

GREEN BANK NETWORK





Green Banks and Financing Energy Efficiency and Renewables in Industry and Buildings

Sixth Annual Green Bank Congress





Lawrence Berkeley National Laboratory

Green Financing to Scale Building Energy Efficiency

Presented by Carolyn Szum, China Energy Group, Lawrence Berkeley National Laboratory

























What's the Problem?

- ◆ According to IEA, cumulative global investments in building EE must reach \$13.4 trillion by 2035 to keep global surface temperature rise below 2° Celsius (C) (Rugova 2016).
- ◆ This scale exceeds the capacity of public funding and mobilization of private capital is necessary (IPEEC 2016).
- ◆ However, few structures exist in the market today for institutional investors to deploy capital, resulting in the absence of EE as an asset class (EEFIG 2015).
- ◆ In other words, EE projects are not "developed, delivered, maintained, verified, and measured in a consistent manner" (ICP 2017).



Barriers to Building EE Lending

1. Technical Barriers

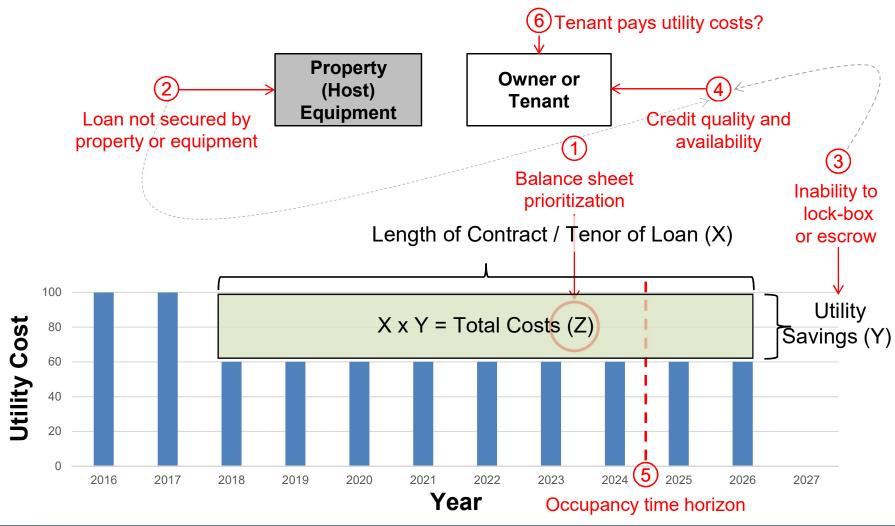
- Lack of information/asymmetric information.
- Lack of standardized protocols and tools for originating EE projects.
- Lack of technical capacity for EE.

2. Credit/Market Barriers

- Balance sheet prioritization (self-finance thresholds).
- Loan not secured by property or equipment.
- Inability to "lock-box" or "escrow" future streams of cost-savings.
- Quality/availability of host credit information.
- Disconnect between occupancy time horizon in property and contract tenor.
- Split incentive (landlord/tenant).



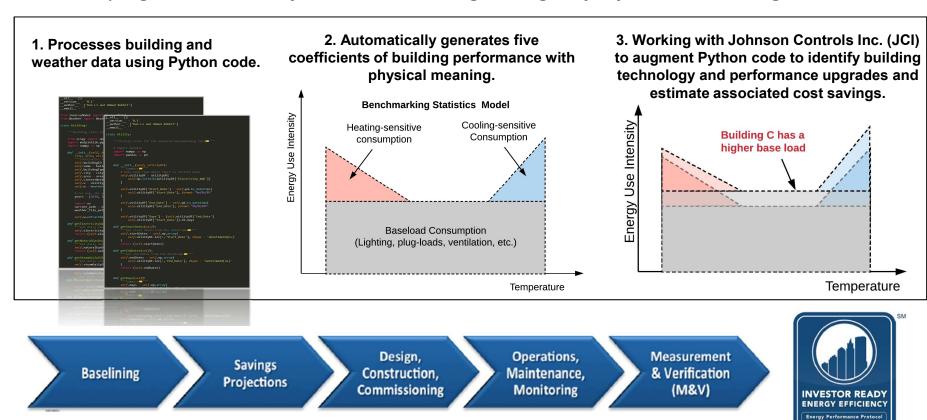
Credit/Market Barriers





Exploratory Solutions to Technical Barriers

- Advancing data transparency to expand the market for EE.
- ◆ Developing open-source **virtual assessment tools** to target cost-effective EE opportunities.
- ◆ Developing standardized procedures for originating EE projects which mitigate risk.





Exploratory Solutions to Credit/Market Barriers

- Partnering with banks to develop and scale innovative EE financial products.
- Systematically analyzing the risk profile of EE loans.
- ◆Working with institutions to create next-generation credit information products.

April 2018 Launch: Innovative Green Financial Product











- Green mortgage product: MRCB and LANDSEA proposing low interest rate mortgage product for green homes and apartments (3-Star or LEED certified).
- Green building product: MRCB proposing a derivative product for non-residential green buildings and mid-size corporate energy efficiency upgrades

How Do We Leverage Secondary Market Capital for EE?

Meet the requirements of capital markets:

- ◆Sufficient scale.
- Standardization.
- Ability to efficiently understand credit quality in many market segments.

Transaction	Sector	Туре	Credit	Size	Aggregation
Delaware Sustainable Energy Utility	MUSH	Bond	Public Investment- Grade	\$72.5mm	State properties; Multi-agency
Unilever	Corporate	Bond	Corporate Investment- Grade	\$324mm	Corporate facilities; international
RENOVATE AMERICA hero Your energy efficient future, today.	Single-Family	PACE ABS	Tax lien	\$232mm (10) \$2+b total	Pool
RENEW FINANCIAL WHEEL	Single-Family	Unsecured ABS	Unsecured	\$12.5mm	Pool
Fortune 100 + METRUS ENERGY	Commercial	Efficiency Services Agreement	Two Factor Backstop?	\$14mm	Property Management

Secondary Market Examples in the United States (Citi 2017)

Thank You!

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Dr. An Guojun, Green Finance Committee of China Society for Finance and Banking

Sixth Annual Green Bank Congress

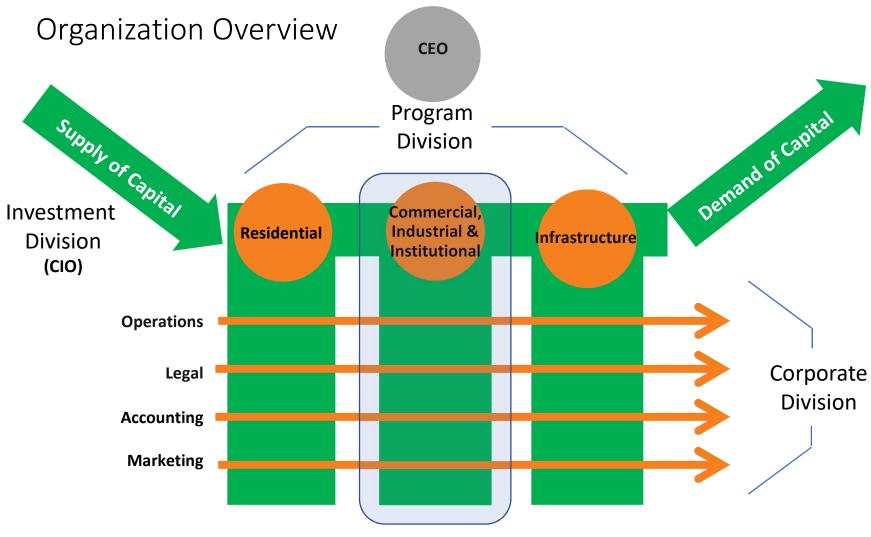


Green Banks: Accelerating Energy Efficiency and Renewables in Industry and Buildings

Green Bank Congress

29 Nov 2018

Connecticut Green Bank





Commercial PACE

What is C-PACE?



100% low-cost,
long-term
financing for
cost saving
energy
upgrades

Paid back over time via property assessment; remains with property

Energy cost savings create more competitive property

Assessment structure allows costs to be passed through to tenants

C-PACE provides building owners with:

- 1. Confidence
- 2. Control and
- 3. Comfort





Building Owner

Contractor

Developer

Municipality

Capital Provider

Mortgage Holder

Appraiser

Apply Now

Contact Us

About Us

Green energy financing that builds better businesses

C-PACE (Commercial Property Assessed Clean Energy) financing makes green energy upgrades more accessible and affordable. This innovative financing program is accelerating the green energy movement, and making a positive impact on many different stakeholders across Connecticut.

What type of stakeholder are you?













Role of Contractor

- Integrate C-PACE financing in proposal & project development
- Paradigm shift:
 - FROM: "Old Way" owner self-funded, short-term payback focused
 - TO: "New Way" 3rd party long-term financed, cash flow focused
 - Where "well-designed" projects typically:
 - Require no owner out-of-pocket expense
 - Generate immediate positive cash flow

...Providing a "too good to be true" opportunity for the building owner

C-PACE Projects Require SIR > 1

- Savings-to-Investment Ratio ("SIR"):
 - "S" = projected energy cost savings over ECMs effective useful life (EUL)
 - "I" = cost of equipment, installation and financing costs

 $\frac{Savings}{Investment} > 1$

SIR Calculation Example

	Savings	Investment
Savings: Energy savings over the EUL Recurring incentives (e.g. RECs) Cash value of Investment Tax Credit	\$720,000 \$0 \$0	
Cash value of MACRS depreciation Investment: Installed cost net of one-time utility incentives Loan interest (20 year term, 6.0%)	\$0	\$350,000
Total	\$720,000	\$601,802
Savings-to-Investment Ratio (SIR):	\$720,000 \$601,802	= 1.2

Almost all facilities can use an energy upgrade



example: old gas boiler to new high efficiency boiler system





InSports Center



Peter Corbett Is a PACEsetter. He thought that by going solar and optimizing energy efficiency, InSports might serve as a model for renewable initiatives and conservation. C-PACE helped Peter make it happen quickly with simple financing that bundled multiple upgrades into one package. Detailed up front analysis gave him confidence that he was making a good investment. Now he's saving money and leading by example. That's how PACEsetters like Peter are sparking the green energy movement.





Energy on the Line



- Launched April 2016
- \$800,000 in funding from MIF / DECD used for grants equal to 1% IRR
- 17 C-PACE projects (including GWL projects) + additional pipeline
- Nearly \$6M in financing
- Over \$200,000 remaining
- Approx. \$80,000 in marketing spend
 - Direct Mail
 - Web
 - Digital Media
 - Relationship Manager / Project Development
 - Approx. 150 leads / 50 applications



Contractor Focused Efforts

Contractor Engagement strategies have included:

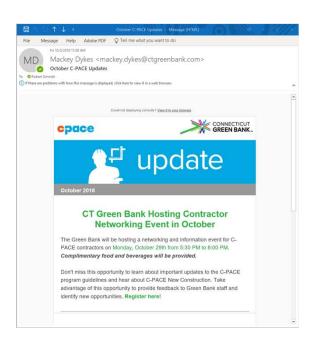
- Networking and Informational Events (1 2 annually)
- Annual PACEsetter Awards
- · Advanced and Registered contractor recognition
- Monthly Email Communications
- Webinars and Trainings
- AMP (Accelerated Marketing Platform) [retired]
- Project Accelerator Service





Outstanding Project, 2017

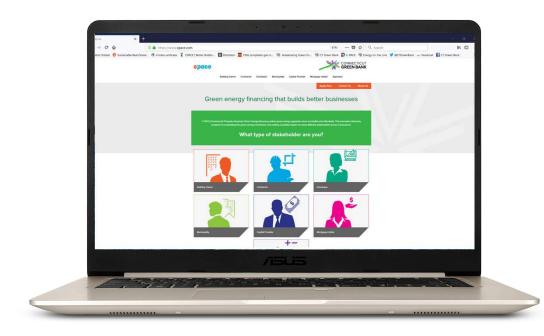






New Website & Digital Strategy

- Persona-based version of cpace.com website launched January 2018
 - Provides building owners and contractors (as well as other stakeholders) with custom experiences that better delivers relevant information
 - Currently revising site with additional 'contact' prompts and tools to increase conversion of visitors to leads
- Digital campaign to launch in CY 18/19 to drive building owner leads
 - Targeted as using search, video, display, etc.

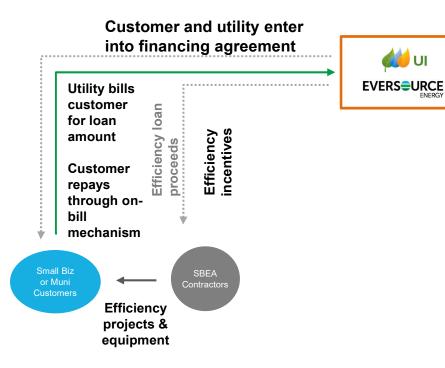




Small Business Lending (On-Bill)

SBEA Recapitalization - Current Structure

₩ UI



Funding provided to utilities annually based on anticipated Connecticut budget Efficiency Fund

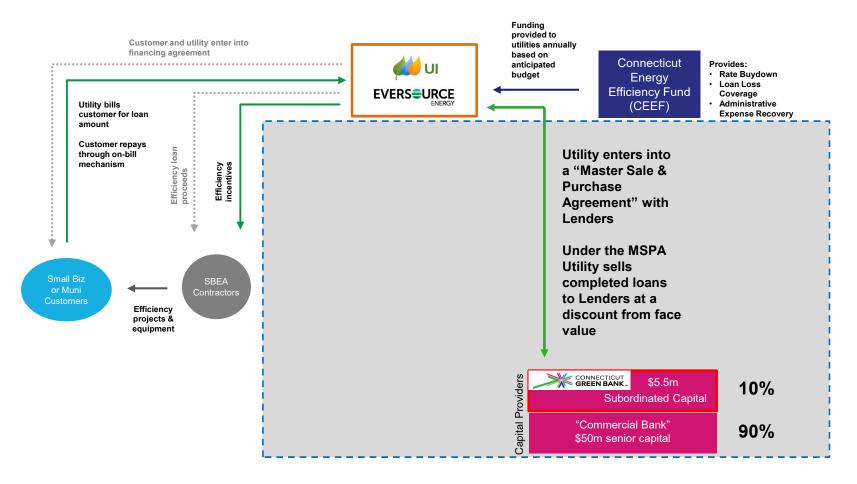
Energy

(CEEF)

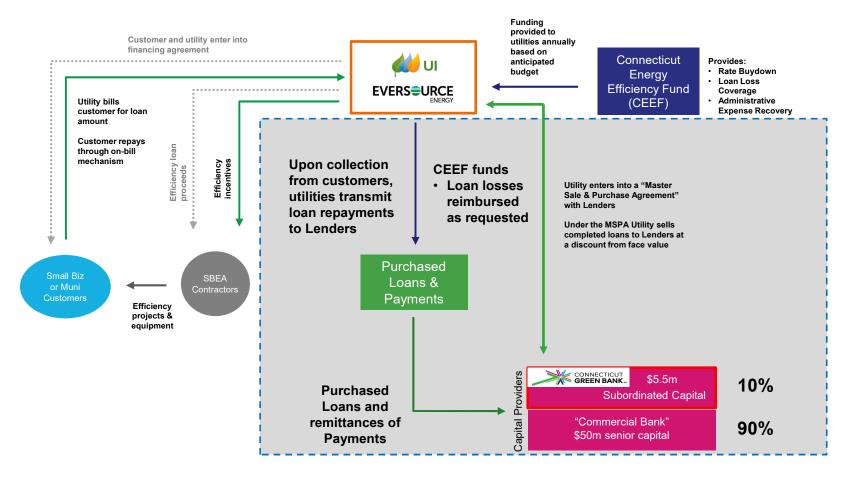
Provides:

- · Rate Buydown
- Loan Loss Coverage
- Administrative **Expense** Recovery

SBEA Recapitalization - Future Structure



SBEA Recapitalization - Future Structure







Bert Hunter

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Financing Energy Efficiency and Renewables: Municipal and Commercial Buildings

Sixth Annual Green Bank Congress
November 29, 2018



Who We Are

Centralized hub of local infrastructure investment in Rhode Island

Our mission is to actively support and finance investments in Rhode Island's local infrastructure. We do so through a variety of means, including the issuance of bonds, the making of loans and grants, and the engagement with and mobilization of sources of public and private capital. Through its activities the Bank fosters infrastructure improvements that enhance the environment, create jobs, and promote economic development.



30

Our Impact Since 2015



\$370 MM in new lending, 66% from private capital sources



Supported almost 9,000 direct and indirect jobs



We have generated \$126 MM in financial and energy savings for local communities



Greenhouse gas emission reduction equivalent to 131 MM miles driven by the average passenger car



C-PACE program saving small businesses \$8.1 MM in energy costs



Fully deployed new financial & loan management software



Awards from EPA for clean water project at TF Green Airport & GFOA for excellence in financial reporting and transparency



Proactive customer & stakeholder engagement strategy



11/29/2018

Clean Energy offerings

EBF | Improvement Type



Municipallyowned wind turbines and solar investments



Energy efficiency improvements in municipal facilities across 36% of municipalities

Multi-Golf Courses: family:

6%



Multiuse: 12% profits: 13%

Non-

Retail: 13%

C-PACE | Energy Measure

C-PACE | Building Type

Office : 44%

• ×

EBF | Energy Measure



Renewable Energy: 28%



Energy Efficiency: 72%



Renewable Energy: 87.5%



Energy Efficiency: 12.5%

C-PACE | Savings

EBF | Savings



Emission reduction equivalent to the annual carbon footprint of 3,400 homes



Over \$66 MM USD in savings to local governments

32



Emission reduction equivalent to the annual carbon footprint of 1,700 homes



Over \$8 MM USD in savings to small / mid sized businesses



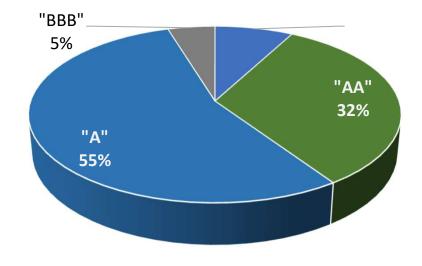
Efficient Buildings Fund Overview

- Revolving loan fund for local governments, schools and quasi-state entities to invest in renewable energy and energy efficiency projects
- Lifetime energy savings must exceed the cost of the project

#	Borrower	Amount (\$MM)	% of Portfolio
1	Barrington	2.5	8%
2	Cranston	2.1	7%
3	Cumberland	1.3	4%
4	East Providence	2.3	7%
5	Hopkinton	0.2	1%
6	Newport	1.1	4%
7	North Kingstown	0.9	3%
8	Pawtucket	3.5	11%
9	Providence	1.1	4%
10	Scituate	1.7	5%
11	Warren	0.5	2%
12	West Warwick	12.7	40%
13	Westerly	1.5	5%
	Total	31.4	100%

engineering service to help borrowers develop projects

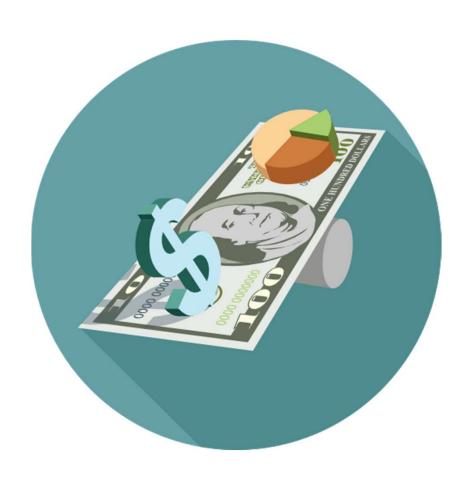
 Each borrower pays a below-market interest rate, which is approximately 80 – 85% of its applicable market interest rates





Capitalized Pool Financing Model

- The Bank's business model is to combine a number of smaller infrastructure loans into a "pool"
- Pool is financed with program capital and proceeds from a public market bond sale
- Benefits:
 - Lower cost of issuance and debt service to borrowers
 - Risk transfer
 - Capital is recycled and supports new loans as older loans are paid back



Efficient Buildings Fund Bond Issue

Efficient Buildings Fund Revenue Bonds Series 2018 A (Green Bonds)

- Use of bond proceeds:
 - Refunding the Bank's \$23.3 MM Efficient Buildings Fund Revenue Bond Anticipation Note
 - Funding a new loan to the Town of North Kingstown
- Security:
 - Cross-collateralized with Municipal Road & Bridge Fund
 - Added layer of lender and bondholder security
 - Special obligation of the Bank payable solely from revenues generated by loans or other program capital
 - Step-Up mechanism
 - Small capital reserve

• Par Amount: \$18.3 MM

• Premium: \$1.9 MM

Credit Rating: AA (S&P)

Green Evaluation: E1 (S&P)

 Principal Payment Dates: October 1, 2019 to October 1, 2033

Call Structure: 11-year par call

• Tax Status: Federal & State Exempt



11/29/2018

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AT A GLANCE



Universal bank with a focus on green finance



Principal place of business: **Ukraine**



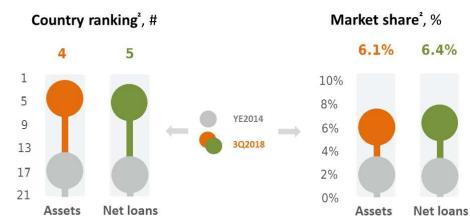
Major shareholder: State of Ukraine (since 2009), 95%

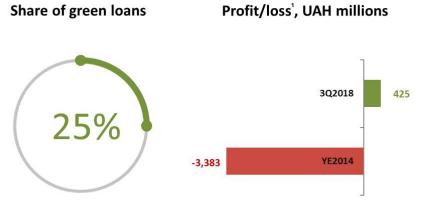


1.2 million customers



245 branches in **153** cities and towns





^{1 3}Q2018 IFRS Financial Statements. Unaudited.

² Bank calculation according to NBU data as of 3Q2018



STRATEGY

FOCUSED GREEN BANKING STRATEGY

aimed to utilize resilient universal banking platform to become the leading green bank in Ukraine and to cover 30% of total Ukraine's green finance needs



RENEWARIE ENERGY

Wind-, solar-, hydro-power, biomass



ENERGY EFFICIENCY

Energy saving equipment and measures for enterprises, housing and municipal objects



ENVIRONMENT PROTECTION

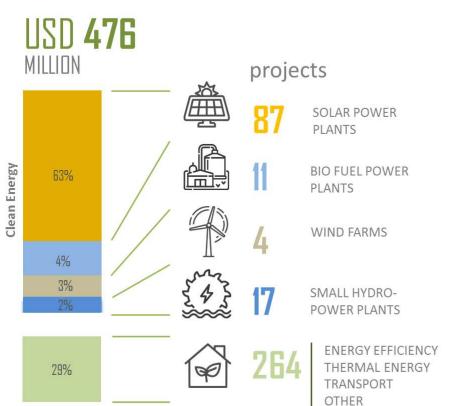
Harmful emissions reduction measures



GREEN PROJECTS

financed and committed since May 2016

GREEN LOAN PORTFOLIO BREAKDOWN



TOTAL FINANCED AND COMMITTED SINCE MAY 2016





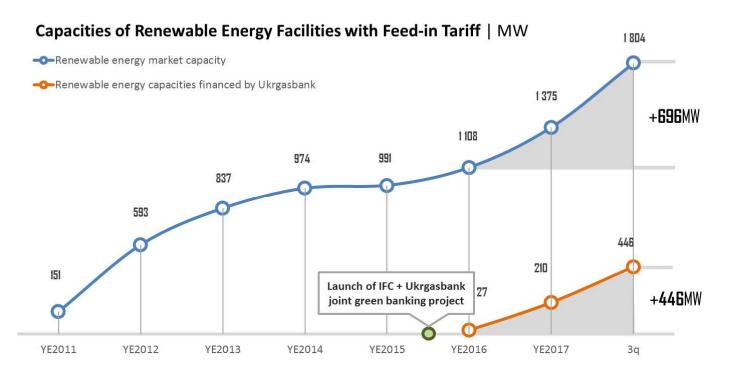


EMISSIONS REDUCTION

4



... A NEW IMPETUS TO UKRAINE'S RENEWABLE ENERGY MARKET



25%

of all renewable energy facilities operating in Ukraine as of Oct 2018 were financed or refinanced by Ukrgasbank

64%

Share of Ukrgasbank financing in total renewable energy capacities with feed-in tariff put into operation in Ukraine since YE2016









The leader in financing new clean energy facilities in Ukraine. Share of green loans in the bank loan portfolio is 25% as of 3Q2018



Ukrgasbank is a pioneer among Ukrainian banks to introduce Environmental and Social Risk Management System



Every second megawatt of new installed RE facilities that received feed-in tariff in 3Q2018 was financed with the help of Ukrgasbank



Ukrgasbank became the first Ukrainian partner of Carbon Pricing Leadership Coalition to advocate and promote climate change combatting in Ukraine

6

第六届国际绿色银行大会(上海) Sixth Annual Green Bank Congress

兴业银行绿色金融助力工业建筑业发展

IB's green finance promote industry and building sector development

兴业银行 绿色金融部 Green Finance Department of IB

2018-11-29 Shanghai



1、持续探索和实践

green finance keep developing



2008

公开承诺采纳赤道原 则,成为中国首家 "赤道银行"

Adopting Equator Principles

项目一期(CHUEE I),

exploration and practice

begin EE financing

2006

推出中国节能减排融资

市能被排融资项目(二期)签约仪式暨新闻发布会

2017

境内首批发行 500亿元绿色金

2016

融债;

the first 50 billion RMB

green finance agreement

issuer

与浙江等五个绿 色金融金改试验 区省政府签订战 略合作协议

signing

strategic cooperation

with five green

finance reform & innovation

pilot provincial

government respectively



2018

发布"点绿成金(GFP) "绿色金融 专业系统;

Public release the professional operation management system-- Green Finance **Platform**



推出中国首张低 碳信用卡 项产品 issue low future carbon usufruct credit card pledged

2010

首推合同能源 管理未来收益 权质押融资专 financing

44

EPC

model

2012

2、集团化的绿色金融产品和服务体系 Integrated Green Finance Products and Services

	绿色产品体系 Green Finance Product				
企业金融 Corporate Finance	绿色项目融资、绿色 流动资金贷款 Green Project loans and liquidity loans	环境权益抵质押融资 Carbon/Emission right pledge financing	应收账款抵质押 融资 Receivable pledge financing	现金管理 Cash Management	
零售金融 Retail Finance	绿色按揭贷款 Green mortgage loans	绿色理财 Green wealth management	绿色信用卡 Green credit card	绿色消费贷款 Green consumer loan	
投资银行与金融市场 Investment Banking and Financial Markets	绿色债券承销 Green debt underwriting	绿色资产证券化 Green ABS	绿色股权基金 Green equity fund	绿色投资 Green investment	
基金 Funds	绿色产业基金 Green industrial fund	环境及基础设施PPP基金 Environmental and infrastructure PPP fund			
信托 Trusts	绿色信托贷款 Green entrusted loan	绿色信托基金 Green entrusted fund			
金融租赁 Financial Leasing	绿色直接租赁 Green direct leasing	绿色售后回租 Green sale-and-lease- back	绿色经营性租赁 Green operating lease		
证券服务 Securities	绿色股权投资 Green equity investment	绿色债券承销 Green bond underwriting	绿色企业上市服务 Green enterprise IPO		

3、采纳赤道原则 强化防范环境和社会风险



Adopting the Equator Principle

▶截至2018年9月底、兴业银行累计对1048笔项目开展适用性判断,其中376笔适用赤道 原则,涉及1.6万亿元。Up to the end of September 2018, IB has conducted applicability judgement for 1048 projects, of which 376 are applicable to the Equator Principle, involving 1.6 trillion yuan.

▶**2013年. 本行利用赤道原**则的理念、方法、工具,主动将赤道原则应用到钢铁、水泥、 电解铝、平板玻璃等行业的项目贷款。In 2013, IB applied the Equator Principle initiatively to project loans in steel, cement, electrolytic aluminium, flat glass and other industries, using the concept, methods and tools of the Equator Principle.

▶2014年, 自主开发赤道原则项目评审系统 In 2014, IB independently developed **Equator Principles Project Evaluation System**

4、开发专业系统提升绿色金融服务质效

Professional green finance system



业务管理 Business management

- ●绿色项目识别
- ●环境效益测算
- ●绿色客户管理
- ●业务营销管理



风险管理 Risk management

- ●环境与社会风险管理
- ●赤道原则审查
- ●授信业务办理
- ●资产质量管理



运营管理 Operation management

- ●考评管理
- ●团队管理
- ●资源管理
- ●信息管理
- ●报表管理



5、绿色金融同业合作探索

exploration of green finance bank-bank cooperation



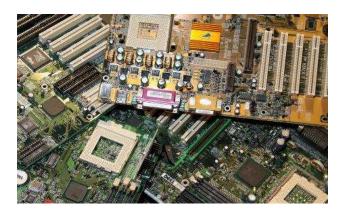




6、工业领域典型案例1 cases in industry area



煤层气发电项目贷款
Coalbed methane power generation project loan



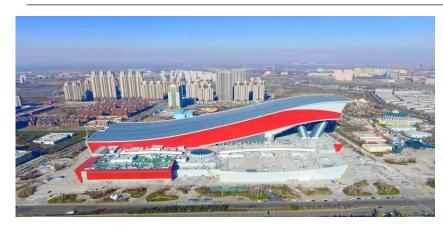
资源循环利用企业绿色债券承销
Resource recycling enterprise green bond underwriting



排污权抵押融资 Emission right pledge financing



6、建筑领域典型案例2 cases in building area



2星级新建绿色建筑项目融资
2 star green public building project finance



城投公司绿色中期票据 MTN for building envelop energy retrofit



合同能源管理未来收益权质押贷款 future usufruct pledged EPC projects

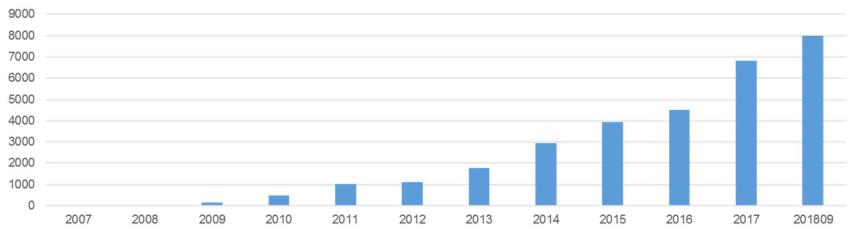


供热公司绿色融资租赁
Green lease for heating network energy (1997)

7、经济效益与环境效益显著

distinct environmental & economical benefits





截至2018年9月末,兴业银行在全国已累计为超过1.6万家企业提供绿色金融融资1.6万亿元,绿色金融融资余额约8000亿元(工业节能节水环保项目融资余额1282亿元,绿色建筑及建筑节能融资余额420亿元),全部绿色贷款不良率0.29%

兴业银行绿色贷款支持的项目可节约2959万吨标煤/年,可实现年减排8399万吨 CO₂,年利用固体 废弃物4529万吨,年节水量4.1亿吨。减排的二氧化碳相当于关闭了195座100MW火电站。





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Capacity, Cognizance, Confidence, and Capital

How Green Banks Are Driving Efficiency in Affordable Housing

2018 Green Bank Congress Shanghai | November 2018

Bettina Bergöö
Center for Market Innovation



1 OPPORTUNITY AND CHALLENGES

2 BUILDING CAPACITY AND COGNIZANCE

3 BUILDING CONFIDENCE

4 MEETING CAPITAL NEEDS

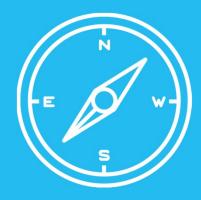


VEMBER 2018 IB: 17-11-A

CAPACITY, COGNIZANCE, CONFIDENCE, AND CAPITAL:

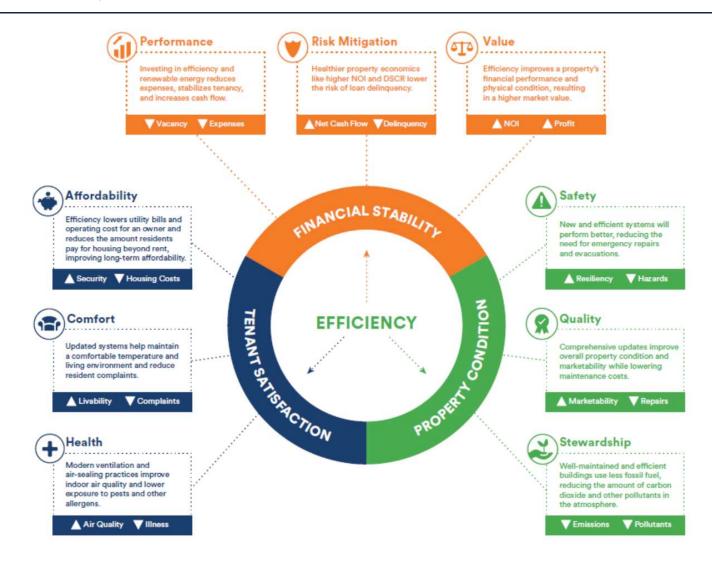
HOW GREEN BANKS ARE DRIVING ENERGY EFFICIENCY IMPROVEMENTS IN AFFORDABLE HOUSING





Opportunity and Challenges

Opportunity



From Community Preservation Corporation's Underwriting Efficiency Handbook

Challenges to Improving Efficiency in Affordable Housing



Capacity

LIMITED STAFF TIME TO EXPLORE AND PURSUE SEEMINGLY COMPLEX AND NONCRITICAL PROJECTS



Cognizance

LIMITED AWARENESS OF AND FAMILIARITY
WITH ENERGY EFFICIENCY OPPORTUNITIES,
AND THUS LIMITED COMFORT MANAGING A
PROJECT INVOLVING THEM



Confidence

LIMITED EXPOSURE TO INFORMATION ON THE VARIOUS BENEFITS OF SUCCESSFUL PROJECTS



Capital

LIMITED AVAILABILITY OF CAPITAL
RESERVES OR AFFORDABLE FINANCING
OPTIONS TO BRING PROJECTS TO FRUITION
ONCE THEY ARE DESIGNED



Building Capacity and Cognizance

Building Capacity and Cognizance Through Predevelopment Support

- Direct technical assistance
- Financing for third party technical assistance

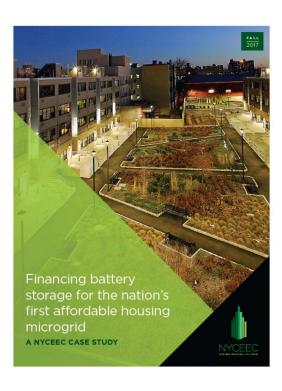




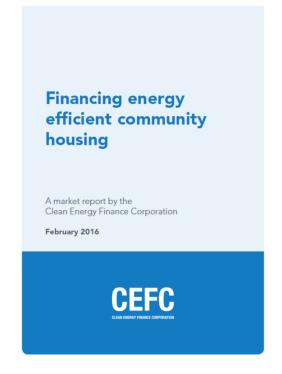
Building Confidence

Building Market Confidence Through Data Collection and Dissemination

- Project- and portfolio-level performance monitoring
- In-depth case studies









Meeting Capital Needs

Meeting Capital Needs for Project Development

Integrate efficiency into major financing events

Support mid-cycle retrofits

Green mortgages for new construction

Bridge loans

as part of capital needs
assessment

Unsecured loans

Credit enhancement for green mortgage

Secured loans (e.g. linked to tax payments)

Financing for energy service contracts (PPA, ESA)

☆ Plus: Gap financing for health and safety work ☆

Case Study: CEFC Green Mortgages for New Construction

- SGCH worked with CEFC to construct 500 high-efficiency homes
- CEFC has committed AU\$170 million (US\$121 million) in mortgage financing
- The high efficiency increases tenant comfort and lowers energy costs



Case Study: Underwriting Anticipated Savings at Heritage Commons

- 89-unit property serving lowincome elderly residents
- Two existing mortgages
- Project designed costing over US\$ 1 million
- 10% covered by utility incentives, property reserves
- Unsecured loan of US\$
 960,000 underwritten by
 expected energy and O&M
 savings to meet DSCR
 requirement

YEAR	ENERGY SAVINGS	0&M SAVINGS	TOTAL SAVINGS	DEBT SERVICE COVERAGE RATIO
1	\$48,579	\$49,900	\$98,479	1.30
2	\$49,793	\$49,651	\$99,444	1.31
3	\$51,038	\$49,402	\$100,441	1.32
4	\$52,314	\$49,155	\$101,470	1.34
5	\$53,622	\$48,909	\$102,532	1.35
6	\$54,963	\$48,665	\$103,628	1.36
7	\$56,337	\$48,422	\$104,758	1.38
8	\$57,745	\$48,179	\$105,925	1.39
9	\$59,189	\$47,939	\$107,127	1.41
10	\$60,669	\$47,699	\$108,367	1.43
10 Year Total	\$544,249	\$487,921	\$1,032,170	
IO Year Average	\$54,425	\$48,792	\$103,217	1.36

Source: Capital for Change. Reproduced with permission from CT Green Bank.

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GREEN BANK NETWORK





Green Banks and Financing Energy Efficiency and Renewables in Industry and Buildings

Questions & Discussion

Sixth Annual Green Bank Congress