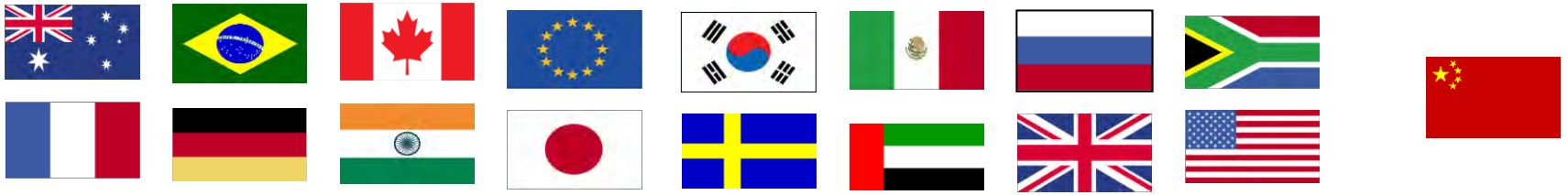
SEAD: Improving Procurement Practices to Accelerate Market Transformation

Getting Good Value for Money in Energy Efficient Street Lighting Programs – ESMAP/World Bank BBL
December 3, 2014

SEAD is a multinational government collaboration whose primary objective is to accelerate global market transformation for energy efficient products

Measures taken by SEAD partners since its launch in 2010 could save 600 TWh of electricity per year by 2030*

* = Energy produced by 200 mid-sized coal-fired power plants.



SEAD Work Streams

Awards — Showcase leadership in energy efficiency

Incentives — Increase demand for energy efficient products

Procurement — Lead by example, with tools & best practice

Standards & Labels — Ensure energy efficiency performance

Technical Analysis — Provide foundation for policy success

Technical Assistance — Support implementation

Improving Energy Efficiency in Street Lighting

- Investments to improve infrastructure (e.g. optimizing roadway configuration)
- Energy Management practices (including installation of adaptive controls for LEDs)
- Luminaire retrofits

Public lighting can represent up to 40% of electricity consumed by municipalities and between 1% and 3% of total demand for electricity. (The Climate Group, 2012).

SEAD's Focus

Procurement Barriers Preventing Adoption of More Efficient Street Lighting Technologies

- Lack of market transparency for best performing products in terms of quality and energy
- Rapidly evolving street lighting technologies (e.g., LEDs)
- Higher initial costs of advanced technologies
- Procurement processes that do not integrate energy-efficiency criteria

Procurement Best Practices

- Creating Strong Municipal Networks
- Aggregating Demand for EE products
- Building EE Procurement Processes

Creating Strong Municipal Networks

- Communication and collaboration through municipal networks can help accelerate the transition to energy-efficiency street lighting
- Small municipalities benefit the most from participating in local networks
- Example: Mexico's National Project for EE in Public Lighting brings municipalities together to discuss best practices and share experiences with retrofit projects and new technologies.

Municipal networks can support procurement best practices

- Facilitate peer learning (e.g. discussion on new technologies; sharing case studies of implementation in other municipalities, etc.)
- Coordinate and share results of advanced technology pilot projects
- Develop joint resources such as model specifications, procurement process frameworks
- Provides access to experts

Aggregating Demand for Energy-Efficient Technologies

Aggregating demand through bulk purchasing programs can result in a number of benefits:

- **Lower costs**
- **Increased transparency**
- **Dissemination of best practices**
- **Boost to Capacity**

Case Study - Worcestershire County Council (UK)

Using standardized specifications, reverse auction, and collaborative purchasing cost savings of between 10-20% were achieved for the 23 municipalities involved.

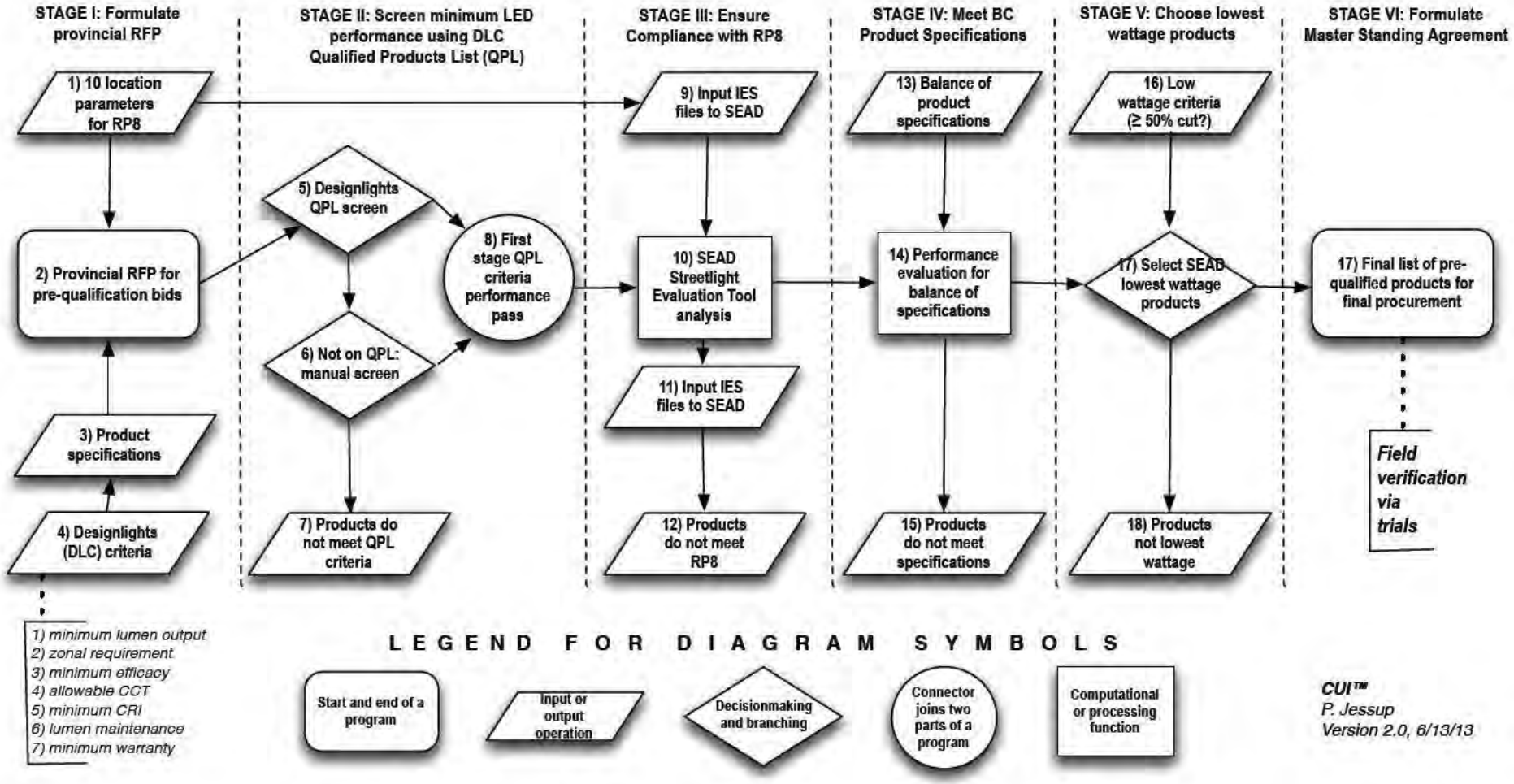
Building EE Procurement Processes

- Procurement process must be adapted in order to integrate energy-efficiency as a criteria
- The process should integrate tool and resources to adequately evaluate products in the market for their energy-savings potential
- A clear, staged process and accompanying guidelines can help municipalities purchase the best products

Canada's 6-Stage Product Pre-Qualification Process

- Clearly outlines the process officials should follow to evaluate bids and create a list of pre-qualified products for street lighting applications
- Integrates energy-efficiency evaluation tools and resources such as SEAD Street Lighting Tool and DesignLights Consortium's (DLC) Qualified Products List
- Project led by LightSavers Canada in partnership with Natural Resources Canada

DRAFT LIGHTSAVERS CANADA PRE-QUALIFICATION PROCESS FOR PROVINCIAL AGGREGATE PROCUREMENT



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Procurement Tools: Design Lights Consortium – Qualified Product List

Qualified Product Lists provide purchasers with a trusted resource to select products that are energy efficient and high quality.

The QPL:

- Sets the bar for **efficiency program incentives** across the U.S. and Canada and informs manufacturer product development.
- Ensures that **high-quality, high-performance, tested and verified** LED products will be eligible for participating incentive and procurement programs

OVERVIEW OF QPL

- Contains 69,390 products
- Products meet criteria for EE and quality
- SEAD working to analyze international applicability of this resource.
- Access the QPL at: https://www.designlights.org/QPL

Procurement Tools: SEAD Street Lighting Product Evaluation Tool

Complements existing street lighting design software commonly used in the field by adding key unique features to maximize energy efficiency.

The SEAD Tool:

- Integrates **life cycle cost criteria *with* basic photometric analysis** which traditional software does not do.
- Allows municipalities to **evaluate hundreds of fixtures simultaneously**, eliminating dependence on suppliers to highlight most efficient models and increasing transparency in the process.

SEAD TOOL BASICS

- FREE!
- Compatible with Microsoft Excel 2003 and later versions
- Photometric analysis can be done using either the IES or CIE calculation method
- Available in English, French, Russian and Spanish
- Download the latest version directly from: www.superefficient.org/sltool

SEAD SL Tool's 5-Step Analysis

1. Road Characteristics

Users input the ***size*** and ***type*** of the ***road section***, and the ***placement*** of ***poles***. This provides the tool with the basic layout of the road to be analyzed, using simplified road configurations to speed up the analysis process.

2. Light Quality Targets

Identifying **minimum light level targets** allows the tool to filter fixtures by those that pass or fail the criteria. **Illuminance** and **luminance** both available.

3. Fixtures Data

Users can select as many as **hundreds of fixtures** for simultaneous analysis. The tool can store a library of fixture data (**default** and **user-added**), and then select which of these fixtures will be included in a particular analysis.

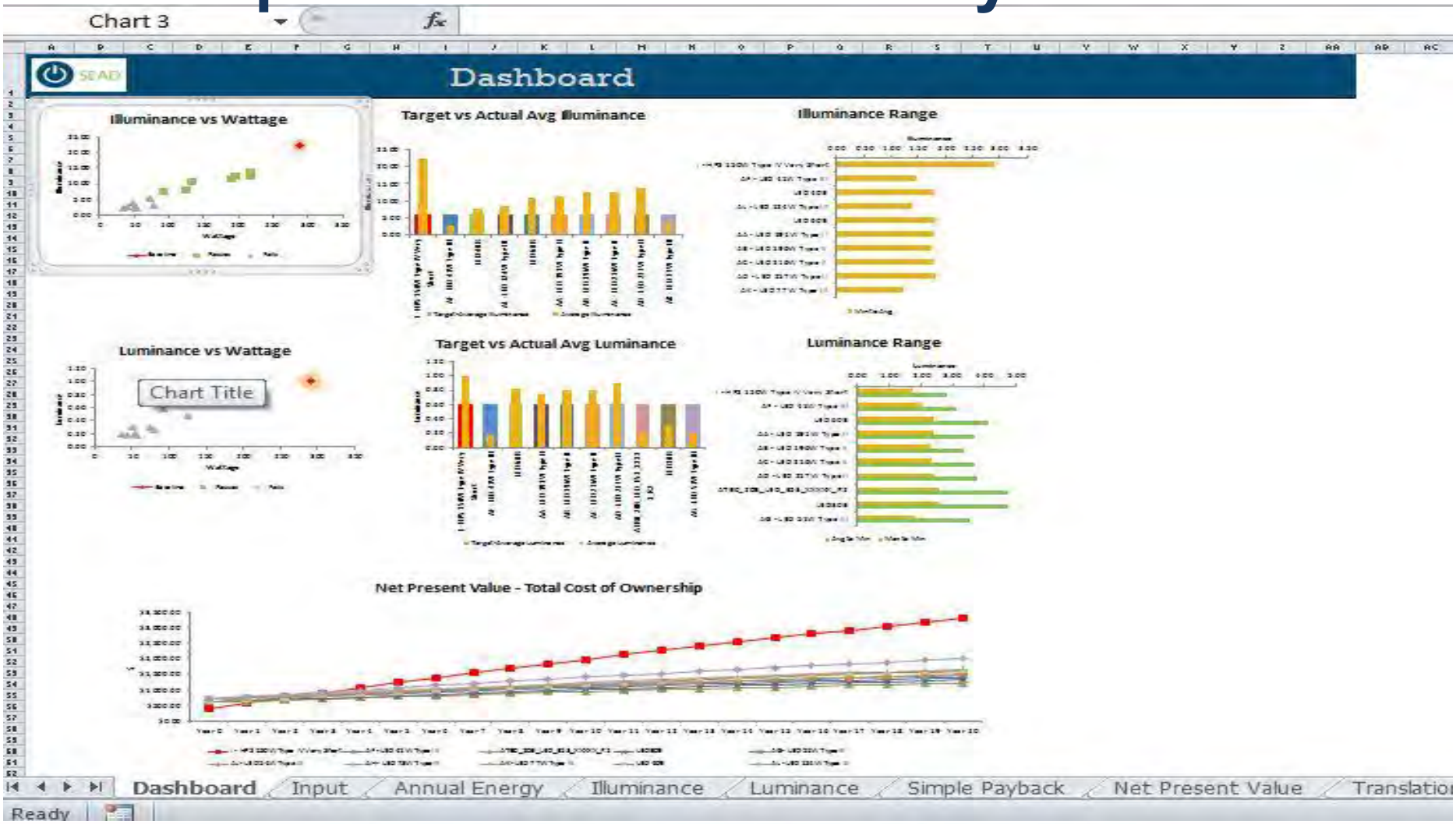
4. Cost Inputs

Optionally, users can enter high-level cost estimates for fixture installation, maintenance, etc. The tool returns **simple payback** compared to a baseline and **life cycle** net present value estimates.

5. SEAD Tool Analysis Results

Once inputs are confirmed, the SEAD Tool produces analysis of how well fixtures perform in terms of lighting quality, cost and energy efficiency criteria.

Snapshot: SEAD Tool Analysis Results



Sample Analysis
of an Ontario municipality

The Road Layout

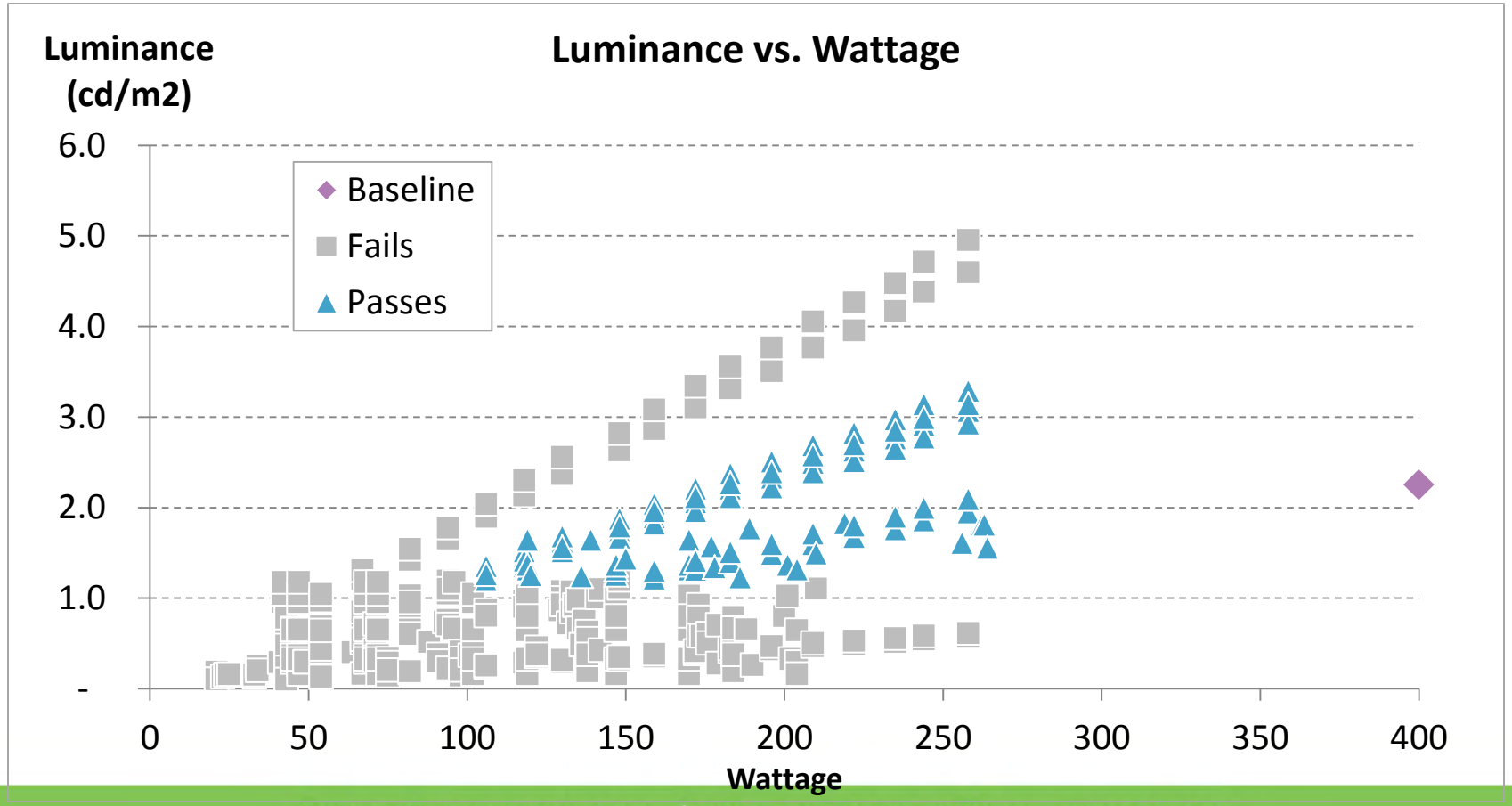
Typical 4-lane arterial road

Description:	Value	Units
Road Geometry		
Number of Lanes	4	lanes
Lane Width	2.7	meters
Shoulder Width	0	meters
Median Width	0	meters
Light Geometry:		
Pole Placement	Single-side	
Pole Height	10	meters
Pole Spacing	28	meters
Pole Setback	0.2	meters
Arm length	3	meters

Description:	Value	Units
Luminance Target		
Road Surface Type	R3	
Average Luminance Target (Lav)	1.2	cd/m2
Overall Uniformity (U0 - avg/min)	3	unitless
Fixture Data		
Lamp Lumen Depreciation	0.73	unitless
Luminaire Dirt Depreciation	0.88	unitless
Operating hours	4380	hours

Results

Analyzed performance for 300+ fixtures from 3 manufacturers



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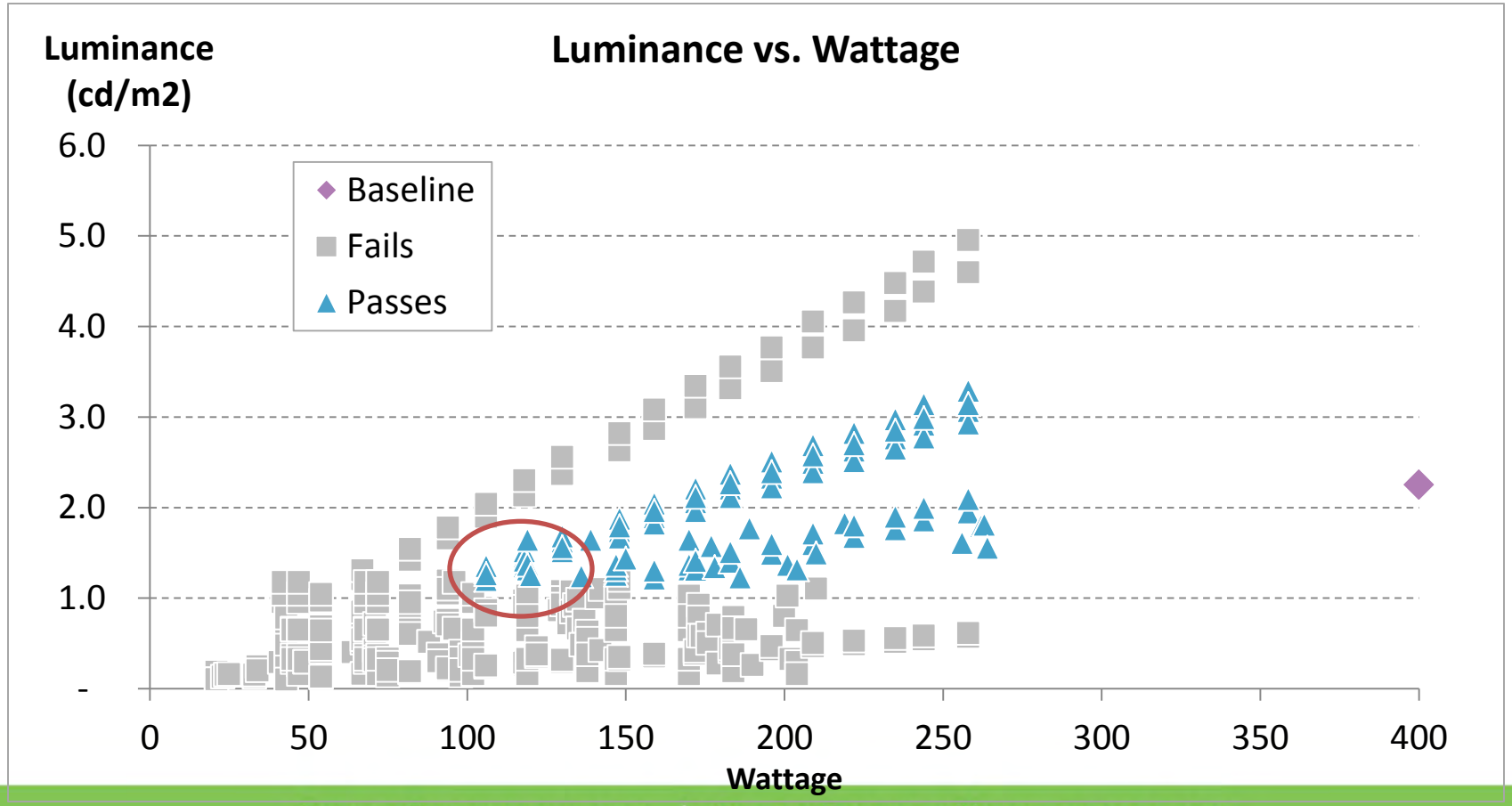
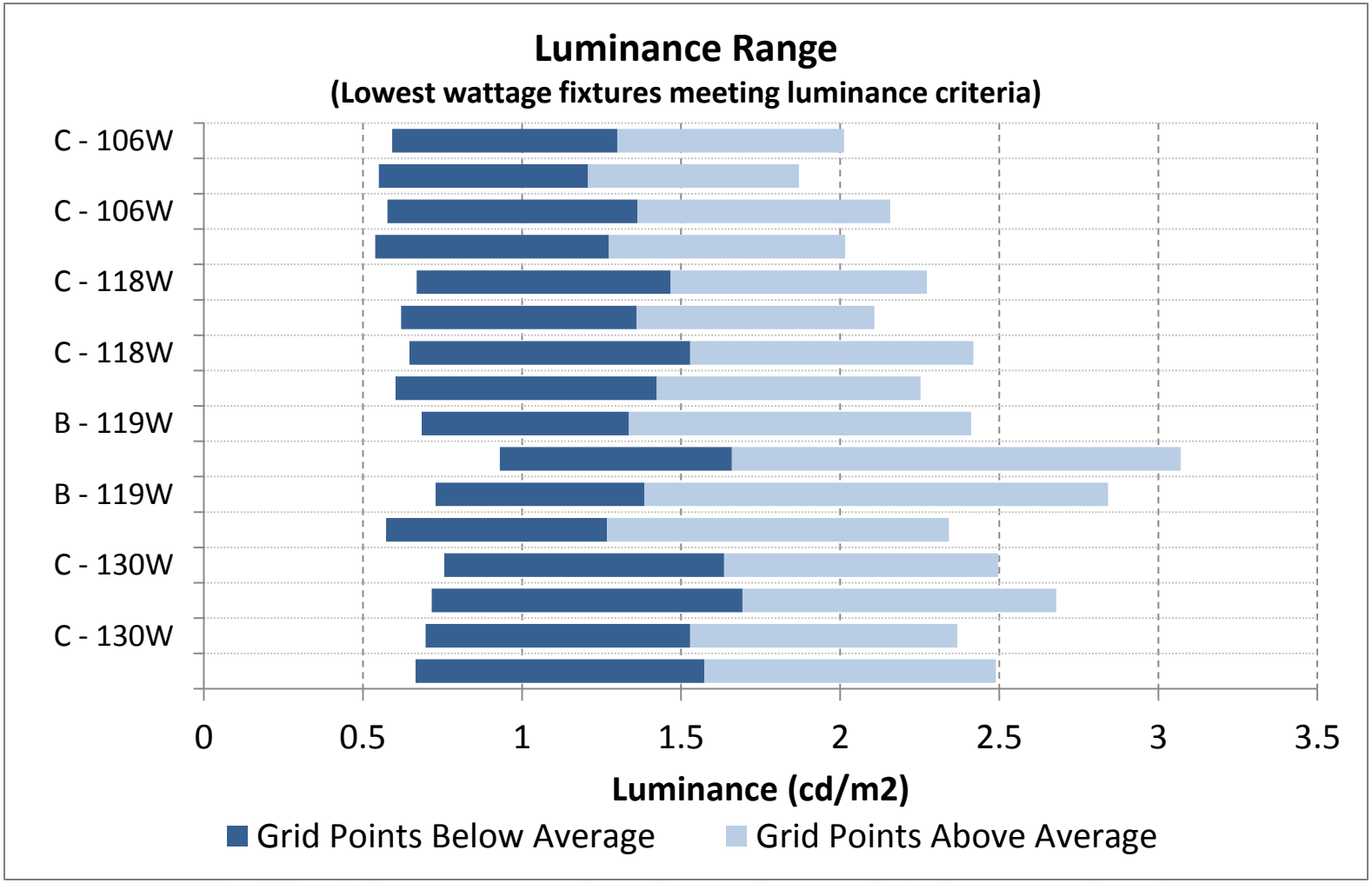


Results

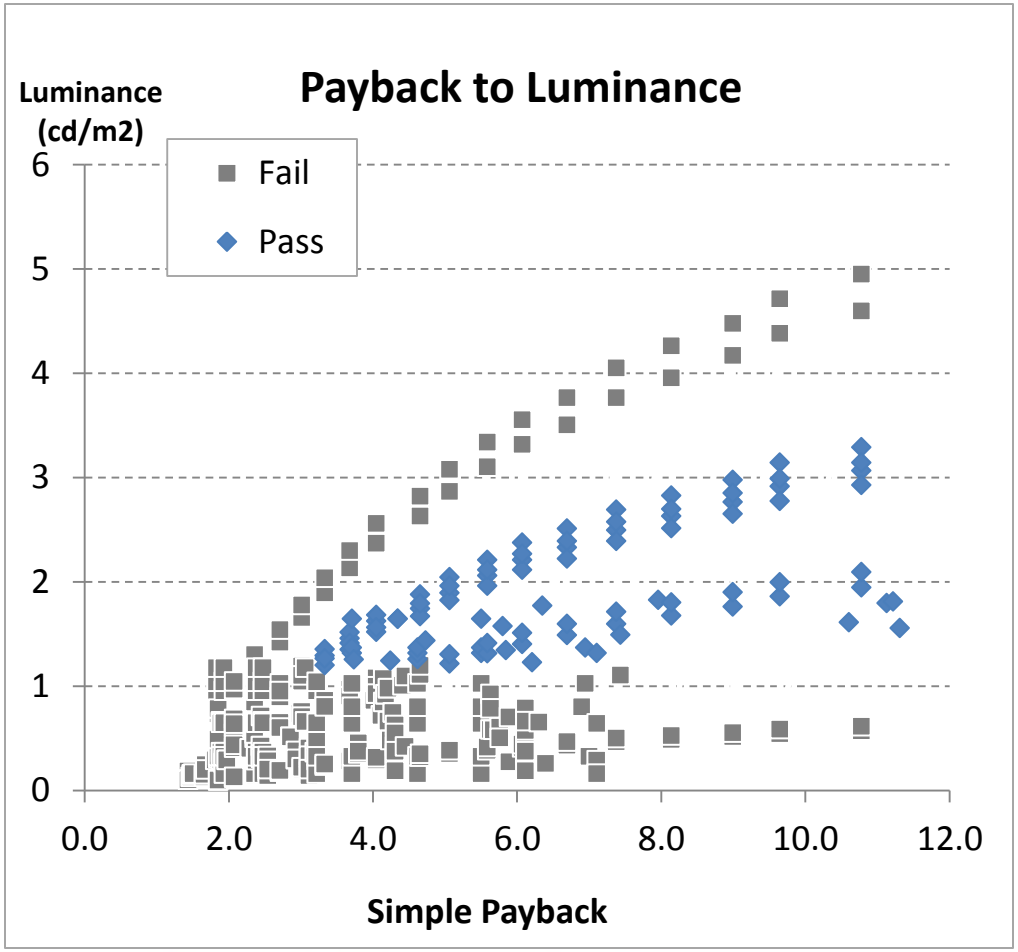

Luminance Range
(Lowest wattage fixtures meeting luminance criteria)
C - 106W
C - 106W
C - 118W
C - 118W
B - 119W
B - 119W
C - 130W
C - 130W
0
0.5
1
1.5
2
2.5
3
3.5
Luminance (cd/m2)
Grid Points Below Average
Grid Points Above Average

Sample Cost Analysis

Description:	Cost/Fixture
LED Fixture Cost*	$2.8/watt + $115
Installation Cost	$100
LED Maintenance Cost	$25
Baseline Maintenance Cost	$50
Energy Cost	$0.10 / kWh

Values are illustrative and approximate

*LED fixture cost equation calculated from a limited set of sample fixture costs and should not be used for actual analysis.



SEAD Tool and International Use

Standards	*The SEAD Tool can support both CIE and IES standards, which countries reference in national standards. Therefore, when looking to do a Street Lighting upgrade, any national standards can be used.*
Existing Road Conditions	*Users are able to input actual road layouts into the SEAD Tool making it applicable to any context. The SEAD tool can be used to compare existing road conditions to optimized layouts based on standards and best practices; and to select fixtures to optimize existing conditions in cases where road re-design is not feasible.*

SEAD Tool and International Use

India	*Working with local partners **BEE** (the Bureau of Energy Efficiency), **ICLEI** (Local Governments for Sustainability), and **ELCOMA** (Electric Lamp and Component Manufacturers Association) to train municipal officials to select the most EE luminaires using the SEAD Tool*
Armenia	*Working with **UNDP** to integrate use of the SEAD Tool into street lighting projects through their urban green cities program*
Mexico	*Collaborating with **CONUEE** (the National Commission for the Efficient Use of Energy) to use the SEAD Tool to evaluate retrofit projects for their national public lighting program*

Collaboration between SEAD and Mexico

- CONUEE promotes efficient use of energy in different sectors of the Mexican economy and population.
- In 2013-2014, CONUEE actively participated in translation and refinement of the SEAD Tool for its use by Mexican municipalities.

CONUEE is currently using the SEAD Tool in its National Project for Energy Efficiency in Public Lighting to verify that projects applying for public financing achieve 50% energy savings and comply with NOM-013-ENER-2013, the national standard that regulates illumination levels on streets and roadways.

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Download tool and user guides:
www.superefficient.org/sltool