

January 7, 2016

RE: Portland Solar Equity & Innovation Policy

Portland City Council members:

As an urban designer, former comprehensive planner, and sustainability and environmental policy professional for over 17 years, I would like to advocate for your attention to a critical environmental and urban planning issue that needs attention now as part of your policy adoption efforts being considered while undertaking the Comprehensive Plan update: **Solar equity, energy efficiency, climate protection, and community resiliency.**

As our populations grow, and our urban sphere expands upwards to maintain our urban growth boundary, we are in need of more policy tools in our toolbox to ensure we are supporting our goals for both livability and density. From the hundreds of survey responses received from the Division Perceptions Survey about the negative impacts of recent development, there is a deep and widely held concern that we are moving backwards on livability, something we are so famous for that is indeed part of our brand and identity here in this great City.

The attached draft “Solar Equity and Innovation Policy” recommendations (while still in progress) should be considered for inclusion in the Comprehensive Plan Update and the Mixed Use Zoning proposals. As supporting background, I have also including some the preliminary solar analysis which demonstrates that:

- **Buildings built too tall on narrow east-west streets create a significant solar impact.**
- **A significant amount of radial benefit is lost when blocking 20-35 degree sun angles on narrow E-W streets with 60’ ROW.**

A solar policy like the attached draft recommendations could help achieve more context-sensitive development and will go a long way towards engendering more broad support of mixed use density by existing communities as well as supporting more energy savings and resilience within our residential neighborhoods as well. Given Comprehensive Planning goals for increased density, as well as resiliency and livability, and existing precedents in other Oregon communities, it is recommended that there be further consideration of a solar equity and innovation policy for Portland.

The attached Climate Action Plan letter from NBI also documents the OR state statute that allows for solar access policies to be enacted by cities and counties and lists some recommendations for next steps.

Thank you for your attention to these draft policy recommendations. I encourage you to continue to be bold in your approach to livability and to further advance our national legacy of leadership in Portland.

Thank you so much for your community dedication and long-term vision,

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Portland Solar Equity & Innovation Policy for Consideration in the Comprehensive Plan Update PRELIMINARY DRAFT 1.7.16

GOALS

1. **Maintain Quality Access to Air & Light** (Equity)
2. **Encourage Climate and Community Resiliency through Innovative Energy Efficient Building Design** (Environment)
 - a. Provide incentives and bonuses for net zero energy and other ultra-low energy, verified, high performance buildings
3. **Retain Value for Commercial & Residential** (Economy)
 - a. Properties
 - b. Energy Generation/Solar (Hot water & PV)
 - c. Energy Efficient Passive Strategies (e.g. daylighting, thermal heating, and natural ventilation)
 - d. Urban Agriculture Production

POLICY RECOMMENDATIONS

1. Equity: Maintain Access to Air & Light

Recommendation:

- a. Maintain fair and reasonable access to sun, air and light for buildings, residents and the pedestrian right way.
- b. Provide windows on all sides of upper stories of residential buildings,
- c. Provide light wells where a building is planned to abut another future building façade

Why to support this policy:

- Support passive heating, and cooling and fosters more natural ventilation
- Minimizes large blank walls.
- Helps reduce overly concentrating windows on rear of buildings which can result in privacy impacts and “overlighting” at night of adjacent properties. Especially key where new development abuts residential zoning and existing residential uses.

2. Environment: Foster Innovative Building Design & Climate Resiliency

- a. Provide incentives to encourage compact, energy-efficient infill housing types. Buildings with x% solar or verified/certified ultra-low energy buildings (including net zero energy verified, or LEED, PassiveHaus, Earth Advantage certified mixed use buildings).

3. Economy: Retain Value for Commercial & Residential Properties:

Buildings built too tall on narrow east-west streets create a significant solar impact. This includes loss of access to the sun in the months Portlanders need it most for thermal comfort, heating, and daylighting, and also significantly impacts economic value for energy generation, and long term resiliency goals.

Policy Recommendation: Require a solar shading analysis as part of permit submittal requirements to identify and minimize/mitigate impacts where feasible through design strategies any significant overshadowing of an adjacent building or property. Measure solar shading onto adjacent properties on December 21st.

Why to support this policy:

- Saves energy and supports climate resiliency from passive heating and cooling, and natural daylighting.
- Excessive solar shading impacts thermal comfort. Access to natural daylight has commonly recognized and documented psycho-social impacts to health and well-being. Studies show connection between greater productivity and natural daylighting as well.
- Retain economic value of property owners on (or adjacent to buildings abutting) E-W corridors.

PROPOSED EQUITY & INNOVATION SOLAR POLICY

Comprehensive Plan Policy Implications & Recommendations

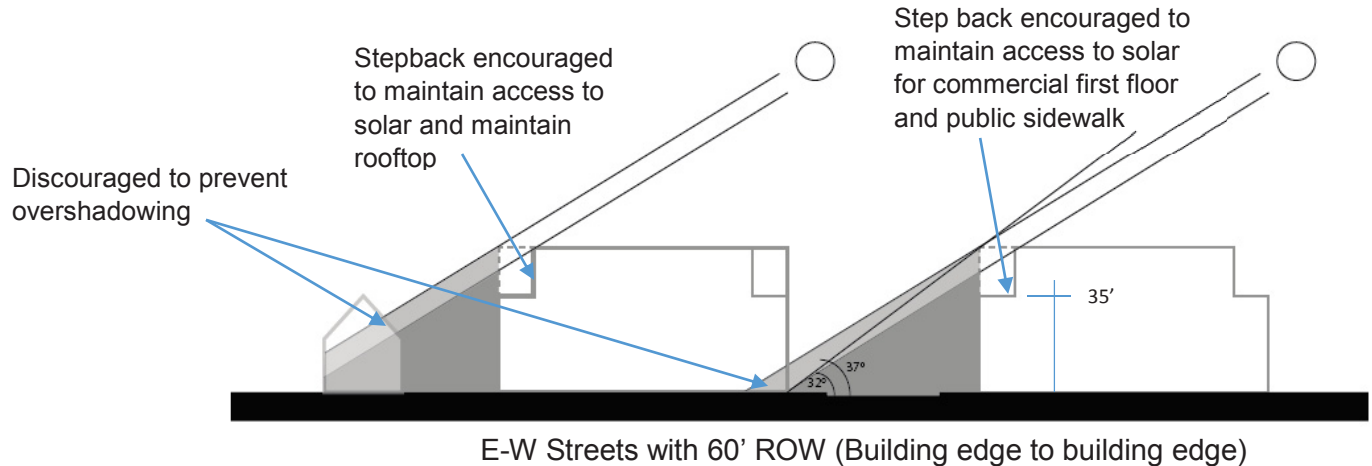
Comprehensive Plan

1. Maintain fair and reasonable access to sun, air and light for buildings, residents and the pedestrian right way.
2. Scale Building Heights to Street Widths -> Build taller buildings on wider streets.
3. Growth Strategy: Focus taller buildings on North-South Streets where shading impact is the least impactful to adjacent existing residential neighborhoods

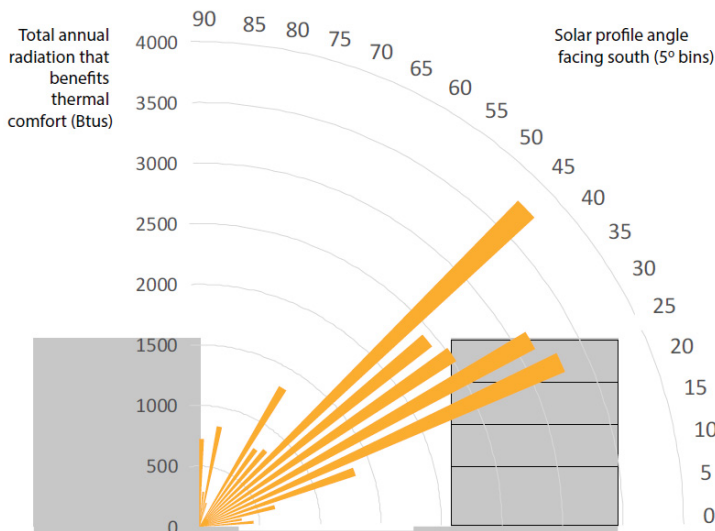
Mixed Use Zoning Recommendations:

1. 8'-12' step back of main street building façade beginning at 4th floor of street frontage
 - a. Specifically on narrow/60' E-W main street corridors. (e.g. Division, Sellwood)
 - b. Areas with a Neighborhood Center designation if desired (Woodstock)
 - c. Areas with smaller scale historic main street character (e.g Hawthorne, Mississippi, Belmont)
2. Provide windows on all sides of upper stories of residential buildings
3. Provide light wells where a building is planned to abut another future building façade

Encouraged and Discouraged Building Form & Shading Conditions on East-West Streets



PRELIMINARY SOLAR ANALYSIS FOR 60' RIGHT OF WAY (ROW)

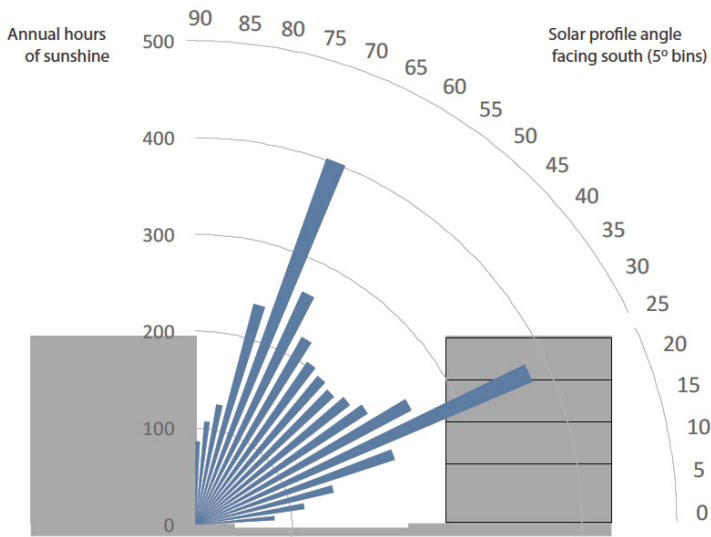


The Radial charts:

1. The number of hours per year that the sun is at a certain elevation, define by bins of 5 degree increments (and where each number represents 5 degrees less and up to that number), as measured off the horizon facing due south.

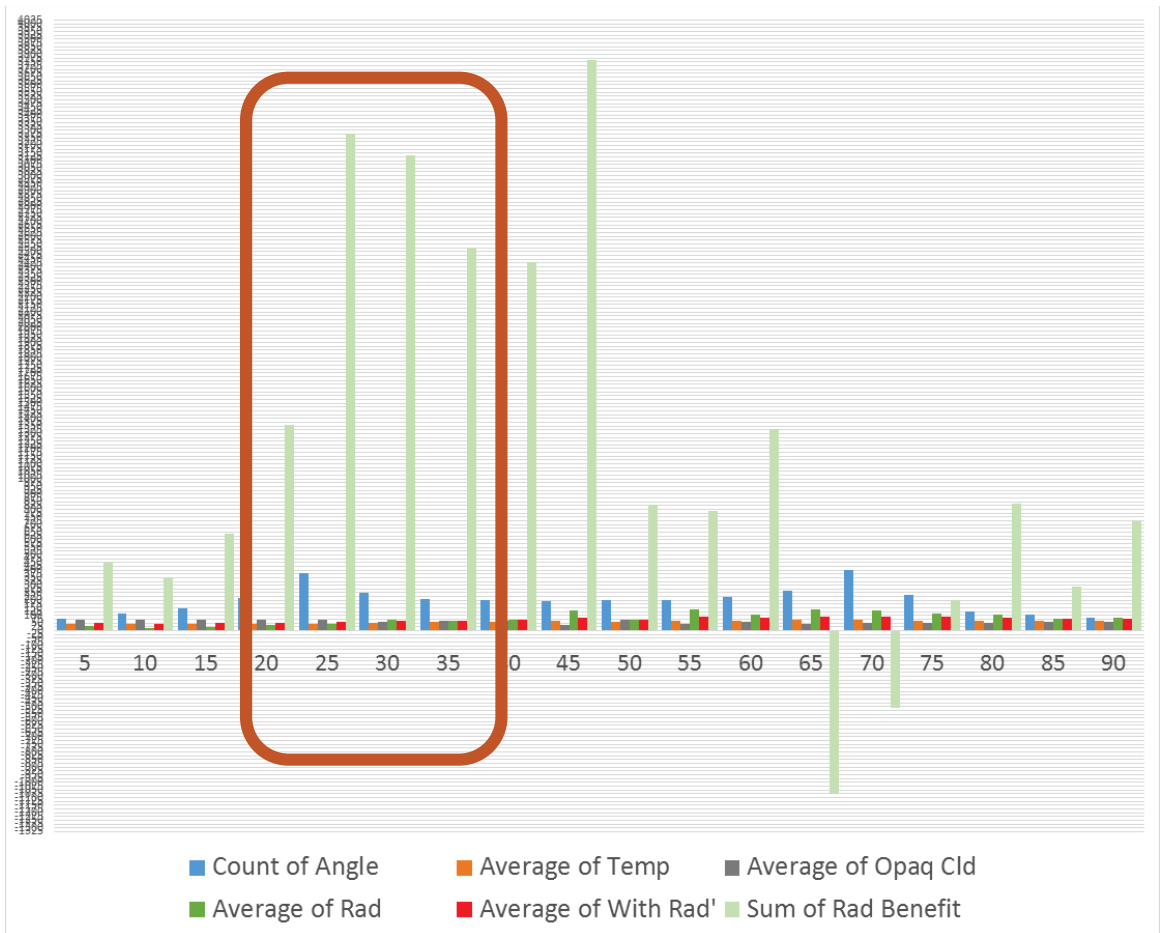
The sum of radiation is the number of useful BTUs (to bring effective temperature for a person outside up to 75F comfort), with the same southern angle binning.

Solar Shading Impact Analysis 60' Wide Right of Way Street



2. This second radial chart shows the number of hours that the sun is at certain angle. This diagram shows the beneficial radiation (which counts radiation when temp is < 75F), which shows the preponderance of these hours at low angle winter times.

3. The chart below shows the average temp (F), average radiation (Btu) and average cloud cover (0-10).



Conclusions:

- A significant amount of radial benefit is lost when blocking 20-35 degree sun angles on E-W streets.
- Buildings built too tall on narrow east-west streets create a significant solar impact.

(Excerpt from the Climate Action Plan comment letter submitted by New Buildings Institute to the City of Portland in April 2015. NBI is a national nonprofit think tank for high performance green buildings, providing policy, technical research and design guidance for new and existing buildings.)

Portland has experienced a significant amount of new development recently, with wide community concerns expressed about loss of solar access to adjacent properties. To accomplish the objectives in 3B Installed Solar and as it relates to desired urban form in item 4Q Better Multifamily Buildings, it is necessary to address solar access protection. With the knowledge that increased density allows protection of the urban growth boundary and provides great efficiencies in land use, transportation and overall sustainability, we support infill development, adaptive reuse of existing buildings and higher density development goals. Increases in development can help meet these goals, but they may also result in greater impacts to existing neighborhoods and adjacent properties that are not fully documented or analyzed. These impacts may include loss of solar access, which reduces the capability of adjacent properties to independently generate energy through onsite renewables. Other cities in Oregon such as Clackamas and Ashland have adopted policies for solar access protection. Ashland's policy ensures that a shadow on the north property line shall not exceed a minimum level as measured on December 21st.

Oregon state law states the following:

227.190 Solar access ordinances; purpose; standards

(1) City councils may adopt and implement solar access ordinances. The ordinances shall provide and protect to the extent feasible solar access to the south face of buildings during solar heating hours, taking into account latitude, topography, microclimate, existing development, existing vegetation and planned uses and densities. The city council shall consider for inclusion in any solar access ordinance, but not be limited to, standards for:

- (a) The orientation of new streets, lots and parcels;
- (b) The placement, height, bulk and orientation of new buildings;
- (c) The type and placement of new trees on public street rights of way and other public property; and
- (d) Planned uses and densities to conserve energy, facilitate the use of solar energy, or both.

Given Comprehensive Planning goals for increased density, as well as resiliency and livability, and existing precedents in other Oregon communities, it is recommended that there be further consideration of solar access protection policies. We would encourage the Climate Action Plan to include the following direction that will help support more zero energy and low-energy buildings, protect solar access and help mitigate any significant impacts.

Specific recommendations:

- 1) Work with the City of Portland to adopt a solar access protection ordinance consistent with state policy **227.190** above and other leading cities and counties in Oregon (e.g. Ashland)
- 2) Coordinate with the BPS and BDS to address the topics in state statute **227.190 (a)-(d)** above by incorporating, zoning code provisions, building design standards, and solar setbacks that help mitigate impacts to adjacent development, support livable and resilient communities, as well as energy self-sufficiency.
- 3) Integrate these policies with current Mixed Use Zoning project efforts to help ensure new zoning codes and policies for the placement, and allowed height and bulk of new buildings do not

significantly reduce the potential solar access of adjacent development and protects access to sunlight for both electricity generation systems and passive solar heating.

- 4) Require solar shading analysis as part of permit submittal requirements to assess impacts of new development to existing adjacent development.
- 5) Require mitigation for any significant impacts to loss of solar access. Below is the suggested language NBI provided in our comments on the Comprehensive plan:

Mitigate impacts from new development that substantively reduces solar access on adjacent properties and public rights-of-way. To balance goals for increased density in the Comprehensive Plan with the potential impacts from loss of solar access, all new development projects over 10,000 s.f. or over 35' in height should include a solar shading and impact analysis as well as a recommendation for mitigation of any substantive impacts on solar access.

Mitigation measures should include at least one of the following:

- a. Transfer of solar development credits
- b. Compensation to impacted individuals
- c. Development of (or contribution towards) shared community solar or other renewable projects.

*If solar access impacts are de minimis, then no mitigation would be required