Barriers and Solutions for Achieving Deep Energy Retrofits in Government Buildings

John Shonder, Oak Ridge National Lab
Marko Nokkala, VTT
Cost and risk are the two main barriers to deep energy retrofits

- Given interest rate and required services, project must have SPB < 15
- Only $600k of potential $1.5 million in savings can be achieved
- Cost is $10 million
- Another $35 million required to achieve all potential savings
Four main types of risk to investors

• Technology
• Construction
• Measurement and verification
• Financial
Technology Risk

• Deep retrofit projects may involve new and/or underutilized technologies

• May also require improved construction techniques (to eliminate thermal bridges, for example)

• Equipment failures -- or envelope-related issues such as leaks, condensation, mold growth -- could result in savings shortfalls
Construction Risk

- In the US, combining building renovation with energy retrofit requires two contractors and two contracts
- ESCO receives about 94% of required funding from appropriated funding, but this is paid only at project acceptance
- ESCO must carry a loan for 100% of the project cost during the construction period
- Any delay in the construction process – due to actions of the renovation contractor, for example – increases interest costs
Measurement and Verification Risk

• ESPC projects require measurement and verification (M&V) of savings

• Given the interactive effects of the many conservation measures used in deep retrofit projects, IPMVP Option C (utility bill analysis) is often the most logical choice for M&V

• Financiers perceive more risk in IPMVP Option C Measurement and Verification

• ESCO can reduce this risk by guaranteeing a smaller fraction of the predicted energy savings, but this increases interest costs
Financial risk

• Terms of financing (interest rate changes, currency fluctuations etc.)

• Functionality created change in projected revenue stream (altered use of the building, abandoned or demolished during the contract period)

• Social risk (of changing demographics, less demand for (particular) type of government building in the area (non-movable assets))

• Can different models be introduced to manage the financial flows? Premium, price guarantees, purchase of contract by third party etc.)
Thoughts on the market structure?

• Is the business model already seasoned and established? U.S. ESCO model very solid and carved in legislation, other countries with different working assumptions

• Is the fixed market mechanism a driver or hinder of development for the market?

• What is the actual market size? Potential with existing backlog of renovations vs the current realised volume of project?
Solutions to identified risks

• Better investment planning
• More stringent contract management (including sub-contracting)
• Use and monitoring of targeted energy saving levels in setting the energy saving targets
• Speeding up financing by PPP’s and other methods
• Spatial planning of public building utilisation to reduce changes in revenue streams