GREEN BANCORP

KBW Community Bank Conference

NASDAQ: GNBC
August 2, 2016

Safe Harbor

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Annualized, pro forma, projected and estimated numbers are used for illustrative purpose only, are not forecasts and may not reflect actual results.

Company Snapshot

Overview

- Headquartered in Houston, TX
- Established in 2006 with Redstone Bank merger
- 22 Branches
  - Houston MSA (11)
  - Dallas MSA (8)
  - Austin MSA (1)
  - Honey Grove TX (1)
  - Louisville KY MSA (1)
- Focused on commercial and private banking relationships

Financial Highlights

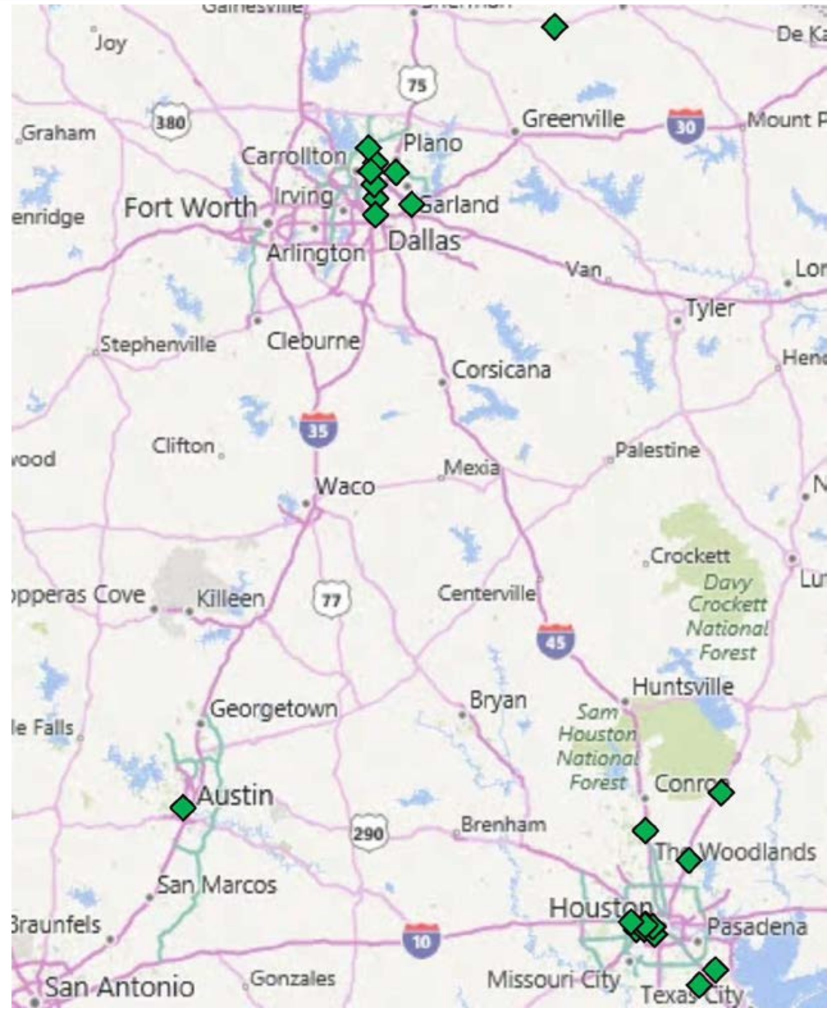
Balance Sheet ($ in millions) – Qtr. Ended 6/30/16	
Total Assets	$3,827
Total Loans (held for investment)	3,189
Total Deposits	3,207
Equity	435

Asset Quality – Qtr. Ended 6/30/16	
NPAs / Assets	2.44%
NPLs / Loans	2.74
Allowance / Loans	1.49
NCO Ratio (YTD)	0.40

Profitability – Qtr. Ended 6/30/16	
ROAA[(1)]	0.39%
ROAE[(1)]	3.38
Net Interest Margin	3.74
Efficiency Ratio[(1)]	55.30

[(1)] Excludes one-time acquisition expenses

Branch Map



Investment Highlights

- Strong and experienced management team
- Well-positioned within attractive major metropolitan markets in Texas
- Portfolio banking model fuels organic growth
- Scalable portfolio and operating platform can accommodate significant organic growth and enhance profitability potential
- Experienced acquirer and integrator of financial institutions – including recently completed Patriot Bancshares merger
- Aggressively reducing energy exposure - introduced the Managed Asset Reduction Strategy in April 2016

Strong and Experienced Management Team

Talented team with deep breadth of banking experience

Name and Title	Qualification Details	Education & Experience
 Manuel J. Mehos, CEO Green Bancorp, Inc. Chairman Green Bank	• Former Chairman / CEO / President of Coastal Bancorp, Inc. • Securities Sales at Goldman, Sachs & Co. • C.P.A. at KPMG • Previous Board Memberships: – Finance Commission of Texas – America's Community Bankers – Federal Home Loan Bank of Dallas – Texas Savings and Community Bankers Association	• M.B.A. – University of Texas • B.B.A. – University of Texas • 30 years in banking
 Geoffrey D. Greenwade, President Green Bancorp, Inc. President and CEO Green Bank	• Former Wells Fargo – Regional Manager of Business Banking – 30 offices with 130 officers and managers • Wells Fargo – EVP, Commercial Business Banking • Bank of America – Banking Center President – Lending Manager – Commercial Loan Officer	• M.B.A. – Baylor University • B.B.A. – Texas A&M University • 32 years in banking

Strong and Experienced Management Team

Name and Title	Qualification Details	Education & Experience
 **John P. Durie, Executive Vice President and Chief Financial Officer**	• **Former President and COO of Northwest Bank, N.A.** • **First Interstate Bank** – **Managed Texas M&A Activity** – **Problem Asset Resolution** – **CFO of Workout Subsidiary**	• **B.B.A. – University of Oklahoma** • **32 years in banking**
 **Donald Perschbacher, Executive Vice President and Corporate Chief Credit Officer**	• **Former EVP and Credit Risk Executive of BBVA Compass Bank.** • **Executive Vice President and Chief Credit Officer of Guaranty Bank** • **Senior Vice President and Senior Approval Officer of Bank of America**	• **B.B.A. in Finance – Texas A&M University** • **31 years in banking**

Scalable Platform for Growth

Organic Growth
Portfolio Banker Model

- Portfolio Bankers are actively generating business and serving as the primary point of contact for our customers
  - Private and business bankers focus on emerging, affluent and small business customers
  - Commercial and specialty bankers focus on C&I, real estate, mortgage warehouse and SBA loans
- Continue to increase the productivity of our existing portfolio bankers
  - Capacity to support $4 billion of loans & deposits with current team
  - As utilization rises our efficiency ratio will continue to improve

Strategic Acquisitions

- Strategic M&A remains an important growth driver, though the current market backdrop and GNBC stock price are headwinds
- Will await a recovery before revisiting further strategic acquisitions

Managed Asset Reduction Strategy 'MARS'

- MARS program announced on the first quarter 2016 earnings call and is management's top strategic priority
- Objective is to remove the barrier to execution of the Company's strategic plan by addressing energy exposure
- Strategy is being implemented by a team of eight dedicated and experienced workout professionals reporting to the Corporate Chief Credit Officer
- The MARS portfolio includes all energy loans as well as other non-energy classified loans and purchase credit impaired loans acquired in previous acquisitions

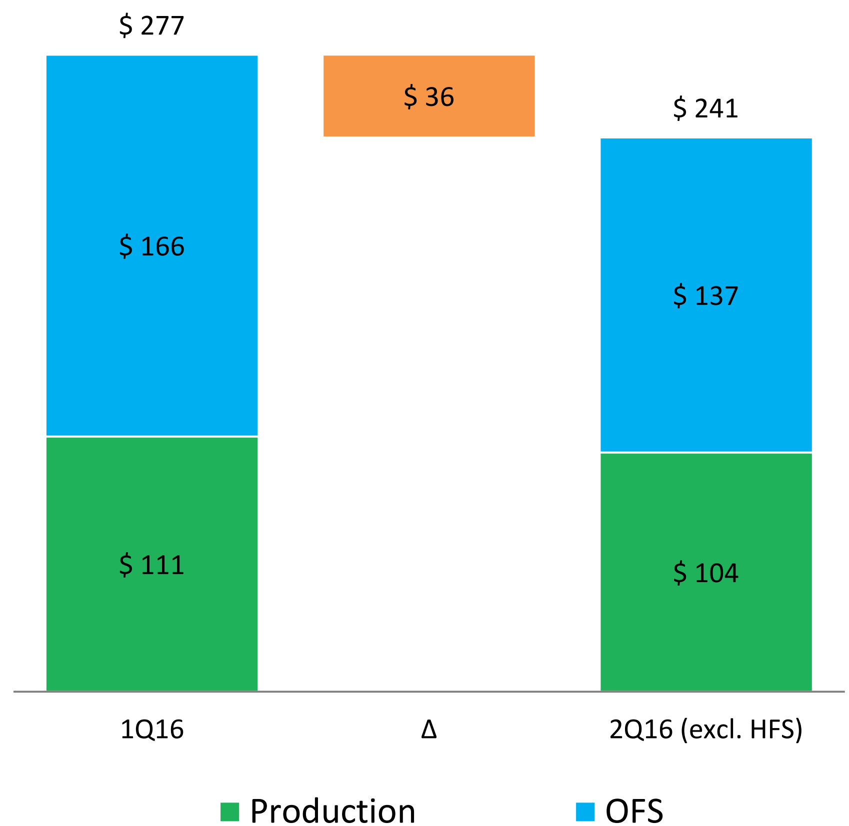
Overview of MARS Progress

Process and Resolution Alternatives

- MARS borrowers have been directly informed of the disposition strategy
- Loans will be resolved under the following categories:
  - Reclassification and Upgrade: seek to change primary support for loans to non-energy collateral and/or co-borrowers
  - Payoff at Par: borrower to refinance elsewhere where collateral value and loan performance allow
  - Payoff at Discount: allow borrower to repay at discount subject to repayment capacity
  - Foreclose and Sell Collateral: to utilize where borrower is in default, discounted payoff not feasible, and loan not suitable for sale
  - Portfolio or Asset Sales: to be used where above strategies are not suitable

MARS Energy Portfolio Resolution

($ in millions)

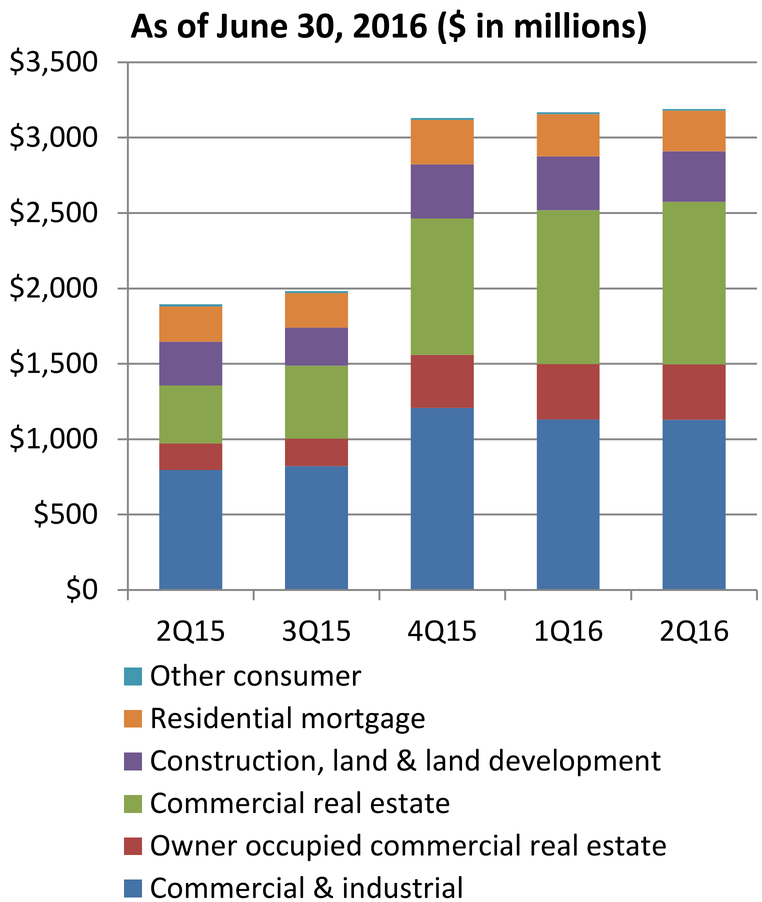


Current Energy Portfolio Exposure

- MARS Strategy is progressing in line with expectations
- E&P loans total $104 million or 3.2% of total loans, through July 21st
- OFS loans total $137 million or 4.3% of total loans, through July 21st
- Energy loans are now 7.5% of total loans vs. 8.8% of total loans as of March 31, 2016
- Total reserve on the energy loan book is 9.2% of total energy loans
- Approximately 80% of the MARS portfolio is scheduled to be resolved by March 31, 2017, with other loans to be resolved thereafter
- Expect to build capital through the duration of the MARS plan

Loan Update

Total Loan Composition



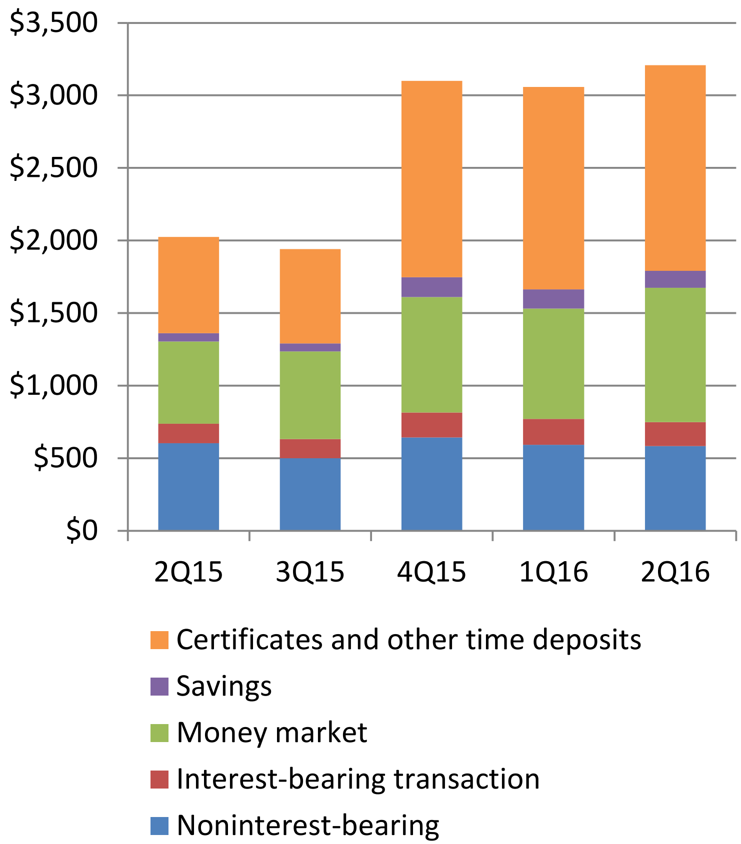
Highlights

- Total loans increased by $21.3 million during the second quarter to $3.2 billion
- Loan yield for the second quarter of 2016 was 4.76%
  - Loan yield, excluding fees, for the second quarter was 4.29%, unchanged from the first quarter of 2016
  - Fees and discounts at payoff contributed approximately 12 basis points to the second quarter loan yield
  - Accretion of fees and discounts (net) contributed approximately 35 basis points to the second quarter loan yield

Deposit Update

Total Deposit Composition

As of June 30, 2016 ($ in millions)



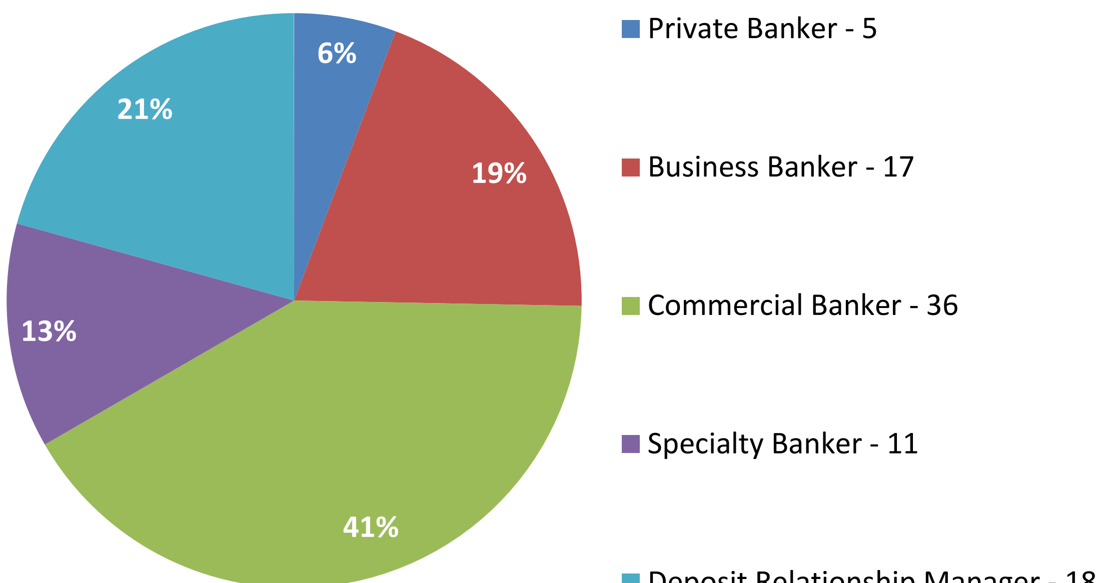
Highlights

- Total deposits increased $150.2 million during the second quarter to $3.2 billion
- Noninterest-bearing deposits were 18.2% of deposits at June 30, 2016
- Cost of deposits including noninterest-bearing was 0.64%, up 12 bps from the first quarter
- Deposit cost impacted by a $652,000 decrease in accretion of purchase accounting marks

Existing Banker Capacity

- Our current group of bankers have the capacity to support up to $4 billion of both loans and deposits:

Banking Staff as of June 30, 2016



Strategic Acquisitions to Drive Future Growth

Acquisition Strategy Emphasizes Focus, Discipline and Success

- Focused on well-managed banks in our target markets
  - Favorable market share
  - Low cost deposit funding
  - Compelling non-interest income generating business
  - Growth potential
  - Other unique attractive characteristics
- Leverage reputation as an experienced acquirer
- Maintain discipline in pricing and pursue transactions expected to produce attractive risk adjusted returns

Experienced Acquirer With Strong Track Record

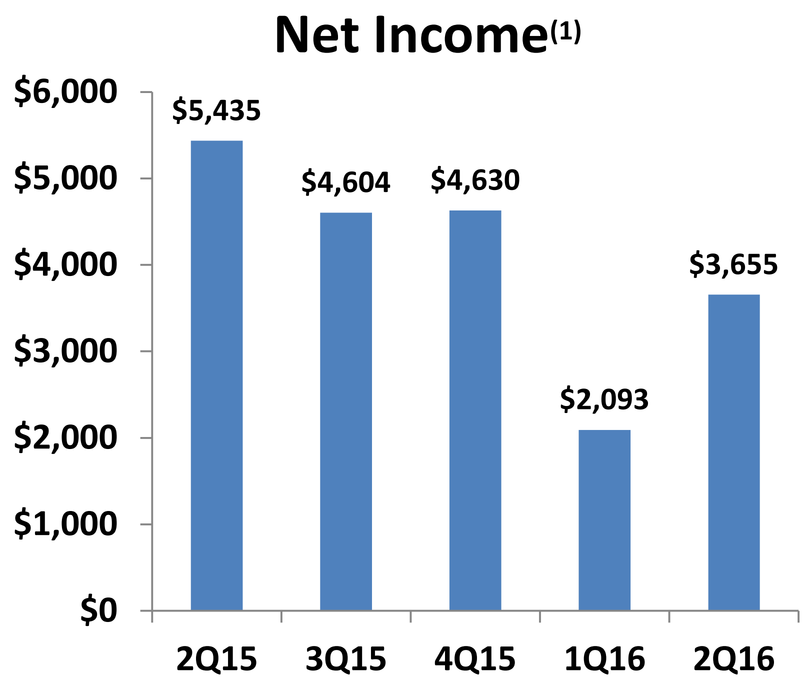
Significant In-market Acquisition Opportunities Remain

Redstone Bank, N.A. 12/31/2006	$ 182.7 million - Deposits $ 85.4 million - Loans 2 Branches
LaJolla / One West 10/29/2010	$ 188.4 million - Deposits 1 Branch
Main Street Bank 10/21/2011	$167.7 million - Deposits $ 12.7 million - Loans 3 Branches
Opportunity Bank 05/31/2012	$ 44.1 million - Deposits $ 25.6 million - Loans 1 Branch
SharePlus Bank 10/17/2014	$270.0 million - Deposits $251.2 million - Loans 4 Branches
Patriot Bancshares 10/1/2015	$1,103 million - Deposits $1,081 million - Loans 9 Branches

Second Quarter 2016 Financial Highlights

	2016 Q2	2016 Q1
Net Income[(1)]	3,655	2,093
EPS[(1)]	$0.10	$0.06
ROAA[(1)]	0.39%	0.22%
Loans[(2)]	$3,189,436	$3,168,183
Deposits	$3,207,261	$3,057,019

*$ in thousands, except per share data

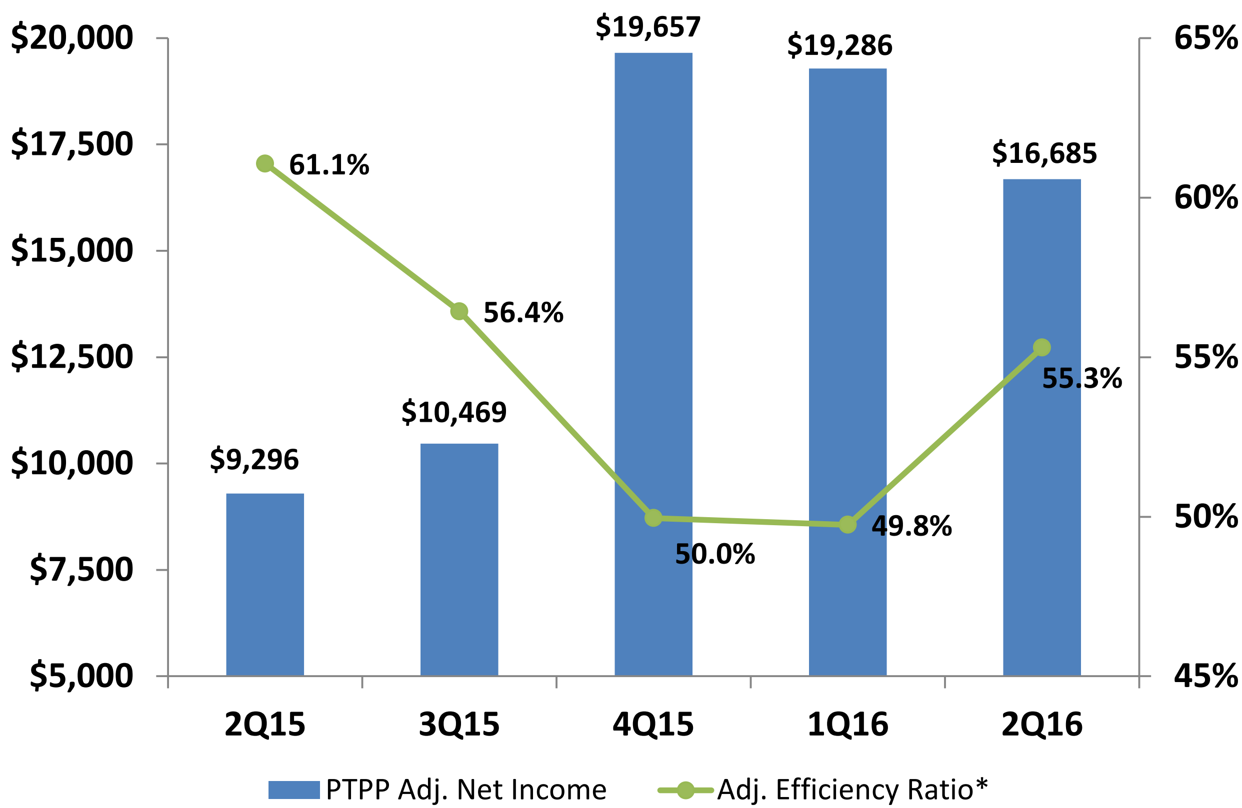


($ in thousands)

(1) Excluding one-time acquisition expenses
(2) Excluding loans held for sale

Pre-Tax Pre-Provision Adjusted Net Income

- Core profitability remains robust, despite overhang from energy portfolio



(*) excludes one-time acquisition expenses

Closing Remarks

- The bank remains well-positioned within attractive major metropolitan markets in Texas
  - Dallas expansion will drive balance in the geographic footprint
- Gross loan origination continues to be strong
- Successful execution of the MARS plan will re-position the bank for balance sheet and earnings growth in 2017
- Scalable portfolio banker strategy and operating platform can accommodate significant organic growth and enhance profitability potential
- Core bank performance remains robust, with $18 to $19 million of pre-tax, pre-provision net income after adjusting for MARS expense

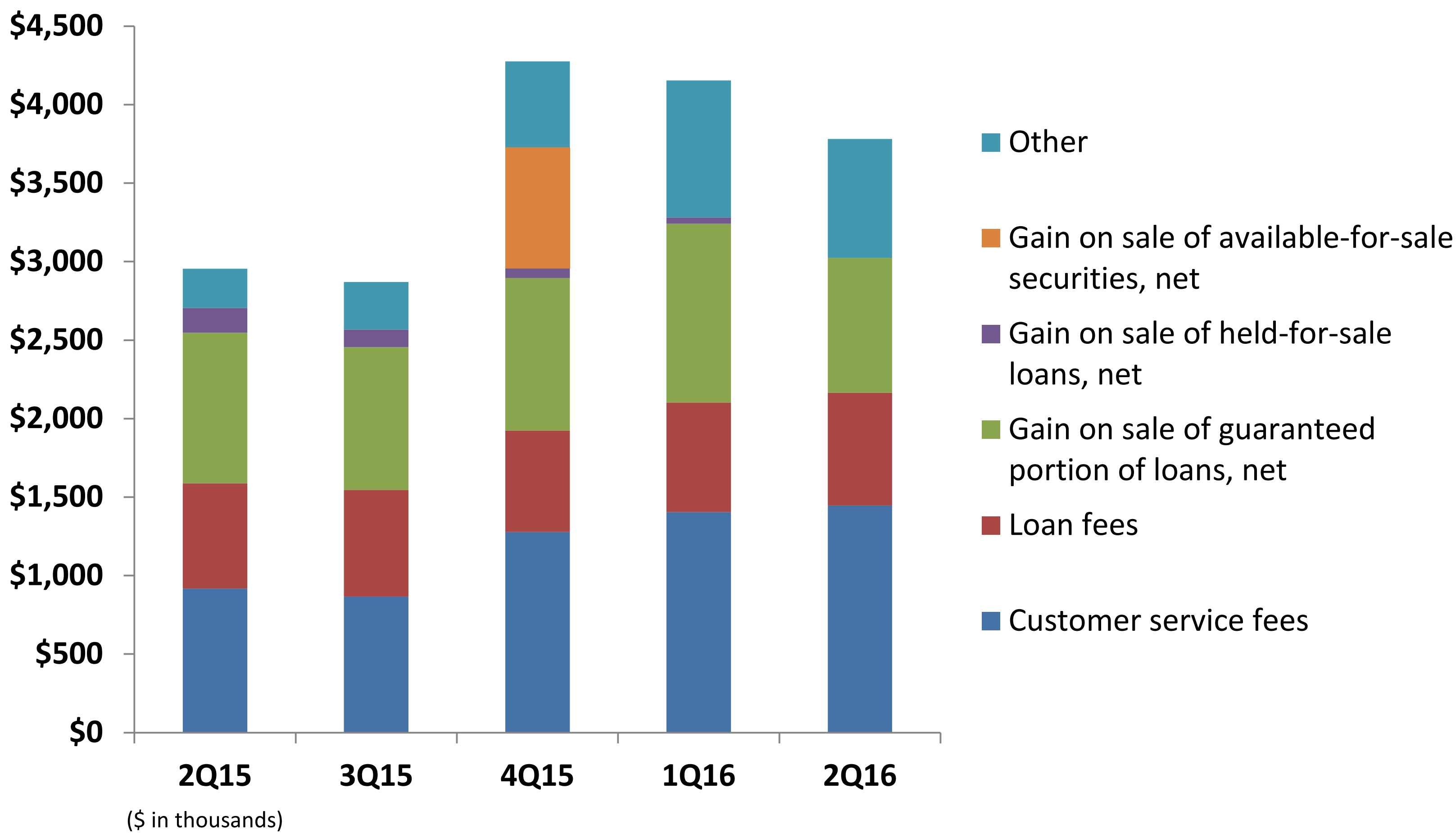
Question & Answer Session

Appendix

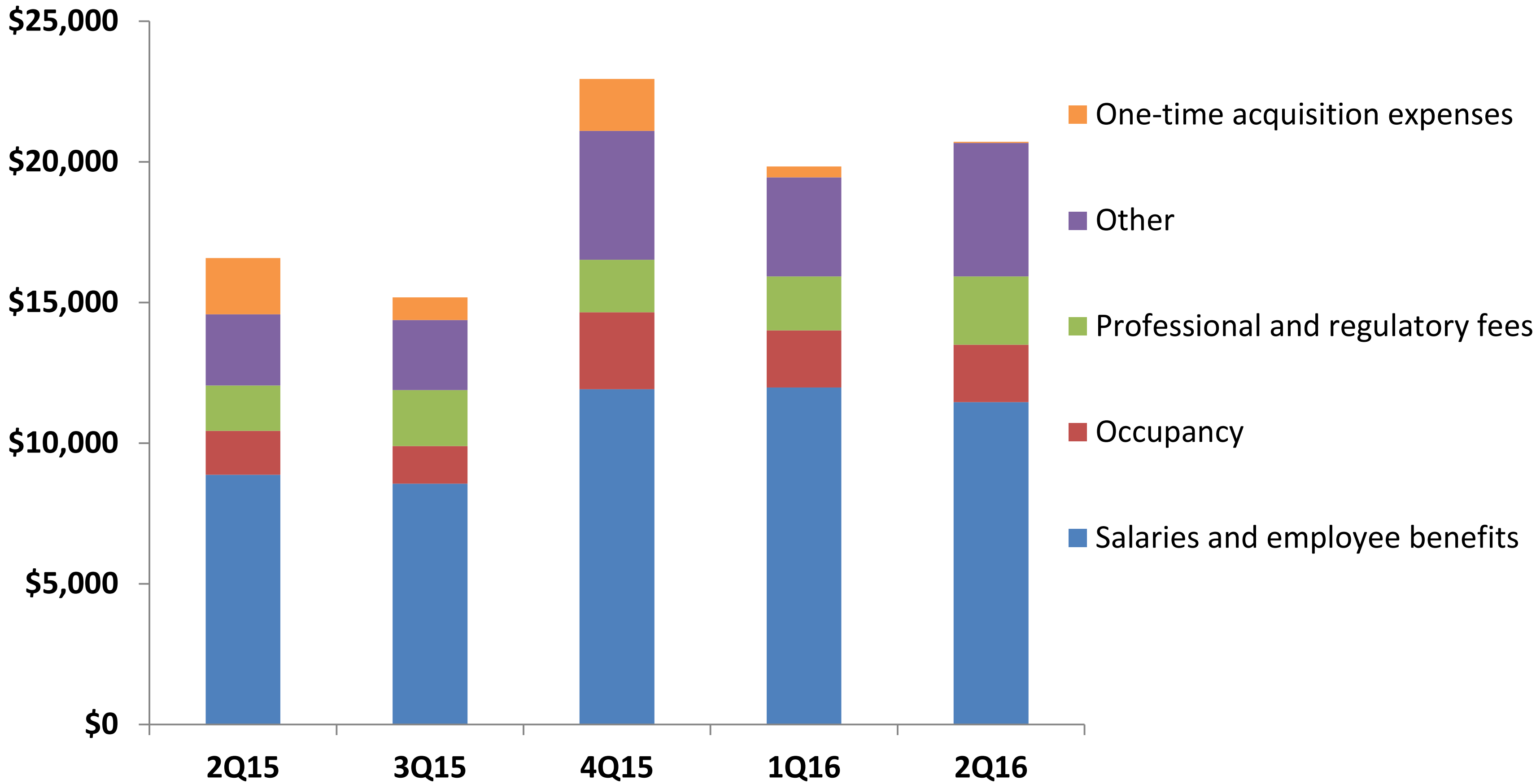
Second Quarter Highlights

- Earnings per diluted share of $0.10, compared to $0.05 in the first quarter of 2016, after recording $11.0 million in provision for loan losses
- Net income of $3.6 million, compared to $1.8 million in the first quarter of 2016
- Pre-tax, pre-provision adjusted net income of $16.7 million, compared to $19.3 million in the first quarter of 2016 and $9.3 million in the second quarter of 2015
- Loan growth of $21.3 million to $3.2 billion, compared with March 31, 2016

Noninterest Income

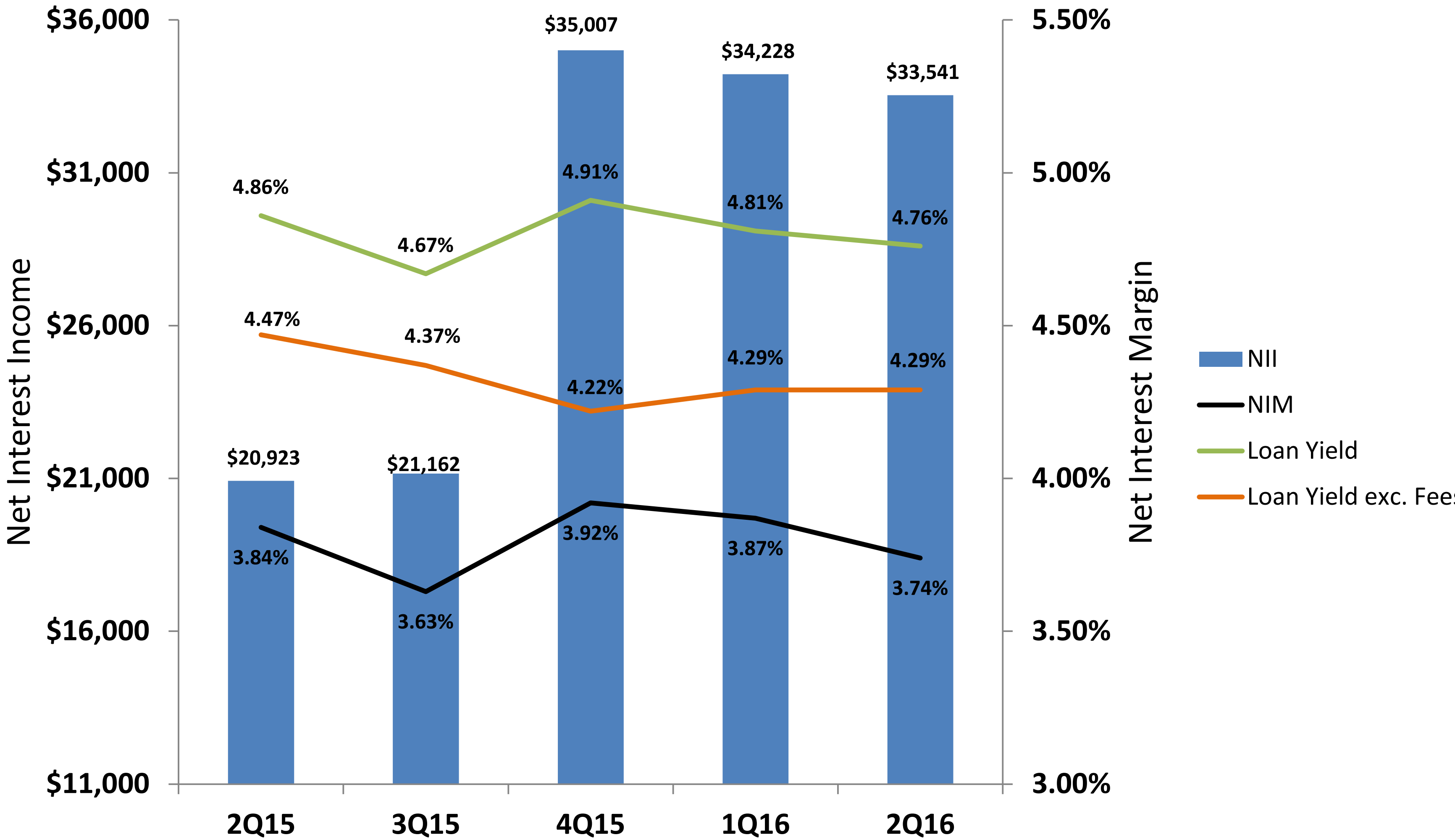


Noninterest Expense



($ in thousands)

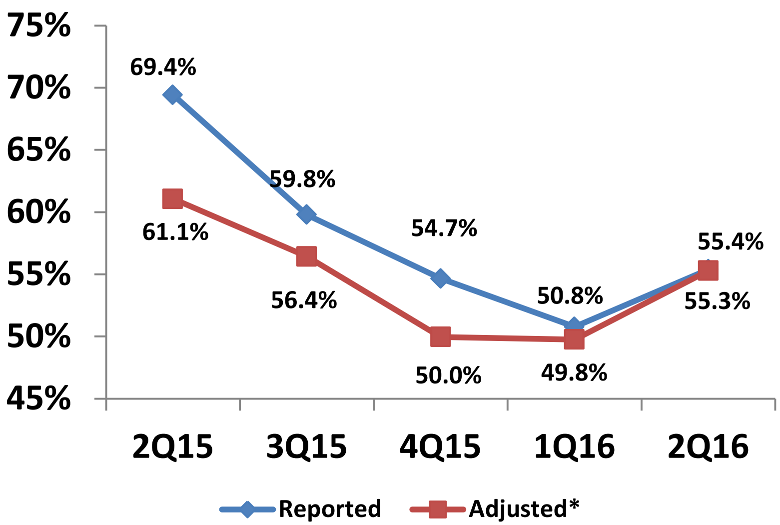
Net Interest Income and Net Interest Margin



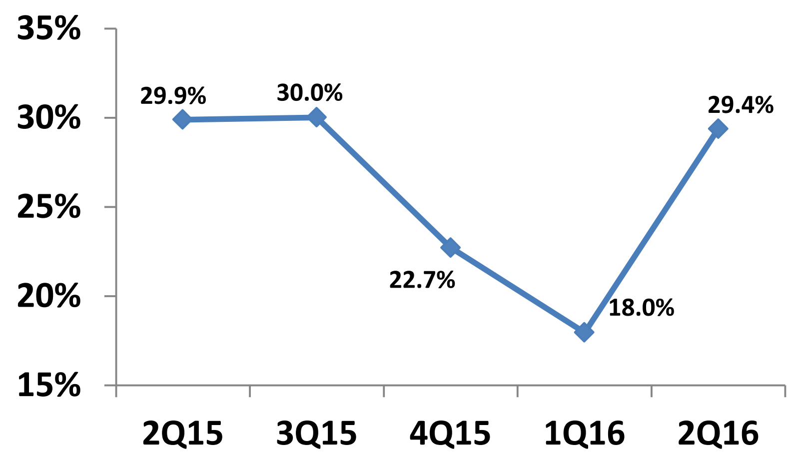
($ in thousands)

Performance Metrics

Efficiency Ratio



Remaining Banker Capacity



(*) excludes one-time acquisition expenses

Credit Quality

- NPA's totaled $93.5 million or 2.44% of period end assets at June 30, 2016 compared to $77.5 million or 2.01% of period end total assets at March 31, 2016

- The net increase in NPAs is due to expected energy-related grade migration
  - Over 50% of the grade migration was driven by a single classified OFS loan within the MARS portfolio

- Allowance for loan losses was 1.49% of total loans at June 30, 2016, an increase of 24 basis points from 1.25% at March 31, 2016

- Provision expense of $11.0 million in the second quarter 2016 reflects the addition of $7 million in specific reserves related to increased impairment in E&P credits, an increase in reserves on purchased credit impaired loans, and a $2.4 million write-down related to the loan portfolio sale