

Potential Socio-Economic Benefits of GOES-R

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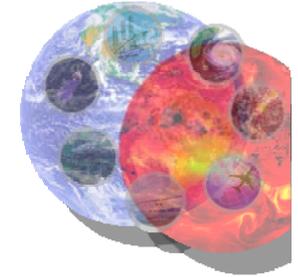
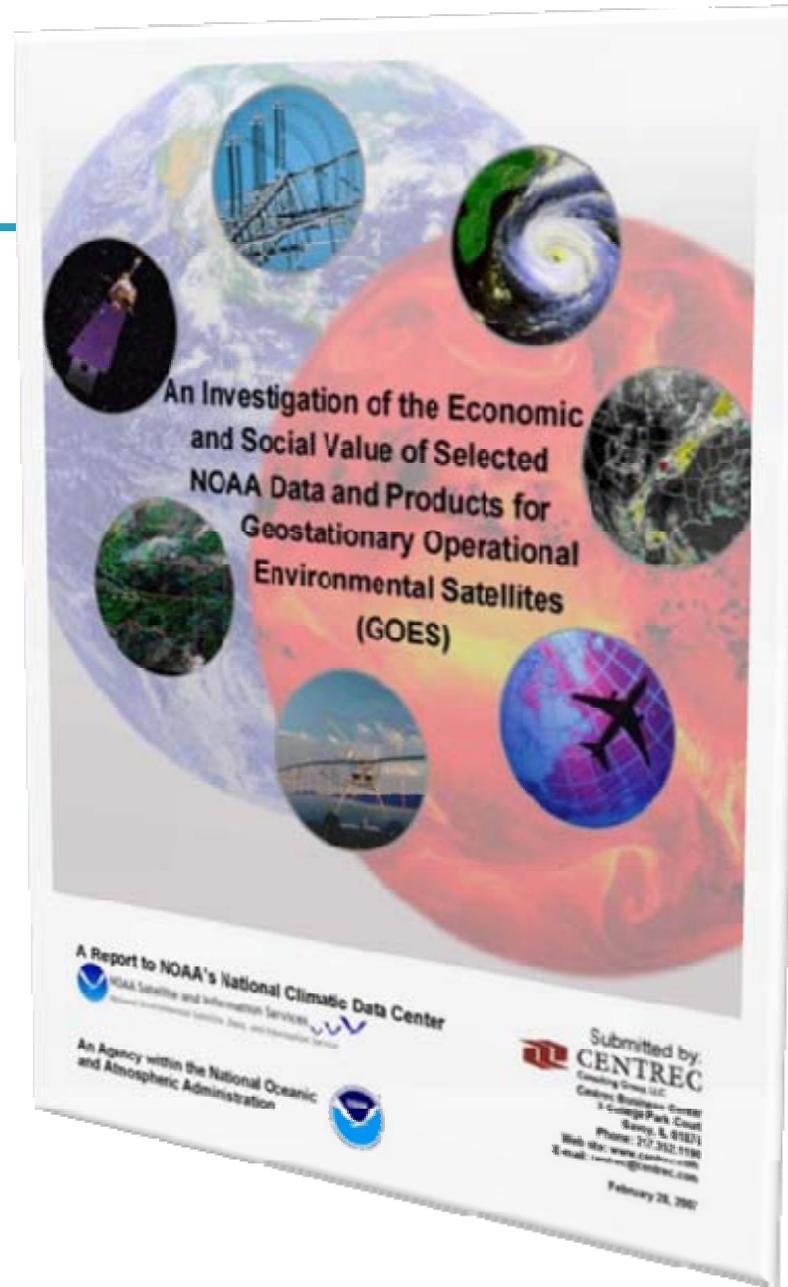


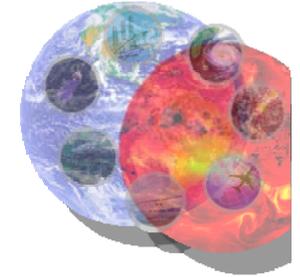
Presented at the Fifth GOES Users' Conference

January 24, 2007

88th AMS Annual Meeting, New Orleans, LA

An Investigation of the Economic and Social Value of Selected NOAA Data and Products for GOES Report

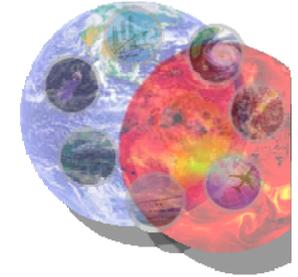




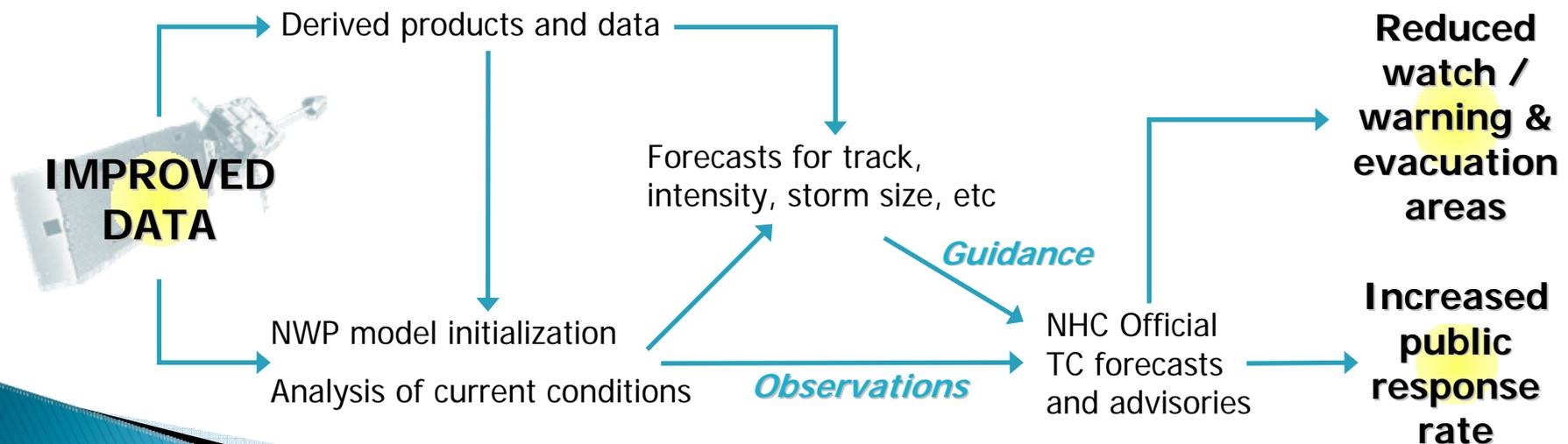
Objective of Study

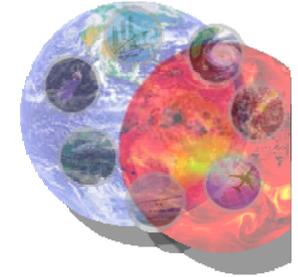
- ▶ To estimate the potential socio-economic benefits of GOES-R in selected application areas
 - Valuation of improved tropical cyclone (TC) forecast information along the Gulf and Atlantic coastlines
 - Updated quantification of benefits previously estimated for aviation, energy (electricity and natural gas), irrigated agriculture, and recreational boating (“GOES-R Sounder and Imager Cost/Benefit Analysis”, 2002)

Improved Tropical Cyclone Forecasts – Technological Assumptions



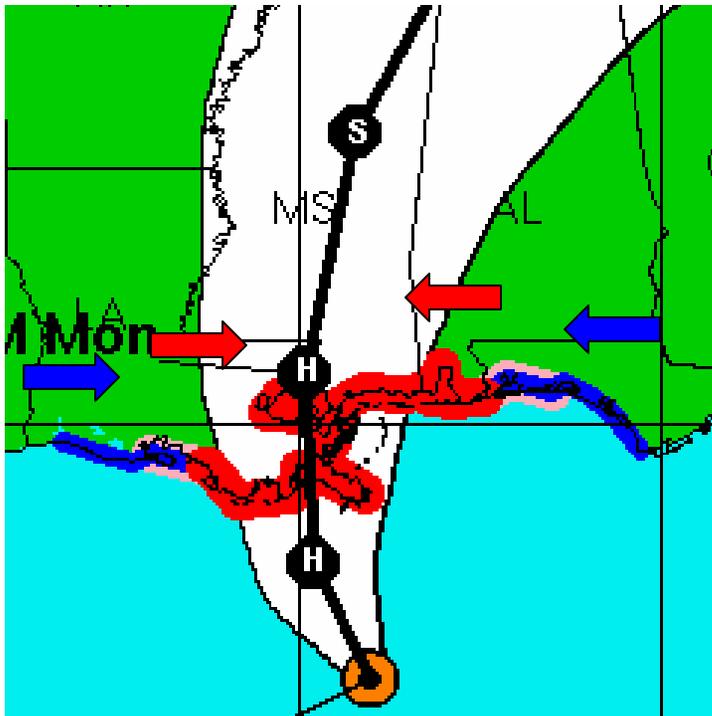
- ▶ Instruments – ABI and possible high resolution spectral sounder
- ▶ Key impacts on TC forecasts
 - More accurate intensity and track forecasts through reduced forecast errors
 - Secondary implications could be tightening of wind speed probability fields and improved surge forecasts



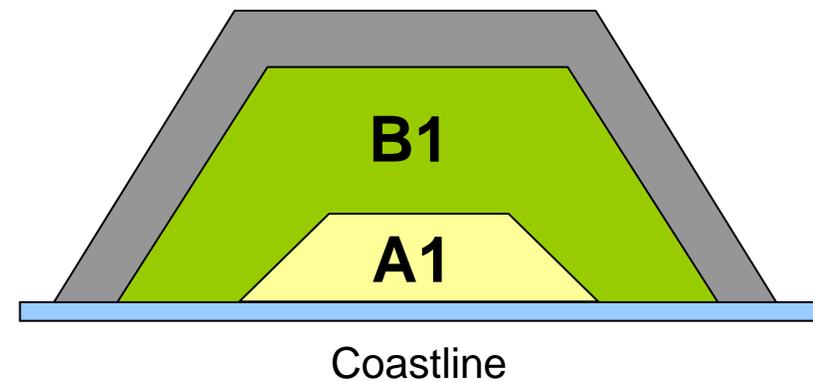
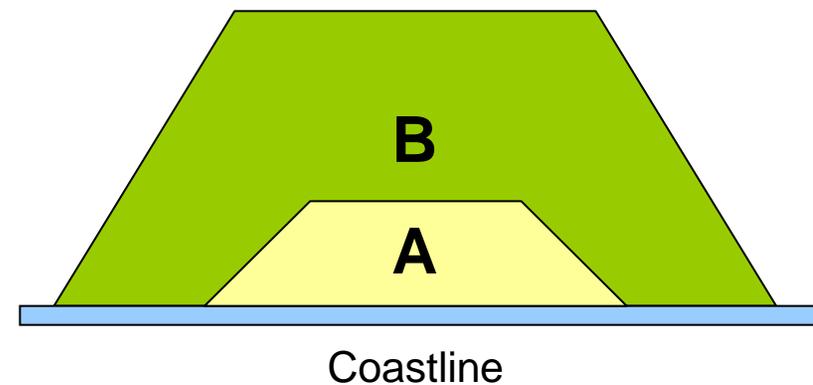


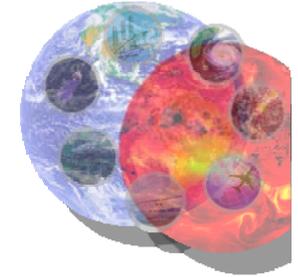
Reduced Watch / Warning Areas

More accurate TC forecasts should reduce watch and warning areas



Graphic used for illustrative purposes only





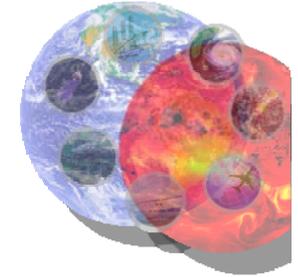
Increased Public Responsiveness

More accurate TC forecasts should increase the public's responsiveness

Protection	
↑	Protection costs
↓	Property damage
+	Net economic effect

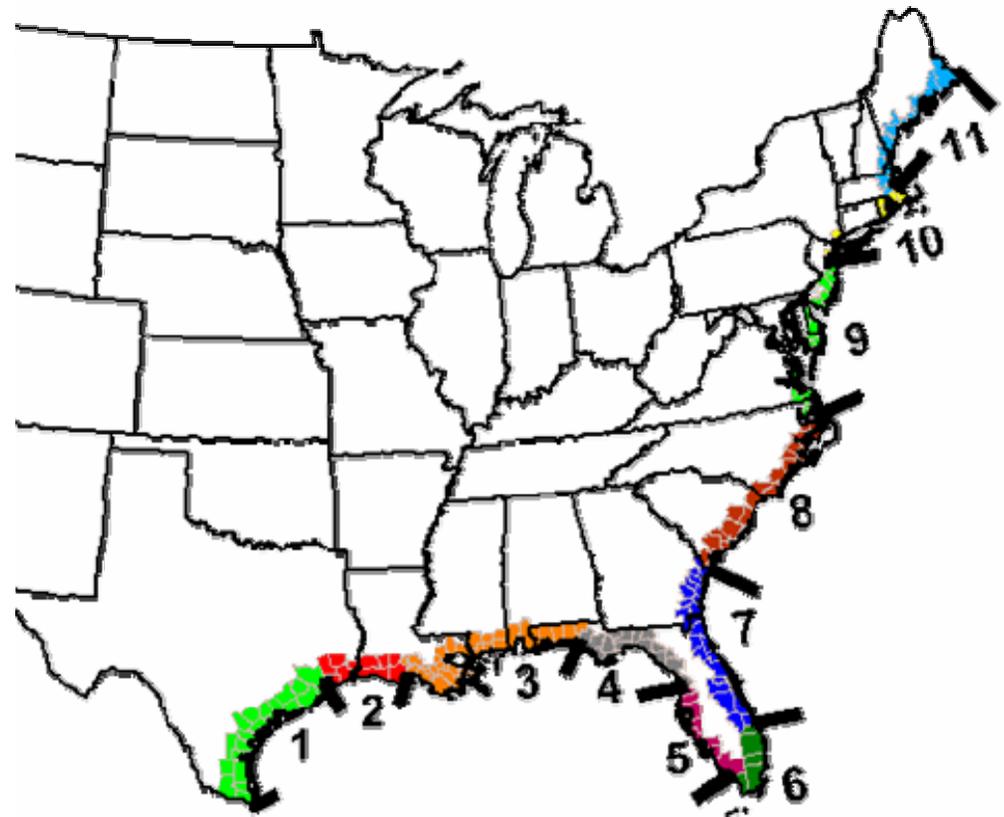
Evacuation	
↑	Evacuation costs
↓	Economic loss of life and injury
+	Net economic effect

Reduced Evacuation Area	
↓	Overall evacuation costs
+	Net economic effect

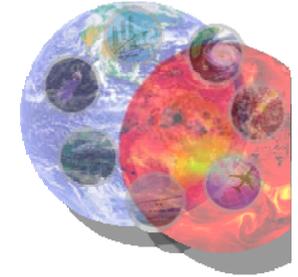


Analysis Framework

- ▶ The Tropical Cyclone Forecast Valuation Tool, an Excel-based model, was developed to implement the methodology
 - Relevant geographic area: Atlantic and Gulf coastlines
 - Used estimated annual, county-level probabilities of landfall or being in vicinity for tropical storms; S-S 1 & 2; and S-S 3, 4 & 5 hurricanes¹



¹ Compiled by the U.S. Landfall Probability Project

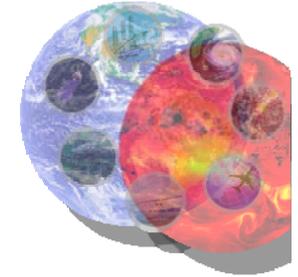


Analysis Scenarios¹

	Base Case (ABI)	Enhanced Technology (ABI plus HRSS)
Instrument focus	ABI	ABI plus more accurate technology performance such as a high resolution spectral sounder (HRSS)
Improved GEO data's impact on TC forecasts	Analysts' most conservative estimates	More aggressive estimates ²
Impact on watch/warning and evacuation areas	5%	15%

¹ Only two of eight different scenarios considered in the report are presented.

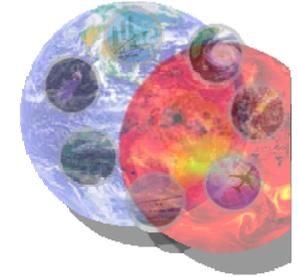
² The assumptions made for this scenario are intentionally aggressive values and are not based on social behavior or scientific evidence due to the limited research on this topic. Nonetheless, while these assumptions might not be scientifically expected today, they are meant to illustrate the potential benefits if proved true in the future.



Estimated Benefits

	Base Case (ABI)	Enhanced Technology (ABI plus HRSS)
Total Net Benefits		
Non-discounted net benefits for the single year 2015	\$452 M	\$814 M
Total NPV ¹ benefits for 2015 - 2027	\$2,376 M	\$4,278 M
Per Coastline Mile		
Non-discounted net benefits for the single year 2015	\$130 K	\$233 K
Total NPV ¹ benefits for 2015 - 2027	\$690 K	\$1,227 K

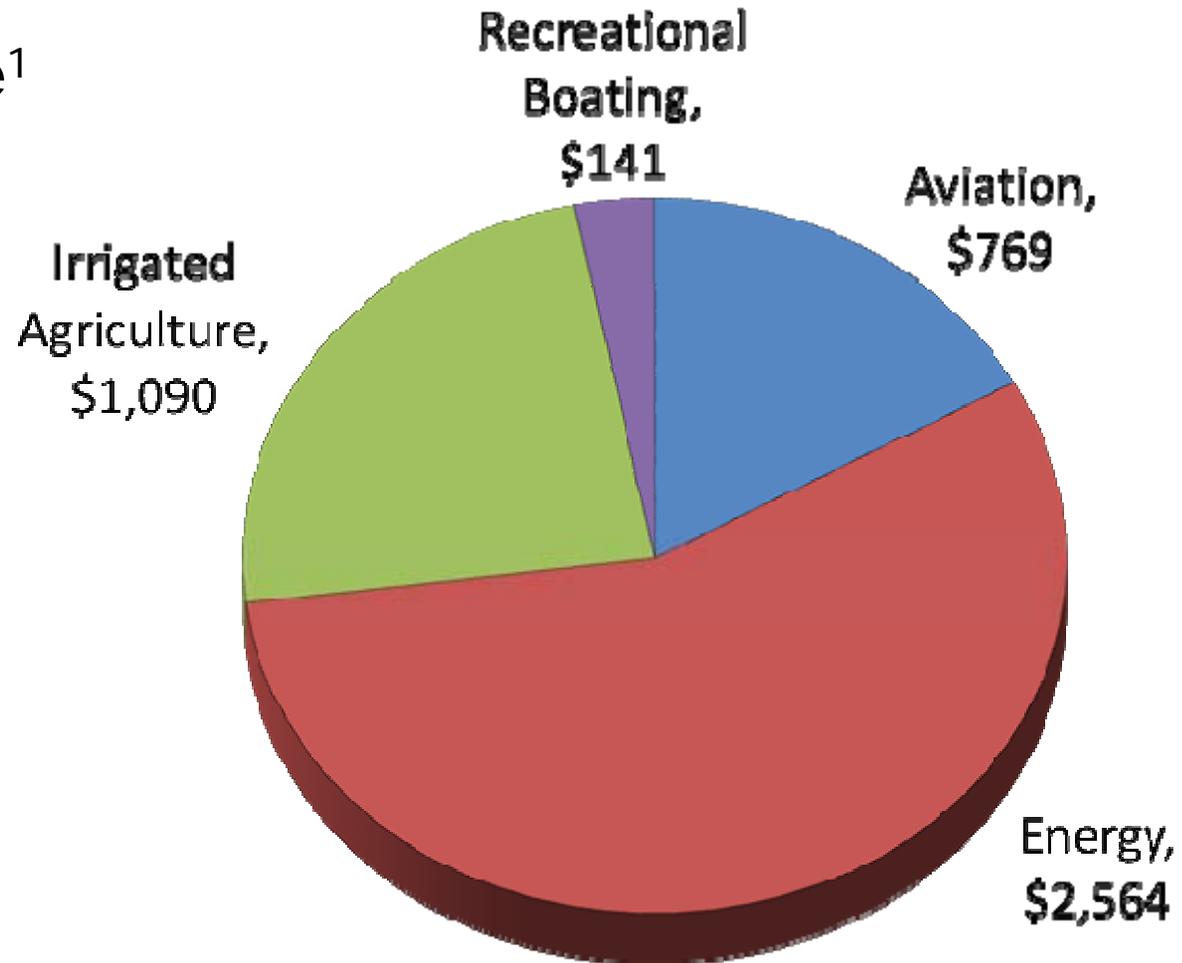
¹ NPV – Net Present Value discounted at 7% with 1.5% population growth and no inflation



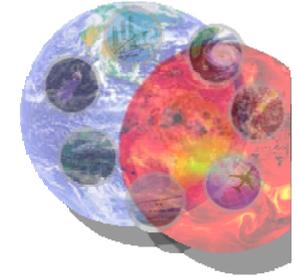
Updated Cost-Benefit Analysis

Net Present Value¹
of Benefits
from 2015-2027
(\$ Mil)

Total Benefits -
\$4,563 Mil

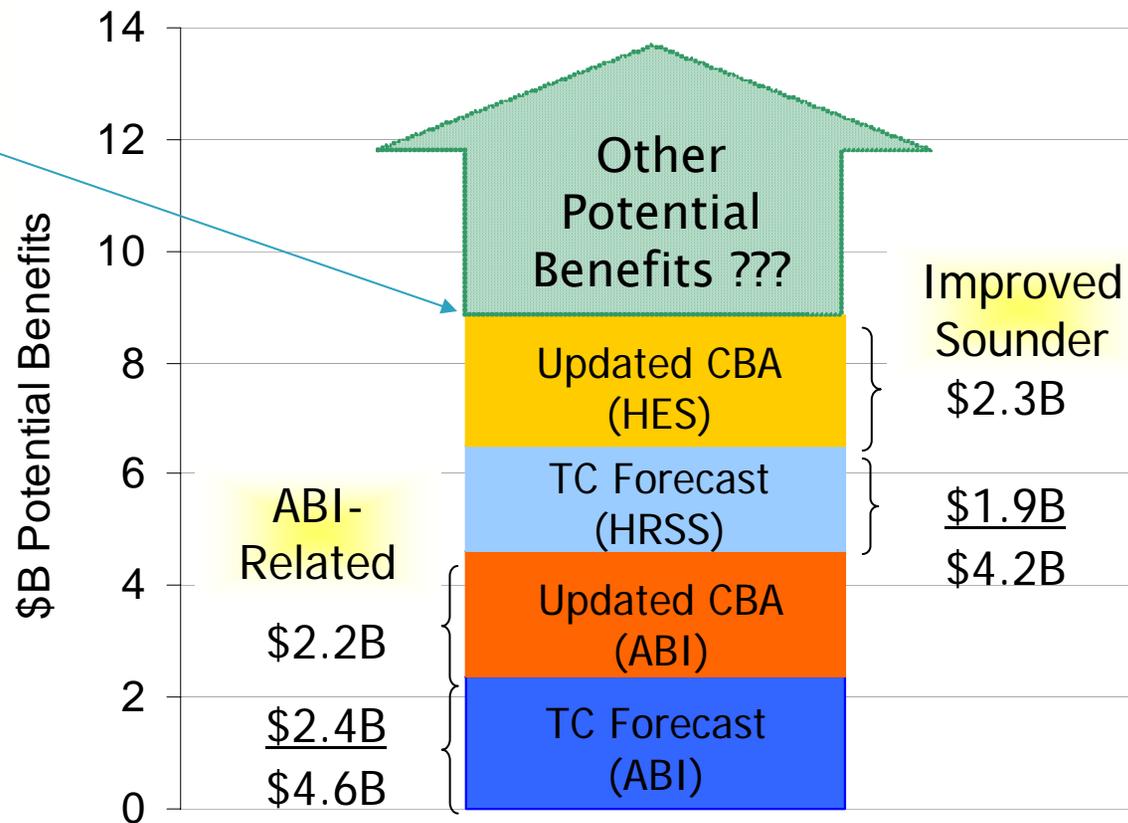


¹ Discounted at 7%

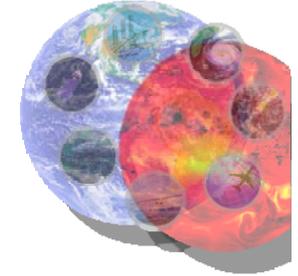


Summarized Potential NVP¹ Benefits Beyond Current GOES Series

ABI-related and high resolution spectral sounder technology - \$8.8 B

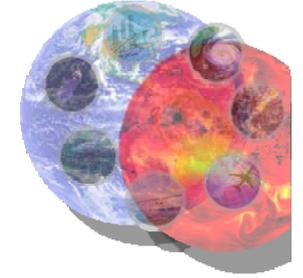


¹ Discounted at 7%



Areas Not Included in Analysis

- ▶ Tropical cyclone forecast analysis
 - Disruptions of economic operations
 - Inland damages due to rain and wind effects
- ▶ Instruments – Geostationary Lightning Mapper (GLM); Solar UV Imager (SUVI); Extreme UV/X-Ray Irradiance Sensor (EXIS); Space Environmental In-Situ Suite (SEISS); Magnetometer (MAG) and Unique Payload Services
- ▶ Users – international; retrospective; DoD; data collection services
- ▶ Economic sectors including commercial transportation, tourism, television
- ▶ Societal benefit areas such as human health, climate, ecological, ocean



Concluding Remarks

- ▶ Potential benefits of GOES-R beyond the current system:
 - ABI-related benefits - \$4.6 B
 - Improved GEO sounder data benefits - \$4.2 B
- ▶ These results most likely underestimate the potential total benefits of the GOES-R satellite system beyond the current system
- ▶ GOES-R program costs were not considered in this study

The report can be found at:

http://www.centrec.com/climate_weather.htm

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Thank you!

