

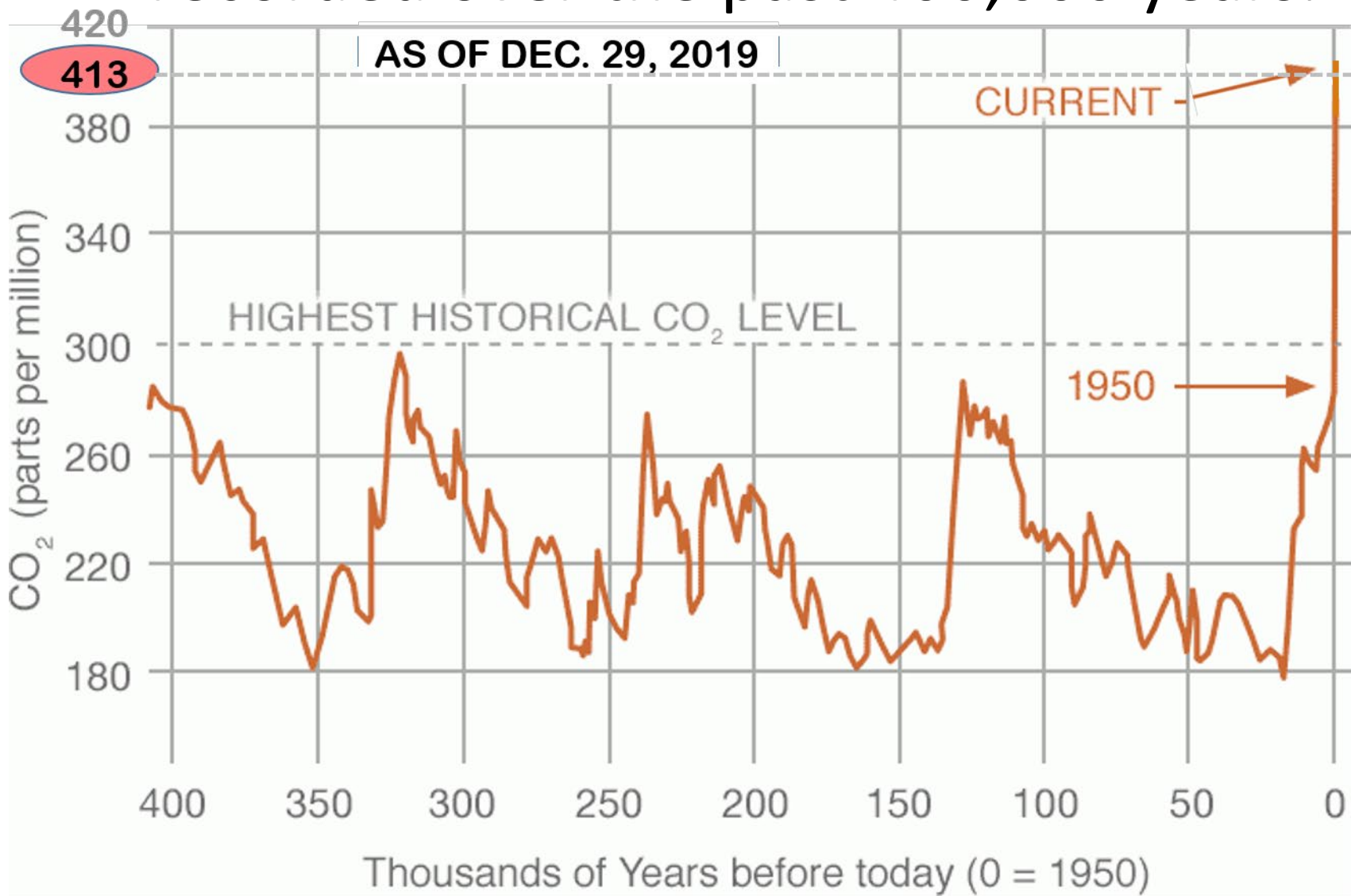
Let's Make Moscow Ready For 100% Clean, Sustainable Energy!!

“RF 100”: An initiative to help Moscow commit to and achieve 100% sustainable, clean energy usage.

Why Do We Need To Switch to Clean Sustainable Energy?

- With our historical use of carbon-based energy we have crossed into the carbon emissions danger zone world-wide.
- Humans now have 8-12 years to eliminate carbon emissions or lock into an unstoppable catastrophe that will cause hundreds of millions of deaths, endangering civilization as we know it.
- Yes, this sounds extreme and unbelievable, but *this is what the best available science is telling us.*
- *We need to act. . . . NOW*

CO2 levels today are higher than levels recorded over the past 400,000 years.



Source: NASA, see Lüthi, D. et al. 2008. Nature 453, pages 379–382



This is Urgent

U.S. Fourth National Climate Assessment, 2018, Key Findings:

- It is extremely likely that human activities, especially emissions of greenhouse gases, are the dominant cause of the observed warming since the mid-20th century.
- For the warming over the last century, there is no convincing alternative explanation supported by the extent of the observational evidence.
- Without substantial and sustained global mitigation and regional adaptation efforts, climate change is expected to cause growing losses to American infrastructure and property and impede the rate of economic growth over this century.
- Human health and safety and American quality of life is increasingly vulnerable to the impacts of climate change.

This is Urgent

IPCC Special Report on Global Warming of 1.5 °C, October 2018,
Key Findings:

- A 1.5° C target would require deep emissions reductions and rapid, far-reaching and unprecedented changes in all aspects of society.
- A 2° C temperature increase would intensify extreme weather, rising sea levels and diminishing Arctic sea ice, coral bleaching, and loss of ecosystems, among other severe impacts.
- For global warming to be limited to 1.5° C, human-caused emissions of CO₂ need to fall *by about 45%* from **2010** levels *by 2030*, reaching zero by 2050.

For a science update, google “***Climate tipping points — too risky to bet against***”. By Lenton and others, Nature, November 28, Vol. 575, pp 592-595.



Okay, it's serious. But aren't we pretty well insulated from this here on the Palouse?

- Sea level rise and storm surge flooding, along with severe increases in storm intensity and duration are likely to result in large losses of life and property in coming decades.
- Within the U.S. (not including potential immigration), it is estimated that 1 to 4 million people could relocate from the Gulf, Atlantic, and Pacific coastal zones between about 2050 to 2090, depending on how bad it gets and when ^{1, 2}.
- Where will these people resettle? How will they be absorbed into the social, economic, and political fabric of inland communities? How will those communities deal with population increases of tens of thousands or more over just a few decades?
- The implications of this for land use planning, utility services, and infrastructure, as well as for local economies, would be staggering if only half of this estimate were realized “here on the Palouse”.

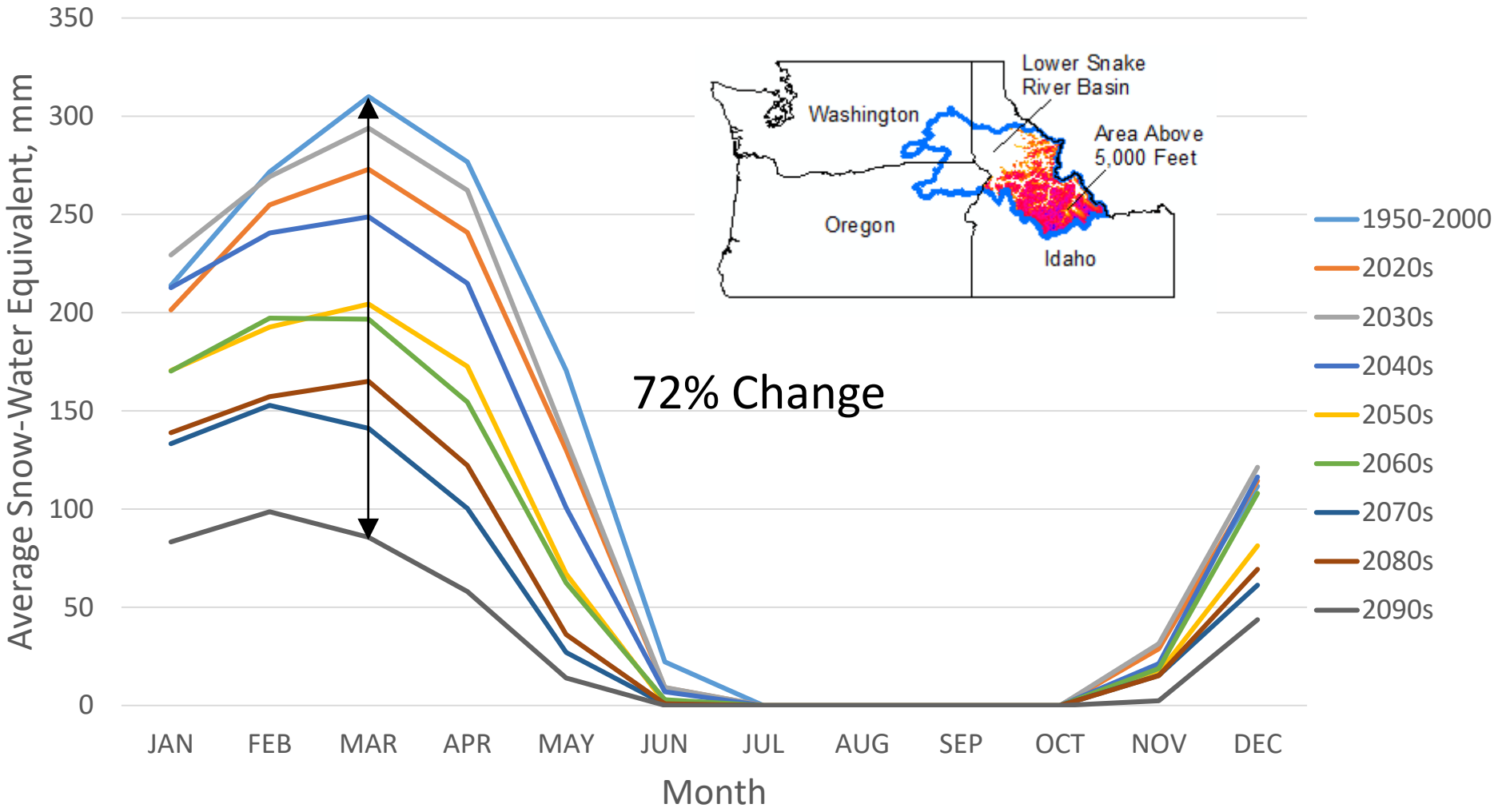
But we're pretty safe here on the Palouse, right?

- Sea level flooding is only one of many types of disruptions that are likely to cause large scale resettlement.
- What could this mean for Moscow?
- What about our own regional climate? How could it change?



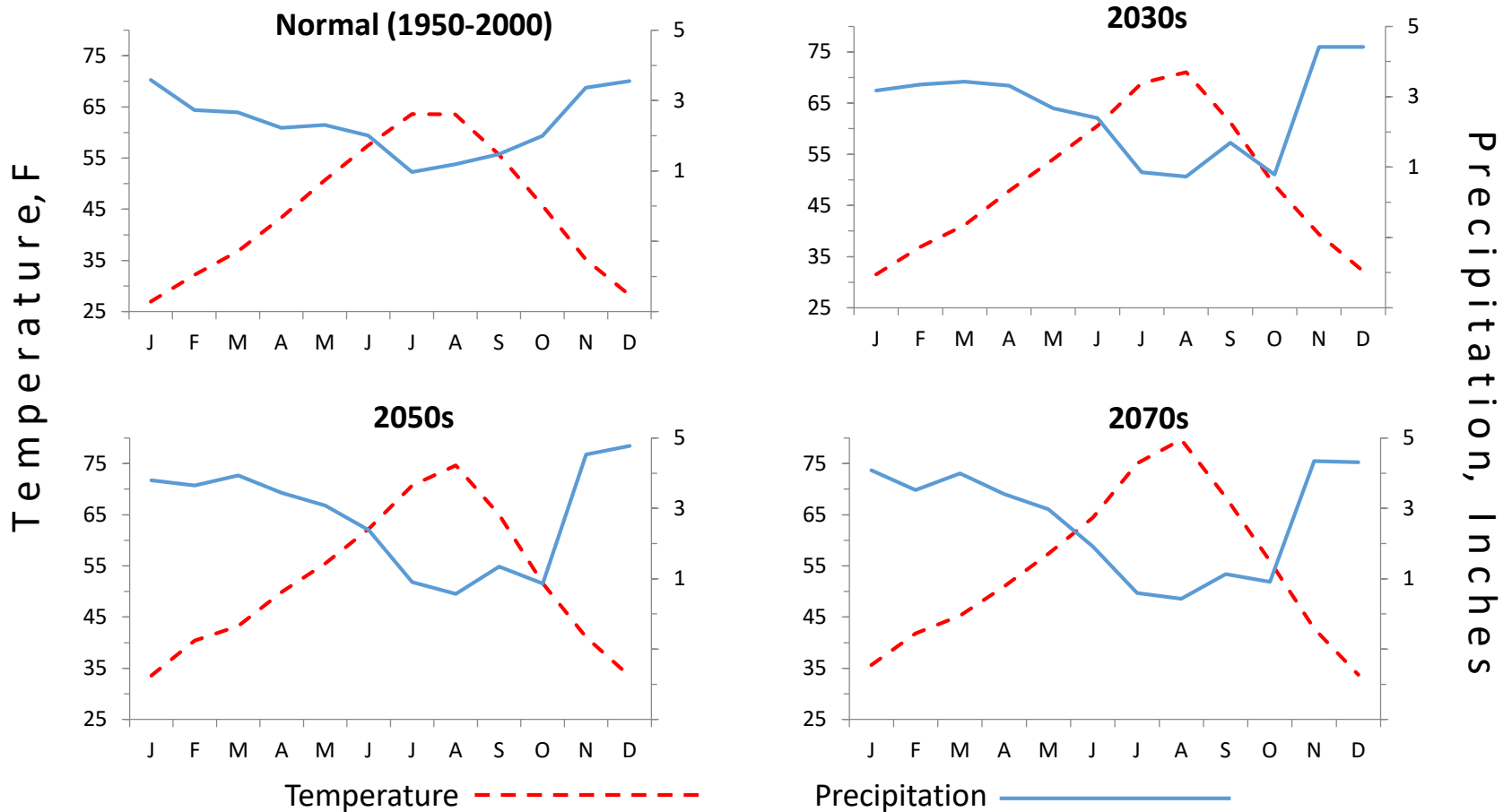
Lower Snake River Basin: Mean Snow-Water Equivalent Snowpack Above 5,000 Feet

Current, or "Normal", and Projected Decadal Averages



Walter Climate Diagram, Latah County

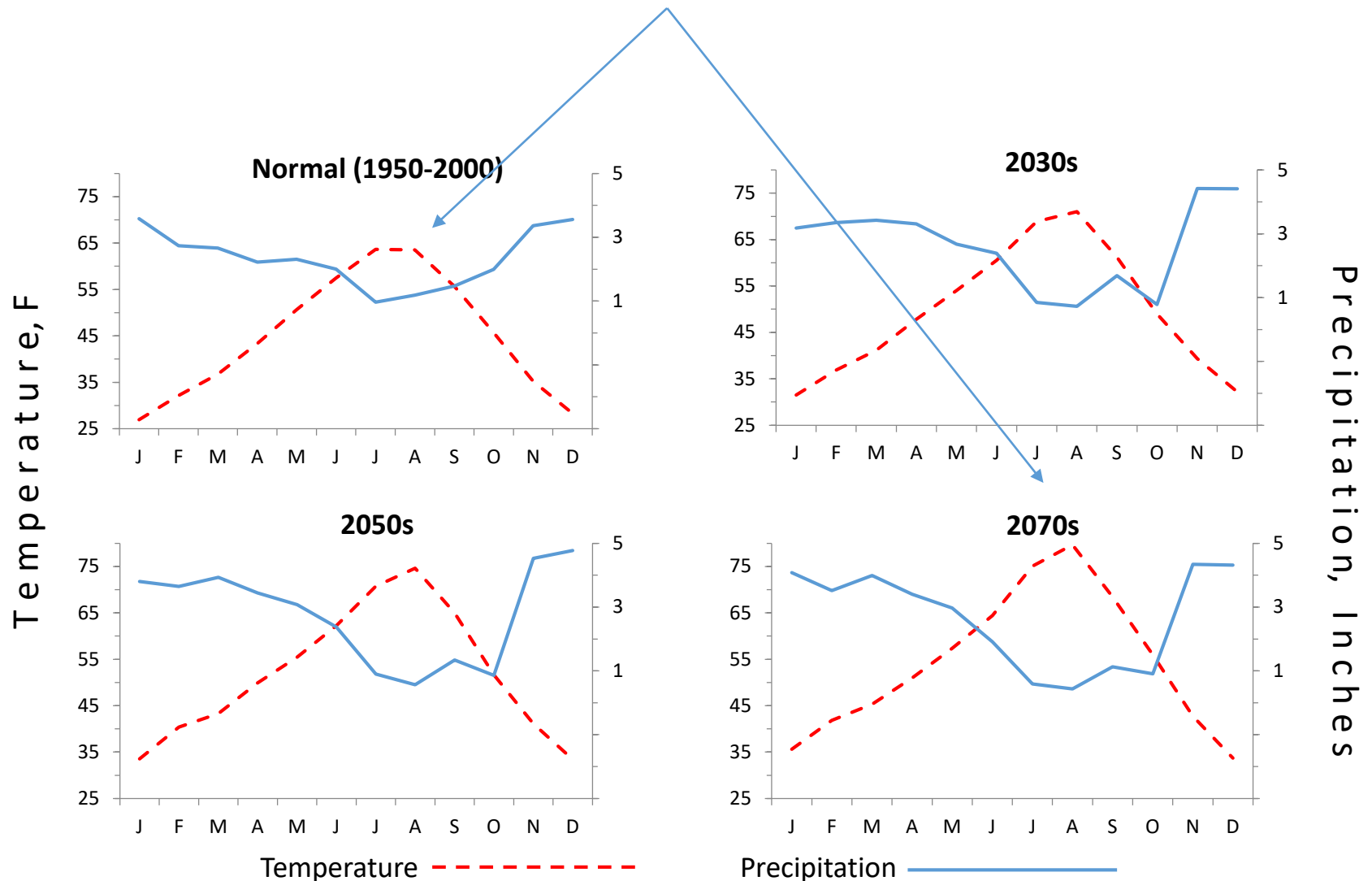
Shows the seasonal relationship between mean monthly temperature and precipitation for our “normal” period as well as projected for future decades. This relationship is critical to the phenology of plant species.



Based on NOAA Geophysical Fluid Dynamics Laboratory CM3 general circulation model, RCP 8.5 (Donner et al. 2011)

Observations: Latah County

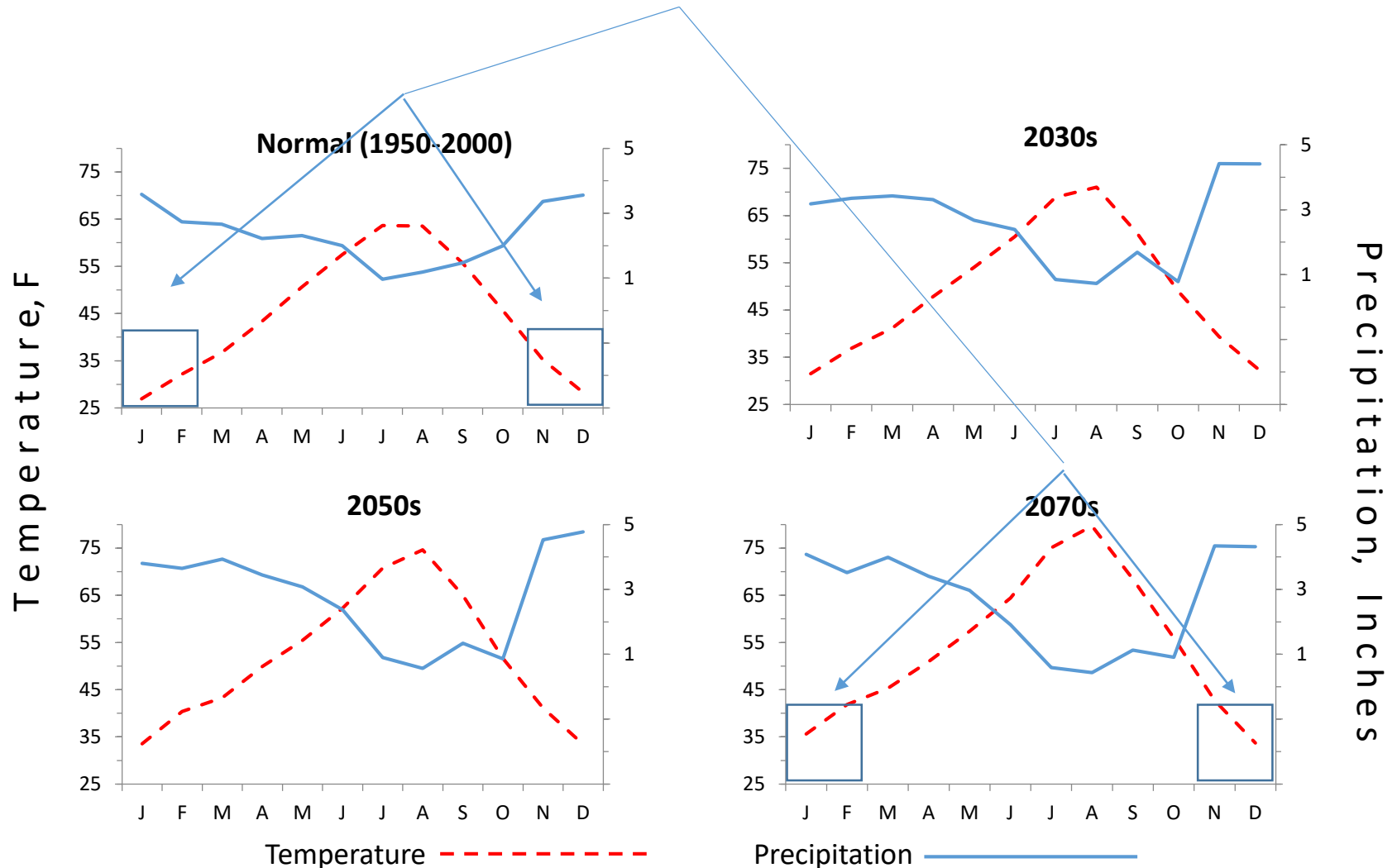
Average summer temperature is expected to increase by six degrees, from 66 to 72 F between now and the 2070s.



Observations: Latah County

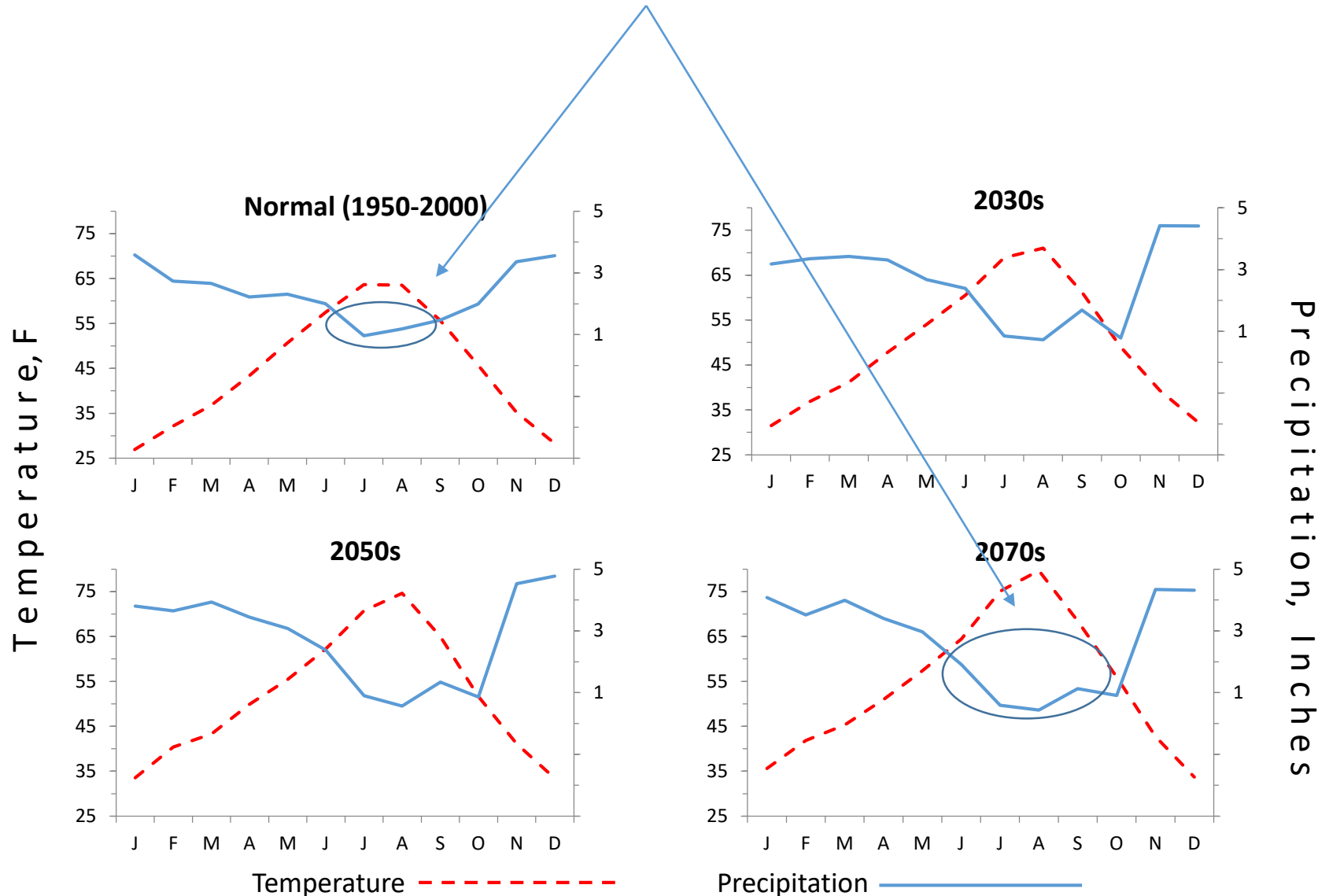
Average winter temperature is expected to increase by seven degrees, from 30 to 37 F:

N, D, J, F



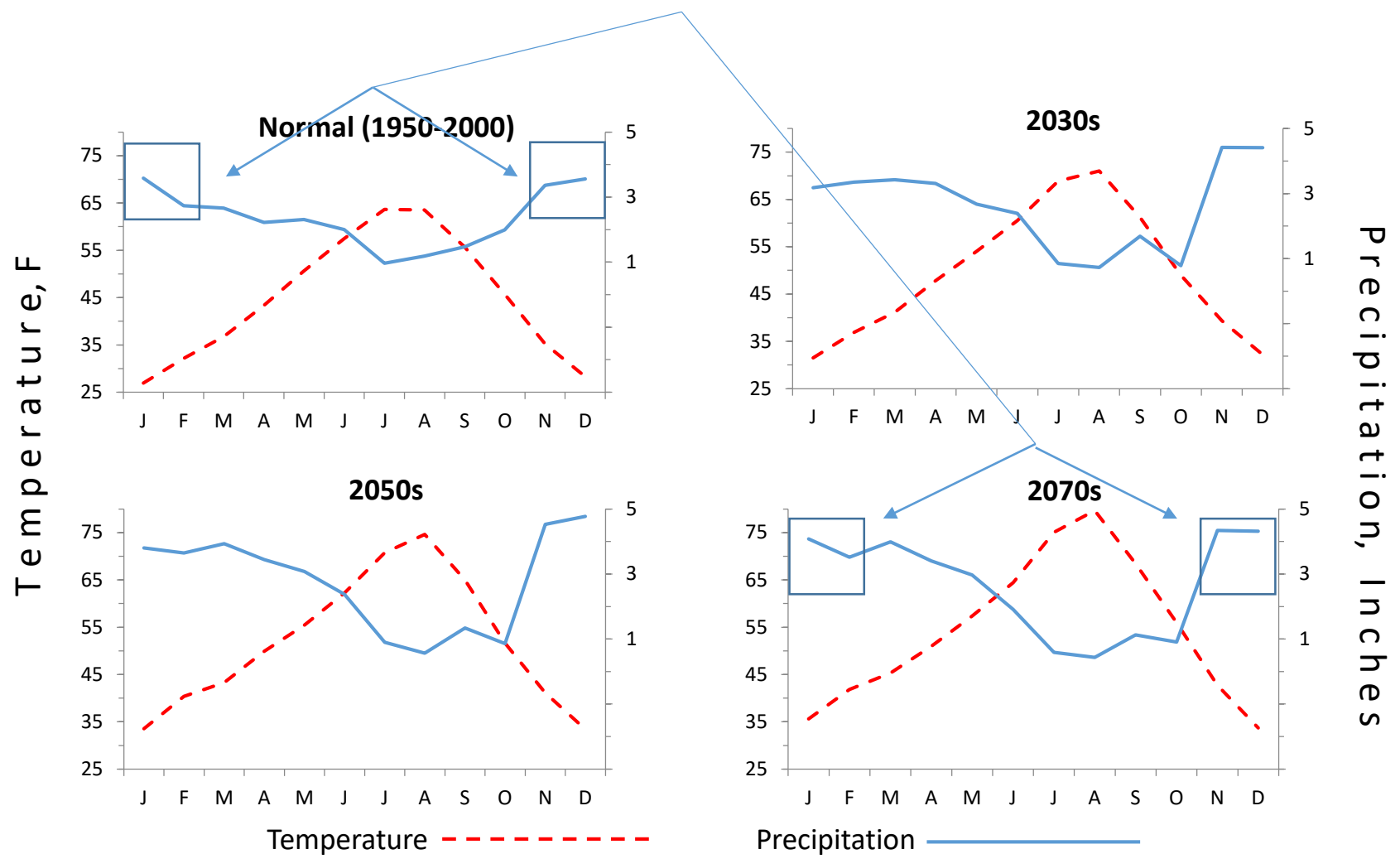
Observations: Latah County

Summertime precipitation is expected to decrease by one and a half inches



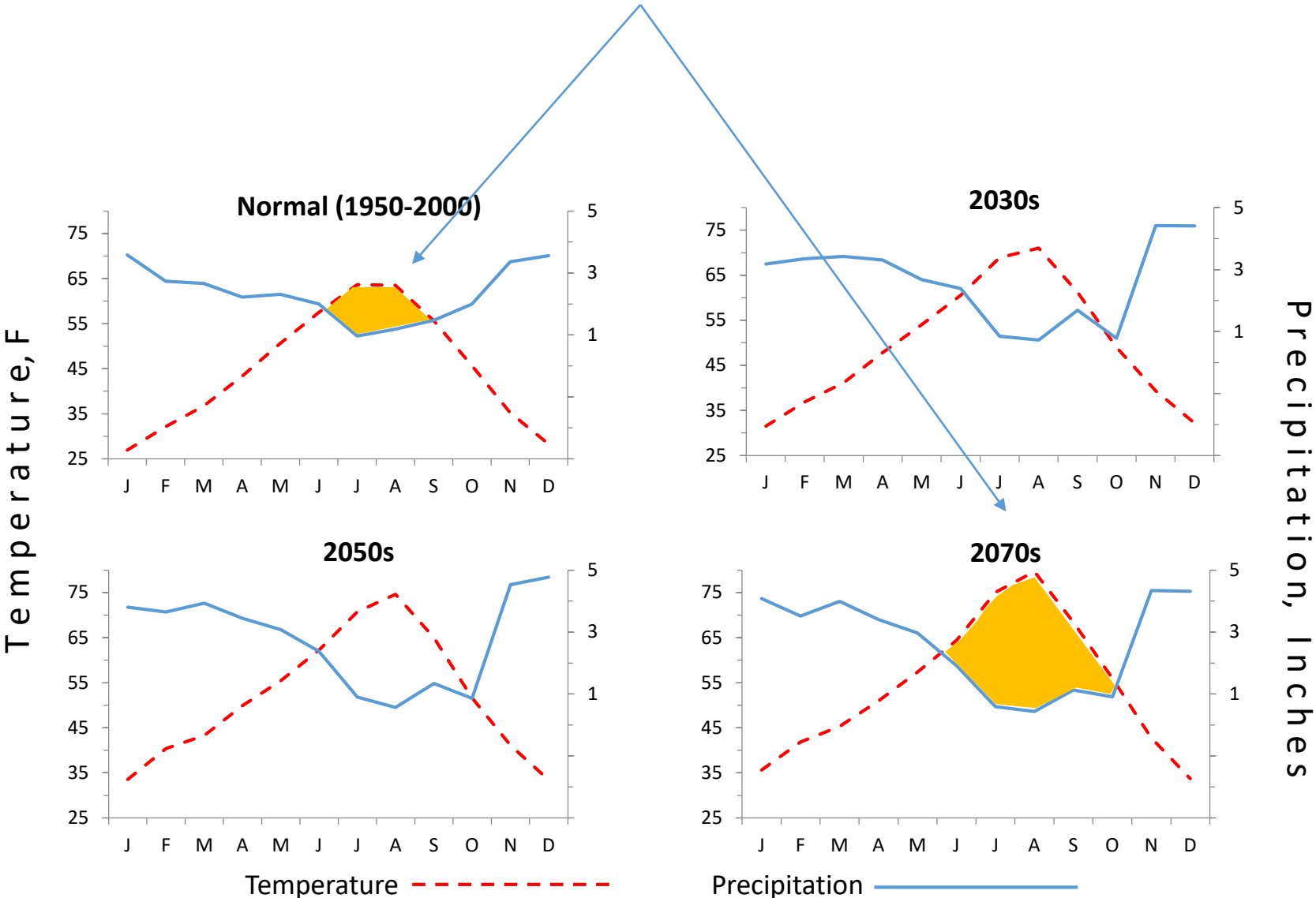
Observations: Latah County

Winter precipitation is expected to increase by about two inches. More of the winter precipitation will probably fall as rain rather than snow and run off rather than recharge the deeper soil and aquifer.



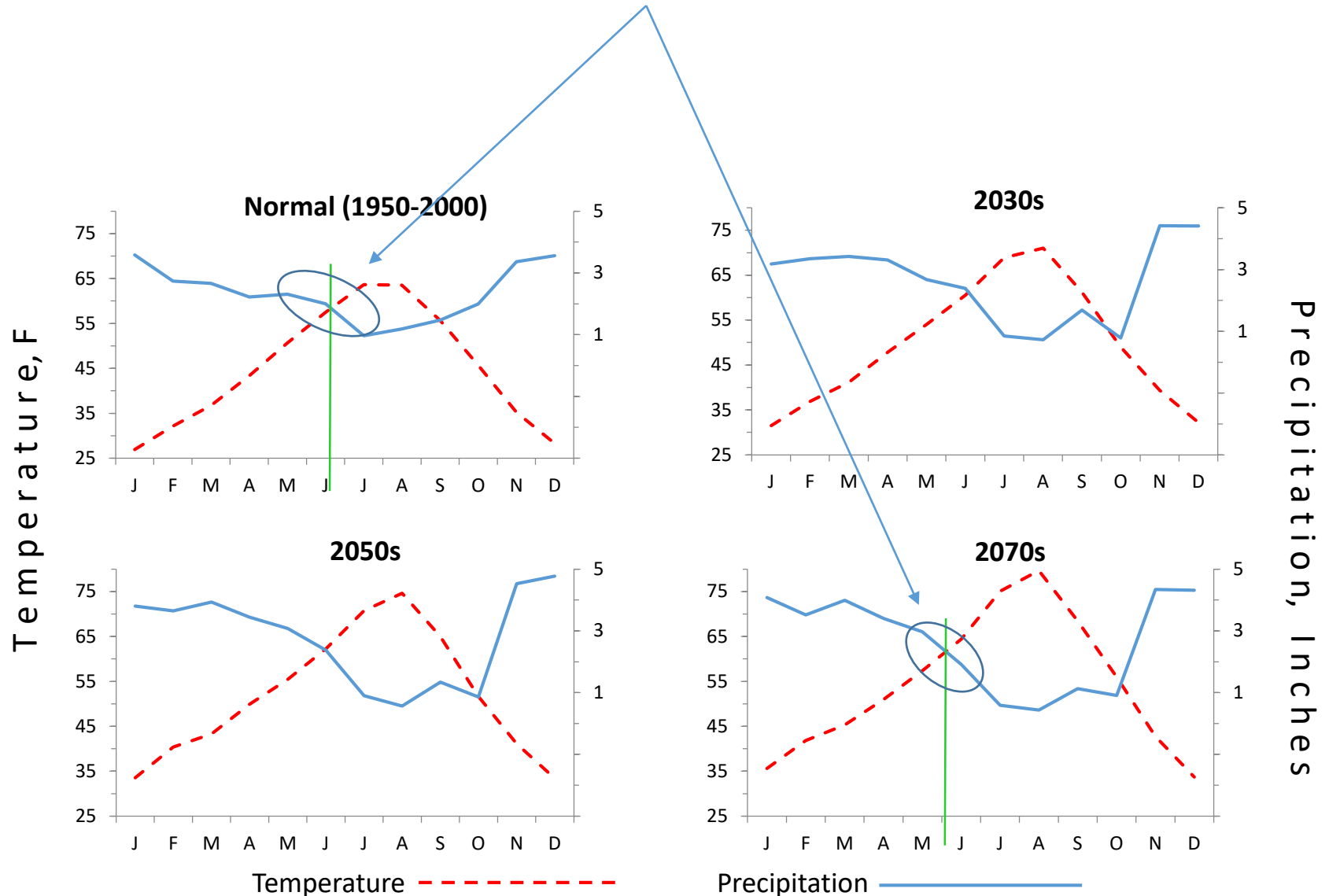
Observations: Latah County

Summers are expected to be longer, hotter, and drier.



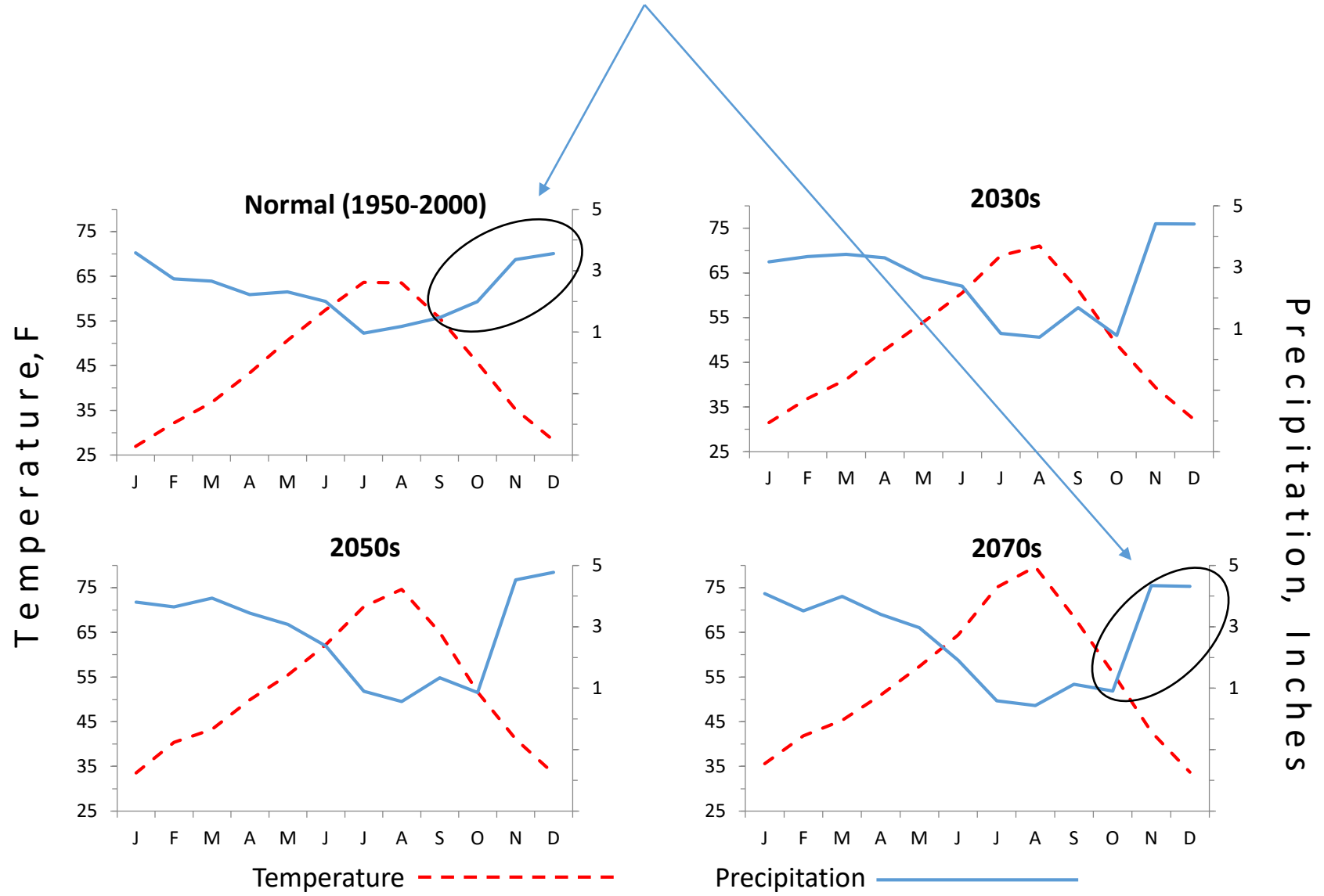
Observations: Latah County

Springs are expected to come earlier and be shorter.



Observations: Latah County

A great deal of the annual precipitation is expected to occur as heavy rain in the fall.



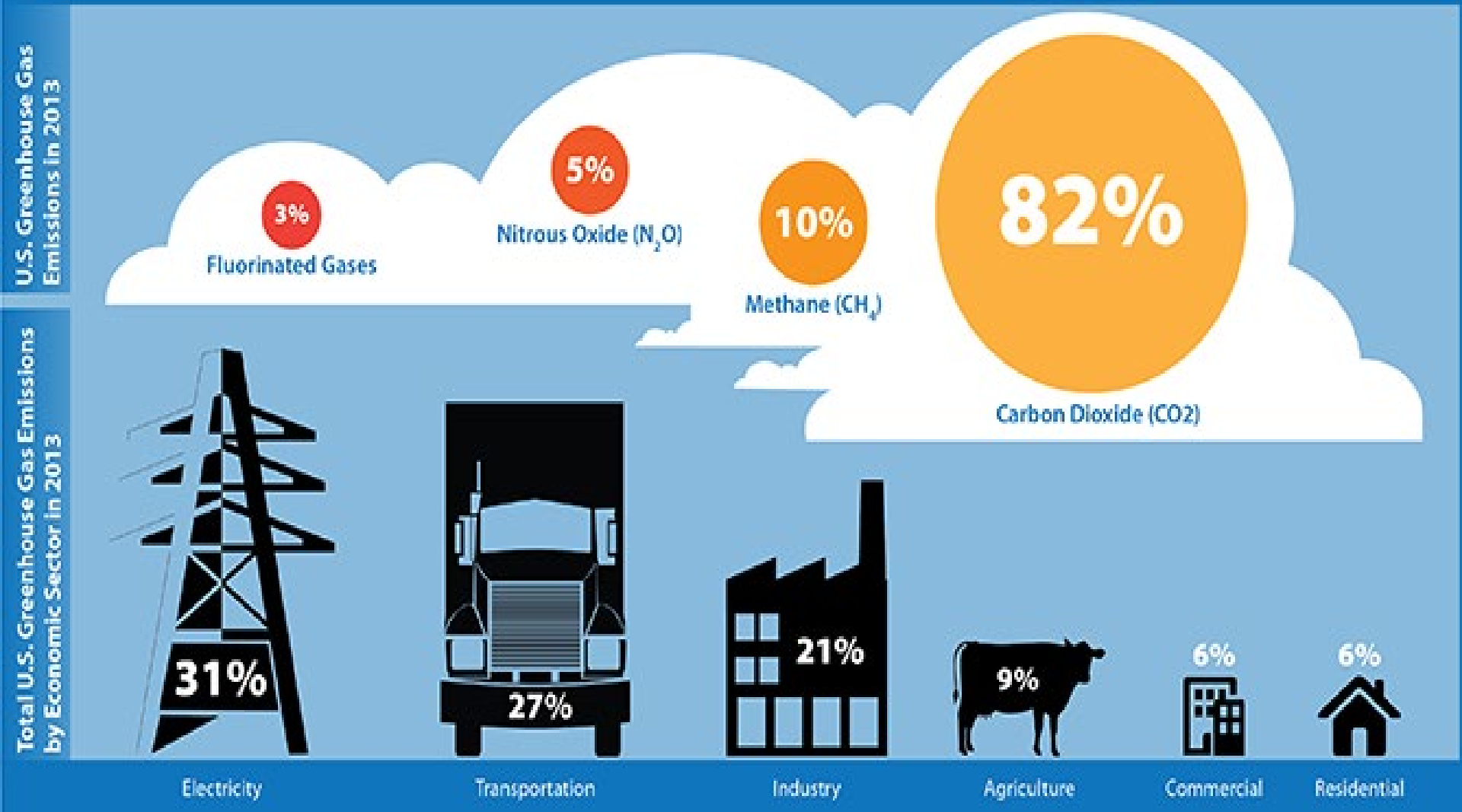
However . . .

- These projections provide useful insight; however, they must be understood as seasonal averages.
- In addition to changes in the averages, the range between maximum and minimum temperatures—the standard deviations—are also expected to increase.
- The *way* in which seasons change is expected to become different; for example, the occurrence of early or late frosts, or the onset of fall with chilly weather then being reversed by periods of warmer days.
- Weather in general is expected to become more variable, more chaotic.
- Many of these changes are likely to have deleterious affects on agricultural and regional ecosystems.

Some Changes Have Already Taken Place

- Idaho fire seasons have lengthened by 47 days in the last 25 years.
- Snowpack has decreased and earlier snowpack melt in Idaho has become more frequent.
- Peak streamflow associated with snowmelt in Idaho has come earlier in the last ten years.
- Stream temperature in the North Fork Clearwater River has increased by about 1.5 deg F since 1970.
- Closures due to fish die-offs and poor returns have become more common in the Snake River Basin.
- Smoke from wildfires and extreme heat events have led to unhealthy conditions and increases in respiratory illness in the region.

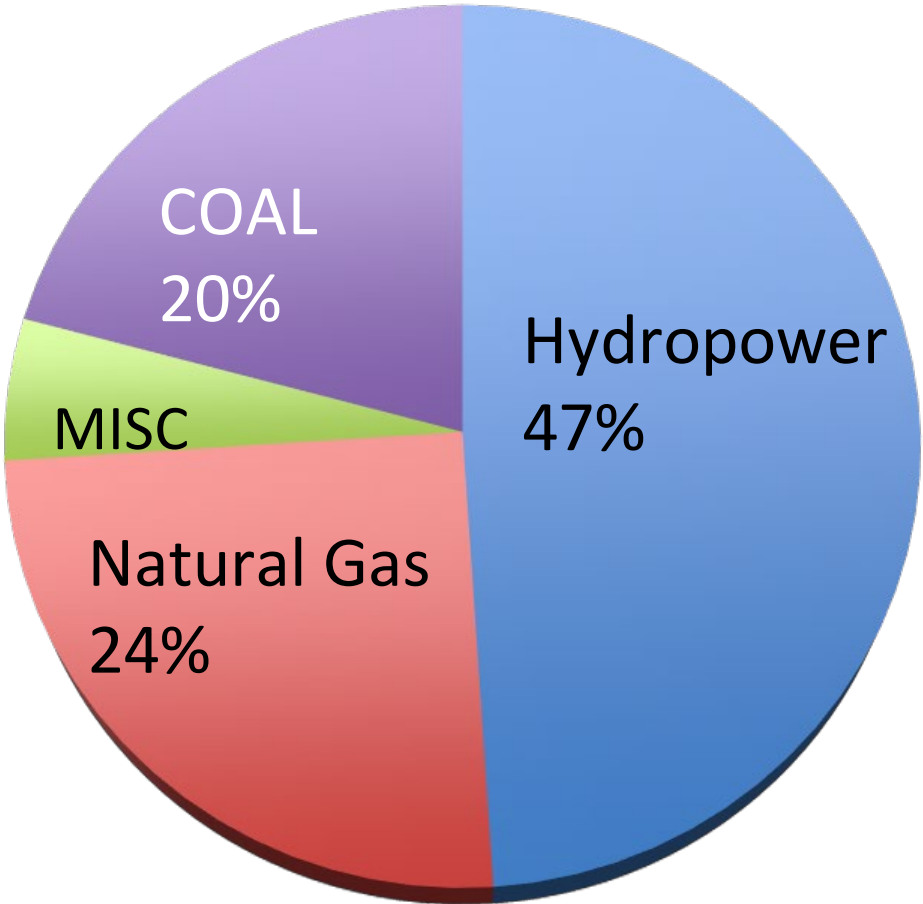
Why Focus on Carbon Dioxide and Electricity?



**IN THE PAST DECADE, SOLAR
AND WIND ENERGY HAVE HAD
RECORD GROWTH IN REPLACING
OLD DIRTY COAL.**



Avista's Electricity Delivered 2008-2012



Let's work with Avista

In April, Avista announced two ambitious clean energy goals:

1. To have a carbon neutral supply of electricity by the end of 2027.
2. To supply customers with 100% clean electricity by the end of 2045.

Moscow and Avista share the same aspiration.

Let's commit to working with Avista toward a common clean energy goal.

COLSTRIP COAL PLANT: BIG, UGLY MESS

WORST IN THE WEST

1490 lbs mercury - 2009

Massive, illegal
groundwater withdrawals

“High hazard
dams”

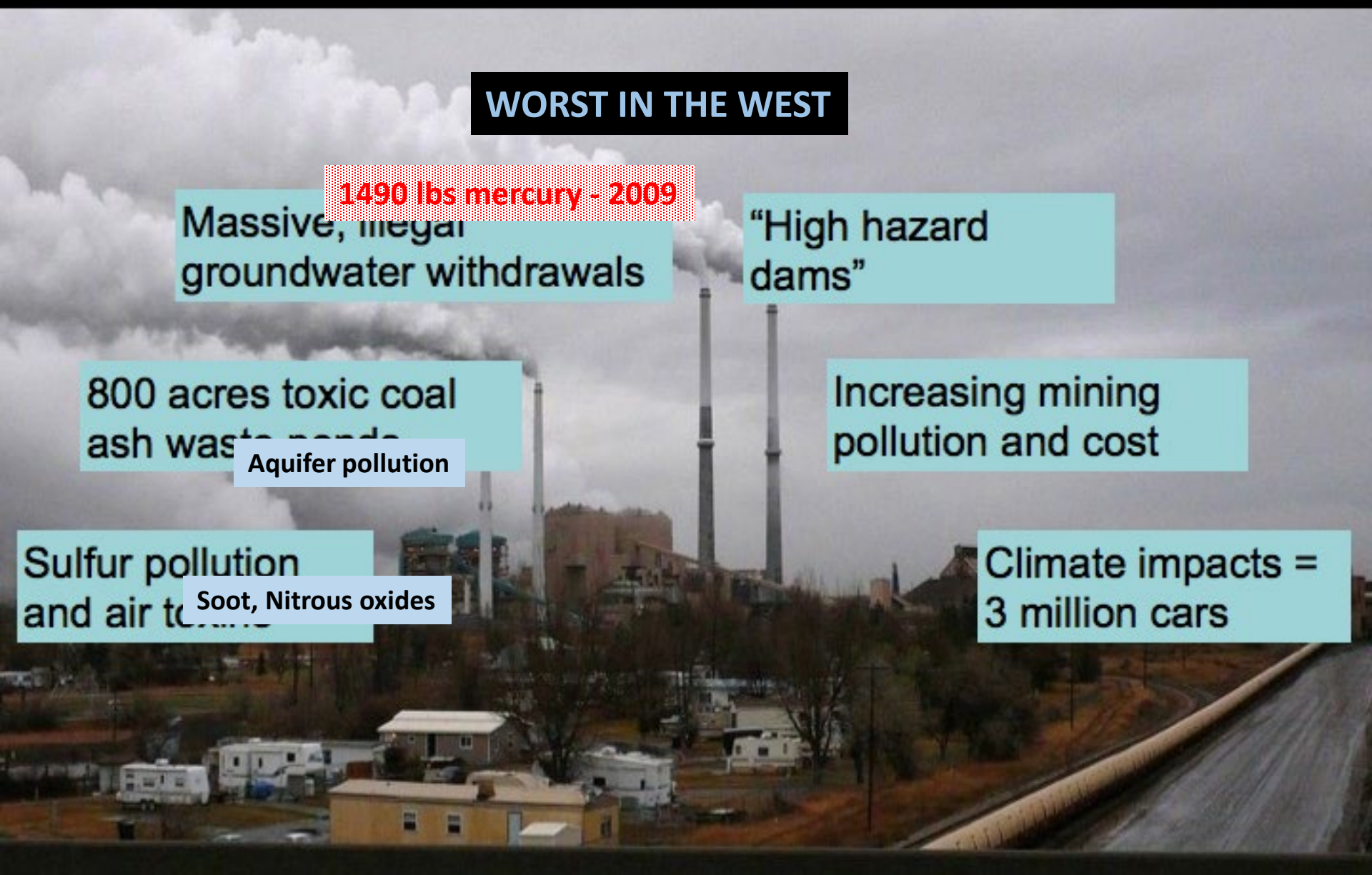
800 acres toxic coal
ash waste ponds

Aquifer pollution

Increasing mining
pollution and cost

Sulfur pollution
and air toxics
Soot, Nitrous oxides

Climate impacts =
3 million cars



Death and disease attributable to **fine particle pollution** from the Colstrip Steam Plant

Type of Impact	Annual Incidence	Valuation
<i>Deaths</i>	31	\$230,000,000
Heart attacks	48	\$5,300,000
Asthma attacks	530	\$4,000
Hospital admissions	22	\$28,000
Chronic bronchitis	19	\$8,600,000
Asthma ER visits	31	\$11,000



Sierra Club - Ready for 100

A campaign to help cities and municipalities to pledge and achieve 100% clean, renewable energy use for all sectors – building climate control, transportation and electrical generation by 2045. Over 150 US cities have now committed.

Today, over 94 million Americans live in a community committed to 100% sustainable energy. For example:

RF 100

- The “Ready for 100%” project began in 2016 as a grass-roots effort sponsored by the Sierra Club.
- Today over 150 cities across the U.S. have signed on to RF 100 and have completed or are working on RF 100 projects.
- In the last 12 months Boise and Missoula adopted 100% renewable goals and are actively working on them.
- A new law in Utah allows and encourages communities to adopt 100% renewable goals. So far, 20 communities have committed to the goals, representing over one quarter of the state’s population.
- Nearly two dozen towns in the Philadelphia area have joined and they are working together to for regional cleaner, healthier, more affordable electricity.
- In Florida 10 cities are working on a 100% future.

Cities Already Powered by 100% Renewable Energy

Aspen, CO: As of 2015, Aspen, Colorado has been powered by 100% renewable electricity - a mix of approximately 50% wind, 45% hydropower, and the remaining 5% from solar and landfill gas.

Burlington, VT: As of 2014, Burlington, Vermont is powered by 100% renewable electricity.

Greensburg, KS: As of 2013, Greensburg, Kansas is powered with 100% renewable electricity.

Kodiak Island, AK: Since 2012, Kodiak Island is powered by 100% renewable electricity.

Rock Port, MO: is powered by 100% wind energy.

Cities Committed to 100% Renewable Energy

Abita Springs, LA	Alta, UT	Ambler Borough, PA	Amherst, MA	Angel Fire, NM	Athens, GA	Atlanta, GA	Augusta, GA	Berkeley, CA	Blackfoot, ID	Boise, ID	Boulder, CO	Breckenridge, CO	Cambridge, MA	Chapel Hill, NC	Cherokee, SC	Chillicothe, OH	Chula Vista, CA	Cincinnati, OH	Clarkston, GA	Cleveland, OH	Coalville, UT	Columbia, MO	Concord, NC	Conshohocken Borough, PA	Cornish, NH	Cottonwood Heights, UT	Culver City, CA	Denton, TX	Denver, CO	Downingtown, PA	Dunedin, FL	Durango, CO	Eagle Nest, NM	East Bradford, PA	East Hampton, NY	East Pikeland, PA	Eau Claire, WI	Edmonds, WA	Encinitas, CA	Eureka, CA	Evanston, IL	Fayetteville, AR	Fort Collins, CO	Francis, UT	Fredericksburg, VA	Frisco, CO	Gainesville, FL	Golden, CO	Goleta, CA	Hanover, MA	Haverford Township, PA	Hillsdale Borough, NJ	Kamas, UT	Kansas City, MO	Kearns, UT	Keene, NH	Kennett Township, PA	Kirkland, WA	Lafayette, CO	Lakewood, OH	Largo, FL	Longmont, CO	Lowell, MA	Madison, WI	Menlo Park, CA	Middleton, WI	Millcreek, UT	Missoula, MT	Moab, UT	Monona, WI	Monterey, CA	Narberth Borough, PA	Nederland, CO	Nevada City, CA	New Brunswick, NJ	New York, NY	Northampton, MA	Oakley, UT	Ogden, UT	Ojai, CA	Portland, OR	Oxnard, CA	Palo Alto, CA	Park City, UT	Petoskey, MI	Philadelphia, PA	Phoenixville, PA	Plainfield, NH	Township, PA	Portland, OR	Pueblo, CO	Questa, NM	Radnor Township, PA	Reading, PA	Red River, NM	Rolling Hills, CA	Safety Harbor, FL	San Diego, CA	San Francisco, CA	San Jose, CA	San Luis, CA	Santa Barbara, CA	Santa Monica, CA	Sarasota, FL	Sarasota, FL	Satellite Beach, FL	Schuylkill Township, PA	Silverthorne, CO	Solana Beach, CA	South Lake, CA	South Miami, FL	South Pasadena, CA	Southampton, NH	Spokane, WA	Springfield Township, MA	St. Louis, MO	St. Louis Park, MO	St. Paul, MN	St. Petersburg, FL	State College, PA	Spokane, WA	Ski Valley, NM	Thousand Oaks, CA	Traverse City, MI	Township, PA	Truckee, CA	Upper Merion, PA	Uwchlan Township, WA	West Jordan, UT	West Valley, UT	Whitemarsh Township, PA	Windsor, MA
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How Can We Get To 100% Clean Energy?

- We must replace our carbon-based energy with clean renewable energy ASAP.
- We need to start with a plan.
- The framework for that plan must be approved by our City.
- The City needs the support and involvement of citizens and businesses.
- Moscow must kick off the process by adopting a resolution – the framework.

Committing to Eliminating Our Carbon Emissions

Let's begin with a clear statement of facts why eliminating our carbon emissions is more important than anything.

Whereas Whereas Whereas Whereas Whereas Whereas Whereas Whereas
Whereas Whereas Whereas Whereas Whereas Whereas Whereas Whereas

- *Whereas:* Climate change is a world-wide threat to all human civilization and all life on Earth as we know it.
- *Whereas:* The single most important driver of climate change today is our continuing use of fossil fuels, including gasoline, diesel, and natural gas, all of us – individuals, businesses, and governments.

Committing to Eliminating Our Carbon Emissions

Then let's move forward with a clear statement of what we are going to do about it.

Resolved Resolved Resolved Resolved Resolved Resolved Resolved Resolved
Resolved Resolved Resolved Resolved Resolved Resolved Resolved Resolved

- *Resolved*: That the City of Moscow shall take measures to achieve:
 - A fair and equitable transition to the use of 100% clean renewable energy for electricity in municipal operations by 2030;
 - Sustainable electricity city-wide by 2035;
 - For all types of energy, including heat and transportation, city-wide by 2050 or sooner.

We've Already Taken the First Step

- In 2010 Moscow City Council pledged to reduce the City's carbon emissions 20% by 2020.
- That goal should be achieved in 2020.
- Now it's time to take the next steps.
- RF 100 is about taking those next steps.
- Over the next years, citizens, businesses, and city government will be collaborating on ways to move Moscow to 100% renewable, carbon-free energy.

Moscow 20% by 2020: What Has Already Been Done

- The city conducts a biannual greenhouse gas inventory
- EcoDriver Program/Vehicle replacement with electric or hybrid units
- LED Lighting Retrofit Project
- Water System Upgrades to save energy/reduce GHG emissions
- Roadway Lighting Project
- Alternative Transportation/Bicycle and Pedestrian Improvements

ENERGY SECURITY AND THE LOCAL ECONOMY

BOISE IDAHO

Boise residents, businesses, and local government spend **\$564M** on fossil fuels every year



SPENDS \$181M



SPENDS \$325M



SPENDS \$58M



SUMMARY

- Moscow must do its part to reduce GHG emissions to zero by switching to 100% clean, renewable energy
- This will increase the likelihood of maintaining a climate favorable to our civilized society.
- Added benefits will be in the areas of human health and economic development.

MOSCOW CAN DO THIS!