

École des Ponts

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C.I.R.E.D.

CENTRE
INTERNATIONAL
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SUR L'ENVIRONNEMENT
ET LE DÉVELOPPEMENT

Information Problems in Energy Efficiency Decisions

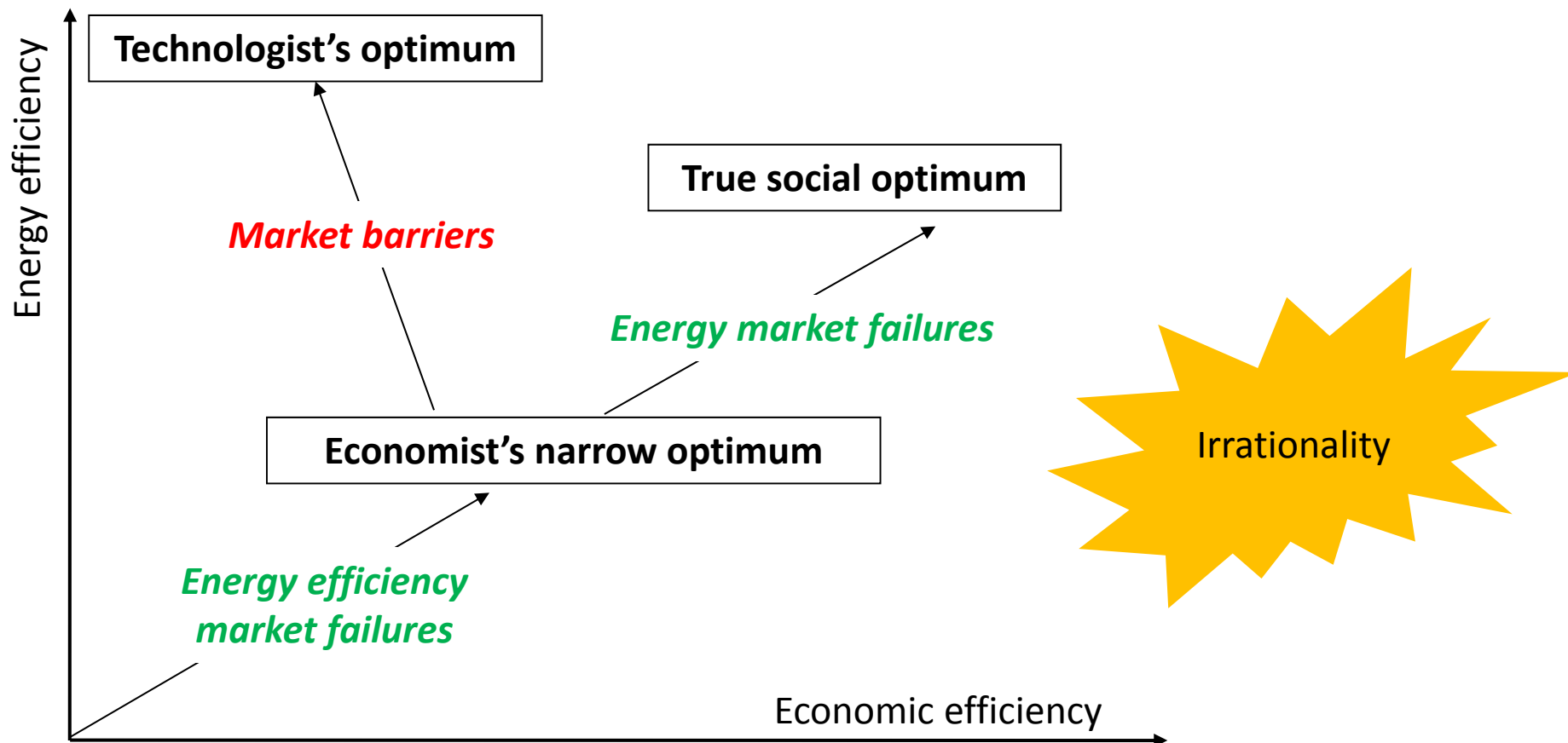
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Madrid – September 30, 2015

The Energy Efficiency Gap

Under-investment in energy efficiency compared to some optimal situation

Jaffe, Newell, Stavins (2004)



→ *How do information problems contribute to the energy efficiency gap?*

→ *What are the policy implications?*

- Information barriers (non-market failures)
 - Incomplete information
 - Imperfect information

- Information asymmetries (market failures)
 - Moral hazard
 - Adverse selection

INFORMATION BARRIERS

Incomplete information

- *Some energy uses are not completely known*
- Examples
 - All electricity uses
 - Prediction of energy savings after retrofit
- (Private) solutions (Ramos, Gago, Labandeira and Linares, 2015)
 - Smart metering seems to be effective – more than comparative feedback!
 - Energy audits do not seem to be very effective

Imperfect information

- *Some energy uses carry irreducible risk and uncertainty*
- Examples
 - Space heating and cooling depend on weather conditions
 - Volatility of energy prices
- (Private) solution
 - Irreversibility + risk = option value
 - Risk premia should be taken into account

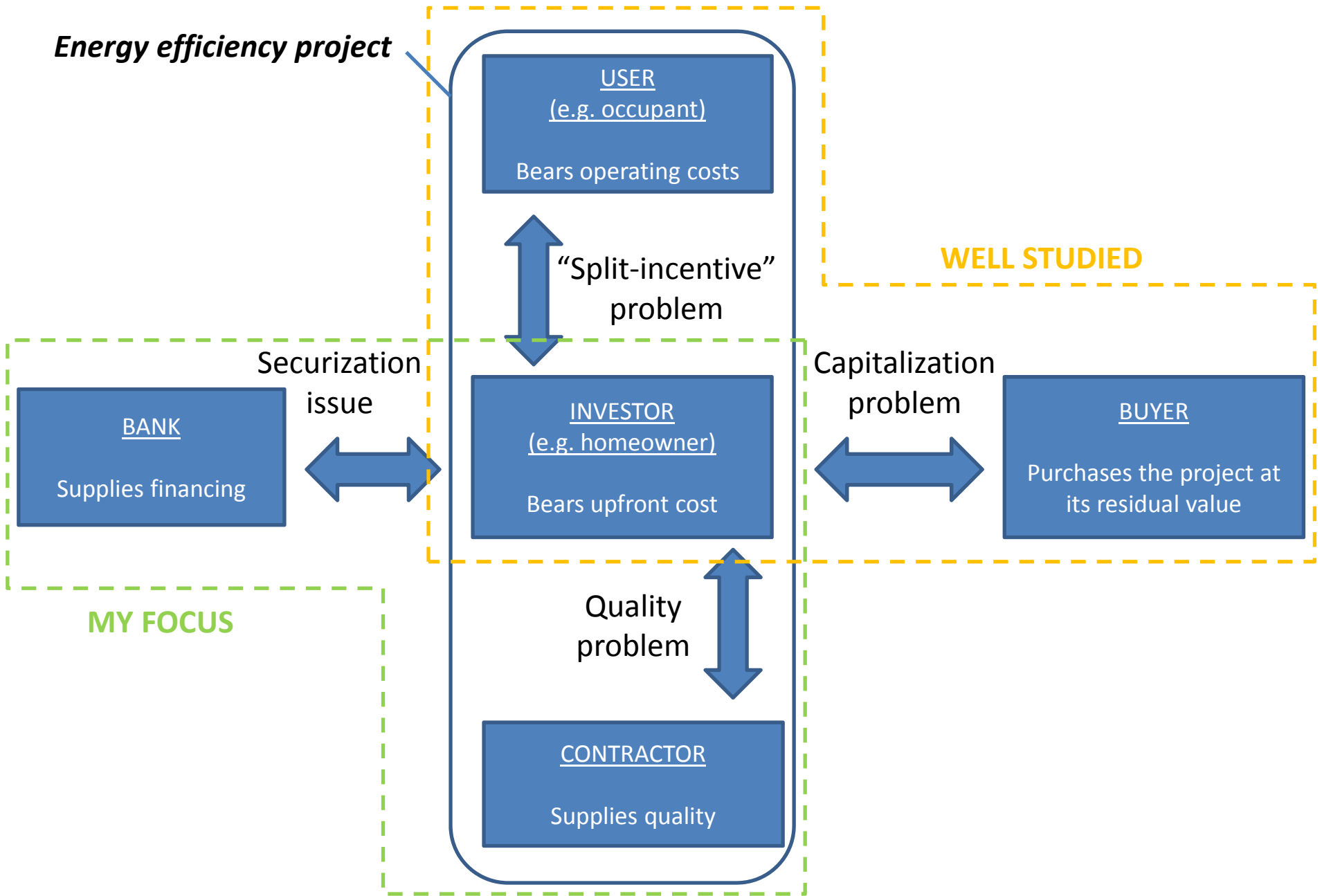
3 examples drawn from my own research

INFORMATION ASYMMETRIES

Definitions

- Moral hazard = hidden action
- Adverse selection = hidden information
 - About the buyer: “screening”
 - About the seller: “signaling”
- Anyway, one party has an informational rent and the outcome is suboptimal (e.g. insurance)

Energy efficiency project



Nota bene: exogenous energy supply

Example #1: Moral Hazard in Building Retrofits



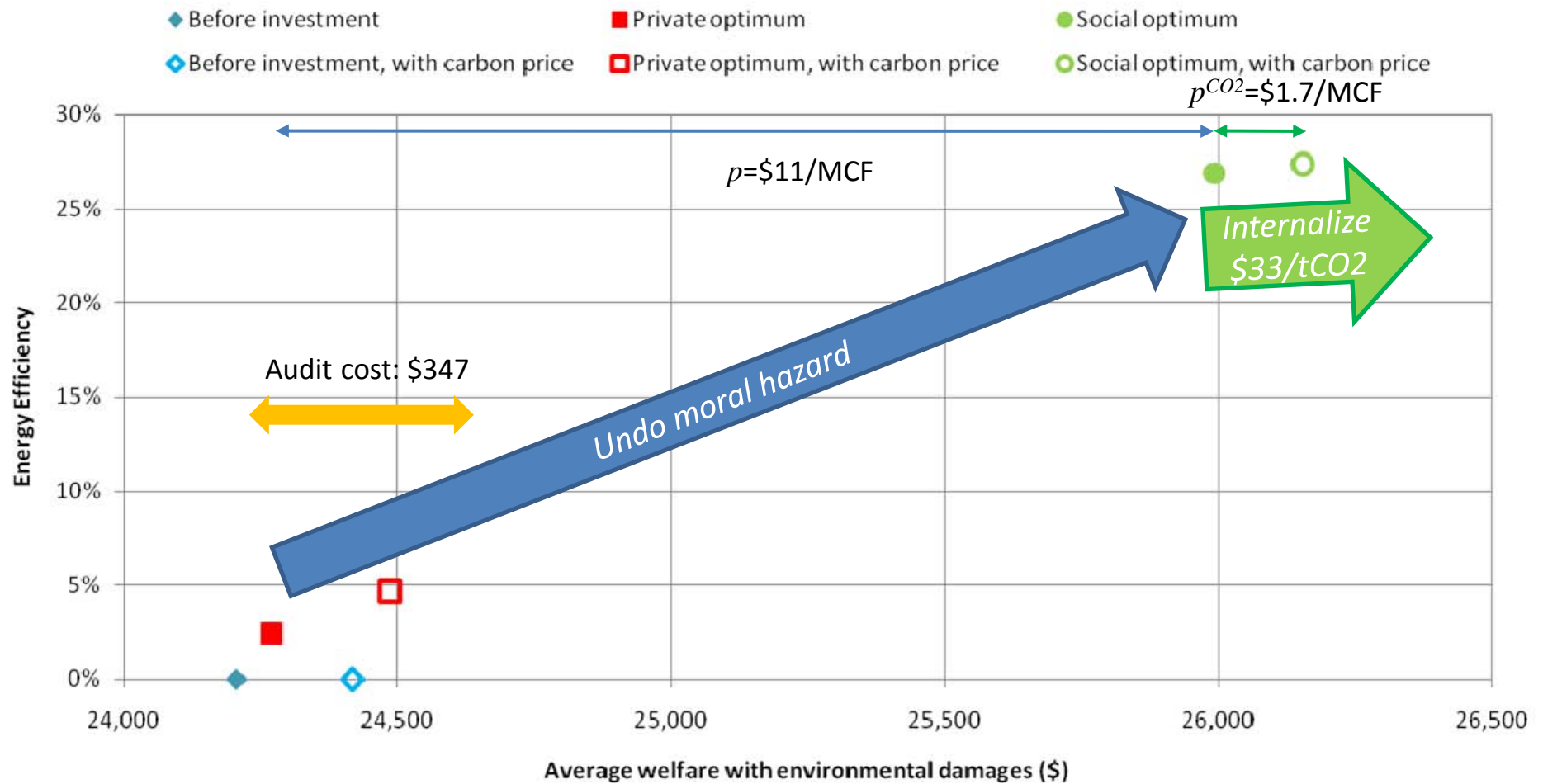
2013 Winner

“Best Construction Defect” Photo Contest

Awarded by AQC, the French Construction Quality Agency



Moral Hazard: Potential Magnitude



Moral Hazard: Public/Private Solutions

Voluntary certifications



CERTIFIED
PROFESSIONAL



Problem:
Monitoring costs

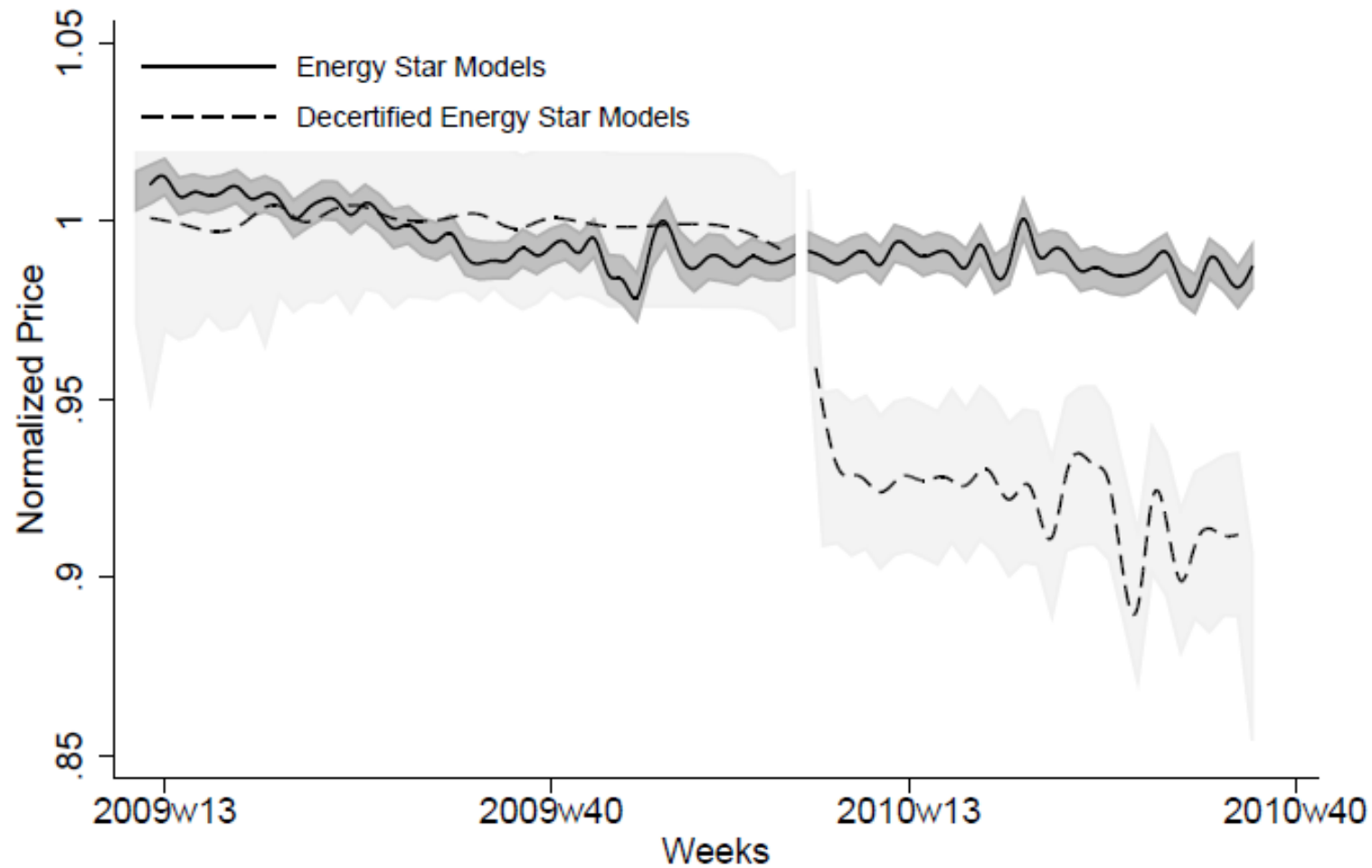
Incentives



CLICK HERE TO SEE YOUR SAVINGS!

Problem: Second moral hazard (rebound effect), hence incomplete contract

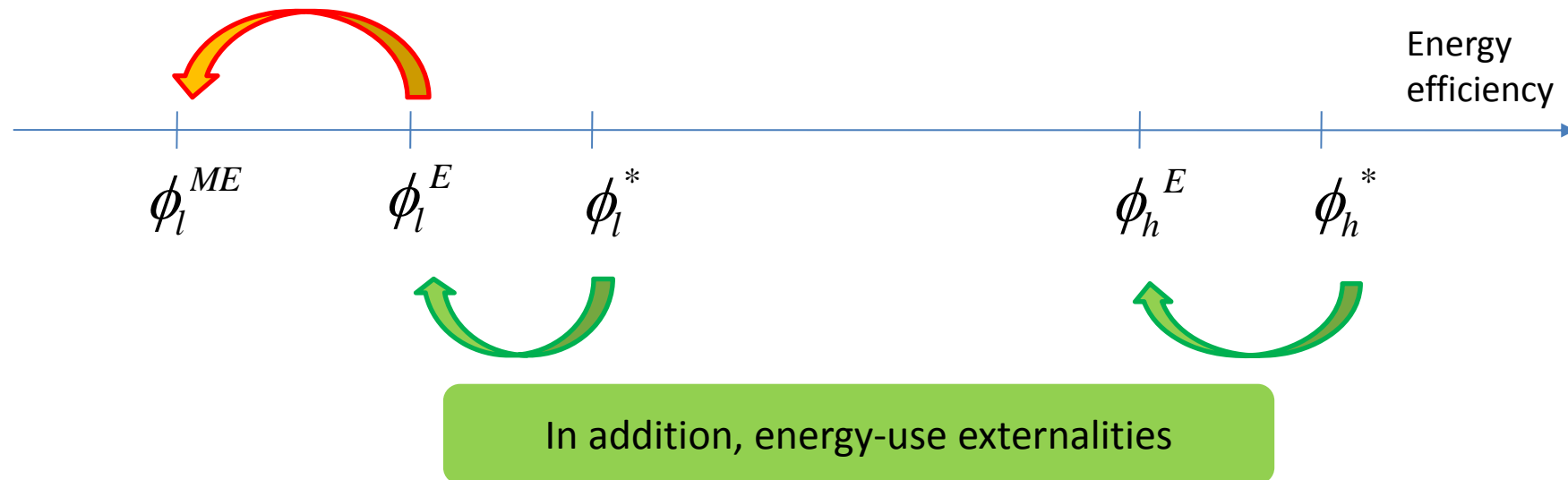
Example #2: Consumer Screening by Dominant Firms



Consumer Screening: Policy Implications

Distortion at the bottom
(e.g. economy versus business traveling)

Nauleau, Giraudet and Quirion (2015)



- Implications for energy efficiency subsidies (e.g. tax credits)
 - Ad valorem subsidies should have decreasing rates
 - Per-quality subsidies better than ad valorem
- Prescriptions at odds with actual practice

Example #3: Moral Hazard & Adverse Selection

Comparing car loans versus loans for energy retrofits for similar amounts & maturity (WORK IN PROGRESS)

- Energy retrofits save energy. If this is perfectly observable (moral hazard), interest rates should be **lower**
- Energy retrofits cannot be secured by a collateral (moral hazard). Hence, interest rates should be **higher**
- Depending on consumer's willingness to borrow money for cars versus energy retrofits (adverse selection), interest rates may **vary** as well

Moral Hazard versus Adverse Selection: Evidence

9000+ observations

	Valeur	Ecart-type	
Constante (Société générale)	6.68%	0.09%	***
BNP	-2.23%	0.10%	***
Caisse d'Épargne	-0.49%	0.13%	***
Cetelem	-1.48%	0.10%	***
Cofidis	2.47%	0.13%	***
Cofinoga	-1.07%	0.11%	***
Credit Agricole	-0.76%	0.13%	***
Domofinance	-1.33%	0.10%	***
LCL	-0.71%	0.11%	***
La Banque Postale	-1.08%	0.13%	***
Rénovation*BNP	0.79%	0.08%	***
Rénovation*Caisse d'Épargne	-0.48%	0.13%	***
Rénovation*Cetelem	0.43%	0.08%	***
Rénovation*Cofidis	0.03%	0.13%	
Rénovation*Cofinoga	0.35%	0.11%	***
Rénovation*Credit Agricole	0.00%	0.13%	
Rénovation*La Banque Postale	0.22%	0.14%	
Efficacité énergétique*BNP	-0.20%	0.09%	**
Efficacité énergétique*Domofinance	-1.32%	0.05%	***

Interest rates tend to be higher for renovation

Interest rates tend to be lower when there is an energy efficient option

CONCLUSIONS

- Information problems are pervasive in energy efficiency decisions
 - Welfare cost potentially larger than energy-use externalities
 - Information barriers, failures and irrationality hard to disentangle
- Policy implications
 - Public intervention legitimate for information asymmetries
 - They can also be partly solved through private forces
- What role for information technologies?
 - Certainly helpful
 - But subject to manipulation and privacy issues

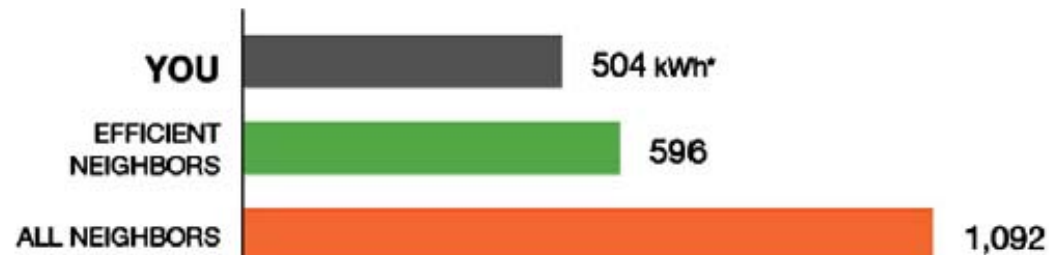
SUPPLEMENTAL MATERIAL

Comparative Feedback

H. Allcott / Journal of Public Economics 95 (2011) 1082–1095

Last Month Neighborhood Comparison

Last month you used **15% LESS** electricity than your efficient neighbors.



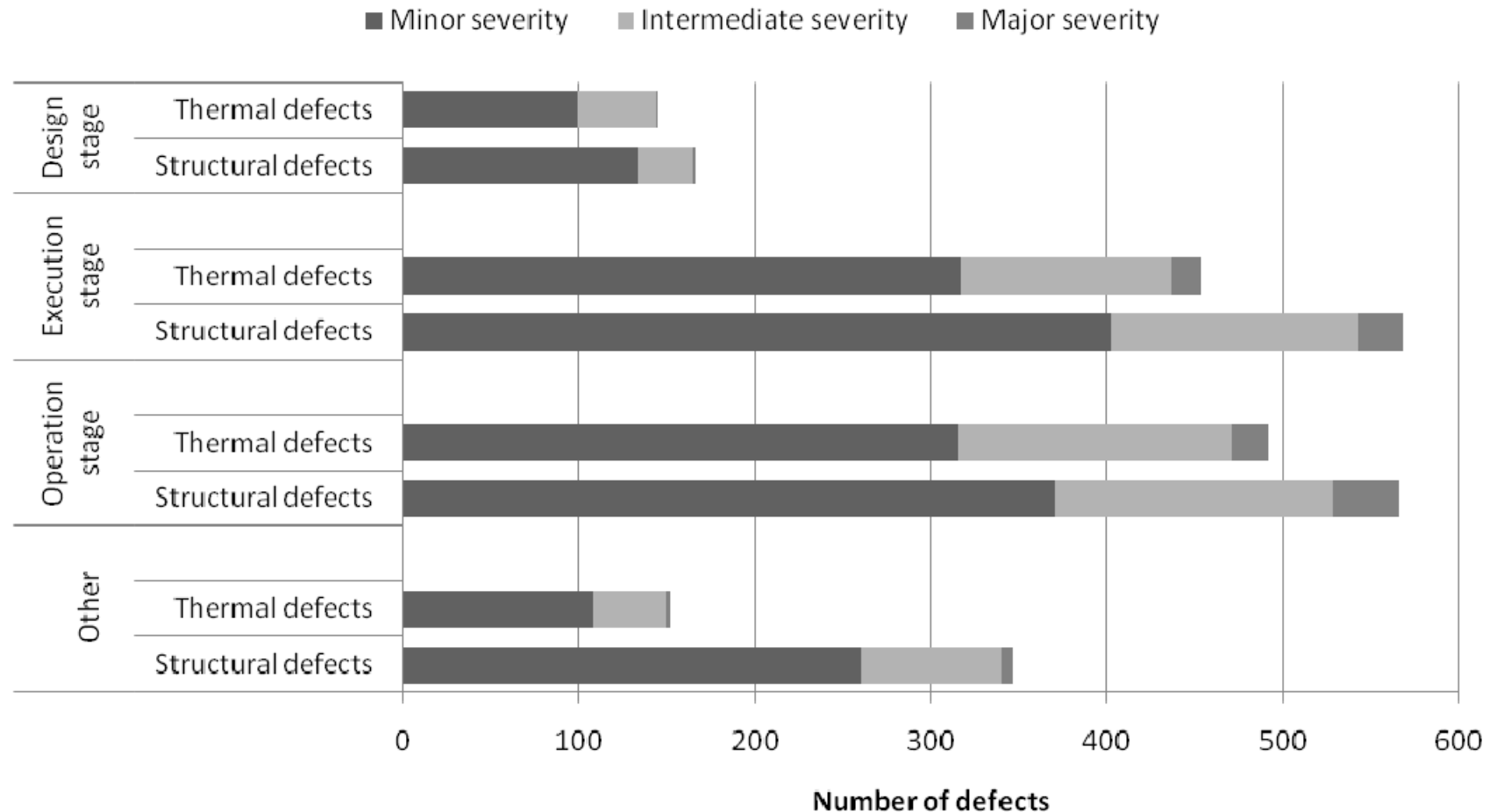
* kWh: A 100-Watt bulb burning for 10 hours uses 1 kilowatt-hour.

YOUR EFFICIENCY STANDING:



- Here, savings of 2%
 - In contrast, smart meters: 5-7%
- *Is irrationality really the matter?*

AQC Audits of 'Bâtiments basse consommation'



Overall frequency of defects (per building): median 4, mean 5.1, standard error 4.9

Distribution of Defects by Building Characteristics

