A discussion of financing structures, instruments and risk management considerations for financing of Renewable Energy and Energy Efficiency projects

Presented by:

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• Edison Galbraith has 25 years of experience in the investment and development banking industries with 10 years promoting and financing investments in energy efficiency, renewable energy and sustainability.

• Edison holds diverse qualifications including a BA in History and Economics from the University of the West Indies and an MBA in Finance from the Manchester Business School, UK. He is also a Certified Energy Manager accredited by the Association of Energy Engineers and an Energy Risk Professional accredited by the Global Association of Risk Professionals.

• Since 2011 he has served as General Manager - Loan Origination and Portfolio Management at the Development Bank of Jamaica (DBJ), where he heads the bank’s lending operations.

• His responsibilities include managing DBJ’s relationships with financial institutions, development partners and the business sector and deploying DBJ’s portfolio to unlock strategic sectors, improve access to finance and support economic growth and job creation.

• In this regard, Edison has led the bank’s successful MSME, business process outsourcing and energy financing initiatives as well as its partial credit guarantee programme.

• He also serves on the Jamaica Energy Council and various other boards and committees geared towards achieving energy transition, financial access, climate action and food security.
“CROWDING IN” THE PRIVATE SECTOR

Privatization & Public Private Partnerships
- Divestment of electric utility JPS and Wigton Wind Farm
- Schools Solar PPP

Private Equity Market Development
- Seeded 5 Funds that invest in RE

PROMOTING AND FINANCING EE & RE INVESTMENTS

Technical Assistance and Capacity Building
- Public education, Training Energy Auditors, Energy Audit Grant

Loans and Guarantees
- EE and RE loans for business and homes, 300 loans of US$30M through intermediaries
- Credit Enhancement Facility - partial credit guarantees for EE and RE loans
FINANCIAL INSTITUTIONS’ CONSIDERATIONS
COMPILED BASED ON FEEDBACK FROM WORKSHOPS AND DISCUSSIONS WITH FIs

INSTITUTIONAL / PORTFOLIO LEVEL
• Preservation of capital
• Return on capital
• Portfolio growth
• Mandate, Impact, ESG
• Strategic and geopolitical risk
• Risk management, limits
• Concentration / diversification
• Administration, transaction costs
• Operational risk
• Consistency of processes, frequency
• Institutional capacity, knowledge, manuals

PORTFOLIO / TRANSACTION LEVEL
• Market risk
• Matching of assets and liabilities
• Liquidity / Tenor
• Interest Rate, currency
• Accounting treatment, Provisioning, IFRS 9
• Credit risk / rating
• Character
• Capacity
• Capital
• Conditions
• Collateral
*This presentation focuses on the electricity sector and excludes fuels except where fuels are being displaced by electricity in transportation and other sectors.*
ENERGY TRANSITION - PROVEN TECHNOLOGY

Fossil Fuels – Coal, HFO, Diesel, Combustion Turbine,

Natural Gas, LNG – Combined Cycle, (cogeneration)

Renewable – Hydro, Wind, Photovoltaic, Solar, Biomass, Geothermal, Ocean,

OTHER CONSIDERATIONS
Energy security, diversification, Climate action
Lowest cost, Levelized cost of electricity, Parity
Capacity factor, Intermittent versus firm, Grid stability
Energy Storage – Chemical, Battery, Pumped Hydro, etc.
# LEVELIZED COST OF ELECTRICITY

Table 1a. Estimated levelized cost of electricity (LCOE, capacity-weighted\(^1\)) for new generation resources entering service in 2025 (2019 dollars per megawatthour)

<table>
<thead>
<tr>
<th>Plant type</th>
<th>Capacity factor (percent)</th>
<th>Levelized capital cost</th>
<th>Levelized fixed O&amp;M(^2)</th>
<th>Levelized variable O&amp;M</th>
<th>Levelized transmission cost</th>
<th>Total system LCOE</th>
<th>Levelized tax credit(^3)</th>
<th>Total LCOE including tax credit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dispatchable technologies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultra-supercritical coal</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
</tr>
<tr>
<td>Combined cycle</td>
<td>87</td>
<td>7.48</td>
<td>1.59</td>
<td>26.40</td>
<td>1.13</td>
<td>36.61</td>
<td>NA</td>
<td>36.61</td>
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<tr>
<td>Combustion turbine</td>
<td>30</td>
<td>16.10</td>
<td>2.65</td>
<td>46.51</td>
<td>3.44</td>
<td>68.71</td>
<td>NA</td>
<td>68.71</td>
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<tr>
<td>Advanced nuclear</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
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<tr>
<td>Geothermal</td>
<td>90</td>
<td>20.36</td>
<td>14.50</td>
<td>1.16</td>
<td>1.45</td>
<td>37.47</td>
<td>-2.04</td>
<td>35.44</td>
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<tr>
<td>Biomass</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
<td>NB</td>
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<tr>
<td><strong>Non-dispatchable technologies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind, onshore</td>
<td>40</td>
<td>23.51</td>
<td>7.51</td>
<td>0.00</td>
<td>3.08</td>
<td>34.10</td>
<td>NA</td>
<td>34.10</td>
</tr>
<tr>
<td>Wind, offshore</td>
<td>45</td>
<td>84.00</td>
<td>27.89</td>
<td>0.00</td>
<td>3.15</td>
<td>115.04</td>
<td>NA</td>
<td>115.04</td>
</tr>
<tr>
<td>Solar photovoltaic(^4)</td>
<td>30</td>
<td>24.12</td>
<td>5.77</td>
<td>0.00</td>
<td>2.91</td>
<td>32.80</td>
<td>-2.41</td>
<td>30.39</td>
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<tr>
<td>Hydroelectric(^5,6)</td>
<td>73</td>
<td>28.89</td>
<td>7.64</td>
<td>1.39</td>
<td>1.62</td>
<td>39.54</td>
<td>NA</td>
<td>39.54</td>
</tr>
</tbody>
</table>

Source: US Energy Information Administration, Annual Energy Outlook 2020

RISK MITIGATION

- Identify risks at all stages
- Measure and estimate exposure and impact
- Evaluate options available
- Develop risk mitigation strategy
- Make decision and take action
- Review and update

- Construction, Installation and Commissioning
- Engineering, procurement and construction (EPC) contracts
- Warranties
- Performance bond
- Escrows
- Guarantees
- Maintenance
- Performance contracting
- Measurement and verification
- Security
- Insurance
POLICY, LEGISLATION AND REGULATIONS

Enable or constrain market growth

• National policies
• Global trends
• Climate change mitigation funding
• Legal and / or natural monopolies
• Bidding / Procurement of capacity / RFP process, IPPs
• Taxation, incentives and subsidies
• Energy ecosystem development
• Public awareness of solutions
• Capacity of providers
FINANCING OPPORTUNITIES

ENERGY GENERATION

*Megawatts* — Generates revenue and cash inflows

Add generating capacity
Growth in demand for energy — Driven by economic expansion, lifestyle, Climate change Electrification

Replacement or Displacement of existing generating capacity

ENERGY EFFICIENCY

*“Negawatts”* — Yields savings and reduces cash outflow
Reduces overall demand and need for new capacity

Financing Grid Improvements
FINANCING OPPORTUNITIES

TYPES AND SIZES OF PROJECTS

• Utility Scale
• Distributed
• Independent Power Producers
• Industrial
• Commercial
• Residential
• Grid tied
• Off Grid

ELECTRICITY CONSUMERS

• Utility – Water, Communication
• Industry, Manufacturing
• Government Buildings, Schools, Hospitals,
• HVAC, Cold storage
• Lighting, Street lighting
• Commercial - Malls, Offices
• Residential, Hotels, Homes

OTHER

• Energy Equipment Suppliers
• Energy Service Companies / Performance Contracting
FINANCING OPPORTUNITIES

MARKET SIZE
• Utility scale – few transactions
• Residential – numerous transactions

RISK RETURN TRADEOFF
• Utility Scale – Concentration - Syndication
  • Residential – Diversified - Transaction Cost - Aggregation

RISK STRUCTURE
• Utility Scale – PPA, Guaranteed off-taker, Utility, Parent - Credit Quality – Customers, Economy
• Residential – Contract with consumer – Credit Quality -
FINANCING OPPORTUNITIES

FUNDING INSTITUTIONS
- International – Private investors / funds, Development Finance Institutions, Donors, Green Climate Fund, GEF etc.
- Domestic Capital – Commercial Banks, Credit Unions, Leasing, other lenders, Private credit / equity funds,
- Capital Markets – Bond, Equity,
- Market structures - Funds, ESCOs,

FUNDING SOURCES
- Deposits, Pensions, Capital,
- Government – budget, borrowing,

FUNDING INSTRUMENTS
- Debt, Leasing, Guarantees, Equity, Performance contracting
Thank you.

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