MetroScope Testing of a Central Eastside Rezone to Mixed Use with URA Support

Introduction

The purpose of the present short study is two-fold. First, we intend to provide a fairly readable example of the various urban performance measures available from our integrated urban model, MetroScope. Second, we have chosen a relatively obvious example, the Central Eastside Industrial District, to display how adopting more flexible land use regulations in conjunction with Urban Renewal provides large benefits that are distributed throughout the 6 County economic region. Not parenthetically, the study also emphasizes the ability of a public policy financial tool such as urban renewal to provide widespread economic benefits.

The Central Eastside Industrial District comprises a roughly 1.5 square mile area extending south from Burnside Street to Powell and east from the Willamette River to roughly 15th Avenue. With a few exceptions the area is fully developed with 19th and early 20th century industrial/warehouse architecture. A limited commercial area lines the two major north-south arterials of Martin Luther King Boulevard and Grand Avenue. Some additional commercial has developed along the east approaches of the Hawthorne, Morrison and Burnside Bridges. With the exception of the MLK-Grand couplet most of the area remains in industrial zoning with much of it restricted to industrial and industrial serving employment. Besides the bridge approaches and the couplet, the area is bisected with the Union Pacific mainline and the I-5 Eastbank Freeway. Immediately, bordering the west side on the Willamette, the City of Portland had built the East Bank Esplanade that provides access to the River and a throughway for pedestrians and bicyclists. Construction has just commenced on a streetcar extension that will provide access via MLK and Grand to the Lloyd District and the CBD on the west side of the River. The urban design of the bulk of the Central Eastside and certainly the surrounding area for several square miles is late 19th and early 20th century urban traditional with high levels of mixed use particularly on 2 and narrow 4 lane, relatively low traffic speed former street car lines.

At issue here is the land use future of the Central Eastside Industrial District. It is safe to say that for the foreseeable future the industrial future of the area is nonexistent. Location, vintage real estate and land economics do not merit reserving the land for any form of industrial development. Industrial employment has consistently declined in the area over the last 20 years and encroachment by opportunistic development is actually the rule. Location trends and accompanying government land use actions have been to create industrial land capacity at the urban periphery and in low density areas with combined water, rail, road and air access. At the same time the real estate market has capitalized much of the future land use changes and opportunities into land values that substantially outsize the existing improvements and well exceed the land values that any industrial or warehouse development would be willing to pay. However, the existence of the industrial sanctuary designation has prevented the real estate market from embodying the area's development potential in actual buildings. As a result the area has experienced almost no development over the last 30 years and is replete with a large number of devalued and decaying structures.

Given our interpretation of the economic condition of the Central Eastside, we feel it is most appropriate and informative to examine the overall regional public welfare effects of changing the land use designation from industrial sanctuary to mixed use. Furthermore, we test the impact of combining the land use regulatory change with using the existing urban renewal area to promote the capacity for and subsidize the construction of up to 20,000 multi-family units, both owner and renter, at an average cost per unit of $50,000.

The vehicle we use to conduct this land use experiment is MetroScope, Metro's integrated land use and transportation model. Specifically, we run an experiment where we simulate the real estate development and transportation of the 6 County economic region for the period 2005 – 2040. We conduct one simulation with the existing industrial sanctuary zoning in effect to determine a baseline. Next we conduct a simulation with the mixed use zoning in effect and an assumption that the URA supports each dwelling unit constructed with an offset of construction costs of $50,000. Specifically, in the 4 census tracts covered by the Central Eastside Industrial District we make the following land use changes.

Central Eastside Mixed Use Experiment – Changes in Capacity

Census Tract No.	Urban Renewal Capacity Reference Case Scenario 910	Urban Renewal Capacity Mixed Use with URA in DU Scenario 913
10	0	5000
11.01	0	5000
11.02	0	5000
21	0	5000

As noted above we assumed that for mixed use the operation of the Urban Renewal Area would provide sufficient high density land capacity to construct a total of 20,000 units over a 35 year period.

Results – Comparing Output Indicators from the Two Scenarios

MetroScope produces a large array of data from each Scenario simulation covering travel, real estate development and prices at a spatial resolution level down to the Census Tract. What we present below are a few highly summarized measures that we feel best represent the effects of the zone change policy on the region and within the area of direct impact.

First using MetroScope we are able to compute "benefit/cost" ratios and such indicators as "ROI – Return on Investment" for the zone change policy relative to the reference case. Exhibit One below summarizes those calculations.

Exhibit One: ROI for Central Eastside Mixed Use URA

Infrastructure Savings (one time)	$	543,409,341
Present Value Private Transportation Cost Savings (@ 15 years)	$	920,064,384
Present Value Private Housing Savings (@ 15 years)	$	9,037,820,905
Total Benefits	$	10,501,294,631
Subsidy Cost (14138 units @ $50,000) +opportunity cost and risk adjustment	$	1,091,765,668
Benefit/Cost ratio:		9.62
ROI		16.29%

Exhibit One displays a number of indicators that require some explaining. MetroScope produces information that allows us to calculate a number of public welfare indicators of benefits and costs associated with any policy that is under test. Specifically, we compare total regional infrastructure costs for the proposed rezone with the reference case. MetroScope calculates local, community and regional infrastructure costs as a function of usage, density and travel (VMT). These are long run marginal economic costs so all development is charged proportional to its usage of the system regardless of whether surplus capacity currently exists or not. Consequently, all areas are measured in consistent terms unlike short run government budgetary accounts that confuse surplus capacity, replacement costs, project locations, etc. When region wide infrastructure costs are compared between the reference case and the simulated rezone, we find that development over the 35 year period costs $500 million less ($44 billion versus $43.5 billion) with the rezone.

MetroScope also produces estimates of VMT by census tract and household consumption group. We use these data to estimate annual household transportation expenses. Again we subtract region wide transportation expenses with the simulated rezone from the reference case transportation expenses to yield an estimate of annual savings. We limit the stream of benefits to 15 years for our study to compensate for benefits being less prior to complete build out in 2040. These annual benefit streams are reduced each year by compounding a rate of 3.5% (real rate of interest with inflation taken out) to arrive at a present value calculation for transportation cost savings. These savings amount to a present value of over $900 million.

Comparing annual housing costs yields an estimate of how much in housing expenses the simulated rezone saves owners and renters. Again, we limit the present value calculation to 15 years rather than 35 since the total annual benefits are only realized at the end of the 35 year period. Due to market place dynamics the reductions in overall housing prices while not great percentage wise are nevertheless distributed over the

entire housing stock. The result is substantial annual housing cost savings for the entire region. When annualized over a 15 year period, these savings amount to over $9 billion.

Summing up the 3 streams of benefits we arrive at a figure of over $10 billion that would be generated from the simulated rezoning and URA implementation in the Central Eastside Industrial District. We need note here that we are including for purposes of this demonstration calculation only benefits and costs that are "monetized" in the private or public markets. Uses of the commons such as air, water, habitat, etc. though relevant are not addressed in this analysis. Clearly, commons resources are not free and this analysis should not be regarded as endorsing methodologies and resultant studies that ignore them.

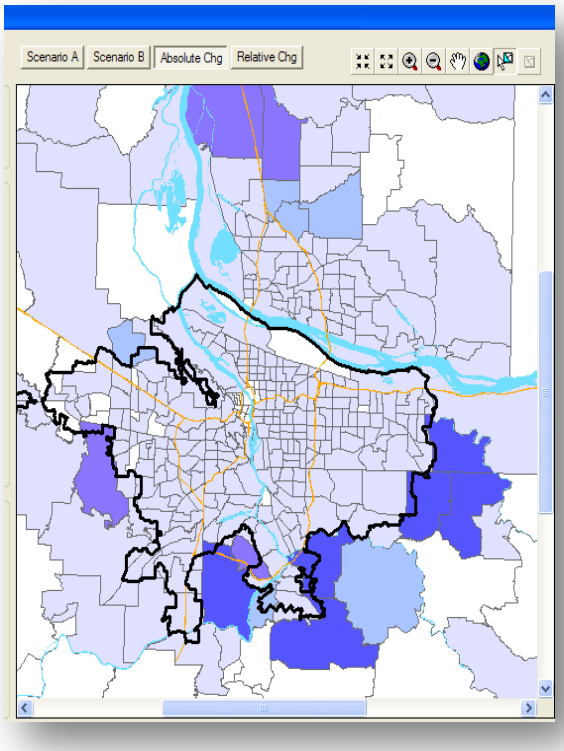
On the cost side of the schedule we count the money spent to reduce the construction cost of each dwelling unit actually built within the Urban Renewal Area. Of the 20,000 DU capacity created, 14,000 units are built through 2040. At $50,000 per unit the cost of the subsidy exceeds $700 million. Like infrastructure cost we assume this happens today rather than spread out over 35 years so the cost is higher than spreading and discounting would provide. Also, we include an opportunity cost compounding at 3.5% and a risk premium of 2.5%; so the total amount amortized over 15 years (same time frame as our benefit stream) amounts to $1.1 billion. The rezoning per se we regard as having no cost since we do not preclude any form of development but rather increase the range of allowable land uses within the present industrial sanctuary. Indeed, as our more detailed analysis points out employment within the zone and adjacent zones actually increases by roughly 2000.

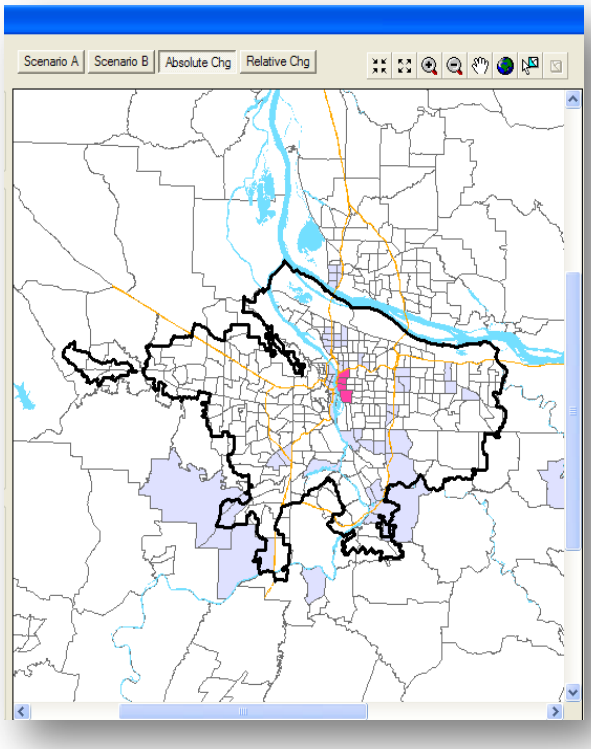
Comparing benefits to costs we see that benefits exceed costs by a ratio of 9.6 to 1. Viewed from a "Return on Investment (ROI) " perspective the $10 billion in benefits over 15 years represents an annual return of over 16% on the opportunity and risk adjusted investment amount of $1.1 billion. Assuming that our modeling simulation results are roughly correct, the resultant benefits are very large relative to the amount of public capital put at risk. So what processes lead to such a large response; given the fairly small nature of the policy incentive simulated? To get a better understanding of this we need examine some details of the MetroScope simulation.

Simulation Details

Exhibit Two below displays the map showing the census tracts within the 6 County region that experienced changes in housing numbers with the Central Eastside mixed use URA in effect.

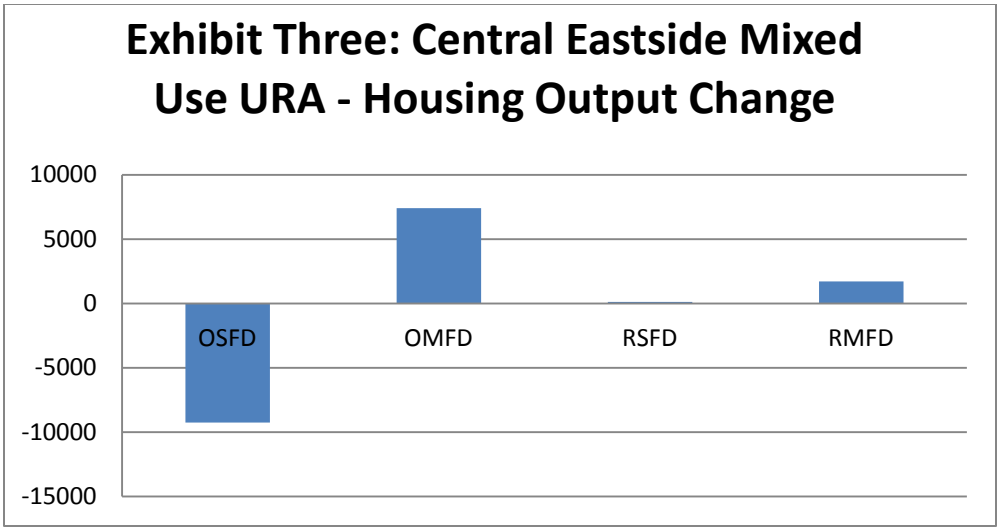
Exhibit Two: Growth of SFD at Urban Edge is Less; MFD Growth in Center is More





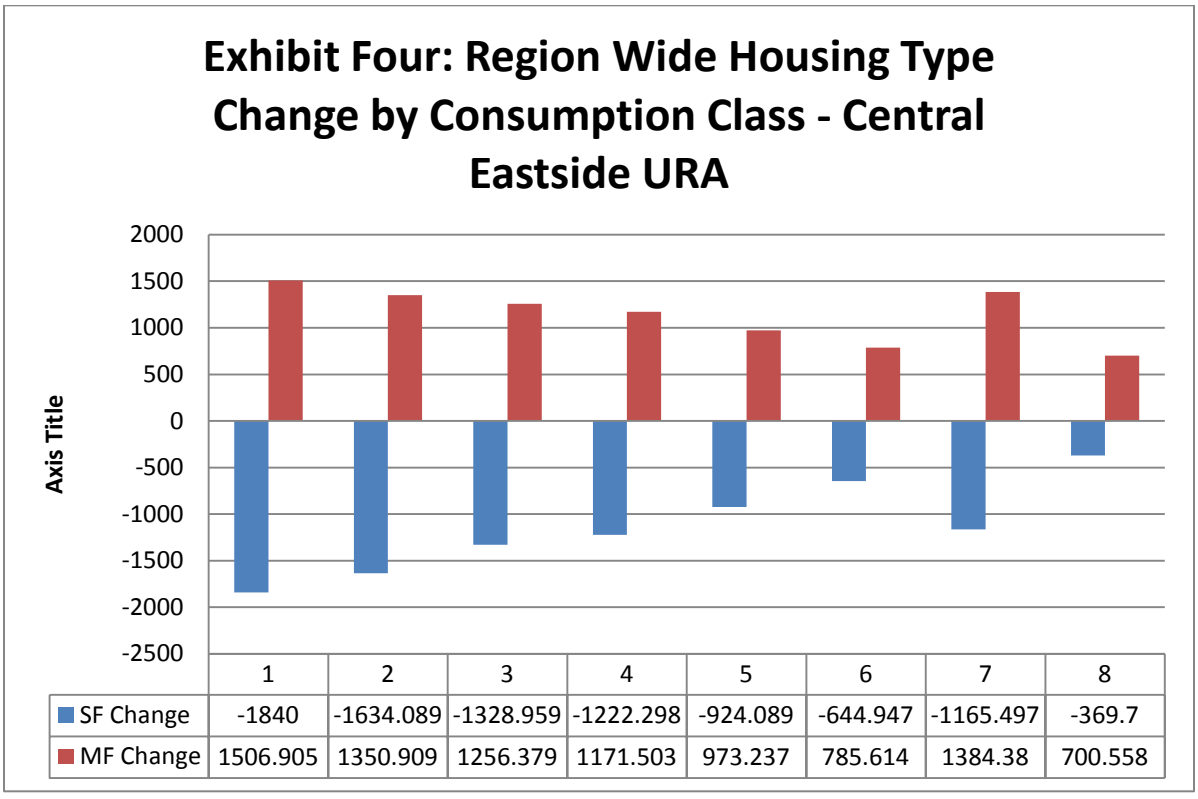
The skeptical among us should be immediately puzzled by the results presented in Exhibit Two. How is it possible to increase high density multi-family capacity in the center of the region and thereby reduce growth of low density single family at the region's edge? Are we simply a bunch of neo-traditional design partisans who are making up a fantasy? The answer is that the two maps represent the end result of a much more complicated set of demand displacements mediated by traffic congestion, shifts in demand prices and a latent demand for areas with high neighborhood amenity. The households occupying the new MFD capacity in the Central Eastside Industrial District are not the households that would have occupied low density suburban areas. Rather they are households already located close to the Central Eastside who would have located there if dwelling units in their price range were available. The households who occupy the locations vacated by the new Central Eastside occupants are similarly located fairly close in and now find available housing at a better location. Essentially we have a game of musical chairs with everyone moving one chair closer to the center. The result is that many of the chairs at the low density suburban fringe end up unoccupied. In the event that appropriately priced residential capacity is removed from the center, then the musical chair game moves outward so suburban and rural chairs must be added.

Exhibit 3 below depicts the region wide changes in residential output by housing type when the Central Eastside rezone is implemented.



In sum about 9,000 fewer owner occupied single family houses are produced region wide and about 9,000 more multi-family houses are built with the majority of those coming in the owner occupied category.

Exhibit Four presents the regional change in single family and multi-family housing units divided into the 8 household consumption classes. From Exhibit Four we can see that the shift is pretty much symmetrical. The largest SFD reductions are in the lowest income classes while the largest MFD gains are generally in the lowest income classes. The major differences are that the SFD losses are predominately remote locations on the urban fringe while most all of the MFD gains are in the Central Eastside Industrial District.



	1	2	3	4	5	6	7	8
SF Change	-1840	-1634.089	-1328.959	-1222.298	-924.089	-644.947	-1165.497	-369.7
MF Change	1506.905	1350.909	1256.379	1171.503	973.237	785.614	1384.38	700.558

Exhibit Five presents the growth data for the 4 census tracts comprising the Central Eastside Industrial District.

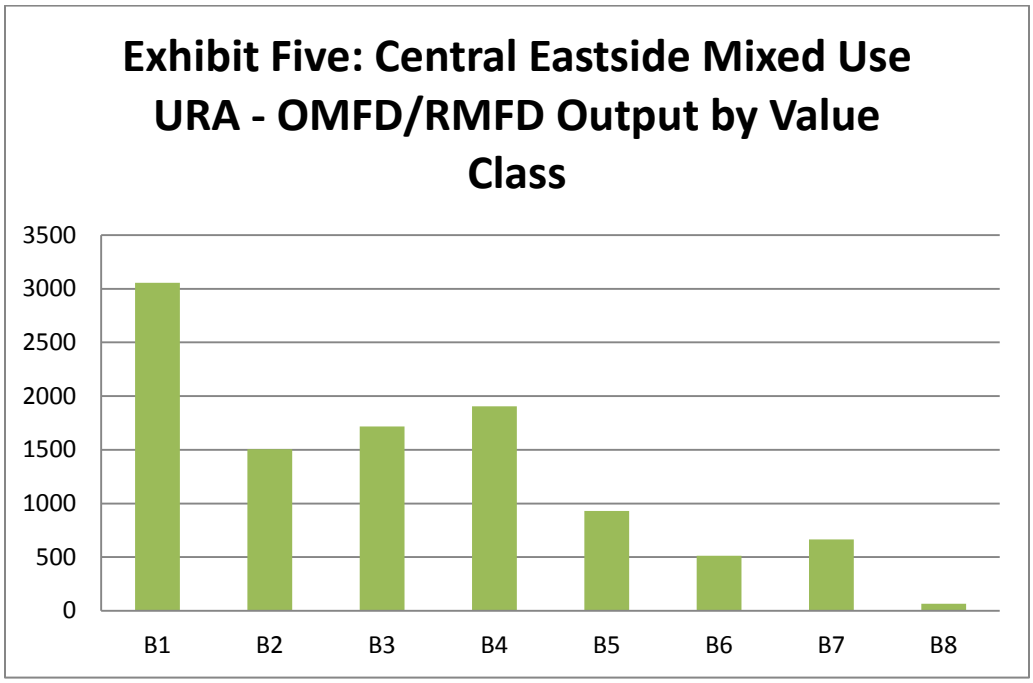


Exhibit Five indicates that within the Central Eastside the majority of the new dwelling units constructed are in the lower one-half of the household consumption categories. Unlike similar high density multi-family development in the Pearl and Westside, the bulk of the units will be occupied by low to middle income households. Unlike the Westside the MetroScope mixed use simulation brings large numbers of assisted housing units onto the market in each 5 year forecast period. Market "saturation" insures competitive pricing and brings housing units within reach of a much larger segment of the population.

Of central significance to Metro policy formulation is the impact of a particular initiative on land consumption. Exhibit Six displays the land consumption differences between the reference case and the rezone to mixed use simulation.

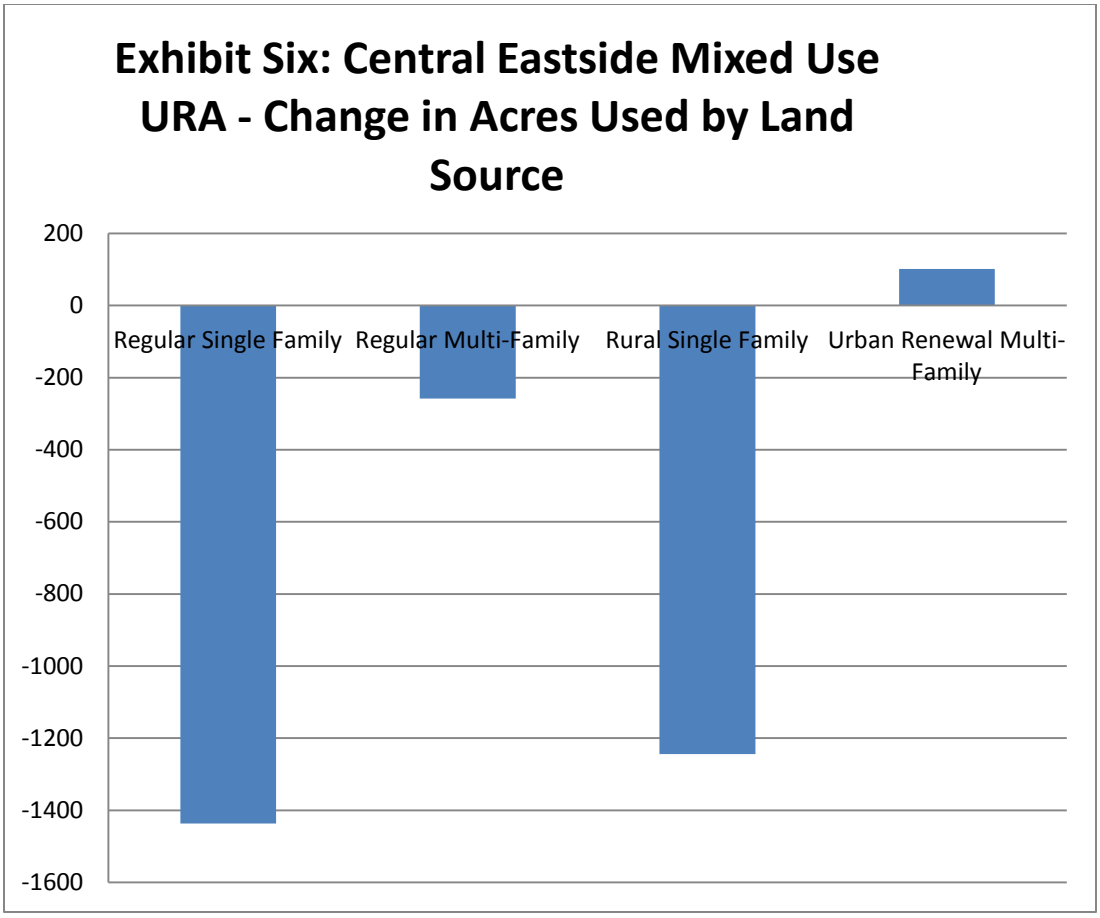
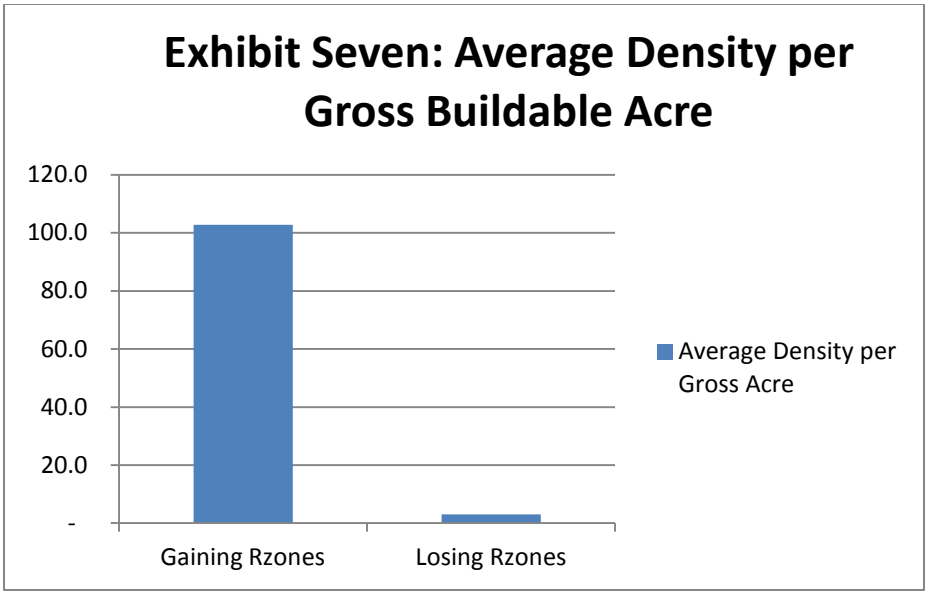


Exhibit Six indicates the rezoning the Central Eastside dramatically reduces the gross buildable acres of land used for urban single family and rural single family development. In return for about 100 acres of urban renewal area being used for multi-family, the region saves 1,400 acres of urban land and 1,200 acres of rural land from being developed. Significant is the rural single family acreage since this is development at very low density of about 1 unit per 5 acres.

Exhibit Six really begs the question of density. In Exhibit Seven we compare the resultant 2040 density of the rezoned areas to the density of the areas that lost dwelling units in the rezone simulation. In Exhibit Seven we note that the average density per gross buildable acre is over 100 du per acre for the rezone areas. Conversely, the density of the areas at the urban periphery that lost dwelling units averages slightly over 3 du per gross buildable acre.



Exhibits Six and Seven taken together indicate that by rezoning a high demand area from industrial sanctuary to mixed use and making use of the existing urban renewal area, the region could possible save thousands of acres and greatly increase densities in an area close to many jobs and very well served with a variety of transportation choices.

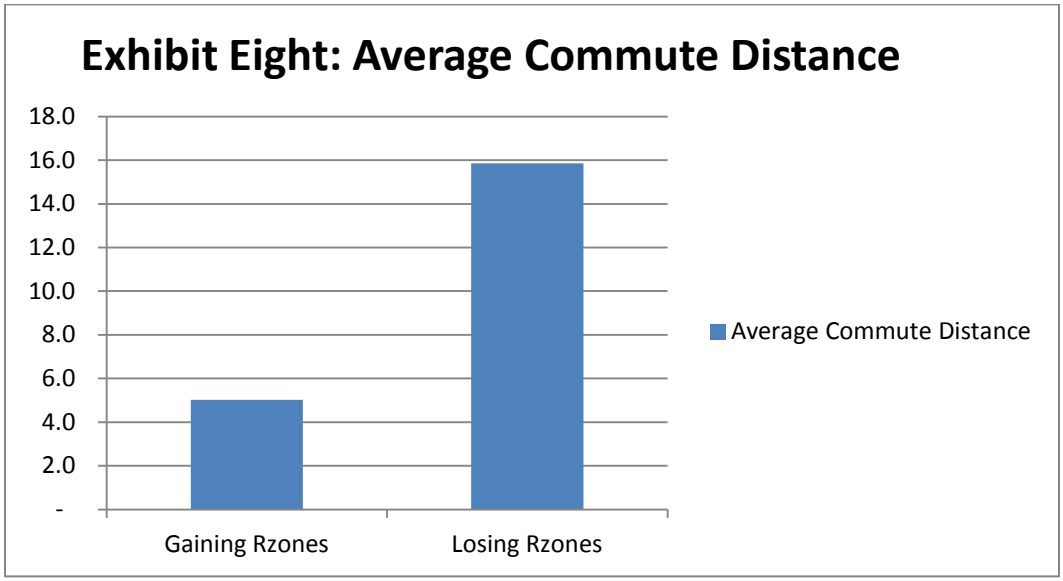


Exhibit Eight follows the same format as Exhibit Seven. In this case it compares the average work trip length of the gaining zones to that of the losing zones. In this instance we note that the average work trip length of households in the rezoned Central Eastside is about 5 miles. The average work trip length of households in areas at the urban periphery that lost dwelling units is 16 miles. Moreover, the likelihood for the commuter at the urban edge of being an auto commuter is about .9 while the likelihood for Central Eastside commuters is about .5.

Shorter commutes and lower private vehicle use amount to greatly reduced VMT. Less VMT and much higher densities also directly translate into lower infrastructure costs. It is worth repeating that we calculate

infrastructure cost on the basis of how much capacity is required (or used). Existing surpluses or accumulated depreciation associated with any particular jurisdiction are irrelevant. What matters is how many units of streets, sidewalks, sewer and water pipe, parks, classrooms, freeways, transit, etc. are required per dwelling unit constructed. Not surprisingly, most of the infrastructure cost variation can be explained as a function of density and of vehicle miles traveled per household. Exhibit Nine summarizes total infrastructure costs for the gaining zones in the Central Eastside and the losing zones on the urban edge.

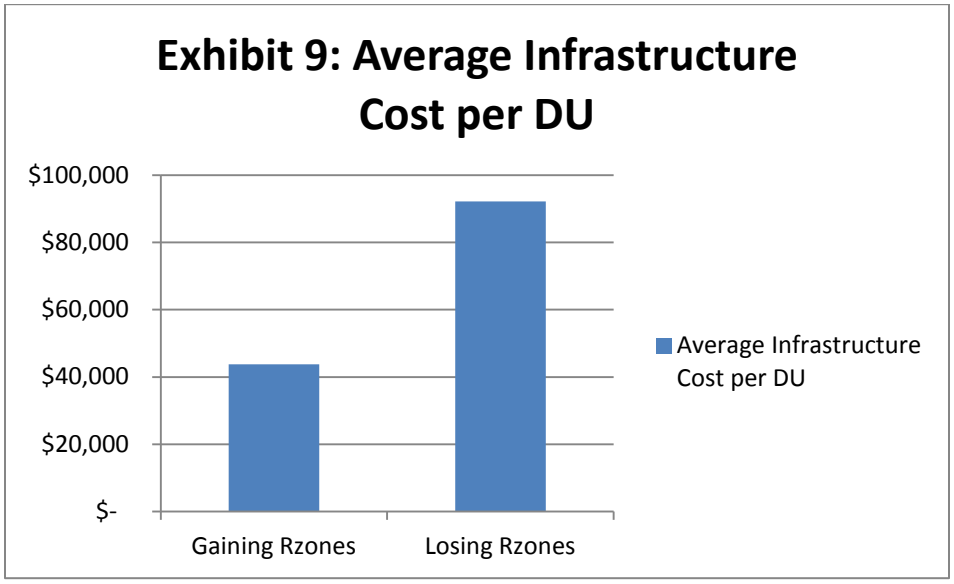


Exhibit Nine indicates that the average total infrastructure cost per DU for the high density multi-family amounts to over $40,000 per unit. Conversely infrastructure costs for the losing zones comes in at an average of roughly $90,000 per unit. These differences owe to the much higher density of the gaining zones and commute distances being about 1/3 those of the losing zones.

Exhibit Ten depicts the region wide impact on home prices of the rezone simulation of the Central Eastside Industrial District.

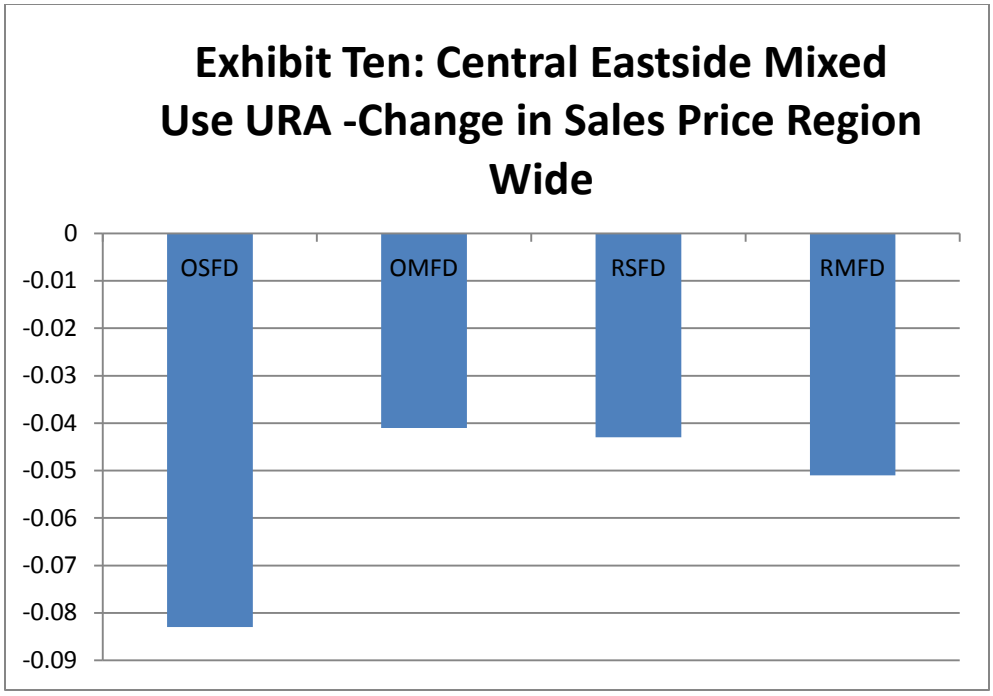


Exhibit Ten indicates that the largest price reduction occurred for the OSFD housing type; none of which are produced in the rezoned Central Eastside Industrial District. Conversely, the smallest price reduction came in the OMFD category that experienced the largest increase in production as a result of rezoning the Central Eastside. Similarly striking is that price reductions for all housing types ranged from 4% up to over 8%, while the amount of housing output shifted to the Central Eastside amounts to about 2.5% of the total to be built over the 2005 – 2040 period – why such a profound impact particularly on housing types not directly impacted by the rezone?

The answer to the question lies on the supply side rather than the demand side. Due to changes in demographics over time, increasing traffic congestion and lengthening travel times, there is disproportionate demand growth for higher density, centrally located housing products in areas of moderate to high neighborhood amenity. The problem has been supply; more specifically overcoming lack of capacity, gravity and economies of scale. MetroScope and by extension the market it models solves this problem by raising real estate prices. Increasing prices have two effects. One, higher prices enable suppliers to provide housing in more expensive locations and two; it induces households to locate further away in cheaper, less accessible locations. Our simulated operation of the Central Eastside Industrial District URA provided for the creation of up to 20,000 dwelling units in precisely the area of highest pressure. The simulation allowed the balloon to lose some pressure and contract somewhat on the edges. Loss of demand for SFD on the urban periphery was compensated for in the model simulation by reducing prices the most for the product whose aggregate demand declined the most.

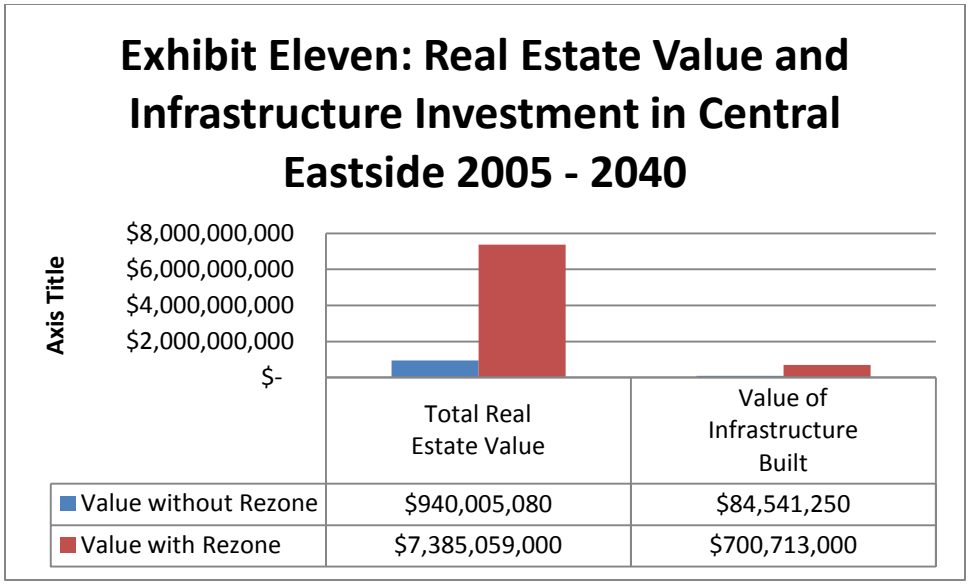


Exhibit Eleven provides a final measurement of economic impact specific to the Central Eastside Industrial District. From a public welfare perspective this is relevant since the private value of real estate created within the District determines the ability of the Urban Renewal Area to fund building subsidies and infrastructure investment. As Exhibit Eleven indicates over $7 billion in private residential real estate development occurs with the rezone and less than $1 billion without it. Similarly, private development contributes over $700 million toward infrastructure with the rezone and less than $100 million without it.

Summary

The point of the above presentation has been to demonstrate how MetroScope can be used to produce a wide array of indicators that measure change in public welfare as a result of different public policy options. We have deliberately chosen a very clear case to provide this demonstration. The Central Eastside Industrial District by virtue of zoning restrictions is for the most part limited to the least intensive urban land use. Strikingly, the location of the Central Eastside Industrial District places it adjacent to and surrounded by some of the most intensive urban land uses. Not surprisingly, when we use MetroScope to simulate the rezoning of the area to mixed use, we obtain dramatic increases in public welfare that extend throughout the economic region. It is fair to say that any prudent or knowledgeable person would come to the same conclusion without benefit of an Integrated Transportation and Land Use model. However, using the model provides us a wide array of quantitative data to fully appreciate the extent and scope of the economic impacts. Most importantly, there are many potential policy options and a large number of areas that do not provide such a clear cut set of options and outcomes. In these instances, the modeling approach appears even more valuable.