

# Recognizing Uncertainty and Valuing Flexibility in Appraisals: New Songdo City Case Study

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The background features a light blue gradient with a faint grid pattern. On the left side, there is a complex, abstract line drawing in a darker blue color, consisting of numerous vertical and horizontal lines that create a sense of depth and structure. On the right side, there is a very faint, light-colored architectural drawing or technical sketch, showing various lines and shapes that suggest a building or mechanical structure.

# Context of the case problem

“The economic concept of value is not inherently in the commodity, good or service to which it is ascribed. Rather, it is created in the minds of the individuals who make up the market. The relationships that create value are complex, and values change when the factors that influence value change.”

*The Appraisal of Real Estate, 13<sup>th</sup> Edition.  
2008. The Appraisal Institute. p. 15.*

Why perform this case study?

- Yet, we appraisers use linear, deterministic quantitative models that do not reflect the complexity, ambiguity, and change inherent in the assets we value.
- Not only are our quantitative models linear and deterministic, but our thinking has become so as well.
- **We keep trying to fit the equivalents of living organisms into the neat packages of point estimates of value!**

- When times are good what we do seems to be close enough to “market” value for most purposes.
- However, when economies are facing distress on a global basis, the deficiencies of current appraisal practice begin to show.
  - Real estate assets that yesterday were important line items on balance sheets, today become embarrassments.
  - Funding dries up.
  - Yet it is possible that these assets have changed in **no discernable way. This is the dark side of the concept of residual value.**

- As this morning's presentations indicate, the field of engineering systems design (ESD) offers some useful solutions.
- At the risk of redundancy, we need to be clear about what ESD and appraisal have in common:
  - Both are concerned with large-scale, complex, long-lived assets – their future value as well as history.
  - Valuation is an integral part of ESD. In a sense, a central part (though the engineers think it's the easy part!).
  - **The appraisal process is a kind of design task.**
    - Highest and best use analysis.
    - Determining Fair Market Value or Fair Value under SFAS 157.

- An extreme case in every way, due to size, complexity, and associated risk & uncertainties.
- A provocative test of theory/practice suggested by ESD.
- Allows for multiple levels of analysis.
- Ideal for application of real options / flexibility concepts and methods.

The background features a stylized, abstract architectural drawing of a city skyline. It consists of numerous vertical lines of varying heights and widths, some solid and some outlined, creating a sense of depth and structure. The lines are arranged in a way that suggests a cityscape viewed from a low angle, with some lines extending further into the background. The overall style is modern and minimalist, using a limited color palette of greys and blues.

# Case Facts and Risk Assessment

New Songdo City  
(Songdo International  
Business District)  
South Korea

- Assessment of **key risks**.
- Identification of **major sources of uncertainty**.
- Selection of **appropriate variables**.
- Analysis of **flexibilities**.
- Appreciation of contribution made by proposed method to **more realistic, useful results**.

- Built on 1,500 acres of land reclaimed from the Yellow Sea off Incheon.
  - 35 miles from Seoul.
  - 7 miles from Incheon Airport, opened in 2001, the second largest airport in the world and gateway to one-third of world's population. By 2006, Asia's 6<sup>th</sup> busiest airport in terms of passengers.
- **Billed as the largest private real estate development in history.**
- Overall 100,000,000 square foot master plan to house 65,000 residents and 300,000 workers.
- Cost to complete estimated at between \$35-\$45 **billion.**

Scale & scope risk



Scale & scope risk



- **Class A commercial space** – up to 45,000,000 sq ft.
  - Example is **Northeast Asia Trade Tower (NEATT)**:
    - 65-68 floors (984 feet high);
    - 1.6 million sq ft of mixed use.
    - Cost = over \$550 million.
    - Structurally very sophisticated, using new techniques.
    - Ground broken February 2007 with completion date estimated as end of 2011.
    - July 24, 2009 *Korea Times* press release indicates that the project is in jeopardy and key investors have pulled out.
    - In February 2010, the 65th-floor observatory opened to the public for the G-20 major economies meeting of finance ministers.



- **Prime residential condominium units:**
  - More than 22,500 units, totaling 30,000,000 sq ft.
  - Example is **The First World**: June 2005 ground broken. Completed Feb 2009.
  - Cost = \$1.1 billion. 2,654 units of various sizes comprising 3,970,000 sq ft (450,000 sq ft dedicated to retail) + additional 1,660,000 sq ft of parking.
  - During 2004 pre-sale, 92% of units were sold in first 3 days, with remaining sold in 2 more days.
  - Oversubscribed 8:1.
    - Pre-sale revenues were \$1.3 **billion**.
    - Buyers were from Seoul.



- **Total retail space** = 10,000,000 sq ft.
  - Example is **Riverstone Mall:**
    - 1,500,000 sq ft to be completed by early 2012.
    - Cost estimated to be \$600 million.
    - To include major large-store tenants, multiplex cinema, ice rink, food emporium with 1,200-seat dining area, and 150 specialty stores.



- Total hotel space = 5,000,000 sq ft.



- Some of “lifestyle” sub-projects **to be donated to City of Incheon** by developers (i.e. **development options**):
  - **Songdo Convensia:** 300,000 sq ft convention center designed with flexible components so it can be expanded to 1.3 million sq ft.
  - Cost of over \$155 million.
  - Completed October 7, 2008.



- Some of “lifestyle” sub-projects **to be donated to City of Incheon** by developers (i.e. **development options**):
  - **Songdo Central Park**: Modeled after NY Central Park.
  - Opened August 7, 2009.
  - Cost \$163.7 million to build (3x more than ordinary urban parks).
  - Part of a total of 600 acres of open space dedicated to green spaces, pocket parks (modeled after Savannah, GA) and salt-water canals (modeled after Venice, Italy).



- Some other “lifestyle” sub-projects in various stages of completion: **Jack Nicklaus Golf Club Korea:**
  - One of only 25 golf courses worldwide to have Nicklaus imprimatur.
  - 228 acres that will include 179 luxury villas.
  - Par-72, 7,257 yard signature golf course with 60,000 sq ft clubhouse.
  - Only 220 total memberships will be offered (only 60 corporate).
  - Estimated cost = \$680 million.



- **Songdo International School:**

- Completed construction in June 2009.
- Cost \$150 million.
- 17 acres. Includes state-of-art athletic facilities, 650-seat theater, swimming pool, TV studio.
- Has had no success developing affiliations with U.S. or Canadian schools to run it.
- Second school like this one is planned for later development phase.

- **Songdo International Hospital:**

- To be first foreign-run hospital in Korea.
- To be 500-bed hospital with 500 doctors, 2,000 nurses and total of 5,000 new jobs created.
- Estimated cost = \$362 million.
- Has had no success in developing relationships with U.S. hospital systems to operate it.
- Latest MOU (December 2009) was with Johns Hopkins Medicine International. **But no official permission has yet been given by National Assembly for foreign hospitals to build and operate in South Korea.**

- **Prototype city of the future – sustainable and environmentally sound:**
  - 600 acres of open and green space connected to walking/biking corridors. Planted with native species.
  - Sustainable transportation – abundant public transportation; 10% of parking capacity dedicated to low-emission vehicles and car-pool vehicles; parking located underground.
  - Water consumption, storage and re-use – all to use latest environmental technologies to conserve.
  - Carbon emissions and energy use – All projects built to internationally recognized benchmark standards for comfortable, energy-efficient buildings and public utilities.
  - LEED certified - And much more.
- **Ubiquitous information technology and systems**
- **Superior infrastructure, within the city and connecting to the outside**

- Massive investment in infrastructure was promised by Korean and Incheon governments at inception of Songdo IBD project.
- To date, only one project completed: **Bridge connecting Songdo IBD to Incheon Airport.**
  - Was to cost \$775 million and be completed by 2008. Opened in October 2009 at cost of \$1.2 billion.
  - **South Korea's longest bridge** –
    - 21.4 kilometers, 18.4 of which is over water.
    - Rises to height of 74 meters.
    - Bridge deck weight is carried by 208 cables attached to two inverted Y-shaped pylons, each 238.5 meters high (almost as high as Korea's highest skyscraper).
    - **Built to overcome enormous odds like huge waves, gusty wind, and fog.**



- **July 2001** – Developers and City of Incheon signed MOU granting development rights and land supply to newly formed joint venture company, New Songdo City Development LLC (NSC Development LLC).
- **November 2002** – Master plan created, zoned, approved by City of Incheon.
- **October 2003** – First round of financing closed for \$90 million. Business plan completed and approved by City of Incheon.
- **February 2004** – NSC Development LLC opened Seoul office.
- **May 2005** – Ground broken on first sub-project, Songdo Convensia convention center.
- **June 2005** – Ground broken on The First World condominium project.
- **February 2007** – Ground broken on Songdo Central Park, five-star Sheraton Incheon Hotel, and Northeast Asia Trade Tower commercial space.
- **August 7, 2009** – **Songdo IBD “officially” opened as a designated Free Economic Zone modeled after Shanghai and Hong Kong.**
- **2014 to 2016** – Completion date estimated in 2008 literature.

- **Project joint venture structure.**
- **Financing risk:** No long-term construction loans, corporate bonds, or mortgages available in Korea.
- **Investing risk:** This is the largest real estate financing in Korean history. Korean banks are in for billions.
- **Government:** Local boroughs, City of Incheon, and National Assembly.
- **Even the weather!**



# Performing the appraisal

- Original project divided into six phases, each contained within distinct geographical area of Master Plan.
- We reconfigured it to add development flexibility and allow for extensive time-to-build uncertainties.



# Reconfigure original project layout



- **Period of analysis:** 15 years beginning 2010.
- Retained 6 phases, but roll-out much more realistic.
- Divided each phase into 5 process stages:
  - **Preconstruction** – 2 years;
  - **Construction;**
    - 1 year to build hotel;
    - 2 years to build commercial or residential space;
    - All retail except Riverstone Mall is part of commercial and residential construction projects.
  - **Stabilization** – 2 years;
  - **Asset management and/or sale;**
  - **Reversion year** – the final year of projection period.

- **Land purchase** – assumes all land is purchased at beginning of New Phase One.
  - Price of land set by City of Incheon for New Phases One – Five. At market for New Phase Six.
  - An option because land provides developer the right but not the obligation to develop projects on it.
- **Non-income producing sub-projects** – assumes each set of sub-projects is built at the start of each phase, with all costs in first year of phase.

- Inflows:
  - **Pre-sale revenues** – spread over 4 years of construction stage.
  - **Commercial space lease revenue** – Begins to flow the year after sub-project completed. Assume five year leases for office space and 10-15 year leases for retail. **Revenues reported net of operating costs.**
- Outflows:
  - **Building construction costs** – Spread over 4-year construction stage. Cost overruns were applied to everything, with amounts used from actual (7.1% for hotel; 170% for Riverstone Mall; 70% for both commercial and residential space).
  - **Remediation for technological obsolescence** - Every 2 years after construction completed. Throughout life of commercial assets. Estimated at certain % of original construction costs.
  - **Adjustments for non-cash charges and additional working capital needs not included.**

- We assumed the following for long-term project financing:
  - Principal = \$5 billion.
  - Interest = 7.50% compounded annually.
  - 25-year term.
  - Start date is 12-31-2010.

- Rates of return developed from available market data, standard appraisal practice, our assessment of risk of each phase, stage and sub-project.
- Risk-free rates and inflation rates provided by [www.global-rates.com](http://www.global-rates.com) and Bank of Korea publications.
- Discounting convention is whole-year, in keeping with standard real estate appraisal practice.
- Calculation of reversion year flows uses Gordon Growth Model.
  - Grows annual net cash flows for year prior to reversion by selected rate of inflation.
  - Capitalizes this into future value using selected cap rate.
  - Discounts result by reversion year cost of capital.

- Three quantitative models built. Model 2 has two distinct iterations.
- **Model 1 – Baseline economic valuation:**
  - All analysis is performed using standard appraisal practice.
  - Produces deterministic point estimate of value.

- **Model 2, uncertainty identification:** We identified four major sources of uncertainty.
  - **Market demand uncertainty** – represented in the following metrics:
    - % occupancy, office & retail space
    - % absorption, residential space
    - % capacity utilization, hotel space
  - **Technological uncertainty** – represented by % of commercial space construction costs.
  - **Government/regulatory uncertainty** – effects embedded in high construction costs and high discount rates.
  - **Financing/investing uncertainty** – Embedded in cost of capital.

- **Model 2A – Recognizes uncertainty by using deterministic point estimates of uncertain parameters** (i.e. the metrics assigned to each kind of uncertainty).
  - All analysis is performed using standard appraisal practice.

- **Model 2B – Recognizes uncertainty by assigning volatilities to uncertain parameters and creating ranges (i.e., stochastic distributions) around them.**
  - Cash inflows, construction costs, and remediation costs all varied stochastically, using a simple RAND function in Excel.
  - Discount rates, the risk-free rate, and inflation rates NOT varied stochastically. Were varied by phase and stage as point estimates.
  - Once uncertain parameters assigned volatilities and distributions, Monte Carlo simulation run to generate pro formas under stochastic (i.e., realistic) uncertainty. Simulation is simple Excel function.
  - Pro formas then put through ordinary discounted cash flow analysis to calculate NPVs for invested capital and for equity.

- **Model 3 – Flexibility identification and quantification:**
  - Flexible strategies all directly address market demand uncertainty.
  - We could have provided a flexible design option to mitigate technological uncertainty but it added unnecessary layer of complexity.
  - The “Default” for Model 3 flexibility analysis is Model 2B.

- **Early reversion in 2018:**
  - Due to near-completion of many sub-projects in these two phases, early reversion is only choice available.
  - In 2018:
    - New Phase One properties will have experienced two years of the benefits of the asset management stage.
    - New Phase Two will have just completed its stabilization stage.
    - This should position both portfolios of properties well for exit.

- **Convert commercial development into high-rise residential development:**
  - Flexible strategy will follow same roll-out timeline as default. Cash flows immediate due to pre-sale.
  - Development option remains in place because construction of school will be required to service additional residential units.

- **Convert high-rise residential development into high-end single family estates.**
  - Flexible strategy will follow same roll-out timeline as default.
  - 58 acres can be sold at market prices along with houses = profit on original cost of land.
  - Development option is no longer needed.
  - Placement of lots is ideal for this strategy because contiguous to golf course and community.

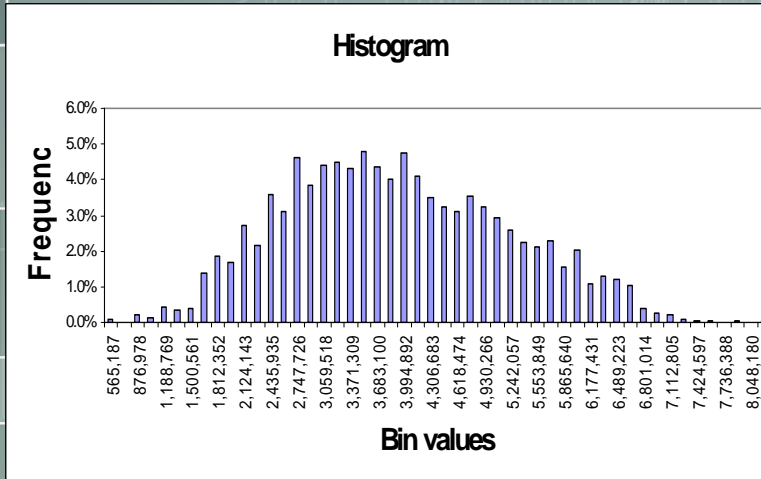
- **Sale of raw land at 2018 market prices.**
  - Land is located on outer rim of city and could be repurposed to manufacturing facilities, helipad, or other yet-unforeseen uses.
  - Development option is no longer needed.

- The decision trigger is pulled as follows:
  - Calculate Expected NPVs (ENPVs) for 2018 reversion for the Default under stochastic uncertainty (i.e. Model 2B).
  - **If:** ENPV to invested capital for this calculation is  $<$  remaining mortgage principal + interest payable to the end of 2017,
  - **Then:** Invoke flexible strategies, all phases.

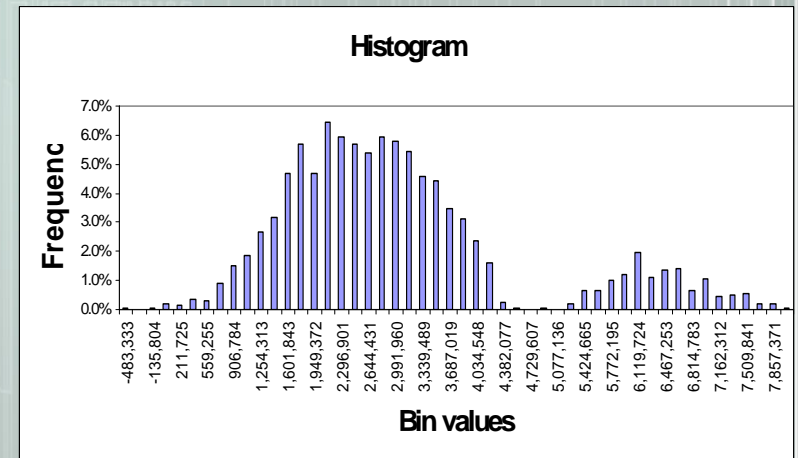
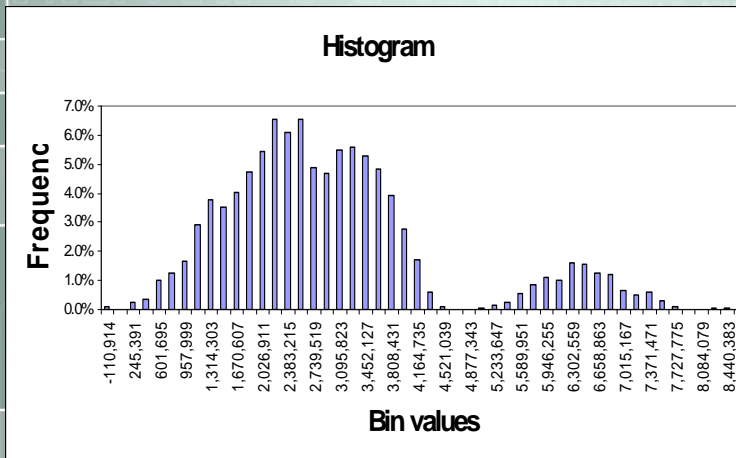
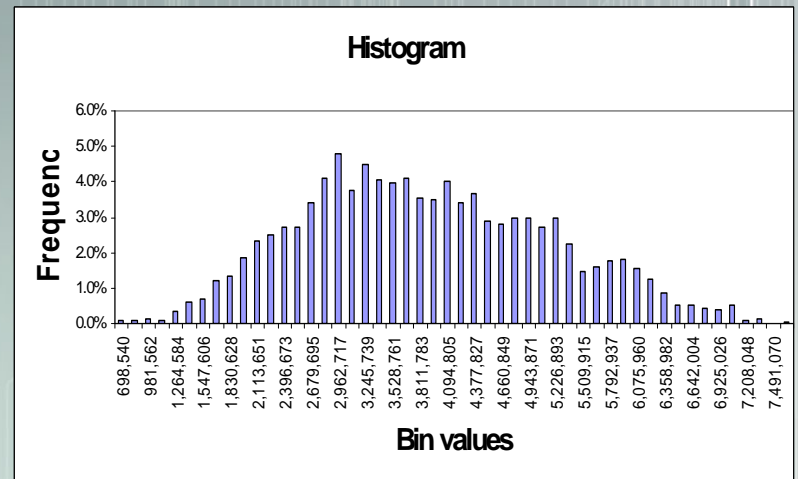
- Once the decision trigger is pulled, Model 3 is built to run a flexibility analysis automatically:
  - It creates pro formas under stochastic uncertainty and flexibility and recalculates IRRs.
  - It runs Monte Carlo simulations on them to derive new ENPVs.
  - Excel can be “programmed” to find specific results such as means, maximums, minimums and to create histograms and Value at Risk and Gain (VARG) Curves.
  - The Monte Carlo simulation can be run as often as you want and a chart of run results can be compiled to provide an even more refined picture of results.

# Histograms

## Run 2

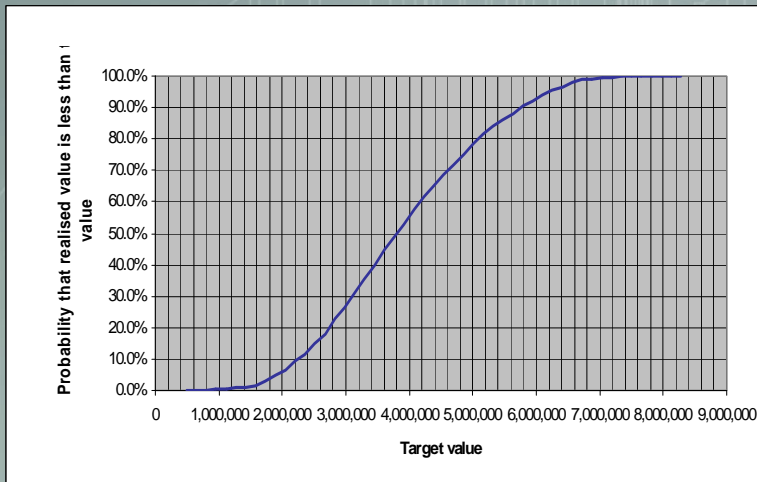


## Run 4

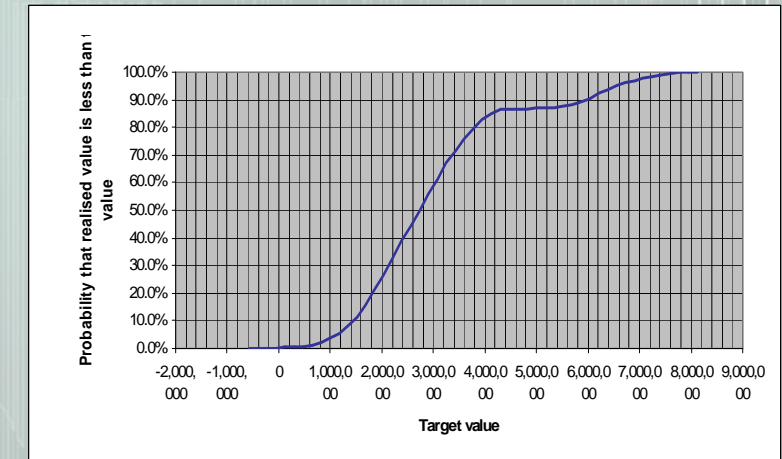
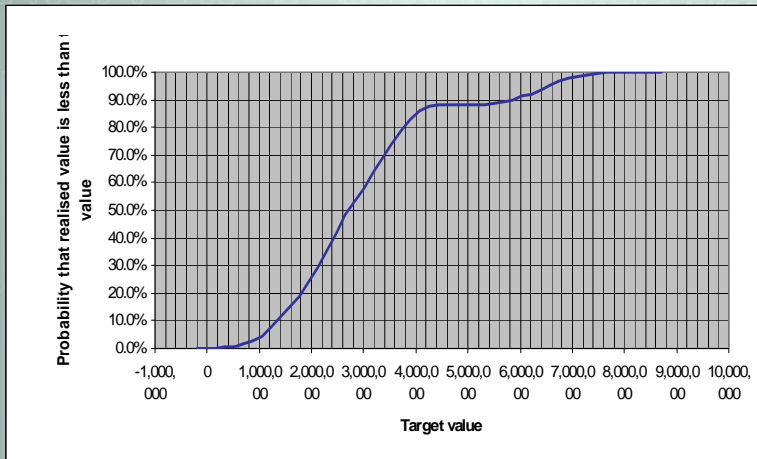
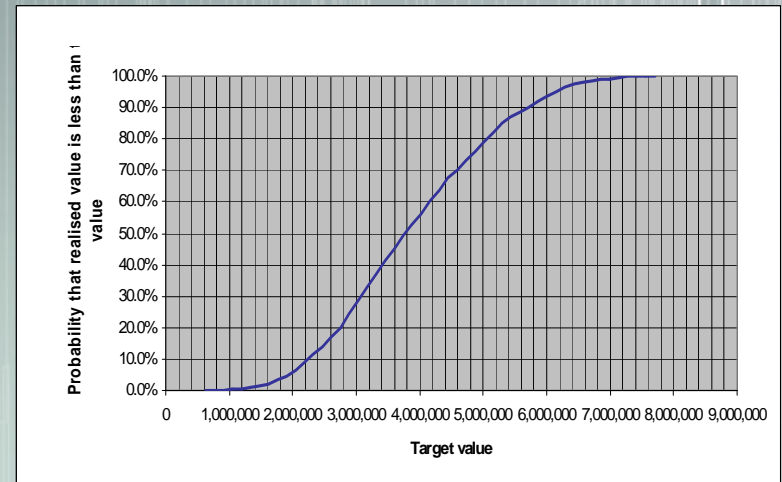


**Note: Default (Model 2B) at top; Model 3 (flexible) at bottom.**

Run 2



Run 4



Note: Default (Model 2B) at top; Model 3 (flexible) at bottom.



# Analysis of results

- The following table compiles results from all Models and four runs of Monte Carlo simulation for Models 2B and 3.
- Results are recorded in 000s.

**SUMMARY OF RESULTS**  
**New Songdo International Business District**

Result	MODEL 1 - w/o Uncertainties	MODEL 2A - w Deterministic Uncertainties	MODEL 2B - w Stochastic Uncertainties				MODEL 3 - w Stochastic Uncertainties & Flexibility			
			Run 1	Run 2	Run 3	Run 4	Run 1	Run 2	Run 3	Run 4
							<i>w Flexibility</i>	<i>w Flexibility</i>	<i>w Flexibility</i>	<i>w Flexibility</i>
NPV, Invested Capital	\$ 7,257,597	\$ 3,893,365	\$ 4,717,508	\$ 3,188,517	\$ 2,068,787	\$ 3,862,697	\$ 3,246,639	\$ 1,896,940	\$ 1,677,429	\$ 2,461,482
Overall IRR	20%	14%	8%	5%	4%	7%	14%	11%	11%	13%
Mean			4,648,718	3,907,798	3,873,100	3,883,104	3,988,272	3,001,050	3,058,765	3,037,780
Standard Deviation			2,178,365	1,307,556	1,277,615	1,288,427	2,760,056	1,537,581	1,568,130	1,567,279
Maximum			18,067,109	8,126,127	7,605,738	7,561,825	19,769,240	8,529,459	7,859,465	7,944,253
Minimum			(151,703)	487,239	498,536	627,785	(555,269)	(199,990)	(377,153)	(570,216)
Coefficient of Variation			0.4686	0.3346	0.3299	0.3318	0.6920	0.5123	0.5127	0.5159
P <sub>5</sub>			1,923,812	1,904,054	1,919,908	1,944,729	1,047,670	1,098,429	1,141,320	1,135,572
P <sub>95</sub>			8,655,714	6,216,746	6,085,637	6,121,651	9,621,967	6,525,309	6,631,720	6,559,484
NPV, Equity	\$ (2,093,395)	\$ (5,457,627)	\$ (4,633,484)	\$ (6,162,475)	\$ (7,282,205)	\$ (5,488,295)	\$ (4,375,390)	\$ (5,725,089)	\$ (5,944,599)	\$ (5,160,547)

- Rather than focus on all results, we will focus on two – ENPVs and IRRs. The estimates for Model 2B and Model 3 are averages of four Monte Carlo simulation runs.
  - **NPVs to invested capital:**
    - Model 1 w/o uncertainties: **\$7,257,597,000. [MYTHICAL]**
    - Model 2A w deterministic uncertainties: **\$3,893,365,000. [REALISTIC]**
    - Model 2B w stochastic uncertainties: **\$3,459,377,000. [MORE REALISTIC]**
    - Model 3 w flexibilities: **\$2,320,622,000. [SEEMS LOW UNTIL YOU LOOK AT NPVs TO EQUITY]**
  - **NPVs to equity (i.e., after debt service/repayment):**
    - Model 1 w/o uncertainties: **\$(2,093,395,000). [MYTHICAL]**
    - Model 2A w deterministic uncertainties: **\$(5,457,627,000).**
    - Model 2B w stochastic uncertainties: **\$(5,891,615,000).**
    - Model 3 w flexibilities: **\$(5,301,406,000).**

- The benefits of the flexible strategy show up definitively in the IRRs.
  - IRRs:
    - Model 1 w/o uncertainties: **20%. [MYTHICAL]**
    - Model 2A w deterministic uncertainties: **14%. [MORE REALISTIC]**
    - Model 2B w stochastic uncertainties: **6%. [MUCH MORE REALISTIC]**
    - Model 3 w flexibilities: **12%. [MUCH MORE REALISTIC & ALSO IMPROVED]**

The background features a series of vertical lines of varying heights and thicknesses, some solid and some dashed, creating a sense of depth and structure. On the right side, there is a faint, light-colored architectural drawing or blueprint, showing various lines, angles, and possibly some text, though it is too light to read clearly. The overall color palette is a gradient of light blues and greys.

# Practical implications

- This methodology brings **increased realism & practicality** to the appraisal process.
  - Now we can model both external and internal asset uncertainties and flexibility in a meaningful manner.
  - The required computational tools are relatively simple applications of standard software package, Excel.
  - The computations take little time to run and use average laptop capabilities.
  - The analysis & results are expressed in terminology and techniques that are familiar to clients and other stakeholders.
  - The estimate of value can be represented as a “point” expected value, i.e. the mean of a realistic value space (i.e., range).

- With increased realism, both **going-in and exit strategies, as well as ongoing operating strategies, can be improved.**
- The banking community should welcome **healthier balance sheets, based on realistic ENPVs that can be supported**, rather than “bubble-and-bust” driven ones.
  - Yes, bad properties will be seen for what they are.
  - But, so will great ones – in all states of the economy.
- **Mark-to-market might actually mean something** – as might impairment analysis.

- This methodology could facilitate asset revaluation on a quarterly, annual, or other regular basis. Near real-time values become possible.
  - Once created, this set of models can be re-used indefinitely, with modifications for the individual client.
  - As uncertain variables are updated and values revisited, flexible strategies can also be fine-tuned.

Is New Songdo City an Atlantis rising from the sea?



Or is it a banker's and developer's greatest nightmare?


**Only time will tell.**



# Questions and comments



# Appendices



- **Risk & uncertainty:**
  - **Are not the same thing.**
  - **Uncertainty:** Describes something not currently known or known only imprecisely.
    - Key attribute of large, complex systems. (Real property is a “system.”)
    - All systems planning, implementation and appraisal depend on forecasting uncertain variables.
    - Is “value neutral,” i.e. not necessarily linked to negative outcomes.
    - Is impossible to predict over the lifetimes of systems.
    - **Measurement is subject to the “flaw of averages” – which is standard appraisal practice.**

- **Flaw of Averages:**
  - To quote de Neufville & Scholtes, **“The answer you get from a realistic description of the effect of uncertain parameters generally differs – often greatly – from the answer you get from using estimates of the average of uncertain parameters.”**
  - Actual systems are complex and non-linear and distort inputs asymmetrically, i.e. their upside and downside effects are not equal. Reasons?
    - The system response to change is non-linear.
    - The system response involves some discontinuity.
    - Management rationally imposes a discontinuity.

- **Robustness:**
  - A system's capacity for passively dealing with uncertainty.
    - Builds everything into the system up front that might be needed for the system to respond to future uncertainty.
    - Handles a pre-planned cluster of uncertainties well but not capable of flexing to take advantage of unplanned events and circumstances.
  - Supports and sustains value, but, because a passive attribute, does not create or drive value and may actually detract from it if pre-planned uncertainties are far from reality.

- **Flexibility:**
  - A system's capacity for dealing dynamically with uncertainty.
    - Builds components into the system that provide for system change capacity, should it be desirable.
    - Components may cost more now, but long-term cost is lower due to smaller initial systems required and less expensive adaptations to future scenarios.
  - Can increase system expected value, often dramatically, because allows system to take advantage of changing information and circumstances in a variety of ways.
  - The greater the uncertainty, the more flexibility has value.
  - Flexibility = real options = choice v. pre-determined results = ability to harvest opportunities that unfold over time

- **Flexibility:**
  - Is there any concept like this in the real estate appraisal world?
    - “Highest and best use” analysis . . .
    - Real estate synergy: **“A process of recombining, adding, subtracting, or otherwise affecting relationships of internal or external factors associated with a real estate asset that results in increased overall value at a specific point in time.”** *Real Estate Issues*. Vol. 35 No. 1, 2010.

- **"on:"**
  - Occurs at strategic/transactional level.
  - Value created by presence of choice (i.e. flexibility) to:
    - Defer an action/transaction during project lifecycle;
    - Enlarge, contract, or otherwise alter the course of the project;
    - Disband the project entirely.
  - Utilizes modified and extended financial options pricing concepts and models.
  - Requires knowledge of overall system and potential strategic flexibilities but not deep knowledge of system technical aspects.
  - **NPV + Option Value** provides more realistic picture of project's **performance and lifecycle** under uncertainty.

- **"in:"**
  - Focuses on design/operational level.
    - How to identify design/operations combinations that, out of thousands of available choices, should be studied further.
    - How to value and use these flexibilities to limit negative outcomes while being able to take advantage of unforeseen upside opportunities.
  - Value created by presence of flexibility **within** project itself (see definition of flexibility).
  - **NPV + Flexibility** provides more realistic picture of project's **capabilities and potential** over time and under uncertainty.

**We will consider both types of real options in this case study.**

- Hard to find current, detailed data. No direct contact with project developers, investors, or other parties with “insider” information.
- Two Masters’ theses by MIT students, using Songdo IBD as their research subject:
  - Jihun Kang (2004).
  - Junho Lee and Jeehyun Oh (2008).
- Developer and architect websites; Songdo IBD website; other websites and blogsites that discussed New Songdo City (example: *Korean Times*)
- April 2010 Republic of Korea *Economic Bulletin*; 4<sup>th</sup> Q 2009 publications from CB Richard Ellis.
- “South Korea: Finding its place on the world stage.” McKinsey Quarterly, April 2010.

- **29.9% Partner = POSCO E&C:** A division of POSCO, the 2<sup>nd</sup> largest steel manufacturer in the world and one of Korea's top companies.
  - Founded in 1994. Thus, a relatively young construction company, though highly rated.
  - Is assigned all construction risk.
  - Sole contractor. Therefore, no competitive bidding process for projects.
  - Equity stake in project company is only \$10 million – a miniscule stake in light of size of whole project.

- **70.1% Partner = The Gale Company:** A moderate-sized real estate development and investment company, originally headquartered in Florham Park, NJ.
  - Had never done international development prior to Songdo project.
  - Brought impressive list of strategic relationships with institutional investors and major corporations to the table.
  - Became the first legal foreign owner of Korean land.
- **The joint venture structure between these two partners is quite complex.**

- **Morgan Stanley:**
  - May 2003 – Invested **\$15 million** in NSC Investment LLC (part of joint venture structure), taking 12.5% equity interest.
  - October 2003 – Helped put together first funding round.
- October 2003 - **Woori Bank (Korea) and Industrial Bank of Korea** split **\$50 million** of first-round funding. **ABN Amro, Bank of Nova Scotia and others** put together remaining **\$40 million** of first-round funding.
- 2004 – **Woori Bank** arranges **\$180 million** syndicated loan for bridge funding purposes.
- October 2004 – **Taubman Centers, Inc.** provides letter of intent to invest **\$477 million** in Riverstone Mall.

- June 2005 – **26 financial firms** provide **\$1.5 billion** syndicated loan to repay second round, cover working capital needs, cover costs of “development options.”
- 2006 – NSC announces **Linkage Programs** granting development rights for residential projects in exchange for investment in commercial projects. **Morgan Stanley Real Estate** helps put three programs together for about **\$700 million**.
- November 2007 – **Shinhan Bank** arranges **\$2.7 billion total** syndicated loan, funding almost \$1.7 billion itself. 12 other banks participate including: **Industrial Bank of Korea, Hana Bank, Kumho Life Insurance.**

- **City of Incheon:**
  - Required NSC Development to fulfill certain conditions in order to gain a signed Land Supply Agreement (setting land at lower-than-market prices):
    - Build a convention center (\$100M) in the first phase and donate it and land for future expansion to the City. **Originally the City was to provide this, with NSC Development as developer. But new mayor renegotiated.**
    - Build a central park with 6,000 underground parking spaces. To be donated to City.
    - Provide main infrastructure. **Originally, City was to provide infrastructure such as roads and sewerage. This was later amended to require Gale to cover such costs for residential blocks.**
  - Required NSC Development to participate in every individual sub-project in Songdo, holding at least 1% ownership interest in each.

- **National government - examples:**
  - 2004 – City of Incheon and Ministry of Finance and Economy requested funding of \$12.2 million for Songdo IBD infrastructure construction. Only \$5.6 million was included in national budget by National Assembly, leading to delays and no construction of promised infrastructure.
  - January 2007 - National Assembly enacted law placing price cap on pre-sale pricing in an attempt to control pre-sale price appreciation, creating following problems:
    - Each round of financing was secured by value of land and pre-sale revenues, based on prices set by NSC Development. So, value of collateral seriously affected.
    - Investors started withdrawing because profits seriously affected.
    - Profitability of entire project affected due to much higher costs to build than estimated.

- Residential, owner-occupied properties are considered most profitable while income-producing properties are considered more risky and less profitable.
- Residential rental units are considered only for the poor – therefore, no market for building them.
- Almost all real estate development lending is secured by land and supported by credit of general contractor.
- Korean banks have limited ability to provide true long-term financing.
  - Bank loans rarely exceed 3-5 years in duration, including the construction period.
  - Stepped financing exposes project sponsors to significant refinancing risks and unfavorable interest rate fluctuations.
- Average maturity of Korean corporate bond is 3.5 years.
- No long-term domestic commercial mortgages available in Korea.

- Typical Korean condominium payment schedule is at least 10% down payment with the remainder paid off within two years.
- Condominiums are “pre-sold” – e.g. sold when construction begins, not after it is completed. Thus, cash flows are immediately available.
- NSC Development LLC is using this pre-sale mechanism to provide greater flexibility in short-term financing than would have been otherwise possible.
  - Reinvestment of residential pre-sales profits will enable NSC Development to:
    - Pay down construction loans rapidly.
    - Build up developer equity in project and support permanent debt service coverage of 1.6:1 in later phases.
    - Diminish default risk and provide incentives to banks to lend.