey), 2%
Poverty by Census Tract, 2012

Legend
DVRPC Census Tracts
- 0.00 - 3.20%
- 3.20 - 6.00%
- 6.00 - 10.50%
- 10.50 - 22.54%
- 22.54 - 99.00%
Change in Poverty, 2000-2012

Legend
DVRPC Census Tracts
-44.32 - -1.54%
-1.54 - 0.00%
0.00 - 2.41%
2.41 - 5.85%
5.85 - 94.80%
Commuter Rail
Bus Routes
Thank You!
Questions? Comments?

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2004: No teams’ autonomous vehicles completed 150-mile challenge

2005: Six teams completed the challenge (including teams from Stanford, CMU, Upenn, and MIT)
Existing Technology
When will technologies be market-ready?
Primary Impacts: Safety
Primary Impacts: Congestion and VMT?
Primary Impacts: Urban Form?
Primary Impacts: Shared Vehicles?
Areas allowing testing of autonomous vehicles:

- California
- Nevada
- Florida
- Washington, DC

California DMV says Google’s autonomous car tests need a steering wheel
State isn't ready to approve Google's cars without a backup control system.

by Ron Amadeo - Aug 21 2014, 2:40pm EDT
• Technology is here (but expensive)
• Prices are likely to fall
• Mass-marketing likely within the next 20 years
• Legislation is likely to support (particularly due to safety)
• Direct impacts on safety and road capacity
• Uncertain impacts on VMT, congestion, and urban form