



Financing Resources Summary

Power Purchase Agreements (PPA)/Solar Leases:

Power purchase agreements are the simplest and most important component financing the drive toward net zero buildings today. [Power purchase agreements](#) allow building owners to keep equipment such as solar panels off their balance sheets even when such panels are on *their* roof generating *their* electricity. This is because a power purchase agreement centers upon the provision of energy services (electricity) rather than the panel itself. For years, accountants have warned that the Generally Accepted Accounting Principles (GAAP) that allow this structure would be transitioning to a model that does not allow power purchase agreements to remain off balance sheet. An excellent but somewhat dated discussion of the topic is available [here](#). Organizations that offer PPAs often also offer a slightly different ownership model known as [solar leases](#). Some examples of organizations offering these financing models are [Solar City](#) (national) or [Suncommon](#) (VT).

Energy Services Companies (ESCOs):

Energy Services Companies (ESCOs) provide a one-stop-shop for energy auditing, design and planning, retrofit installation, commissioning, and evaluation. Some larger ESCOs will even finance improvements via an Energy Services Agreement (ESA) modeled upon the PPA structure, while others provide an energy savings guarantee via an energy saving performance contract (ESPC/EPC) which can then be used to secure funding from lending institutions. The North American Association of Energy Services Companies (NAESCO) maintains a [directory](#) of large energy services companies. Often, larger energy services companies prefer projects with a minimum ~\$1 million budget. Municipalities can aggregate several buildings to become a more desirable customer. For example, the city of [Brattleboro, VT](#) (page 11) aggregated their municipal buildings for one energy services contract, and funded it through a municipal lease/bonding structure secured against Honeywell's performance guarantee. One of the most notable ESCO retrofit projects was done on the [Empire State Building](#) by Johnson controls with help from the Rocky Mountain Institute and others.

Revolving Loan Funds:

Revolving Loan Funds are based on the idea that a retrofit's operational savings will eventually pay back the capital cost of an initial investment. Many colleges, universities, and other large institutions have revolving loan funds. For example, Vermont Law School has a [Green Revolving Fund](#) of about \$250,000 dedicated to energy efficiency investments that will gain a return. Many states have [revolving loan funds](#) dedicated to energy investments, but most of them focus on loans to the commercial and industrial sector where there is greater assurance of repayment and less transactional cost per dollar of the transaction. All states also have access to Clean Water State Revolving Funds which can--in certain circumstances where the energy-water nexus is clear enough--be used in the funding of energy projects. The New York Energy Research and Development Authority (NYSERDA) recently used their clean water state revolving fund as a [backstop for on-bill financed loans](#) (et.al.), allowing them to remove these loans from their balance sheet and place secondary market via a bond with a AAA credit rating.



On-bill Financing:

On bill-financing programs vary greatly, but the main idea behind most of them is that a lien is placed against the meter in order to secure the loan to the property owner. The Burlington Electric Department is currently piloting a [commercial on-bill financing](#) program. NYSERDA launched an [on-bill financing program](#) in 2013 that is available for commercial and residential utility customers.

Property Assessed Clean Energy (PACE) Programs:

PACE is a method of securing funding for energy efficiency investments against the value of the property that will benefit from those investments via a lien on the property. PACE loans are paid back at the same time as the property tax bill. Often, a state program administrator organizes the program and municipalities must vote to enable it in their city/town. Engaged properties are then audited and cost-effective efficiency (sometimes renewables) measures are identified. A program administrator then provides funding subsequent to a bond issuance and retrofits with a specific payback period may be installed. An excellent resource for the PACE program can be found [here](#). The PACE program began to pick up speed just before the housing crisis and when the market crashed in late 2008 the FHFA clarified that any lien placed on a residential property with a loan supported by the FHA was in fact subordinate to the initial lending obligation. This clarification severely limited the viability of Residential PACE Programs. Commercial Pace programs (C-PACE) are common throughout the country, but residential PACE programs are now less common.

Loan Loss Reserve Fund:

Loan Loss Reserve Funds are one method of incentivizing lenders who might be weary of risk related to energy efficiency investments. [Loan loss reserve funds](#) are utilized most often at the state level. Often, state capitalizes a loan loss reserve fund to stand in the shoes of a borrower who would otherwise default on an energy efficiency loans. This lender of last resort can incentivize banks to invest in what would otherwise be risky loans due to a lack of collateral, performance data, or standardized products. Most states with PACE or on-bill financing programs use a loan loss reserve fund to buy down interest rates (by limiting lender risk from default) to a level that incentivizes demand. For example, CEFIA utilizes a [loan loss reserve](#) to support their residential solar programs.

Energy efficient mortgages/green loans:

Many mortgage lenders, including those sponsored by the [FHA](#) will provide low interest loans for the residential energy efficiency retrofits.

Green Banks:

Green Banks are state sponsored organizations that use government funding and bonding authority to leverage private capital for energy efficiency investments (et.al.). They often utilize or incentivize one or more of the above-mentioned finance methods. Many of these banks have an ultimate goal of incentivizing private lenders to accept risk in exchange for guarantees for default such as a loan loss reserve fund or a credit enhancement. The [Connecticut Energy Finance and Investment Authority](#) and the [New York State Green Bank](#) are two examples of green banks currently operating.

An excellent and detailed outside resource discussing most of these programs can be found [here](#).