

REPORT: DATA CENTER ANALYSIS & EVALUATION FOR COLUMBIA, MISSOURI



October 2007

PROJECT OMEGA

INTRODUCTION

- In May 2007 Columbia Regional Economic Development, Inc. (Columbia REDI) retained AngelouEconomics (AE) to conduct a reverse site selection analysis that would evaluate the Columbia region (Columbia) in terms of its viability as a location for data centers.
- To initiate the evaluation, AE issued Columbia REDI a Request for Information (RFI), to which Columbia REDI responded with a submission containing data and information relevant to the community and its data center assets.
- This report represents the culmination of the study and the findings, observations, and recommendations of AngelouEconomics.

REPORT STRUCTURE

- The reverse site selection analysis contained in this report is structured as follows:

PHASE I SCREEN



PHASE II SCREEN



EVALUATION

General Screen of Columbia as a Region Suitable for Data Center Investment

Screen of Selected Columbia Sites Including Data Center Assets and Liabilities

Final Evaluation of Columbia



DATA CENTERS

WHAT IS A DATA CENTER?

- A building housing computer equipment
 - Computing
 - Enterprise software hosting
 - Data storage
 - Networking equipment
- Data centers typically provide:
 - Some level of on-site IT staffing
 - Electrical and mechanical systems to maintain computers in an ideal operating environment
 - Increased physical and IT security



WHICH INDUSTRIES USE DATA CENTERS?

- Fortune 1000
- Health Care
- Financial Services
 - Investment Bankers and VCs
- Telecom
- Internet-based companies
 - Search Engines
 - E-retailing
 - Web hosting and CoLocation providers

BUSINESS DRIVERS

- **IT Consolidation – cost savings**
- **Updated technology**
 - Higher computer density requires more power and cooling, increased backup requirements
 - Older data centers do not meet new uptime, staffing, electrical, or mechanical requirements
- **Disaster Prevention & Recovery**
- **Government Regulations**
 - Sarbanes/Oxley, HIPAA
- **Increasing electronic transaction rates**
 - 50+% retail transactions, 60% use auto bill-pay

DATA CENTER CLASSIFICATIONS*

Increasing Redundancy and Data Security: 

(TYPE)	Tier I-II	Tier III	Tier IV
User	Small Biz/Data Storage	Service Centers, Help Desk	Int'l Biz; E-Commerce
Introduction	1960's/70's	1980's	1990's
Site Infrastructure	Basic Redundant	Concurrently Maintainable	Fault Tolerant
Occupancy	Tenant	Owner	Owner
Annual Downtime	1 Day	2 Hours	1 Hour<

*Due to the prevalence of Tier III and Tier IV data centers, for purposes of this report only these data center types are included in the analysis

THE NEW DATA CENTER

- **Tier IV Data Center:**
 - Multiple backups for every electrical & mechanical system
 - 99.99% uptime (equivalent to 30 min/yr downtime)
 - No downtime for maintenance, power outages
 - "24 x Forever" staffing
- **Typical size: 75,000 to 250,000 sf raised floor**
- **Latest cost estimates: \$220/sf raised floor**
- **15-20MW of power required per 100,000 sq ft**



DATA CENTERS & ECONOMIC
DEVELOPMENT

DATA CENTER GROWTH

The Data Center industry is highly active:

Data Center Growth		
Server Growth:	➡	11% annually
Storage Growth:	➡	22% annually
Growth in Supply:	➡	6% (2006)
Growth in Demand:	➡	67% (2006)

- Companies aggressively consolidating and/or opening new facilities
- 22% of data center survey respondents will undertake data center project near term

DATA CENTER ACTIVITY

New Corporate Data Center Projects, 06/07:



- Quincy, WA
- Moses Lake, WA
- The Dalles, OR
- Scranton, PA
- Sioux Falls, SD
- Council Bluffs, IA
- Boulder, CO
- St. Louis, MO
- Lenoir, NC
- Blythewood, SC
- Goose Creek, SC
- Pryor, OK
- Georgetown, TX
- San Antonio, TX

Representative companies include: Google, Microsoft, Ask.com, Intuit, Citicorp, SECCAS, Scottrade, IBM

DATA CENTER IMPACT

The Data Center industry is high impact:

Data Center Impact (2006)		
Capex:	➔	\$15+ Billion
Jobs Created:	➔	5,000+
SF Constructed:	➔	5,000,000+ SF

- High wages create strong multiplier effect locally
- DC's attract highly educated workers
- Opportunity for Fortune 500 name association
- Opportunity for rural technology presence

CASE STUDY: QUINCY, WA


Quincy Before:

Founded: 1892

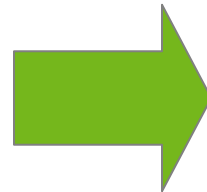
Population: 5,265

Industry: Food Processing

Data Center Projects

- Microsoft
- 
- Yahoo
 - Intuit
 - Ask.com
 - Sabey Corp

Clustering Effect



Boomtown

- 2 million SF data center space
- Farmland values up tenfold
- Retail Sales up 25%
- Multiple subdivisions planned/underway
- 600-1000 construction workers
- 125 acre movie theatre-hotel-business complex



PHASE I SCREEN

PHASE I SCREEN OVERVIEW

Purpose:

- **Measure Columbia's ability to adequately satisfy the following regional screening criteria important to the data industry in making site location decisions:**

1 Cost of Power

2 Disaster Risk

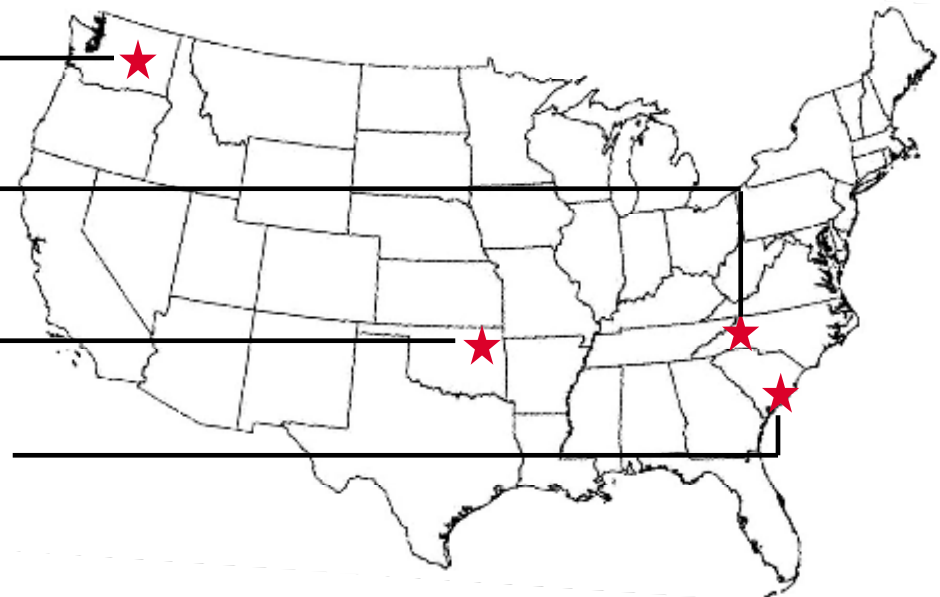
3 Labor Availability

4 Land Cost

PHASE I SCREEN BENCHMARKS

- **In order to assess Columbia's competitiveness for data centers, we compare the region to the following recent recipients of data center investment:**

- Quincy, WA (Grant County)
 - Microsoft, Yahoo, Ask.com
- Lenoir, NC (Caldwell County)
 - Google
- Pryor, OK (Mayes County)
 - Google
- Goose Creek, SC (Berkeley County)
 - Google

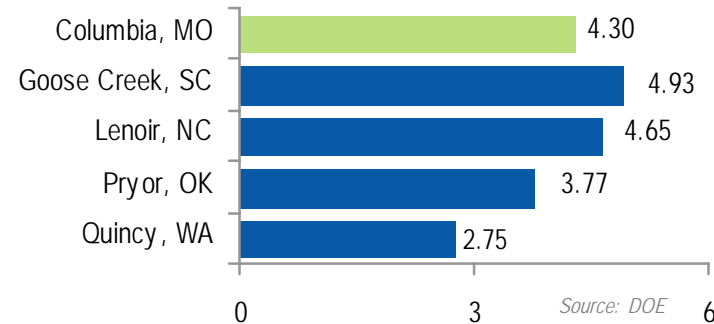


FACTOR #1: POWER COSTS

- Columbia electric rates competitive nationally with major data center locations, making annual power cost to operate data center competitive as well
- Missouri industrial rate (4.41c/kwh) ranks as the 6th lowest in the nation as of April 2007 – lower than all benchmarks
- Missouri overall rate for all sectors (6.04 c/kwh) 7th lowest in the nation – lower than all benchmarks

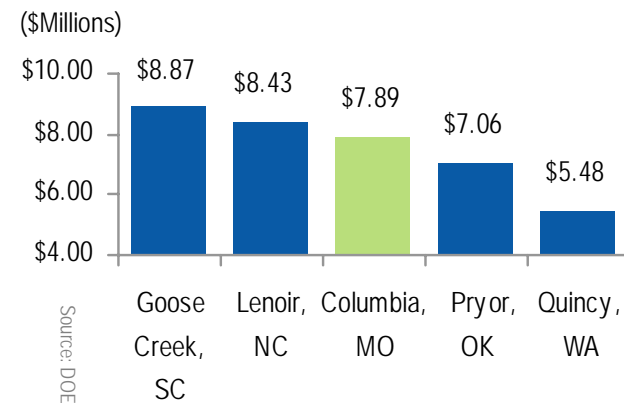
ELECTRIC RATES

AVERAGE INDUSTRIAL RETAIL PRICE (CENTS/KWH), COLUMBIA VS BENCHMARKS, 2005



POWER COSTS

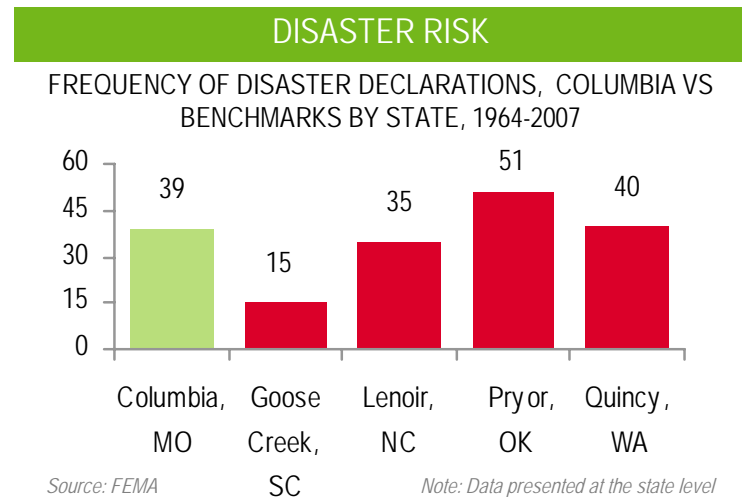
ANNUAL POWER COST FOR DATA CENTER USER*, COLUMBIA VS BENCHMARKS, 2005



Based on 20MW User @ Average Retail Price: Demand Charge Assumed Constant Across Communities; Basic Charge, Metering and Delivery Adjustments Not Factored into Analysis

FACTOR #2: DISASTER RISK

- Columbia (Boone County) has a disaster declaration frequency range of 13-18 since 1964, placing it in the same FEMA frequency category as Pryor and Lenoir. Quincy and Goose creek have frequency ranges of 7-12.
- Boone County is “at risk” to tornadoes due to its location in the heart of “tornado alley”; however, central Missouri is not considered “high risk” or “highest risk” as determined by the U.S. Geological Survey
- Though southeastern Missouri lies within the New Madrid seismic zone, Boone County is in an area of low-moderate risk for earthquake hazards
- Columbia is not at risk for Hurricanes

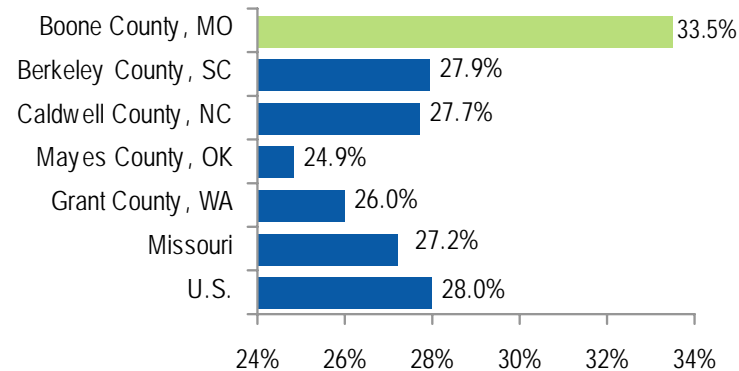


FACTOR #3: LABOR AVAILABILITY

- Columbia easily distances itself from benchmark communities in terms of its institutions of higher education
- 33.5% of Boone County's population is in the critical 25-44 demographic valued by high tech companies, far exceeding benchmarks
- Columbia's proportion of employees in various computer related occupations significantly higher than nation as a whole

YOUNG DEMOGRAPHIC PRESENCE

% OF RESIDENTS IN THE 25-44 AGE GROUP, COLUMBIA (BOONE COUNTY) VS BENCHMARKS, 2006



Source: Census, DemographicsNow

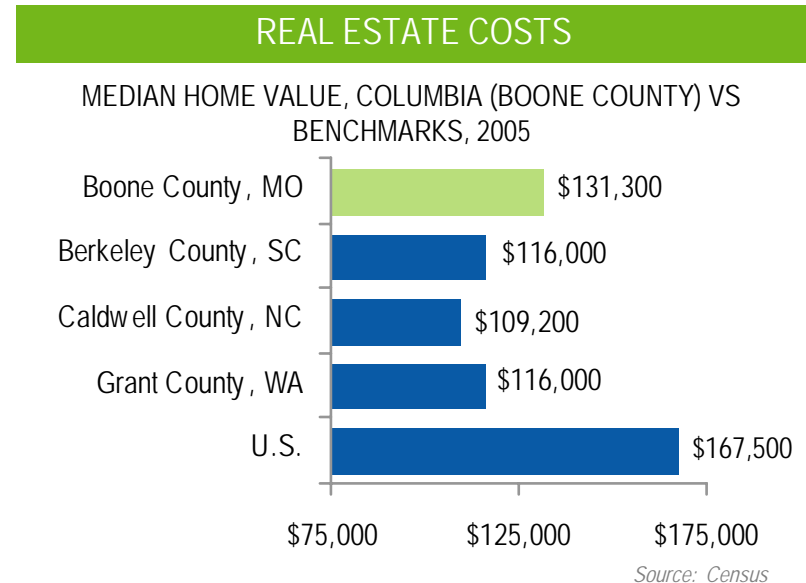
WORKFORCE AVAILABILITY

COMPUTER RELATED TECHNICAL OCCUPATIONS AS SHARE OF TOTAL EMPLOYMENT, COLUMBIA VS U.S., MAY 2005

Occupation	Columbia	U.S.
Computer Programmers	2.31%	0.35%
Computer Software Engineers, Applications	1.09%	0.41%
Computer Software Engineers, Systems Software	0.07%	0.29%
Computer Support Specialists	1.27%	0.45%
Computer Systems Analysts	0.78%	0.44%
Database Administrators	0.30%	0.09%
Network & Computer Systems Administrators	0.62%	0.24%
Network Systems/Data Communications Analysts	0.40%	0.17%
Operations Research Analysts	0.05%	0.05%
Computer & Information Systems Managers	0.42%	0.23%

FACTOR #4: REAL ESTATE COSTS

- Housing values indicate the pressures on a given real estate market, and are thus a good proxy for land prices
- The median housing value of \$131,300 in Boone County is higher than benchmarks, but significantly lower than the U.S. average and indicative of a relatively low cost market







ADDITIONAL FACTOR: INCENTIVES

Data Center Incentives	
Community	Primary Incentives Offered
Goose Creek, SC	sales tax exemption; job development credits
Lenoir, NC	property tax abatement; job development credits
Pryor, OK	property tax abatement; infrastructure upgrades
Quincy, WA	none

- Incentives are a latter stage factor that comes into play toward the end of the site selection process
- Due to high levels of business personal property investment, property and sales tax exemptions are the most valued data center incentives
- Missouri (Boone County) Chapter 100 Industrial Development Bonds have potential appeal to data centers

COLUMBIA REGIONAL EVALUATION

FACTOR	COMMENT	EVALUATION
1 Power Costs	Strong access to cheap electric power	
2 Disaster Risk	Not located in area of high disaster vulnerability	
3 Labor Availability	Great access to IT workforce given size	
4 Real Estate Costs	Higher than benchmarks but not prohibitive	



PHASE II SCREEN

PHASE II SCREEN OVERVIEW

Purpose:

Assess available sites in Columbia against the following factors affecting data center end users:

- Size
- Power Connectivity
- Dual Feed Availability
- Fiber Connectivity
- Water (Cooling) Capacity
- Disaster Risk
- Incompatible Uses
- Other

SITE ASSESSMENT LEGEND



Strong



Adequate



Concerning



Disqualifier



OVERALL EVALUATION

COLUMBIA EVALUATION

PHASE I SCREEN

Columbia passes the Phase I screen for data center site selection; potential exists for short-listing

PHASE II SCREEN

Columbia passes the Phase II screen on a conditional basis

* Columbia possesses sites with potential to meet the needs of both Tier III and Tier IV data center users; however, site infrastructural upgrades are needed in order to make sites ready for data center investment

RECOMMENDATIONS

- Columbia REDI should adopt Data Centers as a target industry and begin proactive recruitment, including development of appropriate web/print marketing
- Columbia REDI should continue to identify sites suitable for highest level (Tier IV) of data center investment
- Columbia REDI should work with public and private sector stakeholders to prepare potential site(s) for data centers, including making progress toward necessary infrastructure upgrades.
- Columbia REDI should prepare site profiles showing assets of 'data center ready' site(s)
- Columbia REDI should aggressively market site(s) to site selectors and potential end-users

AngelouEconomics

2801 Via Fortuna, Suite 430
Austin, Texas 78746

PH: 512-225-9322

FAX: 512-225-9283

www.angeloueconomics.com