Python 3.11.11 | packaged by conda-forge | (main, Dec 5 2024, 14:24:23) [Clang 18.1.8 ]

Type "copyright", "credits" or "license" for more information.

IPython 8.32.0 -- An enhanced Interactive Python. Type '?' for help.

%runfile /Users/juanramonjimenezmogollon/Downloads/Improve\_Hornsrev1\_Layout\_JRJ\_11\_03\_2025V2.py --wdir

WARNING: This file contains a global statement, but it is run in an empty namespace. Consider using the 'Run in console's namespace instead of an empty one' option, that you can find in the menu 'Run > Configuration per file', if you want to capture the namespace.

Enter Site to be used 1-IEA37, 2-Hornsrev1, 3-UniforSite: 1

Enter Iteration Lenght in meters: 10

Enter Number of Iterations on each Generation: 400

Enter Number of Genetic Generations: 20

Enter border aditional distance from actual laylout in m: 20

Original AEP: 715.702891 GWh

Best solution on reference layout randomized Generation 0:

([423976.4321242075, 424035.17257662956, 424108.17069528264, 424176.6121236024, 424244.3539085627, 424308.63163164933, 424377.64470884495, 424451.0559037792, 424532.4556607379, 424603.3016065181, 424666.3023460802, 424740.1127933737, 424804.5700327943, 424872.1221629164, 424950.7716078556, 425013.67166492774, 425099.4824669075, 425162.35723589984, 425230.725868494, 425300.89412388304, 425361.0441945742, 425434.46729340137, 425498.9567637146, 425571.17403875757, 425649.8336616996, 425727.6352748431, 425794.62893722276, 425856.73943556525, 425929.02857688215, 425989.5084143019, 426070.0454465719, 426138.84164408, 426218.5138701453, 426281.53954843694, 426351.78736967314, 426421.4927077629, 426483.4853139769, 426558.1007185593, 426625.5007447933, 426694.2983983284, 426773.5697539388, 426835.84730126936, 426912.6527530083, 426976.03306196694, 427053.0036564457, 427108.8312922301, 427178.162377956, 427254.58024425345, 427332.73592256993, 427406.34071301593, 427468.80306621286, 427535.8668832671, 427609.7058628709, 427672.2627676854, 427738.48928315425, 427806.2655397445, 427900.0874091094, 427958.98314242816, 428031.5193970959, 428104.7441345406, 428170.9741072027, 428238.1966091102, 428298.95091346046, 428368.4029973866, 428456.59218305873, 428528.3330156531, 428584.98591945984, 428661.31172797136, 428733.86743036105, 428797.749473626, 428867.92420257296, 428931.1115754149, 429014.37625061517, 429085.8586746355, 429155.8337622941, 429212.3250510554, 429293.92733138066, 429357.153652207, 429430.59536081617, 429489.14535231586], [6151447.082164478, 6150891.9945477545, 6150330.639763463, 6149781.354693743, 6149223.275592542, 6148669.144356707, 6148105.861001554, 6147551.670495368, 6151446.697371956, 6150893.16399602, 6150333.7703985525, 6149784.161814235, 6149224.7905701455, 6148662.35959956, 6148111.639270205, 6147553.51063915, 6151452.055863656, 6150889.929730688, 6150337.363222691, 6149776.687826914, 6149225.498770404, 6148666.7926833965, 6148115.32043358, 6147558.49502798, 6151448.131518957, 6150887.8262580875, 6150339.247287834, 6149784.542508879, 6149227.353712674, 6148672.709106772, 6148107.889036914, 6147549.192945385, 6151453.909680251, 6150897.389864138, 6150329.464707558, 6149783.95601401, 6149218.310230689, 6148669.1983148465, 6148117.043269171, 6147558.435302536, 6151441.896099775, 6150889.1763938805, 6150329.423911248, 6149777.329465932, 6149218.432077232, 6148674.946074188, 6148115.974078195, 6147552.316242497, 6151452.2892799005, 6150897.7207206, 6150336.086882619, 6149777.045069496, 6149218.374618538, 6148669.340525268, 6148110.3681282615, 6147549.046634269, 6151449.600445778, 6150892.391181904, 6150332.659971269, 6149772.617809972, 6149226.8230928825, 6148671.748855765, 6148111.360271377, 6147559.827437242, 6151450.882311344, 6150893.962227869, 6150341.307668577, 6149782.100689802, 6149227.199418268, 6148662.698211415, 6148118.335293639, 6147557.224605709, 6151449.194876328, 6150885.991587342, 6150333.317826042, 6149773.12714638, 6149217.716777712, 6148671.358028033, 6148105.562635546, 6147553.839956604])

aep\_best\_sol on reference layout randomized Generation 0: 715.723032584982

Best solution on Genetic Generation 1:

([423974.2729404701, 424028.7191519375, 424105.4069798367, 424171.4933096164, 424240.54085162655, 424309.3467684598, 424375.44931540015, 424447.8793753329, 424530.5483924858, 424602.37180501927, 424670.4694217764, 424742.5542648481, 424799.6914388203, 424876.5780600325, 424954.2510039097, 425011.3236413639, 425101.3475440694, 425156.1714222635, 425236.1507700933, 425303.4811513288, 425360.65346608876, 425435.51018933963, 425497.8018650958, 425568.82683652284, 425643.6656656655, 425720.6674450017, 425794.45474820305, 425859.06789662613, 425932.60121301207, 425988.6381839049, 426071.2017714388, 426141.04429583, 426214.9491828047, 426277.4257759637, 426356.78295463865, 426417.024407536, 426487.4510528503, 426561.88911472814, 426624.8639611942, 426690.56485210534, 426778.41520894895, 426837.9641136647, 426908.1329379811, 426974.9570249797, 427050.35499488696, 427105.35552710894, 427177.0166536069, 427254.7715298737, 427339.66783578135, 427406.4559534848, 427466.3444136379, 427535.352991809, 427609.49744859256, 427678.83780986647, 427736.79162464774, 427802.7352473472, 427893.9407253927, 427964.4583141929, 428036.3203704452, 428107.21299503464, 428165.4426694389, 428241.85232376354, 428304.38403729134, 428361.85368823144, 428458.49766904954, 428531.6010029566, 428590.0147866919, 428655.27374832594, 428732.8076835205, 428797.34544243384, 428865.89549350063, 428924.49553473294, 429011.6317968148, 429089.40302122524, 429152.40255828784, 429215.6270033877, 429293.24453591846, 429361.30045748333, 429425.08608794474, 429490.95470996015], [6151440.774938505, 6150896.842784647, 6150337.327959193, 6149779.131106028, 6149219.409795469, 6148671.514521835, 6148108.883497444, 6147556.881245127, 6151449.039307674, 6150892.227072, 6150334.536005909, 6149780.994689829, 6149224.770800491, 6148656.1580816405, 6148111.120103756, 6147552.224562833, 6151452.872934884, 6150884.496341186, 6150340.203458377, 6149774.879359261, 6149230.331852982, 6148660.258184634, 6148115.687692506, 6147563.238718944, 6151448.346886621, 6150894.713797244, 6150333.444409767, 6149783.047519194, 6149223.919641281, 6148667.429598057, 6148106.993809776, 6147549.633249775, 6151451.13379061, 6150890.668857125, 6150332.234683535, 6149784.355144812, 6149218.42543527, 6148664.9946471155, 6148111.883436232, 6147553.120626855, 6151442.810766091, 6150884.480458813, 6150330.425557347, 6149774.174707671, 6149212.999879311, 6148678.363895381, 6148109.033521968, 6147551.047384754, 6151456.536972533, 6150902.91077537, 6150335.273640734, 6149772.876988542, 6149215.155031214, 6148671.578323088, 6148106.527614555, 6147545.209106179, 6151455.509682973, 6150896.464966942, 6150329.0118282465, 6149775.348740962, 6149227.300539967, 6148673.486986255, 6148107.780752881, 6147556.254594336, 6151455.875039824, 6150890.091277674, 6150336.294066517, 6149777.795711841, 6149229.033010115, 6148660.081537933, 6148118.786299409, 6147556.499255594, 6151454.850954622, 6150884.794036879, 6150328.14414272, 6149773.584196193, 6149215.471701703, 6148665.226060842, 6148106.0895997435, 6147552.725412507])

aep\_best\_sol on Genetic Generation 1: 715.7898651687876

Best solution on Genetic Generation 2:

([423965.03101757355, 424035.91707556363, 424095.4229862164, 424175.703598026, 424249.5754409338, 424301.13855466456, 424372.83804137335, 424453.092209453, 424538.90134535875, 424605.68866579013, 424670.858643756, 424735.05282275734, 424801.26568128547, 424869.2994199907, 424956.9428971975, 425006.1013982742, 425099.60494837555, 425161.75495470467, 425229.7537913458, 425303.80812884925, 425357.5474582022, 425431.41284976463, 425507.46893089317, 425569.6939055877, 425646.9760178202, 425717.98586440604, 425788.8654326619, 425856.6983716261, 425928.2183470297, 425995.92238374794, 426066.5153957942, 426131.3198107161, 426205.1734902623, 426282.476801755, 426364.01131428924, 426407.08881927014, 426483.8750397549, 426553.393047362, 426622.17609523976, 426684.6470297037, 426786.89036353235, 426840.84329433826, 426908.76020911353, 426976.73155224486, 427054.98630012415, 427103.20260512654, 427184.7583999653, 427254.99080399243, 427347.7216789843, 427403.28287243436, 427473.08512195933, 427529.5481369723, 427616.85671262286, 427680.16717864113, 427744.7194712776, 427794.8631188265, 427896.8712515564, 427971.5828789849, 428026.4941796681, 428098.5583067017, 428160.49023248145, 428248.55808583857, 428300.3126498597, 428352.94072407077, 428458.25137313415, 428534.5263205, 428585.04626525467, 428652.01619968395, 428732.3743675872, 428797.41936371656, 428862.36570934847, 428932.5691571792, 429019.0171365545, 429094.9719316874, 429160.7322308903, 429211.8596923521, 429294.96635204117, 429369.00163099664, 429429.6769729414, 429495.57629742764], [6151442.540176219, 6150900.395895726, 6150331.147318215, 6149776.331155309, 6149228.490593175, 6148666.631732253, 6148110.004555838, 6147549.765846539, 6151455.38488324, 6150895.519444128, 6150336.6515370235, 6149781.723035716, 6149221.244803405, 6148658.803158384, 6148103.526273797, 6147560.53790969, 6151452.109952385, 6150884.091177512, 6150339.482243106, 6149775.179397643, 6149229.154688063, 6148665.126803342, 6148113.945334612, 6147556.934787604, 6151456.931713147, 6150885.555101286, 6150335.345177493, 6149791.200659176, 6149218.361675956, 6148668.552994898, 6148099.3169434685, 6147553.596511052, 6151460.895830896, 6150892.5419885535, 6150338.529613615, 6149775.277255113, 6149216.59461436, 6148660.150359832, 6148120.475791201, 6147549.726537865, 6151452.276521013, 6150888.994950815, 6150329.387930345, 6149767.262385919, 6149205.7686154, 6148687.843510626, 6148100.428077238, 6147547.9530554125, 6151462.191766978, 6150909.217840212, 6150327.31955469, 6149772.078193152, 6149218.205086798, 6148668.207721964, 6148100.721107595, 6147541.542755272, 6151463.185301367, 6150899.562615942, 6150337.790717672, 6149771.610699707, 6149234.917430476, 6148667.124072249, 6148105.62200656, 6147555.570515097, 6151464.331023658, 6150886.978783463, 6150345.334576807, 6149773.459112631, 6149222.024626682, 6148667.501763434, 6148124.309247363, 6147554.023336197, 6151459.976883617, 6150892.058711536, 6150337.165846003, 6149782.7965640975, 6149210.148116396, 6148669.688503526, 6148113.493261652, 6147555.58037841])

aep\_best\_sol on Genetic Generation 2: 715.7970526576628

Best solution on Genetic Generation 3:

([423966.7511270152, 424037.43033491547, 424092.34953589033, 424172.1998375722, 424246.6585100551, 424296.03402113135, 424368.9469918878, 424458.47672401153, 424538.57120060734, 424600.11471386976, 424671.2784849329, 424734.76624600077, 424801.5596869825, 424876.0850421515, 424952.3727358587, 425005.95729069266, 425101.3064702165, 425155.0856122949, 425225.28268278943, 425308.9348764846, 425352.46206155256, 425428.9032892777, 425505.598007098, 425567.34704190696, 425641.24853639316, 425713.3626006732, 425782.17803735164, 425861.5248863931, 425933.7344134586, 426000.6279804245, 426061.8873098695, 426126.2907646326, 426205.76217414247, 426281.20159059146, 426367.66178570595, 426407.46005579625, 426486.7718149181, 426551.5740056806, 426622.9438946742, 426680.0862896861, 426786.4579883669, 426847.4804073488, 426901.80053677346, 426981.0714277154, 427049.2923003003, 427108.0998670402, 427183.3429860251, 427249.75516845705, 427348.21743595664, 427404.9211184755, 427473.7060112602, 427532.24058759236, 427612.8960263794, 427678.07610162377, 427738.13598701503, 427790.9589604483, 427901.46397082164, 427975.29120004165, 428032.8870660964, 428096.76942302176, 428161.2863415737, 428250.3931931853, 428305.02756261686, 428351.348727785, 428452.1927540712, 428540.82229736616, 428591.33063765906, 428658.21139601263, 428725.73743645445, 428793.8150168621, 428861.6219915586, 428925.7579047, 429025.5257265067, 429091.43202438124, 429155.86602660315, 429205.15377990506, 429293.9023369578, 429366.45222618023, 429431.70289474714, 429499.89992217376], [6151448.031930715, 6150903.729971233, 6150336.04357767, 6149774.830363776, 6149233.945319675, 6148664.509859636, 6148110.870252998, 6147543.738565503, 6151454.392846836, 6150891.608775347, 6150337.031509211, 6149785.938607078, 6149221.744805811, 6148661.233643428, 6148110.40754827, 6147558.311239263, 6151452.00969656, 6150888.573343307, 6150333.507598585, 6149774.374725736, 6149226.767380784, 6148669.168141776, 6148107.4426974, 6147557.7529786825, 6151453.308232495, 6150882.316706267, 6150329.36598007, 6149788.838567977, 6149216.086369078, 6148662.284951711, 6148095.3311979715, 6147550.833299527, 6151457.878952937, 6150898.485110454, 6150337.374386444, 6149780.099448669, 6149212.633650128, 6148660.462055846, 6148114.518617668, 6147544.9424934685, 6151453.533823507, 6150887.070573892, 6150331.43260743, 6149773.706128831, 6149207.51825417, 6148689.691485121, 6148104.763254746, 6147543.402519853, 6151458.967166951, 6150904.604915975, 6150330.182023546, 6149775.228357191, 6149213.56617994, 6148668.596409917, 6148103.966778995, 6147536.0889242655, 6151460.796617598, 6150896.8415332185, 6150341.21547487, 6149778.270610891, 6149230.946145165, 6148660.588765402, 6148101.671479459, 6147551.596067491, 6151463.250724482, 6150883.668872355, 6150347.614750962, 6149768.551373885, 6149219.3240651395, 6148670.506456404, 6148122.455722653, 6147554.511044463, 6151461.364487299, 6150897.048504104, 6150339.552442408, 6149780.303085716, 6149215.56942723, 6148666.638887244, 6148118.968125299, 6147551.986518275])

aep\_best\_sol on Genetic Generation 3: 715.8666326147877

Best solution on Genetic Generation 4:

([423971.3280368433, 424032.0338851025, 424092.9006298854, 424166.17707226926, 424241.69597018004, 424297.321085153, 424364.480909751, 424456.09284231643, 424540.9859279031, 424598.3708466293, 424666.16047583503, 424730.92497757945, 424796.3811411912, 424870.02900086297, 424954.5315724619, 425008.1888641855, 425100.2915962076, 425159.43865406944, 425222.5596785365, 425306.8957658388, 425352.41216376977, 425432.83473565604, 425501.5327374866, 425563.2962497201, 425640.01614715095, 425713.7869369974, 425788.6425501415, 425867.159842062, 425928.1665162781, 426007.02335195575, 426064.63741843594, 426128.6430371797, 426203.7887985169, 426279.27177733683, 426365.1962967953, 426414.2428861709, 426492.35300068185, 426549.59257774294, 426623.05053932336, 426683.99951916497, 426787.5992055312, 426851.7193682988, 426900.800462584, 426985.30530212406, 427042.61253470974, 427105.7295850832, 427177.9972129868, 427255.63069129403, 427348.52772529185, 427409.99429662456, 427469.1702519817, 427532.3166166989, 427615.4503980428, 427671.4401756043, 427741.09763144597, 427794.39707506594, 427897.85953188775, 427970.50170450966, 428035.4152582174, 428093.2944301811, 428156.9729445498, 428250.43418492103, 428306.18921337085, 428352.32200466556, 428454.3240114704, 428534.6560456631, 428586.455962475, 428663.01081739337, 428724.23564404546, 428798.0339701133, 428863.8170549129, 428928.93937349325, 429024.57905590016, 429086.626229941, 429161.61576687475, 429210.0803419805, 429292.89340015646, 429367.41868922126, 429429.6232758541, 429499.4423140559], [6151453.070420721, 6150900.114205234, 6150336.354586985, 6149769.969280828, 6149229.470074587, 6148662.647925934, 6148116.256230868, 6147548.052550834, 6151460.326647036, 6150890.414435545, 6150342.796919927, 6149780.214085139, 6149227.3384003565, 6148655.407981549, 6148117.1276014475, 6147557.393161845, 6151452.3452845095, 6150883.230047119, 6150331.974567778, 6149767.613736379, 6149222.423051687, 6148670.148293885, 6148100.711531094, 6147561.016690625, 6151458.43480802, 6150887.634393901, 6150323.800303248, 6149791.516725059, 6149213.181755408, 6148660.66793008, 6148098.922972103, 6147550.073732777, 6151457.395728617, 6150892.385319703, 6150333.143637476, 6149774.06810962, 6149205.920345472, 6148658.535274629, 6148109.139260178, 6147539.228741422, 6151456.4593326105, 6150892.399961528, 6150336.673565257, 6149772.420966362, 6149212.402793028, 6148683.253356033, 6148108.244563025, 6147543.308549312, 6151461.144753428, 6150899.79734388, 6150325.2495311275, 6149776.74833816, 6149213.474688801, 6148665.451200795, 6148108.782031745, 6147538.4407279715, 6151460.882799955, 6150891.338337069, 6150340.032582755, 6149778.680424644, 6149227.92585019, 6148667.578674325, 6148104.675691988, 6147547.807287344, 6151466.408891627, 6150887.340330715, 6150349.984814759, 6149762.1095883865, 6149219.474000627, 6148670.608821408, 6148118.993805334, 6147549.308984781, 6151454.970051855, 6150893.185997357, 6150346.046769622, 6149783.524477347, 6149208.764963742, 6148673.017737412, 6148116.240639674, 6147546.117410253])

aep\_best\_sol on Genetic Generation 4: 715.9908501226965

Best solution on Genetic Generation 5:

([423974.6767351443, 424027.46043788415, 424100.7532955055, 424161.5024157173, 424234.5917744965, 424305.3022314028, 424361.2706478953, 424453.8144425946, 424534.1237184753, 424591.5293868974, 424661.1220674749, 424739.9641248275, 424798.7748610602, 424861.1147798144, 424950.8009661965, 425002.3494594275, 425092.6537040019, 425152.88698389695, 425228.9221534887, 425300.73567067157, 425358.26998837746, 425431.2795866595, 425509.8139171246, 425557.27034466254, 425638.21604422404, 425716.56362927146, 425789.1377485328, 425857.4630335657, 425928.96848506434, 426010.09496199497, 426067.8847097093, 426118.7247959543, 426212.63044478715, 426280.53694641683, 426366.2839973481, 426412.51715797145, 426495.9430546508, 426547.7968550627, 426624.7513927046, 426675.62373598496, 426792.9775817652, 426847.89915896, 426895.99658334296, 426980.0573929284, 427051.6691382504, 427100.98616947926, 427177.06793980167, 427261.6234063247, 427342.732371773, 427419.18649997085, 427478.23489241104, 427537.0544089434, 427606.75787383877, 427663.2456200908, 427740.4794819267, 427792.6227635302, 427902.79307830945, 427973.10387494514, 428027.41038835974, 428087.4796937751, 428155.1424491602, 428241.3894099031, 428305.8545739889, 428351.78863441286, 428461.90464472485, 428544.04056836106, 428579.81977628835, 428665.7398863717, 428729.01538920955, 428804.6592589382, 428858.24670840276, 428920.93318327534, 429032.98162620066, 429095.67327626137, 429155.01090253156, 429211.46616117685, 429294.6924420938, 429371.5929789077, 429434.1171729498, 429507.4552858339], [6151446.325585629, 6150898.316065099, 6150342.311123052, 6149763.712501279, 6149225.885098712, 6148661.163637094, 6148119.162309904, 6147542.828977225, 6151465.98968588, 6150898.316354148, 6150334.668785968, 6149771.708148176, 6149223.2266580565, 6148663.765239154, 6148113.048536713, 6147550.738069061, 6151459.526813604, 6150892.205283687, 6150332.055054681, 6149768.882154264, 6149217.21728924, 6148673.681479966, 6148097.655643112, 6147551.560881125, 6151463.562501361, 6150883.53359309, 6150323.126295552, 6149781.813771931, 6149203.831689092, 6148661.303560139, 6148103.044766254, 6147552.283243272, 6151463.562210461, 6150898.484010764, 6150341.968737435, 6149780.1661223965, 6149212.478629826, 6148658.395621675, 6148102.200319471, 6147545.980014113, 6151449.972637268, 6150892.745249635, 6150333.682988544, 6149771.604718802, 6149206.288713584, 6148685.282938266, 6148114.086497928, 6147547.823680415, 6151463.12442513, 6150899.695014713, 6150325.796059155, 6149783.271927973, 6149221.897207855, 6148664.908950328, 6148114.965895902, 6147540.191235285, 6151454.0189847, 6150901.266056323, 6150341.648573129, 6149785.221286793, 6149222.330059005, 6148668.411180141, 6148100.245118469, 6147551.210759264, 6151463.964421438, 6150886.35591916, 6150355.55341688, 6149763.976139646, 6149224.8026622245, 6148666.894524947, 6148109.420307924, 6147546.692435193, 6151458.370491323, 6150894.465617747, 6150345.390338424, 6149773.857303802, 6149202.948423655, 6148672.320126268, 6148126.150904762, 6147543.04428112])

aep\_best\_sol on Genetic Generation 5: 716.0623383129963

Best solution on Genetic Generation 6:

([423974.0723801955, 424033.51578123687, 424098.30486088444, 424162.5550153731, 424231.1099066701, 424303.5451706541, 424362.8782277159, 424455.66194608476, 424533.08645529766, 424593.1433190234, 424659.33568517934, 424739.1138348174, 424796.4378776389, 424856.1511219453, 424950.32348662143, 424997.9141934272, 425089.78329163784, 425157.4362335092, 425225.923699126, 425302.50842587434, 425365.10933201865, 425424.3428436954, 425504.28085287317, 425555.5775825472, 425645.1127451962, 425723.3579269696, 425796.02868402103, 425856.9576085485, 425930.100203434, 426016.1619786344, 426074.31206518045, 426121.07487055176, 426216.5443360949, 426277.5240334288, 426366.29220764973, 426416.97612453246, 426495.9045169321, 426551.7614179933, 426618.49163690995, 426671.2181594355, 426798.7681939607, 426852.59644612717, 426901.42843604775, 426976.9541205931, 427055.3118274754, 427106.50443007046, 427172.7324382592, 427267.86006598437, 427336.2988836788, 427422.0056465262, 427477.36534861824, 427538.3996620717, 427601.6444407203, 427662.5571067387, 427740.2276704503, 427797.374760687, 427900.14929922135, 427967.6006315314, 428026.5722558366, 428088.0431571152, 428150.5267359475, 428240.0537199568, 428300.1525411465, 428356.3886202996, 428466.3480679098, 428537.08584831795, 428577.4687324884, 428666.64617343864, 428729.0530726957, 428800.85956432286, 428860.9582302984, 428920.34385104134, 429028.0779371426, 429096.1191746334, 429157.6217691043, 429212.5769091457, 429298.7760887622, 429367.62493294536, 429438.57102269534, 429507.4266626602], [6151452.109963154, 6150891.594409267, 6150336.498041828, 6149766.16021178, 6149219.826435089, 6148660.109672329, 6148123.942326896, 6147542.8428453505, 6151460.6269073775, 6150901.244661577, 6150336.399026036, 6149774.899924617, 6149223.4509878345, 6148666.631930179, 6148107.785868565, 6147556.267074785, 6151463.417979258, 6150895.111992121, 6150335.764385215, 6149768.603226294, 6149212.840143635, 6148668.309945709, 6148093.509594469, 6147555.125273935, 6151462.251199877, 6150877.315853356, 6150324.733628124, 6149774.8421183815, 6149202.944911422, 6148663.513321015, 6148098.439896735, 6147550.759101862, 6151460.459630902, 6150905.477211109, 6150343.312173266, 6149785.85479016, 6149205.698095444, 6148665.22618198, 6148101.6661369875, 6147547.1084756935, 6151454.984394965, 6150898.54643764, 6150333.703352803, 6149776.159982278, 6149203.280461156, 6148681.706817737, 6148118.054480884, 6147545.355968495, 6151462.620285592, 6150901.897298996, 6150326.012556352, 6149776.754233278, 6149224.25694243, 6148670.715138822, 6148115.85969216, 6147540.32557154, 6151460.76235549, 6150896.042618989, 6150336.7280533975, 6149787.068348281, 6149223.857380777, 6148667.699430057, 6148095.002331545, 6147545.503867767, 6151463.488829329, 6150893.113935382, 6150353.549137051, 6149768.603844849, 6149231.253530306, 6148667.383126248, 6148105.150149865, 6147553.264093528, 6151457.894707805, 6150892.205105083, 6150347.981771574, 6149772.265970983, 6149196.2024794705, 6148673.885488948, 6148130.702936052, 6147539.622773542])

aep\_best\_sol on Genetic Generation 6: 716.1312777006822

Best solution on Genetic Generation 7:

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aep\_best\_sol on Genetic Generation 7: 716.1552977418318

Best solution on Genetic Generation 8:

([423974.47816745867, 424034.21013977105, 424092.83261287864, 424163.3173234264, 424227.70481516066, 424297.827691391, 424365.6502682253, 424460.2901967789, 424531.80037605285, 424595.9311743866, 424653.4016370584, 424727.91041754704, 424792.2107435741, 424846.5505766003, 424948.3519349376, 424995.28928484296, 425091.9430910581, 425166.4328254936, 425218.47594612994, 425296.5405814481, 425366.8191477549, 425416.8600087392, 425501.7900575688, 425550.0790963713, 425655.82481965824, 425732.87854283943, 425796.35254593176, 425866.5682442292, 425939.53947240254, 426013.2506217955, 426068.5360759101, 426111.76647544757, 426226.4195011449, 426282.2538898414, 426366.8340839945, 426419.43772679823, 426504.1766592961, 426552.3060971624, 426610.6587803293, 426682.5737489163, 426800.9426860617, 426853.63466807536, 426899.07415982726, 426967.5571523972, 427046.6550590756, 427108.1120696152, 427165.61686923367, 427265.8147650134, 427340.97718619154, 427415.5766312389, 427476.59102368273, 427533.107450443, 427597.4754860109, 427671.6280769735, 427738.4987841761, 427808.2456377644, 427901.9298466211, 427973.44894473965, 428028.154102337, 428082.16831163695, 428150.19134402846, 428236.7618663001, 428302.4430590313, 428361.17619704484, 428474.41917491995, 428527.68683814985, 428578.17182429123, 428667.48360996146, 428728.8377094156, 428806.7840853772, 428871.3585098289, 428919.26186311507, 429034.97847253544, 429095.2927478912, 429164.94313048216, 429221.7063609755, 429305.00958093745, 429371.37740304583, 429428.0637178217, 429502.74646258476], [6151459.57464214, 6150887.662491926, 6150331.893226191, 6149774.359890524, 6149226.6872617975, 6148654.656979072, 6148120.955144951, 6147543.869329193, 6151459.831724627, 6150891.996989359, 6150334.768813812, 6149774.2436524425, 6149231.495142092, 6148656.338404774, 6148107.412069732, 6147564.801194993, 6151457.126479337, 6150894.192093844, 6150334.218757963, 6149770.058421278, 6149207.37806144, 6148669.390811549, 6148093.127281424, 6147556.00332838, 6151460.429405386, 6150884.814643305, 6150322.95672492, 6149763.975822527, 6149198.716952363, 6148664.843998454, 6148095.538416924, 6147540.260142069, 6151456.376187287, 6150902.498247274, 6150345.797315239, 6149778.8359824745, 6149210.999269739, 6148658.706411305, 6148105.24223622, 6147544.124795483, 6151453.7167320335, 6150908.465856257, 6150335.021452628, 6149782.407883008, 6149211.867492723, 6148670.003307274, 6148114.757388608, 6147546.416112712, 6151463.111793732, 6150899.633347087, 6150326.5173444105, 6149773.977531172, 6149226.230390999, 6148675.537161284, 6148106.934887526, 6147541.118106108, 6151462.9671916, 6150896.024629125, 6150342.245607958, 6149782.119863235, 6149230.093216157, 6148661.038436124, 6148089.054743588, 6147547.102297508, 6151461.877665957, 6150888.807828726, 6150354.558070968, 6149764.301068071, 6149238.851701063, 6148674.916942839, 6148106.605139813, 6147550.005083701, 6151454.151495829, 6150895.979005404, 6150350.668033468, 6149762.287463352, 6149188.401514478, 6148682.759522825, 6148126.5333099095, 6147539.034345398])

aep\_best\_sol on Genetic Generation 8: 716.1925589131512

Best solution on Genetic Generation 9:

([423980.8702110529, 424034.9493662087, 424096.35347286385, 424164.5893405671, 424229.32712612, 424296.43964716693, 424366.15261855186, 424455.0825080247, 424526.1262688906, 424593.59115988266, 424650.607224229, 424727.6029949097, 424790.71433355816, 424849.5337214282, 424942.49700722535, 425000.38161811884, 425088.6943442806, 425162.28416776273, 425220.1758431271, 425298.1465908254, 425361.2159315142, 425419.97246469645, 425501.0687967057, 425545.9022144431, 425652.2631113493, 425739.03937842447, 425794.2596929466, 425871.7397097113, 425941.33235002874, 426009.23069968313, 426062.5465562398, 426118.3554981573, 426229.79995365266, 426276.29990260454, 426373.61126159877, 426420.7792361698, 426499.1271331031, 426547.5651391984, 426606.2885902371, 426678.6755700695, 426807.52825874905, 426852.97051683144, 426904.91756739176, 426961.8443025422, 427039.7111944208, 427110.95699353755, 427171.2670991215, 427264.1294266433, 427337.0128141385, 427414.0265499357, 427475.0668300132, 427533.5190725975, 427604.3343145733, 427665.98655101313, 427734.30594084907, 427807.14239993563, 427896.70283800777, 427975.4834385594, 428024.5379073886, 428088.2136231737, 428154.2455339345, 428238.700207394, 428301.52142004354, 428366.0022615324, 428475.263173155, 428526.95288658486, 428583.8583454337, 428670.2862439386, 428727.6476675272, 428803.06547462835, 428872.8295726855, 428912.9222156886, 429031.9453340518, 429093.4299771092, 429169.5396904618, 429225.0704868819, 429299.4748164511, 429371.1898475649, 429429.51025049674, 429497.4932248522], [6151457.296046271, 6150888.704682998, 6150332.953079419, 6149772.373703808, 6149224.836939805, 6148660.641373837, 6148115.890475887, 6147538.236050628, 6151466.205454373, 6150886.2121271435, 6150341.434002736, 6149769.053619935, 6149229.032953684, 6148654.303373953, 6148101.730294247, 6147560.200167758, 6151461.9363448275, 6150892.75635776, 6150327.322737235, 6149768.5457193665, 6149211.037121758, 6148667.894350788, 6148087.317715288, 6147549.209298376, 6151456.271147031, 6150885.331471503, 6150325.138003515, 6149759.837578852, 6149196.228854419, 6148665.151640249, 6148097.697280722, 6147544.156439729, 6151459.625940013, 6150898.864433254, 6150341.158163243, 6149773.179819246, 6149213.395191746, 6148655.305715939, 6148103.180684056, 6147548.849316587, 6151454.809234429, 6150902.612300736, 6150333.754758621, 6149779.033755038, 6149209.984699623, 6148663.134926817, 6148118.887278377, 6147543.881138879, 6151460.846917678, 6150904.602088517, 6150327.396008151, 6149778.077576295, 6149224.020324455, 6148670.106279399, 6148103.6171700815, 6147540.841046036, 6151464.740437935, 6150901.9097866155, 6150343.332881828, 6149779.749781318, 6149233.677605608, 6148666.445121536, 6148094.952386791, 6147546.274645694, 6151462.988687982, 6150883.769187152, 6150349.886876576, 6149765.401070055, 6149233.801947144, 6148674.035579865, 6148101.082655032, 6147544.994892761, 6151448.266352299, 6150890.106072307, 6150343.839327724, 6149761.140410545, 6149182.782693045, 6148681.817942104, 6148126.050998572, 6147536.133489512])

aep\_best\_sol on Genetic Generation 9: 716.2758310203695

Best solution on Genetic Generation 10:

([423985.46062360384, 424036.9336945275, 424097.94325617846, 424161.2754032958, 424229.7809520189, 424295.87561161857, 424366.21358500293, 424457.1929866239, 424531.6535688465, 424591.11855873413, 424650.2943490314, 424724.6512303349, 424784.166973129, 424854.81166036864, 424942.7530716939, 425000.0561080203, 425085.13766964426, 425160.0483728672, 425224.17800328037, 425298.14965255535, 425368.01176932716, 425423.3587017044, 425500.083114536, 425540.06305062876, 425658.53954258433, 425738.93062611297, 425800.5469997463, 425878.2657935486, 425941.56937053805, 426002.513751721, 426058.10781985894, 426113.86017928127, 426224.039150866, 426274.9656518698, 426373.47403358406, 426414.5240964061, 426494.5536552912, 426551.2122885821, 426609.10253198305, 426675.2323808745, 426814.2022783071, 426849.50331650337, 426908.2104081308, 426963.8474095978, 427045.6430036683, 427110.13442895265, 427164.3303558035, 427258.8355745701, 427332.5915444066, 427412.91286292684, 427475.67857676896, 427531.1265030363, 427598.863440246, 427661.5411560606, 427735.7417831687, 427803.6803261872, 427894.0809250438, 427972.17910482123, 428024.8942532008, 428085.09735108755, 428158.0746098269, 428241.458354783, 428308.5130011747, 428359.3677783009, 428475.5966117979, 428529.2752389064, 428589.0869809927, 428670.8046954937, 428720.9673364337, 428797.9427112734, 428877.3537426895, 428907.8615921353, 429025.274022171, 429086.4478831372, 429164.9948363978, 429225.00952941086, 429299.147742281, 429364.55696636875, 429435.12712113775, 429504.3743906039], [6151456.737488599, 6150886.415761457, 6150333.832586759, 6149777.902150866, 6149229.864619327, 6148664.344100335, 6148113.767779575, 6147536.26960882, 6151466.502788599, 6150887.0051360885, 6150338.679217237, 6149764.011699142, 6149228.7448152555, 6148654.554122996, 6148101.785148213, 6147556.426209866, 6151465.502129626, 6150891.190876242, 6150331.506277969, 6149770.311943588, 6149207.197868662, 6148671.169701541, 6148083.669851118, 6147545.92977732, 6151461.4638107205, 6150886.758434798, 6150325.447948144, 6149760.199990673, 6149198.597324886, 6148663.875982813, 6148090.898831193, 6147538.402035803, 6151465.427993145, 6150893.86936245, 6150336.548730939, 6149773.677375101, 6149213.970936353, 6148651.208906496, 6148097.420639919, 6147542.568877601, 6151461.360423998, 6150906.127477897, 6150329.568523437, 6149776.848730749, 6149208.919519452, 6148660.382037148, 6148115.701574003, 6147548.951363324, 6151458.415513005, 6150909.01424832, 6150333.006193226, 6149782.545334484, 6149229.598208172, 6148666.47481529, 6148106.19242194, 6147537.568743649, 6151464.416043766, 6150902.750725446, 6150342.57572653, 6149774.75457935, 6149237.214622853, 6148670.737375072, 6148101.802713936, 6147542.270946962, 6151466.822758099, 6150885.036221932, 6150355.58306739, 6149767.301554986, 6149234.72299509, 6148680.07762586, 6148106.230086484, 6147540.163825349, 6151449.918497882, 6150887.887132271, 6150348.051026601, 6149760.850011481, 6149178.271356321, 6148685.9022837505, 6148119.648909752, 6147541.259442118])

aep\_best\_sol on Genetic Generation 10: 716.3249622435136

Best solution on Genetic Generation 11:

([423981.9717578644, 424039.26967382914, 424096.0299844449, 424163.6840476879, 424231.91257421806, 424301.38758630893, 424368.4481339917, 424455.0295651056, 424531.4637588305, 424585.92812376376, 424653.14311139536, 424723.5575643007, 424787.51522057835, 424856.93423284404, 424947.82425060996, 424998.1724929386, 425088.9447662673, 425165.0537973606, 425228.48893009534, 425298.66813038365, 425367.0698820432, 425420.77174427867, 425506.630753787, 425535.4200476591, 425662.3372507678, 425742.3647628508, 425806.1683307037, 425879.9799803129, 425946.0534408147, 426004.93637907854, 426062.1346389313, 426115.7255301588, 426220.7441003777, 426275.70210906555, 426374.96240849735, 426420.98738267366, 426494.6643712081, 426556.3766161296, 426609.5507705475, 426675.3706320278, 426811.2595204163, 426852.73139644304, 426902.21110065805, 426961.86560086004, 427043.3510199944, 427107.4708513359, 427169.12733981153, 427253.28174338146, 427339.32661101804, 427416.3547345555, 427472.004343588, 427524.3294332771, 427595.3780119248, 427659.8309135001, 427735.1023694619, 427805.52130096115, 427889.2556837264, 427973.8516501167, 428020.9209800145, 428087.1160751017, 428153.89160045626, 428240.6967201012, 428301.85630697774, 428358.05376566766, 428479.3628319048, 428535.3419465494, 428594.3964319029, 428671.67379524175, 428719.66509805253, 428802.7006627944, 428881.0417084256, 428903.2763302146, 429022.67992696195, 429090.7245402857, 429164.91079289076, 429228.5659730909, 429301.53136286646, 429369.55498920707, 429436.37201314594, 429510.93460509233], [6151458.1504887575, 6150889.24099858, 6150330.407499964, 6149779.958469448, 6149224.121026768, 6148662.140679112, 6148107.42648909, 6147541.243557354, 6151461.201155449, 6150886.5808886215, 6150337.282375092, 6149760.193936126, 6149232.396170033, 6148656.206600867, 6148098.208385361, 6147560.580706013, 6151463.840935193, 6150884.549938649, 6150329.405009144, 6149768.951917367, 6149208.088514585, 6148669.232197837, 6148085.373959429, 6147542.087527553, 6151455.915838761, 6150882.054679762, 6150324.982521235, 6149757.908329403, 6149204.947981923, 6148662.795204382, 6148092.009379003, 6147537.926686538, 6151463.379046577, 6150897.720819372, 6150336.778618155, 6149768.292071038, 6149210.336542505, 6148654.298750667, 6148097.653545433, 6147546.28871383, 6151464.409926194, 6150902.2705895, 6150333.811245729, 6149776.242340027, 6149203.328165032, 6148664.911948636, 6148115.831198753, 6147541.983487873, 6151461.497030692, 6150905.066578741, 6150329.544502029, 6149778.104681886, 6149230.266711081, 6148663.607068339, 6148107.2528865235, 6147537.208559192, 6151461.892353011, 6150908.090274885, 6150341.669030832, 6149773.097500072, 6149237.714827888, 6148663.9325114805, 6148101.330974799, 6147543.017835282, 6151464.819434757, 6150890.668039471, 6150356.240340879, 6149766.84251564, 6149228.052988365, 6148685.179467067, 6148112.920968115, 6147538.33653705, 6151448.458136414, 6150893.172473132, 6150352.925144499, 6149757.046293634, 6149171.815409615, 6148679.165980543, 6148112.790488306, 6147536.467671755])

aep\_best\_sol on Genetic Generation 11: 716.282681991862

Best solution on Genetic Generation 12:

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aep\_best\_sol on Genetic Generation 12: 716.3391184315152

Best solution on Genetic Generation 13:

([423981.39848727157, 424031.1717107121, 424098.8025441673, 424165.11619355215, 424227.2829446913, 424310.30780936923, 424362.7579790489, 424449.3195192073, 424529.38113591576, 424574.79299961106, 424658.1201116327, 424720.3771361765, 424789.77481565264, 424864.98159117106, 424943.88655178295, 424997.40836111223, 425095.105315315, 425154.79877845227, 425226.42247991124, 425298.8787907619, 425355.0037719133, 425419.99239010183, 425502.1164896577, 425531.8075292284, 425661.5464056912, 425744.72127321805, 425815.5260261227, 425879.5212407189, 425947.0425625569, 426002.7876812994, 426059.94437856344, 426118.71038956, 426210.9595234433, 426276.7436527243, 426366.96700843173, 426425.4261431693, 426496.70838523743, 426564.57704266027, 426615.2914402142, 426681.73387195595, 426813.3902938979, 426854.9478473855, 426900.841495308, 426961.7631737934, 427043.598308394, 427116.00594804325, 427169.51647650107, 427249.9204702872, 427338.2606472305, 427403.52868660586, 427466.83306526375, 427525.12233834853, 427586.12129290577, 427664.26712697576, 427726.0316756064, 427802.90052531013, 427881.9547182646, 427975.54746352846, 428027.3947153936, 428084.6642680493, 428164.57488817704, 428229.9846751885, 428302.28968829865, 428353.49783504085, 428475.7070929351, 428528.15004566615, 428598.84888688737, 428671.91682178323, 428727.2441394386, 428799.03206827666, 428878.02689610585, 428904.690028283, 429018.8493037324, 429096.77902649064, 429163.05905681837, 429234.48380694416, 429309.48324859195, 429368.74867357226, 429438.05534162396, 429505.30829999293], [6151464.188492571, 6150894.096330185, 6150334.70312195, 6149784.824522676, 6149222.053280526, 6148654.915979503, 6148108.055822067, 6147537.778974811, 6151466.85463546, 6150877.94755028, 6150329.331725, 6149761.172107274, 6149221.937842896, 6148655.699733744, 6148098.613776451, 6147551.851649027, 6151466.390309921, 6150885.017344261, 6150321.414232311, 6149767.219091896, 6149207.676024012, 6148676.119845342, 6148093.431960665, 6147554.525543855, 6151465.48264214, 6150890.930313528, 6150318.395201452, 6149768.374517928, 6149206.553293809, 6148665.355413376, 6148090.888665747, 6147536.798624541, 6151466.680103966, 6150892.637450931, 6150330.809087475, 6149771.780161331, 6149213.060962139, 6148646.040524469, 6148104.684840797, 6147537.713665151, 6151464.732012626, 6150898.59334968, 6150327.355347226, 6149773.326837877, 6149199.387745884, 6148656.150381514, 6148121.2734499695, 6147552.137180668, 6151461.6471287245, 6150906.036348202, 6150337.779986486, 6149772.905443008, 6149229.005746955, 6148662.091519418, 6148106.929231274, 6147538.452809308, 6151462.437334857, 6150914.528388255, 6150330.644223639, 6149763.255205468, 6149232.822728067, 6148663.311248331, 6148110.131115694, 6147538.422213485, 6151462.717080961, 6150904.09879746, 6150360.088868414, 6149773.0920595275, 6149222.744320441, 6148686.570100923, 6148100.447096239, 6147544.033685749, 6151452.397865449, 6150888.560074701, 6150359.490460346, 6149763.728609176, 6149180.005026562, 6148673.829277112, 6148113.621616963, 6147537.899571535])

aep\_best\_sol on Genetic Generation 13: 716.3606139909887

Best solution on Genetic Generation 14:

([423987.1043442374, 424028.38974117866, 424097.9768518885, 424158.72786306334, 424232.0767198995, 424311.201804866, 424368.7003426438, 424446.89303329727, 424533.0532223941, 424570.90408759884, 424658.8378967559, 424725.3791998336, 424793.6993393485, 424866.80472306855, 424942.2291914848, 424995.8120658781, 425088.12725056097, 425148.2018335124, 425224.99822469894, 425295.5423908421, 425360.2164275028, 425421.03285514185, 425503.25868966285, 425533.83507134137, 425660.0615458701, 425742.07769757, 425820.5689886359, 425883.7149411385, 425952.6354764771, 426008.93512982037, 426057.622052921, 426118.53472078685, 426204.30757104093, 426272.922121781, 426368.10136839334, 426424.904372566, 426498.24867944856, 426563.8258166722, 426620.0480157927, 426683.7726566317, 426810.0088729849, 426854.81861743313, 426906.87427835376, 426963.53954101185, 427045.2383801977, 427119.4095119087, 427173.07081813196, 427253.0202027494, 427339.17947633995, 427404.2661542194, 427472.12078702566, 427527.379594977, 427587.4236009796, 427670.9183192771, 427730.29393412505, 427795.92254585767, 427879.29276822205, 427978.7835621718, 428028.79525424034, 428086.944886844, 428168.1741130264, 428228.44182049704, 428305.56109352846, 428350.0003546216, 428475.8439362866, 428534.1408596325, 428593.601137533, 428677.52993910084, 428726.3284349615, 428802.5037972663, 428872.5030616473, 428906.6187681599, 429022.96994514833, 429094.6223767657, 429167.7888764814, 429234.28054460813, 429305.2540837606, 429371.09607755125, 429442.0812638699, 429506.05842119164], [6151464.245965046, 6150888.129766491, 6150336.891042295, 6149788.990410691, 6149222.227607002, 6148654.139669362, 6148108.054970659, 6147539.111589693, 6151462.394108895, 6150880.184188532, 6150322.549955967, 6149765.9833135335, 6149218.915282186, 6148654.276109786, 6148101.016222292, 6147552.042108229, 6151464.628934112, 6150891.856093627, 6150326.693848642, 6149766.640460303, 6149203.512805089, 6148671.234110221, 6148090.557130306, 6147548.022828206, 6151465.155312638, 6150894.882508853, 6150320.710777653, 6149765.586375433, 6149213.008865807, 6148661.598481954, 6148088.161467654, 6147536.481253216, 6151459.76528276, 6150897.2598873945, 6150329.078613176, 6149772.726613565, 6149214.657889388, 6148647.7917451495, 6148102.923494948, 6147538.071742312, 6151464.678983468, 6150895.343710619, 6150323.881586919, 6149770.545433389, 6149202.968254131, 6148659.730676614, 6148117.717811517, 6147555.4564276915, 6151461.465513965, 6150910.506068428, 6150334.09133002, 6149768.090140411, 6149230.54861385, 6148663.315952489, 6148111.997199666, 6147541.369565987, 6151462.913961171, 6150910.521775051, 6150337.011851907, 6149759.43988661, 6149237.846591295, 6148664.722854153, 6148116.28143014, 6147544.64047138, 6151465.474192114, 6150905.966859536, 6150364.51777424, 6149767.228343365, 6149223.126304319, 6148689.056152557, 6148106.909445435, 6147540.6043757, 6151459.147836939, 6150889.670301539, 6150363.068423071, 6149770.138086237, 6149175.437949063, 6148672.552088726, 6148107.633378624, 6147538.320397274])

aep\_best\_sol on Genetic Generation 14: 716.3598535320032

Best solution on Genetic Generation 15:

([423986.1146473363, 424025.34822912444, 424091.01126575755, 424161.3410440388, 424226.7261663989, 424308.11250636383, 424367.0785111548, 424441.71261843096, 424537.1349142971, 424576.16814437683, 424658.02925724455, 424727.72310784546, 424797.28646208515, 424862.9067492564, 424944.5835320414, 424999.7461838957, 425091.0054157969, 425142.41922479303, 425220.6755113122, 425289.11579902907, 425362.91799477494, 425420.41772299935, 425498.58372398355, 425532.74578493304, 425655.51954582677, 425744.2655923573, 425827.0453296658, 425885.86691392143, 425953.53983102, 426009.92342992924, 426053.48048932117, 426122.42526348424, 426206.0687582604, 426268.2711995244, 426370.1858264188, 426422.24019640114, 426491.51358744194, 426563.6261299464, 426622.46603681217, 426689.96309576806, 426807.5512284335, 426860.04987125046, 426901.11947288015, 426970.1831787156, 427049.30466162594, 427118.0729124618, 427173.64854172786, 427251.39027989045, 427338.84055321134, 427402.50465793675, 427472.5183983212, 427524.138584188, 427584.1661550009, 427671.74261972704, 427730.1693835414, 427794.12696587114, 427885.20642440824, 427981.7368827643, 428034.50078642333, 428087.4223471126, 428164.25546587247, 428227.88393544586, 428309.186820476, 428356.23871717084, 428481.91924248077, 428527.99831631756, 428587.12700417417, 428674.5138825219, 428723.5939571363, 428802.7280622202, 428878.52968677087, 428910.0335111184, 429028.51022655907, 429098.24976829847, 429162.3763988129, 429238.804367338, 429307.27571123, 429369.9765449183, 429438.07026166416, 429507.7551847623], [6151458.916222777, 6150883.921241515, 6150341.051396075, 6149794.699522887, 6149228.458106138, 6148657.206147741, 6148109.037146831, 6147540.106632576, 6151462.878792422, 6150877.8709165035, 6150316.3116046805, 6149763.615790739, 6149215.5885376455, 6148654.946716099, 6148105.414320925, 6147557.7820454575, 6151463.254498786, 6150895.211758158, 6150332.08970422, 6149772.452621602, 6149207.990167737, 6148666.287600061, 6148095.013873338, 6147552.70447613, 6151466.67322396, 6150896.017783975, 6150323.897632524, 6149769.410573847, 6149214.6312084105, 6148655.435218946, 6148085.993588385, 6147539.925271788, 6151456.112906238, 6150891.709062509, 6150323.468957197, 6149771.098320557, 6149220.321710197, 6148652.895242186, 6148101.460047761, 6147540.459339301, 6151460.455237418, 6150899.047050913, 6150320.566857235, 6149770.888085411, 6149206.330250824, 6148652.9360123295, 6148112.971969711, 6147550.13305092, 6151464.099602835, 6150914.313359791, 6150327.871059452, 6149770.668528947, 6149230.368168684, 6148660.580502433, 6148111.008470027, 6147537.581811155, 6151465.301699231, 6150917.475340612, 6150339.806424148, 6149763.169394785, 6149233.102789683, 6148665.716563736, 6148119.407447647, 6147551.01644199, 6151463.853591439, 6150903.207577466, 6150370.534384477, 6149768.082586847, 6149217.246352371, 6148682.843291995, 6148109.73273458, 6147542.013224282, 6151456.2032120265, 6150895.912881395, 6150369.527477877, 6149763.191422776, 6149175.076393387, 6148673.868801481, 6148100.77632955, 6147536.663581005])

aep\_best\_sol on Genetic Generation 15: 716.3510736887495

Best solution on Genetic Generation 16:

([423985.7150836994, 424028.2304527548, 424095.75641884946, 424166.06660761597, 424227.079806085, 424305.26708936936, 424365.02219967695, 424442.50279693154, 424535.9735226292, 424580.2829845338, 424653.2427037906, 424732.41379403585, 424798.8372685531, 424858.49763425754, 424939.6075961356, 424993.09570722113, 425095.81287685706, 425142.31817346974, 425213.9491210004, 425291.22510880104, 425367.792813886, 425424.3748016029, 425496.5168846052, 425532.90394941403, 425659.78504781064, 425738.08923972026, 425823.8101349213, 425886.60502530966, 425952.22138443013, 426016.42871031555, 426050.3160924017, 426117.8470381979, 426209.74187183176, 426265.6749062946, 426363.29917693924, 426420.5694604915, 426491.6956345373, 426563.3589100698, 426620.1983477685, 426690.78850275447, 426804.9839274311, 426860.2917699762, 426903.80701647, 426971.5798967454, 427045.8209466264, 427123.7348833258, 427169.0179626639, 427257.00925937, 427336.8494551569, 427397.1552052453, 427469.29111914826, 427523.79790677025, 427585.73635328485, 427675.60790993046, 427732.8838830412, 427789.0063914442, 427880.1907753915, 427977.1485803938, 428030.80937122094, 428084.38079063786, 428163.6284699563, 428230.50824301125, 428311.66849588015, 428356.4081046044, 428482.32475127873, 428534.43204402755, 428582.87708252686, 428675.1533389586, 428723.00742891646, 428803.20587389765, 428883.187568884, 428905.94143662596, 429029.4458897081, 429098.73037022405, 429164.45572398533, 429235.4711568527, 429311.13100954663, 429371.20299765357, 429441.42186294706, 429502.91727179027], [6151461.941589838, 6150882.844944542, 6150345.470660763, 6149801.457686494, 6149226.115546294, 6148657.812900088, 6148106.922760834, 6147545.852254828, 6151458.48545562, 6150881.967952326, 6150319.1395409815, 6149770.498289731, 6149222.431558798, 6148659.328624208, 6148100.804319931, 6147560.092844519, 6151466.92613063, 6150895.175151887, 6150334.61016187, 6149771.095516522, 6149210.029138509, 6148662.201604291, 6148089.222535619, 6147551.278049012, 6151464.974314058, 6150890.694179726, 6150317.025210847, 6149765.638555221, 6149211.387820332, 6148656.373276014, 6148079.566201456, 6147545.187742832, 6151457.999994575, 6150897.545659424, 6150328.157127808, 6149765.88685187, 6149214.940585658, 6148651.491153594, 6148105.597447504, 6147536.179355096, 6151462.889306266, 6150892.5711841425, 6150324.452478382, 6149770.690325322, 6149213.01936508, 6148653.532605813, 6148114.777709675, 6147549.025174294, 6151460.558284724, 6150912.438732022, 6150329.426205052, 6149770.590942133, 6149236.239113276, 6148655.539829436, 6148115.055292799, 6147542.36660027, 6151463.807639758, 6150911.742057051, 6150346.362670788, 6149767.2956950525, 6149230.120315244, 6148669.0425969185, 6148125.052487877, 6147545.951497429, 6151461.815849924, 6150908.515097446, 6150374.627513811, 6149769.061175956, 6149219.762969767, 6148683.174408375, 6148115.372825266, 6147538.698563468, 6151453.809705562, 6150889.690046988, 6150372.254676481, 6149762.213665751, 6149177.353049329, 6148670.494249235, 6148098.73575476, 6147536.893182052])

aep\_best\_sol on Genetic Generation 16: 716.3077646698177

Best solution on Genetic Generation 17:

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aep\_best\_sol on Genetic Generation 17: 716.2899004914048

Best solution on Genetic Generation 18:

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aep\_best\_sol on Genetic Generation 18: 716.2678644855412

Best solution on Genetic Generation 19:

([423989.9482056173, 424031.9098994818, 424095.0005522386, 424156.4184016247, 424228.8685114797, 424301.40516405035, 424368.40022428613, 424442.9389329855, 424536.8887172659, 424584.2625196486, 424665.5379232489, 424728.0743576793, 424792.30791555863, 424871.7426199288, 424930.01655811863, 424987.48759100924, 425095.96950605285, 425150.7451528007, 425224.9715779021, 425281.2606774468, 425372.0959568064, 425425.50048244966, 425487.82228943845, 425535.44708099565, 425656.9446142276, 425730.8865559719, 425826.2617913279, 425884.5638450322, 425949.39071727806, 426006.20512552717, 426059.7707614186, 426114.79121305625, 426220.37650858425, 426284.39049345255, 426361.2418741341, 426423.6023438251, 426490.40660987195, 426569.68149090145, 426615.834249938, 426693.60616414447, 426804.90079784946, 426862.18369517475, 426915.8403485946, 426962.8142014409, 427043.27047167177, 427119.8898725731, 427172.56408170465, 427241.01850848045, 427337.25114238064, 427395.1027663779, 427460.66249369027, 427535.28486177383, 427590.03473253705, 427685.25159086473, 427734.31342797686, 427780.7073620183, 427883.75557160034, 427977.2405712079, 428039.2753595387, 428090.8324188754, 428156.68983712984, 428227.6817054212, 428313.803838151, 428341.047887044, 428477.13920904783, 428541.0173869628, 428589.55640672584, 428673.6268780221, 428720.440584558, 428812.31815243716, 428880.5293862251, 428911.5735994705, 429035.88553318556, 429099.86290210765, 429159.2816144752, 429239.7716076091, 429302.98078317696, 429366.9392497146, 429442.1521371804, 429498.54064505803], [6151462.962543918, 6150889.266800538, 6150342.329738889, 6149814.067550859, 6149217.790818464, 6148663.313924866, 6148102.425884212, 6147551.140626179, 6151456.869338341, 6150883.308239984, 6150314.19109693, 6149776.416836073, 6149224.47621494, 6148655.940130313, 6148097.841544698, 6147546.1999738095, 6151457.158586542, 6150895.452833954, 6150331.948500352, 6149755.935781201, 6149205.848240009, 6148659.412258812, 6148084.5769321835, 6147548.631066754, 6151463.164116549, 6150899.886494038, 6150322.901955458, 6149761.216121366, 6149205.435082908, 6148642.254843469, 6148084.046643529, 6147536.046526859, 6151459.040640519, 6150891.82261478, 6150327.196069232, 6149758.03044613, 6149205.034018499, 6148647.537943501, 6148104.582853336, 6147544.795289995, 6151454.538681656, 6150892.11650552, 6150331.126022258, 6149754.922707754, 6149213.416625085, 6148652.11790562, 6148104.876798284, 6147547.810934955, 6151447.78692502, 6150909.2862019, 6150335.091490321, 6149765.636535565, 6149226.901424458, 6148656.086004623, 6148115.739557917, 6147544.143272802, 6151465.651032588, 6150928.641042649, 6150343.174379907, 6149774.724034861, 6149226.825751716, 6148672.159893306, 6148114.569136716, 6147557.183626898, 6151458.564238214, 6150910.372087187, 6150360.996844234, 6149762.044273061, 6149206.33404383, 6148690.842112132, 6148111.9607607825, 6147541.83575869, 6151450.83924542, 6150887.2788244905, 6150378.555904685, 6149759.295024401, 6149179.026300986, 6148672.985653519, 6148104.59197567, 6147540.426750812])

aep\_best\_sol on Genetic Generation 19: 716.2742517140927

Best solution on Genetic Generation 20:

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aep\_best\_sol on Genetic Generation 20: 716.2598579684727

finalsolution

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aep\_max: 716.2598579684727









