

# The Role of Systems Engineering in Lawmaking

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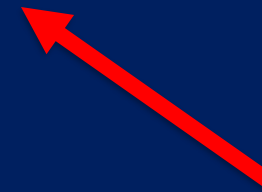
**EXPAND SCIENCE**

**TO ENCOMPASS**

**LAWS AND LAWMAKING**

**SCIENCE / ENGINEERING**

**NUCLEAR SCIENCE  
GENETICS ELECTRONICS  
ROCKETS PHARMACOLOGY  
AEROSPACE COMPUTERS  
MICROBIOLOGY...**



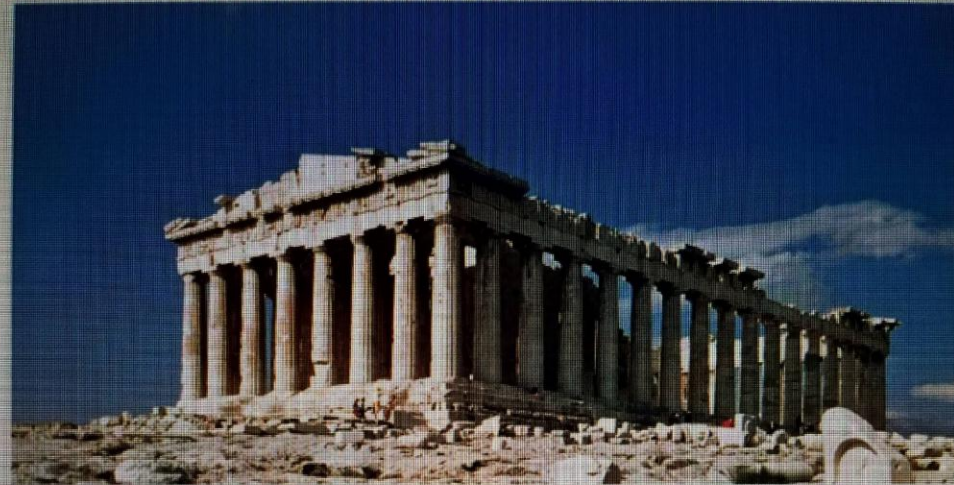
**LAWS**

**LAWMAKING**



# THE SCIENCE OF LAWS JOURNAL

- Excellence in Governance through Science -



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# THE END OF CHAOS

QUALITY LAWS AND THE  
ASCENDANCY OF DEMOCRACY



DAVID G. SCHRUNK

# DISCUSSION POINTS

- **Democracy**
- **Laws**
- **Traditional Lawmaking**
- **Problem Solution**
- **Science of Laws**

# DEMOCRACY

# **Democracy (~ 50% Governments)**

- **Sovereignty vested in Citizenry**
- **People control Government fbo People**

# Purpose of Democracy

- **Secure Rights and Liberty (Dec Ind...)**
- **Solve Problems\* that Degrade or Threaten to Degrade:**
  - **Human Rights**
  - **Living Standards**
  - **Quality of Life**

# Democratic vs Authoritarian Gov't

- **Democracy**
  - **Goal: Control Problems**
- **Authoritarian Government**
  - **Goal: Control People**

**GOVERNMENT  
MECHANISM FOR  
ACHIEVING GOALS?**

**LAWS**

**(Laws and Regulations)**

# LAWS OF GOVERNMENT

- **Human - Made**
- **Direct / Modify Behavior**
- **Consume / Divert Resources**
- **Produce Outcomes (+/-)**
- **Produce Side Effects**

# DESIRED PROPERTIES OF LAWS

- **Effective in Solving Problems**
- **Cost-efficient**
- **Non-intrusive**
- **Minimal Acceptable Side Effects**
- **User-friendly**
- **Positive Net Benefit to Public**

**CREATION OF LAWS**

**LEGISLATIVE BRANCH  
OF GOVERNMENT**

# LEGISLATURES

- **Traditional Method of Lawmaking**
- **Create, Amend, Repeal Laws**

# **TRADITIONAL LAWMAKING**

*Guidelines*  
FOR DRAFTING LEGISLATION

2014

House Bill Drafting Service  
*Florida House of Representatives*



# **TRADITIONAL LAWMAKING**

- **Begins With An Idea For A Law  
(Omits Problem Definition)**

# TRADITIONAL LAWMAKING

- **Idea Transcribed into Written  
Petition (Bill)**
- **Bill Submitted to Legislature**

# **TRADITIONAL LAWMAKING**

- **Legislature = Debate Bill, often  
Modifies with Amendments**
- **Legislature = Rejects Final Version  
of Bill or Enacts into Law**



# TRADITIONAL LAWMAKING

- **Variation of Socratic Method**
- **Not a Knowledge-Based Process**
- **Not a Problem-Solving Process**

# TRADITIONAL LAWMAKING

- **Lacks Requirements**
  - **Problem Definition, Design Expertise**
  - **Statement of Purpose, Priority**
  - **Sanction Modeling, Selection Process**
  - **Cost / Risk / Analyses**
  - **Basis in Knowledge**
  - **Validation (Follow-up Evaluation)**
  - **Certification of Law-Creators**

# **TRADITIONAL LAWMAKING**

**A Feed Forward Control  
System That Produces Laws**

# TRADITIONAL LAWMAKING



# TRADITIONAL LAWMAKING

- **MAKES LAWS**
  - **SUCCESSFUL IN PRODUCTION**
  - **10,000's... OF LAWS STATE GOV'TS**

**TRADITIONAL LAWMAKING**

**NO FOLLOW-UP VALIDATION:**

**GOVERNMENTS ARE**

**“FLYING BLIND”**

# TRADITIONAL LAWMAKING

Davies, Legislative Law and Process:

**“Once an act is passed, the legislature’s job is done.”**

# **TRADITIONAL LAWMAKING**

**WITHOUT FOLLOW-UP**

**UNKNOWN PERCENTAGE OF LAWS:**

- **USELESS, REDUNDANT**
- **HARMFUL, CONFLICTING**
- **OUTMODED, WASTEFUL**

# **RECORD OF FAILURE**

- **POVERTY, POLLUTION, CRIME**
- **ILLITERACY, DEBT, PRIVATION**
- **WAR, HOMELESSNESS...**

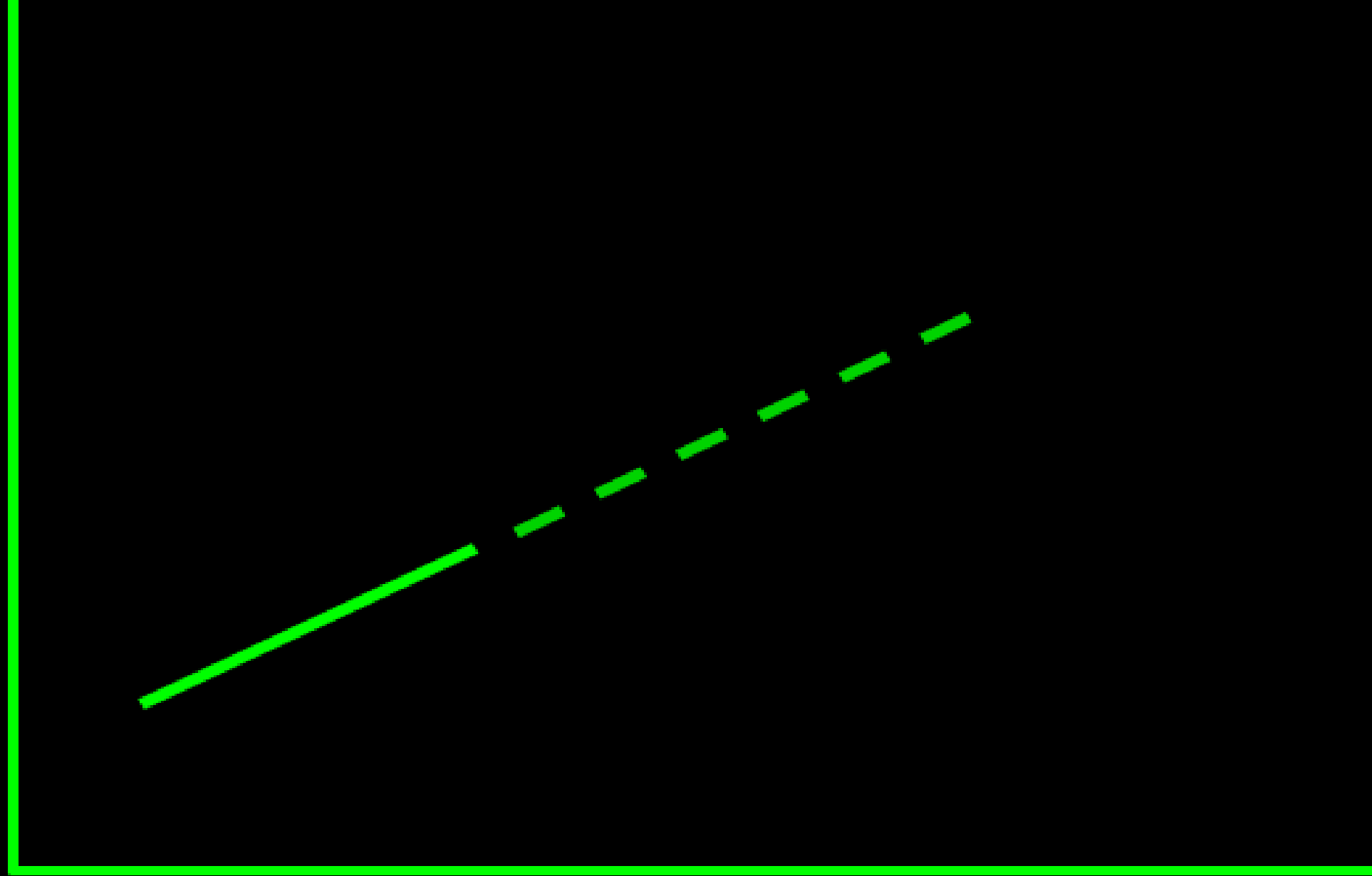
**TRADITIONAL LAWMAKING**

**LEGISLATIVE RESPONSE TO  
PERSISTENT PROBLEMS?**

**CREATE MORE LAWS**



**Size of  
Body of  
Laws**



**Time**



# **Over Production of Laws**

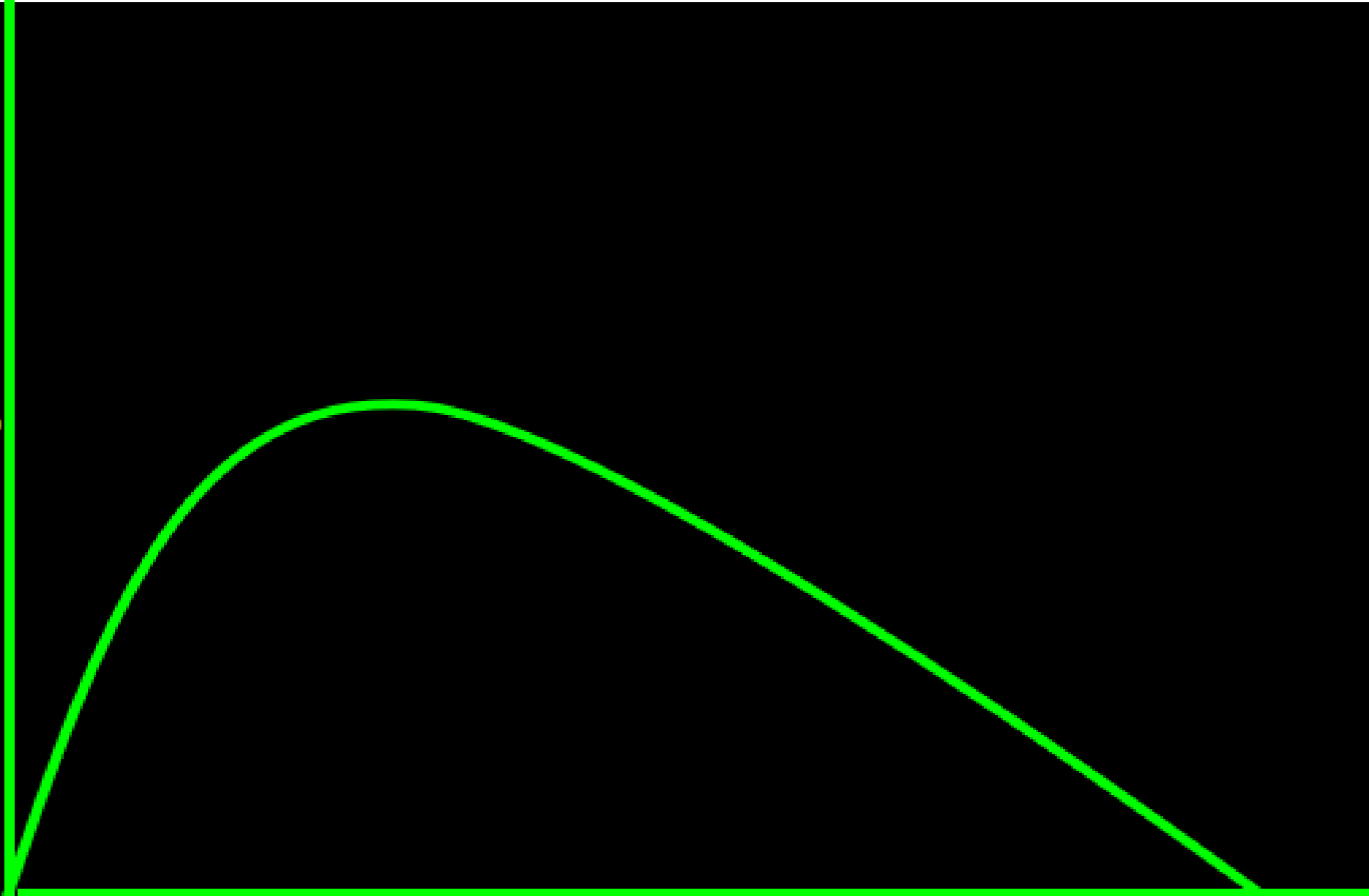
- **THREAT TO SOCIETAL WELLBEING**
  - **LAWS CONSUME INCREASING SHARE OF SOCIETAL RESOURCES**
  - **FEWER RESOURCES FOR PRODUCTIVE INDUSTRIES**

# Over Production of Laws

- **THREAT TO RULE OF LAW**
- **SELECTIVE ENFORCEMENT OF LAWS TRENDS TO AUTHORITARIAN GOVERNMENT (RULE OF MAN)**



**Usefulness  
of Laws**



**Number of Laws** →

# **TRADITIONAL LAWMAKING**

## **DEFECTS AND OMISSIONS:**

### **Threat to Democracy**

- **Unprincipled**
- **Incompetent**
- **Irresponsible**
- **Misdirected**

# **TRADITIONAL LAWMAKING**

**HOW TO CORRECT  
DEFECTS  
AND OMISSIONS?**

# **LAWMAKING CORRECTION**

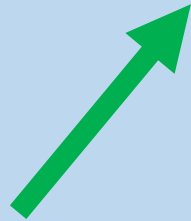
**Replace Tradition Method of Lawmaking  
(to make laws)**

**-- With --**

**Problem Solving Method  
(to solve problems\*)**

# Evolution of Lawmaking

**Problem Solving Method**



**Traditional Method of Lawmaking**

**PROBLEM SOLVING**

**METHOD**

# PROBLEM SOLVING METHOD

1. DEFINE PROBLEM, PRIORITIZE FOR SOLUTION
2. STATE OBJECTIVE (MEASURABLE)
3. MODELING / SIMULATION SOLUTIONS
4. COST / RISK ANALYSES / OPTIMIZATION
5. IMPLEMENTATION
6. VALIDATION, ..., RETIREMENT
7. DOCUMENTATION DATA / OUTCOMES

# **PROBLEM SOLVING METHOD FOR LAWMAKING IN DEMOCRACY**

- **REPLACES “MAKING LAWS” WITH “SOLVING PROBLEMS” AS THE GOAL OF LEGISLATURES**
- **MAJOR STEP FORWARD IN SATISFACTION OF THE PURPOSE OF DEMOCRACY**

# **Rationale For Law Standards**

- **Confirm Purpose of Lawmaking for Democratic Governments**
  - **Secure Rights and Liberty**
  - **Solve Societal Problems**
  - **Enable Pursuit of Happiness**

# Transition to Problem Solution

- **European EU Commission**
- **JAPAN (METI)**
- **MONGOLIA**

# EUROPEAN UNION

# **Lawmaking Purpose**

## **European EU Commission**

**The EU is committed to “human dignity, freedom, democracy, equality, the rule of law and respect for human rights.”**

# Lawmaking Standards



# Initial Standards

European Commission, “Better Regulation Guidelines” SWD (2021), European Union (EU), Brussels, 2021, on Guidelines of Impact Assessment of Regulations, the following guidelines / standards constitute “...a tool to...conduct analyses to inform policy design,” pages 31-32:

- 1. *What is the (societal) problem and why is it a problem?***
- 2. *Why should the EU act?***
- 3. *What should be achieved?***
- 4. *What are the options for achieving the objectives?***
- 5. *What are their economic, social and environmental impacts and who will be affected?***
- 6. *How do the options compare (effectiveness, efficiency and coherence)?***
- 7. *How will monitoring and subsequent evaluation be organised?***

**JAPAN**

# Lawmaking Standards

## Japan

(Ministry of Economy, Trade, and Industry)

### Governance Innovation

ver.2 (2021) “Agile Governance\*”

\*INCOSE Members contributing authors

# Lawmaking Standards

## GOVERNANCE INNOVATION

Ver.2

A Guide to Designing and Implementing Agile Governance



# Lawmaking Standards

## Japan “Agile Governance”

Page vii, on Liberty and the Pursuit of Happiness “...**liberty**” should continue to be positioned as an **"ultimate goal" of governance** ... to include "a state of being able to proactively choose, based on our individual values, the nature of technological influences under which we choose to **pursue our happiness**"

# Lawmaking Standards

## Japan “Agile Governance”

Page xii, on validation of laws and regulations, **“laws, regulations, standards, and guidelines should be continuously evaluated based on data, and improved from the standpoints of [1] whether they are able to achieve policy goals that were defined at the outset, and [2] whether policy goals need to be revised to address changes in social conditions.”**

# MONGOLIA

# Founding Principles

## Mongolia Constitution (1992)

**Chapter One**, Article Three: State power is vested in the people of Mongolia. (**The definition of democracy**)

**Chapter Two** specifies the **civil, political and inalienable rights of the individual**: freedom of speech, of religion, of expression, of the press, the right to vote, equality before the law, the right to government-provided health care, education and intellectual property...

# Mongolia Legislature

## Legislation Enacted, 2016:

**“APPROVAL OF METHODOLOGY,”** Decision of the Government of Mongolia. Number 59, Ulaanbaatar City, January 25, 2016, “Based on Article 12.1 of the Law on Legislation the government of Mongolia passed legislation that **requires the legislature to observe quality standards for the creation, evaluation, improvement, and retirement of laws, and that the purpose of laws is to secure rights and liberty of the people.**”

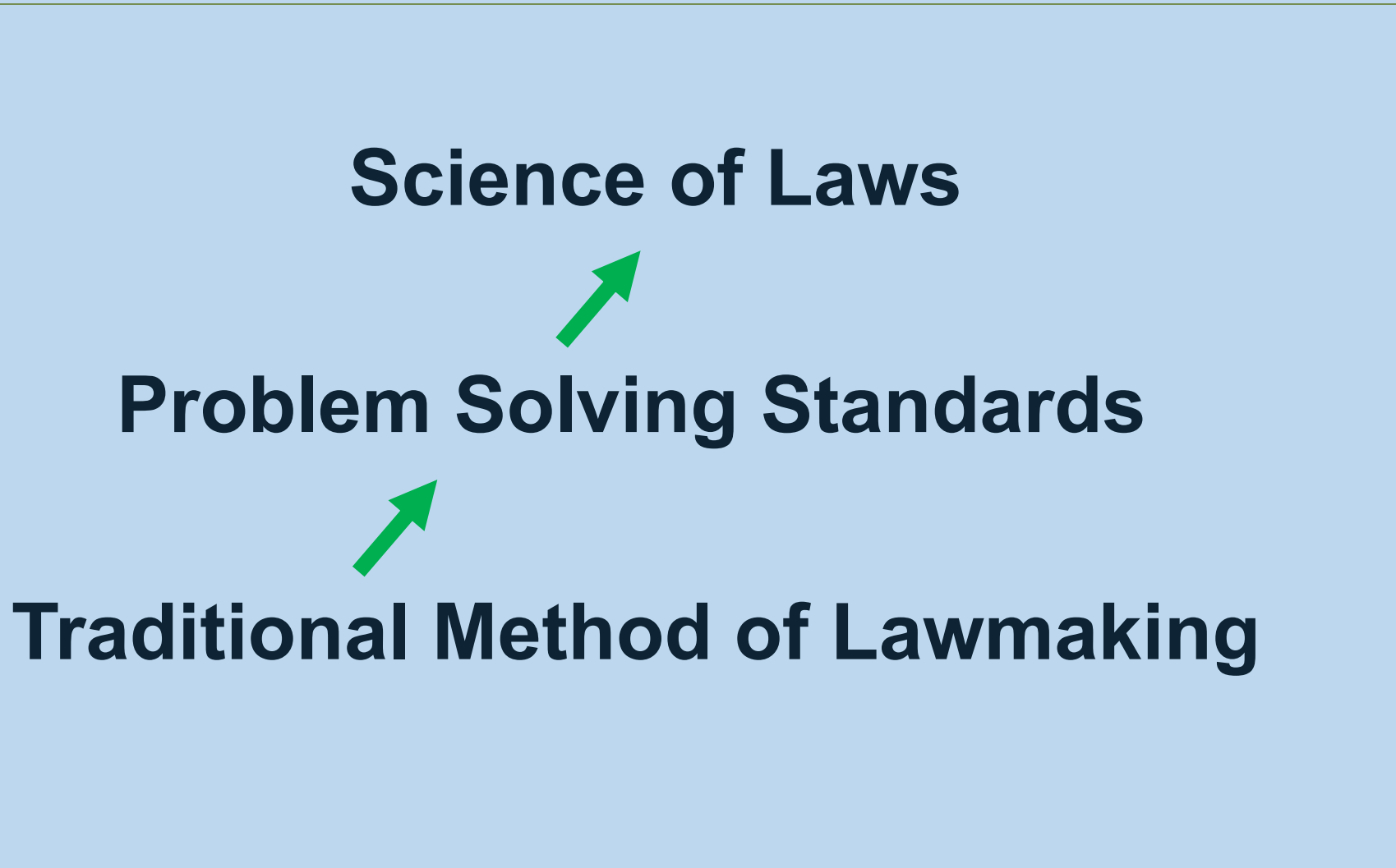
# **NEXT STEP**

**Continuing Evolution of Lawmaking**

**From Standards To Science:**

**The Science of Laws and Systems of Laws**

# Evolution of Lawmaking



# **RATIONALE FOR A NEW SCIENCE**

- **EVERY SCIENCE IS A SUCCESS**  
**(Rule of Science)**
- **EVERY ENGINEERING DISCIPLINE**  
**IS A SUCCESS**  
**(Rule of Engineering)**

# **THE SCIENCE OF LAWS**

**NEED TO DEVELOP AN  
ENTIRELY NEW SCIENCE?**

**NO – NOT NECESSARY**

# **THE SCIENCE OF LAWS**

**A FIELD OF SYSTEMS SCIENCE**

**FOR LAWS AND LAWMAKING**

**ALREADY EXISTS:**

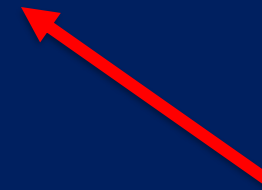
**SYSTEMS ENGINEERING**

# **SYSTEMS ENGINEERING**

**Eminently Suited to the Creation  
and Validation of Laws and  
Systems of Laws that Satisfy  
the Purpose of Democracy**

SCIENCE / ENGINEERING

NUCLEAR SCIENCE  
GENETICS ELECTRONICS  
ROCKETS PHARMACOLOGY  
AEROSPACE COMPUTERS  
MICROBIOLOGY...



**LAWS**

**LAWMAKING**

# **SYSTEMS ENGINEERING OF LAWS**

**Initial Step: SELAW**

# SELAW

## **SYSTEMS ENGINEERING AND LAWMAKING WORKING GROUP**

ORGANIZED: May 2022

GOAL: Explore the utility of applying Systems

Engineering to Laws and Lawmaking, of Science-  
Directed Lawmaking

# SELAW

- **Monthly meetings**
- **Research divided into eight subgroups**
- **Engage other WG's (Smart Cities, Social Studies  
Risk Mitigation...)**

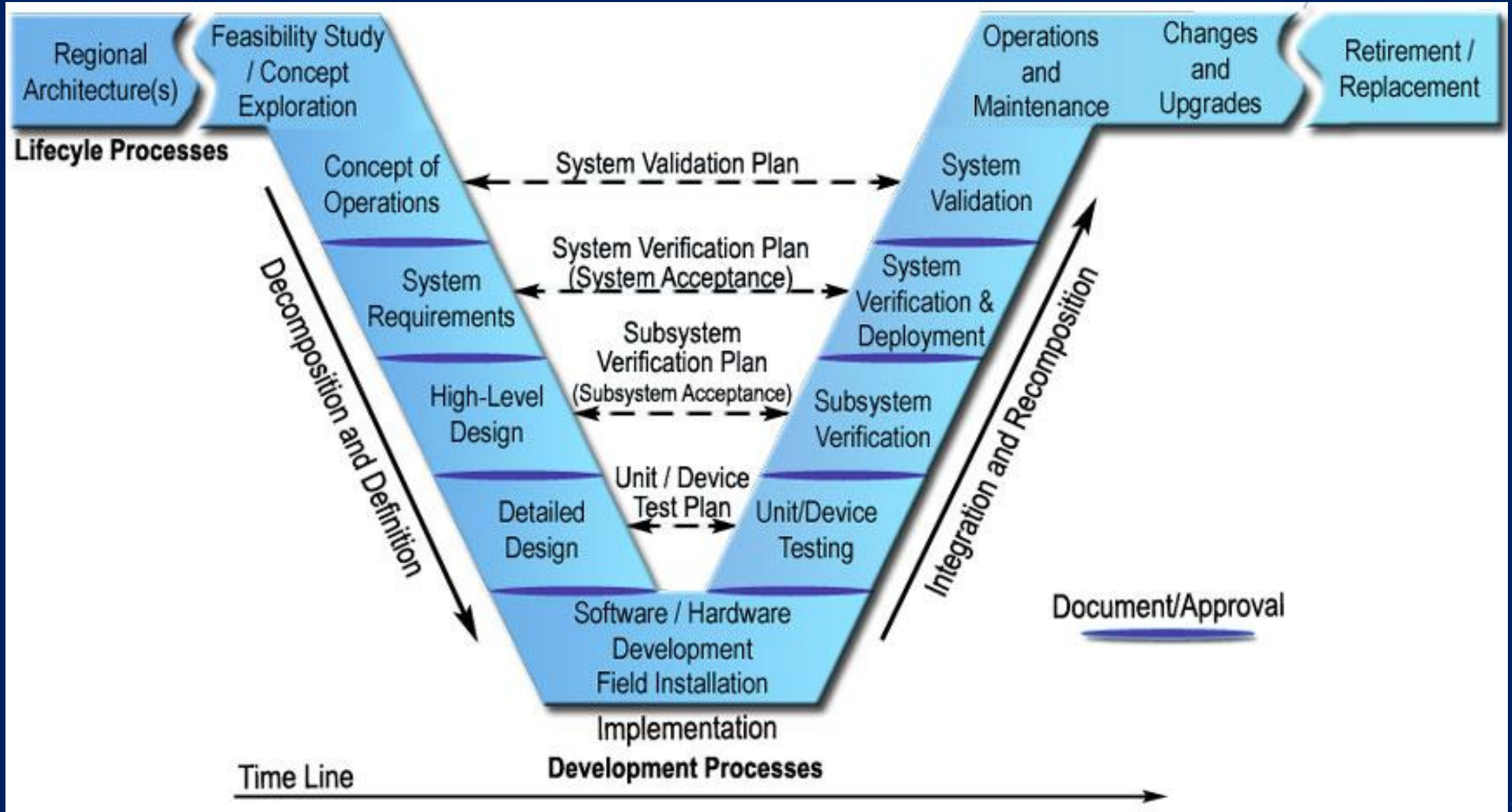
# SELAW Subgroups

1. Document the **defects and omissions** in traditional lawmaking
2. Derive **law design standards** based on systems engineering principles (e.g., the IEEE-15288)
3. Create **models of sanctions** (fine, tax, tariff, subsidy...)
4. Create a **comprehensive cost model** for laws

# SELAW Subgroups

5. Creation of **risk-assessment models** for laws
6. Create standards for the periodic **follow-up evaluation, validation, and documentation** of the structure and outcomes of existing laws (**science of laws**)
7. Establish **credentials for designers** (drafters) of law-design
8. Create and **publish** an **SE Law-creation Manual**

# FUTURE OF LAWMAKING



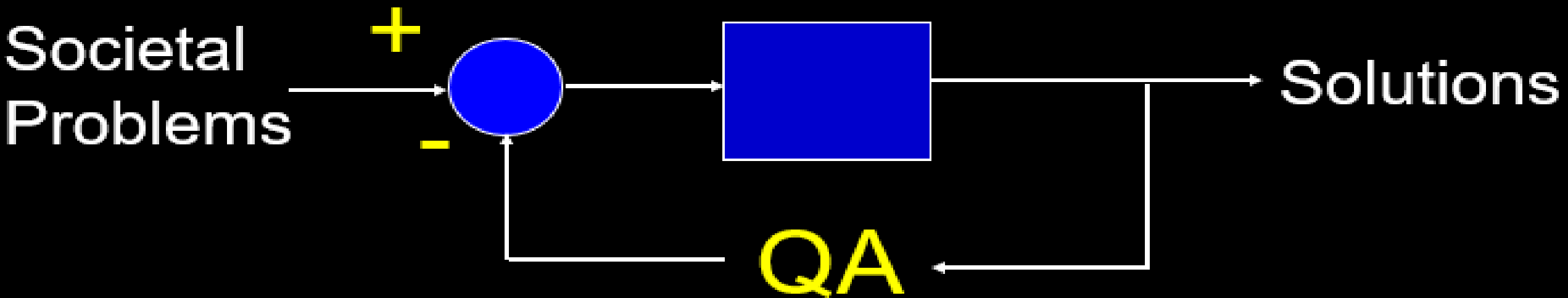
**SCIENCE DIRECTED LAWMAKING**

**TRANSFORM LAWMAKING**

**INTO A PROBLEM – SOLVING**

**FEEDBACK CONTROL SYSTEM**

# SE - DIRECTED LAWMAKING



“Weed Out” Non - Productive Laws

# SCIENCE DIRECTED LAWMAKING

**Conduct Periodic Verification and Validation (QA) of every law:**

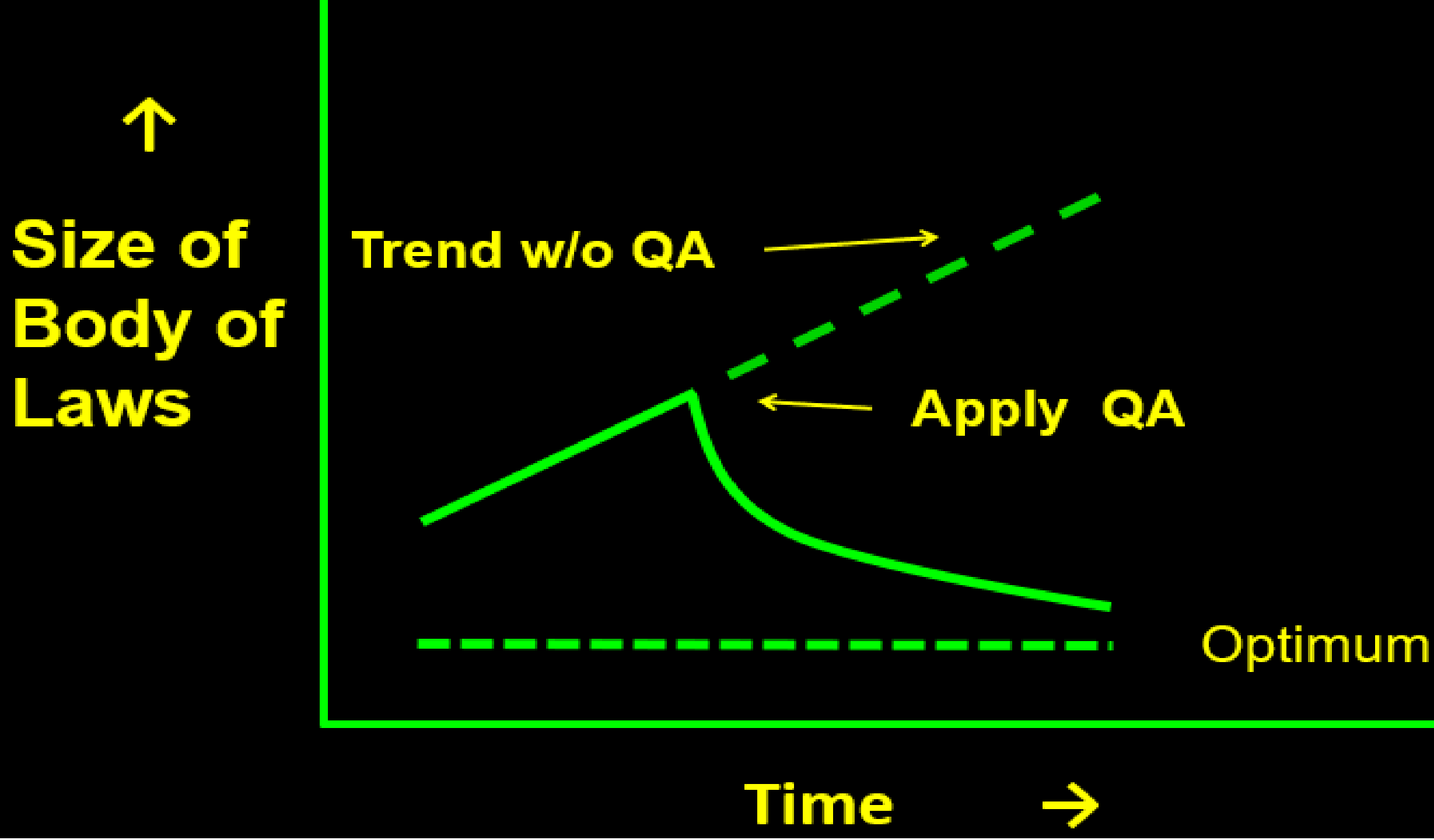
- Repeal of less-than-successful laws
- Ever-improving performance of the rule of law

# QA: Repeal of Laws

- address problems that have not been defined
- address problems that no longer exist
- address more than one problem (omnibus)
- lack a stated, measurable problem-solving goal
- are not enforced
- violate human rights
- are overly vague or complex
- fail to achieve their problem-solving purpose

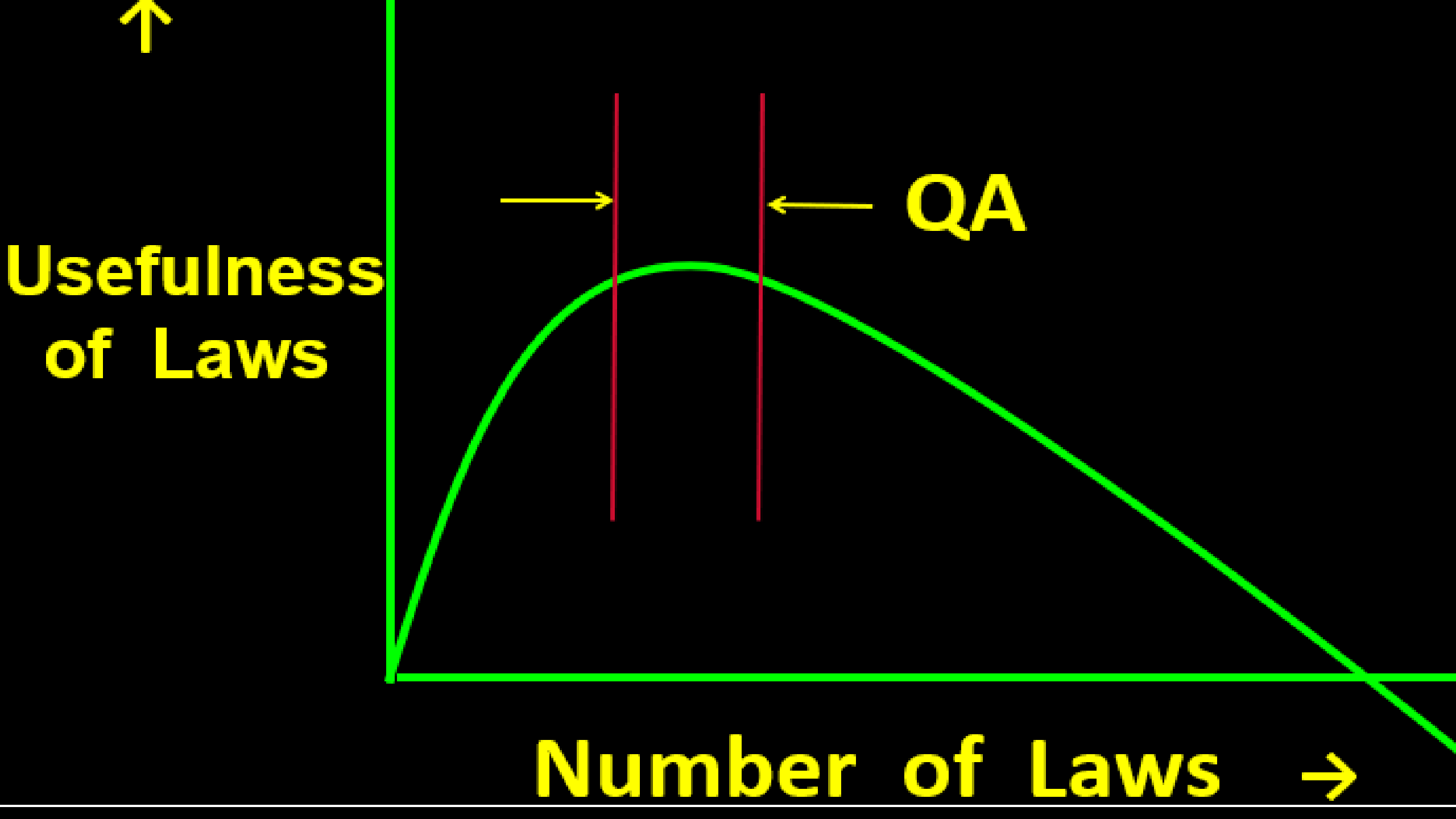
# QA: Repeal of Laws

- lack a citation of relevant references and data bases
- whose burdens are greater than / equal to their benefit
- whose results cannot be accurately measured
- interfere with other laws
- duplicate other laws
- have not been signed by their designer(s)
- have not undergone QA analysis within a specified time frame, e.g., ten years



# RESULTS -- FEEDBACK CONTROL

- Threat of Arbitrary Rule Reduced
- Rule of Law Maintained Optimum Level



# RESULTS -- FEEDBACK CONTROL

Each Cycle = Quality Improvement

Lawmaking Self-Correcting in the  
Direction of Optimum Outcomes and  
Performance of the Rule of Law

↑  
**Efficacy  
Of Useful  
Products**

X



**Cycles of QD / QA / QI →**

# SCIENCE DIRECTED LAWMAKING

## Continual Growth of Scientific Knowledge

- The structure and mechanics of laws
- Engineering methodologies and best practices of law creation and validation

# SIGNIFICANCE OF LAW-SCIENCE

## Scientific Knowledge of Law Outcomes

<b>← LAW CAUSATION →</b>		
<b>Limitations, Abuse</b>	<b>HUMAN RIGHTS</b>	<b>Secure</b>
<b>Poverty, Privation Unstable Currency</b>	<b>LIVING STANDARDS</b>	<b>Affluence Stable Currency</b>
<b>War Crime Pollution Resource Mismanagement</b>	<b>QUALITY OF LIFE</b>	<b>Peace Security Clean Environment Competent Management</b>

# CONCLUSION

# SCIENCE OF LAWS AND SCIENCE-DIRECTED LAWMAKING

- Improvement in the Rule of Law
- Enable Ascendancy of Democracy

**THANK YOU**

