

DON'T LET GROWTH STOP US



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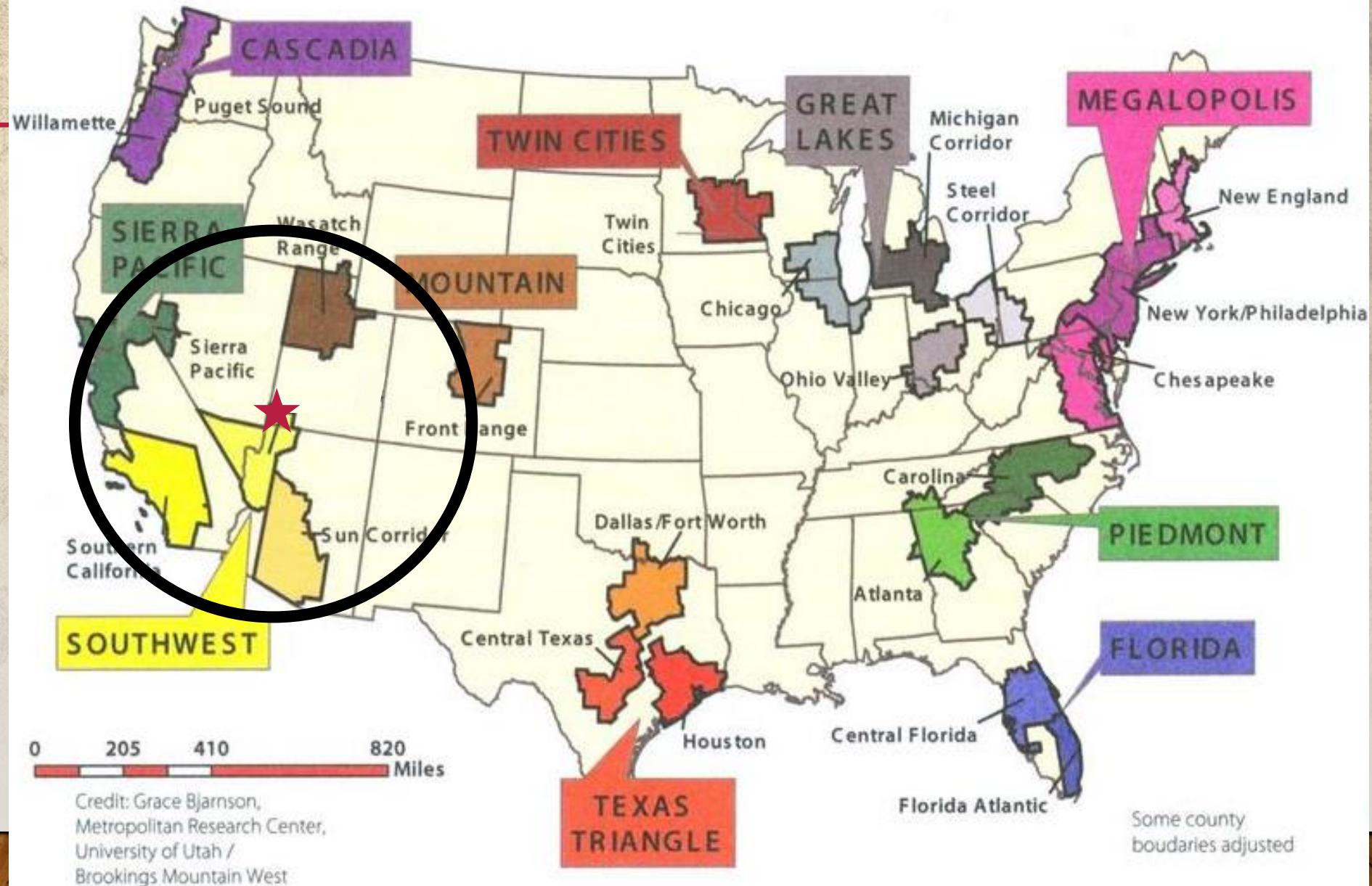


OUTLINE

- Growth Trends → **Big Picture**
- What About **Water**?
- What About **Power**?
- **Demographic** Drill Down
- Providing **Moderate** Income Housing
- The Missing **Middle** Housing Option
- Opportunities to **remake** the metropolitan area
- **Don't** let growth stop us



Megapolitan America/48 States



MEGAPOLITAN AMERICA

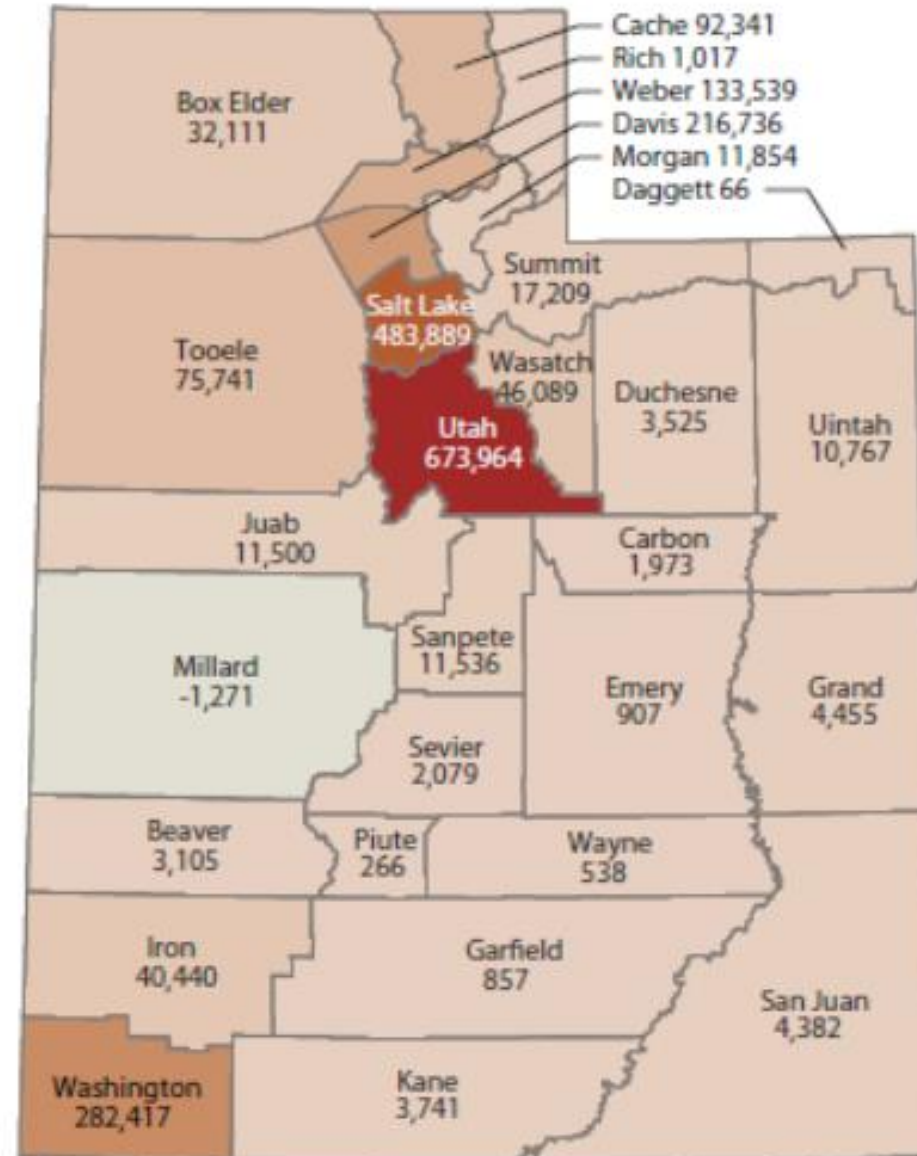
A New Vision for Understanding America's Metropolitan Geography

Arthur C. Nelson
Robert E. Lang

THE BIG PICTURE

#1 for growth rate
#3 for total growth

Figure 8: Utah Projected County Population Change, 2020 to 2060



Source: Kern C. Gardner Policy Institute, 2020-2060 Projections

WHAT ABOUT WATER?

- “Manage the downside; the upside will take care of itself.”
—Donald Trump
- “Don’t put all your eggs in one basket.”
—Proverb
- “Be prepared.”
—Boy Scout motto

HOW DO WE COMPARE?

Feature	Albuquerque	Colorado Springs	Tucson	Salt Lake City	Las Vegas Metro	Washington County
Calculation Year	2015	2016	2017	2017	2017	2017
Service Population	658,238	480,185	750,000	326,544	2,262,962	164,543
Ave. System Demand (MGD)*	87.5	78.6	89.3	61.1	455.0	48.8
Ave. Daily Gallons/Person**	133	164	119	187	201	297
Updated 2019***						271

Source: Adapted from Washington County Water Conservancy District, Water Conservation Programs: A Comparative Evaluation, Maddaus Water Management, Inc. (Dec. 17, 2018)

Note: Calculation year includes extrapolating population in base year to water demand in target year using proportionalities from the census.

*Assumed to include all residential, commercial, institutional and industrial demand.

Total system. **Raw numbers don't tell the whole story. See <https://lpputah.org/wp-content/uploads/2022/07/LPP-FactSheet-Water-Use-6.28.2022-revised.pdf>

***Updated 2019 figures from <https://lpputah.org/water-use/>

WATER CONSERVATION

Washington County Leads Utah in Water Conservation

As the hottest, most arid county in Utah, water conservation is essential to Washington County's future. The Washington County Water Conservancy District (WCWCD) and its municipal partners have invested \$70 million in recent water conservation efforts. Washington County reduced its per capita water use from 2000-2020 by 30%, during which time the population doubled. Washington County was the first county in Utah to implement a water conservation plan and meet the governor's statewide water conservation goal. Washington County is home to the state's most water-efficient landscapes, which have half the amount of irrigated area and grass compared to landscapes in northern Utah.^{1,2}

Today Washington County uses less than 50,000 acre-feet of potable water a year to support nearly 200,000 permanent residents, more than 15,000 second home owners and more than 6 million visitors per year.

WCWCD's water conservation program was audited by a third-party nationally recognized water conservation expert, Maddaus Water Management. Maddaus concluded that the WCWCD conservation program is "on par with other notable programs in the western US and exceeds those of other entities of a similar size and customer base." The WCWCD Water Conservation Programs: A Comparative Evaluation compared the district's conservation program to that of 10 other similarly situated western water agencies with vigorous conservation programs.

Maddaus concluded that WCWCD's program budget, spending and staffing efforts equal or exceed those of several other similarly situated water agencies.

Washington County's conservation, rebate and education programs include: ³

Existing

- Advanced metering infrastructure
- Real water loss reduction
- Tiered water conservation rate
- Weather-based irrigation controller rebates
- Irrigation equipment rebates
- Efficient outdoor watering education
- Outdoor water audit
- Tree coupon
- Public and school education
- High-efficiency fixture giveaway
- Commercial washing machine rebate
- Commercial toilet and urinal rebate

New

- Landscape conversion (grass removal) rebate
- New development standards
- Hot water on demand rebate
- Residential landscape design consultations
- Leak devices/flow sensor rebate
- Water audits for hotels/motels
- Customized incentive program for high water users

¹ 2018 Governor's Office of Management and Budget 2018 study

² Utah's Regional M&I Water Conservation Goals, August 2019

³ Water in Washington County Conservation's Essential Role in Meeting Current and Future Needs, 2022

AGRICULTURAL WATER CONSERVATION

- **80%** of western water is used for agriculture and **80%** of that is used for hay.

—City of Denver Water Utility Director

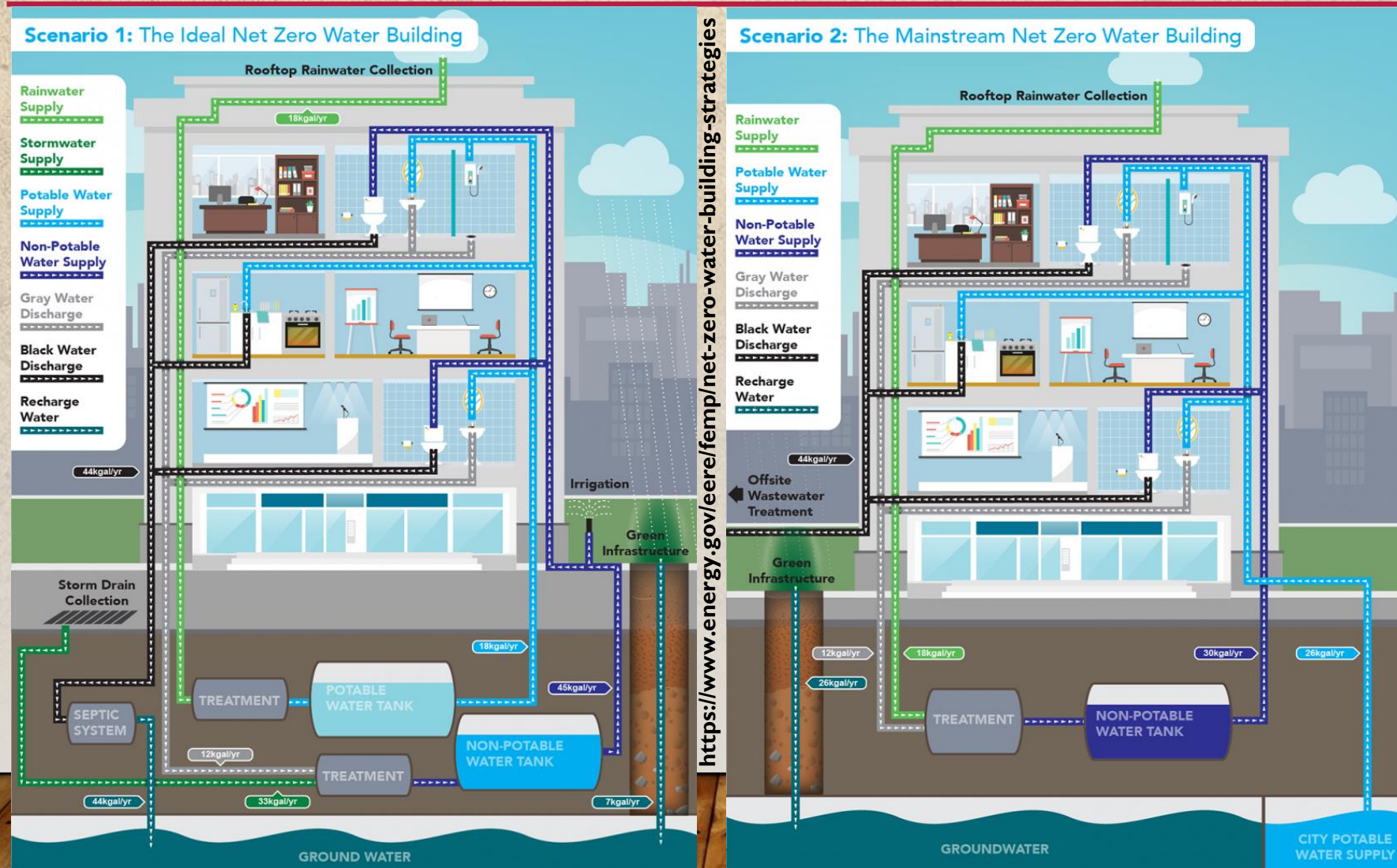
- Can agricultural water conservation be **improved**?
- “**Dry farming**” pioneered by Utah State/Utah president John A Widstoe and later LDS Apostle.
- Reducing agricultural water demand can increase domestic water supply—perhaps through **ratepayer subsidies**?
- Perhaps **acquire** some agriculture water rights.



SMART WATER PRICING

- In economics, the **less something costs** the more it is consumed.
- Conversely, the **more something costs** the less it is consumed.
- In public economics, everyone needs a base allocation of water beyond which tiered **pricing can induce lower consumption.**
- The Washington County Water Conservation District has an “**excessive water use fee**” in which water users that exceed a threshold pay more.
- Cities have tiered fees with **increasing rates by volume** to encourage conservation.
- In addition to reducing water demand, new revenues will be **reinvested** into water conservation programs.

NET **ZERO** OR NEAR-NET ZERO WATER ANYONE?



UTAH TECH
can become a leader
in applied
net zero water
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development and
training using
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ON THE RIGHT TRACK

- Conservation
- Pricing
- Agricultural water conservation perhaps with ratepayer subsidies?
- Net zero or near-net zero water applications on the horizon.
- Bottom line ... local efforts + innovations can ensure water for **sustained** growth.

WHAT ABOUT POWER?

- “Manage the downside; the upside will take care of itself.”
—Donald Trump
- “Don’t put all your eggs in one basket.”
—Proverb
- “Be prepared.”
—Boy Scout motto

AN UNFORTUNATE SCENARIO*

- Glen Canyon dam provides power to **5.8 million** households in the SW.
- Lake Powell's **falling elevation** has reduced power production by about 36%.
- It is conceivable that Lake Powell will drop **below** its ability to produce power.
- One scenario has the dam abandoned and Lake Powell being used to **maintain Lake Mead**.
- Alternative scenarios **increase power** up to 27% in the 2030s for up to \$3 billion.



Glen Canyon Dam (Lorcel/Shutterstock)

<https://www.saturdayeveningpost.com/2016/03/damming-the-parks/>

*Adapted from <https://thehill.com/policy/energy-environment/3671785-what-happens-if-lake-powell-runs-out-of-water/> and https://tucson.com/news/local/subscriber/arizonas-glen-canyon-dam-might-get-pricey-makeover/article_1dd0c6f0-acbe-11ed-8e24-efd51ba52327.html?utm_source=tucson.com&utm_campaign=%2Fnewsletter-templates%2Fnews-alert&utm_medium=PostUp&utm_term=2757032&utm_email_ehl=b3169006766f7181b7639fdc171180851c959852

WHAT'S WRONG WITH THIS PICTURE?



<https://www.gpb.org/sites/default/files/styles/flexheight/public/2022-08/img-6814-1024x768-1.jpg?itok=UXHrhZ6j>



<https://www.usgs.gov/media/images/coal-burning-power-plant>

BEYOND COAL AND HEDGING HYDRO

- Solar
- Geothermal heat pumps
- Geothermal power
- Wind
- Small scale nuclear
- Pricing



<https://gardner.utah.edu/renewable-energy-best-things-life-free/>

SOLAR ON THE MOVE

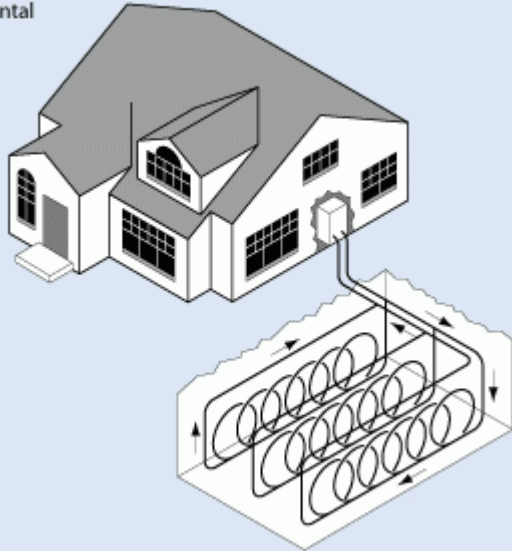
- New IRS rules allow **30% tax credit** for solar through 2032.
- Typically, \$10,000-\$20,000 with payoff in 6-10 years without tax credit.
- St. George is seeing an **exponential** increase in solar.
- On a base of 44 MW, solar since 2015 has added 4.4 MW.
- This **trend may increase** as costs continue to fall, tax credits sustained, and utilities facilitate it.

Year	Installs
2018	44
2019	35
2020	34
2021	72
2022	241

Source: City of St. George

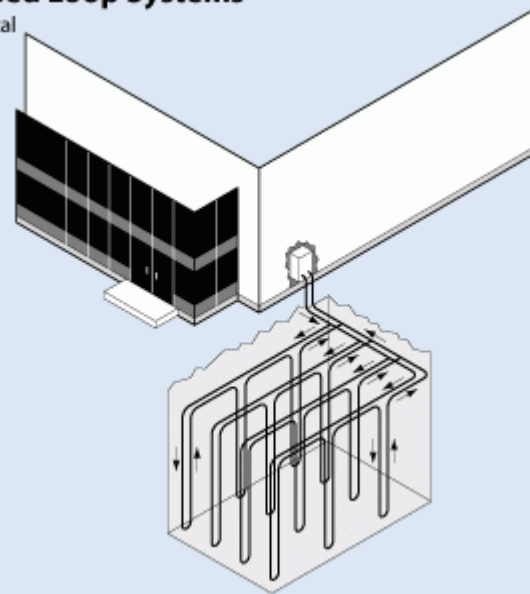
GEOHERMAL HEAT PUMPS (HVAC)

Closed Loop Systems
Horizontal



Most cost-effective if land is available. Trenches at least four feet deep. With two pipes, at six feet and four feet, or two pipes placed side-by-side at five feet in a two-foot wide trench. Or a Slinky™ that loops more pipe in a shorter trench cutting down on installation costs and in small land areas.

Closed Loop Systems
Vertical



Limited land or shallow soils, vertical systems involve 4-inch holes drilled about 20 feet apart and 100 to 400 feet deep. Two pipes create a U-bend to form a loop and grouted to improve performance. The vertical loops are connected to the heat pump in the building.

EPA data report **30-70%** on heating costs and **20-50%** on cooling costs, compared to other conventional systems.

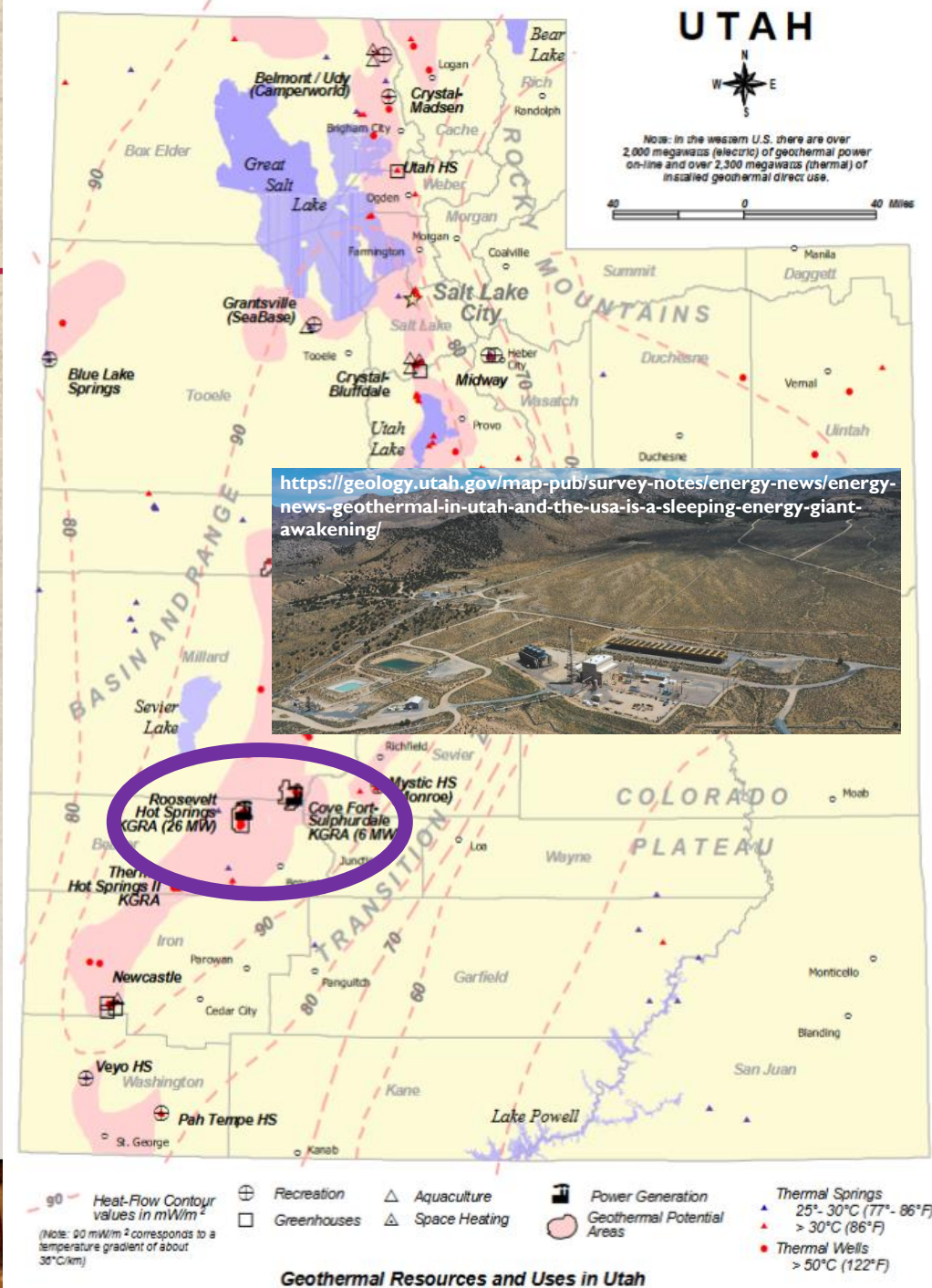
Prices range from \$10,000 to \$30,000.

Qualifies for 30% tax credit.

When solar and geothermal are combined, the home can become a **net negative energy** consumer.

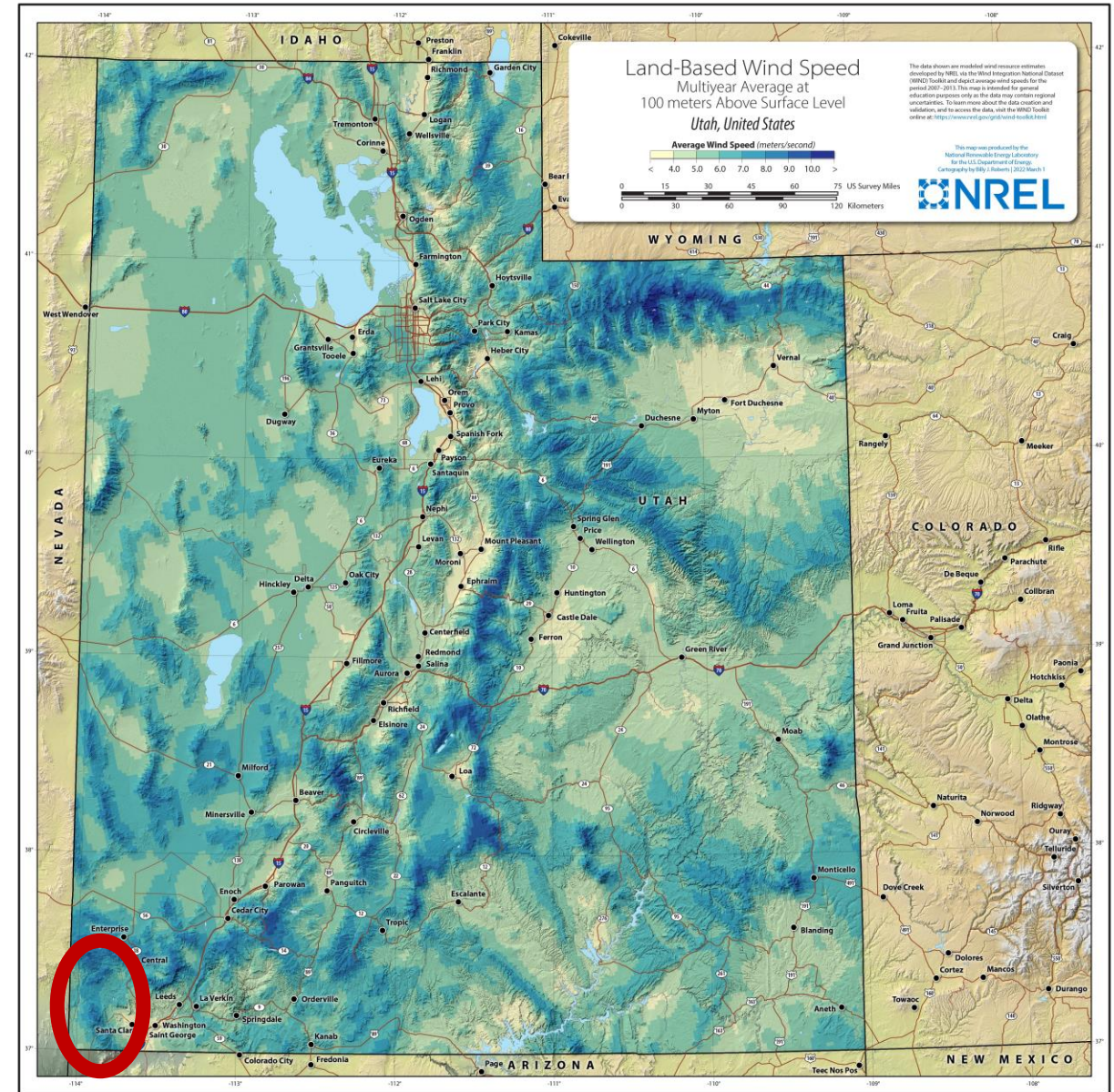
GEO THERMAL POWER

- Roosevelt & Cove hot springs in Beaver County have **powered 30,000** homes for years.
- Frontier Observatory for Research in Geothermal Energy → **FORGE**.
- **Potential** for power supporting hundreds of thousands of homes.



THE WIND WILDCARD

- Residential wind power eligible for 30% **tax credit**.
- Potential exists above valleys.
- Large wind turbine potential in the western part of the county.
- **Not** seriously considered ... yet.

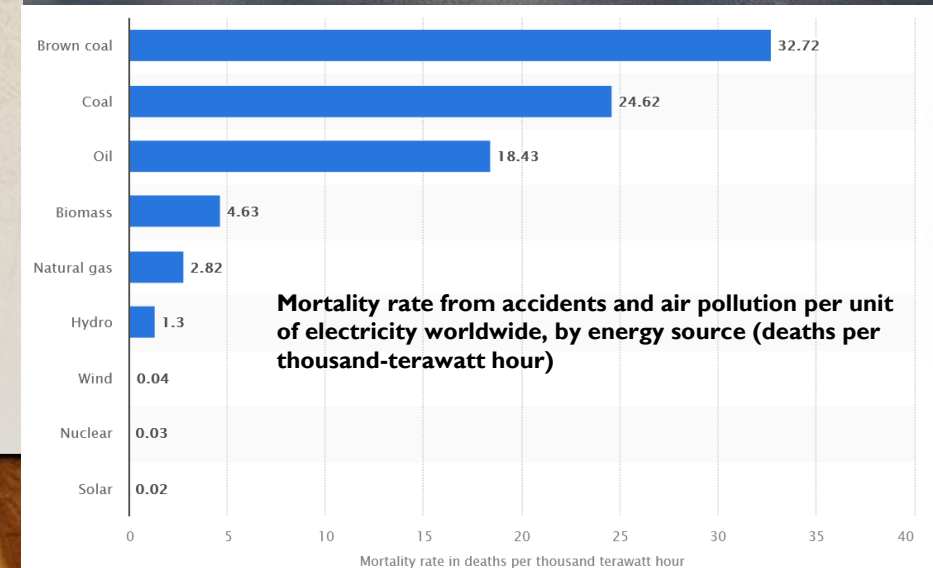


SMALL NUCLEAR POWER PLANT ONLINE SOON

- Utah Associated Municipal Power Systems (UAMPS)
- NuScale **small modular reactors** at Idaho National Laboratory west of Idaho Falls.
- Nuclear fission but design is **safer** than current nuclear power plants.
- 462 MW for the equivalent of **300,000+** homes across the network by about 2030.
- Washington County UAMPS **partners**: Hurricane, Santa Clara, St. George, Washington City.



<https://www.world-nuclear-news.org/Articles/Scaled-down-SMR-pilot-project-remains-on-course>



Mortality rate from accidents and air pollution per unit of electricity worldwide, by energy source (deaths per thousand-terawatt hour)

<https://www.statista.com/statistics/494425/death-rate-worldwide-by-energy-source/>

POWER EQUATION

- + Solar
 - + Geothermal Heat Pump
 - + Geothermal Power
 - + Some Wind
 - + Small Nuclear
- = Dixie **independent** of carbon-based power by mid-century?
- We'll probably still need hydro.*

UTAH TECH

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TRAILBLAZERS

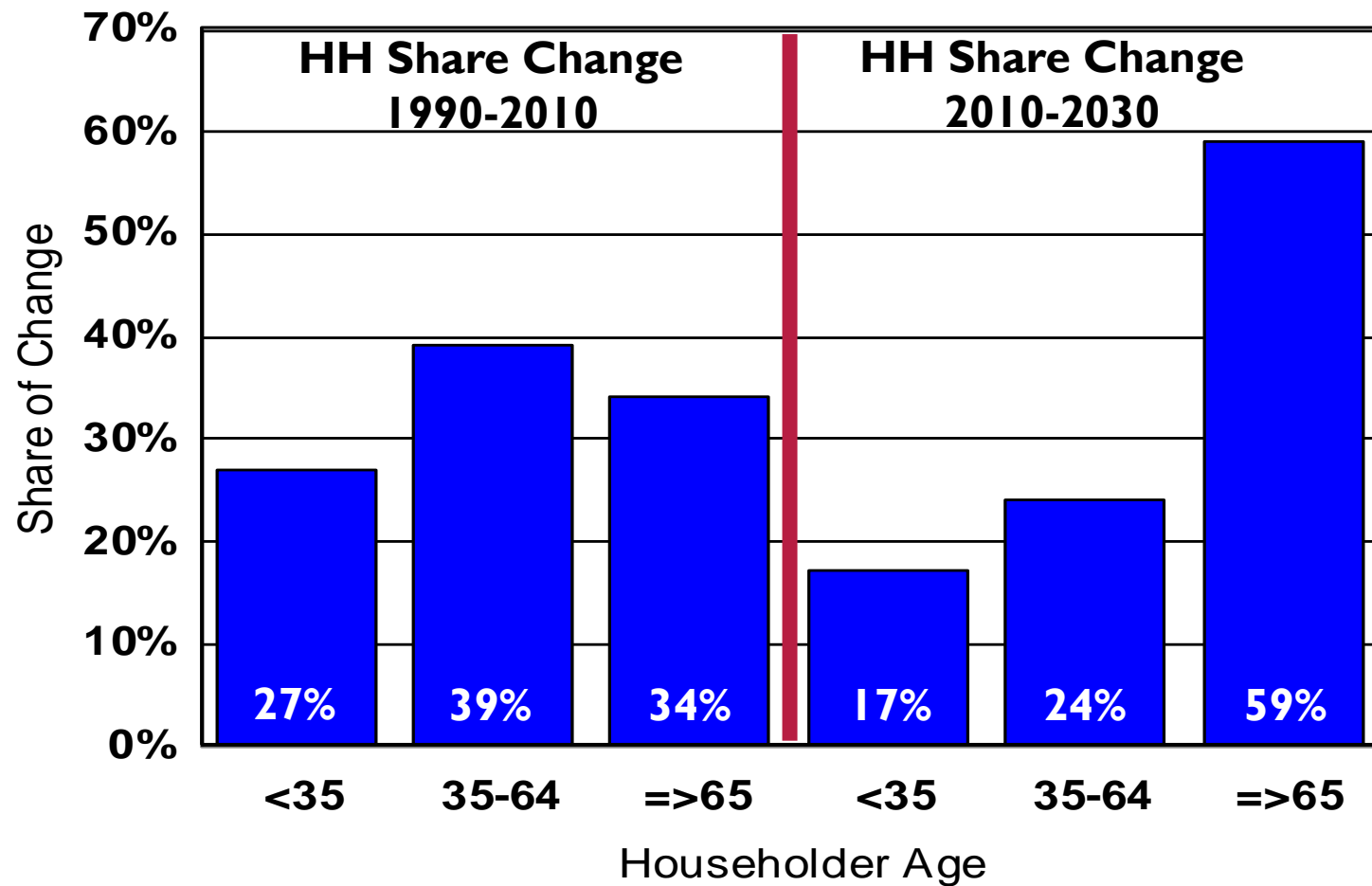
DEMOGRAPHIC DRILL DOWN

- The Baby Boom **hangover**.
- Household **trends** to 2060.
- What kinds of **communities** are preferred?
- Meeting the need for **Moderate Income** housing.
- The role of Missing **Middle** Housing.



Gov. Olene Walker

THE BABY BOOM HANGOVER IN ST. GEORGE METRO



Population

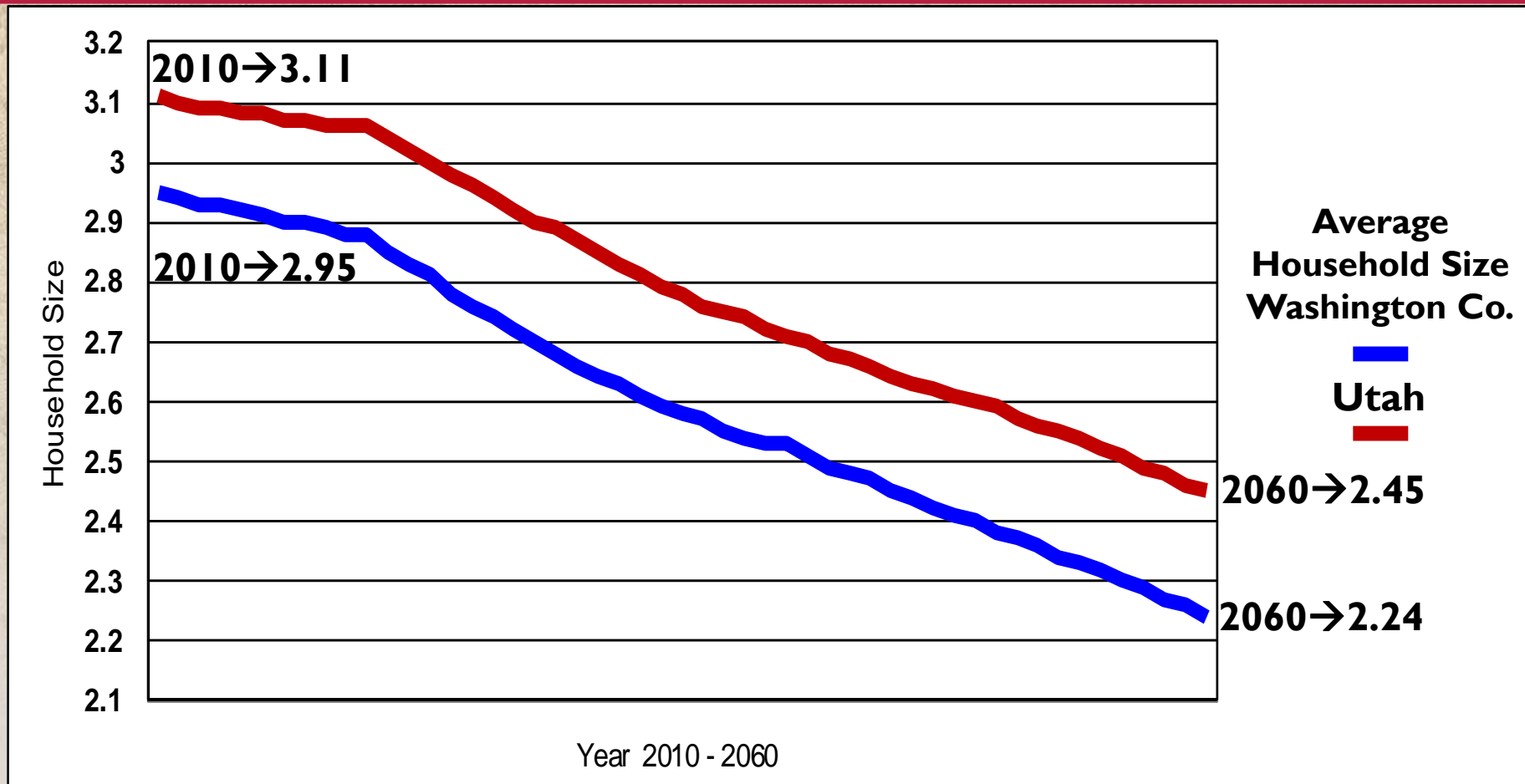
Households

County	Absolute Change 2020-2060	Percent Change 2020-2060	Rank	Absolute Change 2020-2060	Percent Change 2020-2060	Rank
Beaver County	3,105	43.9%	14	2,154	94.7%	11
Box Elder County	32,111	55.5%	10	19,267	103.2%	9
Cache County	92,342	69.0%	8	41,626	99.9%	10
Carbon County	1,973	9.6%	25	2,128	26.8%	27
Daggett County	67	7.1%	28	77	19.7%	28
Davis County	216,736	59.6%	9	119,031	106.7%	8
Duchesne County	3,525	18.0%	23	2,311	35.5%	23
Emery County	907	9.2%	27	1,254	35.5%	24
Garfield County	857	16.9%	24	644	34.2%	25
Grand County	4,455	46.1%	13	2,994	74.7%	15
Iron County	40,440	70.1%	7	21,273	113.6%	7
Juab County	11,500	97.2%	5	5,927	167.9%	5
Kane County	3,741	48.6%	12	2,362	76.7%	14
Millard County	-1,271	-9.8%	29	789	18.4%	29
Morgan County	11,854	96.0%	6	6,004	168.0%	4
Piute County	267	18.5%	22	263	49.0%	21
Rich County	1,018	40.4%	17	637	71.9%	18
Salt Lake County	483,889	40.7%	15	298,275	73.6%	16
San Juan County	4,382	30.1%	20	3,413	73.4%	17
Sanpete County	11,536	40.4%	18	4,309	51.3%	20
Sevier County	2,079	9.6%	26	3,172	42.5%	22
Summit County	17,210	40.6%	16	12,390	79.0%	13
Tooele County	75,742	103.5%	3	42,204	191.1%	3
Uintah County	10,767	30.2%	19	6,719	56.0%	19
Utah County	673,964	101.5%	4	290,256	157.3%	6
Wasatch County	46,089	131.9%	2	22,326	202.2%	2
Washington County	282,417	155.1%	1	141,485	226.7%	1
Wayne County	538	21.6%	21	292	27.4%	26
Weber County	133,539	50.8%	11	77,997	87.1%	12
State of Utah	2,165,775	65.9%	0	1,131,578	107.0%	0

Source: Kem C. Gardner Policy Institute, 2020-2060 Projections

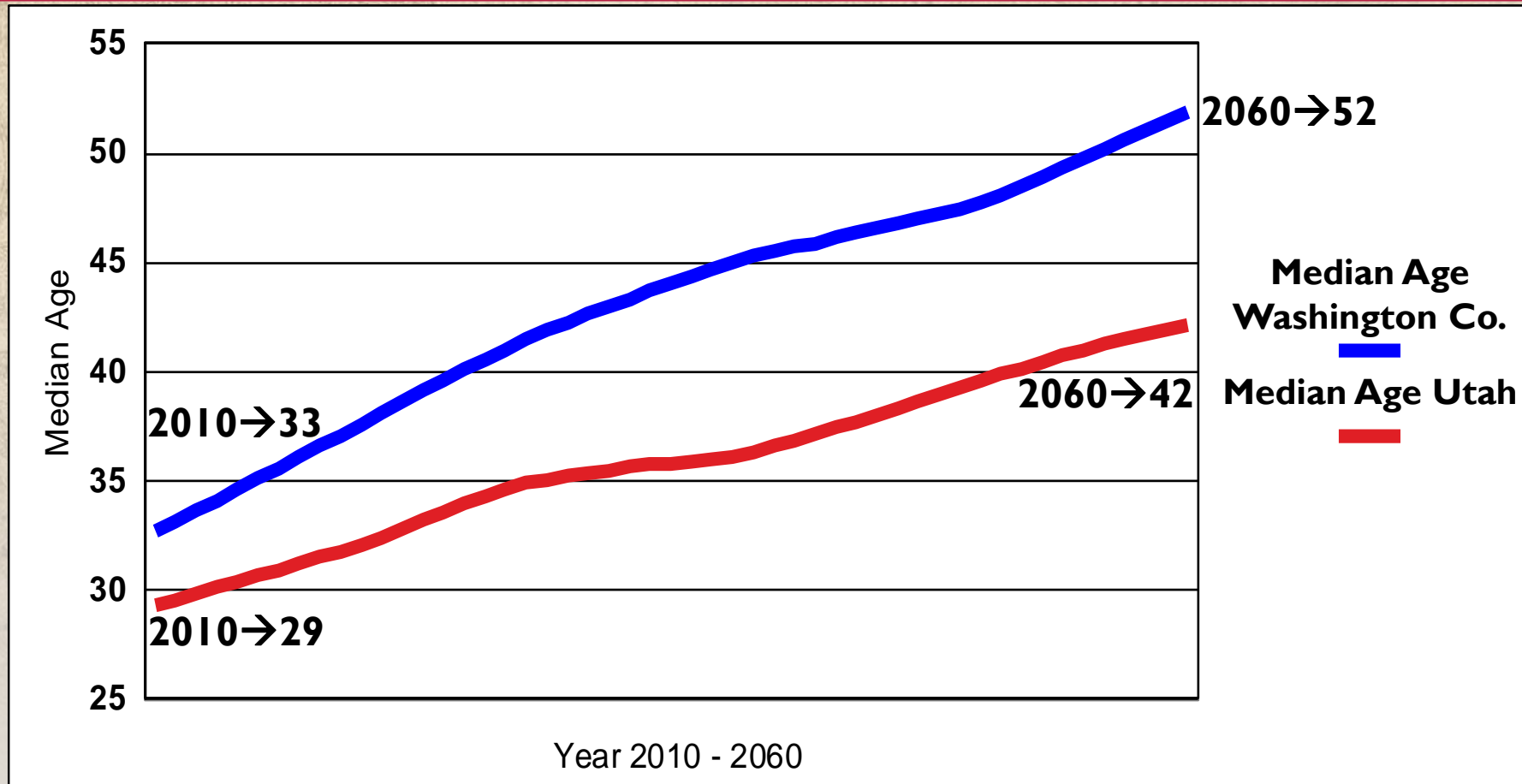
155% Population Growth
223% Household Growth

AVERAGE HOUSEHOLD SIZE 2010-2060



Source: Kem Gardner Institute

MEDIAN AGE



Source: Kem Gardner Institute

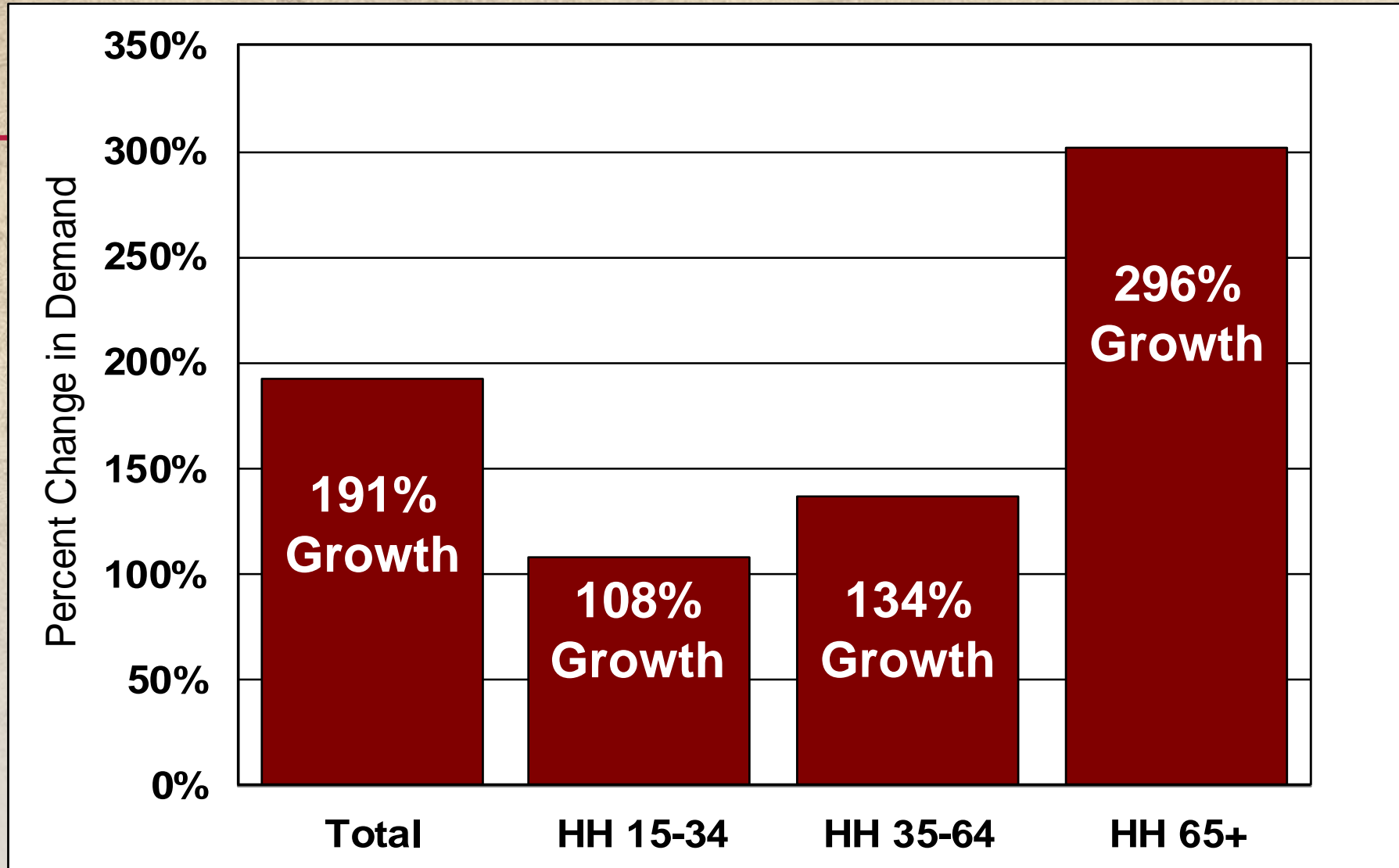
HOUSEHOLD CHANGE BY AGE, 2020-2060

	HHs 15-34	HHs 35-64	HHs 65+	
Year, Metric	<i>STARTER</i>	<i>PEAK</i>	<i>DOWNSIZE</i>	Total
2020 (000s)	13	32	26	70
2060 (000s)	26	75	103	204
Change (000s)	14	43	77	134
Percent Change	108%	134%	296%	191%
Change Share	10%	32%	58%	

Figures may not sum due to rounding.

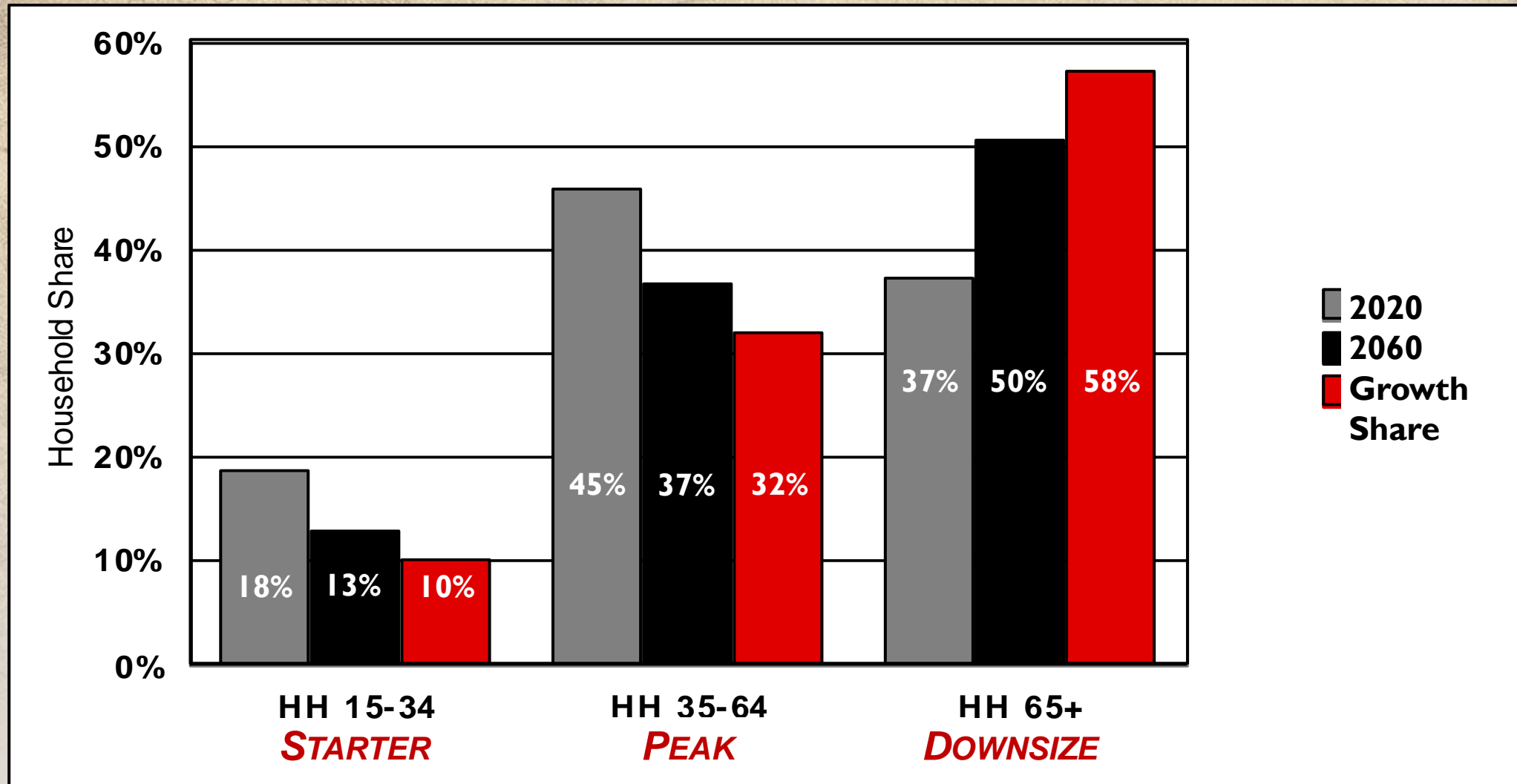
Sources: Adapted from Kem Gardner Institute and Woods & Poole Economics

HOUSEHOLD PERCENT CHANGE, 2020-2060



Sources: Adapted from Kem Gardner Institute and Woods & Poole Economics

HOUSEHOLD SHARE, 2020-2060



Sources: Adapted from Kem Gardner Institute and Woods & Poole Economics

HOUSING NEEDS BY GENERATION

SIMPLIFIED HOUSING NEEDS LIFE CYCLE

STARTER Home Households Want

Smaller Homes

Smaller Lots or Attached Options

Shorter Commute

Walkability to Places

PEAK Demand Households Want

Larger Homes

Larger Lots

Separation/Isolation

Drivability to Places, Longer Commutes Okay

DOWNSIZING Households Want

Smaller Homes

Smaller Lots or Attached Options

Security

Walkability to Places

DEFINITIONS

- What is a “**small**” or “**large yard**”?

Contextual → Large yard in Los Angeles is a small yard in St. George.

Small yard in Wyoming might be 20 acres and large yard might be a section of land (square mile of 640 acres).

- What is “**walkability**”?

More than just walking to the cul-de-sac and back.

Ability to walk to destinations especially shopping, restaurants, services, active recreation.

TRADEOFF PREFERENCE FOR SMALL YARD IF WALKABILITY AVAILABLE

STARTER

53%

47%

PEAK DEMAND

49%

51%

DOWNSIZING

55%

45%

OVER 80

61%

39%

*Houses with
small yards
and it is
easy to walk
to the places you
need to go.*

*Houses with
large yards
and you
have to drive
to the places
where you need
to go.*



TRADEOFF PREFERENCE FOR ATTACHED HOMES IF WALKABILITY AVAILABLE

STARTER

62%

38%

Own or rent an apartment or townhouse and you have an easy walk to shops and restaurants and have a shorter commute to work.

PEAK DEMAND

45%

55%

DOWNSIZING

45%

55%

Own or rent a detached, single-family house and you have to drive to shops and restaurants and have a longer commute to work.

OVER 80

55%

45%



PREFERENCE IF WALKABILITY IS AN OPTION

Housing Type	Most of U.S.	St. George Low MH Scenario
Large Lot Detached	25%	33%
Small Lot Detached	25%	33%
Middle Housing Attached	50%	33%

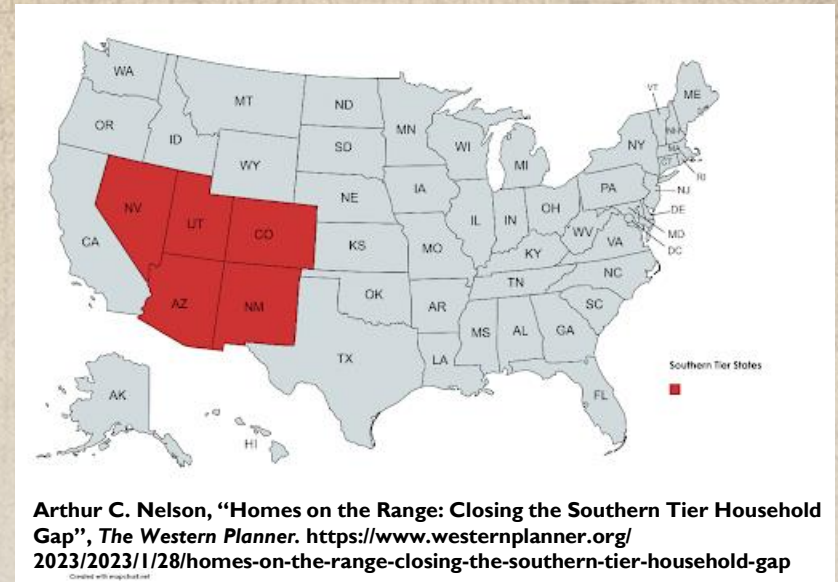
ARE PAST TRENDS THE FUTURE?

Year, Metric	Total Units	Detached	Attached
2010	57,859	42,080	12,809
Share		73%	27%
2021	78,986	58,662	17,751
Share		74%	26%
Change	21,127	16,582	4,942
Share		78%	22%

Source: American Community Survey, 1-year sample.

MISSING HOUSEHOLDS

- **Missing households** are those living with others who want a place of their own but cannot find or afford it.
- **Utah** has 50,000 missing households.
- St. George metropolitan area has **4,000** missing households.



MODERATE INCOME HOUSEHOLDS

- Police officers
- Firefighters
- Teachers
- Health care workers
- University workers



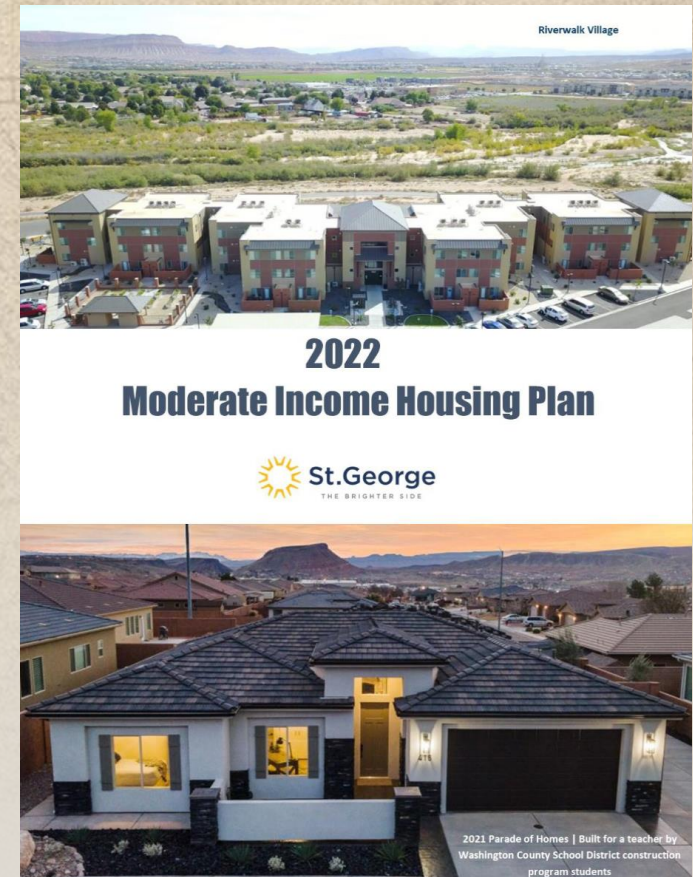
<https://www.aafedt.com/minnesota-covid19-presumption-extended-to-january-2023>

Large shares of these workers cannot afford housing in metro St. George.

UTAH MODERATE INCOME HOUSING PLAN

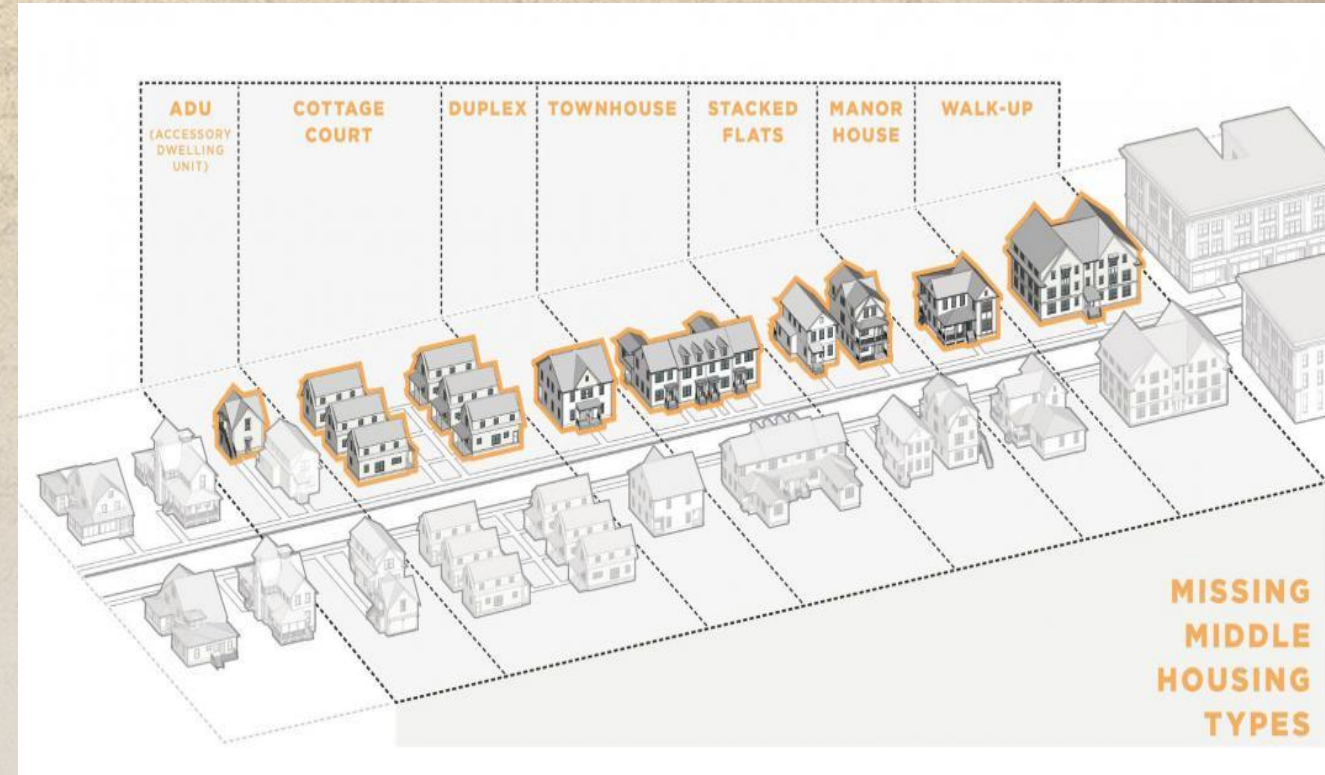
- Moderate-income housing **strategies**;
- Implementation **plan**;
- **Actions** taken to implement strategies;
- Description of **barriers**;
- **Number** of internal and detached ADUs built;
- How the **market** has responded;
- Number of **entitled** moderate income housing units; and
- Recommendations to the State to **improve** outcomes.

Adapted from <https://jobs.utah.gov/housing/affordable/moderate/reporting/>



“MIDDLE HOUSING” OPTION?

- Not too tall and not too small ...
- **Attached & cluster homes** of all types not exceeding 3 floors.
- **No** required elevators.
- In **walkable** communities.



<https://www.cnu.org/publicsquare/2022/05/18/making-%E2%80%98missing-middle%E2%80%99-work-anti-density-region>

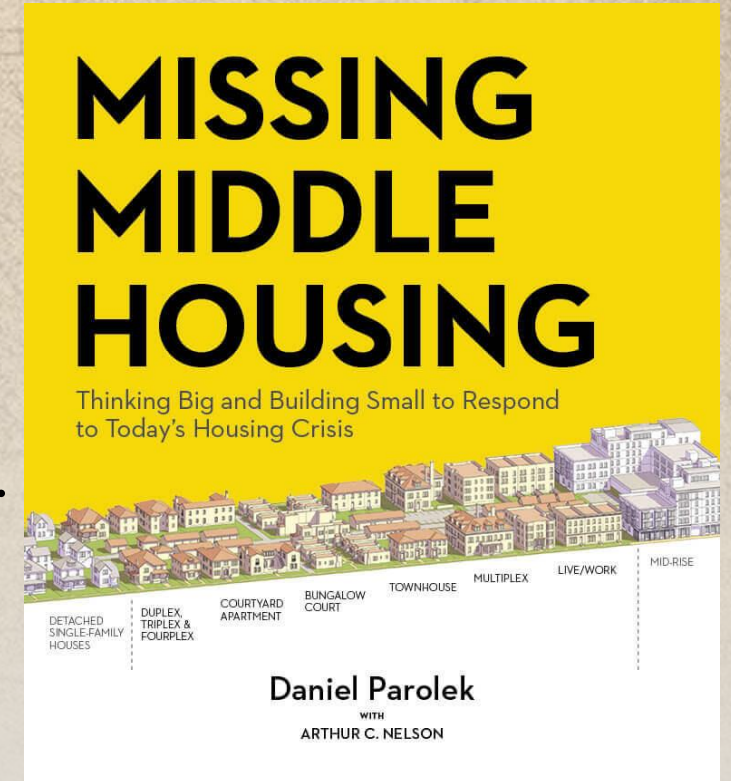
GOOD PLACES FOR MIDDLE HOUSING?

- **Central** St. George has it all:
 - University
 - Medical center
 - Downtown
 - Vast seas of asphalt parking
- **Downtowns** of smaller cities.
- Selected commercial **strips**.
- Targeted commercial **centers** and nodes.
- New **mixed-use** planned developments.



BENEFITS OF MEETING MIDDLE HOUSING DEMAND

- Reduces **water** demand per person.
- Reduces **power** demand per person.
- Reduces **vehicle trips** per person.
- Adds “eyes on the street” advancing **public safety**.
- Adds to local **economic development**.



PROVIDING MODERATE INCOME HOUSING OPTIONS WITH MIDDLE HOUSING IN DIXIE

Analytic Step	Figure
Households 2060	203,901
Vacancy Rate	5.0%
Homes Needed 2060	214,096
Total Homes 2021	78,986
Net New Homes Needed	135,110
Target Middle Housing Share of Total Homes 2060	33%
Middle Housing Homes Needed 2060	71,365
Attached Homes 2021 (assuming all are Middle Housing)	17,751
New Middle Housing Homes to 2060	53,614
Middle Housing Share of New Housing	40%

... AND THEN THERE'S REPURPOSING COMMERCIAL

50,000,000 square feet of nonresidential space in 2020.

40,000,000 square feet of space to become

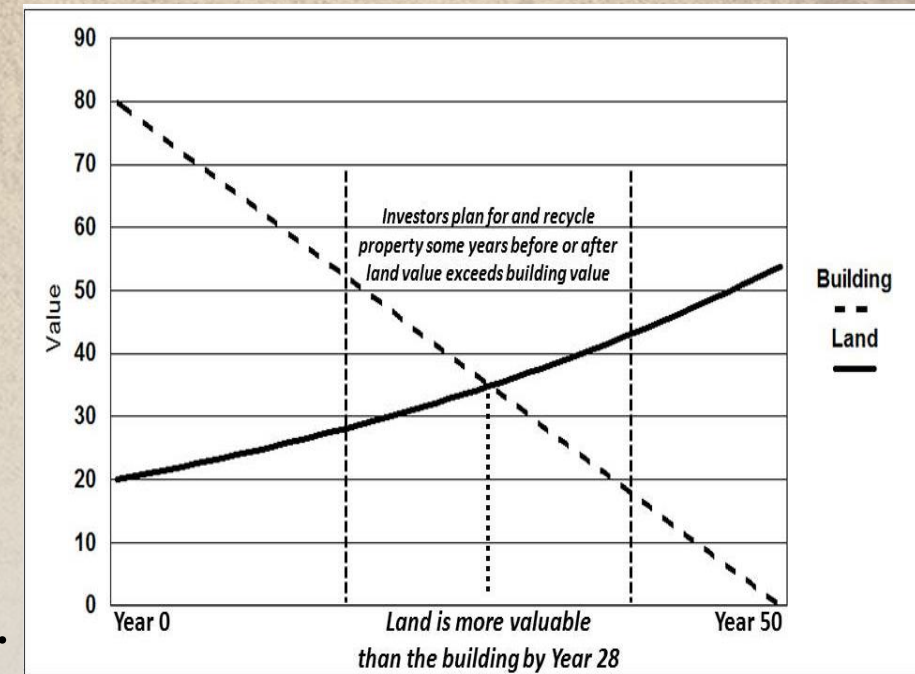
obsolete, demolished, repurposed

by 2060.

50,000,000 **net new** square feet to meet needs
of new jobs 2020-2060.

90,000,000 new and replaced square feet to 2060.

Opportunity to **reshape** St. George metropolitan area.



Source: Arthur C. Nelson.

GROWTH IS OUR FRIEND ... ***IF WE LEVERAGE IT***

- Creates **new** opportunities.
- Enhances the payoff for **innovation** much of which is within our grasp.
- Allows us to **fix** past mistakes.
- Gives us **new resources** to reshape the future.
- Don't let growth stop us from making a **better future** for everyone.



Thank You!



Bryce Canyon in winter, Monika Nelson